

THE COMPANY

55

Years



Sabro

Technological Research HVAC Solutions

TRUST the AIRXperts

AWC

Air-Cooled Package Water Chillers





PAGE #



C O N T E N T S

● Introduction	01
● Equipment Features	02
● Component Details	04
● Safety Devices	05
● Optional Accessories	06
● Nomenclature	07
● Physical Data	08
● Cooling Performance Data	10
● Capacity Correction Factors	12
● Electrical Data	13
● Dimensional Data	14
● Notes	21
● Units Conversion Chart	22



Also Available with Environmental
Friendly Refrigerant
(R-407C)+DC INVERTER

Sabro
HVAC Solutions





Introduction

SABRO Air-cooled Packaged Water Chillers are complete, Self-Contained automatic refrigerating units. Every unit is completely assembled, factory wired, charged and tested, dispatched ready for immediate installation.

The electrical control center includes all safety and operating controls necessary for dependable operations, with easy access for maintenance, adjustment and servicing, air-cooled packaged water chillers can adequately serve the needs of various commercial/industrial applications.

AWC Models are provided with **single/multiple compressors & refrigeration circuits**, manufactured in a wide range with 'the customer friendly' engineering approach.

These units are also available with reverse cycle arrangement for hot water heating in winter season.

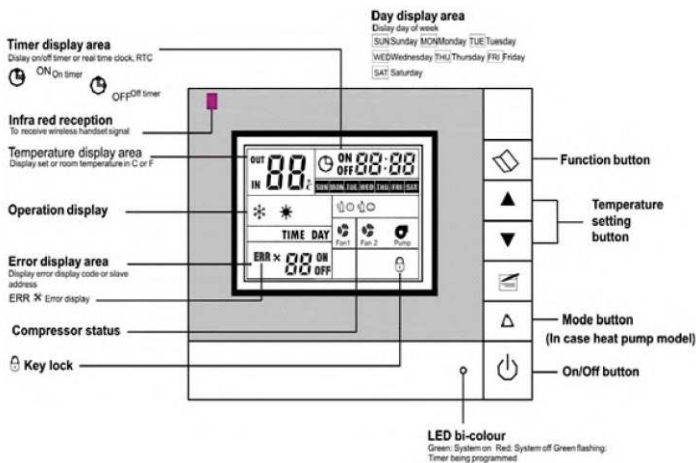


Equipment Features



Performance and Technical Features

- Highly efficient/reliable hermetic scroll/semi-hermetic(reciprocating) compressors.
- Specially designed to operate in diverse tropical conditions, most of the models have multiple compressors with individual refrigerant circuits, all equipped with necessary safety devices for smooth and reliable operations.
- Multi compressors unit is provided with step thermostat.
- Acrylic coated aluminium foil fins (optional) for installation at seal line areas.
- Economical and energy efficient in operations.
- The units are passed through rigorous in-house testing which guarantees smooth and efficient operations at installation sites.
- The unit is equipped with current over-load protections as well the other refrigeration, electronics/electrical/mechanical safety devices.
- Fan motors are totally enclosed, weather proof type having class F insulation along with IP-55 protection.
- The unit is provided with micro-processor based electronic digital thermostat that is an intelligent programmable temperature control device.





Equipment Features(Cont'd..)

Sabro Air-cooled Pasckage Chillers Are..

Designed to help you create a better environment now and for the future, providing increased energy efficiency, improved performance with lower sound-levels and when it comes to the refrigerant, Sabro really does leave you free to select an environment friendly air cooled chiller without compromising either capacity or efficiency.

- All in one package.
- Single point electrical connections.
- Units can be handled conveniently and flexibly thus saving installation cost & installation space.

Factory charged environment friendly refrigerant R-407(optional)



Component Details



Casing Material

Units are made from Galvanized steel sheets, degreased, de-rusted, phosphate coated and finished electro statically with powder paint which is then baked. This results in excellent corrosion resistance ensuring longer life of the units.

Compressor

Sabro has always placed sole reliance on copeland^{®/TM} compressors, one of the most well reputed and reliable manufactures in the world. ALL AWC units consist of hermetic scrolls or semi hermetic reciprocating compressors, with completely independent refrigerant circuits.

Refrigerant Control

Units are equipped with thermostatic expansion valve to control the flow of refrigerant through evaporator shells of chiller.

Electronic Digital Thermostat

An intelligent programmable temperature control device. The thermostat is designed to perform function setting, time setting, security protection, failure error display and other various functions deeming essential for optimum performance.

Condenser Fan and Motor

Propeller type (direct driven) fans constructed from heavy gauge aluminium are directly mounted on the shaft of condenser fan motors. The fan motor is enclosed with class F insulation and IP-55 protection.

Chiller Shell

The evaporator is shell and tube direct expansion type (refrigerant in copper tubes and water in enclosed MS shell). The shell is made of MS seamless pipe & bundle of tubes is made of expanded "U" copper tubes. The refrigerant side is tested at 225 Psig pressure and water side is tested at 100 Psig pressure. The shell is insulated with closed cell high grade thermal break insulation.

Condenser Coil

The condenser coil is made up of seamless copper tubes and aluminium foil fins. The tubes are mechanically expanded to ensure rigid contact with fins for greater heat transfer rate. These coils are tested under water with nitrogen gas at a gauge pressure of 450 Psig against leakage.

Electric Control Panel

It consists of contactors, thermal overload relays, time delay relay and fuses etc. The control panel can be provided for remote installation in the field on request. Field wiring will be required to carry out with remote control installation.



Safety Devices

Compressor Internal Protector

Protects the compressor motor winding from overheating.

Power Monitor

Monitors voltage fluctuations. It stops the unit from operating at high /low voltage or wrong phase sequence/phase reversal.

Compressor Over-Load Relay

Protects the compressor fan motor by switching it OFF at higher than required current.

Condenser Fan Motor Over-Load Relay

Protects the condenser fan motor by switching it OFF at higher than required current.

High & Low Pressure Cut-out Switches

These switches are used to protect the compressor from any damage due to abnormal suction/discharge pressures.

Oil Protection Switch

Protects the compressor from any damage due to lack of lubrication. (Only In Semi-hermetic Compressors)

Flow Switch

It stops the unit, to protect it from any damage due to lack of water flow.

Optional Accessories



Pressure Gauge

Visual representation, depicting compressor's operating conditions, using high and low refrigerant pressure and oil pr. gauges (with semi-hermetic compressors).

Acrylic Protective coating

On condenser coils, a protective coating of acrylic resin is used to prolong its life, specifically in sea line areas.

Low Ambient Control

L.A.C is used to keep the compressor discharge pressure within operating limits.

Micro-Processor Control

Computes logic to operate and monitor the unit, maintaining precise control of temperature and humidity.

Capacity Head Controller

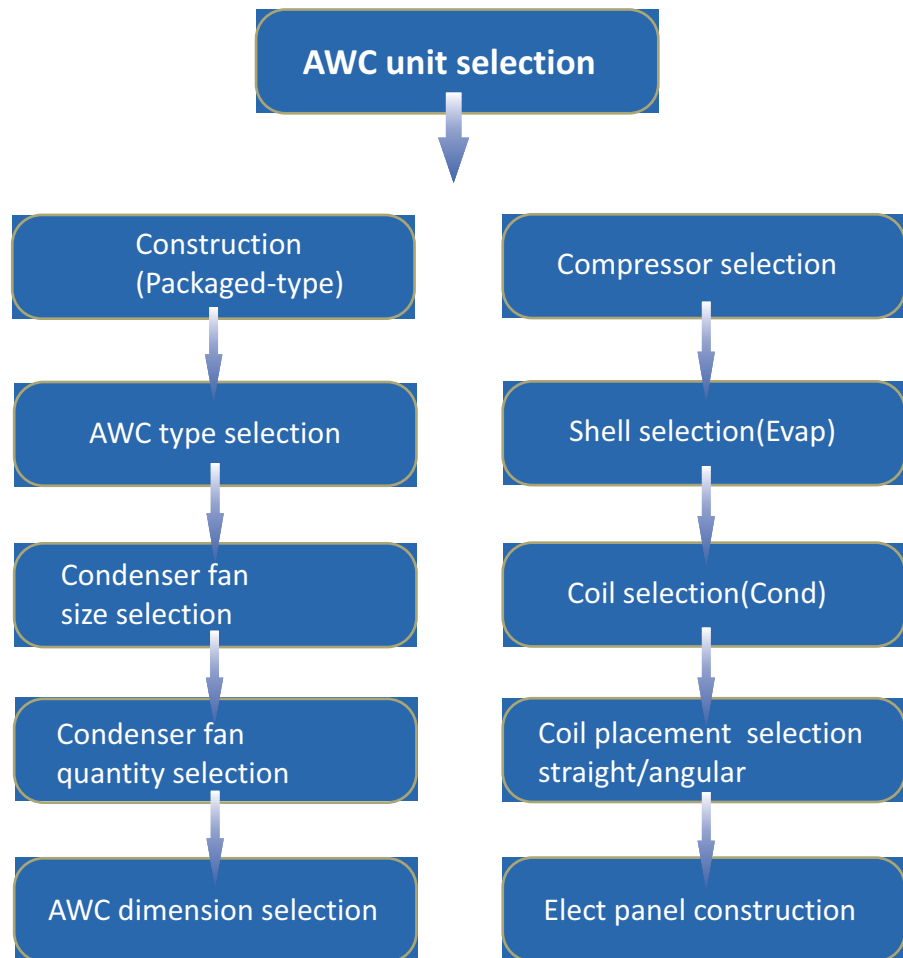
Controls system automatically by adjusting the compressor's pumping capacity (Only with semi-hermetic compressors) balancing the cooling load and permitting the compressor to start under partial load.

Hot Water Heating

Reverse cycle arrangement is also available on requirement, for producing hot water for winter season.



