

Unit Specifications

Outdoor Split Systems



***GT-S 38WQS Series
Geothermal Heating
and Cooling System
Sizes 018-060***



GT-S

Residential Geothermal Heat Pump Split System

Specifications Catalog

Revised 06/09/04

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Geothermal Advantages

Geothermal systems transfer heat from a building to the earth in the cooling mode, or from the earth to the building in the heating mode. Water is used as the heat transfer medium, either in a closed loop piping system, or by directly pumping well water. By using this stable thermal source, geothermal heat pumps provide energy efficient comfort the year around.

Highest Efficiency

The extremely high levels of efficiency are possible because a geothermal heat pump only uses electricity to move heat, not produce it. A GT-S unit typically supplies 4 kilowatts of heat for every kilowatt of electricity used. Three of these kilowatts of heat come directly from the earth itself, and are clean, free, and renewable. Overall, geothermal technology offers the highest cooling EER's and heating COP's available in the industry.

Maximum Comfort

Geothermal heat pumps also provide higher comfort levels than traditional space conditioning equipment. By using a relatively warm source of heat such as the earth, supply air temperatures are significantly higher in the heating mode than traditional air-source heat pumps. Geothermal heat pumps also cycle much less often than fossil furnaces, creating a consistent indoor temperature with comfortable relative humidity.

Environmentally Friendly

The environmental advantages of geothermal systems have caught the eye of governmental agencies such as the Environmental Protection Agency (EPA) and the Department of Energy (DOE). Because it is lowest in CO₂ emissions, geothermal technology provides a solution to global warming by primarily using the natural energy of the earth. In contrast, traditional space conditioning systems depend upon the exploitation and burning of fossil energy sources with the resultant greenhouse gas emissions.

Better Investment

Low life-cycle costs are provided by the low operating and maintenance costs of geothermal systems, even when the higher initial installation costs are considered. In new construction, monthly energy savings typically exceed the increased mortgage payments. Therefore, cash flow can be positive from the start. In retrofit systems, a buyer who purchases with cash usually realizes a return on investment well above certificate of deposit rates. And, with equipment life exceeding 20 years, a Carrier GT-S Series unit is a lasting investment.

Electric utilities, recognizing the dual benefits of high efficiency and low electric peak demand, often provide incentives to purchase these systems.

Geothermal System Types

Before choosing a geothermal system, many application factors must be evaluated including:

- ground water availability and quality
- loop installation costs
- land area available
- sub-soil conditions
- local codes
- owner preferences

Carrier dealers have the expertise and computer software to determine the best type of system. Many regions have contractors specializing in the installation of the ground loop portion of the system.

Closed Loop Systems

Closed Loop Systems consist of an underground heat exchange network of sealed, high strength polyethylene plastic pipe and a Flow Controller pumping module. When cooling, the loop fluid temperature will rise, and rejected heat is dissipated into the cooler earth. Conversely, while heating, the loop fluid temperatures fall, and heat is absorbed from the earth. Carrier Flow Controller pumping modules utilize small wattage pumps to circulate the water/antifreeze fluid within the piping system. The plastic heat exchange loop is closed and thermally fusion-welded at all connections in the same manner as natural gas distribution lines. Closed loops do not require a ground water supply or drain, and they are not subject to mineral build up.

Closed Loops can be installed in vertical or horizontal configurations, or submerged in a pond or lake. When designed properly, all three alternatives operate with similar efficiency. Carrier high density polyethylene plastic pipe is used for all closed loop installations. Pipe connections are heat fused to form joints that are stronger than the pipe itself. Carrier loop piping has a life expectancy in excess of 50 years.

Horizontal Loops are often considered when adequate land space is available. The pipes are placed in trenches, excavated by a backhoe or chain trencher to a depth of 4-6 feet. Depending on design, from 1-6 pipes are installed in each trench. Multiple pipe and coiled “slinky” configurations are often used to conserve land requirements and reduce overall installed loop costs. Horizontal boring technology can also be used to install u-bend loops 10-15 feet deep with minimal landscaping disruption. Trench lengths range from 100-400 feet per system ton. Trenches must be spaced from 6-10 feet apart. The overall land area required ranges from 750-1,500 square feet per system ton.

Vertical Loops are the ideal choice when available land area is limited. Drilling equipment is used to bore small-diameter vertical holes. Two pipes joined together with a u-bend fitting are inserted into the vertical bore. Bore hole depth ranges from 100-300 feet per system ton. Bores must be spaced from 10-15 feet apart and properly grouted. The land space required ranges from 100-200 square feet per system ton.

Pond (Lake) Loops are very economical to install when a body of surface water is available, because excavation costs are mostly eliminated. Coils or “slinky” mats of pipe are simply placed on the bottom of the pond (lake). In most cases, 1/4 to 1/2 acre of water surface, with a minimum depth of 8-10 feet, is needed for a typical residence.

Ground Water Systems

Open loop systems utilize ground water as a direct energy source when good quality water is available at a reasonable pumping depth. A well must have enough capacity to deliver a minimum of 1.5 gpm per system ton during peak operation. Ditches, field tiles, ponds and streams are the most common discharge systems. Reinjection or semi-closed recirculation wells can also be utilized in some regions. In ideal conditions, an open loop application can be the most economical type of system to install.



Horizontal Closed Loop



Vertical Closed Loop



Ground Water (open) Loop

About the GT-S

What is the GT-S?

Carrier is introducing the industry to the first ever geothermal split system with internal pumping for residential applications. We are giving the consumer choices for unit location! The unit may be installed inside or outside, thereby satisfying the requirements of almost any home. When installed outside, the unit may be placed on an existing pad and easily connected to existing electric service. And with this installation option, the fluid loop remains outside avoiding extensive installation inside the home. The GT-S is geothermal without the hassle.

Why GT-S?

We have defined the goal of the GT-S as follows: to advance a model of technology beyond the familiar. But what do we mean? Essentially, our GT-S is taking traditional geothermal technology a step further by offering a unique split system design suitable for any home. Home owners can now enjoy all the savings of a geothermal system with lower installation costs and less hassle. More importantly, the GT-S is opening up the previously illusive retrofit market. Hence, our slogan "From Air to Water.". The GT-S is a competitive product designed to shift traditional air source homeowners to the benefits of water source geothermal technology.

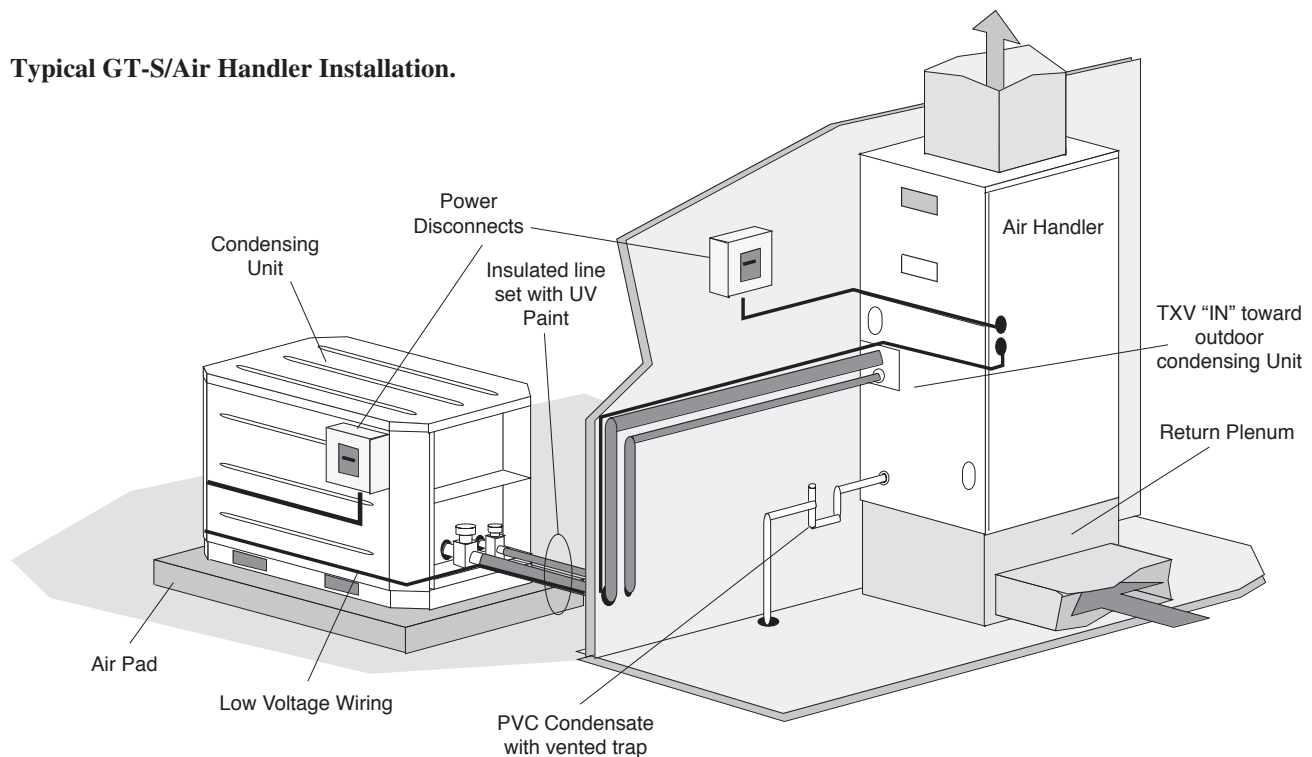
From the utility perspective, the GT-S just about perfectly embodies what the utility industry has been searching for in geothermal: Lower first cost, simple and easy to service, fits traditional dealer practices and broad market appeal especially for retrofit, etc. The GT-S can pull geothermal out of its high end niche into more of a mainstream segment.

The GT-S Concept

The GT-S provides a unique solution to many of the problems associated with single-package geothermal units. In addition, it substantially reduces overall installed costs and perhaps more importantly, opens up the largely untapped retrofit market (which, for conventional equipment, is over 3 times larger than the new construction market).

In new construction, the GT-S offers many benefits over packaged geothermal units: The fluid loop is kept outside, which keeps large diameter piping, flammable antifreezes and flushing carts (a large, messy service tool) out of the home. The outdoor compressor means noise and most service activity will remain outside. The indoor air handlers are quiet, require less space and allow less costly ductwork (they don't have to be side return with canvas collars and plenum lining). Also, a GT-S can utilize a gas furnace as the blower and supplemental heat (dual fuel or add-on) which removes a major consumer barrier in that geothermal has traditionally forced the homeowner to make an all-electric home decision. An add-on application also allows the option of sizing the geothermal component to the cooling load, rather than heating, which may further reduce first costs. The GT-S should be able to tap a larger new construction segment than geothermal currently captures, even when marketed through existing geothermal dealers.

Typical GT-S/Air Handler Installation.



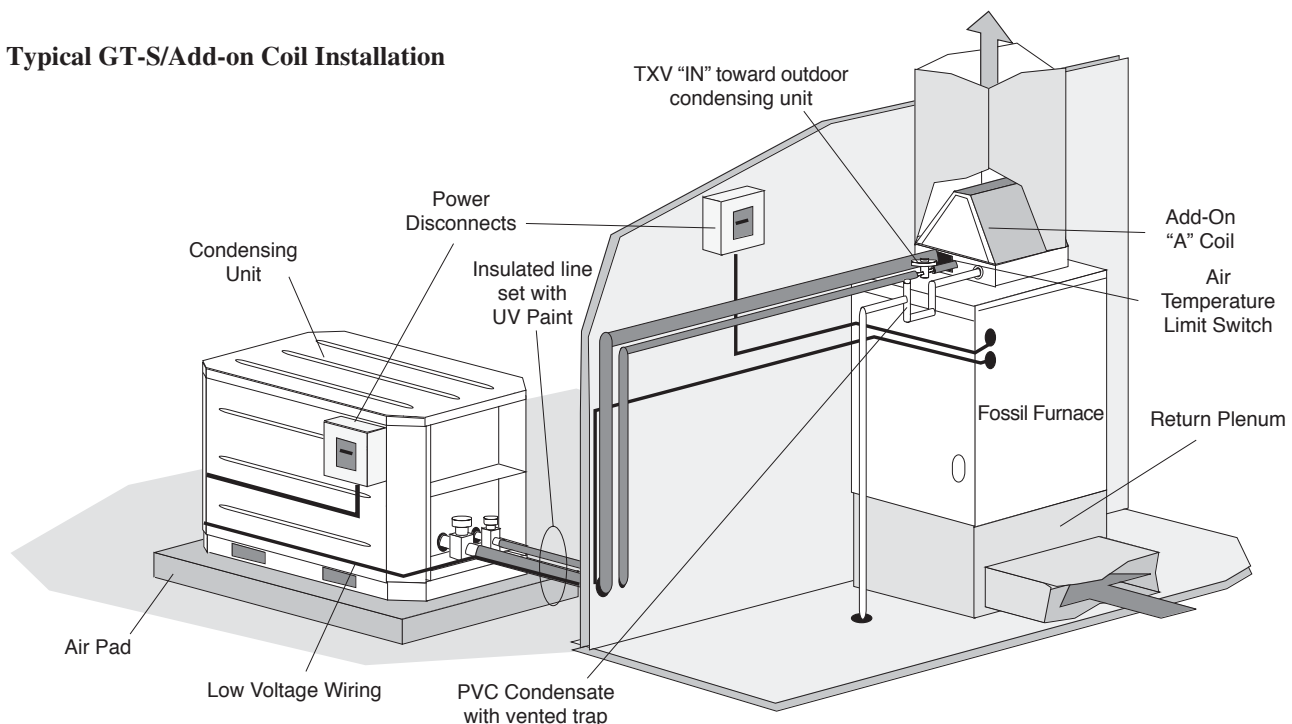
About the GT-S

In the replacement market, the GT-S greatly expands the range of suitable geothermal applications. Current geothermal retrofits have required a complete change out of all existing equipment, elaborate ductwork modifications, complex routing of interior loop fluid lines including below grade foundation penetrations, upgraded electrical service and unit feeders (110v furnace being changed to 240v heat pump with electric backup), and more. This assumes that a geothermal package unit can even be adapted to fit into the existing space. This process is expensive and disruptive to the owner (they typically don't want to change radically from what they have); hence the lack of geothermal retrofits existing. In contrast, the GT-S can be installed outside on the same line set and electric service supplying the existing air conditioner or heat pump condensing unit. The loop stays outside. Only the indoor coil might need to be changed on an existing furnace, or possibly the air handler on an older heat pump. The purchase timing could be driven by a first-time central cooling addition; the upgrade replacement of an aging or broken air conditioner, heat pump or furnace; an HVAC change necessitated by a renovation; or an efficiency upgrade driven by a utility marketing program.

