GENESIS ULTRA (GS) SERIES

SIZE 015 - 070 (4.4kW - 21.1kW)
HORIZONTAL, VERTICAL & DOWNFLOW
R22 - 60Hz STANDARD & EXTENDED RANGE

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THE GENESIS ULTRA (GS) SERIES

The GS series offers ultra high efficiency with advanced features, extremely quiet operation and application flexibility at competitive prices. As ClimateMaster's highest efficiency R-22 refrigerant units, the GS series, exceeds ASHRAE 90.1 efficiencies.

Available in sizes 1-1/4 ton (4.4 kW) through 6 tons (21.1 kW) with multiple cabinet options (vertical upflow, vertical downflow and horizontal) the GS series offers a wide range of units for most any installation. The GS has an extended range refrigerant circuit, capable of ground loop (geothermal) applications as well as water loop (boiler-tower) applications. Standard features are many. Microprocessor controls, galvanized steel cabinet, polyester powder coat paint and TXV refrigerant metering device are just some of the features of the flexible GS series.

ClimateMaster's exclusive double isolation compressor mounting system makes the GS series the quietest unit on the market. Compressors are mounted on vibration isolation springs to a heavy gauge mounting plate, which is then isolated from the cabinet base with rubber grommets for maximized vibration/sound attenuation. Options such as e-coated air coil, DDC controls, internal pump and factory-installed water solenoid valves allow customized design solutions.

The GS Series water-source heat pumps are designed to meet the challenges of today's HVAC demands with a high efficiency, high value solution.

UNIT FEATURES

- Sizes 015 (1-1/4 ton, 4.4 kW) through 070 (6 tons, 21.1 kW)
- Copeland scroll compressors (rotary on sizes 015 and 018)
- Exceeds ASHRAE 90.1 efficiencies
- Galvanized steel construction with polyester powder coat paint
- Unique double isolation compressor mounting with vibration isolation springs for quiet operation
- Insulated divider and separate compressor/air handler compartments
- TXV metering device
- Extended range (20 to 120°F, -6.7 to 48.9°C) operation
- Microprocessor controls standard (optional DXM and/or DDC controls)
- LonWorks, BACnet, Modbus and Johnson N2 compatibility options for DDC controls
- Field convertible discharge air arrangement for horizontal units
- Factory-mounted hanger brackets for horizontal units
- Internally trapped condensate drain line (vertical units only)
- Flush securely-mounted corner post water connections (no backup wrench required)
- Unit Performance Sentinel performance monitoring system
- Eight Safeties Standard
- Wide variety of options including ClimaDry modulating reheat, e-coated air coils and internal pumps

Selection Procedure

Reference Calculations

Heating

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

$$LAT = EAT + \frac{HC}{CFM \times 1.08}$$

Cooling

$$LWT = EWT + \frac{HR}{GPM \times 500}$$

$$LAT\ (DB) = EAT\ (DB) - \frac{SC}{CFM \times 1.08}$$

$$LC = TC - SC$$

$$S/T = \frac{SC}{TC}$$

Legend and Glossary of Abbreviations

BTUH = BTU(British Thermal Unit) per hour
CFM = airflow, cubic feet/minute
COP = coefficient of performance = BTUH output/BTUH input
DB = dry bulb temperature (°F)
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
EER = energy efficiency ratio = BTUH output/Watt input
EPT = external pipe thread
ESP = external static pressure (inches w.g.)
EWT = entering water temperature
GPM = water flow in U.S. gallons/minute
HE = total heat of extraction, BTUH
HC = air heating capacity, BTUH
HR = total heat of rejection, BTUH
HWC = hot water generator (desuperheater) capacity, Mbtuh
IPT = internal pipe thread
KW = total power unit input, kilowatts
LAT = leaving air temperature, °F
LC = latent cooling capacity, BTUH
LWT = leaving water temperature, °F
MBTUH = 1000 BTU per hour
S/T = sensible to total cooling ratio
SC = sensible cooling capacity, BTUH
TC = total cooling capacity, BTUH
WB = wet bulb temperature (°F)
WPD = waterside pressure drop (psi & ft. of hd.)

Conversion Table - to convert inch-pound (English) to SI (Metric)

Air Flow	Water Flow	Ext Static Pressure	Water Pressure Drop
Airflow (L/s) = CFM x 0.472	Water Flow (L/s) = gpm x 0.0631	ESP (Pa) = ESP (in of wg) x 249	PD (kPa) = PD (ft of hd) x 2.99

Selection Procedure

Step 1 Determine the actual heating and cooling loads at the desired dry bulb and wet bulb conditions.

Step 2 Obtain the following design parameters: Entering water temperature, water flow rate in GPM, air flow in CFM, water flow pressure drop and design wet and dry bulb temperatures. Air flow CFM should be between 300 and 450 CFM per ton. Unit water pressure drop should be kept as close as possible to each other to make water balancing easier. Go to the appropriate tables and find the proper indicated water flow and water temperature.

Step 3 Select a unit based on total and sensible cooling conditions. Select a unit which is closest to, but no larger than, the actual cooling load.

Step 4 Enter tables at the design water flow and water temperature. Read the total and sensible cooling capacities (Note: interpolation is permissible, extrapolation is not).

Step 5 Read the heating capacity. If it exceeds the design criteria it is acceptable. It is quite normal for Water-Source Heat Pumps to be selected on cooling capacity only since the heating output is usually greater than the cooling capacity.

Step 6 Determine the correction factors associated with the variable factors of dry bulb and wet bulb (page 14).

Corrected Total Cooling =
tabulated total cooling x wet bulb correction.
Corrected Sensible Cooling =
tabulated sensible cooling x wet/dry bulb correction.

Step 7 Compare the corrected capacities to the load requirements. Normally if the capacities are within 10% of the loads, the equipment is acceptable. It is better to undersize than oversize, as undersizing improves humidity control, reduces sound levels and extends the life of the equipment.

Step 8 When completed, calculate water temperature rise and assess the selection. If the units selected are not within 10% of the load calculations, then review what effect changing the GPM, water temperature and/or air flow and air temperature would have on the corrected capacities. If the desired capacity cannot be achieved, select the next larger or smaller unit and repeat the procedure. Remember, when in doubt, undersize slightly for best performance.

Example Equipment Selection For Cooling

Step 1 Load Determination:
Assume we have determined that the appropriate cooling load at the desired dry bulb 80°F and wet bulb 65°F conditions is as follows:

Total Cooling ..... 23,100 BTUH
Sensible Cooling ..... 17,500 BTUH
Entering Air Temp.... 80°F Dry Bulb / 65°F Wet Bulb

Step 2 Design Conditions:
Similarly, we have also obtained the following design parameters:

Entering Water Temp ..... 90°F
Water Flow (Based upon 12°F rise in temp.) 4.5 GPM
Air Flow ..... 700 CFM

Step 3, 4 & 5 HP Selection:
After making our preliminary selection (GSH024), we enter the tables at design water flow and water temperature and read Total Cooling, Sens. Cooling and Heat of Rej. capacities:

Total Cooling ..... 24,900 BTUH
Sensible Cooling ..... 17,800 BTUH
Heat of Rejection ..... 31,400 BTUH

Step 6 & 7 Entering Air and Airflow Corrections:
Next, we determine our correction factors.

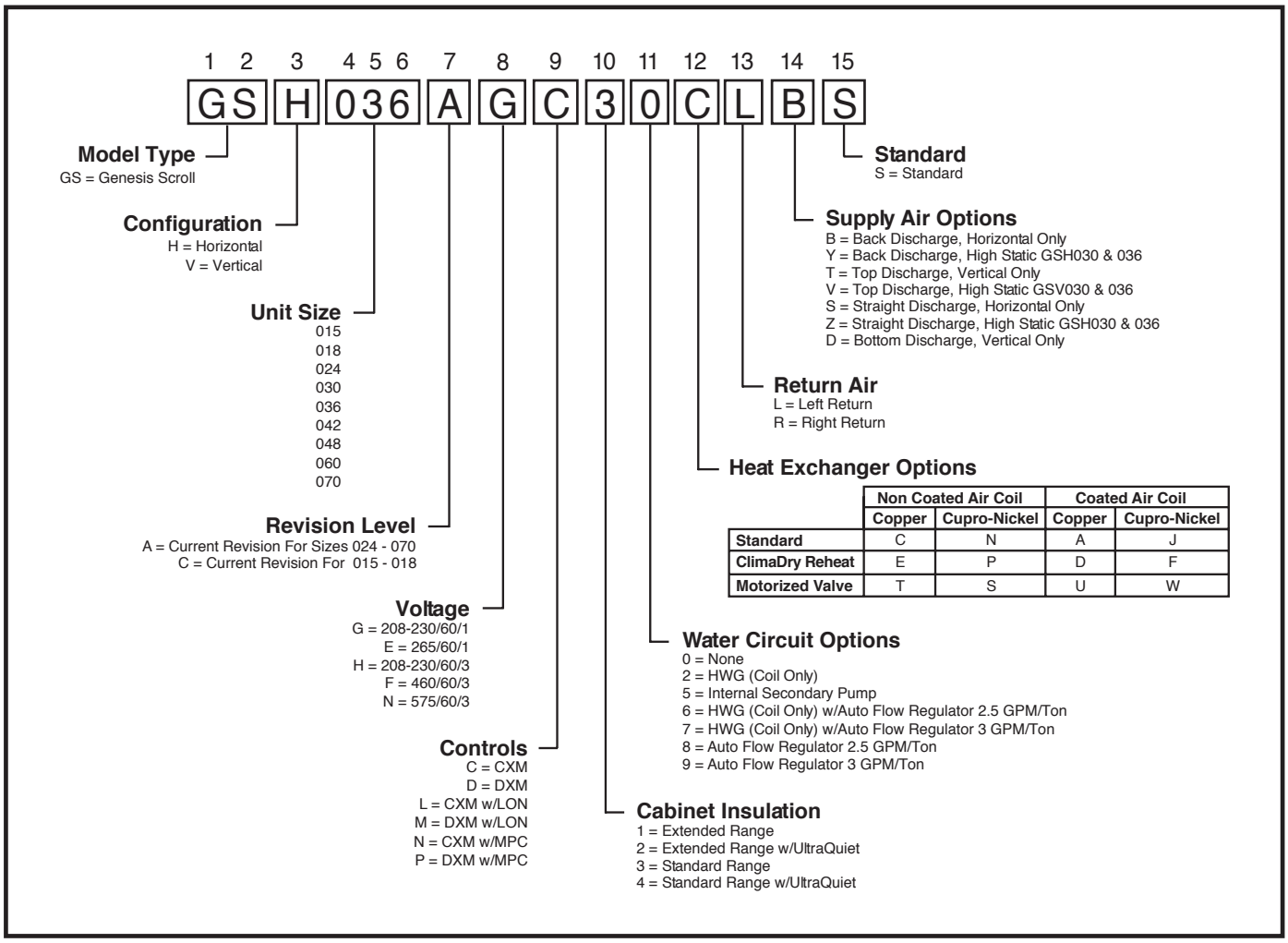
	Table		Ent Air		Air Flow		Corrected
Corrected Total Cooling =	24,900	x	0.940	x	0.957	=	22,400
Corrected Sens Cooling =	17,800	x	1.106	x	0.917	=	18,683
Corrected Heat of Reject =	31,400	x	0.949	x	0.964	=	28,726

Step 8 Water Temperature Rise Calculation & Assessment:

Actual Temperature Rise 12.8°F

When we compare the Corrected Total Cooling and Corrected Sensible Cooling figures with our load requirements stated in Step 1, we discover that our selection is within +/- 10% of our sensible load requirement. Furthermore, we see that our Corrected Total Cooling figure is slightly undersized, as recommended, when compared to the actual load

GS Series Nomenclature



Rev.: 09/13/06D

Performance Data
ARI/ASHRAE/ISO 13256-1

ASHRAE/ARI/ISO 13256-1. English (IP) Units

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 86°F		Heating 68°F		Cooling 59°F		Heating 50°F		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
GSH/V015	14,100	16.0	16.300	5.3	15,600	23.9	12,900	4.1	14,900	18.5	11,200	3.8
GSH/V018	17,100	14.8	20,900	5.0	19,000	22.7	16,000	4.1	18,300	16.7	13,200	3.6
GSH/V024	24,200	14.9	31,000	4.8	26,500	21.2	23,500	4.0	26,000	17.1	19,200	3.6
GSH/V030	28,900	15.1	35,000	4.8	31,100	21.4	27,200	4.0	30,700	16.9	22,200	3.6
GSH/V036	33,800	14.9	40,400	4.6	36,000	20.7	32,900	4.0	35,800	16.4	26.700	3.4
GSH/V042	41,000	14.5	49,800	4.8	45,400	20.3	39,000	4.0	43,300	16.0	32,700	3.7
GSH/V048	45,800	14.6	54,100	4.9	49,000	19.9	43,300	4.0	48,900	16.4	36,900	3.7
GSH/V060	56,800	13.4	74,900	4.7	59,600	17.7	58,900	3.6	59,400	14.6	48,700	3.8
GSH/V070	63,700	12.4	78,300	4.5	70,000	16.8	62,900	3.8	67,100	13.4	53,400	3.6

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 air flow is rated on high speed
All ratings based upon operation at lower voltage of dual voltage rated models

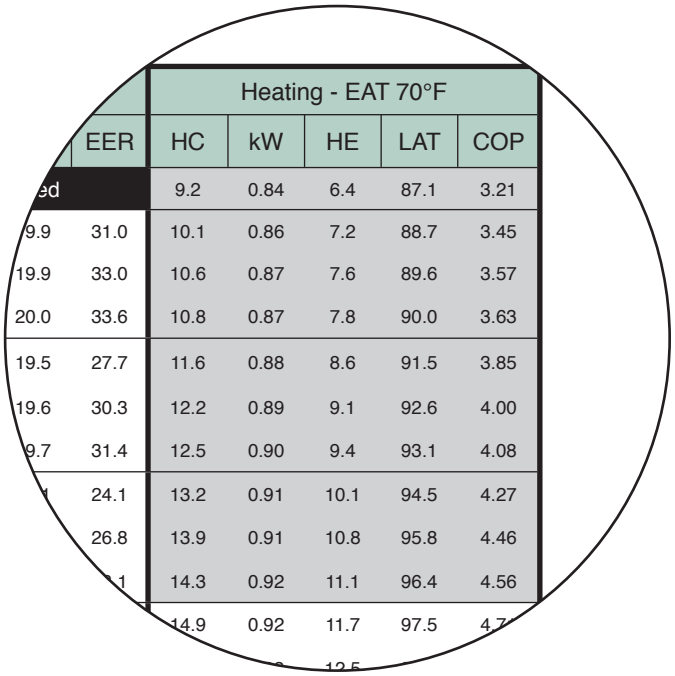
ASHRAE/ARI/ISO 13256-1. Metric (SI) Units

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 30°C		Heating 20°C		Cooling 15°C		Heating 10°C		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
GSH/V015	4,131	4.7	4,776	5.3	4,571	7.0	3,780	4.1	4,366	5.4	3,282	3.8
GSH/V018	5,010	4.3	6,124	5.0	5,567	6.7	4,688	4.1	5,362	4.9	3,868	3.6
GSH/V024	7,091	4.4	8,819	4.8	7,764	6.2	6,886	4.0	7,618	5.0	5,626	3.6
GSH/V030	8,468	4.4	10,255	4.8	9,112	6.3	7,790	4.0	8,995	5.0	6,505	3.6
GSH/V036	9,903	4.4	11,837	4.6	10,548	6.1	9,640	4.0	10,468	4.8	7,823	3.4
GSH/V042	12,013	4.2	14,591	4.8	13,302	5.9	11,423	4.0	12,687	4.7	9,581	3.7
GSH/V048	13,419	4.3	15,851	4.9	14,357	5.8	12,687	4.0	14,328	4.8	10,812	3.7
GSH/V060	16,642	3.9	21,946	4.7	17,463	5.2	17,258	3.6	17,409	4.3	14,269	3.8
GSH/V070	18,664	3.6	22,942	4.5	20,510	4.9	18,430	3.8	19,660	3.9	15,646	3.6

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 air flow is rated on high speed
All ratings based upon operation at lower voltage of dual voltage rated models

Performance Data
Selection Notes

For operation in the shaded area when water is used in lieu of an anti-freeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 40°F [4.4°C] when the JW3 jumper is not clipped (see example below). This is due to the potential of the refrigerant temperature being as low as 32°F [0°C] with 40°F [4.4°C] LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for standard range equipment or systems without antifreeze.