Nomenclature



Physical Data



MODELS		AWC 040S	AWC 050S	AWC 060S	AWC 080D	AWC 100D	AWC 120D	AWC 160S	AWC 160D	AWC 200D	AWC 200Q
Nominal Cooling Capacity	BTU/hr	32500	45000	51000	65000	90000	102000	130000	131000	179600	180000
	Kcal/hr	8195	11347	12860	16391	22695	25721	32781	33034	45289	45390
	KW	9.52	13.19	14.95	19.05	26.38	29.89	38.09	38.39	52.64	52.75
Refrigerant Circuit	Qty	1	1	1	2	2	2	1	2	2	4
Compressor	Type	Hermetic Scroll									
	Qty	1	1	1	2	2	2	1	2	2	4
	Nominal H.P	4	5	6	4	5	6	16	8	10	5
Evaporator Cooler	Type	MS Shell and Removable Expanded U - Tube Bundle									
Evaporator Water Flow Rate	US GPM	6.5	9	10.2	13	18	20.4	26	26.20	35.92	36
	Liter /sec	0.41	0.568	0.644	0.82	1.136	1.287	1.64	1.653	2.266	2.271
Cooler Water Connection	Inlet	1"		1-1/4"			1-1/2"			2"	1-1/2" x 2
	Outlet	1"		1-1/4"			1-1/2"			2"	1-1/2" x 2
Cooler Insulation	Type	Pre - expanded high grade thermal break insulation									
Condenser Coil	Type	Air Cooled – Made of Copper tube mechanically expanded to Aluminum foil fins									
Condenser Fan	Type	Propeller Type Direct Driven									
	Qty	2		1	1				2		
	Motor HP	1/6		1/2	3/4				3/4		
Power Supply	380~415V , 3 - Phase, 50Hz+N										
Refrigerant	R - 22 – Factory Charged										
Refrigerant Flow Control	Thermostatic Expansion Valve										
Safety Devices	Power Monitor, Over-load current relay for each compressor and condenser fan motor, High & Low Pressure cutout for each compressor, Freeze up protection and Compressor internal protector etc										
Overall Dimensions MM(Inch)	Height	1219(48")		1219(48")	1219(48")			1313(51.7")		1577(62")	1625(64")
	Width	1219(48")		1321(52")		1524(60")		1575(62")		2134(84")	1727(68")
	Depth	559(22")		914(36")	914(36")		1016(40")			1016(40")	1795(70.7")
Weight (Approx)	Kg	250	270	290	320	450	500	550	570	820	1000
MODELS		AWC 240Q	AWC 240D	AWC 260D	AWC 320D	AWC 370D	AWC 420D	AWC 500D	AWC 640D	AWC 700D	AWC 800D
Nominal Cooling Capacity	BTU/hr	204000	204500	219800	260000	302100	350000	408300	533750	540000	590000
	Kcal/hr	51442	51568	55426	65563	76179	88258	102959	134593	136169	148777
	KW	59.78	59.93	64.42	76.20	88.54	102.60	119.66	156.39	158.43	172.91
Refrigerant Circuit	Qty	4	2								
Compressor	Type	Hermetic Scroll								S.H Reciprocating	
	Qty	4	2								
	Nominal H.P	6	12	10+16	16	16+21	21	25	32	35	40
Evaporator Cooler	Type	MS Shell and Removable Expanded U -Tube Bundle									
Evaporator water flow rate	US GPM	40.80	40.90	43.96	52.00	60.42	70.00	81.66	106.75	108.00	118.00
	Liter /sec	2.574	2.580	2.776	3.280	3.812	4.416	5.152	6.735	6.814	7.445
Cooler Water connect on	Inlet	1-1/2" x 2	2"			2-1/2"			3"		
	Outlet	1-1/2" x 2	2"			2-1/2"			3"		
Cooler Insulat on	Type	Pre - expanded high grade thermal break insulation									
Condenser Coil	Type	Air Cooled – Made of Copper tube mechanically expanded to Aluminium foil fins									
Condenser Fan	Type	Propeller Type Direct Driven									
	Qty	2	3			4			8		
	Motor HP	3/4									
Power Supply	380~415V , 3 - Phase, 50Hz+N										
Refrigerant	R - 22 – Factory Charged										
Refrigerant Flow Control	Thermostatic Expansion Valve										
Safety Devices	Power Monitor, Over-load current relay for each compressor and condenser fan motor, High & Low Pressure cutout for each compressor, Freeze up protection and Compressor internal protector etc										
Overall Dimensions MM(Inch)	Height	1625(64")	1577(62")	1777(62")			2087 (82.2")	2218 (87.32")		22 18(87.32")	
	Width	1727(68")	2134(84")	2388(84")			2286 (90")	2845 (112")		3353(132")	
	Depth	1795(70.7")	1016(40")	1016(40")			1778(70")	1727(68")		1727(68")	
Weight (Approx)	Kg	1000	1080	1250	1260	1310	1420	1500	1700	1850	1950

Notes at next page

MODELS		AWC 1050T	AWC 1200T	AWC 1280Q	AWC 1400Q	AWC 1600Q	AWC 1920H	AWC 2100H	AWC 2400H
Nominal Cooling Capacity	BTU/hr	810000	885000	1067500	1080000	1180000	1601250	1620000	1770000
	Kcal/hr	204253	223165	269185	272337	297554	403778	408506	446331
	KW	237.39	259.37	312.85	316.52	345.82	469.28	474.77	518.73
Refrigerant Circuit	Qty	3		4			6		
Compressor	Type	Semi Hermetic Reciprocating		Scroll	Semi Hermetic Reciprocating		Scroll	Semi Hermetic Reciprocating	
	Qty	3		4			6		
	Nominal H.P	35	40	32	35	40	32	35	40
Evaporator Cooler	Type	MS Shell and Removable Expanded U-Tube							
Evaporator Water Flow Rate	US GPM	162	177	213.5	216	236	320.3	324	354
	Liter /sec	10.220	11.167	13.500	13.627	14.889	20.189	20.441	22.334
Cooler Water Connection	Inlet	4"		3" x 2			3" x 3		
	Outlet	4"		3" x 2			3" x 3		
Cooler Insulation	Type	1" thick high grade thermal break insulation							
Condenser Coil	Type	Air Cooled – Made of Copper tube mechanically expanded to Aluminium foil fins							
Condenser Fan	Type	Propeller Type Direct Driven							
	Qty	18		24			36		
	Motor HP	3/4							
Power Supply		380~415V , 3- Phase, 50Hz +N							
Refrigerant		R-22 Factory Charged							
Refrigerant Flow Control		Thermostatic Expansion Valve							
Safety Devices		Power Monitor, Over-load current Relay for each Compressor and Motor, High & Low Pressure cutout for each compressor, freeze up protect on and compressor internal protector etc							
Overall Dimensions MM (Inch)	Height	2333 (91.85")		2333 (91.85")			2305 (90.75")		
	Width	5025 (197.8")		4394 (173")			6350(250")		
	Depth	2588 (101.9")		3496 (137.6")			4191(165")		
Weight	Kg	2400	2900	3500	3700	4100	4250	5000	6000

Nominal cooling capacities are based on following conditions;

Cooler entering water temperature 12.7° C (55° F)

Cooler leaving water temperature 7.2° C (45° F)

Condenser entering air temperature (ambient) 35° C (95° F)