The GT-S does not need to be located outside. It can be placed in garages, carports, basements, crawl spaces, etc. This may be important to some homeowners who may be very concerned about outdoor aesthetics. They also can utilize ground water if placed in an appropriate indoor location. Noise is not a problem as the GT-S is extremely quiet (the box is sealed and insulated). The GT-S also has excellent heating and latent cooling capacities compared with competitive high efficiency geothermal units. In many cases a GT-S produces the heating output of one size larger competitor unit. And the GT-S is likely to be the highest EER per dollar cost unit available in the geothermal industry today.

The goal for the GT-S Series is based upon application flexibility, efficiency, reliability and a blend of solid state compressor and electro-mechanical controls, producing a reliable, simple product both easy to service and install. Its efficiency and application flexibility make it the "GT-S" of geothermal heat pumps.

Typical GT-S/Add-on Coil Installation



GT-S Split System Design Features

Application Flexibility

- Seven Capacities 18, 24, 30, 36, 42, 48, and 60
- Extended range operation (20-110°F EWT)
- Weather-resistant cabinet
- Add-on heat pump capable design
- Pre-charged with refrigerant
- Internally mounted Flow Controller (Field installed option)
- All brass backseating service valves
- Field selectable freeze protection setting for well or earth loop
- Hot Water Generator ready with built-in HWG valve ports
- Relay to control field-mounted accessories
- Coaxial heat exchanger, refrigerant suction lines and all water lines are fully insulated to eliminate condensation problems in low temperature applications
- Noise Reduction features include: isolation mounted compressors; insulated compressor compartment; and interior cabinet insulation using 1/2" coated glass fiber.
- Safety features include: high pressure and loss of charge refrigerant controls to protect compressor; freeze protection sensor to safeguard the coaxial heat exchanger; fault lockout prevents compressor operation until thermostat or circuit breaker is reset

Operating Efficiencies

- Extremely high efficiencies as shown in the ARI/ASHRAE/ISO 13256-1 ratings for heating COP's, cooling EER's and low water flow rates
- Operating and temperature range allow shorter loops
- Optional remote hot water generator accessory with internal pump generates hot water at considerable savings
- Rugged and highly efficient scroll compressors
- Oversized coaxial tube water-to-refrigerant heat exchangers operate at low liquid pressure drop
- Convoluted copper (and optional cupronickel) water tube functions efficiently at low-flow rates and provides freeze-damage resistance
- Low pressure drop heat exchanger means one pump is adequate through 4 ton units in most cases

Service Advantages

- Top access for compressor section.
- "High side" loss of charge pressure switch for more accurate sensing
- Thermal expansion valve with external superheat adjustment
- Solid state compressor control boards provide reliable lockout and time delay functions for each circuit
- Low ambient temperature switch activates loop pump in extreme temperatures
- High and low pressure service ports on refrigerant service valves
- Refrigerant sensing freeze protection for more accurate freeze protection

Factory Quality

- All units are water run-tested in all modes to insure efficiency and reliability
- Heavy gauge galvanized steel cabinets are powder painted for durable and long-lasting finish
- All refrigerant brazing is done in a nitrogen atmosphere
- All units are deep evacuated to less than 50 microns prior to refrigerant charging
- All joints are both helium and halogen leak tested to insure annual leak rate of less than 1/4 ounce

Performance Certified by ARI/ASHRAE/ISO 13256-1-00



ARI/ASHRAE/ISO 13256-1-00 for Water or Brine-to-Air Heat Pumps English Inch-Pound Unit of Measure

Model	Air Handler Model	Air Flow (cfm)	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump						
			Liquid Flow (gpm)	Cooling 86°F		Heating 68°F		Liquid Flow (gpm)	Cooling 59°F		Heating 50°F		Liquid Flow (gpm)	Cooling 77°F		Heating 32°F	
				Capacity Btuh	EER Btuh/W	Capacity Btuh	COP		Capacity Btuh	EER Btuh/W	Capacity Btuh	COP		Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
018	GAH18	600	4.5	16,600	14.4	20,300	4.8	2.3	18,500	22.1	15,500	4.0	4.5	17,800	16.2	12,800	3.5
024	GAH24	800	6.0	23,500	14.5	29,300	4.7	3.0	25,700	20.6	22,800	3.9	6.0	25,200	16.6	18,600	3.5
030	GAH30	1000	8.0	28,000	14.7	34,000	4.7	4.0	30,200	20.8	26,400	3.9	8.0	29,800	16.4	21,500	3.5
036	GAH36	1150	9.0	32,800	14.5	39,200	4.4	4.5	34,900	20.1	31,900	3.9	9.0	34,700	15.9	25,900	3.3
042	GAH42	1400	10.5	39,800	14.1	48,300	4.7	5.3	44,100	19.7	37,800	3.9	10.5	42,000	15.5	31,700	3.6
048	GAH48	1600	12.0	44,500	14.2	52,500	4.8	6.0	47,500	19.3	42,000	3.9	12.0	47,400	15.9	35,800	3.6
060	GAH60	2000	15.0	55,100	13.0	72,700	4.6	7.5	57,800	17.2	57,100	3.7	15.0	57,600	14.2	47,200	3.5

Cooling capacities based upon 80.6°F DB, 66.2°F WB entering air temperature.
Heating capacities based upon 68°F DB, 59°F WB entering air temperature.
All ratings based upon 208V operation.

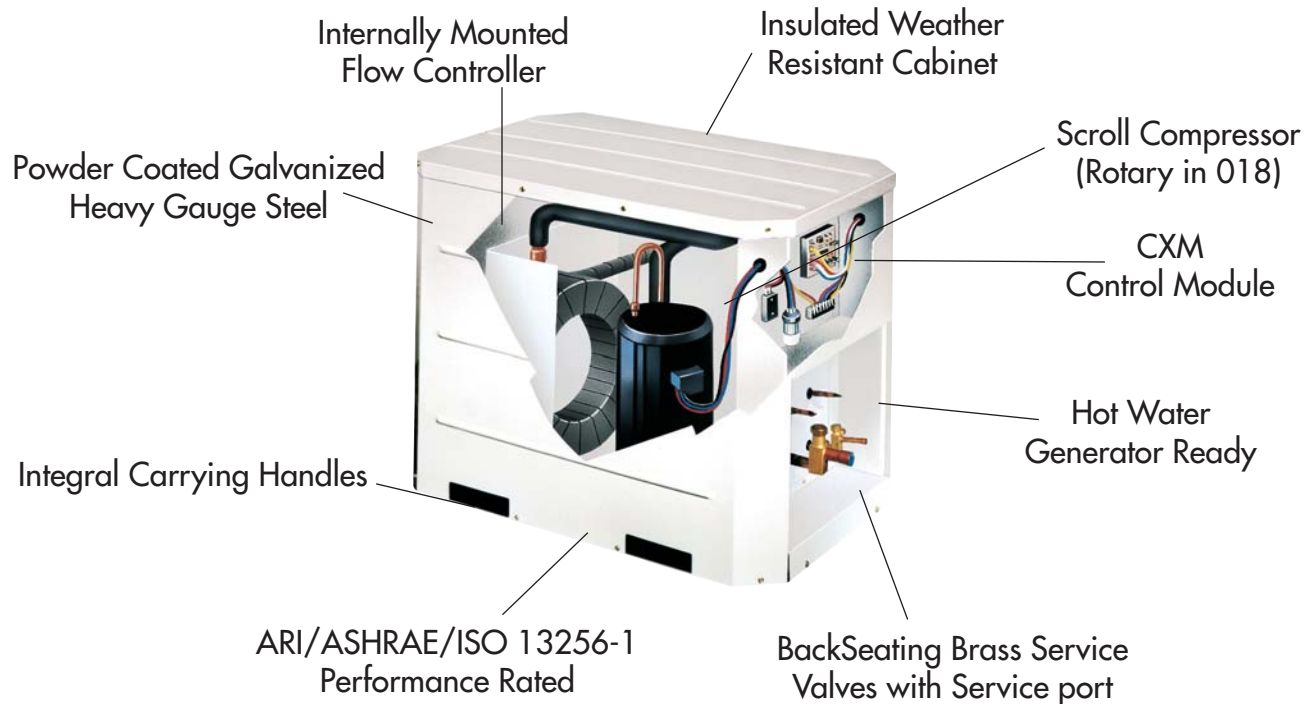
Rev: 5/04/01B

ARI/ASHRAE/ISO 13256-1-00 for Water or Brine-to-Air Heat Pumps Metric Unit of Measure

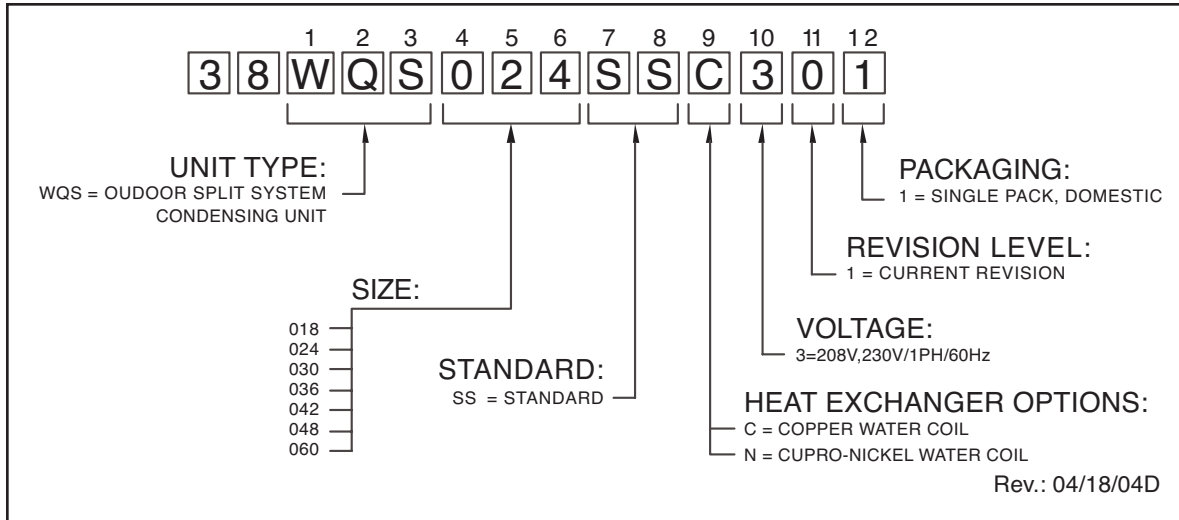
Model	Air Handler Model	Air Flow (l/s)	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump						
			Liquid Flow (l/s)	Cooling 30°C		Heating 20°C		Liquid Flow (l/s)	Cooling 15°C		Heating 10°C		Liquid Flow (l/s)	Cooling 25°C		Heating 0°C	
				Capacity Watts	EER (W/W)	Capacity Watts	COP		Capacity Watts	EER (W/W)	Capacity Watts	COP		Capacity Watts	EER (W/W)	Capacity Watts	COP
018	GAH18	283	0.28	4,865	4.2	5,950	4.8	0.15	5,422	6.5	4,543	4.0	0.28	5,217	4.7	3,751	3.5
024	GAH24	378	0.38	6,887	4.2	8,587	4.7	0.19	7,532	6.0	6,682	3.9	0.38	7,386	4.9	5,451	3.5
030	GAH30	472	0.50	8,206	4.3	9,965	4.7	0.25	8,851	6.1	7,737	3.9	0.50	8,734	4.8	6,301	3.5
036	GAH36	543	0.57	9,613	4.2	11,489	4.4	0.28	10,229	5.9	9,349	3.9	0.57	10,170	4.7	7,591	3.3
042	GAH42	661	0.66	11,665	4.1	14,156	4.7	0.33	12,925	5.8	11,079	3.9	0.66	12,309	4.5	9,291	3.6
048	GAH48	755	0.76	13,042	4.2	15,387	4.8	0.38	13,921	5.7	12,309	3.9	0.76	13,892	4.7	10,492	3.6
060	GAH60	944	0.95	16,149	3.8	21,307	4.6	0.47	16,940	5.0	16,735	3.7	0.95	16,882	4.2	13,834	3.5

Cooling capacities based upon 27°C DB, 19°C WB entering air temperature.
Heating capacities based upon 20°C DB, 15°C WB entering air temperature.
All ratings based upon 208V operation.