		Heating - EAT 70°F				
	EER	HC	kW	HE	LAT	COP
ed		9.2	0.84	6.4	87.1	3.21
9.9	31.0	10.1	0.86	7.2	88.7	3.45
19.9	33.0	10.6	0.87	7.6	89.6	3.57
20.0	33.6	10.8	0.87	7.8	90.0	3.63
19.5	27.7	11.6	0.88	8.6	91.5	3.85
19.6	30.3	12.2	0.89	9.1	92.6	4.00
9.7	31.4	12.5	0.90	9.4	93.1	4.08
	24.1	13.2	0.91	10.1	94.5	4.27
	26.8	13.9	0.91	10.8	95.8	4.46
		14.3	0.92	11.1	96.4	4.56
		14.9	0.92	11.7	97.5	4.7

Example:

At 50°F EWT (Entering Water Temperature) and 1.5 gpm/ton, a 3 ton unit has a HE of 22,500 Btuh. To calculate LWT, rearrange the formula for HE as follows:

HE = TD x GPM x 500, where HE = Heat of Extraction (Btuh); TD = temperature difference (EWT - LWT) and GPM = U.S. Gallons per Minute.

TD = HE / (GPM x 500)

TD = 22,500 / (4.5 x 500)

TD = 10°F

LWT = EWT - TD

LWT = 50 - 10 = 40°F

In this example, as long as the EWT does not fall below 50°F, the system will operate as designed. For EWTs below 50°F, higher flow rates will be required (open loop systems, for example, require at least 2 gpm/ton when EWT is below 50°F).

Performance Data
GS H/V/D 015

500 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, GS H/V/D 015 (Cv = 5, MOPD = 25 psi)		
GPM	WPD Adder	
	PSI	FT
1.8	0.13	0.30
2.8	0.31	0.72
3.8	0.58	1.33

EWT °F	GPM	*WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
		PSI	FT	TC	SC	Sens/Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
20	3.8	1.3	3.1	Operation Not Recommended						9.2	0.84	6.4	87.1	3.21
30	1.8	0.3	0.8	17.3	12.2	0.71	0.56	19.9	31.0	10.1	0.86	7.2	88.7	3.45
	2.8	0.8	1.8	17.5	12.2	0.70	0.53	19.9	33.0	10.6	0.87	7.6	89.6	3.57
	3.8	1.3	3.0	17.7	12.2	0.69	0.53	20.0	33.6	10.8	0.87	7.8	90.0	3.63
40	1.8	0.3	0.8	16.8	12.0	0.71	0.61	19.5	27.7	11.6	0.88	8.6	91.5	3.85
	2.8	0.7	1.7	17.2	12.2	0.71	0.57	19.6	30.3	12.2	0.89	9.1	92.6	4.00
	3.8	1.3	2.9	17.3	12.2	0.71	0.55	19.7	31.4	12.5	0.90	9.4	93.1	4.08
50	1.8	0.3	0.8	16.3	11.7	0.72	0.68	19.1	24.1	13.2	0.91	10.1	94.5	4.27
	2.8	0.7	1.7	16.7	11.9	0.72	0.62	19.2	26.8	13.9	0.91	10.8	95.8	4.46
	3.8	1.2	2.8	16.9	12.0	0.71	0.60	19.3	28.1	14.3	0.92	11.1	96.4	4.56
60	1.8	0.3	0.7	15.7	11.3	0.72	0.76	18.5	20.6	14.9	0.92	11.7	97.5	4.71
	2.8	0.7	1.6	16.1	11.6	0.72	0.70	18.6	23.1	15.7	0.93	12.5	99.1	4.93
	3.8	1.2	2.7	16.3	11.7	0.72	0.67	18.6	24.4	16.1	0.94	12.9	99.9	5.05
70	1.8	0.3	0.7	14.9	10.9	0.73	0.86	17.9	17.4	16.6	0.94	13.4	100.7	5.16
	2.8	0.7	1.5	15.5	11.2	0.72	0.79	18.0	19.6	17.5	0.95	14.3	102.5	5.41
	3.8	1.1	2.7	15.7	11.3	0.72	0.76	18.0	20.8	18.1	0.96	14.8	103.5	5.54
80	1.8	0.3	0.7	14.2	10.6	0.75	0.97	17.6	14.7	18.3	0.96	15.0	103.9	5.60
	2.8	0.6	1.5	14.7	10.8	0.73	0.89	17.7	16.5	19.4	0.97	16.1	106.0	5.89
	3.8	1.1	2.6	15.0	10.9	0.73	0.85	17.7	17.5	20.0	0.97	16.7	107.1	6.04
90	1.8	0.3	0.7	13.3	10.4	0.78	1.08	17.3	12.3	20.1	0.97	16.7	107.2	6.05
	2.8	0.6	1.4	13.9	10.5	0.76	1.00	17.4	13.9	21.3	0.98	18.0	109.5	6.36
	3.8	1.1	2.5	14.2	10.6	0.75	0.96	17.4	14.7	22.0	0.99	18.6	110.7	6.52
100	1.8	0.3	0.6	12.3	10.2	0.83	1.19	16.9	10.3	Operation Not Recommended				
	2.8	0.6	1.4	13.0	10.3	0.79	1.12	16.9	11.6					
	3.8	1.0	2.4	13.3	10.4	0.78	1.08	16.9	12.3					
110	1.8	0.3	0.6	11.3	10.1	0.89	1.31	16.5	8.6					
	2.8	0.6	1.3	12.0	10.2	0.85	1.24	16.4	9.7					
	3.8	1.0	2.3	12.3	10.2	0.83	1.20	16.3	10.3					

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.
ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
Table does not reflect fan or pump power corrections for ARI/ISO conditions.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
GS H/V/D 018

600 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, GS H/V/D 018 (Cv = 5, MOPD = 25 psi)		
GPM	WPD Adder	
	PSI	FT
2.2	0.19	0.45
3.5	0.49	1.13
4.5	0.81	1.87

EWT °F	GPM	*WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
		PSI	FT	TC	SC	Sens/Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
20	4.5	1.8	4.2	Operation Not Recommended						12.1	1.12	8.2	88.6	3.17
30	2.2	0.5	1.2	22.1	14.7	0.66	0.80	24.0	27.5	13.2	1.14	9.3	90.4	3.40
	3.5	1.1	2.6	22.3	14.7	0.66	0.76	24.1	29.5	13.9	1.16	9.9	91.4	3.52
	4.5	1.8	4.1	22.4	14.7	0.66	0.75	24.2	30.0	14.1	1.16	10.2	91.8	3.57
40	2.2	0.5	1.1	21.7	14.7	0.68	0.88	23.6	24.6	15.2	1.18	11.2	93.4	3.77
	3.5	1.1	2.5	22.1	14.7	0.67	0.81	23.7	27.1	16.0	1.20	11.9	94.7	3.92
	4.5	1.7	3.9	22.2	14.7	0.66	0.79	23.8	27.9	16.4	1.21	12.2	95.2	3.98
50	2.2	0.5	1.1	21.0	14.6	0.69	0.98	23.3	21.4	17.2	1.22	13.1	96.6	4.13
	3.5	1.1	2.5	21.6	14.7	0.68	0.90	23.3	24.0	18.2	1.24	14.0	98.1	4.31
	4.5	1.7	3.8	21.7	14.7	0.68	0.87	23.3	25.0	18.6	1.25	14.4	98.8	4.38
60	2.2	0.5	1.0	20.2	14.3	0.71	1.09	23.2	18.4	19.3	1.26	15.0	99.9	4.49
	3.5	1.0	2.4	20.9	14.5	0.70	1.00	23.2	20.9	20.5	1.28	16.1	101.6	4.69
	4.5	1.6	3.7	21.1	14.6	0.69	0.97	23.2	21.8	21.0	1.29	16.6	102.4	4.77
70	2.2	0.4	1.0	19.3	13.9	0.72	1.22	23.0	15.8	21.5	1.30	17.0	103.1	4.84
	3.5	1.0	2.3	20.0	14.2	0.71	1.12	23.1	17.9	22.8	1.32	18.3	105.2	5.06
	4.5	1.5	3.6	20.3	14.3	0.71	1.08	23.1	18.8	23.4	1.33	18.8	106.0	5.14
80	2.2	0.4	1.0	18.3	13.5	0.74	1.36	22.6	13.5	23.6	1.34	19.1	106.5	5.18
	3.5	1.0	2.2	19.1	13.8	0.73	1.25	22.6	15.3	25.1	1.36	20.5	108.8	5.41
	4.5	1.5	3.5	19.4	14.0	0.72	1.21	22.5	16.0	25.7	1.37	21.1	109.7	5.51
90	2.2	0.4	0.9	17.2	12.9	0.75	1.49	22.1	11.5	25.8	1.37	21.1	109.8	5.51
	3.5	0.9	2.1	18.0	13.3	0.74	1.39	22.1	13.0	27.4	1.40	22.6	112.3	5.76
	4.5	1.4	3.3	18.3	13.5	0.74	1.35	22.0	13.6	28.1	1.40	23.3	113.3	5.85
100	2.2	0.4	0.9	16.1	12.2	0.76	1.63	21.5	9.8	Operation Not Recommended				
	3.5	0.9	2.1	16.9	12.7	0.75	1.53	21.4	11.0					
	4.5	1.4	3.2	17.2	12.9	0.75	1.49	21.3	11.6					
110	2.2	0.4	0.9	14.9	11.5	0.77	1.77	20.9	8.4					
	3.5	0.9	2.0	15.7	12.0	0.76	1.67	20.8	9.4					
	4.5	1.3	3.1	16.1	12.2	0.76	1.63	20.7	9.8					

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.
ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
Table does not reflect fan or pump power corrections for ARI/ISO conditions.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
GS H/V/D 024

800 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, GS H/V/D 024 (Cv = 5, MOPD = 25 psi)		
GPM	WPD Adder	
	PSI	FT
3.0	0.36	0.83
4.5	0.81	1.87
6.0	1.44	3.33

EWT °F	GPM	*WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
		PSI	FT	TC	SC	Sens/Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
20	6.0	1.7	3.9	Operation Not Recommended						16.2	1.59	10.8	88.7	2.99
30	3.0	0.4	0.9	30.6	21.2	0.69	0.94	33.8	32.6	19.2	1.65	13.6	92.3	3.42
	4.5	0.9	2.1	30.9	21.2	0.69	0.91	34.0	34.1	19.4	1.65	13.7	92.4	3.44
	6.0	1.6	3.8	31.1	21.2	0.68	0.87	34.1	35.6	19.5	1.65	13.9	92.6	3.47
40	3.0	0.4	0.9	29.7	20.6	0.69	1.12	33.5	26.5	21.9	1.70	16.1	95.3	3.77
	4.5	0.9	2.1	30.0	20.6	0.69	1.08	33.7	27.8	22.2	1.71	16.3	95.6	3.80
	6.0	1.6	3.7	30.2	20.6	0.68	1.04	33.8	29.2	22.5	1.72	16.6	96.0	3.83
50	3.0	0.4	0.9	28.8	20.0	0.69	1.31	33.3	22.0	24.5	1.75	18.5	98.3	4.10
	4.5	0.9	2.0	29.1	20.0	0.69	1.25	33.3	23.2	24.9	1.77	18.9	98.9	4.13
	6.0	1.6	3.6	29.3	20.0	0.68	1.20	33.4	24.4	25.4	1.79	19.3	99.4	4.16
60	3.0	0.4	0.9	27.5	19.6	0.71	1.46	32.4	18.8	27.1	1.82	20.9	101.4	4.38
	4.5	0.8	1.9	27.7	19.6	0.71	1.39	32.4	19.9	27.9	1.84	21.6	102.3	4.44
	6.0	1.5	3.5	28.0	19.7	0.70	1.32	32.5	21.2	28.7	1.87	22.3	103.2	4.49
70	3.0	0.4	0.8	26.1	19.3	0.74	1.61	31.6	16.2	29.7	1.88	23.3	104.4	4.63
	4.5	0.8	1.9	26.3	19.3	0.73	1.53	31.6	17.3	30.8	1.92	24.3	105.7	4.72
	6.0	1.5	3.4	26.6	19.4	0.73	1.44	31.5	18.4	32.0	1.95	25.3	107.0	4.80
80	3.0	0.3	0.8	25.4	18.5	0.73	1.81	31.6	14.0	32.4	1.95	25.7	107.4	4.87
	4.5	0.8	1.8	25.6	18.6	0.72	1.72	31.5	14.9	33.6	1.99	26.8	108.9	4.96
	6.0	1.4	3.2	25.9	18.6	0.72	1.62	31.4	15.9	34.9	2.03	28.0	110.4	5.04
90	3.0	0.3	0.8	24.7	17.7	0.72	2.01	31.6	12.3	35.0	2.01	28.1	110.5	5.10
	4.5	0.8	1.7	24.9	17.8	0.71	1.91	31.4	13.1	36.4	2.06	29.4	112.1	5.18
	6.0	1.4	3.1	25.2	17.9	0.71	1.80	31.3	14.0	37.8	2.11	30.6	113.8	5.25
100	3.0	0.3	0.7	23.3	17.2	0.74	2.26	31.0	10.3	Operation Not Recommended				
	4.5	0.7	1.7	23.6	17.3	0.73	2.14	30.9	11.0					
	6.0	1.3	3.0	23.8	17.3	0.73	2.02	30.7	11.8					
110	3.0	0.3	0.7	22.0	16.7	0.76	2.50	30.5	8.8					
	4.5	0.7	1.6	22.2	16.7	0.75	2.37	30.3	9.3					
	6.0	1.3	2.9	22.4	16.8	0.75	2.24	30.0	10.0					