Fouling factor 0.0005, BTU/hr/sqf/°F

Cooling Performance Data



Models	Leaving Chilled Water Temp °F	CONDENSER ENTERING AIR TEMPERATURE °F DB														
		85			95			105			115			125		
		COOLING CAPACITY														
	TH	GPM	KW	TH	GPM	KW	TH	GPM	KW	TH	GPM	KW	TH	GPM	KW	
AWC 040S	42	32.20	6.40	2.80	30.40	6.10	2.90	28.60	5.70	3.00	26.80	5.40	3.00	25.00	5.00	3.00
	44	33.60	6.70	2.90	31.80	6.40	3.00	31.00	6.00	3.00	28.20	5.70	3.10	26.40	5.30	3.20
	45	34.30	6.90	2.00	32.50	6.50	3.10	30.70	6.20	3.20	28.90	5.80	3.30	27.20	5.40	3.30
	46	35.00	7.00	3.10	33.20	6.70	3.20	31.40	6.30	3.30	29.60	6.00	3.40	27.80	5.50	3.50
48	36.40	7.30	3.20	34.60	6.90	3.30	32.80	6.60	3.40	31.00	6.20	3.50	29.20	5.80	3.60	
AWC 050S	42	44.00	8.80	3.60	41.80	8.40	3.90	39.60	7.90	4.00	37.40	7.50	4.10	35.20	7.10	4.20
	44	46.50	9.30	3.70	44.00	8.80	4.00	41.50	8.30	4.20	39.00	7.80	4.40	36.50	7.30	4.60
	45	47.40	9.50	3.80	45.00	9.00	4.10	42.60	8.50	4.20	40.20	8.10	4.60	37.80	7.60	4.80
	46	49.00	9.80	4.00	46.20	9.30	4.30	43.40	8.70	4.60	41.70	8.40	5.10	39.50	7.90	5.40
48	51.50	10.30	4.20	48.40	9.70	4.60	45.30	9.10	5.00	43.20	8.70	5.50	41.20	8.30	5.80	
AWC 060S	42	50.10	10.10	4.20	47.40	9.50	4.70	44.70	9.00	5.10	42.00	8.40	5.50	39.30	7.90	5.90
	44	52.50	10.50	4.30	49.80	10.00	4.80	47.10	9.40	5.20	44.40	8.90	5.60	41.70	8.40	6.00
	45	53.70	10.80	4.30	51.00	10.20	4.80	48.30	9.70	5.20	45.60	9.10	5.60	42.90	8.60	6.00
	46	54.90	11.00	4.40	52.20	10.50	4.90	49.50	10.00	5.20	46.80	9.40	5.60	44.10	8.80	6.00
48	57.30	11.50	4.50	54.60	10.60	5.00	51.90	10.40	5.30	49.20	9.90	5.70	46.50	9.30	6.10	
AWC 080D	42	64.40	12.80	5.60	60.80	12.20	5.80	57.20	11.40	6.00	53.60	10.80	6.00	50.00	10.00	6.00
	44	67.20	13.40	5.80	63.60	12.80	6.00	62.00	12.00	6.00	56.40	11.40	6.20	52.80	10.60	6.40
	45	68.60	13.80	4.00	65.00	13.00	6.20	61.40	12.40	6.40	57.80	11.60	6.60	54.40	10.80	6.60
	46	70.00	14.00	6.20	66.40	13.40	6.40	62.80	12.60	6.60	59.20	12.00	6.80	55.60	11.00	7.00
48	72.80	14.60	6.40	69.20	13.80	6.60	65.60	13.20	6.80	62.00	12.40	7.00	58.40	11.60	7.20	
AWC 100D	42	88.00	17.60	7.20	83.60	16.80	7.80	79.20	15.80	8.00	74.80	15.00	8.20	70.40	14.20	8.40
	44	93.00	18.60	7.40	88.00	17.60	8.00	83.00	16.60	8.40	78.00	15.60	8.80	73.00	14.60	9.20
	45	94.80	19.00	7.60	90.00	18.00	8.20	85.20	17.00	8.40	80.40	16.20	9.20	75.60	15.20	9.60
	46	98.00	19.60	8.00	92.40	18.60	8.60	86.80	17.40	9.20	83.40	16.80	10.20	79.00	15.80	10.80
48	103.0	20.60	8.40	96.80	19.40	9.20	90.60	18.20	10.00	86.40	17.40	11.00	82.40	16.60	11.60	
AWC 120D	42	100.2	20.20	8.40	94.80	19.00	9.40	89.40	18.00	10.20	84.00	16.80	11.00	78.60	15.80	11.80
	44	105.0	21.00	8.60	99.60	20.00	9.60	94.20	18.80	10.40	88.80	17.80	11.20	83.40	16.80	12.00
	45	107.4	21.60	8.60	102.0	20.40	9.60	96.60	19.40	10.40	91.20	18.20	11.20	85.80	17.20	12.00
	46	109.8	22.00	8.80	104.4	21.00	9.80	99.00	20.00	10.40	93.60	18.80	11.20	88.20	17.60	12.00
48	114.6	23.00	9.00	109.2	21.20	10.00	103.8	20.80	10.60	98.40	19.80	11.40	93.00	18.60	12.20	
AWC 160S	42	124.0	24.80	11.00	121.0	24.20	12.60	115.1	23.10	14.20	109.2	21.00	15.80	103.3	20.70	17.40
	44	133.1	26.60	11.10	127.0	25.40	12.70	120.9	24.20	14.30	114.8	23.00	15.90	108.7	21.70	17.50
	45	136.2	27.30	11.20	130.0	26.00	12.80	123.8	24.80	14.40	117.6	23.50	16.00	111.4	22.30	17.60
	46	139.3	27.90	11.30	133.0	26.60	12.90	126.7	25.40	14.50	120.4	24.10	16.10	114.1	22.80	17.70
48	145.5	29.10	11.40	139.0	27.80	13.00	132.5	26.50	14.60	126.0	25.20	16.20	119.5	23.90	17.80	
AWC 160D	42	130.9	26.20	10.80	125.0	25.00	12.40	119.1	23.80	14.00	113.2	22.70	15.70	107.3	21.50	17.40
	44	137.5	27.50	10.90	131.2	26.30	12.50	124.9	25.00	14.10	118.6	23.70	15.80	112.3	22.50	17.50
	45	140.8	28.20	10.90	131.0	26.20	12.50	127.8	25.60	14.10	121.3	24.30	15.80	114.8	23.00	17.50
	46	144.1	28.80	11.00	137.4	27.50	12.60	130.7	26.20	14.20	124.0	24.80	15.90	117.3	23.50	17.60
48	150.7	30.20	11.10	143.6	28.70	12.70	136.5	27.30	14.30	129.4	25.90	16.00	122.3	24.50	17.70	
AWC 200D	42	175.6	35.10	13.30	167.5	33.50	16.10	159.4	31.90	18.90	151.3	30.30	20.90	143.2	28.70	22.90
	44	183.8	36.80	13.40	175.5	35.10	16.20	167.2	33.50	19.00	158.9	31.80	21.00	150.6	30.20	23.00
	45	188.1	37.60	13.40	179.6	35.92	16.20	171.1	34.20	17.00	162.6	32.50	21.00	154.1	30.80	23.00
	46	192.4	38.50	13.50	183.5	36.70	16.30	175.0	35.00	19.10	166.5	33.30	21.10	158.0	31.60	23.10
48	201.0	40.20	13.60	191.5	38.30	16.40	182.8	36.60	19.20	174.1	34.80	21.20	165.4	33.10	23.20	
AWC 200Q	42	176.0	35.20	14.40	167.2	33.60	15.60	158.4	31.60	16.00	149.6	30.00	16.40	140.8	28.40	16.80
	44	186.0	37.20	14.80	176.0	35.20	16.00	166.0	33.20	16.80	156.0	31.20	17.60	146.0	29.20	18.40
	45	189.6	38.00	15.20	180.0	36.00	16.40	170.4	34.00	16.80	160.8	32.40	18.40	151.2	30.40	19.20
	46	196.0	39.20	16.00	184.8	37.20	17.20	173.6	34.80	18.40	166.8	33.60	20.40	158.0	31.60	21.60
48	206.0	41.20	16.80	193.6	38.80	18.40	181.2	36.40	20.00	172.8	34.80	22.00	164.8	33.20	23.20	
AWC 240Q	42	200.4	40.40	16.80	189.6	38.00	18.80	178.8	36.00	20.40	168.0	33.60	22.00	157.2	31.60	23.60
	44	210.0	42.00	17.20	199.2	40.00	19.20	188.4	37.60	20.80	177.6	35.60	22.40	166.8	33.60	24.00
	45	214.8	43.20	17.20	204.0	40.80	19.20	193.2	38.80	20.80	182.4	36.40	22.40	171.6	34.40	24.00
	46	219.6	44.00	17.60	208.8	42.00	19.60	198.0	40.00	20.80	187.2	37.60	22.40	176.4	35.20	24.00
48	229.2	46.00	18.00	218.4	42.40	20.00	207.6	41.60	21.20	196.8	39.60	22.80	186.0	37.20	24.40	
AWC 240D	42	200.1	40.00	16.80	191.0	38.20	18.30	181.9	36.40	20.20	172.8	34.60	21.30	163.7	32.70	23.00
	44	209.5	41.90	17.00	200.0	40.00	18.50	190.5	38.10	20.40	181.0	36.20	21.50	171.5	34.30	23.10
	45	214.2	42.80	17.00	204.5	40.90	18.50	194.8	39.00	20.00	185.1	37.00	21.50	175.4	35.10	23.10
	46	218.9	43.80	17.10	209.0	41.80	18.60	199.1	39.80	20.10	189.2	37.90	21.60	179.3	35.90	23.20
48	228.3	45.70	17.20	218.0	43.60	18.70	207.7	41.60	20.20	197.4	39.50	21.70	187.1	37.40	23.30	
AWC 260D	42	211.8	42.40	17.70	204.5	41.00	20.70	194.8	40.10	23.60	184.9	37.00	26.30	174.9	35.00	28.80
	44	225.0	45.00	17.80	214.8	43.00	20.80	204.5	40.90	23.70	194.3	38.90	26.40	184.0	36.80	28.90
	45	230.2	46.00	17.80	219.8	43.96	20.80	209.4	41.90	23.70	198.9	39.80	26.40	188.5	37.70	28.90
	46	235.5	47.10	17.90	224.6	45.00	20.90	214.2	42.90	23.80	203.7	40.70	26.50	193.1	38.60	30.00
48	246.0	49.20	18.00	234.8	47.00	21.00	223.9	44.80	23.90	213.1	42.60	26.60	202.2	40.50	30.00	
AWC 320D	42	248.0	49.60	22.00	242.0	48.40	25.20	230.2	46.20	28.40	218.4	42.00	31.60	206.6	41.40	34.80
	44	266.2	53.20	22.20	254.0	50.80	25.40	241.8	48.40	28.60	229.6	46.00	31.80	217.4	43.40	35.00
	45	272.4	54.60	22.40	260.0	52.00	25.60	247.6	49.60	28.80	235.2	47.00	32.00	222.8	44.60	35.20
	46	278.6	55.80	22.60	266.0	53.40	25.80	253.4	50.80	29.00	240.8	48.20	32.20	228.2	45.60	35.40
48	291.0	58.20	22.80	278.0	55.60	26.00	265.0	53.00	29.20	252.0	50.40	32.40	239.0	47.80	35.60	

See notes on page No. 11





Cooling Performance Data(Cont'd.)