Rev: 5/04/01B



Model Key



Reference Calculations & Legend

Heating		Cooling	
$LWT = EWT - \frac{HE}{GPM \times 500}$		$LWT = EWT + \frac{HR}{GPM \times 500}$	$LC = TC - SC$
$LAT = EAT + \frac{HC}{CFM \times 1.08}$		$LAT (DB) = EAT (DB) - \frac{SC}{CFM \times 1.08}$	$S/T = \frac{SC}{TC}$

CFM = airflow, cubic feet/minute	HWG = hot water generator (desuperheater) capacity, BTUH
EWT = entering water temperature, °F	EER = Energy Efficiency Ratio
GPM = water flow in gallons/minute	= BTU output/Watt input
EAT = entering air temperature, °F (dry bulb/wet bulb)	COP = Coefficient of Performance
HC = air heating capacity, BTUH	= BTU output/BTU input
TC = total cooling capacity, BTUH	LWT = leaving water temperature, °F
SC = sensible cooling capacity, BTUH	LAT = leaving air temperature, °F
KW = total power unit input, kilowatts	LC = latent cooling capacity, BTUH
HR = total heat of rejection, BTUH	S/T = sensible to total cooling ratio
HE = total heat of extraction, BTUH	WPD = water pressure drop (psi & ft. hd.)

Performance Correction Tables

Heating Corrections				Cooling Corrections										
Ent Air DB °F	Htg Cap	Power	Heat of Ext	Ent Air WB °F	Total Clg Cap	Sens Clg Cap Multiplier - Entering DB °F						Power	Heat of Rej	
						70	75	80	80.6	85	90			95
60	1.019	0.896	1.054	60	0.881	0.943	1.067	1.192	1.240	*	*	*	0.983	0.899
65	1.010	0.948	1.028	65	0.940	0.797	0.952	1.106	1.125	1.261	*	*	0.991	0.949
68	1.004	0.980	1.011	66.2	0.976	0.693	0.868	1.043	1.063	1.217	*	*	0.997	0.980
70	1.000	1.000	1.000	67	1.000	0.624	0.812	1.000	1.023	1.188	1.343	1.352	1.000	1.000
75	0.997	1.059	0.979	70	1.012		0.697	0.820	0.835	0.944	1.067	1.257	1.002	1.010
80	0.993	1.118	0.957	75	1.024			0.637	0.658	0.817	0.983	1.159	1.005	1.019

* Sensible capacity equals total capacity.

ARI/ISO/ASHRAE 13256-1 uses entering air conditions of Clg- 80.6°F DB/66.2°F WB and Htg- 68°F DB/59°F WB.

Discontinued Standards ARI 320, 325, and 330 used entering air conditions of Clg- 80°F DB/67°F WB and Htg- 70°F DB (bold print).

Rev. 5/2/00M

38WQS018 with GAH18

Performance capacities shown in thousands of Btuh.

EWT °F	GPM	WPD		CFM	HEATING - EAT 70°F						COOLING - EAT 80/67 °F					
		PSI	FT		HC	KW	HE	LAT	COP	HWC	TC	SC	KW	HR	EER	HWC
20	2.2	0.5	1.2	475 600	Operation not recommended						Operation not recommended					
	3.5	1.2	2.7	475 600												
	4.5	1.8	4.2	475 600	11.8 12.1	1.19 1.12	7.7 8.2	92.9 88.6	2.89 3.17	1.3 1.2						
30	2.2	0.5	1.2	475 600	12.9 13.2	1.22 1.14	8.7 9.3	95.2 90.4	3.10 3.40	1.5 1.3	20.7 22.1	12.9 14.7	0.80 0.80	23.4 24.9	26.0 27.5	0.5 0.5
	3.5	1.1	2.6	475 600	13.5 13.9	1.23 1.16	9.3 9.9	96.4 91.4	3.22 3.52	1.6 1.3	20.9 22.3	12.9 14.7	0.75 0.76	23.5 24.9	27.9 29.5	0.6 0.5
	4.5	1.8	4.1	475 600	13.8 14.1	1.24 1.16	9.6 10.2	96.9 91.8	3.26 3.57	1.6 1.4	20.9 22.4	12.9 14.7	0.74 0.75	23.5 24.9	28.3 30.0	0.6 0.5
	2.2	0.5	1.1	475 600	14.8 15.2	1.26 1.18	10.5 11.2	98.9 93.4	3.44 3.77	1.8 1.5	20.3 21.7	12.9 14.7	0.87 0.88	23.2 24.7	23.2 24.6	1.0 0.9
	3.5	1.1	2.5	475 600	15.6 16.0	1.28 1.20	11.3 11.9	100.5 94.7	3.58 3.92	1.8 1.6	20.6 22.1	12.9 14.7	0.81 0.81	23.4 24.8	25.6 27.1	0.9 0.8
40	4.5	1.7	3.9	475 600	16.0 16.4	1.29 1.21	11.6 12.2	101.1 95.2	3.63 3.98	1.9 1.7	20.8 22.2	12.9 14.7	0.79 0.79	23.4 24.9	26.4 27.9	0.8 0.8
	2.2	0.5	1.1	475 600	16.8 17.2	1.31 1.22	12.4 13.1	102.8 96.6	3.78 4.13	2.0 1.8	19.7 21.0	12.7 14.6	0.97 0.98	23.0 24.3	20.3 21.4	1.4 1.3
	3.5	1.1	2.5	475 600	17.8 18.2	1.33 1.24	13.3 14.0	104.7 98.1	3.93 4.31	2.1 1.8	20.2 21.6	12.8 14.7	0.89 0.90	23.2 24.6	22.7 24.0	1.2 1.2
	4.5	1.7	3.8	475 600	18.2 18.6	1.33 1.25	13.6 14.4	105.5 98.8	4.00 4.38	2.2 1.9	20.3 21.7	12.9 14.7	0.86 0.87	23.3 24.7	23.7 25.0	1.0 1.1
	2.2	0.5	1.0	475 600	18.9 19.3	1.35 1.26	14.3 15.0	106.8 99.9	4.10 4.49	2.3 2.0	18.9 20.2	12.5 14.3	1.08 1.09	22.6 23.9	17.4 18.4	1.7 1.6
60	3.5	1.0	2.4	475 600	20.0 20.5	1.37 1.28	15.3 16.1	109.0 101.6	4.28 4.69	2.4 2.1	19.5 20.9	12.7 14.5	0.99 1.00	22.9 24.3	19.7 20.9	1.5 1.5
	4.5	1.6	3.7	475 600	20.5 21.0	1.38 1.29	15.8 16.6	109.9 102.4	4.35 4.77	2.4 2.2	19.7 21.1	12.8 14.6	0.96 0.97	23.0 24.4	20.6 21.8	1.3 1.4
	2.2	0.4	1.0	475 600	21.0 21.5	1.39 1.30	16.2 17.0	110.8 103.1	4.43 4.84	2.6 2.2	18.0 19.3	12.2 13.9	1.21 1.22	22.2 23.4	14.9 15.8	2.0 2.0
	3.5	1.0	2.3	475 600	22.3 22.8	1.41 1.32	17.4 18.3	113.4 105.2	4.62 5.06	2.6 2.3	18.7 20.0	12.5 14.2	1.11 1.12	22.5 23.8	16.9 17.9	1.8 1.8
	4.5	1.5	3.6	475 600	22.8 23.4	1.42 1.33	17.9 18.8	114.4 106.0	4.70 5.14	2.7 2.4	19.0 20.3	12.6 14.3	1.07 1.08	22.6 24.0	17.7 18.8	1.6 1.7
80	2.2	0.4	1.0	475 600	23.1 23.6	1.43 1.34	18.2 19.1	114.9 106.5	4.74 5.18	2.9 2.4	17.1 18.3	11.8 13.5	1.34 1.36	21.7 22.9	12.7 13.5	2.2 2.3
	3.5	1.0	2.2	475 600	24.5 25.1	1.45 1.36	19.5 20.5	117.8 108.8	4.94 5.41	3.0 2.5	17.8 19.1	12.1 13.8	1.24 1.25	22.1 23.3	14.4 15.3	2.1 2.2
	4.5	1.5	3.5	475 600	25.1 25.7	1.46 1.37	20.1 21.1	118.9 109.7	5.03 5.51	3.1 2.7	18.1 19.4	12.2 14.0	1.20 1.21	22.2 23.5	15.1 16.0	1.9 2.0
	2.2	0.4	0.9	475 600	25.1 25.8	1.46 1.37	20.2 21.1	119.0 109.8	5.04 5.51	3.1 2.7	16.1 17.2	11.3 12.9	1.48 1.49	21.1 22.3	10.9 11.5	2.5 2.6
	3.5	0.9	2.1	475 600	26.7 27.4	1.49 1.40	21.6 22.6	122.1 112.3	5.26 5.76	3.3 2.8	16.8 18.0	11.7 13.3	1.37 1.39	21.5 22.7	12.3 13.0	2.4 2.5
90	4.5	1.4	3.3	475 600	27.4 28.1	1.50 1.40	22.3 23.3	123.4 113.3	5.35 5.85	3.4 2.9	17.1 18.3	11.8 13.5	1.33 1.35	21.7 22.9	12.8 13.6	2.3 2.3
	2.2	0.4	0.9	475 600	Operation not recommended						15.0 16.1	10.7 12.2	1.62 1.63	20.5 21.6	9.3 9.8	2.9 3.0
	3.5	0.9	2.1	475 600							15.8 16.9	11.1 12.7	1.52 1.53	21.0 22.1	10.4 11.0	2.7 2.8
	4.5	1.4	3.2	475 600							16.1 17.2	11.3 12.9	1.48 1.49	21.1 22.3	10.9 11.6	2.5 2.6
	2.2	0.4	0.9	475 600							14.0 14.9	10.1 11.5	1.75 1.77	20.0 21.0	8.0 8.4	3.2 3.3
	3.5	0.9	2.0	475 600							14.7 15.7	10.5 12.0	1.66 1.67	20.4 21.5	8.9 9.4	3.0 3.1
110	4.5	1.3	3.1	475 600							15.0 16.1	10.7 12.2	1.62 1.63	20.6 21.6	9.3 9.8	2.8 2.9

Interpolation is permissible, extrapolation is not.

Rev: 12/12/03 B

All entering air conditions are 80°F DB and 67°F WB in cooling and 70°F DB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

Operation below 40°F EWT is based on 15% antifreeze solution.

See performance correction tables for operating conditions other than those listed above.

Table does not reflect fan or pump power ISO corrections.

38WQS024 with GAH24

Performance capacities shown in thousands of Btu/h.