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.
ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
Table does not reflect fan or pump power corrections for ARI/ISO conditions.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
GS H/V/D 030

1000 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, GS H/V/D 030 (Cv = 5, MOPD = 25 psi)		
GPM	WPD Adder	
	PSI	FT
3.7	0.55	1.26
5.5	1.21	2.80
7.5	2.25	5.20

EWT °F	GPM	*WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
		PSI	FT	TC	SC	Sens/Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
20	7.5	2.7	6.2	Operation Not Recommended						18.6	1.88	12.2	87.2	2.91
30	3.7	0.6	1.4	35.8	24.4	0.68	1.22	39.9	29.2	20.7	1.92	14.1	89.1	3.15
	5.5	1.4	3.2	35.9	24.3	0.68	1.18	40.0	30.5	21.6	1.92	15.1	90.0	3.30
	7.5	2.6	6.0	36.1	24.1	0.67	1.14	40.0	31.8	22.6	1.92	16.1	90.9	3.45
40	3.7	0.6	1.4	34.7	24.2	0.70	1.41	39.5	24.6	24.1	1.98	17.4	92.4	3.58
	5.5	1.3	3.1	34.8	24.0	0.69	1.36	39.5	25.6	24.9	1.98	18.2	93.1	3.68
	7.5	2.5	5.8	35.0	23.9	0.68	1.31	39.5	26.8	25.7	1.99	18.9	93.8	3.79
50	3.7	0.6	1.3	33.6	23.9	0.71	1.60	39.1	21.0	27.6	2.03	20.7	95.6	3.99
	5.5	1.3	3.0	33.8	23.8	0.71	1.54	39.0	22.0	28.2	2.05	21.2	96.1	4.04
	7.5	2.4	5.6	33.9	23.8	0.70	1.48	39.0	23.0	28.8	2.06	21.8	96.6	4.09
60	3.7	0.6	1.3	32.5	23.2	0.71	1.73	38.4	18.7	31.1	2.09	24.0	98.8	4.37
	5.5	1.3	2.9	32.6	23.1	0.71	1.66	38.3	19.7	32.0	2.11	24.8	99.6	4.45
	7.5	2.4	5.4	32.8	23.1	0.70	1.58	38.2	20.7	32.9	2.13	25.6	100.4	4.52
70	3.7	0.5	1.3	31.3	22.4	0.72	1.87	37.7	16.8	34.6	2.14	27.3	102.0	4.73
	5.5	1.2	2.8	31.5	22.5	0.71	1.78	37.6	17.7	35.8	2.17	28.4	103.1	4.83
	7.5	2.3	5.3	31.7	22.5	0.71	1.69	37.5	18.8	37.0	2.20	29.5	104.2	4.92
80	3.7	0.5	1.2	30.2	22.4	0.74	2.08	37.3	14.5	38.0	2.22	30.5	105.2	5.02
	5.5	1.2	2.7	30.4	22.4	0.74	1.98	37.2	15.4	39.1	2.25	31.4	106.2	5.10
	7.5	2.2	5.1	30.6	22.5	0.73	1.89	37.1	16.3	40.2	2.28	32.4	107.2	5.17
90	3.7	0.5	1.2	29.2	22.4	0.77	2.30	37.0	12.7	41.5	2.30	33.7	108.4	5.29
	5.5	1.1	2.6	29.4	22.4	0.76	2.19	36.8	13.4	42.5	2.33	34.5	109.3	5.34
	7.5	2.1	4.9	29.6	22.5	0.76	2.08	36.7	14.2	43.5	2.36	35.4	110.3	5.40
100	3.7	0.5	1.1	27.5	21.2	0.77	2.49	36.0	11.0	Operation Not Recommended				
	5.5	1.1	2.5	27.7	21.3	0.77	2.38	35.8	11.7					
	7.5	2.0	4.7	27.9	21.3	0.76	2.26	35.6	12.3					
110	3.7	0.5	1.1	25.8	20.1	0.78	2.69	35.0	9.6					
	5.5	1.1	2.4	26.0	20.1	0.77	2.57	34.8	10.1					
	7.5	2.0	4.5	26.2	20.2	0.77	2.44	34.5	10.7					

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.
ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
Table does not reflect fan or pump power corrections for ARI/ISO conditions.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
GS H/V/D 036

*WPD Adder for Motorized Valve, GS H/V/D 036 (Cv = 5, MOPD = 25 psi)		
GPM	WPD Adder	
	PSI	FT
4.5	0.81	1.87
7.0	1.96	4.53
9.0	3.24	7.48

1150 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

EWT °F	GPM	*WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
		PSI	FT	TC	SC	Sens/Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
20	9.0	4.9	11.2	Operation Not Recommended						22.9	2.23	15.3	88.4	3.01
30	4.5	1.6	3.7	40.2	29.2	0.73	1.38	44.9	29.0	25.9	2.30	18.1	90.9	3.30
	7.0	3.2	7.3	41.0	29.5	0.72	1.33	45.5	30.9	26.3	2.31	18.4	91.1	3.33
	9.0	4.7	10.9	41.9	29.8	0.71	1.27	46.2	32.9	26.6	2.32	18.7	91.4	3.36
40	4.5	1.5	3.5	38.9	28.5	0.73	1.60	44.4	24.4	29.6	2.40	21.4	93.8	3.61
	7.0	3.1	7.1	39.8	28.8	0.72	1.54	45.0	25.9	29.9	2.40	21.7	94.1	3.65
	9.0	4.6	10.6	40.6	29.0	0.72	1.48	45.6	27.5	30.3	2.41	22.1	94.4	3.69
50	4.5	1.5	3.4	37.7	27.9	0.74	1.81	43.9	20.8	33.2	2.50	24.7	96.7	3.89
	7.0	3.0	6.9	38.5	28.1	0.73	1.75	44.5	22.1	33.6	2.50	25.1	97.1	3.95
	9.0	4.4	10.2	39.3	28.3	0.72	1.68	45.0	23.4	34.0	2.49	25.5	97.4	4.00
60	4.5	1.4	3.3	36.6	28.0	0.77	1.98	43.4	18.5	36.9	2.57	28.1	99.7	4.20
	7.0	2.9	6.7	37.4	28.1	0.75	1.91	43.9	19.6	37.5	2.58	28.7	100.2	4.26
	9.0	4.3	9.9	38.2	28.3	0.74	1.85	44.5	20.7	38.2	2.59	29.3	100.7	4.32
70	4.5	1.4	3.2	35.5	28.1	0.79	2.15	42.8	16.5	40.5	2.64	31.5	102.6	4.50
	7.0	2.8	6.5	36.3	28.2	0.78	2.08	43.4	17.5	41.4	2.67	32.3	103.3	4.55
	9.0	4.1	9.6	37.1	28.2	0.76	2.01	44.0	18.5	42.3	2.69	33.1	104.1	4.61
80	4.5	1.3	3.1	34.2	27.1	0.79	2.39	42.3	14.3	44.2	2.71	34.9	105.5	4.77
	7.0	2.7	6.2	35.0	27.2	0.78	2.31	42.9	15.2	45.0	2.75	35.7	106.3	4.80
	9.0	4.0	9.3	35.8	27.2	0.76	2.23	43.4	16.0	45.9	2.79	36.4	107.0	4.83
90	4.5	1.3	3.0	32.9	26.1	0.79	2.62	41.9	12.6	47.8	2.78	38.3	108.5	5.04
	7.0	2.6	6.0	33.7	26.2	0.78	2.54	42.3	13.3	48.7	2.83	39.0	109.2	5.04
	9.0	3.9	8.9	34.4	26.2	0.76	2.45	42.8	14.0	49.5	2.88	39.7	109.9	5.04
100	4.5	1.3	2.9	30.9	26.2	0.85	2.94	40.9	10.5	Operation Not Recommended				
	7.0	2.5	5.8	31.6	26.3	0.83	2.85	41.3	11.1					
	9.0	3.7	8.6	32.3	26.3	0.82	2.75	41.6	11.7					
110	4.5	1.2	2.8	28.8	26.4	0.92	3.26	39.9	8.8					
	7.0	2.4	5.6	29.5	26.4	0.90	3.16	40.2	9.3					
	9.0	3.6	8.3	30.1	26.5	0.88	3.05	40.5	9.9					

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.
ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
Table does not reflect fan or pump power corrections for ARI/ISO conditions.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas..

Performance Data
GS H/V/D 042

1400 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, GS H/V/D 042 (Cv = 5, MOPD = 25 psi)		
GPM	WPD Adder	
	PSI	FT
5.2	1.08	2.50
9.0	3.24	7.48
10.5	4.41	10.19

EWT °F	GPM	*WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
		PSI	FT	TC	SC	Sens/Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
20	10.5	6.2	14.3	Operation Not Recommended						27.2	2.60	18.4	88.0	3.08
30	5.2	2.0	4.6	51.7	36.7	0.71	1.73	57.6	29.9	31.3	2.65	22.3	90.7	3.47
	9.0	4.7	10.9	52.1	36.8	0.71	1.68	57.9	31.1	31.9	2.67	22.8	91.1	3.51
	10.5	6.0	13.9	52.6	36.9	0.70	1.63	58.2	32.4	32.5	2.68	23.3	91.5	3.55
40	5.2	1.9	4.5	49.7	35.7	0.72	2.01	56.5	24.7	35.9	2.73	26.6	93.7	3.85
	9.0	4.6	10.6	50.1	35.8	0.71	1.94	56.7	25.8	36.9	2.77	27.4	94.4	3.91
	10.5	5.8	13.5	50.5	35.9	0.71	1.88	57.0	26.9	37.8	2.80	28.3	95.0	3.96
50	5.2	1.9	4.3	47.7	34.7	0.73	2.29	55.5	20.8	40.4	2.82	30.8	96.7	4.21
	9.0	4.4	10.2	48.1	34.8	0.72	2.21	55.6	21.8	41.8	2.87	32.0	97.7	4.27
	10.5	5.6	13.0	48.5	34.9	0.72	2.13	55.8	22.8	43.2	2.92	33.2	98.6	4.34
60	5.2	1.8	4.2	46.3	33.8	0.73	2.52	54.9	18.3	45.0	2.90	35.1	99.7	4.55
	9.0	4.3	9.9	46.6	33.9	0.73	2.42	54.9	19.3	46.4	2.94	36.3	100.7	4.62
	10.5	5.5	12.6	47.0	34.1	0.72	2.31	54.9	20.3	47.8	2.99	37.6	101.6	4.68
70	5.2	1.8	4.0	44.8	32.9	0.73	2.75	54.2	16.3	49.5	2.98	39.4	102.8	4.87
	9.0	4.1	9.6	45.2	33.1	0.73	2.63	54.1	17.2	50.9	3.02	40.6	103.7	4.94
	10.5	5.3	12.2	45.5	33.2	0.73	2.50	54.0	18.2	52.3	3.07	41.9	104.6	5.00
80	5.2	1.7	3.9	42.5	31.9	0.75	3.06	53.0	13.9	54.1	3.06	43.6	105.8	5.17
	9.0	4.0	9.3	42.9	32.0	0.75	2.92	52.8	14.7	55.7	3.13	45.1	106.9	5.23
	10.5	5.1	11.8	43.2	32.2	0.74	2.78	52.7	15.6	57.4	3.19	46.5	108.0	5.28
90	5.2	1.6	3.8	40.3	30.8	0.76	3.37	51.8	12.0	58.6	3.15	47.9	108.8	5.46
	9.0	3.9	8.9	40.6	31.0	0.76	3.21	51.6	12.7	60.5	3.23	49.5	110.0	5.50
	10.5	4.9	11.4	40.9	31.1	0.76	3.06	51.4	13.4	62.5	3.31	51.2	111.3	5.53
100	5.2	1.6	3.6	38.3	30.2	0.79	3.76	51.1	10.2	Operation Not Recommended				
	9.0	3.7	8.6	38.6	30.3	0.79	3.59	50.8	10.8					
	10.5	4.7	11.0	38.9	30.5	0.78	3.42	50.6	11.4					
110	5.2	1.5	3.5	36.3	29.6	0.81	4.16	50.5	8.7					
	9.0	3.6	8.3	36.6	29.7	0.81	3.97	50.1	9.2					
	10.5	4.6	10.5	36.9	29.9	0.81	3.78	49.8	9.8					

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.
ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
Table does not reflect fan or pump power corrections for ARI/ISO conditions.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
GS H/V/D 048

1600 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, GS H/V/D 048 (Cv = 5, MOPD = 25 psi)		
GPM	WPD Adder	
	PSI	FT
6.0	1.44	3.33
9.0	3.24	7.48
12.0	5.76	13.31