Models	Leaving Chilled Water Temp °F	CONDENSER ENTERING AIR TEMPERATURE °FDB														
		85			95			105			115			125		
		COOLING CAPACITY														
	TH	GPM	KW	TH	GPM	KW	TH	GPM	KW	TH	GPM	KW	TH	GPM	KW	
AWC 370D	42	291.5	58.30	25.60	281.4	56.30	29.10	268.4	53.70	32.60	255.4	51.10	36.10	242.3	48.50	39.60
	44	308.8	61.70	25.80	295.2	59.10	29.30	281.6	56.30	32.80	268.0	53.60	36.30	254.4	50.90	39.80
	45	315.8	63.20	25.90	302.1	60.42	29.30	288.2	57.70	32.80	274.3	54.90	36.30	260.4	52.10	39.80
	46	322.8	64.60	26.10	309.0	61.80	29.50	294.8	59.00	33.10	280.6	56.10	36.60	266.4	53.30	40.10
	48	345.0	69.00	26.00	322.8	64.60	29.70	308.0	63.60	33.30	293.2	58.70	36.80	278.4	55.70	40.30
AWC 420D	42	335.0	67.00	29.10	320.8	64.20	33.20	308.6	61.30	36.80	292.4	58.50	40.60	278.2	55.70	44.40
	44	351.4	70.30	29.30	336.4	67.30	33.10	321.4	64.30	36.90	306.4	61.30	40.70	291.4	58.30	44.50
	45	359.2	71.90	29.30	350.0	70.00	33.10	328.8	65.70	36.90	313.4	62.70	40.70	298.0	59.60	44.50
	46	367.0	73.40	29.50	352.0	71.80	33.30	336.2	67.30	37.10	320.4	64.10	40.90	304.6	60.90	44.70
	48	399.0	79.80	29.70	367.6	73.90	33.50	351.0	70.20	37.30	334.4	66.90	41.10	317.8	63.60	44.90
AWC 500D	42	397.4	79.50	32.90	380.4	76.20	37.00	363.4	72.70	41.00	346.4	69.30	45.00	329.4	65.90	48.90
	44	416.8	83.40	33.00	399.0	79.80	37.00	381.0	76.30	41.20	363.4	72.30	45.10	345.6	69.20	49.00
	45	426.5	85.30	33.00	408.3	81.66	37.10	390.1	78.00	41.20	371.9	74.40	45.10	353.7	70.70	49.00
	46	436.2	87.30	33.10	417.6	83.50	37.20	399.0	79.80	41.30	380.4	76.10	45.20	361.8	72.40	49.10
	48	455.6	91.20	33.20	436.2	87.30	37.30	416.8	83.40	41.40	397.4	79.50	45.30	376.0	75.60	49.20
AWC 640D	42	496.00	99.20	44.00	484.00	96.80	50.40	460.40	92.40	56.80	436.80	84.00	63.20	413.20	82.80	69.60
	44	532.40	106.50	44.40	508.00	101.60	50.80	483.60	96.80	57.20	459.20	92.00	63.60	434.80	86.80	70.00
	45	558.00	111.60	45.10	533.75	106.75	51.40	495.20	99.20	57.60	470.40	94.00	64.00	445.60	89.20	70.40
	46	567.10	113.40	45.60	542.00	108.40	51.62	506.80	101.60	58.00	481.60	96.40	64.40	456.40	91.20	70.80
	48	582.00	116.40	45.75	556.00	111.20	52.00	530.00	106.00	58.40	504.00	100.80	64.80	478.00	95.60	71.20
AWC 700D	42	533.00	106.60	48.41	505.00	101.00	50.50	479.20	95.84	54.40	451.80	90.36	56.25	420.70	84.14	59.20
	44	546.00	109.20	49.50	518.00	103.60	51.00	490.00	98.00	55.20	462.20	92.44	57.15	434.20	86.84	60.10
	45	568.20	113.60	49.90	540.00	108.00	51.61	512.30	102.50	55.95	484.00	96.80	57.75	455.50	91.10	60.50
	46	589.50	117.90	50.29	561.00	112.20	52.10	532.40	106.50	56.25	503.80	100.70	58.25	475.20	95.04	61.50
	48	615.30	123.10	51.80	585.50	117.10	54.45	556.30	111.30	57.30	527.10	105.40	58.75	497.90	99.58	62.60
AWC 800D	42	565.00	113.00	49.75	535.00	107.00	51.55	505.70	101.20	57.50	476.40	95.28	60.75	447.10	89.42	63.10
	44	598.30	119.70	50.75	568.00	113.60	52.35	543.20	108.60	58.10	506.50	101.30	61.50	475.80	95.16	64.10
	45	620.00	124.00	52.00	590.00	118.00	54.50	559.00	111.80	58.25	527.50	105.50	62.15	496.10	99.22	65.05
	46	636.40	127.30	53.00	604.00	120.80	54.75	571.90	114.40	58.50	539.80	108.00	63.50	507.70	101.50	66.15
	48	666.00	133.20	53.90	632.80	126.60	57.15	599.30	119.90	59.10	565.80	113.20	64.85	532.30	106.50	68.85
AWC 1050T	42	799.50	159.90	72.62	757.50	151.50	75.75	718.80	143.76	81.60	677.70	135.54	84.38	631.05	126.21	88.80
	44	819.00	163.80	74.25	777.00	155.40	76.50	735.00	147.00	82.80	693.30	138.66	85.73	651.30	130.26	90.15
	45	852.30	170.40	74.85	810.00	162.00	77.42	768.45	153.75	83.93	726.00	145.20	86.63	683.25	136.65	90.75
	46	884.25	176.85	75.44	841.50	168.30	78.15	798.60	159.75	84.38	755.70	151.05	87.38	712.80	142.56	92.25
	48	922.95	184.65	77.70	878.25	175.65	81.68	834.45	166.95	85.95	790.65	158.10	88.13	746.85	149.37	93.90
AWC 1200T	42	847.50	169.50	74.63	802.50	160.50	77.33	758.55	151.80	86.25	714.60	142.92	91.13	670.65	134.13	94.65
	44	897.45	179.55	76.13	852.00	170.40	78.53	814.80	162.90	87.15	759.75	151.95	92.25	713.70	142.74	96.15
	45	930.00	186.00	78.00	885.00	177.00	81.75	838.50	167.70	87.38	791.25	158.25	93.23	744.15	148.83	97.58
	46	954.60	190.95	79.50	906.00	181.20	82.13	857.85	171.60	87.75	809.70	162.00	95.25	761.55	152.25	99.23
	48	999.00	199.80	80.85	949.20	189.90	85.73	898.95	179.85	88.65	848.70	169.80	97.28	798.45	159.75	103.28
AWC 1280Q	42	992.00	198.40	88.00	968.00	193.60	100.80	920.80	184.80	113.60	873.60	168.00	126.40	826.40	165.60	139.20
	44	1064.80	213.00	88.80	1016.00	203.20	101.60	967.20	193.60	114.40	918.40	184.00	127.20	869.60	173.60	140.00
	45	1116.00	223.20	90.20	1067.60	213.60	102.80	990.40	198.40	115.20	940.80	188.00	128.00	891.20	178.40	140.80
	46	1134.20	226.80	91.20	1084.00	216.80	103.24	1013.60	203.20	116.00	963.20	192.80	128.80	912.80	182.40	141.60
	48	1164.00	232.80	91.50	1112.00	222.40	104.00	1060.00	212.00	116.80	1008.00	201.60	129.60	956.00	191.20	142.40
AWC 1400Q	42	1066.00	213.20	96.82	1010.00	202.00	101.00	958.40	191.68	108.80	903.60	180.72	112.50	841.40	168.28	118.40
	44	1092.00	218.40	99.00	1036.00	207.20	102.00	980.00	196.00	110.40	924.40	184.88	114.30	868.40	173.68	120.20
	45	1136.40	227.20	99.80	1080.00	216.00	103.22	1024.60	205.00	111.90	968.00	193.60	115.50	911.00	182.20	121.00
	46	1179.00	235.80	100.58	1122.00	224.40	104.20	1064.80	213.00	112.50	1007.60	201.40	116.50	950.40	190.08	123.00
	48	1230.60	246.20	103.60	1171.00	234.20	108.90	1112.60	222.60	114.60	1054.20	210.80	117.50	995.80	199.16	125.20
AWC 1600Q	42	1130.00	226.00	99.50	1070.00	214.00	103.10	1011.40	202.40	115.00	952.80	190.56	121.50	894.20	178.84	126.20
	44	1196.60	239.40	101.50	1136.00	227.20	104.70	1086.40	217.20	116.20	1013.00	202.60	123.00	951.60	190.32	128.20
	45	1240.00	248.00	104.00	1180.00	236.00	109.00	1118.00	223.60	116.50	1055.00	211.00	124.30	992.20	198.44	130.10
	46	1272.80	254.60	106.00	1208.00	241.60	109.50	1143.80	228.80	117.00	1079.60	216.00	127.00	1015.40	203.00	132.30
	48	1332.00	266.40	107.80	1265.60	253.20	114.30	1198.60	239.80	118.20	1131.60	226.40	129.70	1064.60	213.00	137.70
AWC 1920H	42	1488.00	297.60	132.00	1452.00	290.40	151.20	1381.20	277.20	170.40	1310.40	252.00	189.60	1239.60	248.40	208.80
	44	1597.20	319.50	133.20	1524.00	304.80	152.40	1450.80	290.40	171.60	1377.60	276.00	190.80	1304.40	260.40	210.00
	45	1674.00	334.80	135.30	1601.40	320.40	154.20	1485.60	297.60	172.80	1411.20	282.00	192.00	1336.80	267.60	211.20
	46	1701.30	340.20	136.80	1626.00	325.20	154.86	1520.40	304.80	174.00	1444.80	289.20	193.20	1369.20	273.60	212.40
	48	1746.00	349.20	137.25	1668.00	333.60	156.00	1590.00	318.00	175.20	1512.00	302.40	194.40	1434.00	286.80	213.60
AWC 2100H	42	1599.00	319.80	145.23	1515.00	303.00	151.50	1437.60	287.52	163.20	1355.40	271.08	168.75	1262.10	252.42	177.60
	44	1638.00	327.60	148.50	1554.00	310.80	153.00	1470.00	294.00	165.60	1386.60	277.32	171.45	1302.60	260.52	180.30
	45	1704.60	340.80	149.70	1620.00	324.00	154.83	1536.90	307.50	167.85	1452.00	290.40	173.25	1366.50	273.30	181.50
	46	1768.50	353.70	150.87	1683.00	336.60	156.30	1597.20	319.50	168.75	1511.40	302.10	174.75	1425.60	285.12	184.50
	48	1845.90	369.30	155.40	1756.50	351.30	163.35	1668.90	333.90	171.90	1581.30	316.20	176.25	1493.70	298.74	187.80
AWC 2400H	42	1695.00	339.00	149.25	1605.00	321.00	154.65	1517.10	303.60	172.50	1429.20	285.84	182.25	1341.30	268.26	189.30
	44	1794.90	359.10	152.25	1704.00	340.80	157.05	1629.60	325.80	174.30	1519.50	303.90	184.50	1427.40	285.48	192.30
	45	1860.00	372.00	156.00	1770.00	354.00	163.50	1677.00	335.40	174.75	1582.50	316.50	186.45	1488.30	297.66	195.15

Capacity Correction Factors & Working Test Pr.



Cooler Fouling Factors

The units are rated at .0005ft².h.F/Btu. For other fouling factors, apply below correction factors on cooling & power inputs

Fouling Factor	Capacity Multiplier	Power Multiplier
Clean	1.03	1.01
0.00025	1.015	1.005
0.00050	1.00	1.00
0.001	0.97	0.99
0.002	0.92	0.97

Altitude Correction Factors

The unit's capacities are rated at sea level. For areas above sea level, apply below Correction Factor on cooling capacities & power inputs

Altitude Ft.	Capacity Multiplier	Power Multiplier
0	1.00	1.00
2000	0.99	1.01
4000	0.98	1.02
6000	0.97	1.03
8000	0.96	1.04
10000	0.95	1.05

Working And Test Pressures

Cooler Pressure	Refrigerant side	Water side
Max working Pressure	110 Psig	70 Psig
Test pressure	225 Psig	100 Psig

Condenser Pressures

Condenser Pressures	Refrigerant Side
Design working pressure	300 Psig
Test pressure	450 Psig

Range Correction Factors

The capacities are rated at 10°F water temp. rise. For other range, apply below correction factors on cooling capacity & power inputs.