EWT °F	GPM	WPD		CFM	HEATING - EAT 70°F						COOLING - EAT 80/67 °F					
		PSI	FT		HC	KW	HE	LAT	COP	HWC	TC	SC	KW	HR	EER	HWC
20	3.0	0.4	1.0	650 800	Operation not recommended						Operation not recommended					
	4.5	1.0	2.2	650 800												
	6.0	1.7	3.9	650 800	16.0 16.2	1.62 1.59	10.5 10.8	92.8 88.7	2.89 2.99	2.1 1.8						
30	3.0	0.4	0.9	650 800	18.9 19.2	1.69 1.62	13.2 13.7	97.0 92.3	3.29 3.48	2.4 2.0	29.4 31.0	19.3 21.2	0.92 0.94	32.6 34.2	32.1 33.0	0.9 0.8
	4.5	0.9	2.1	650 800	19.1 19.4	1.69 1.64	13.4 13.8	97.2 92.4	3.32 3.47	2.5 2.1	30.0 31.0	19.6 21.2	0.89 0.91	33.0 34.1	33.8 34.3	1.0 0.8
				650 800	19.3 19.5	1.69 1.65	13.5 13.9	97.5 92.6	3.35 3.47	2.6 2.2	30.6 31.1	19.9 21.2	0.86 0.87	33.5 34.1	35.6 35.6	1.0 0.8
	6.0	1.6	3.8	650 800	19.3 19.5	1.69 1.65	13.5 13.9	97.5 92.6	3.35 3.47	2.6 2.2	30.6 31.1	19.9 21.2	0.86 0.87	33.5 34.1	35.6 35.6	1.0 0.8
				650 800	19.3 19.5	1.69 1.65	13.5 13.9	97.5 92.6	3.35 3.47	2.6 2.2	30.6 31.1	19.9 21.2	0.86 0.87	33.5 34.1	35.6 35.6	1.0 0.8
	40	3.0	0.4	0.9	650 800	21.5 21.9	1.75 1.69	15.6 16.1	100.7 95.3	3.60 3.80	2.8 2.4	28.7 30.2	18.7 20.6	1.10 1.12	32.4 34.0	26.2 26.9
4.5		0.9	2.1	650 800	21.9 22.2	1.77 1.70	15.9 16.3	101.2 95.6	3.63 3.81	2.9 2.5	29.2 30.2	19.0 20.6	1.06 1.08	32.8 33.9	27.6 28.0	1.5 1.4
				650 800	22.3 22.5	1.78 1.72	16.2 16.6	101.8 96.0	3.67 3.82	3.0 2.6	29.7 30.2	19.3 20.6	1.02 1.04	33.1 33.8	29.1 29.2	1.3 1.3
6.0		1.6	3.7	650 800	22.3 22.5	1.78 1.72	16.2 16.6	101.8 96.0	3.67 3.82	3.0 2.6	29.7 30.2	19.3 20.6	1.02 1.04	33.1 33.8	29.1 29.2	1.3 1.3
				650 800	22.3 22.5	1.78 1.72	16.2 16.6	101.8 96.0	3.67 3.82	3.0 2.6	29.7 30.2	19.3 20.6	1.02 1.04	33.1 33.8	29.1 29.2	1.3 1.3
50		3.0	0.4	0.9	650 800	24.1 24.5	1.82 1.75	17.9 18.5	104.4 98.3	3.88 4.10	3.2 2.8	27.9 29.4	18.2 20.0	1.28 1.31	32.3 33.8	21.9 22.5
	4.5	0.9	2.0	650 800	24.7 24.9	1.85 1.77	18.4 18.9	105.2 98.9	3.92 4.13	3.3 2.9	28.4 29.3	18.4 20.0	1.23 1.25	32.5 33.6	23.1 23.4	2.0 2.0
				650 800	25.3 25.4	1.87 1.79	18.9 19.3	106.1 99.4	3.96 4.16	3.4 3.0	28.8 29.3	18.7 20.0	1.18 1.20	32.8 33.4	24.4 24.4	1.7 1.8
	6.0	1.6	3.6	650 800	25.3 25.4	1.87 1.79	18.9 19.3	106.1 99.4	3.96 4.16	3.4 3.0	28.8 29.3	18.7 20.0	1.18 1.20	32.8 33.4	24.4 24.4	1.7 1.8
				650 800	25.3 25.4	1.87 1.79	18.9 19.3	106.1 99.4	3.96 4.16	3.4 3.0	28.8 29.3	18.7 20.0	1.18 1.20	32.8 33.4	24.4 24.4	1.7 1.8
	60	3.0	0.4	0.9	650 800	26.6 27.1	1.90 1.82	20.1 20.9	107.9 101.4	4.09 4.38	3.6 3.2	27.0 28.4	18.0 19.6	1.42 1.46	31.9 33.4	19.0 19.5
4.5		0.8	1.9	650 800	27.5 27.9	1.93 1.84	20.9 21.6	109.1 102.3	4.16 4.43	3.8 3.3	27.2 28.2	18.1 19.6	1.36 1.39	31.9 32.9	20.0 20.3	2.4 2.5
				650 800	28.4 28.7	1.96 1.87	21.7 22.3	110.4 103.2	4.23 4.49	3.9 3.4	27.4 28.0	18.3 19.7	1.30 1.32	31.9 32.5	21.2 21.2	2.2 2.3
6.0		1.5	3.5	650 800	28.4 28.7	1.96 1.87	21.7 22.3	110.4 103.2	4.23 4.49	3.9 3.4	27.4 28.0	18.3 19.7	1.30 1.32	31.9 32.5	21.2 21.2	2.2 2.3
				650 800	28.4 28.7	1.96 1.87	21.7 22.3	110.4 103.2	4.23 4.49	3.9 3.4	27.4 28.0	18.3 19.7	1.30 1.32	31.9 32.5	21.2 21.2	2.2 2.3
70		3.0	0.4	0.8	650 800	29.0 29.7	1.98 1.88	22.3 23.3	111.3 104.4	4.29 4.63	4.1 3.5	26.1 27.5	17.8 19.3	1.57 1.61	31.5 33.0	16.7 17.1
	4.5	0.8	1.9	650 800	30.2 30.8	2.02 1.92	23.3 24.3	113.0 105.7	4.38 4.72	4.2 3.7	26.1 27.0	17.9 19.3	1.49 1.53	31.2 32.3	17.5 17.7	2.9 3.0
				650 800	31.4 32.0	2.06 1.95	24.4 25.3	114.7 107.0	4.47 4.80	4.3 3.8	26.1 26.6	18.0 19.4	1.41 1.44	30.9 31.5	18.4 18.4	2.7 2.8
	6.0	1.5	3.4	650 800	31.4 32.0	2.06 1.95	24.4 25.3	114.7 107.0	4.47 4.80	4.3 3.8	26.1 26.6	18.0 19.4	1.41 1.44	30.9 31.5	18.4 18.4	2.7 2.8
				650 800	31.4 32.0	2.06 1.95	24.4 25.3	114.7 107.0	4.47 4.80	4.3 3.8	26.1 26.6	18.0 19.4	1.41 1.44	30.9 31.5	18.4 18.4	2.7 2.8
	80	3.0	0.3	0.8	650 800	31.6 32.4	2.05 1.95	24.6 25.7	115.0 107.4	4.51 4.87	4.5 3.9	25.4 26.8	17.1 18.5	1.77 1.81	31.5 32.9	14.4 14.8
4.5		0.8	1.8	650 800	32.9 33.6	2.09 1.99	25.8 26.8	116.9 108.9	4.60 4.96	4.7 4.0	25.4 26.3	17.2 18.6	1.68 1.72	31.1 32.2	15.1 15.3	3.4 3.5
				650 800	34.3 34.9	2.14 2.03	27.0 28.0	118.8 110.4	4.69 5.04	4.8 4.2	25.4 25.9	17.2 18.6	1.59 1.62	30.8 31.4	16.0 15.9	3.1 3.2
6.0		1.4	3.2	650 800	34.3 34.9	2.14 2.03	27.0 28.0	118.8 110.4	4.69 5.04	4.8 4.2	25.4 25.9	17.2 18.6	1.59 1.62	30.8 31.4	16.0 15.9	3.1 3.2
				650 800	34.3 34.9	2.14 2.03	27.0 28.0	118.8 110.4	4.69 5.04	4.8 4.2	25.4 25.9	17.2 18.6	1.59 1.62	30.8 31.4	16.0 15.9	3.1 3.2
90		3.0	0.3	0.8	650 800	34.2 35.0	2.12 2.01	26.9 28.1	118.6 110.5	4.72 5.10	5.0 4.2	24.7 26.0	16.4 17.7	1.96 2.01	31.4 32.9	12.6 12.9
	4.5	0.8	1.7	650 800	35.6 36.4	2.17 2.06	28.2 29.4	120.8 112.1	4.81 5.18	5.2 4.4	24.7 25.6	16.4 17.8	1.86 1.91	31.1 32.1	13.3 13.4	3.9 4.0
				650 800	37.1 37.8	2.22 2.11	29.5 30.6	122.9 113.8	4.89 5.25	5.4 4.6	24.7 25.2	16.5 17.9	1.77 1.80	30.7 31.3	14.0 14.0	3.6 3.7
	6.0	1.4	3.1	650 800	37.1 37.8	2.22 2.11	29.5 30.6	122.9 113.8	4.89 5.25	5.4 4.6	24.7 25.2	16.5 17.9	1.77 1.80	30.7 31.3	14.0 14.0	3.6 3.7
				650 800	37.1 37.8	2.22 2.11	29.5 30.6	122.9 113.8	4.89 5.25	5.4 4.6	24.7 25.2	16.5 17.9	1.77 1.80	30.7 31.3	14.0 14.0	3.6 3.7
	100	3.0	0.3	0.7	650 800	Operation not recommended						23.4 24.6	15.9 17.2	2.20 2.26	30.9 32.3	10.6 10.9
4.5		0.7	1.7	650 800	23.3 24.2							16.0 17.3	2.09 2.14	30.5 31.5	11.2 11.3	4.4 4.5
				650 800	23.3 23.8							16.0 17.3	1.98 2.02	30.1 30.7	11.8 11.8	4.1 4.2
6.0		1.3	3.0	650 800	22.0 23.2							15.4 16.7	2.44 2.50	30.3 31.7	9.0 9.3	5.1 5.3
				650 800	22.0 22.8							15.5 16.7	2.32 2.37	29.9 30.9	9.5 9.6	5.0 5.0
110		3.0	0.3	0.7	650 800							Operation not recommended				
	4.5	0.7	1.6	650 800	22.0 22.8	15.4 16.7	2.44 2.50	30.3 31.7	9.0 9.3	5.1 5.3						
				650 800	22.0 22.8	15.5 16.7	2.32 2.37	29.9 30.9	9.5 9.6	5.0 5.0						
	6.0	1.3	2.9	650 800	21.9 22.4	15.5 16.8	2.20 2.24	29.4 30.0	10.0 10.0	4.6 4.7						
				650 800	21.9 22.4	15.5 16.8	2.20 2.24	29.4 30.0	10.0 10.0	4.6 4.7						

38WQS030 with GAH30

Performance capacities shown in thousands of Btu/h.

EWT °F	GPM	WPD		CFM	HEATING - EAT 70°F						COOLING - EAT 80/67 °F					
		PSI	FT		HC	KW	HE	LAT	COP	HWC	TC	SC	KW	HR	EER	HWC
20	3.7	0.6	1.5	800	Operation not recommended						Operation not recommended					
	5.5	1.4	3.3	800												
	7.5	2.7	6.2	800												
30	3.7	0.6	1.4	1000	18.4	1.92	11.9	91.3	2.82	2.6	34.5	22.6	1.09	38.2	31.6	1.1
				1000	18.6	1.88	12.2	87.2	2.91	2.2						
	5.5	1.4	3.2	800	20.6	1.97	13.9	93.8	3.06	2.9						
				1000	20.7	1.92	14.1	89.1	3.15	2.5						
	7.5	2.6	6.0	800	21.5	1.96	14.8	94.9	3.20	3.0						
				1000	21.6	1.92	15.1	90.0	3.30	2.6						
40	3.7	0.6	1.4	800	22.4	1.96	15.7	95.9	3.35	3.2	34.8	22.2	1.05	38.4	33.2	1.2
				1000	22.6	1.92	16.1	90.9	3.45	2.7	36.1	24.1	1.14	40.0	31.8	1.0
	5.5	1.3	3.1	800	24.0	2.03	17.1	97.8	3.48	3.4	33.5	22.3	1.31	37.9	25.5	1.9
				1000	24.1	1.98	17.4	92.4	3.58	3.0	34.9	25.0	1.25	39.2	27.8	1.8
	7.5	2.5	5.8	800	24.9	2.04	18.0	98.9	3.58	3.6	33.6	22.2	1.26	37.9	26.7	1.8
				1000	24.9	1.98	18.2	93.1	3.68	3.1	34.9	24.4	1.28	39.3	27.3	1.7
50	3.7	0.6	1.3	800	25.8	2.06	18.8	99.9	3.68	3.7	33.7	22.1	1.20	37.8	28.0	1.6
				1000	25.7	1.99	18.9	93.8	3.78	3.2	35.0	23.9	1.31	39.5	26.8	1.6
	5.5	1.3	3.0	800	27.5	2.08	20.4	101.8	3.87	4.0	32.4	22.1	1.53	37.7	21.2	2.7
				1000	27.6	2.03	20.7	95.6	3.99	3.4	33.8	24.7	1.47	38.8	23.1	2.6
	7.5	2.4	5.6	800	28.4	2.12	21.2	102.8	3.93	4.1	32.6	22.0	1.45	37.5	22.5	2.4
				1000	28.2	2.05	21.2	96.1	4.04	3.6	33.9	24.2	1.47	38.9	23.0	2.4
60	3.7	0.6	1.3	800	29.3	2.16	21.9	103.9	3.98	4.2	32.7	21.9	1.36	37.3	24.0	2.1
				1000	28.8	2.06	21.8	96.6	4.09	3.7	33.9	23.8	1.48	39.0	23.0	2.2
	5.5	1.3	2.9	800	31.0	2.17	23.6	105.8	4.19	4.5	31.2	21.4	1.66	36.9	18.8	3.3
				1000	31.1	2.09	24.0	98.8	4.37	3.9	32.7	23.8	1.67	38.3	19.6	3.3
	7.5	2.4	5.4	800	31.8	2.21	24.3	106.8	4.22	4.6	31.2	21.1	1.59	36.7	19.7	3.0
				1000	32.0	2.11	24.8	99.6	4.45	4.1	32.7	23.5	1.62	38.3	20.2	3.0
70	3.7	0.5	1.3	800	32.7	2.25	25.0	107.9	4.25	4.8	31.2	20.8	1.52	36.4	20.6	2.7
				1000	32.9	2.13	25.6	100.4	4.52	4.2	32.8	23.1	1.58	38.2	20.7	2.8
	5.5	1.2	2.8	800	34.4	2.25	26.8	109.9	4.48	5.0	30.0	20.7	1.79	36.2	16.8	3.9
				1000	34.6	2.14	27.3	102.0	4.73	4.4	31.5	23.0	1.87	37.9	16.9	3.9
	7.5	2.3	5.3	800	35.3	2.30	27.4	110.8	4.50	5.2	29.9	20.2	1.73	35.8	17.3	3.6
				1000	35.8	2.17	28.4	103.1	4.83	4.5	31.6	22.8	1.78	37.7	17.8	3.7
80	3.7	0.5	1.2	800	36.1	2.35	28.1	111.8	4.51	5.3	29.7	19.7	1.67	35.5	17.8	3.3
				1000	37.0	2.20	29.5	104.2	4.92	4.7	31.7	22.5	1.69	37.5	18.8	3.4
	5.5	1.2	2.7	800	37.9	2.31	30.0	113.9	4.81	5.6	29.0	20.7	2.00	35.9	14.5	4.5
				1000	38.0	2.20	30.5	105.2	5.08	4.8	30.5	23.0	2.08	37.6	14.7	4.6
	7.5	2.2	5.1	800	38.6	2.37	30.5	114.7	4.77	5.8	28.9	20.2	1.93	35.5	15.0	4.2
				1000	39.1	2.24	31.5	106.2	5.12	5.0	30.6	22.7	1.98	37.3	15.4	4.3
90	3.7	0.5	1.2	800	39.3	2.44	31.0	115.5	4.73	6.0	28.7	19.7	1.87	35.1	15.4	3.9
				1000	40.2	2.28	32.4	107.2	5.17	5.2	30.6	22.5	1.89	37.1	16.3	4.0
	5.5	1.1	2.6	800	41.4	2.37	33.3	117.9	5.12	6.2	28.0	20.7	2.20	35.5	12.7	5.1
				1000	41.5	2.25	33.8	108.4	5.41	5.2	29.4	23.0	2.30	37.3	12.8	5.3
	7.5	2.1	4.9	800	41.9	2.44	33.6	118.5	5.03	6.4	27.9	20.2	2.13	35.2	13.1	4.8
				1000	42.5	2.31	34.6	109.3	5.40	5.5	29.5	22.7	2.19	37.0	13.5	4.9
100	3.7	0.5	1.1	800	42.5	2.52	33.9	119.2	4.94	6.7	27.7	19.7	2.06	34.8	13.5	4.5
				1000	43.5	2.36	35.4	110.3	5.40	5.7	29.6	22.5	2.08	36.7	14.2	4.6
	5.5	1.1	2.5	800	Operation not recommended						26.4	19.6	2.39	34.6	11.0	5.8
				1000							27.7	21.8	2.49	36.2	11.1	6.0
	7.5	2.0	4.7	800							26.3	19.2	2.32	34.2	11.4	5.4
				1000							27.8	21.6	2.38	35.9	11.7	5.6
	110	0.5	1.1	800							26.2	18.7	2.24	33.8	11.7	5.1
				1000							27.9	21.3	2.26	35.6	12.3	5.2
110	3.7	0.5	1.1	800							24.8	18.6	2.58	33.6	9.6	6.4
				1000							26.0	20.6	2.69	35.2	9.7	6.7
	5.5	1.1	2.4	800							24.7	18.1	2.50	33.2	9.9	6.0
				1000							26.1	20.4	2.57	34.9	10.2	6.2
	7.5	2.0	4.5	800							24.6	17.7	2.42	32.8	10.2	5.7
				1000							26.2	20.2	2.44	34.5	10.7	5.8

Interpolation is permissible, extrapolation is not.