EWT °F	GPM	*WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
		PSI	FT	TC	SC	Sens/Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
20	12.0	7.6	17.6	Operation Not Recommended						31.4	2.95	21.3	88.2	3.12
30	6.0	2.5	5.8	55.5	38.9	0.70	2.00	62.3	27.7	35.7	2.98	25.5	90.7	3.51
	9.0	4.7	10.9	55.9	38.7	0.69	1.93	62.5	29.0	36.3	3.01	26.0	91.0	3.53
	12.0	7.4	17.1	56.4	38.5	0.68	1.85	62.7	30.5	36.9	3.04	26.5	91.4	3.56
40	6.0	2.4	5.6	53.9	38.2	0.71	2.30	61.7	23.5	40.2	3.07	29.7	93.3	3.84
	9.0	4.6	10.6	54.3	38.0	0.70	2.21	61.8	24.6	41.0	3.09	30.5	93.7	3.90
	12.0	7.2	16.6	54.7	37.8	0.69	2.12	61.9	25.8	41.9	3.11	31.3	94.2	3.95
50	6.0	2.3	5.4	52.3	37.5	0.72	2.59	61.1	20.2	44.7	3.15	33.9	95.9	4.15
	9.0	4.4	10.2	52.7	37.3	0.71	2.49	61.2	21.1	45.8	3.16	35.0	96.5	4.24
	12.0	7.0	16.1	53.0	37.1	0.70	2.40	61.2	22.1	46.8	3.17	36.0	97.1	4.33
60	6.0	2.3	5.2	51.3	37.2	0.72	2.83	61.0	18.1	48.7	3.24	37.6	98.2	4.40
	9.0	4.3	9.9	51.6	37.0	0.72	2.73	60.9	18.9	50.3	3.25	39.2	99.1	4.53
	12.0	6.7	15.6	52.0	36.9	0.71	2.62	60.9	19.8	52.0	3.27	40.8	100.1	4.66
70	6.0	2.2	5.1	50.3	36.9	0.73	3.07	60.8	16.4	52.6	3.32	41.3	100.5	4.64
	9.0	4.1	9.6	50.6	36.8	0.73	2.96	60.7	17.1	54.9	3.35	43.5	101.8	4.81
	12.0	6.5	15.1	50.9	36.6	0.72	2.85	60.6	17.9	57.1	3.37	45.6	103.0	4.97
80	6.0	2.1	4.9	48.4	36.0	0.74	3.39	60.0	14.3	56.6	3.41	45.0	102.8	4.87
	9.0	4.0	9.3	48.7	35.8	0.74	3.26	59.8	14.9	58.6	3.43	47.0	103.9	5.02
	12.0	6.3	14.6	49.0	35.7	0.73	3.14	59.7	15.6	60.7	3.44	48.9	105.1	5.16
90	6.0	2.0	4.7	46.5	35.0	0.75	3.71	59.2	12.6	60.6	3.49	48.7	105.1	5.08
	9.0	3.9	8.9	46.8	34.9	0.75	3.57	59.0	13.1	62.4	3.51	50.4	106.1	5.22
	12.0	6.1	14.0	47.1	34.8	0.74	3.43	58.8	13.7	64.2	3.52	52.2	107.2	5.35
100	6.0	2.0	4.5	44.8	34.6	0.77	4.14	59.0	10.8	Operation Not Recommended				
	9.0	3.7	8.6	45.1	34.5	0.77	3.99	58.7	11.3					
	12.0	5.9	13.5	45.4	34.4	0.76	3.84	58.4	11.8					
110	6.0	1.9	4.4	43.1	34.2	0.79	4.58	58.7	9.4					
	9.0	3.6	8.3	43.4	34.1	0.79	4.41	58.4	9.8					
	12.0	5.6	13.0	43.6	34.0	0.78	4.24	58.1	10.3					

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.
ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
Table does not reflect fan or pump power corrections for ARI/ISO conditions.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
GS H/V/D 060

2000 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, GS H/V/D 060 (Cv = 5, MOPD = 25 psi)		
GPM	WPD Adder	
	PSI	FT
7.5	2.25	5.20
11.3	5.11	11.80
15.0	9.00	20.79

EWT °F	GPM	*WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
		PSI	FT	TC	SC	Sens/Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
20	15.0	5.1	11.8	Operation Not Recommended						41.5	3.99	27.9	89.2	3.05
30	7.5	1.6	3.6	68.0	46.8	0.69	2.73	77.4	24.9	43.8	4.05	30.0	90.3	3.17
	11.3	3.1	7.1	68.2	46.4	0.68	2.68	77.4	25.5	46.1	4.09	32.2	91.4	3.31
	15.0	4.9	11.4	68.4	46.1	0.67	2.63	77.4	26.0	48.5	4.13	34.4	92.4	3.44
40	7.5	1.5	3.5	65.8	46.1	0.70	3.15	76.5	20.9	51.3	4.25	36.8	93.7	3.54
	11.3	3.0	6.9	66.0	45.8	0.69	3.07	76.5	21.5	53.3	4.28	38.7	94.7	3.65
	15.0	4.8	11.1	66.3	45.5	0.69	2.99	76.5	22.1	55.3	4.32	40.6	95.6	3.75
50	7.5	1.5	3.4	63.5	45.5	0.72	3.58	75.7	17.8	58.7	4.44	43.5	97.2	3.87
	11.3	2.9	6.7	63.8	45.2	0.71	3.47	75.6	18.4	60.4	4.48	45.2	98.0	3.96
	15.0	4.6	10.7	64.1	44.8	0.70	3.36	75.5	19.1	62.2	4.51	46.8	98.8	4.04
60	7.5	1.4	3.3	62.6	45.3	0.72	3.90	75.9	16.0	66.1	4.64	50.3	100.6	4.18
	11.3	2.8	6.5	62.9	44.9	0.71	3.74	75.7	16.8	68.5	4.67	52.6	101.7	4.30
	15.0	4.5	10.4	63.2	44.6	0.70	3.58	75.4	17.7	71.0	4.71	54.9	102.9	4.42
70	7.5	1.4	3.2	61.7	45.0	0.73	4.23	76.1	14.6	73.5	4.83	57.0	104.0	4.46
	11.3	2.7	6.3	62.0	44.7	0.72	4.02	75.7	15.4	76.6	4.87	60.0	105.5	4.61
	15.0	4.3	10.0	62.4	44.3	0.71	3.80	75.4	16.4	79.7	4.90	63.0	106.9	4.77
80	7.5	1.3	3.1	58.7	44.2	0.75	4.70	74.8	12.5	80.9	5.03	63.7	107.5	4.71
	11.3	2.6	6.1	59.2	43.8	0.74	4.46	74.4	13.3	83.8	5.05	66.6	108.8	4.86
	15.0	4.2	9.7	59.7	43.5	0.73	4.22	74.1	14.1	86.7	5.07	69.4	110.1	5.01
90	7.5	1.3	3.0	55.8	43.4	0.78	5.17	73.4	10.8	88.3	5.23	70.5	110.9	4.95
	11.3	2.5	5.9	56.4	43.0	0.76	4.90	73.1	11.5	91.0	5.24	73.1	112.1	5.09
	15.0	4.1	9.4	56.9	42.7	0.75	4.64	72.8	12.3	93.7	5.25	75.8	113.4	5.23
100	7.5	1.2	2.9	54.4	42.9	0.79	5.72	73.9	9.5	Operation Not Recommended				
	11.3	2.4	5.6	54.8	42.6	0.78	5.43	73.3	10.1					
	15.0	3.9	9.0	55.3	42.2	0.76	5.14	72.8	10.7					
110	7.5	1.2	2.8	52.9	42.5	0.80	6.28	74.4	8.4					
	11.3	2.4	5.4	53.3	42.1	0.79	5.96	73.6	8.9					
	15.0	3.8	8.7	53.6	41.8	0.78	5.64	72.8	9.5					

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.
ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
Table does not reflect fan or pump power corrections for ARI/ISO conditions.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas.

Performance Data
GS H/V/D 070

2300 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, GS H/V/D 070 (Cv = 5, MOPD = 25 psi)		
GPM	WPD Adder	
	PSI	FT
9.0	3.24	7.48
13.5	7.29	16.84
18.0	12.96	29.94

EWT °F	GPM	*WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
		PSI	FT	TC	SC	Sens/Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
20	18.0	6.9	15.9	Operation Not Recommended						45.7	4.51	30.3	88.4	2.97
30	9.0	2.1	4.9	75.8	55.5	0.73	3.30	87.1	22.9	48.3	4.47	33.1	89.5	3.17
	13.5	4.2	9.6	76.2	54.8	0.72	3.17	87.0	24.0	50.8	4.52	35.4	90.5	3.30
	18.0	6.7	15.4	76.6	54.1	0.71	3.04	86.9	25.2	53.3	4.58	37.7	91.5	3.42
40	9.0	2.1	4.8	73.4	54.2	0.74	3.76	86.3	19.5	56.0	4.64	40.2	92.5	3.54
	13.5	4.0	9.3	73.8	53.5	0.73	3.61	86.1	20.4	58.1	4.67	42.2	93.4	3.64
	18.0	6.5	15.0	74.2	52.9	0.71	3.46	86.0	21.4	60.3	4.71	44.2	94.3	3.75
50	9.0	2.0	4.6	71.1	52.9	0.74	4.23	85.5	16.8	63.6	4.81	47.3	95.6	3.88
	13.5	3.9	9.0	71.4	52.3	0.73	4.06	85.3	17.6	65.4	4.83	49.0	96.3	3.97
	18.0	6.3	14.5	71.8	51.7	0.72	3.89	85.1	18.5	67.2	4.85	50.7	97.1	4.06
60	9.0	1.9	4.5	70.2	52.1	0.74	4.62	86.0	15.2	71.3	4.98	54.3	98.7	4.20
	13.5	3.8	8.7	70.7	51.9	0.73	4.43	85.8	15.9	73.2	5.02	56.0	99.5	4.27
	18.0	6.1	14.0	71.2	51.6	0.72	4.25	85.7	16.8	75.0	5.07	57.7	100.2	4.34
70	9.0	1.9	4.3	69.3	51.3	0.74	5.02	86.4	13.8	79.0	5.15	61.4	101.8	4.50
	13.5	3.7	8.4	70.0	51.4	0.73	4.81	86.4	14.5	80.9	5.22	63.1	102.6	4.55
	18.0	5.9	13.6	70.7	51.6	0.73	4.61	86.4	15.3	82.8	5.29	64.8	103.3	4.59
80	9.0	1.8	4.2	66.2	49.6	0.75	5.51	85.0	12.0	86.4	5.40	68.0	104.8	4.69
	13.5	3.5	8.2	66.9	49.8	0.74	5.28	84.9	12.7	87.6	5.42	69.1	105.3	4.74
	18.0	5.7	13.1	67.6	50.0	0.74	5.06	84.8	13.4	88.8	5.45	70.2	105.7	4.78
90	9.0	1.7	4.0	63.2	48.0	0.76	6.00	83.6	10.5	93.9	5.65	74.6	107.8	4.87
	13.5	3.4	7.9	63.8	48.2	0.76	5.76	83.4	11.1	94.3	5.63	75.1	108.0	4.91
	18.0	5.5	12.7	64.4	48.3	0.75	5.51	83.2	11.7	94.8	5.61	75.6	108.1	4.95
100	9.0	1.7	3.9	60.4	47.4	0.78	6.68	83.2	9.1	Operation Not Recommended				
	13.5	3.3	7.6	61.0	47.6	0.78	6.40	82.9	9.5					
	18.0	5.3	12.2	61.6	47.7	0.77	6.13	82.6	10.1					
110	9.0	1.6	3.7	57.7	46.8	0.81	7.35	82.8	7.9					
	13.5	3.2	7.3	58.3	46.9	0.81	7.05	82.3	8.3					
	18.0	5.1	11.7	58.9	47.1	0.80	6.75	81.9	8.7					

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.
ARI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.
Table does not reflect fan or pump power corrections for ARI/ISO conditions.
All performance is based upon the lower voltage of dual voltage rated units.
Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
Operation below 40°F EWT is based upon a 15% antifreeze solution.
Operation below 60°F EWT requires optional insulated water/refrigerant circuit.
See performance correction tables for operating conditions other than those listed above.
See Performance Data Selection Notes for operation in the shaded areas.

Performance Data Correction Tables

Air Flow Correction Table

Airflow	Cooling				Heating		
% of Rated	Total Capacity	Sensible Capacity	Power	Heat of Rejection	Heating Capacity	Power	Heat of Extraction
75%	0.914	0.834	0.987	0.929	0.968	1.091	0.936
81%	0.936	0.876	0.990	0.946	0.976	1.068	0.952
88%	0.957	0.917	0.994	0.964	0.984	1.045	0.968
94%	0.979	0.959	0.997	0.982	0.992	1.023	0.984
100%	1.000	1.000	1.000	1.000	1.000	1.000	1.000
106%	1.021	1.041	1.003	1.018	1.008	0.977	1.016
113%	1.043	1.083	1.006	1.036	1.016	0.955	1.032

Entering Air Correction Table

Heating			
Entering Air DB°F	Heating Capacity	Power	Heat of Extraction
60	1.019	0.896	1.054
65	1.010	0.948	1.028
68	1.004	0.980	1.011
70	1.000	1.000	1.000
75	0.997	1.059	0.979
80	0.993	1.118	0.957

Cooling										
Entering Air WB°F	Total Capacity	Sensible Cooling Capacity Multiplier - Entering DB °F							Power	Heat of Rejection
		70	75	80	80.6	85	90	95		
60	0.881	0.943	1.067	1.192	1.240	*	*	*	0.983	0.899
65	0.940	0.797	0.952	1.106	1.125	1.261	*	*	0.991	0.949
66.2	0.976	0.693	0.868	1.043	1.063	1.217	*	*	0.997	0.980
67	1.000	0.624	0.812	1.000	1.023	1.188	1.343	1.352	1.000	1.000
70	1.012		0.697	0.820	0.835	0.944	1.067	1.257	1.002	1.010
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 Cooling - 80.6°F DB/66.2°F WB, 1 and Heating - 68°F DB/59°F WB entering air temperature

Antifreeze Correction Table

Antifreeze Type	Antifreeze %	Cooling			Heating		WPD Corr. Fct. EWT 30°F
		EWT 90°F			EWT 30°F		
		Total Cap	Sens Cap	Power	Htg Cap	Power	
Water	0	1.000	1.000	1.000	1.000	1.000	1.000
Propylene Glycol	5	0.995	0.995	1.003	0.989	0.997	1.070
	15	0.986	0.986	1.009	0.968	0.990	1.210
	25	0.978	0.978	1.014	0.947	0.983	1.360
Methanol	5	0.997	0.997	1.002	0.989	0.997	1.070
	15	0.990	0.990	1.007	0.968	0.990	1.160
	25	0.982	0.982	1.012	0.949	0.984	1.220
Ethanol	5	0.998	0.998	1.002	0.981	0.994	1.140
	15	0.994	0.994	1.005	0.944	0.983	1.300
	25	0.986	0.986	1.009	0.917	0.974	1.360
Ethylene Glycol	5	0.998	0.998	1.002	0.993	0.998	1.040
	15	0.994	0.994	1.004	0.980	0.994	1.120
	25	0.988	0.988	1.008	0.966	0.990	1.200

Blower Performance Data
Standard Unit - No Reheat

Airflow in CFM with wet coil and clean air filter.