Range °F	Capacity Multiplier	Power Multiplier
8	0.985	0.994
10	1.00	1.00
12	1.015	1.006
14	1.03	1.012
16	1.04	1.02

Models

Steps

Models	Steps
AWC040S	100-0
AWC050S	100-0
AWC060S	100-0
AWC080D	100-50-0
AWC100D	100-50-0
AWC120D	100-50-0
AWC160S	100-0
AWC160D	100-50-0
AWC200D	100-50-0
AWC240Q	100-75-50-25-0
AWC240D	100-50-0
AWC260D	100-50-0
AWC320D	100-50-0
AWC370D	100-50-0
AWC420D	100-50-0
AWC500D	100-50-0
AWC640D	100-50-0
AWC700D	100-50-0
AWC800D	100-50-0
AWC1050T	100-67-33-0
AWC1200T	100-67-33-0
AWC1280Q	100-75-50-25-0
AWC1400Q	100-75-50-25-0
AWC1600Q	100-75-50-25-0
AWC1920H	100-83-66-50-33-17
AWC2100H	100-83-66-50-33-17
AWC2400H	100-83-66-50-33-17

Electrical Data

Model AWC	Compressor (each)						Condenser fan motor (each)			Unit total current & fuse size		
	HP	Qty	Starting method	RLA	FLA	LRA	QTY	RLA	FLA	RLA	FLA	MFA
040S	4.0	1	AL	5.8	8.3	50	2**	0.8	1.2	7.4	10.7	15
050S	5.0	1	AL	7.4	10.1	65	2**	0.8	1.2	9.0	12.5	20
060S	6.0	1	AL	8.2	10.8	75	1	0.7	1.2	8.9	12.0	20
080D	4.0	2	AL	5.8	8.3	50	1	1.0	1.3	12.6	17.9	25
100D	5.0	2	AL	7.4	10.1	65	1	1.0	1.3	15.8	21.5	30
120D	6.0	2	AL	8.2	10.8	75	1	1.0	1.3	17.4	22.9	35
160S	16.0	1	AL	22.5	29.0	179	1	1.0	1.3	23.5	30.3	40
160D	8.0	2	AL	11.5	16.0	95	1	1.0	1.3	24.0	33.3	40
200D	10.0	2	AL	13.8	19.3	125	2	1.0	1.3	29.6	41.2	60
200Q	5.0	4	AL	7.4	10.1	65	2	1.0	1.3	31.6	43.0	2 x 30*
240D	12.0	2	AL	15.8	21.5	135	2	1.0	1.3	33.6	45.6	60
240Q	6.0	4	AL	8.2	10.8	75	2	1.0	1.3	34.8	45.8	2 x 35*
260D	10+16	1+1	AL	13.8+22.5	19.3+29	125+179	3	1.0	1.3	39.3	52.2	70
320D	16	2	AL	22.5	29.0	179.0	3	1.0	1.3	48.0	61.9	75
370D	16+21	1+1	AL	22.5+28	29+37	179+225	3	1.0	1.3	53.5	69.9	85
420D	21.0	2	AL	28	37	225	4	1.0	1.3	60.0	79.2	100
500D	25.0	2	AL	32	40	279	4	1.0	1.3	68.0	85.2	100
640D	32.0	2	AL	42.5	51.0	310	4	1.0	1.3	89.0	107.2	120
700D	35.0	2	PW	62	71.3	150	8	1.0	1.3	132.0	153.0	180
800D	40.0	2	PW	65	73.5	160	8	1.0	1.3	138.0	157.4	180
1050T	35.0	3	PW	62	71.3	150	18	1.0	1.3	204.0	237.3	260
1200T	40.0	3	PW	65	73.5	160	18	1.0	1.3	213.0	243.9	260
1280Q	32.0	4	AL	42.5	51.0	310	24	1.0	1.3	194.0	235.2	250
1400Q	35.0	4	PW	62	71.3	150	24	1.0	1.3	272.0	316.4	180 x2*
1600Q	40.0	4	PW	65	73.5	160	24	1.0	1.3	284.0	325.2	180x2*
1920H	32.0	6	AL	42.5	51.0	310	36	1.0	1.3	291.0	352.8	190x2*
2100H	35.0	6	PW	62	71.3	150	36	1.0	1.3	408.0	474.6	260x2*
2400H	40.0	6	PW	65	73.5	160	36	1.0	1.3	426.0	487.8	260x2*

P W =Part winding start, AL = Across the line starting
L R A =lock rotor current.

R L A =Rated load amps at condenser air in at 95°F(35°C) DB.

F L A =Full load amps at condenser air in 125°F(51.6 °C) DB.

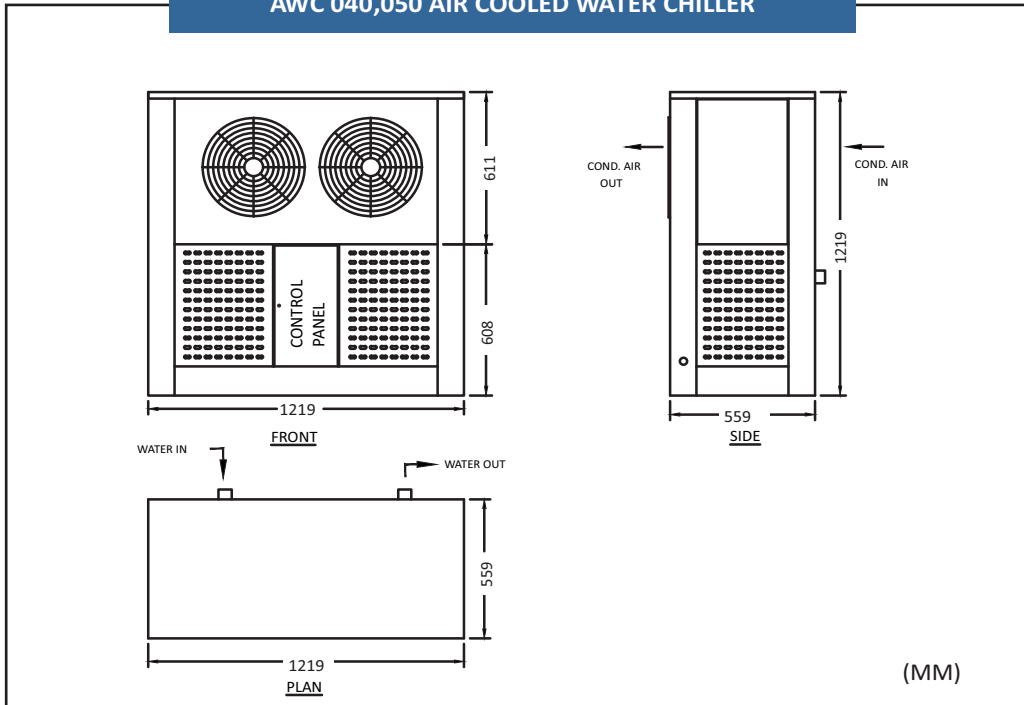
M F A =Maximum fuse amps

*Chiller equipped with two control panels,

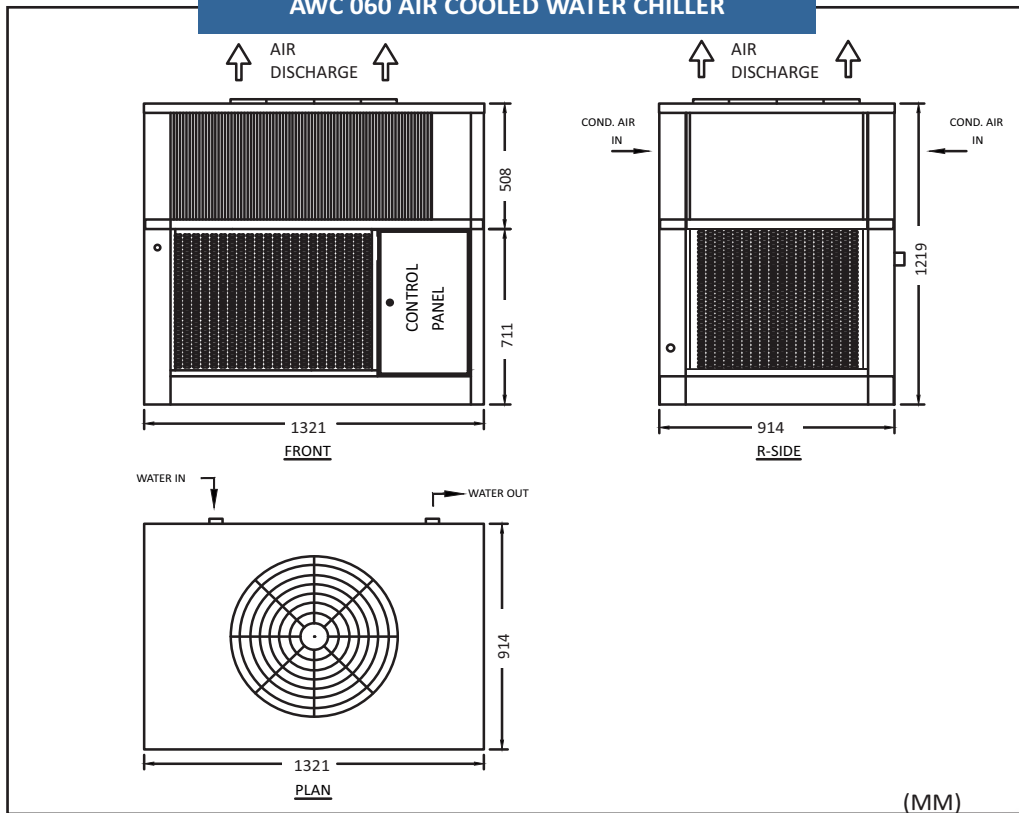
**Condenser motor single phase (220V, 1phase)