All entering air conditions are 80°F DB and 67°F WB in cooling and 70°F DB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

Operation below 40°F EWT is based on 15% antifreeze solution.

See performance correction tables for operating conditions other than those listed above.

Table does not reflect fan or pump power ISO corrections.

Rev: 12/12/03 B

38WQS036 with GAH36

Performance capacities shown in thousands of Btuh.

EWT °F	GPM	WPD		CFM	HEATING - EAT 70°F						COOLING - EAT 80/67 °F					
		PSI	FT		HC	KW	HE	LAT	COP	HWC	TC	SC	KW	HR	EER	HWC
20	4.5	1.6	3.8	975	Operation not recommended						Operation not recommended					
	7.0	3.3	7.6	975												
	9.0	4.9	11.2	975	23.1	2.15	15.7	91.9	3.14	3.2						
				1200	22.9	2.23	15.3	87.7	3.01	2.7						
30	4.5	1.6	3.7	975	25.6	2.38	17.5	94.3	3.14	3.6	41.8	27.1	1.32	46.3	31.6	1.2
				1200	25.9	2.30	18.1	90.0	3.30	3.0	42.2	29.1	1.38	46.9	30.5	1.1
	7.0	3.2	7.3	975	26.2	2.31	18.3	94.9	3.32	3.7	41.7	27.3	1.27	46.1	32.9	1.3
				1200	26.3	2.31	18.4	90.3	3.33	3.2	42.0	29.4	1.33	46.5	31.7	1.1
	9.0	4.7	10.9	975	26.8	2.24	19.2	95.5	3.51	3.9	41.6	27.5	1.22	45.8	34.2	1.3
				1200	26.6	2.32	18.7	90.5	3.36	3.3	41.9	29.8	1.27	46.2	32.9	1.2
40	4.5	1.5	3.5	975	29.2	2.46	20.8	97.7	3.48	4.2	40.4	26.5	1.53	45.6	26.5	2.2
				1200	29.6	2.37	21.5	92.8	3.65	3.6	40.7	28.5	1.60	46.1	25.5	2.1
	7.0	3.1	7.1	975	29.8	2.42	21.6	98.3	3.61	4.4	40.4	26.7	1.47	45.4	27.5	2.1
				1200	29.9	2.39	21.8	93.1	3.67	3.7	40.6	28.8	1.54	45.9	26.4	2.0
	9.0	4.6	10.6	975	30.4	2.38	22.3	98.9	3.75	4.5	40.4	26.9	1.41	45.2	28.5	1.9
				1200	30.3	2.41	22.1	93.4	3.69	3.9	40.6	29.0	1.48	45.6	27.5	1.9
50	4.5	1.5	3.4	975	32.8	2.53	24.2	101.1	3.80	4.8	38.9	26.0	1.73	44.8	22.5	3.2
				1200	33.2	2.44	24.9	95.6	3.99	4.2	39.2	27.9	1.81	45.4	21.7	3.1
	7.0	3.0	6.9	975	33.4	2.53	24.8	101.7	3.88	5.0	39.0	26.1	1.67	44.7	23.4	2.8
				1200	33.6	2.47	25.2	95.9	3.99	4.3	39.3	28.1	1.75	45.2	22.5	2.8
	9.0	4.4	10.2	975	34.1	2.52	25.5	102.3	3.96	5.2	39.1	26.2	1.61	44.6	24.3	2.4
				1200	34.0	2.49	25.5	96.2	4.00	4.5	39.3	28.3	1.68	45.0	23.4	2.6
60	4.5	1.4	3.3	975	36.2	2.65	27.2	104.4	4.01	5.5	36.9	25.7	1.90	43.3	19.4	3.9
				1200	36.9	2.54	28.2	98.4	4.25	4.7	37.4	28.2	1.98	44.1	18.9	3.9
	7.0	2.9	6.7	975	36.9	2.65	27.9	105.1	4.08	5.6	37.3	25.9	1.84	43.6	20.3	3.6
				1200	37.5	2.57	28.7	98.9	4.28	4.9	37.8	28.2	1.91	44.3	19.8	3.6
	9.0	4.3	9.9	975	37.7	2.66	28.6	105.8	4.15	5.8	37.7	26.2	1.78	43.8	21.2	3.2
				1200	38.2	2.59	29.3	99.4	4.32	5.1	38.2	28.3	1.85	44.5	20.7	3.3
70	4.5	1.4	3.2	975	39.6	2.76	30.2	107.6	4.20	6.1	34.8	25.4	2.07	41.9	16.8	4.7
				1200	40.5	2.64	31.5	101.3	4.49	5.3	35.5	28.4	2.15	42.8	16.5	4.7
	7.0	2.8	6.5	975	40.5	2.78	31.0	108.4	4.26	6.3	35.6	25.8	2.01	42.4	17.7	4.3
				1200	41.4	2.67	32.3	101.9	4.55	5.5	36.3	28.3	2.08	43.4	17.5	4.4
	9.0	4.1	9.6	975	41.3	2.80	31.7	109.2	4.32	6.5	36.3	26.2	1.96	43.0	18.6	3.9
				1200	42.3	2.69	33.1	102.6	4.61	5.7	37.1	28.2	2.01	44.0	18.5	4.1
80	4.5	1.3	3.1	975	43.2	2.86	33.4	111.0	4.42	6.8	33.5	24.5	2.30	41.4	14.6	5.4
				1200	44.2	2.74	34.8	104.1	4.72	5.8	34.2	27.4	2.39	42.3	14.3	5.5
	7.0	2.7	6.2	975	44.0	2.88	34.2	111.8	4.47	7.0	34.3	24.9	2.23	41.9	15.4	5.0
				1200	45.0	2.76	35.6	104.7	4.78	6.1	35.0	27.3	2.31	42.9	15.2	5.1
	9.0	4.0	9.3	975	44.8	2.90	34.9	112.6	4.53	7.3	35.0	25.2	2.17	42.4	16.1	4.6
				1200	45.9	2.79	36.4	105.4	4.83	6.3	35.8	27.2	2.23	43.4	16.0	4.8
90	4.5	1.3	3.0	975	46.7	2.97	36.6	114.4	4.61	7.5	32.3	23.6	2.52	40.9	12.8	6.1
				1200	47.8	2.84	38.1	106.9	4.93	6.3	32.9	26.4	2.62	41.9	12.6	6.3
	7.0	2.6	6.0	975	47.5	2.98	37.4	115.1	4.67	7.8	33.0	24.0	2.45	41.4	13.4	5.7
				1200	48.7	2.86	38.9	107.5	4.98	6.6	33.7	26.3	2.54	42.3	13.3	5.9
	9.0	3.9	8.9	975	48.3	3.00	38.1	115.9	4.72	8.1	33.7	24.3	2.38	41.8	14.1	5.4
				1200	49.5	2.88	39.7	108.2	5.04	6.9	34.4	26.2	2.45	42.8	14.0	5.5
100	4.5	1.3	2.9	975	Operation not recommended						30.3	23.7	2.83	39.9	10.7	6.9
				1200							30.9	26.5	2.94	40.9	10.5	7.2
	7.0	2.5	5.8	975							30.9	24.1	2.75	40.3	11.2	6.5
				1200							31.6	26.4	2.85	41.3	11.1	6.7
	9.0	3.7	8.6	975							31.6	24.4	2.67	40.7	11.8	6.1
				1200							32.3	26.3	2.75	41.6	11.7	6.2
110	4.5	1.2	2.8	975							28.2	23.9	3.14	38.9	9.0	7.7
				1200							28.8	26.7	3.26	39.9	8.8	8.0
	7.0	2.4	5.6	975							28.9	24.2	3.05	39.3	9.5	7.2
				1200							29.5	26.6	3.16	40.2	9.3	7.5
	9.0	3.6	8.3	975							29.5	24.6	2.97	39.6	9.9	6.8
				1200							30.1	26.5	3.05	40.5	9.9	7.0

Performance capacities shown in thousands of Btuh.

Rev: 12/12/03 B

All entering air conditions are 80°F DB and 67°F WB in cooling and 70°F DB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

Operation below 40°F EWT is based on 15% antifreeze solution.

See performance correction tables for operating conditions other than those listed above.

Table does not reflect fan or pump power ISO corrections.

38WQS042 with GAH42

Performance capacities shown in thousands of Btuh.

EWT °F	GPM	WPD		CFM	HEATING - EAT 70°F						COOLING - EAT 80/67 °F					
		PSI	FT		HC	KW	HE	LAT	COP	HWC	TC	SC	KW	HR	EER	HWC
20	5.2	2.0	4.7	1150	Operation not recommended						Operation not recommended					
	9.0	4.9	11.2	1150												
	10.5	6.2	14.3	1150	26.5	2.62	17.5	91.3	2.96	3.6						
				1400	27.2	2.60	18.4	88.0	3.07	3.1						
30	5.2	2.0	4.6	1150	31.3	2.71	22.0	95.2	3.38	4.1	50.5	33.1	1.67	56.2	30.3	1.6
				1400	31.3	2.65	22.3	90.7	3.46	3.5	52.4	36.4	1.73	58.3	30.3	1.3
	9.0	4.7	10.9	1150	31.4	2.71	22.2	95.3	3.40	4.3	49.9	32.6	1.62	55.4	30.9	1.6
				1400	31.9	2.67	22.8	91.1	3.51	3.6	52.5	36.6	1.68	58.2	31.3	1.4
	10.5	6.0	13.9	1150	31.6	2.71	22.4	95.4	3.42	4.4	49.3	32.2	1.57	54.6	31.4	1.7
				1400	32.5	2.68	23.3	91.5	3.55	3.8	52.6	36.9	1.63	58.2	32.4	1.5
40	5.2	1.9	4.5	1150	35.8	2.80	26.3	98.9	3.75	4.8	48.6	32.2	1.94	55.2	25.1	2.7
				1400	35.9	2.73	26.6	93.7	3.85	4.2	50.4	35.4	2.01	57.2	25.1	2.5
	9.0	4.6	10.6	1150	36.1	2.81	26.5	99.1	3.76	5.0	48.0	31.7	1.87	54.4	25.6	2.5
				1400	36.9	2.77	27.4	94.4	3.90	4.3	50.5	35.6	1.94	57.1	26.0	2.4
	10.5	5.8	13.5	1150	36.3	2.82	26.7	99.3	3.77	5.2	47.3	31.3	1.81	53.5	26.1	2.3
				1400	37.8	2.80	28.3	95.0	3.96	4.5	50.5	35.9	1.88	57.0	26.9	2.3
50	5.2	1.9	4.3	1150	40.4	2.88	30.6	102.5	4.11	5.6	46.7	31.3	2.21	54.2	21.1	3.8
				1400	40.4	2.82	30.8	96.7	4.21	4.8	48.4	34.3	2.29	56.2	21.1	3.6
	9.0	4.4	10.2	1150	40.7	2.91	30.8	102.8	4.10	5.8	46.0	30.8	2.13	53.3	21.6	3.4
				1400	41.8	2.87	32.0	97.7	4.27	5.0	48.4	34.6	2.21	56.0	21.9	3.4
	10.5	5.6	13.0	1150	41.1	2.94	31.1	103.1	4.10	6.0	45.4	30.4	2.05	52.4	22.1	2.9
				1400	43.2	2.92	33.2	98.6	4.34	5.2	48.5	34.9	2.13	55.8	22.8	3.1
60	5.2	1.8	4.2	1150	44.5	2.98	34.3	105.8	4.37	6.3	45.3	31.0	2.44	53.6	18.6	4.6
				1400	45.0	2.90	35.1	99.7	4.55	5.5	46.9	33.3	2.52	55.5	18.6	4.6
	9.0	4.3	9.9	1150	45.2	3.02	34.9	106.4	4.38	6.5	45.4	30.4	2.36	53.4	19.3	4.2
				1400	46.4	2.94	36.3	100.7	4.61	5.7	47.0	33.7	2.42	55.2	19.4	4.2
	10.5	5.5	12.6	1150	45.9	3.06	35.4	106.9	4.40	6.7	45.5	29.9	2.27	53.2	20.0	3.8
				1400	47.8	2.99	37.6	101.6	4.68	5.9	47.0	34.1	2.31	54.9	20.3	3.9
70	5.2	1.8	4.0	1150	48.6	3.08	38.1	109.1	4.62	7.0	43.9	30.8	2.67	53.0	16.4	5.5
				1400	49.5	2.98	39.4	102.8	4.87	6.2	45.5	32.3	2.75	54.8	16.5	5.5
	9.0	4.1	9.6	1150	49.6	3.13	38.9	109.9	4.65	7.3	44.7	30.0	2.58	53.5	17.3	5.0
				1400	50.9	3.02	40.6	103.7	4.94	6.4	45.5	32.7	2.63	54.4	17.3	5.1
	10.5	5.3	12.2	1150	50.6	3.17	39.8	110.8	4.67	7.5	45.5	29.3	2.49	54.0	18.2	4.6
				1400	52.3	3.07	41.9	104.6	5.00	6.6	45.5	33.2	2.50	54.0	18.2	4.8
80	5.2	1.7	3.9	1150	53.0	3.16	42.2	112.7	4.91	7.9	41.7	29.8	2.97	51.8	14.0	6.3
				1400	54.1	3.06	43.6	105.8	5.17	6.7	43.2	31.2	3.06	53.6	14.1	6.4
	9.0	4.0	9.3	1150	54.3	3.23	43.2	113.7	4.92	8.1	42.5	29.1	2.87	52.3	14.8	5.8
				1400	55.7	3.13	45.1	106.9	5.22	7.0	43.2	31.7	2.92	53.2	14.8	6.0
	10.5	5.1	11.8	1150	55.5	3.30	44.2	114.7	4.93	8.4	43.2	28.4	2.77	52.7	15.6	5.4
				1400	57.4	3.19	46.5	108.0	5.27	7.3	43.2	32.2	2.78	52.7	15.6	5.6
90	5.2	1.6	3.8	1150	57.5	3.25	46.4	116.3	5.19	8.7	39.5	28.8	3.27	50.7	12.1	7.1
				1400	58.6	3.15	47.9	108.8	5.46	7.3	40.9	30.2	3.37	52.4	12.1	7.4
	9.0	3.9	8.9	1150	58.9	3.34	47.5	117.5	5.17	9.0	40.2	28.1	3.16	51.0	12.7	6.7
				1400	60.5	3.23	49.5	110.0	5.49	7.7	40.9	30.7	3.21	51.9	12.7	6.9
	10.5	4.9	11.4	1150	60.4	3.43	48.7	118.6	5.16	9.4	41.0	27.4	3.05	51.4	13.4	6.3
				1400	62.5	3.31	51.2	111.3	5.53	8.0	40.9	31.1	3.06	51.4	13.4	6.4
100	5.2	1.6	3.6	1150	Operation not recommended						37.5	28.2	3.65	50.0	10.3	8.0
				1400							38.9	29.6	3.76	51.7	10.3	8.3
	9.0	3.7	8.6	1150							38.2	27.6	3.53	50.3	10.8	7.5
				1400							38.9	30.0	3.59	51.1	10.8	7.8
	10.5	4.7	11.0	1150							38.9	26.9	3.41	50.6	11.4	7.1
				1400							38.9	30.5	3.42	50.6	11.4	7.2
110	5.2	1.5	3.5	1150	Operation not recommended						35.6	27.6	4.04	49.4	8.8	8.9
				1400							36.8	29.0	4.16	51.0	8.8	9.2
	9.0	3.6	8.3	1150							36.2	27.0	3.91	49.6	9.3	8.4
				1400							36.8	29.4	3.97	50.4	9.3	8.6
	10.5	4.6	10.5	1150							36.9	26.3	3.77	49.7	9.8	7.9
				1400							36.9	29.9	3.78	49.8	9.8	8.1