Model	Fan Speed	Rated Airflow	MIN CFM	Airflow (cfm) at External Static Pressure (in. wg)															
				0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
GSH/V 015	HI	500	375	880	860	840	830	820	800	780	750	730	690	660	610				
	MED	500	375	770	760	750	740	720	710	690	670	640	620	600	520				
	LOW	500	375	660	660	660	650	640	630	620	600	580	550	520	460				
GSH/V 018	HI	600	450	880	860	840	830	820	800	780	750	730	690	660	610				
	MED	600	450	770	760	750	740	720	710	690	670	640	620	600	520				
	LOW	600	450	660	660	660	650	640	630	620	600	580	550	520	460				
GSH/V 024	HI	800	600	1130	1110	1090	1060	1040	1010	980	950	920	880	840	720				
	MED	800	600	950	940	930	920	910	880	860	820	790	760	730					
	LOW	800	600	880	870	860	840	830	810	800	770	730	700	660					
GSH/V 030	HI	1000	750	1260	1230	1200	1180	1160	1120	1090	1050	1000	970	930	850				
	MED	1000	750	1180	1150	1120	1090	1070	1030	1000	970	950	910	870					
	LOW	1000	750	1040	1020	1000	980	960	930	910	870	840	820	790					
GSH/V 030	HS HI	1000	750	1400	1360	1320	1280	1250	1220	1200	1150	1110	1070	1020	940	850			
	HS MED	1000	750	1260	1240	1220	1190	1170	1130	1100	1070	1040	990	950					
	HS LOW	1000	750	1170	1150	1130	1100	1080	1050	1020	990	960	930	900					
GSH/V 036	HI	1150	900	1400	1360	1320	1280	1250	1220	1200	1150	1110	1070	1020	940				
	MED	1150	900	1260	1240	1220	1190	1170	1130	1100	1070	1040	990	950					
	LOW	1150	900	1170	1150	1130	1100	1080	1050	1020	990	960	930	900					
GSH/V 036	HS HI	1150	900	1790	1760	1730	1700	1660	1630	1590	1550	1510	1470	1440	1370	1270	1120		
	HS MED	1150	900	1510	1490	1470	1450	1420	1400	1380	1350	1320	1300	1270	1180	1070			
	HS LOW	1150	900	1110	1100	1090	1080	1060	1050	1040									
GSH/V 042	HI	1400	1050				1670	1630	1600	1570	1540	1510	1440	1380	1290	1130			
	MED	1400	1050	1610	1580	1550	1510	1480	1450	1420	1390	1360	1320	1270					
	LOW	1400	1050	1270	1260	1250	1240	1220	1210	1190	1160	1120	1080						
GSH/V 048	HI	1600	1200				2010	2000	1940	1880	1830	1780	1690	1610	1540	1310			
	MED	1600	1200	1950	1910	1870	1820	1780	1740	1700	1670	1630	1570	1520	1410	1310			
	LOW	1600	1200	1470	1460	1450	1440	1430	1410	1380	1360	1330	1280	1220					
GSH/V 060	HI	2000	1500						2270	2230	2200	2170	2140	2110	2040	1970	1870	1720	1640
	MED	2000	1500	2260	2240	2220	2190	2170	2140	2110	2100	2080	2050	2020	1960	1870	1760	1660	1550
	LOW	2000	1500	2050	2030	2010	1990	1970	1950	1930	1910	1880	1850	1830	1780	1700	1650	1570	
GSH/V 070	HI	2300	1725						2460	2430	2390	2340	2310	2280	2230	2180	1990	1860	1740
	MED	2300	1725	2530	2500	2470	2450	2420	2400	2370	2340	2310	2280	2260	2200	2100	1890	1740	
	LOW	2300	1725	2270	2260	2250	2240	2230	2210	2180	2160	2140	2120	2100	2040	1900	1790		

Black areas denote ESP where operation is not recommended
Units factory shipped on medium speed (Size 015 on low), other speeds require field selection
All airflow is rated at lowest Voltage if unit is dual Voltage rated, e.g. 208V for 208-230V units
All units ARI/ISO/ASHRAE 13256-1 rated on high fan speed (Size 015 rated on medium speed)
Performance stated is at the rated power supply, performance may vary as the power supply varies from the rated.

Blower Performance Data
Units With ClimaDry

Coil Face Velocity FPM	GSH/V with Reheat ESP Loss					
	GSH/V 015, 018 In. of Water	GSH/V 024, 030 In. of Water	GSH/V 036 In. of Water	GSH/V 042, 048 In. of Water	GSH/V 060 In. of Water	GSH/V 070 In. of Water
200	0.040	0.037	0.033	0.031	0.028	0.026
250	0.059	0.052	0.046	0.042	0.038	0.034
300	0.088	0.077	0.066	0.059	0.051	0.044
350	0.131	0.113	0.096	0.085	0.073	0.061
400	0.203	0.181	0.160	0.145	0.131	0.117
450	0.258	0.242	0.226	0.215	0.205	0.194
500	0.375	0.360	0.345	0.335	0.326	0.316

For GS units with ClimaDry Reheat coil applications, calculate face velocity of the entering air. From the table above, find ESP for Reheat application. The loss includes wet coil loss.

Example:
Reheat coil loss can be determined from the above table. Coil velocity (FPM) = Airflow (CFM) / Face Area (sq. ft.)

1) GSH036 has a face area of 3.88 sq. ft. (see physical data table).
2) At 1,100 cfm, coil velocity (FPM) = 1,100 / 3.88 = 284 FPM
3) From above table, it will be necessary to subtract 0.061 from the blower performance ESP.
4) On medium speed, the GSH036 (without reheat - see blower table) can deliver 1,100 CFM at 0.30 in. wg. with the standard PSC motor; with the reheat coil, it now delivers 1,063 CFM at 0.30 in. wg. or 1,100 CFM at 0.24 in. wg.
5) If the decrease in airflow is acceptable, no changes are necessary. Otherwise, high speed fan should be used to overcome the pressure drop of the reheat coil.

Physical Data

Model	015	018	024	030	036	042	048	060	070
Compressor (1 Each)	Rotary		Scroll						
Factory Charge R22 (oz) [kg]	44 [1.25]	44 [1.25]	48 [1.36]	48 [1.36]	60 [1.70]	74 [2.10]	74 [2.10]	102 [2.89]	104 [2.95]
PSC Fan Motor & Blower (3 Speeds)									
Fan Motor (hp) [W]	1/6 [124]	1/6 [124]	1/5 [150]	1/3 [250]	1/2 [373]	1/2 [373]	3/4 [560]	3/4 [560]	1 [746]
Blower Wheel Size (dia x w) - (in) [mm]	9 x 7 [229 x 178]	9 x 7 [229 x 178]	9 x 7 [229 x 178]	9 x 7 [229 x 178]	9 x 7 [229 x 178]	10 x 10 [254 x 254]	10 x 10 [254 x 254]	11 x 10 [279 x 254]	11 x 10 [279 x 254]
Water Connection Size									
IPT (in)	3/4	3/4	3/4	3/4	3/4	1	1	1	1
Coax Volume									
Volume (US Gallons) [liters]	0.56 [2.12]	0.56 [2.12]	0.76 [2.88]	0.76 [2.88]	0.92 [3.48]	0.92 [3.48]	0.92 [3.48]	1.56 [5.91]	1.56 [5.91]
Vertical Upflow									
Air Coil Dimensions (h x w) - (in) [mm]	20 x 20 [508 x 508]	20 x 20 [508 x 508]	24 x 20 [610 x 508]	24 x 20 [610 x 508]	28 x 20 [711 x 508]	28 x 25 [711 x 635]	28 x 25 [711 x 635]	32 x 25 [813 x 635]	36 x 25 [914 x 635]
Standard Filter - 1" [25.4mm] Throwaway, qty (in) [mm]	20 x 24 [508 x 610]	20 x 24 [508 x 610]	24 x 24 [610 x 610]	24 x 24 [610 x 610]	2 - 14 x 24 [356 x 610]	2 - 14 x 30 [356 x 762]	2 - 14 x 30 [356 x 762]	2 - 10 x 30, 1 - 12 x 30 [254 x 762], [305 x 762]	3 - 12 x 30 [305 x 762]
Weight - Operating, (lbs) [kg]	174 [79]	184 [84]	250 [114]	252 [115]	266 [121]	323 [147]	327 [149]	416 [189]	443 [201]
Weight - Packaged, (lbs) [kg]	184 [84]	194 [88]	260 [118]	262 [119]	276 [126]	333 [151]	337 [154]	426 [194]	453 [206]
Horizontal									
Air Coil Dimensions (h x w) - (in) [mm]	18 x 22 [457 x 559]	18 x 22 [457 x 559]	18 x 27 [457 x 686]	18 x 27 [457 x 686]	18 x 31 [457 x 787]	20 x 35 [508 x 889]	20 x 35 [508 x 889]	20 x 40 [508 x 1016]	20 x 45 [508 x 1143]
Standard Filter - 1" [25.4mm] Throwaway, qty (in) [mm]	18 x 24 [457 x 610]	18 x 24 [457 x 610]	2 - 18 x 18 [457 x 457]	2 - 18 x 18 [457 x 457]	2 - 18 x 18 [457 x 457]	1 - 12 x 20, 1 - 20 x 25 [305 x 508], [508 x 635]	1 - 12 x 20, 1 - 20 x 25 [305 x 508], [508 x 635]	1 - 18 x 20, 1 - 20 x 24 [457 x 508], [508 x 610]	2 - 24 x 20 [610 x 508]
Weight - Operating, (lbs) [kg]	179 [81]	189 [86]	250 [114]	252 [115]	266 [121]	323 [147]	327 [149]	416 [189]	443 [201]
Weight - Packaged, (lbs) [kg]	189 [86]	199 [91]	260 [118]	262 [119]	276 [126]	333 [151]	337 [154]	426 [194]	453 [206]

All units have grommet compressor mountings, and 1/2" [12.2mm] & 3/4" [19.mm] electrical knockouts.

Corner Weights for GSH Series Units

Model		Total	Left-Front*	Right-Front*	Left-Back*	Right-Back*
GSH015	Lbs	174	48.5	38	47.5	40
	kg	78.93	22	17.24	21.55	18.14
GSH018	Lbs	184	51	41	50	42
	kg	83.46	23.13	18.60	22.68	19.05
GSH024	Lbs	250	68	56	68	58
	kg	113.40	30.84	25.40	30.84	26.31
GSH030	Lbs	252	69.5	56	68	58.5
	kg	114.31	31.52	25.40	30.84	26.54
GSH036	Lbs	266	72.5	59.5	72.5	61.5
	kg	120.66	32.89	26.99	32.89	27.90
GSH042	Lbs	323	88	72	88	75
	kg	146.51	39.92	32.66	39.92	34.02
GSH048	Lbs	327	89	73	89	76
	kg	148.32	40.37	33.11	40.37	34.47
GSH060	Lbs	416	113.5	93	113	96.5
	kg	188.69	51.48	42.18	51.26	43.77
GSH070	Lbs	443	123	132	142	46
	kg	200.94	55.79	59.87	64.41	20.87

*Front is control box end.

GS - Horizontal
Dimensional Data

Horizontal Model		Overall Cabinet		
		A Width	B Length	C Height
015 - 018	in	22.4	53.2	19.3
	cm	56.8	135.1	49.0
024 - 030	in	22.4	62.2	19.3
	cm	56.8	158.0	49.0
036	in	22.4	62.2	19.3
	cm	56.8	158.0	49.0
042 - 048	in	25.4	71.2	21.3
	cm	64.5	180.8	54.1
060	in	25.4	76.2	21.3
	cm	64.5	193.5	54.1
070	in	25.4	81.2	21.3
	cm	64.5	206.2	54.1

Notes:
1. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
2. Horizontal units shipped with filter bracket only. This bracket should be removed for return duct connection
3. Discharge flange and hanger brackets are factory installed.
4. Condensate is 3/4" IPT.
5. Blower service panel requires 2' service access.
6. Blower service access is through back panel on straight discharge unit or through panel opposite air coil on back discharge units.

Legend:
CAP = Control Access Panel
BSP = Blower Service Panel
CSP = Compressor Access Panel
ASP = Alternative Service Panel

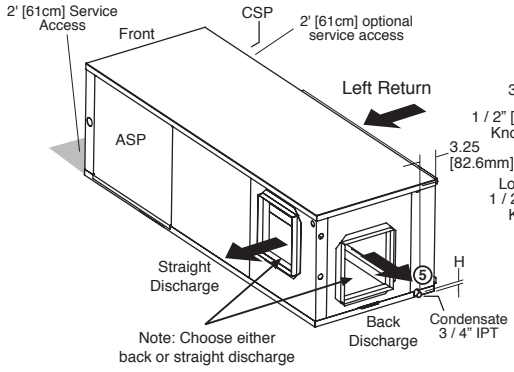
Horizontal Model		Electrical Knockouts		
		J 1/2"	K 1/2"	L 3/4"
		Low Voltage	External Pump	Power Supply
015 - 018	in	5.7	9.7	12.2
	cm	14.5	24.6	31.0
024 - 030	in	5.7	9.7	12.2
	cm	14.5	24.6	31.0
036	in	5.7	9.7	12.2
	cm	14.5	24.6	31.0
042 - 048	in	8.1	11.7	14.2
	cm	20.6	29.7	36.1
060	in	8.1	11.7	14.2
	cm	20.6	29.7	36.1
070	in	8.1	11.7	14.2
	cm	20.6	29.7	36.1

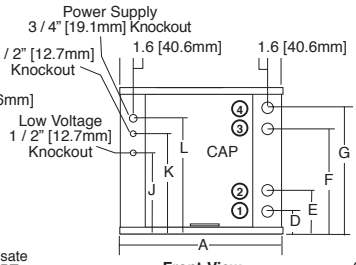
Horizontal Model		Water Connections						
		1	2	3	4	5		
		Loop In D	Loop Out E	HWG In F	HWG Out G	H	Water Loop IPT	HWG IPT
015 - 018	in	2.4	5.4	13.9	16.9	0.6	3/4"	1/2"
	cm	6.1	13.7	35.3	42.9	1.5		
024 - 030	in	2.4	5.4	13.9	16.9	0.6	3/4"	1/2"
	cm	6.1	13.7	35.3	42.9	1.5		
036	in	2.4	5.4	13.9	16.9	0.6	3/4"	1/2"
	cm	6.1	13.7	35.3	42.9	1.5		
042 - 048	in	2.4	5.4	15.9	18.9	0.6	1"	1/2"
	cm	6.1	13.7	40.4	48.0	1.5		
060	in	2.4	5.4	15.9	18.9	0.6	1"	1/2"
	cm	6.1	13.7	40.4	48.0	1.5		
070	in	2.4	5.4	15.9	18.9	0.6	1"	1/2"
	cm	6.1	13.7	40.4	48.0	1.5		