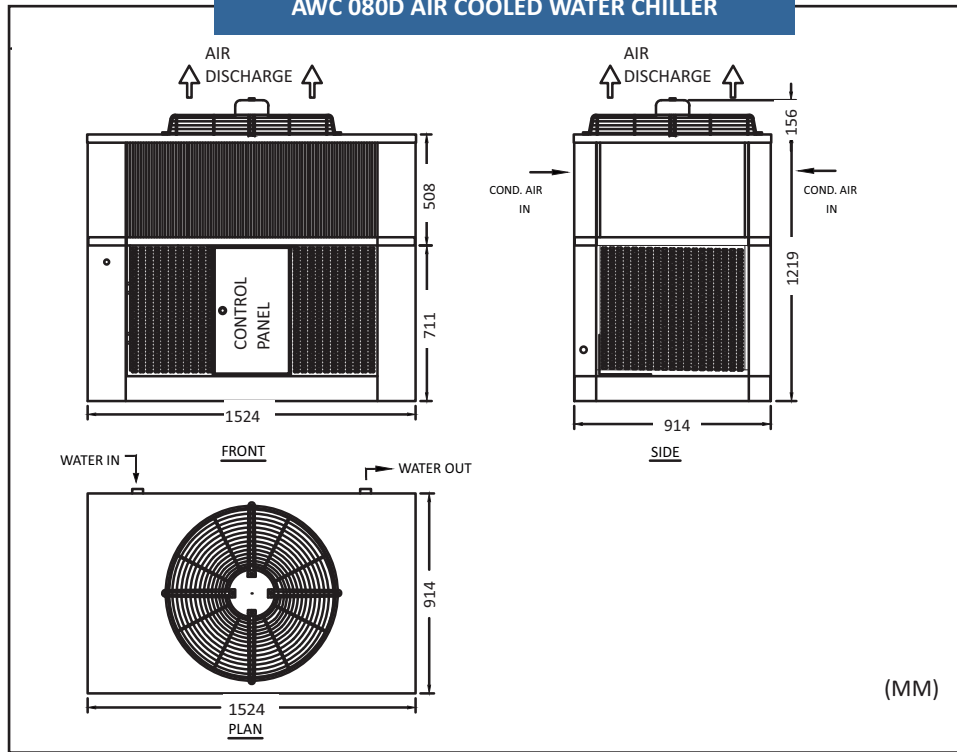
AWC 040,050 AIR COOLED WATER CHILLER



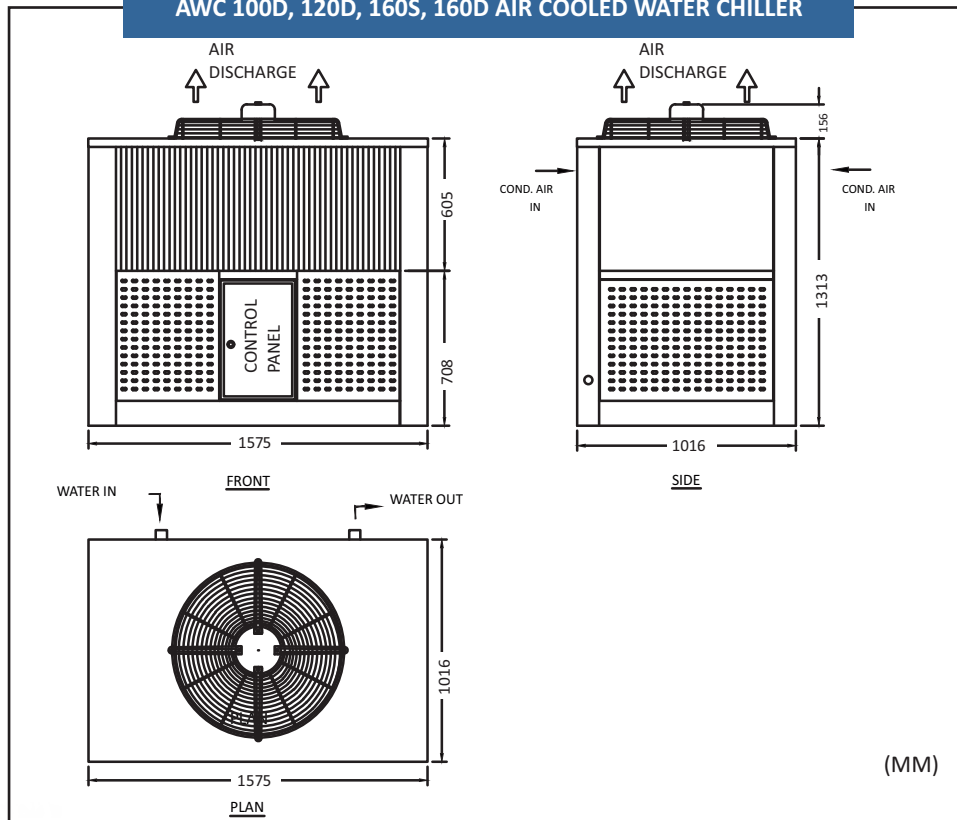
AWC 060 AIR COOLED WATER CHILLER

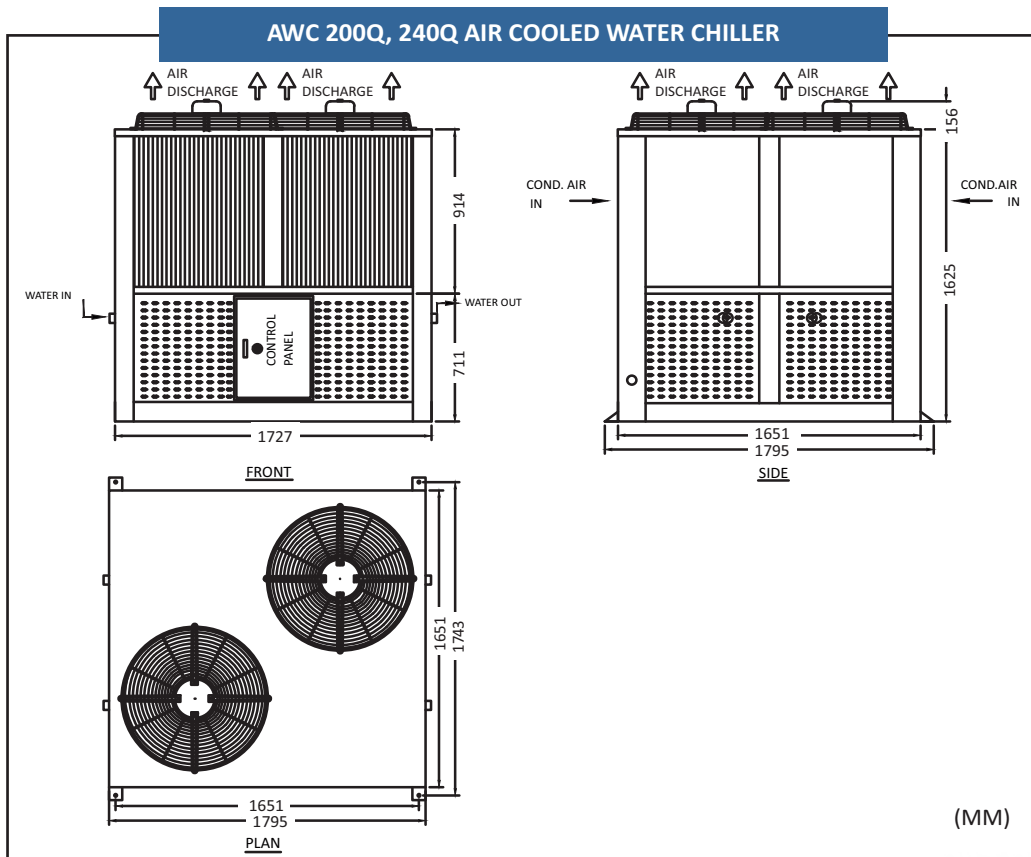
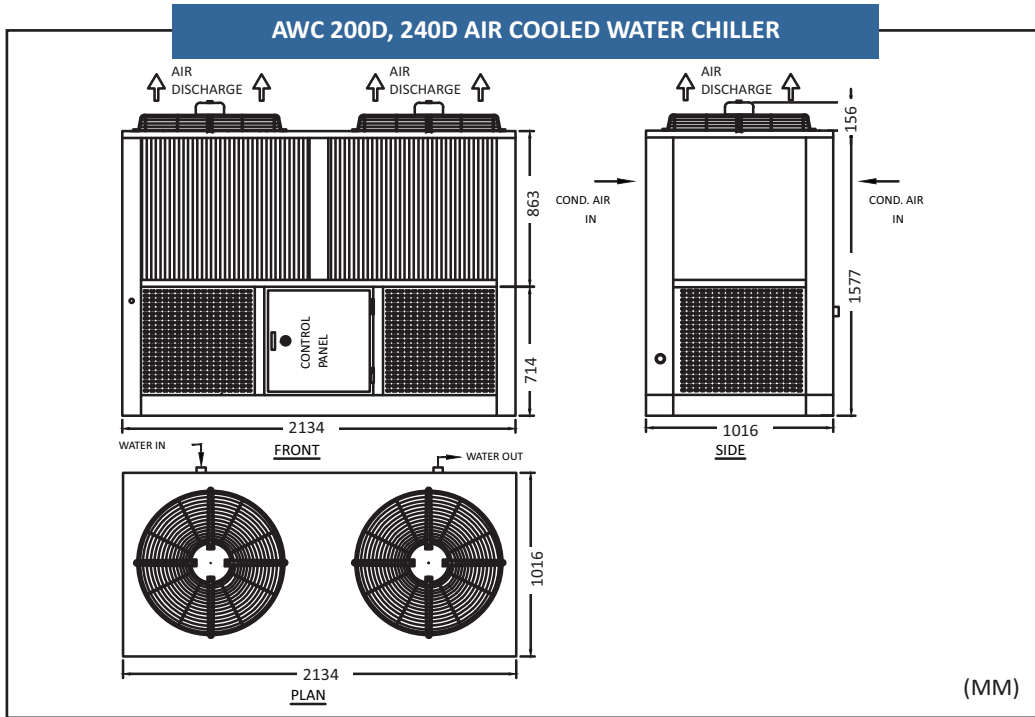