Interpolation is permissible, extrapolation is not.

All entering air conditions are 80°F DB and 67°F WB in cooling and 70°F DB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

Operation below 40°F EWT is based on 15% antifreeze solution.

See performance correction tables for operating conditions other than those listed above.

Table does not reflect fan or pump power ISO corrections.

Rev: 12/12/03 B

38WQS048 with GAH48

Performance capacities shown in thousands of Btu/h.

EWT °F	GPM	WPD		CFM	HEATING - EAT 70°F						COOLING - EAT 80/67 °F					
		PSI	FT		HC	KW	HE	LAT	COP	HWC	TC	SC	KW	HR	EER	HWC
20	6.0	2.6	5.9	1300	Operation not recommended						Operation not recommended					
	9.0	4.9	11.2	1300												
	12.0	7.6	17.6	1300												
				1600	30.1	3.01	19.8	91.4	2.93	4.2						
				1600	31.4	2.95	21.3	88.2	3.12	3.6						
30	6.0	2.5	5.8	1300	34.2	2.99	24.0	94.3	3.35	4.8	54.9	35.5	1.91	61.4	28.7	1.7
				1600	36.7	2.98	26.5	91.2	3.61	4.0	56.7	38.9	2.00	63.5	28.3	1.4
	9.0	4.7	10.9	1300	34.8	3.04	24.4	94.8	3.35	5.0	54.9	35.7	1.84	61.1	29.9	1.7
				1600	36.8	3.01	26.5	91.3	3.58	4.2	56.5	38.7	1.93	63.1	29.4	1.5
	12.0	7.4	17.1	1300	35.4	3.10	24.8	95.2	3.35	5.1	54.8	35.9	1.76	60.9	31.1	1.8
				1600	36.9	3.04	26.5	91.4	3.56	4.4	56.4	38.5	1.85	62.7	30.5	1.6
40	6.0	2.4	5.6	1300	37.9	3.07	27.4	97.0	3.61	5.6	53.4	34.9	2.19	60.9	24.4	3.0
				1600	40.7	3.07	30.2	93.6	3.89	4.8	55.1	38.2	2.30	63.0	24.0	2.8
	9.0	4.6	10.6	1300	39.1	3.13	28.4	97.8	3.66	5.8	53.3	35.1	2.11	60.5	25.3	2.8
				1600	41.3	3.09	30.7	93.9	3.92	5.0	54.9	38.0	2.21	62.4	24.9	2.6
	12.0	7.2	16.6	1300	40.3	3.19	29.4	98.7	3.71	6.0	53.2	35.2	2.03	60.1	26.3	2.6
				1600	41.9	3.11	31.3	94.2	3.95	5.2	54.7	37.8	2.12	61.9	25.8	2.5
50	6.0	2.3	5.4	1300	41.6	3.16	30.8	99.6	3.86	6.4	51.9	34.2	2.47	60.3	21.0	4.3
				1600	44.7	3.15	33.9	95.9	4.15	5.6	53.6	37.5	2.59	62.4	20.7	4.1
	9.0	4.4	10.2	1300	43.4	3.21	32.4	100.9	3.95	6.7	51.7	34.4	2.38	59.9	21.8	3.8
				1600	45.8	3.16	35.0	96.5	4.24	5.8	53.3	37.3	2.49	61.8	21.4	3.8
	12.0	7.0	16.1	1300	45.2	3.27	34.0	102.2	4.05	6.9	51.6	34.6	2.29	59.4	22.6	3.3
				1600	46.8	3.17	36.0	97.1	4.33	6.0	53.0	37.1	2.40	61.2	22.1	3.5
60	6.0	2.3	5.2	1300	46.9	3.26	35.8	103.4	4.21	7.3	50.1	33.6	2.71	59.4	18.5	5.3
				1600	48.7	3.24	37.6	98.2	4.40	6.3	52.7	37.2	2.83	62.4	18.6	5.2
	9.0	4.3	9.9	1300	48.5	3.31	37.2	104.5	4.29	7.5	50.1	33.6	2.62	59.1	19.2	4.8
				1600	50.3	3.25	39.2	99.1	4.53	6.6	52.4	37.0	2.73	61.7	19.2	4.8
	12.0	6.7	15.6	1300	50.1	3.36	38.6	105.7	4.37	7.7	50.1	33.6	2.52	58.8	19.9	4.3
				1600	52.0	3.27	40.8	100.1	4.66	6.8	52.0	36.9	2.62	60.9	19.8	4.5
70	6.0	2.2	5.1	1300	52.2	3.36	40.7	107.2	4.55	8.1	48.4	32.9	2.96	58.5	16.4	6.3
				1600	52.6	3.32	41.3	100.5	4.64	7.1	51.9	36.9	3.07	62.4	16.9	6.3
	9.0	4.1	9.6	1300	53.6	3.40	42.0	108.1	4.62	8.4	48.5	32.8	2.86	58.3	17.0	5.8
				1600	54.9	3.35	43.5	101.8	4.81	7.3	51.4	36.8	2.96	61.5	17.4	5.9
	12.0	6.5	15.1	1300	54.9	3.44	43.2	109.1	4.68	8.6	48.7	32.7	2.76	58.1	17.7	5.3
				1600	57.1	3.37	45.6	103.0	4.97	7.6	50.9	36.6	2.85	60.6	17.9	5.5
80	6.0	2.1	4.9	1300	56.1	3.45	44.3	110.0	4.77	9.0	46.6	32.1	3.26	57.7	14.3	7.2
				1600	56.6	3.41	45.0	102.8	4.87	7.8	50.0	36.0	3.39	61.5	14.7	7.4
	9.0	4.0	9.3	1300	57.2	3.48	45.4	110.8	4.82	9.4	46.7	32.0	3.15	57.5	14.8	6.7
				1600	58.6	3.43	47.0	103.9	5.01	8.1	49.5	35.8	3.26	60.6	15.2	6.9
	12.0	6.3	14.6	1300	58.4	3.52	46.4	111.6	4.86	9.7	46.9	31.9	3.04	57.2	15.4	6.3
				1600	60.7	3.44	48.9	105.1	5.16	8.4	49.0	35.7	3.14	59.7	15.6	6.4
90	6.0	2.0	4.7	1300	60.1	3.53	48.0	112.8	4.98	10.0	44.8	31.3	3.57	57.0	12.6	8.2
				1600	60.6	3.49	48.7	105.1	5.08	8.4	48.0	35.0	3.71	60.7	13.0	8.5
	9.0	3.9	8.9	1300	60.9	3.56	48.8	113.4	5.01	10.4	44.9	31.2	3.45	56.7	13.0	7.7
				1600	62.4	3.51	50.4	106.1	5.21	8.8	47.6	34.9	3.57	59.7	13.3	8.0
	12.0	6.1	14.0	1300	61.8	3.60	49.5	114.0	5.04	10.8	45.1	31.1	3.33	56.4	13.6	7.2
				1600	64.2	3.52	52.2	107.2	5.35	9.2	47.1	34.8	3.43	58.8	13.7	7.4
100	6.0	2.0	4.5	1300	Operation not recommended						43.1	30.9	3.99	56.7	10.8	9.3
				1600							46.3	34.6	4.14	60.4	11.2	9.6
	9.0	3.7	8.6	1300							43.3	30.8	3.85	56.4	11.2	8.7
				1600							45.8	34.5	3.99	59.4	11.5	9.0
	12.0	5.9	13.5	1300							43.4	30.7	3.72	56.1	11.7	8.2
				1600							45.4	34.4	3.84	58.4	11.8	8.4
110	6.0	1.9	4.4	1300	Operation not recommended						41.5	30.6	4.41	56.5	9.4	10.3
				1600							44.5	34.2	4.58	60.1	9.7	10.7
	9.0	3.6	8.3	1300							41.6	30.5	4.26	56.1	9.8	9.7
				1600							44.1	34.1	4.41	59.1	10.0	10.0
	12.0	5.6	13.0	1300							41.7	30.4	4.11	55.8	10.2	9.2
				1600							43.6	34.0	4.24	58.1	10.3	9.4

Interpolation is permissible, extrapolation is not.

Rev: 12/12/03 B

All entering air conditions are 80°F DB and 67°F WB in cooling and 70°F DB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

Operation below 40°F EWT is based on 15% antifreeze solution.

See performance correction tables for operating conditions other than those listed above.

Table does not reflect fan or pump power ISO corrections.

38WQS060 with GAH60

Performance capacities shown in thousands of Btu/h.