GS - Horizontal Dimensional Data

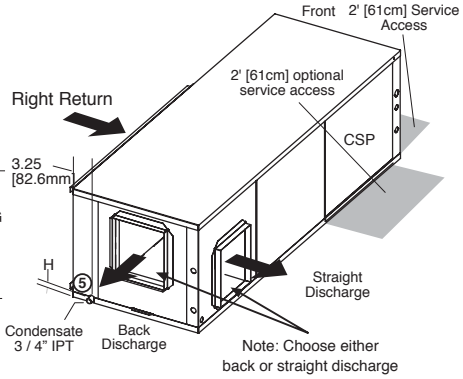
Horizontal Model		Discharge Connection Duct Flange Installed (+/- 0.10 in, +/- 2.5mm)						Return Connection Using Return Air Opening			
		M	N	O Supply Height	P Supply Width	Q	R	S Return Width	T Return Height	U	V
015 - 018	in	5.0	6.8	10.4	9.3	5.0	2.1	23.1	17.3	2.2	1.0
	cm	12.7	17.3	26.4	23.6	12.7	5.3	58.7	43.9	5.6	2.5
024 - 030	in	5.0	6.8	10.4	9.3	5.0	2.1	28.1	17.3	2.2	1.0
	cm	12.7	17.3	26.4	23.6	12.7	5.3	71.4	43.9	5.6	2.5
036	in	5.0	6.8	10.4	9.3	5.0	2.1	32.1	17.3	2.2	1.0
	cm	12.7	17.3	26.4	23.6	12.7	5.3	81.5	43.9	5.6	2.5
042 - 048	in	5.8	5.0	13.6	13.3	4.2	2.9	36.1	19.3	2.5	1.0
	cm	14.7	12.7	34.5	33.8	14.7	7.4	91.7	49.0	5.6	2.5
060	in	5.8	5.0	13.6	13.3	4.2	2.9	41.1	19.3	2.2	1.0
	cm	14.7	12.7	34.5	33.8	14.7	7.4	104.4	49.0	5.6	2.5
070	in	5.8	5.0	13.6	13.3	4.2	2.9	46.1	19.3	2.2	1.0
	cm	14.7	12.7	34.5	33.8	14.7	7.4	117.1	49.0	5.6	2.5

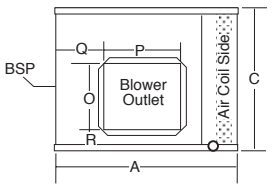
LEFT RETURN





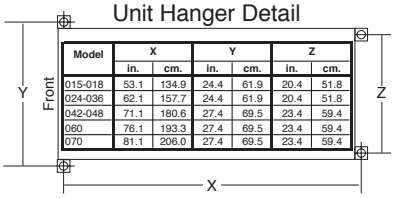
RIGHT RETURN



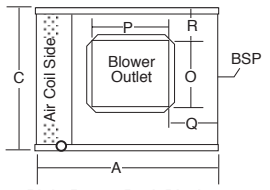


Left Return Back Discharge

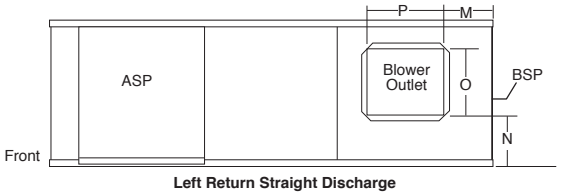
Unit Hanger Detail



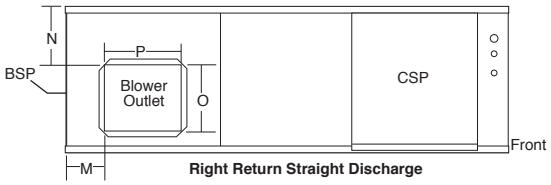
Model	X		Y		Z	
	in.	cm.	in.	cm.	in.	cm.
015-018	53.1	134.9	24.4	61.9	20.4	51.8
024-036	62.1	157.7	24.4	61.9	20.4	51.8
042-048	71.1	180.6	27.4	69.5	23.4	59.4
060	76.1	193.3	27.4	69.5	23.4	59.4
070	81.1	206.0	27.4	69.5	23.4	59.4



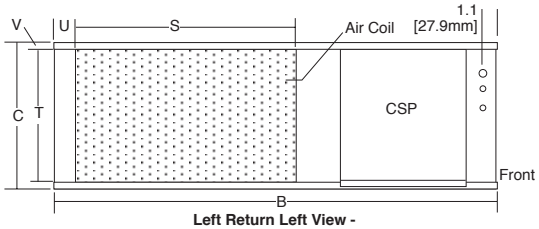
Right Return Back Discharge



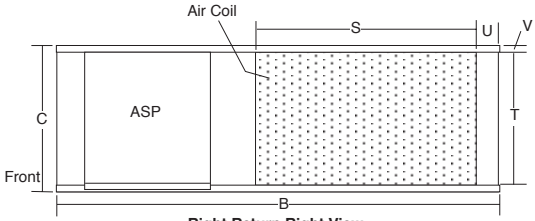
Left Return Straight Discharge



Right Return Straight Discharge



Left Return Left View - Air Coil Opening



Right Return Right View - Air Coil Opening

GS - Vertical Upflow Dimensional Data

Vertical Upflow Model		Overall Cabinet		
		A Width	B Depth	C Height
015 - 018	in	22.4	25.6	40.4
	cm	56.8	65.1	102.6
024 - 030	in	22.4	25.6	44.4
	cm	56.8	65.1	112.8
036	in	22.4	25.6	48.4
	cm	56.8	65.1	122.9
042 - 048	in	25.4	30.6	50.4
	cm	64.5	77.8	128.0
060	in	25.4	30.6	54.4
	cm	64.5	77.8	138.2
070	in	25.4	30.6	58.4
	cm	64.5	77.8	148.3

Vertical Upflow Model		Water Connections						
		1	2	3	4	5		
		Loop In D	Loop Out E	HWG In F	HWG Out G	H	Water Loop IPT	HWG IPT
015 - 018	in	2.4	5.4	13.9	16.9	9.8	3/4”	1/2”
	cm	6.1	13.7	35.3	42.9	24.9		
024 - 030	in	2.4	5.4	13.9	16.9	9.8	3/4”	1/2”
	cm	6.1	13.7	35.3	42.9	24.9		
036	in	2.4	5.4	13.9	16.9	9.8	3/4”	1/2”
	cm	6.1	13.7	35.3	42.9	24.9		
042 - 048	in	2.4	5.4	15.9	18.9	10.8	1”	1/2”
	cm	6.1	13.7	40.4	48.0	27.4		
060	in	2.4	5.4	15.9	18.9	10.8	1”	1/2”
	cm	6.1	13.7	40.4	48.0	27.4		
070	in	2.4	5.4	15.9	18.9	10.8	1”	1/2”
	cm	6.1	13.7	40.4	48.0	27.4		

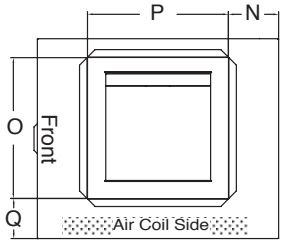
Vertical Upflow Model		Electrical Knockouts		
		J 1/2”	K 1/2”	L 3/4”
		Low Voltage	External Pump	Power Supply
015 - 018	in	6.0	9.5	12.0
	cm	15.2	24.1	30.5
024 - 030	in	6.0	9.5	12.0
	cm	15.2	24.1	30.5
036	in	6.0	9.5	12.0
	cm	15.2	24.1	30.5
042 - 048	in	8.0	11.5	14.0
	cm	20.3	29.2	35.6
060	in	8.0	11.5	14.0
	cm	20.3	29.2	35.6
070	in	8.0	11.5	14.0
	cm	20.3	29.2	35.6

Notes:
1. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
2. Front & Side access is preferred for service access. However, all components may be serviced from the front access panel if side access is not available.
3. Discharge flange is field installed.
4. Condensate is 3/4” IPT PVC and is switchable from front to side.

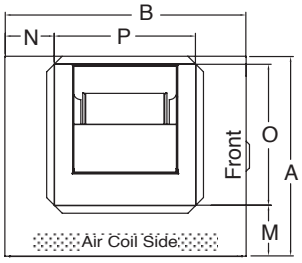
Legend:
CAP = Control Access Panel
BSP = Blower Service Panel
CSP = Compressor Access Panel
ASP = Alternative Service Panel

GS - Vertical Upflow Dimensional Data

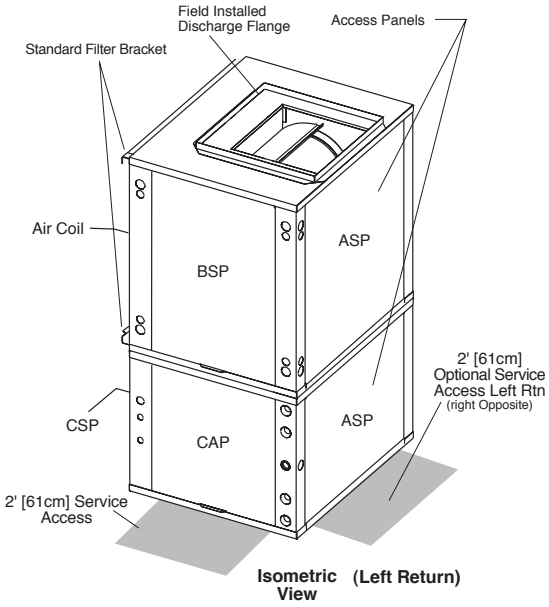
Vertical Upflow Model		Discharge Connection Duct Flange Installed (+/- 0.10 in, +/- 2.5mm)					Return Connection Using Return Air Opening			
		M	N	O Supply Width	P Supply Depth	Q	R	S Return Depth	T Return Height	U
015 - 018	in	7.2	5.8	14.0	14.0	4.3	1.8	22.3	18.2	1.6
	cm	18.3	14.7	35.6	35.6	10.9	4.6	56.6	46.2	4.1
024 - 030	in	7.2	5.8	14.0	14.0	4.3	1.8	22.3	22.2	1.6
	cm	18.3	14.7	35.6	35.6	10.9	4.6	56.6	56.4	4.1
036	in	7.2	5.8	14.0	14.0	4.3	1.8	22.3	26.2	1.6
	cm	18.3	14.7	35.6	35.6	10.9	4.6	56.6	65.5	4.1
042 - 048	in	6.2	6.3	18.0	18.0	5.1	1.5	27.8	26.2	1.5
	cm	15.7	16.0	45.7	45.7	13.0	3.8	70.6	66.5	3.8
060	in	6.2	6.3	18.0	18.0	5.1	1.5	27.8	30.2	1.5
	cm	15.7	16.0	45.7	45.7	13.0	3.8	70.6	76.7	3.8
070	in	6.2	6.3	18.0	18.0	5.1	1.5	27.8	34.2	1.5
	cm	15.7	16.0	45.7	45.7	13.1	3.8	70.6	86.9	3.8



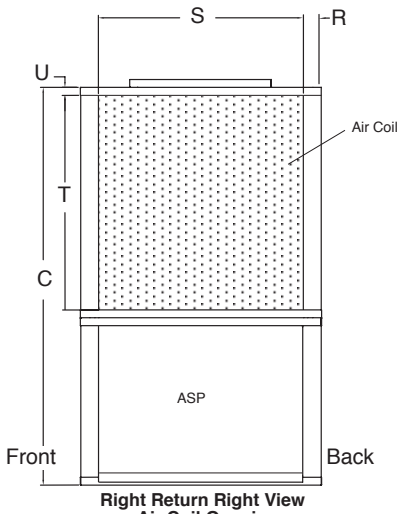
Top View-Right Return



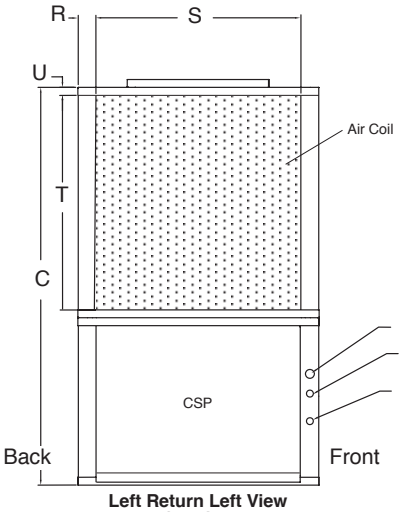
Top View-Left Return



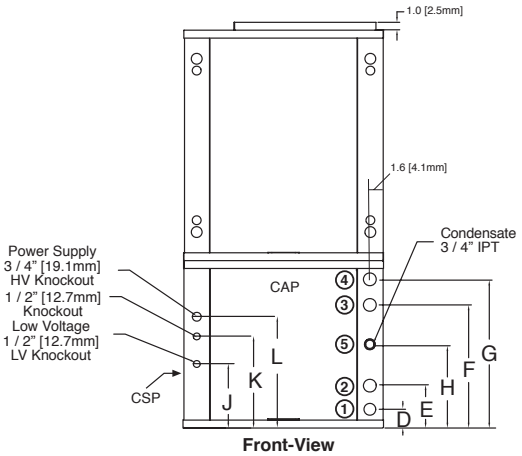
Isometric (Left Return) View



Right Return Right View - Air Coil Opening



Left Return Left View - Air Coil Opening



Front-View

GS - Vertical Downflow Dimensional Data

Vertical Downflow Model		Overall Cabinet		
		A Width	B Depth	C Height
015 - 018	in	22.4	25.6	44.6
	cm	56.8	65.1	113.3
024 - 030	in	22.4	25.6	48.6
	cm	56.8	65.1	123.4
036	in	22.4	25.6	52.6
	cm	56.8	65.1	133.6
042 - 048	in	25.4	30.6	54.6
	cm	64.5	77.8	138.7
060	in	25.4	30.6	58.6
	cm	64.5	77.8	148.8
070	in	25.4	30.6	62.6
	cm	64.5	77.8	159.0

Vertical Downflow Model		Water Connections						
		1	2	3	4	5		
		Loop In D	Loop Out E	HWG In F	HWG Out G	H	Water Loop IPT	HWG IPT
015 - 018	in	16.9	13.9	5.4	2.4	3.5	3/4”	1/2”
	cm	42.9	35.3	13.7	6.1	8.9		
024 - 030	in	16.9	13.9	5.4	2.4	3.5	3/4”	1/2”
	cm	42.9	35.3	13.7	6.1	8.9		
036	in	16.9	13.9	5.4	2.4	3.5	3/4”	1/2”
	cm	42.9	35.3	13.7	6.1	8.9		
042 - 048	in	18.9	15.9	5.4	2.4	3.5	1”	1/2”
	cm	48.0	40.4	13.7	6.1	8.9		
060	in	18.9	15.9	5.4	2.4	3.5	1”	1/2”
	cm	48.0	40.4	13.7	6.1	8.9		
070	in	18.9	15.9	5.4	2.4	3.5	1”	1/2”
	cm	48.0	40.4	13.7	6.1	8.9		

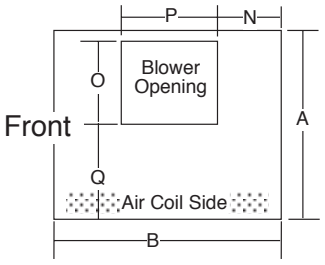
Vertical Downflow Model		Electrical Knockouts		
		J 1/2”	K 1/2”	L 3/4”
		Low Voltage	External Pump	Power Supply
015 - 018	in	13.6	9.7	7.2
	cm	34.5	24.6	18.3
024 - 030	in	13.6	9.7	7.2
	cm	34.5	24.6	18.3
036	in	13.6	9.7	7.2
	cm	34.5	24.6	18.3
042 - 048	in	13.1	9.7	7.2
	cm	33.3	24.6	18.3
060	in	13.1	9.7	7.2
	cm	33.3	24.6	18.3
070	in	13.1	9.7	7.2
	cm	33.3	24.6	18.3

Notes:
1. While clear access to all removable panels is not required, installer should take care to comply with all building codes and allow adequate clearance for future field service.
2. Front & Side access is preferred for service access. However, all components may be serviced from the front access panel if side access is not available.
3. Downflow unit does not have discharge flange, and is rated for zero clearance installation.
4. Condensate is 3/4” IPT PVC and is switchable from front to side.