AWC 080D AIR COOLED WATER CHILLER



AWC 100D, 120D, 160S, 160D AIR COOLED WATER CHILLER

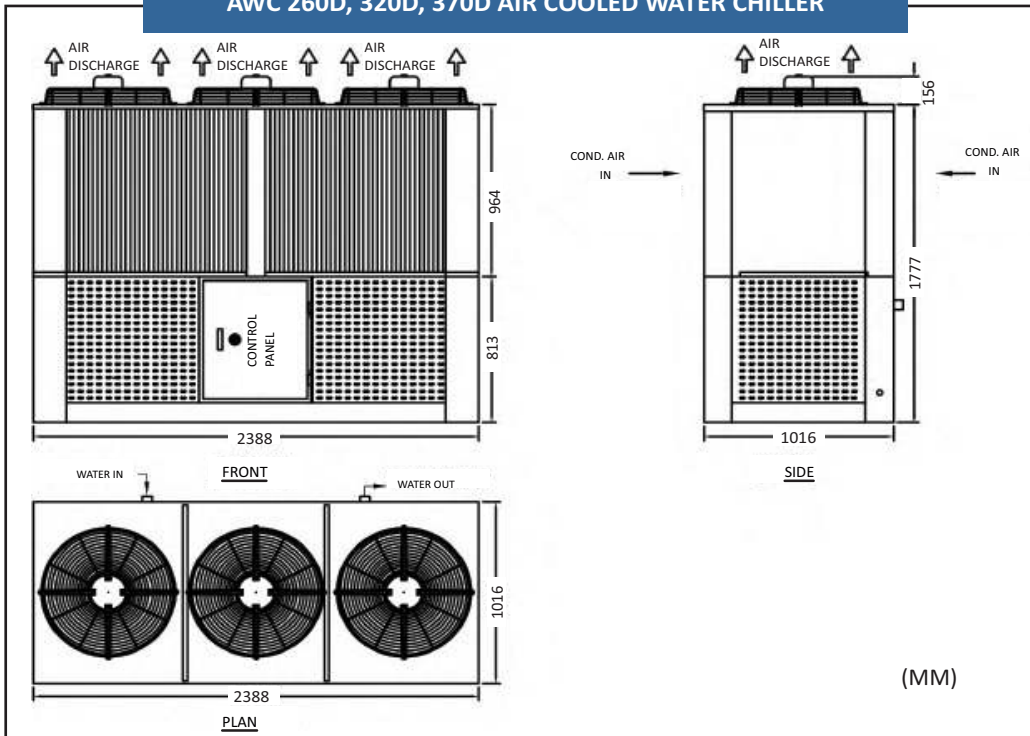




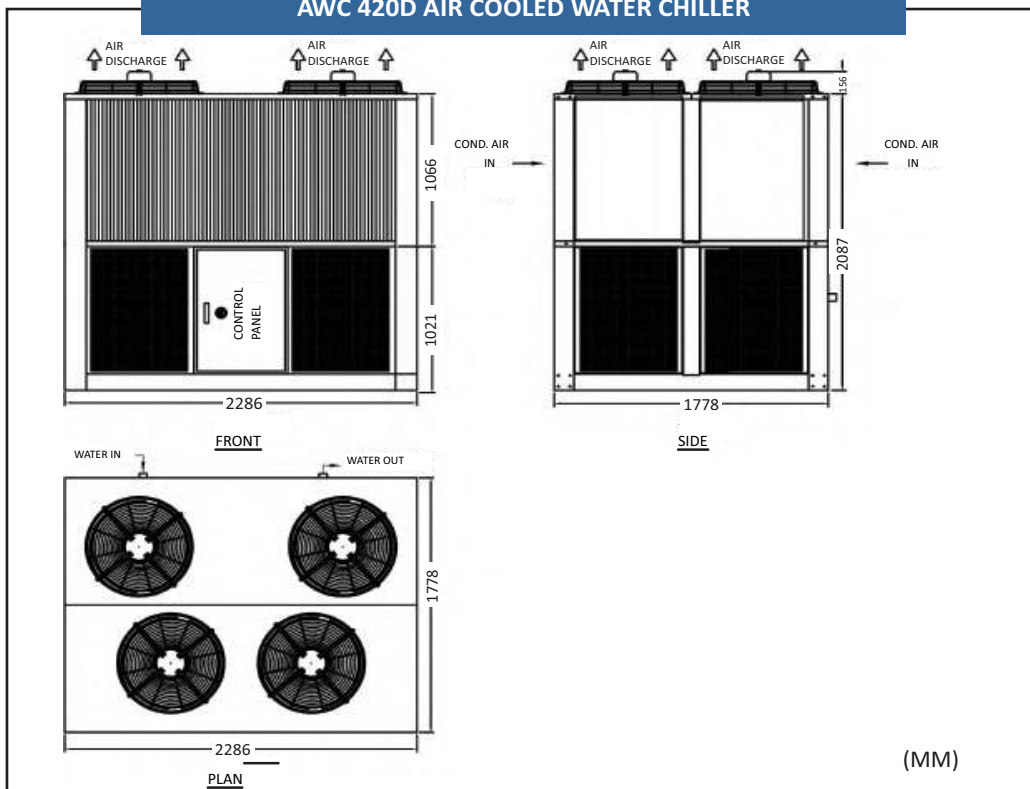


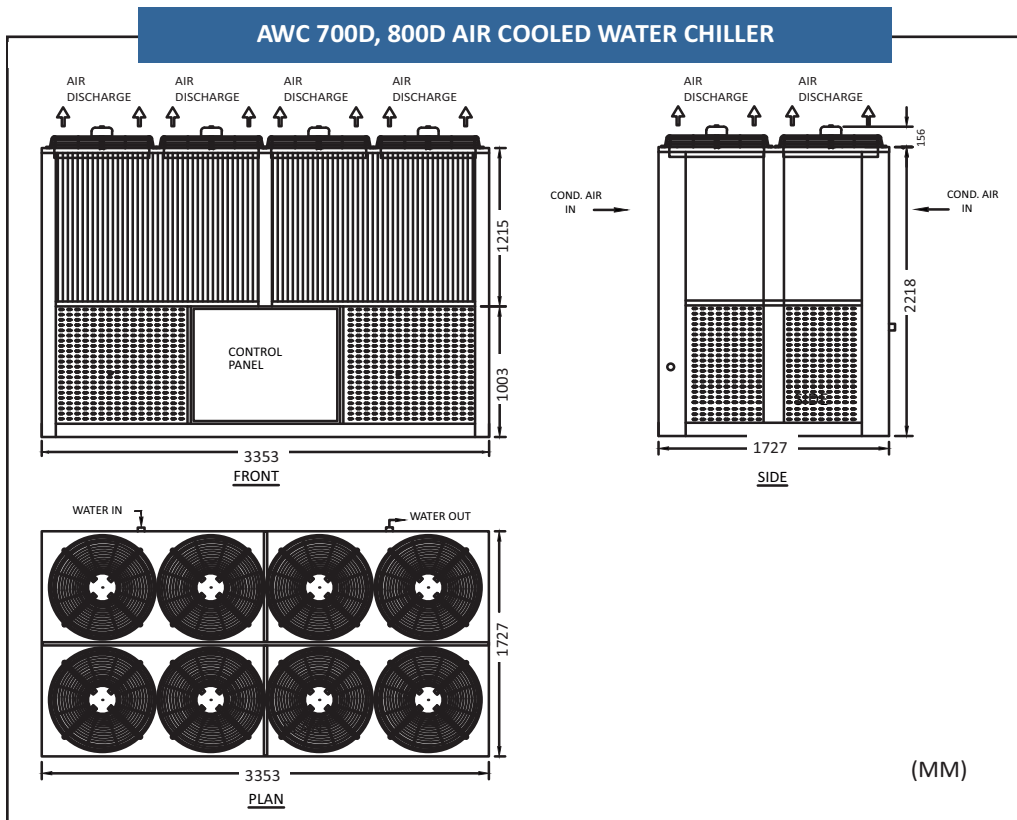
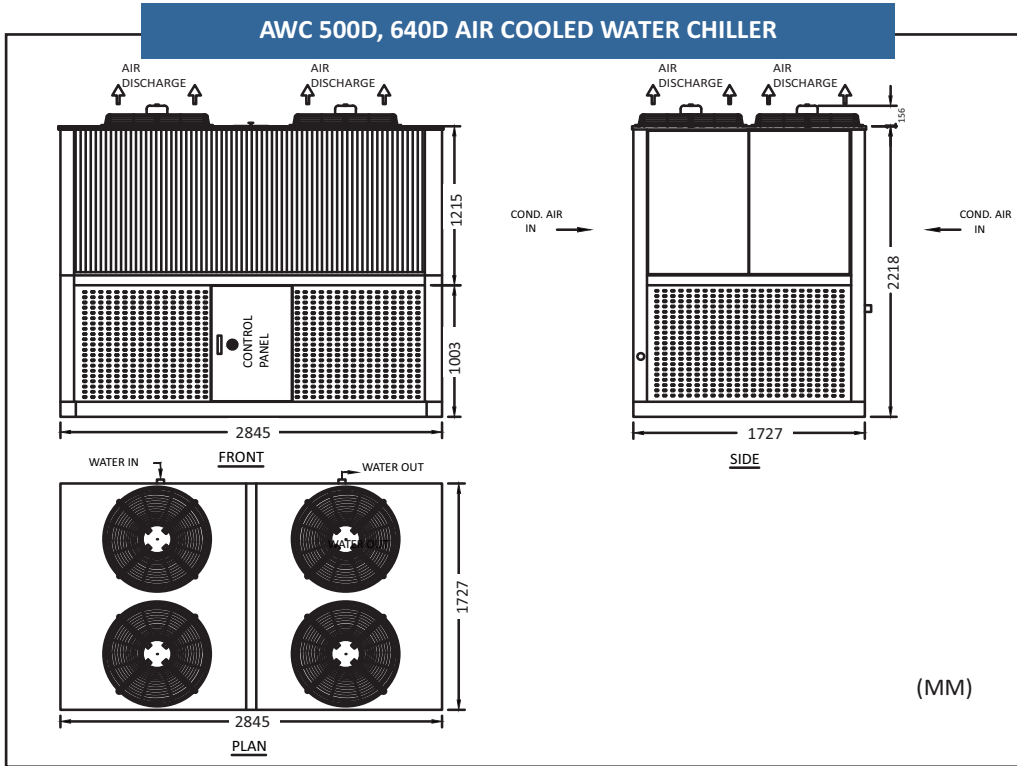
Dimensional Data