EWT °F	GPM	WPD		CFM	HEATING - EAT 70°F						COOLING - EAT 80/67 °F					
		PSI	FT		HC	KW	HE	LAT	COP	HWC	TC	SC	KW	HR	EER	HWC
20	7.5	1.6	3.7	1650	Operation not recommended						Operation not recommended					
	11.3	3.2	7.4	1650												
	15.0	5.1	11.8	1650	41.1	4.04	27.3	93.0	2.98	5.3						
				2000	41.5	3.99	27.9	89.2	3.05	4.5						
30	7.5	1.6	3.6	1650	43.1	4.09	29.2	94.2	3.09	6.0	67.5	44.2	2.64	76.5	25.5	2.2
				2000	43.8	4.05	30.0	90.3	3.17	5.0	69.1	47.2	2.73	78.5	25.3	1.8
	11.3	3.1	7.1	1650	45.5	4.13	31.4	95.5	3.23	6.2	67.6	43.9	2.58	76.4	26.2	2.3
				2000	46.1	4.09	32.2	91.4	3.30	5.3	68.8	46.7	2.68	77.9	25.7	1.9
	15.0	4.9	11.4	1650	47.9	4.18	33.6	96.9	3.36	6.4	67.6	43.6	2.52	76.2	26.9	2.3
				2000	48.5	4.13	34.4	92.4	3.44	5.5	68.4	46.1	2.63	77.4	26.0	2.0
40	7.5	1.5	3.5	1650	50.4	4.29	35.8	98.3	3.45	7.0	65.3	43.5	3.05	75.7	21.4	3.8
				2000	51.3	4.25	36.8	93.7	3.54	6.0	66.8	46.5	3.15	77.6	21.2	3.5
	11.3	3.0	6.9	1650	53.0	4.35	38.2	99.8	3.57	7.3	65.4	43.3	2.96	75.5	22.1	3.5
				2000	53.3	4.28	38.7	94.7	3.65	6.2	66.5	46.0	3.07	77.0	21.7	3.4
	15.0	4.8	11.1	1650	55.7	4.42	40.6	101.3	3.69	7.5	65.5	43.0	2.86	75.2	22.9	3.2
				2000	55.3	4.32	40.6	95.6	3.75	6.5	66.3	45.5	2.99	76.5	22.1	3.2
50	7.5	1.5	3.4	1650	57.7	4.48	42.4	102.4	3.77	8.0	63.1	42.9	3.46	74.9	18.2	5.4
				2000	58.7	4.44	43.5	97.2	3.87	7.0	64.6	45.8	3.58	76.8	18.1	5.2
	11.3	2.9	6.7	1650	60.6	4.57	45.0	104.0	3.88	8.3	63.2	42.6	3.34	74.6	18.9	4.8
				2000	60.4	4.48	45.2	98.0	3.96	7.2	64.3	45.3	3.47	76.1	18.6	4.8
	15.0	4.6	10.7	1650	63.5	4.66	47.6	105.6	3.99	8.6	63.3	42.4	3.21	74.2	19.7	4.1
				2000	62.2	4.51	46.8	98.8	4.04	7.5	64.1	44.8	3.36	75.5	19.1	4.4
60	7.5	1.4	3.3	1650	64.9	4.68	48.9	106.4	4.06	9.1	61.6	41.9	3.78	74.6	16.3	6.6
				2000	66.1	4.64	50.3	100.6	4.17	7.9	63.1	45.4	3.90	76.4	16.2	6.5
	11.3	2.8	6.5	1650	68.1	4.79	51.7	108.2	4.16	9.4	61.9	41.7	3.61	74.2	17.1	6.0
				2000	68.5	4.67	52.6	101.7	4.30	8.2	63.2	45.0	3.74	75.9	16.9	6.1
	15.0	4.5	10.4	1650	71.3	4.90	54.5	110.0	4.26	9.7	62.1	41.4	3.45	73.9	18.0	5.4
				2000	71.0	4.71	54.9	102.9	4.42	8.5	63.2	44.6	3.58	75.4	17.7	5.6
70	7.5	1.4	3.2	1650	72.2	4.88	55.5	110.5	4.33	10.1	60.2	41.0	4.11	74.2	14.7	7.8
				2000	73.5	4.83	57.0	104.0	4.45	8.9	61.7	45.0	4.23	76.1	14.6	7.9
	11.3	2.7	6.3	1650	75.6	5.01	58.5	112.4	4.42	10.4	60.6	40.7	3.89	73.9	15.6	7.2
				2000	76.6	4.87	60.0	105.5	4.61	9.2	62.0	44.7	4.02	75.7	15.4	7.3
	15.0	4.3	10.0	1650	79.0	5.15	61.5	114.4	4.50	10.8	61.0	40.4	3.68	73.5	16.6	6.6
				2000	79.7	4.90	63.0	106.9	4.77	9.5	62.4	44.3	3.80	75.4	16.4	6.8
80	7.5	1.3	3.1	1650	79.4	5.08	62.1	114.6	4.58	11.3	57.6	40.2	4.56	73.2	12.6	9.0
				2000	80.9	5.03	63.7	107.5	4.71	9.7	59.0	44.2	4.70	75.0	12.5	9.2
	11.3	2.6	6.1	1650	82.7	5.20	64.9	116.4	4.66	11.7	58.0	40.0	4.32	72.7	13.4	8.4
				2000	83.8	5.05	66.6	108.8	4.86	10.1	59.3	43.8	4.46	74.5	13.3	8.6
	15.0	4.2	9.7	1650	86.0	5.33	67.8	118.2	4.73	12.1	58.3	39.7	4.09	72.3	14.3	7.8
				2000	86.7	5.07	69.4	110.1	5.01	10.5	59.7	43.5	4.22	74.1	14.1	8.0
90	7.5	1.3	3.0	1650	86.7	5.28	68.7	118.7	4.81	12.5	55.0	39.5	5.02	72.1	11.0	10.2
				2000	88.3	5.23	70.5	110.9	4.95	10.5	56.3	43.4	5.17	73.9	10.9	10.6
	11.3	2.5	5.9	1650	89.8	5.39	71.4	120.4	4.88	13.0	55.3	39.2	4.76	71.5	11.6	9.6
				2000	91.0	5.24	73.1	112.1	5.09	11.0	56.6	43.0	4.90	73.3	11.5	9.9
	15.0	4.1	9.4	1650	92.9	5.51	74.1	122.1	4.94	13.5	55.6	39.0	4.49	71.0	12.4	9.0
				2000	93.7	5.25	75.8	113.4	5.23	11.5	56.9	42.7	4.64	72.8	12.3	9.2
100	7.5	1.2	2.9	1650	Operation not recommended						53.3	39.1	5.56	72.3	9.6	11.5
				2000							54.6	42.9	5.72	74.1	9.5	11.9
	11.3	2.4	5.6	1650							53.7	38.8	5.27	71.6	10.2	10.8
				2000							54.9	42.6	5.43	73.5	10.1	11.2
	15.0	3.9	9.0	1650							54.0	38.5	4.98	71.0	10.8	10.2
				2000							55.3	42.2	5.14	72.8	10.7	10.4
110	7.5	1.2	2.8	1650	Operation not recommended						51.7	38.6	6.10	72.5	8.5	12.8
				2000							52.9	42.5	6.28	74.4	8.4	13.3
	11.3	2.4	5.4	1650							52.0	38.4	5.78	71.8	9.0	12.1
				2000							53.3	42.1	5.96	73.6	8.9	12.5
	15.0	3.8	8.7	1650							52.4	38.1	5.46	71.0	9.6	11.4
				2000							53.6	41.8	5.64	72.8	9.5	11.6

Interpolation is permissible, extrapolation is not.

Rev: 12/12/03 B

All entering air conditions are 80°F DB and 67°F WB in cooling and 70°F DB in heating.

All performance data is based upon the lower voltage of dual voltage rated units.

Operation below 40°F EWT is based on 15% antifreeze solution.

See performance correction tables for operating conditions other than those listed above.

Table does not reflect fan or pump power ISO corrections.

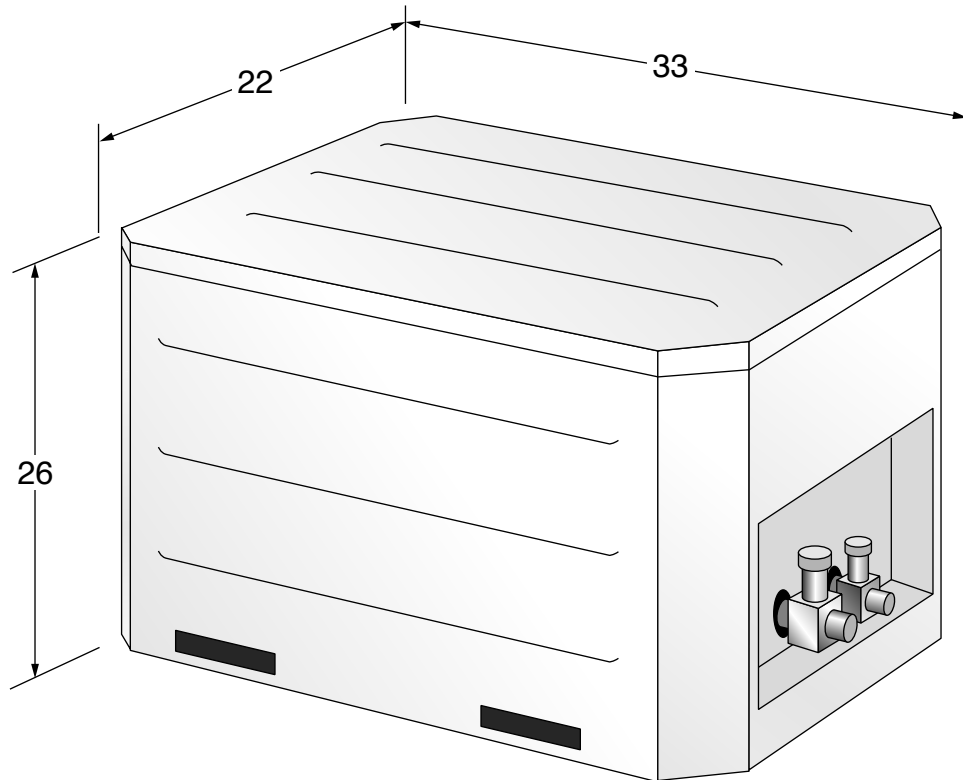
Physical Data

MODEL	018	024	030	036	042	048	060
Compressor	Rotary	Scroll					
Factory Charge R22 - (oz.)	70	74	86	101	122	130	136
Water Connection Size	1-1/4" MPT (for Flow Controller)						
Suction Line Sweat Connection (in.)	3/4"	3/4"	7/8"	7/8"	7/8"	7/8"	1-1/8"
Liquid Line Sweat Connection (in.)	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	1/2"
Weight - Operating	165	203	205	217	221	229	235
Weight - Packaged	180	218	220	232	236	244	250

All units have grommet compressor mounting, TXV expansion devices, 20 ga sheet metal, weather resistant cabinet, and 7/8" x 1-1/8" electrical knockouts.
Hot Water Generator ready with factory installed hot gas service ports.

Rev.: 3/13/01M

Physical Dimensions



Electrical Table

Model	Rated Voltage (Volts/Hz/Ph)	Voltage Min/Max	Compressor			Loop† Pump (Amp)	Total Unit (FLA)	Min Crkt Amp	Max Fuse/ Brkr	Supply Wire	
			RLA*	LRA	Crank- case					Min AWG	Max Ft
018	208-230/60/1	197/254	7.1	38	NA	4.0	112.0	12.9	20	12	90
024	208-230/60/1	197/254	10.3	56	0.17	4.0	14.4	17.0	25	10	120
030	208-230/60/1	197/254	12.2	67	0.17	4.0	16.4	19.4	30	10	100
036	208-230/60/1	197/254	13.5	73	0.17	4.0	17.6	21.0	30	10	90
042	208-230/60/1	197/254	16.5	95	0.17	4.0	20.7	24.8	40	8	120
048	208-230/60/1	197/254	18.3	109	0.17	4.0	22.5	27.1	45	8	110
060	208-230/60/1	197/254	28.9	169	0.29	4.0	33.1	40.4	60	6	120

HACR circuit breaker in USA only. All fuses Class RK-5.

Rev.: 3/13/01M

*MCC/1.56 Method.

Wire length based on one way measurement with 2% voltage drop and wire size based on 60°C copper conductor.

** 90°C Copper Conductor Wire.

†Loop Pump Amps included in Min Ckt Amp and Max Fuse/HACR.

[illegible]

GT-S CXM Control Features

Features

- Anti-short Cycle Protection.
- High And Low Pressure Cutouts.
- Water Coil Freeze Protection.
- Air Coil Freeze Protection.
- Random Start.
- Unit Performance Sentinel.
- Over/Under Voltage Protection.
- Diagnostic LED.
- Reset Lockout at Unit or Disconnect.
- Intelligent Reset.
- Condensate Overflow Sensor.
- Test Mode.
- Electric Heat Outputs.
- Accessory Water Valve Connection.
- Optional LonWorks Control.

Field Selectable Inputs

Test Mode - Test Mode allows the service personnel to check the operation of the control in a timely manner. By **momentarily** shorting the test terminals, the CXM control enters a 20 minute Test Mode period in which all time delays are sped up 15 times. Upon entering Test Mode, the Status LED will flash a code representing the last fault. For Diagnostic ease at the thermostat, the alarm relay will also cycle during test mode. The Alarm relay will cycle on and off, similar to the status LED, to indicate a code representing the last fault, at the thermostat. Test mode can be exited by shorting the test terminals for 3 seconds. **Note: Code 1 indicates there is no fault in memory; stated differently, the control has not faulted since the last power down.**

Retry Mode - If the control is attempting a retry of a fault, the status LED will slow flash (slow flash=one flash every 2 seconds) to indicate the control is in process of retrying. **Note: In the following field configuration options, jumper wires should be clipped ONLY when power is removed from the CXM control.**

Water Coil Freeze Protection Limit Setting - Jumper 2 (JW2-F12 Low Temp) provides field selection of temperature limit setting for FP1 to be 30°F or 10°F. Not Clipped=30°F. Clipped=10°F.

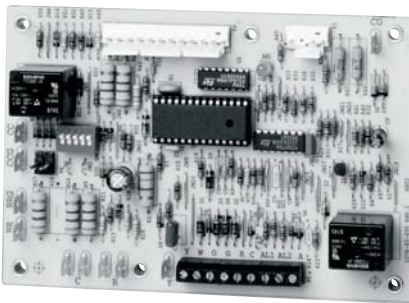
Air Coil Freeze Protection Limit Setting - Jumper 3 (JW3-FP2 Low Temp) provides field selection of temperature limit setting for FP2 to be 30°F or 10°F. Not Clipped=30°F. Clipped=10°F.

Alarm Relay Setting - Jumper 1 (JW1-AL2 Dry) provides field selection of Alarm Relay terminal AL2 to be jumpered to 24Vac or to be dry (no connection). Not Clipped=AL2 connected to R. Clipped=AL2 dry contacts (no connection).

DIP Switches

Unit Performance Sentinel Disable - Dip Switch 1 provides field selection to disable The UPS Feature. On = Enabled. Off = Disabled.