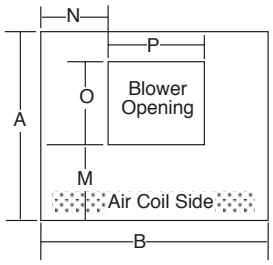
Legend:
CAP = Control Access Panel
BSP = Blower Service Panel
CSP = Compressor Access Panel
ASP = Alternative Service Panel

GS - Vertical Downflow Dimensional Data

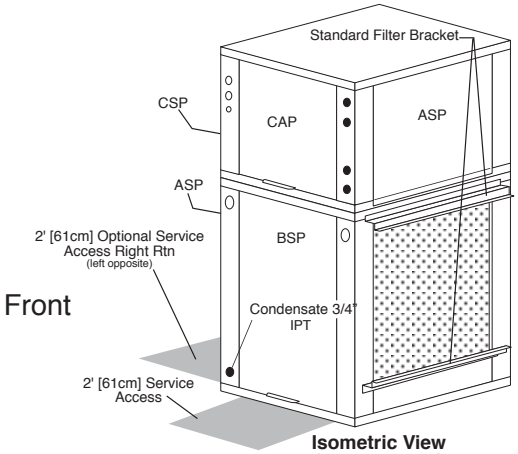
Vertical Downflow Model		Discharge Connection Duct Flange Installed (+/- 0.10 in, +/- 2.5mm)					Return Connection Using Return Air Opening			
		M	N	O Supply Width	P Supply Depth	Q	R	S Return Depth	T Return Height	U
015 - 018	in	6.1	8.2	10.4	9.3	11.0	2.2	21.1	20.2	20.4
	cm	15.4	20.8	26.4	23.5	27.9	5.6	53.6	51.3	51.8
024 - 030	in	6.1	8.2	10.4	9.3	11.0	2.2	21.1	24.2	20.4
	cm	15.4	20.8	26.4	23.5	27.9	5.6	53.6	61.5	51.8
036	in	6.1	8.2	10.4	9.3	11.0	2.2	21.1	28.2	20.4
	cm	15.4	20.8	26.4	23.5	27.9	5.6	53.6	71.6	51.8
042 - 048	in	7.2	8.7	13.6	13.3	10.5	2.2	26.1	28.2	22.4
	cm	18.3	22.1	34.4	34.4	26.7	5.6	66.3	71.6	56.9
060	in	7.2	8.7	13.6	13.3	10.5	2.2	26.1	32.2	22.4
	cm	18.3	22.1	34.4	33.7	26.7	5.6	66.3	81.8	56.9
070	in	7.2	8.7	13.6	13.3	10.5	2.2	26.1	36.2	22.4
	cm	18.3	22.1	34.4	33.7	26.7	5.6	66.3	91.9	56.9



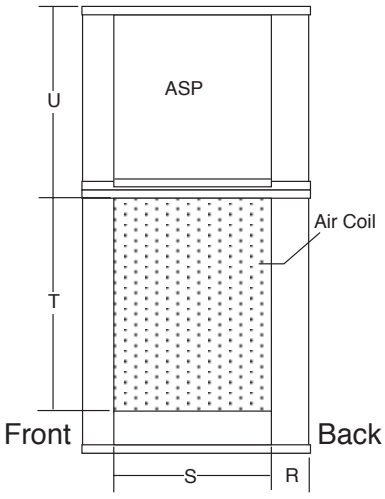
Right Return Discharge Floor Foot Print



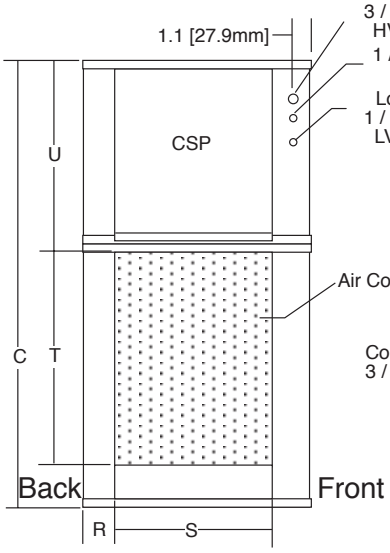
Left Return Discharge Floor Foot Print



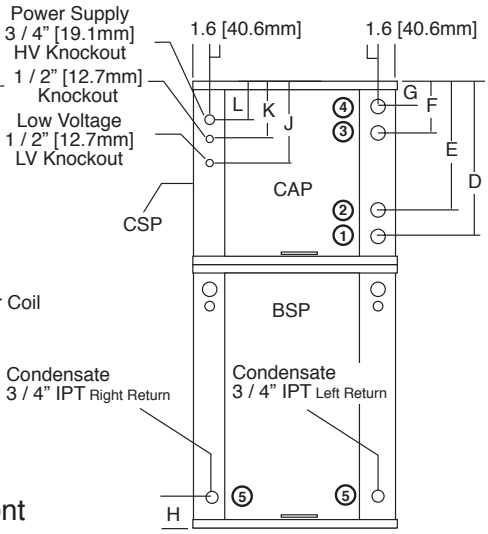
Isometric View (Right Return)



Right Return Right View - Air Coil Opening



Left Return Left View - Air Coil Opening



Front-View

Electrical Data
Standard Units

All GS Units								Standard GS Units		
Model	Voltage Code	Voltage	Min/Max Voltage	Compressor			Fan Motor FLA	Total Unit FLA	Min Circuit Amp	Max Fuse/ HACR
				QTY	RLA	LRA				
GSH/V 015	G	208-230/60/1	197/254	1	4.9	26.3	1.0	7.1	8.6	15
	E	265/60/1	239/292	1	4.4	28.0	0.9	5.7	6.9	15
GSH/V 018	G	208-230/60/1	197/254	1	7.1	38.0	1.0	8.7	10.6	15
	E	265/60/1	239/292	1	5.5	32.0	0.9	6.7	8.2	15
GSH/V 024	G	208-230/60/1	197/254	1	10.9	54.0	1.1	11.4	14.0	20
	E	265/60/1	239/292	1	9.0	55.0	0.9	9.6	11.8	20
	H	208-230/60/3	197/254	1	7.1	45.0	1.1	8.2	10.0	15
	F*	460/60/3	414/506	1	3.5	22.4	0.6	4.1	5.0	15
GSH/V 030	G	208-230/60/1	197/254	1	12.2	67.0	1.3	13.5	16.6	25
	E	265/60/1	239/292	1	10.9	56.0	1.6	12.5	15.2	25
	H	208-230/60/3	197/254	1	7.7	55.0	1.3	9.0	10.9	15
	F*	460/60/3	414/506	1	3.8	27.0	0.9	4.7	5.7	15
GSH/V 030 High Static	G	208-230/60/1	197/254	1	12.2	67.0	1.8	14.0	17.1	25
	E	265/60/1	239/292	1	10.9	56.0	2.0	12.9	15.6	25
	H	208-230/60/3	197/254	1	7.7	55.0	1.8	9.5	11.4	15
	F*	460/60/3	414/506	1	3.8	27.0	1.3	5.1	6.1	15
GSH/V 036	G	208-230/60/1	197/254	1	13.5	73.0	1.8	15.3	18.7	30
	E	265/60/1	239/292	1	12.8	71.0	2.0	14.8	18.0	30
	H	208-230/60/3	197/254	1	9.6	63.0	1.8	11.4	13.8	20
	F*	460/60/3	414/506	1	4.5	31.0	1.3	5.8	6.9	15
GSH/V 036 High Static	G	208-230/60/1	197/254	1	13.5	73.0	3.0	16.5	19.9	30
	E	265/60/1	239/292	1	12.8	71.0	2.7	15.5	18.7	30
	H	208-230/60/3	197/254	1	9.6	63.0	3.0	12.6	15.0	20
	F*	460/60/3	414/506	1	4.5	31.0	1.7	6.2	7.3	15
GSH/V 042	G	208-230/60/1	197/254	1	16.5	95.0	1.9	18.4	22.5	35
	H	208-230/60/3	197/254	1	10.3	77.0	1.9	12.2	14.8	25
	F*	460/60/3	414/506	1	5.1	39.0	1.0	6.1	7.4	15
	N	575/60/3	518/633	1	4.2	31.0	0.8	5.0	6.1	15
GSH/V 048	G	208-230/60/1	197/254	1	18.3	109.0	3.0	21.3	25.9	40
	H	208-230/60/3	197/254	1	12.4	88.0	3.0	15.4	18.5	30
	F*	460/60/3	414/506	1	6.4	44.0	1.7	8.1	9.7	15
	N	575/60/3	518/633	1	4.8	34.0	1.4	6.2	7.4	15
GSH/V 060	G	208-230/60/1	197/254	1	25.0	148.0	3.4	28.4	34.7	50
	H	208-230/60/3	197/254	1	17.3	123.0	3.4	20.7	25.0	40
	F*	460/60/3	414/506	1	6.7	49.5	1.8	8.5	10.2	15
	N	575/60/3	518/633	1	5.8	40.0	1.4	7.2	8.7	15
GSH/V 070	G	208-230/60/1	197/254	1	28.8	148.0	4.9	33.7	40.9	60
	H	208-230/60/3	197/254	1	17.3	137.0	4.9	22.2	26.5	40
	F*	460/60/3	414/506	1	9.0	62.0	2.5	11.5	13.8	20
	N	575/60/3	518/633	1	6.6	49.0	1.9	8.5	10.2	15

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

Electrical Data
Units with Secondary Pump or ClimaDry Reheat

All GS Units				GS Units with ClimaDry				GS Units with Secondary Pump			
Model	Voltage Code	Voltage	Min/Max Voltage	Reheat Pump FLA	Total Unit FLA	Min Circuit Amp	Max Fuse/ HACR	Pump FLA	Total Unit FLA	Min Circuit Amp	Max Fuse/ HACR
GSH/V 015	G	208-230/60/1	197/254	0.8	6.7	7.9	15	0.43	6.3	7.6	15
	E	265/60/1	239/292	0.7	6.0	7.1	15	N/A	N/A	N/A	N/A
GSH/V 018	G	208-230/60/1	197/254	0.8	8.9	10.7	15	0.43	8.5	10.3	15
	E	265/60/1	239/292	0.7	7.1	8.5	15	N/A	N/A	N/A	N/A
GSH/V 024	G	208-230/60/1	197/254	0.8	12.8	15.5	25	0.43	12.4	15.2	20
	E	265/60/1	239/292	0.7	10.6	12.9	20	N/A	N/A	N/A	N/A
	H	208-230/60/3	197/254	0.8	9.0	10.8	20	0.43	8.6	10.4	15
	F*	460/60/3	414/506	0.7	4.8	5.7	15	N/A	N/A	N/A	N/A
GSH/V 030	G	208-230/60/1	197/254	0.8	14.3	17.4	25	0.8	14.3	17.4	25
	E	265/60/1	239/292	0.7	13.2	15.9	25	0.7	13.2	15.9	25
	H	208-230/60/3	197/254	0.8	9.8	11.7	15	0.8	9.8	11.7	15
	F*	460/60/3	414/506	0.7	5.4	6.4	15	0.7	5.4	6.4	15
GSH/V 030 High Static	G	208-230/60/1	197/254	0.8	14.8	17.9	30	0.8	14.8	17.9	30
	E	265/60/1	239/292	0.7	13.6	16.3	25	0.7	13.6	16.3	25
	H	208-230/60/3	197/254	0.8	10.3	12.2	15	0.8	10.3	12.2	15
	F*	460/60/3	414/506	0.7	5.8	6.8	15	0.7	5.8	6.8	15
GSH/V 036	G	208-230/60/1	197/254	0.8	16.1	19.5	30	0.8	16.1	19.5	30
	E	265/60/1	239/292	0.7	15.5	18.7	30	0.7	15.5	18.7	30
	H	208-230/60/3	197/254	0.8	12.2	14.6	20	0.8	12.2	14.6	20
	F*	460/60/3	414/506	0.7	6.5	7.6	15	0.7	6.5	7.6	15
GSH/V 036 High Static	G	208-230/60/1	197/254	0.8	17.3	20.7	30	0.8	17.3	20.7	30
	E	265/60/1	239/292	0.7	16.2	19.4	30	0.7	16.2	19.4	30
	H	208-230/60/3	197/254	0.8	13.4	15.8	25	0.8	13.4	15.8	25
	F*	460/60/3	414/506	0.7	6.9	8.0	15	0.7	6.9	8.0	15
GSH/V 042	G	208-230/60/1	197/254	0.8	19.2	23.3	35	0.8	19.2	23.3	35
	H	208-230/60/3	197/254	0.8	13.0	15.6	25	0.8	13.0	15.6	25
	F*	460/60/3	414/506	0.7	6.8	8.1	15	0.7	6.8	8.1	15
	N	575/60/3	518/633	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GSH/V 048	G	208-230/60/1	197/254	1.07	22.4	26.9	45	0.8	22.1	26.7	40
	H	208-230/60/3	197/254	1.07	16.5	19.6	30	0.8	16.2	19.3	30
	F*	460/60/3	414/506	1.07	9.2	10.8	15	0.7	8.8	10.4	15
	N	575/60/3	518/633	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GSH/V 060	G	208-230/60/1	197/254	1.07	29.5	35.7	60	1.07	29.5	35.7	60
	H	208-230/60/3	197/254	1.07	21.8	26.1	40	1.07	21.8	26.1	40
	F*	460/60/3	414/506	1.07	9.6	11.2	15	1.07	9.6	11.2	15
	N	575/60/3	518/633	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GSH/V 070	G	208-230/60/1	197/254	1.07	34.8	42.0	70	1.07	34.8	42.0	70
	H	208-230/60/3	197/254	1.07	23.3	27.6	40	1.07	23.3	27.6	40
	F*	460/60/3	414/506	1.07	12.6	14.8	20	1.07	12.6	14.8	20
	N	575/60/3	518/633	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* 460V with secondary/ClimaDry pump requires a neutral wire. Pump is rated 265V and is wired between one hot leg and one neutral.
HACR circuit breaker in USA only
All fuses Class RK-5