AWC 260D, 320D, 370D AIR COOLED WATER CHILLER



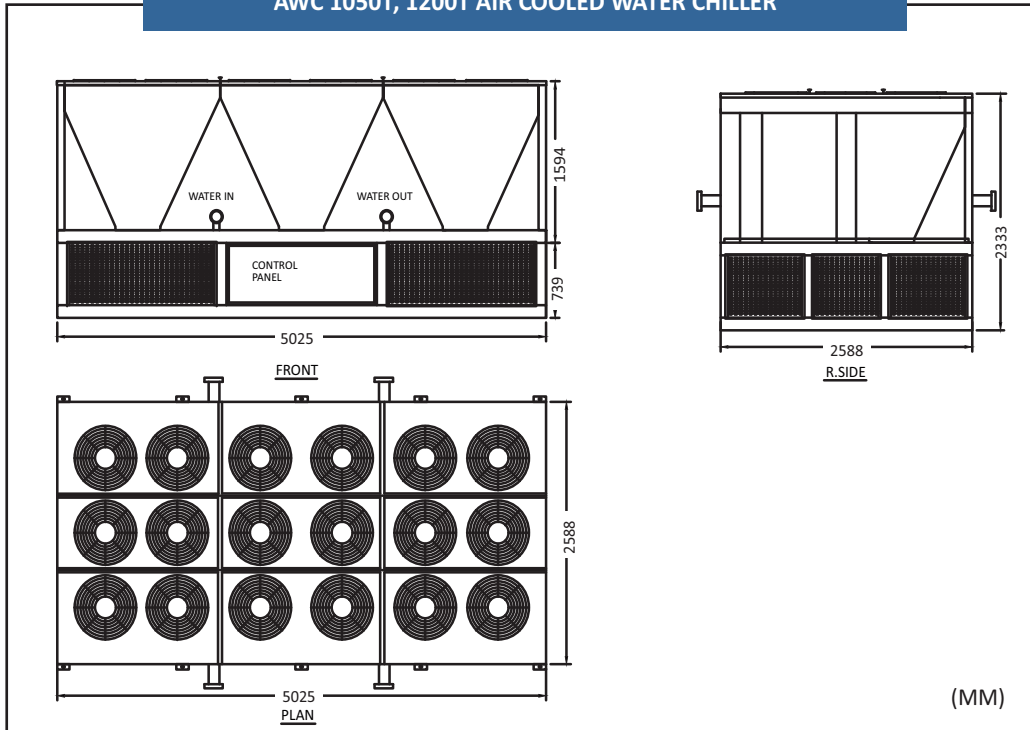
AWC 420D AIR COOLED WATER CHILLER



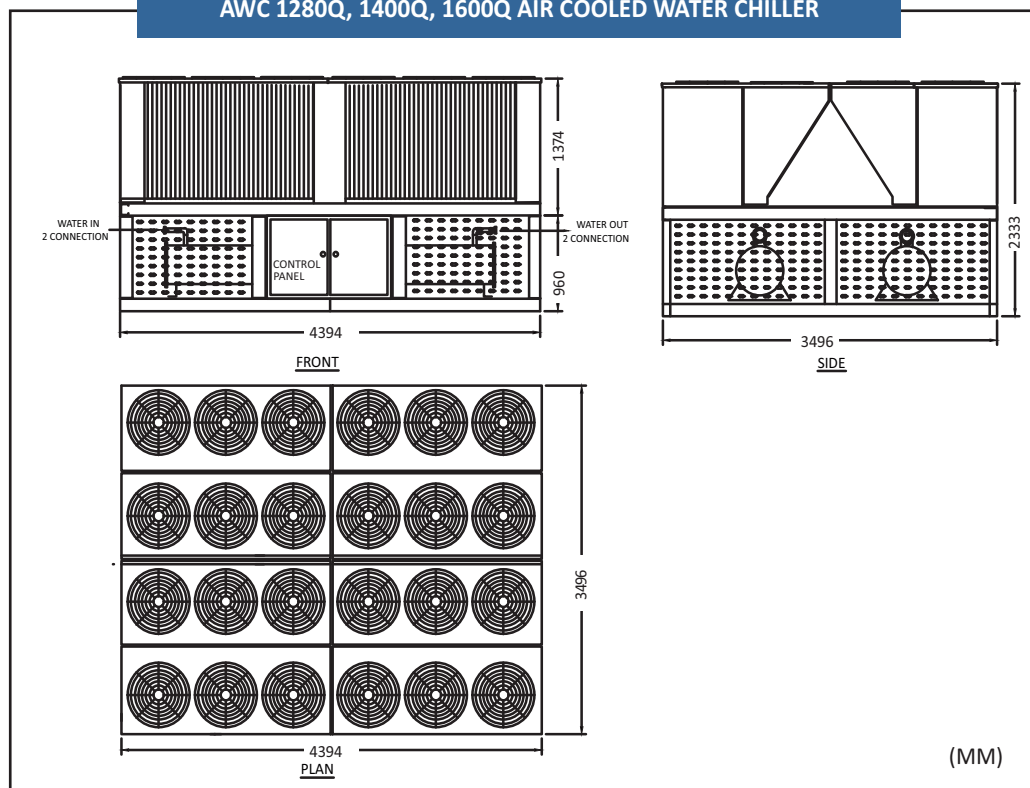


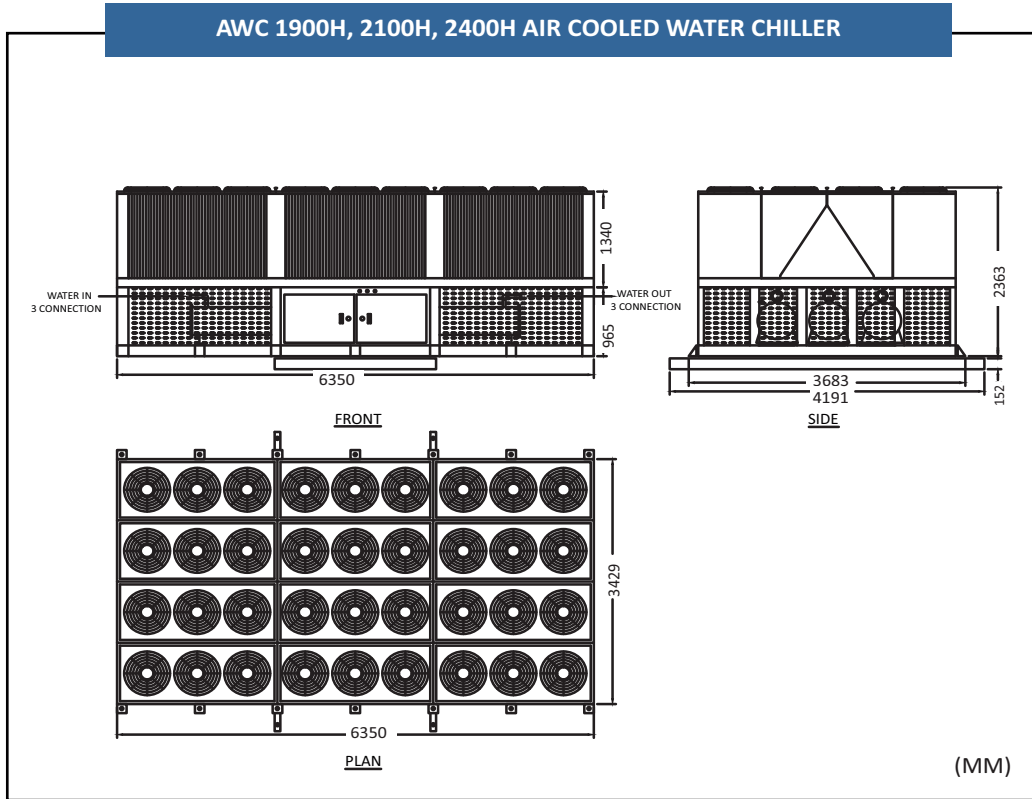


AWC 1050T, 1200T AIR COOLED WATER CHILLER



AWC 1280Q, 1400Q, 1600Q AIR COOLED WATER CHILLER







Metric/Imperial Unit Conversion Table

Imperial → Metric

Linear Measure (Length/Distance)

Imperial	Metric
1 inch	25.4 millimetres
1 foot (=12 inches)	0.3048 metre
1 yard (=3 feet)	0.9144 metre
1 (statute) mile (=1760 yards)	1.6093 kilometres
1 (nautical) mile (=1.150779 miles)	1.852 kilometres

Square Measure (Area)

Imperial	Metric
1 square inch	6.4516 sq. centimeters
1 square foot (=144 square inches)	9.29 square decimeters
1 square yard (=9 square feet)	0.8361 square metres
1 acre (=4840 square yards)	0.40469 hectare
1 square mile (=640 acres)	259 hectares

Cubic Measure (Volume)

Imperial	Metric
1 cubic inch	16.4 cubic centimeters
1 cubic foot (=1728 cubic inches)	0.0283 cubic metres
1 cubic yard (=27 cubic feet)	0.765 cubic metres

Capacity Measure (Volume)

Imperial	Metric
1 (imperial) fl. oz. (=1/20 imperial pint)	28.41 ml
1 (US liquid) fl. oz. (=1/16 US pint)	29.57 ml
1 (imperial) gill (=1/4 imperial pint)	142.07 ml
1 (US liquid) gill (=1/4 US pint)	118.29 ml
1 (imperial) pint (=20 fl. imperial oz.)	568.26 ml
1 (US liquid) pint (=16 fl. US oz.)	473.18 ml
1 (US dry) pint (= 1/2 quart)	550.61 ml
1 (imperial) gallon (=4 quarts)	4.546 litres
1 (US liquid) gallon (=4 quarts)	3.785 litres
1 (imperial) peck (=2 gallons)	9.092 litres
1 (US dry) peck (= 8 quarts)	8.810 litres
1 (imperial) bushel (=4 pecks)	36.369 litres
1 (US dry) bushel (=4 pecks)	35.239 litres

Mass (Weight)

Imperial	Metric
1 grain	0.065 gram
1 dram	1.772 grams
1 ounce (=16 drams)	28.35 grams
1 pound (=16 ounces =7000 grains)	0.45359237 kilogram
1 stone (=14 pounds)	6.35 kilograms
1 quarter (=2 stones)	12.70 kilograms
1 hundred weight (=4 quarters =112 lb.)	50.80 kilograms
1 (long) ton (=2240 lbs)	1.016 tonnes
1 (short) ton (=2,000 lbs)	0.907 tonne

Metric → Imperial

Linear Measure (Length/Distance)

Metric	Imperial
1 millimetre	0.0394 inch
1 centimetre (=10 mm)	0.3937 inch
1 decimetre (=10 cm)	3.937 inches
1 metre (=100 cm)	1.0936 yards
1 decametre (=10 m)	10.936 yards
1 hectometre (=100 m)	109.36 yards
1 kilometre (=1000 m)	0.6214 miles

Square Measure (Area)

Metric	Imperial
1 square centimetre	0.1550 sq. inch
1 square metre (=10 000 sq. cm)	1.1960 sq. yards
1 are (=100 sq. metres)	119.60 sq. yards
1 hectare (=100 ares)	2.4711 acres
1 square kilometre (=100 hectares)	0.3861 sq. mile

Cubic Measure (Volume)

Metric	Imperial
1 cubic centimetre	0.0610 cubic inch
1 cubic metre (one million cu. cm)	1.308 cubic yards

Capacity Measure (Volume)

Metric	Imperial
1 millilitre	0.002 (imperial) pint
1 centilitre (=10 ml)	0.018 pint
1 decilitre (=100 ml)	0.176 pint
1 litre (=1000 ml)	1.76 pints
1 decalitre (=10 l)	2.20 (imperial) gallons
1 hectolitre (=100 l)	2.75 (imperial) bushels

Mass (Weight)

Metric	Imperial
1 milligram	0.015 grain
1 centigram (=10 mg)	0.154 grain
1 decigram (=100 mg)	1.543 grain
1 gram (=1000 mg)	15.43 grain
1 decagram (=10 g)	5.64 drams
1 hectogram (=100 g)	3.527 ounces
1 kilogram (=1000 g)	2.205 pounds
1 tonne (=1000 kg)	0.984 (long) ton



Shaping Your Future With Cutting Edge HVAC Solutions

Inspired by the stimulus to grow through knowledge, interlaced with the zeal and sheer commitment of an **enthusiastic team** and gripped by the **Obsession of Three Brothers** of turning the dream into reality, **Sabro has evolved, grown and expanded since its inception in 1969.**

It was the fruit of commitment, hope and hard work that enabled us to be the pioneers of HVAC manufacturing in Pakistan, exporting to over 22 countries, encapsulating 3 continents. We now thrive as an agile manufacturer for a complete range of HVAC manufacture including Chillers, Self-Contained units, Air-Side Equipment, Mini Split Units & a menagerie of customised HVAC manufacture tailored to suit every HVAC requirement of the customer.

For over Five Decades, Sabro has been a trusted brand name that has exceeded expectations nationwide & internationally, catering to the needs of both domestic as well international customers.

Web site: www.sabrotechnology.com

Contact information:
contact@sabro.com.pk
Sabro Technologies(Pvt.) Ltd.
Plot #270, Kahuta Road, Islamabad

Sabro Head Office:
Plot #77/78, St: 10, I-9/2, Islamabad
+92 51 4433006

Exclusive Distributor in Pakistan
Sabro Engineering & Services
(Pvt.) Ltd. < Sales - Distribution - Service >
www.sabrotechnology.com
international@sabro.com.pk