Stage 2 - Dip Switch 2 provides selection of whether compressor has an on delay. If set to stage 2, the compressor will have a 3 second delay before energizing. Also, if set for stage 2, the alarm relay will NOT cycle during test mode. On = Stage 1 Off = Stage 2



Safety Features

The following safety features are provided to protect the compressor, heat exchangers, wiring, and other components from damage caused by operation outside of design conditions.

Anti-Short Cycle Protection- The control features a 5-minute anti-short cycle protection for the compressor. **Note: The 5 minute anti-short cycle also occurs at power up.**

Random Start - The control features a random start upon power up from 5-80 seconds.

Fault Retry - In Fault Retry mode, the Status LED begins slow flashing to signal that the control is trying to recover from a fault input. The CXM control will stage off the outputs and then “try again” to satisfy the thermostat “Y” input call. Once the thermostat input calls are satisfied, the control will continue on as if no fault occurred. If 3 consecutive faults occur without satisfying the thermostat “Y” input call, then the control will go to Lockout mode. The last fault causing the lockout will be stored in memory and can be viewed by going into test mode.

Lockout - In Lockout mode, the Status LED will begin fast flashing. The compressor relay is turned off immediately. Lockout mode can be soft reset via the thermostat “Y” input or can be hard reset via the disconnect. The last fault causing the lockout will be stored in memory and can be viewed by going into test mode.

Lockout with Emergency Heat - While in Lockout mode, if W becomes active, then Emergency Heat mode will occur.

High Pressure Switch - When the High Pressure Switch opens due to high refrigerant pressures, the Compressor relay is de-energized immediately since the High Pressure Switch is in series with the compressor contactor coil. The High Pressure Fault recognition is immediate as well. High Pressure Lockout Code = 2. Example: 2 quick flashes, 10 sec. pause, 2 quick flashes, 10 sec. pause, etc.

Low Pressure Switch - The Low Pressure Switch must be open and remain open for 30 continuous seconds during “on” cycle to be recognized as a Low Pressure fault. If the low pressure switch is open for 30 seconds prior to compressor power up it will be considered a low pressure (loss of charge) fault. The Low Pressure Switch input is bypassed for the initial 60 seconds of a compressor run cycle. Low Pressure Lockout Code = 3.

GT-S CXM Control Features

Water Coil Freeze Protection (FP1) - The FP1 thermistor temperature must be below the selected freeze protection limit setting for 30 continuous seconds during a compressor run cycle to be recognized as a FP1 fault. The FP1 input is bypassed for the initial 60 seconds of a compressor run cycle. FP1 Lockout Code = 4.

Air Coil Freeze Protection (FP2) - The FP2 thermistor temperature must be below the selected freeze protection limit setting for 30 continuous seconds during a compressor run cycle to be recognized as a FP2 fault. The FP2 input is bypassed for the initial 60 seconds of a compressor run cycle. FP2 Lockout Code = 5.

Condensate Overflow - The Condensate Overflow sensor must sense overflow levels for 30 continuous seconds to be recognized as a CO fault. Condensate Overflow will be monitored at all times. CO Lockout Code = 6.

Over/Under Voltage Shutdown - An Over/Under Voltage condition exists when the control voltage is outside the range of 19Vac to 30Vac. Over/Under Voltage Shutdown is self-resetting in that if the voltage comes back within range of 19Vac to 30Vac for at least 0.5 seconds, then normal operation is restored. This is not considered a fault or lockout. If the CXM is in over/under voltage shutdown for 15 minutes, the alarm relay will close. Over/Under Voltage Shutdown Code = 7.

Unit Performance Sentinel-UPS (patent pending) - The UPS feature warns when the heat pump is operating inefficiently. A UPS condition exists when:

- a) in heating mode with compressor energized, if FP2 is greater than 125°F for 30 continuous seconds,
or
- b) in cooling mode with compressor energized, if FP1 is greater than 125°F for 30 continuous seconds, or FP2 is less than 40°F for 30 continuous seconds.

If a UPS condition occurs, the control will immediately go to UPS warning. The status LED will remain on as if the control is on Normal mode (see "LED and Alarm Relay Operation Table"). Outputs of the control, excluding LED and Alarm Relay, will NOT be affected by UPS. The UPS condition cannot occur during a compressor off cycle. During UPS warning, the alarm relay will cycle on and off. The cycle rate will be On for 5 seconds, Off for 25 seconds, On for 5 seconds, Off for 25 seconds, etc. Unit Performance Sentinel Warning Code = 8.

Diagnostic Features

The Status LED on the CXM control advises the serviceman of the current status of the CXM control. The status LED can display either the current CXM mode or the last fault memory if in test mode. See Table 1 for a complete listing of codes.

Unit Operation Description

PowerUp - The unit will not operate until all the inputs and safety controls are checked for normal conditions. **Note: The compressor will have a 5-minute anti-short -cycle delay at power-up.**

Standby - In Standby mode, Y and W inputs are not active. Inputs O and G may be active. Compressor will be off.

Cooling - To enter Cooling mode, Y and O become active. The first time after power-up that there is a call for compressor, the compressor will follow a 5 to 80 second random start delay. There will also be a 5-minute compressor anti-short cycle protection time as well. After the random start delay, the compressor relay is energized. On all subsequent compressor calls, the random start delay is omitted.

Heating Stage 1 - To enter Heating Stage 1 mode, Y becomes active. The first time after power-up that there is a call for compressor, the compressor will follow a 5 to 80 second random start delay. There will also be a 5-minute compressor anti-short cycle protection time as well. After the random start delay, the compressor relay is energized. On all subsequent compressor calls, the random start delay is omitted.

Heating Stage 2 - To enter Heating Stage 2 mode, W becomes active (Y already active). The Compressor relay remains on. EH1 is turned on immediately. With continuing Heating Stage 2 demand, EH2 will turn on after 10 minutes. The EH2 will not turn on in heating (or will turn off if already on) if loop temperature is above approximately 50°F (FP1 >45°F).

Emergency Heat - In Emergency Heat mode, W becomes active while Y is not active. EH1 is turned on immediately. With continuing Emergency Heat demand, EH2 will turn on after 5 minutes. The FP1 and FP2 temperatures do not effect emergency heat operation.

Table 1 - Status LED Description

Description of Operation	LED	Alarm Relay
Normal Mode	On	Open
Normal Mode with UPS Warning	On	Cycle (closed 5 sec., Open 25 sec.)
CXM is non-functional	Off	Open
Fault Retry	Slow Flash	Open
Lockout	Fast Flash	Closed
Over/Under Voltage Shutdown	Slow Flash	Open (Closed after 15 minutes)
Test Mode - No fault in memory	Flashing Code 1	Cycling Code 1
Test Mode - HP Fault in memory	Flashing Code 2	Cycling Code 2
Test Mode - LP Fault in memory	Flashing Code 3	Cycling Code 3
Test Mode - FP1 Fault in memory	Flashing Code 4	Cycling Code 4
Test Mode - FP2 Fault in memory	Flashing Code 5	Cycling Code 5
Test Mode - CO Fault in memory	Flashing Code 6	Cycling Code 6
Test Mode - Over/Under shutdown in memory	Flashing Code 7	Cycling Code 7
Test Mode - UPS in memory	Flashing Code 8	Cycling Code 8

Air Handler Selection

General

Reference the air handler literature for the appropriate combinations of GT-S Split condensing units, air handlers and coils.

Utilizing the Existing Air Handler or Coil

It is recommended that a new coil or air handler be installed with the GT-S Split due to the low initial cost of the additional equipment versus the reliability and benefit of new warranty, etc. However, the existing air handler may be retained and used provided the following:

- Coil currently uses a TXV. If a TXV is not present, the orifice should be removed and a TXV installed according to the procedure outlined in the *GT-S Split Installation, Operation and Maintenance Manual*. If the coil utilizes capillary tubes as the expansion system it will not operate properly with the GT-S Split system and the coil should be replaced with a new one.
- The coil should match air coil tables for surface area, number of circuits, tube diameters, rows and fin spacing. (see I.O.M.).
- Life expectancy of more than 7 years left in the components such as fan motors, coil and cabinet.
- Minimum 12 SEER rating.

GT-S Split Recommended Line Sets

Model	Factory** Charge (oz)	Basic* Charge (oz)	20 feet		40 feet		60 feet	
			Liquid	Suction	Liquid	Suction	Liquid	Suction
18	70	55	3/8"	3/4"	3/8"	3/4"	3/8"	3/4"
24	74	59	3/8"	3/4"	3/8"	3/4"	3/8"	7/8"
30	108	93	3/8"	3/4"	3/8"	7/8"	3/8"	7/8"
36	117	102	3/8"	3/4"	3/8"	7/8"	3/8"	7/8"
42	122	107	3/8"	7/8"	3/8"	7/8"	3/8"	7/8"
48	130	115	3/8"	7/8"	3/8"	7/8"	1/2"	1-1/8"
60	136	121	3/8"	1-1/8"	1/2"	1-1/8"	1/2"	1-1/8"

*Basic charge includes only the amount required for the condensing unit and the evaporating coil.

An additional amount should be added allowing 0.6 oz for 3/8" and 1.2 oz for 1/2" per foot of lineset used.

**Factory charge is preset for 25' lineset.

Warranty Information

Carrier GT-S Split Series residential warranty reflects the reliability built in to every unit and includes five years on all parts, and ten years on the compressor and refrigerant circuit parts with a service labor allowance during the first 30 days. An optional extended warranty is available for the GT-S Split Series units, which adds a labor allowance and trip charge. See extended warranty certificate for details.

GT-S Split System Condensing Unit

General

The liquid source heating/cooling split condensing units shall be ARI/ASHRAE/ISO 13256-1 loop performance certified and listed by a nationally recognized safety-testing laboratory or agency, such as Underwriter's Laboratory (UL) or Canadian Standards Association (CSA-US). Each unit shall be water run-tested at the factory. Each unit shall be pallet mounted and shipped in clear shrink wrap for visual shipping damage inspection. The units shall be warranted by the manufacturer against defects in materials and workmanship for a period of five years on all parts, and ten years on the compressor and refrigerant circuit parts with a service labor allowance during the first 30 days. An optional extended warranty is available for the GT-S Split Series units, which adds a labor allowance and trip charge. The liquid source units shall be designed to operate with entering liquid temperature between 20°F and 110°F.

Casing & Cabinet

The cabinet shall be weather resistant and designed for outdoor installations. The cabinet shall be fabricated from heavy-gauge galvanized steel painted with a epoxy powder coat paint with a 1000 hr. salt spray test rating. The interior shall be insulated with 1/2"-thick, multi-density, coated glass fiber with edges sealed or tucked under flanges to prevent the introduction of glass fibers into the discharge air. Two compressor compartment access panels shall be provided and shall be removable with linesets and water piping in place. The internal component layout shall provide for major service with the unit in-place for restricted access installations. The cabinet shall have integral carrying handles and provide adequate space to house the one or two pump Flow Controller pumping modules within the cabinet.

Refrigerant Circuit

All units shall contain split refrigerant circuits employing a hermetically sealed compressor, thermal expansion valve, refrigerant accumulator, reversing valve, coaxial tube water-to-refrigerant heat exchanger, service ports and backseating service valves. Compressors shall be high-efficiency rotary or advanced scroll type designed for heat pump duty and mounted on vibration isolators. Compressor motors shall be single phase PSC with internal overload protection. A factory installed bi-directional filter drier shall be provided.

The coaxial water-to-refrigerant heat exchanger shall be designed for close approach temperatures and be constructed of a convoluted copper (optional cupronickel) inner tube and a steel outer tube. The thermal expansion valve shall provide proper superheat over the entire liquid temperature range with minimal "hunting." The valve shall operate only in the heating mode with the use of an internal check valve. The water-to-refrigerant heat exchanger and refrigerant suction lines shall be insulated to prevent condensation at low liquid temperatures. Air Coil Connections shall be made through brass backseating service valves with built-in schrader ports. Desuperheater connections shall be two 1/2" backseating service valves.

Electrical

The CXM Control - A microprocessor-based compressor controller (CXM) shall be provided to monitor and control unit operation. The control shall provide high and low pressure monitoring, field selectable water and air coil freeze protection sensing, over/under voltage monitoring, and unit performance sentinel (UPS). The control shall also provide for water valve connection, a test mode, short cycle protection, random start-up, as well as fault LED, fault memory, and intelligent fault retry.

The control shall employ quick attach harness assemblies for low voltage connections to the control board to aid in troubleshooting or replacement. An integral terminal block with screw terminals shall be provided on the control for all field low voltage connections. Line voltage lugs shall be provided for unit wiring. Units shall have knockouts for entrance of low and line voltage wiring. The fan motor and control box shall be harness plug-connected for easy removal.

Piping

Supply and return water connections shall be 1-1/4" MPT fittings and designed to mate with the Flow Controller pumping module. All water piping shall be insulated to prevent condensation at low liquid temperatures.

Accessories & Options

Cooling TXV Kit (field installed)

A cooling thermostatic expansion valve kit shall be provided to be field installed on the A-Coil or at the air handler.

Hot Water Generator (field installed)

An optional heat reclaiming desuperheater of vented double-wall copper construction suitable for potable water shall be provided as an accessory. A high limit shut-off switch shall be provided.

Thermostat (field installed)

A multi-stage auto-changeover electronic digital thermostat shall be provided. The thermostat shall offer 2 heating and 1 cooling stages with precise temperature control. An OFF-HEAT-AUTO-COOL-EMERG system switch, OFF-AUTO fan switch, and indicating LED's shall be provided. The thermostat shall read out in °F or °C and be calibratable.

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7300 S.W. 44th Street
Oklahoma City, OK 73179
Phone: (405) 745-2920
Fax: (405) 745-6620



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