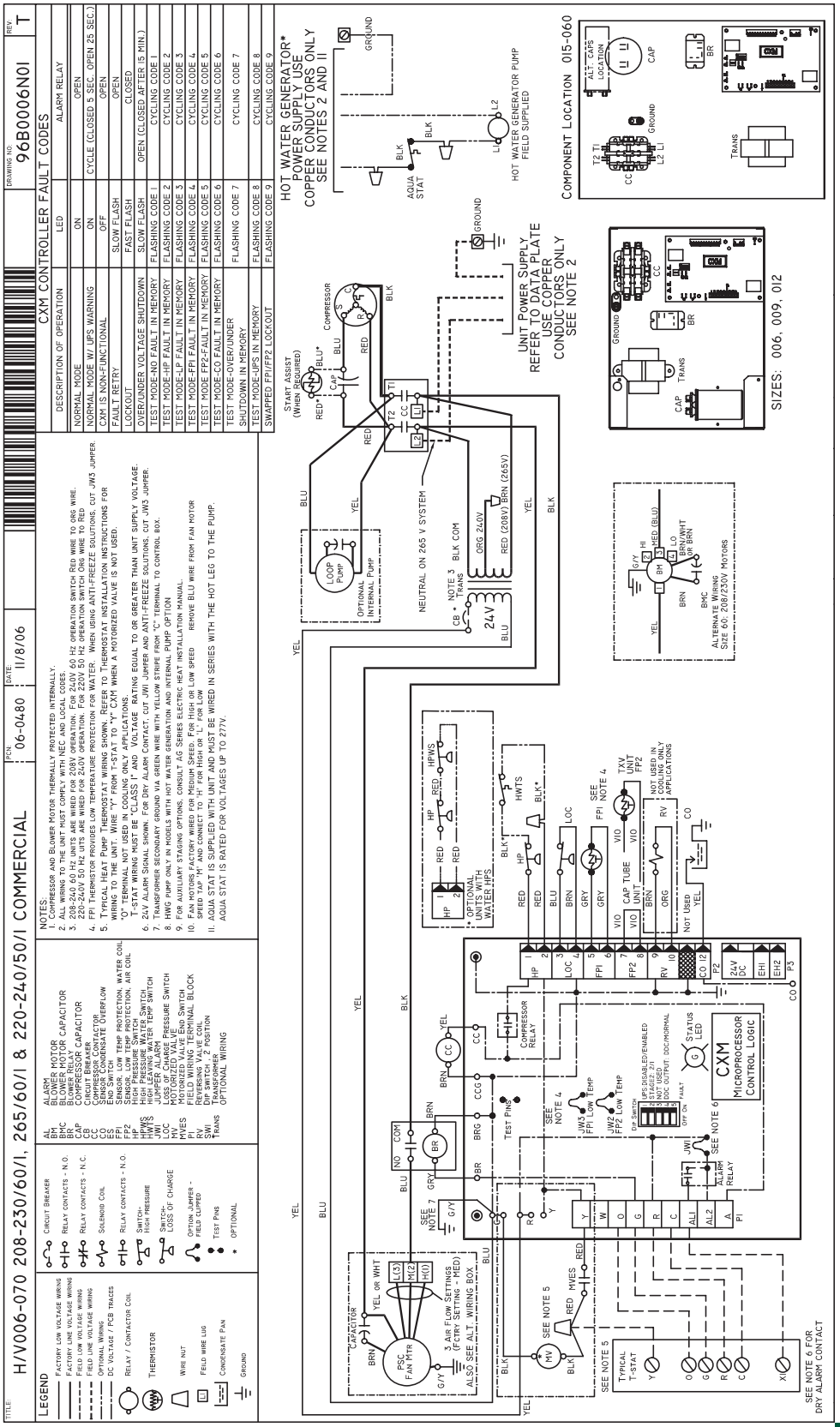
GS Series Wiring Diagram Matrix

Only CXM and DXM diagrams, with a representative diagram of LON and MPC Options are presented in this submittal. Other diagrams can be located online at www.climatemaster.com using the part numbers presented below.

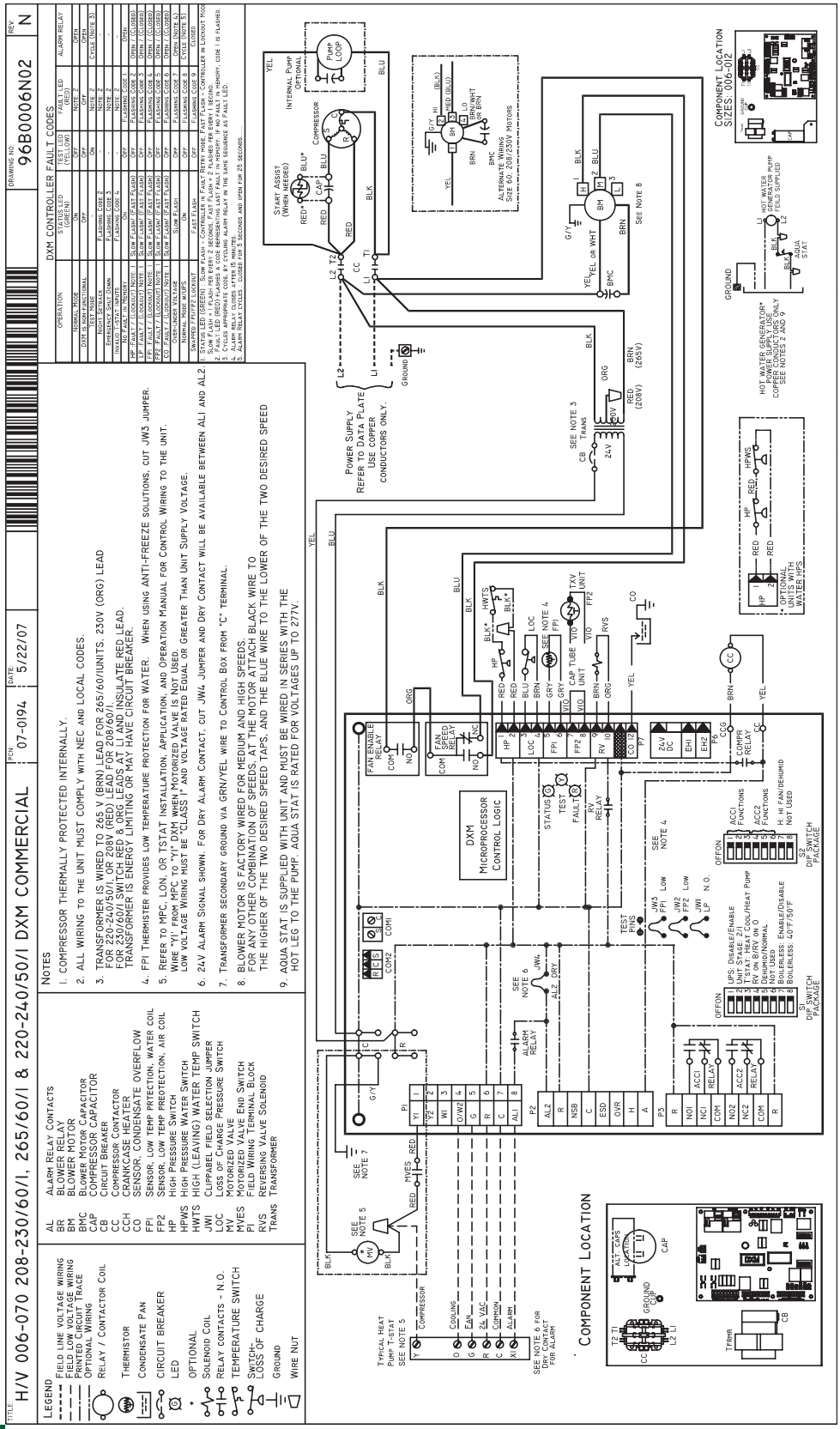
Model	Refrigerant	Wiring Diagram Part Number	Electrical	Control	DDC	Agency
GS Series Single Phase	R22	96B0006N01	208-230/60/1, 265/60/1, 220-240/50/1	CXM	-	-
	R22 & R407C	96B0006N06			-	CE
	R22	96B0006N03			LON	-
	R22	96B0006N09			MPC	-
	R22 & R407C	96B0006N11			MPC	CE
	R22	96B0006N02		DXM	-	-
	R22 & R407C	96B0006N05			-	CE
	R22	96B0006N04			LON	-
	R22	96B0006N10			MPC	-
	R22	96B0006N30			ClimaDry®	-
GS Series Three Phase (230 Style)	R22	96B0007N01	208-230/60/3, 220-240/50/3	CXM	-	-
	R22	96B0007N03			LON	-
	R22	96B0007N06			MPC	-
	R22	96B0007N02		DXM	-	-
	R22	96B0007N04			LON	-
	R22	96B0007N07			MPC	-
GS Series Three Phase (460 Style)	R22	96B0008N01	460/60/3, 575/60/3, 380-420/50/3	CXM	-	
	R22 & R407C	96B0008N06			-	CE
	R22	96B0008N03			LON	-
	R22	96B0008N08			MPC	-
	R22	96B0008N02		DXM	-	-
	R22 & R407C	96B0008N05			-	CE
	R22	96B0008N04			LON	-
	R22	96B0008N09			MPC	-

All wiring diagrams available at www.climatemaster.com. R407C submittals will only contain CE Mark wiring diagrams

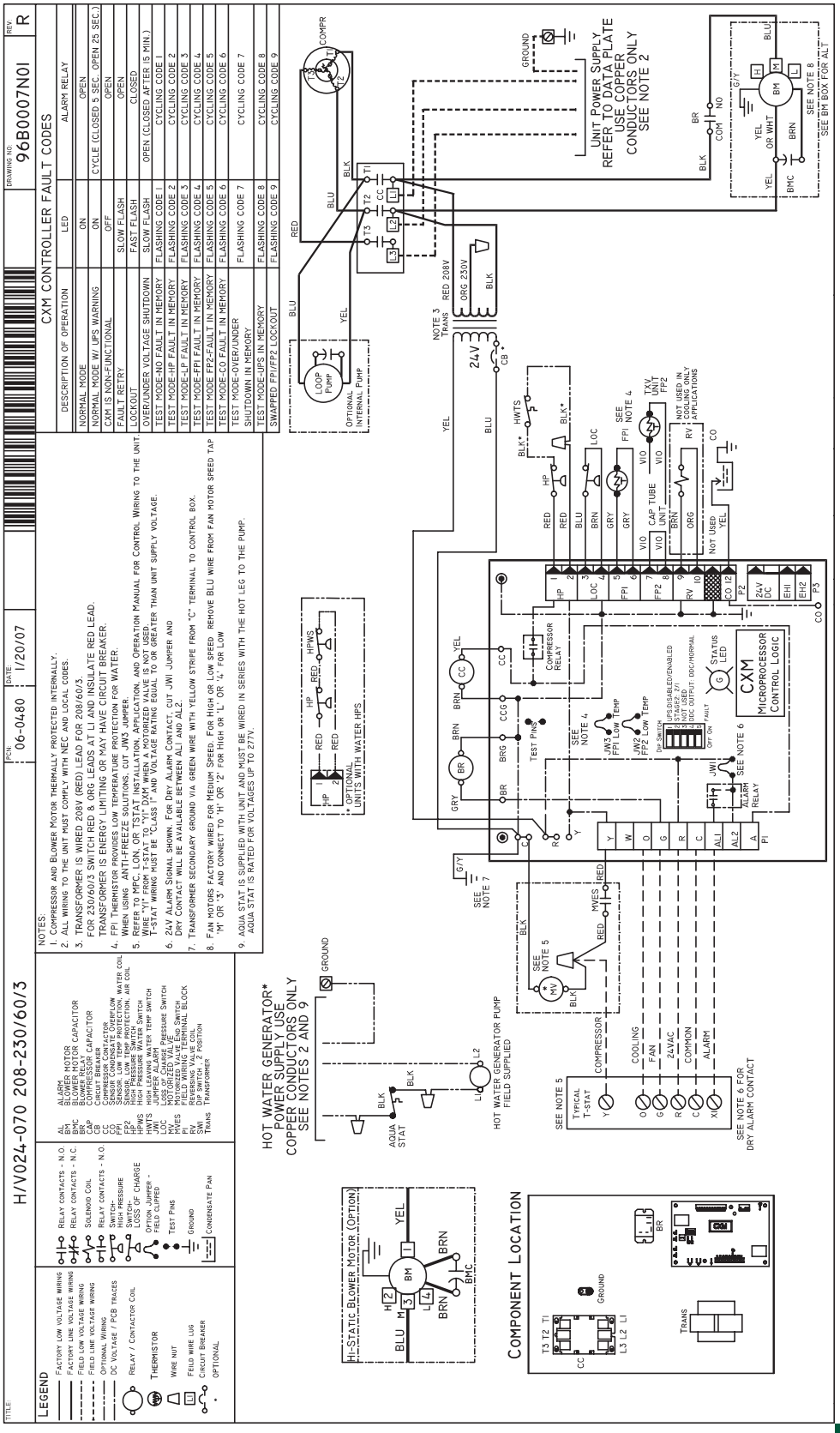
Typical Wiring Diagram Single Phase GS Units With CXM Controller



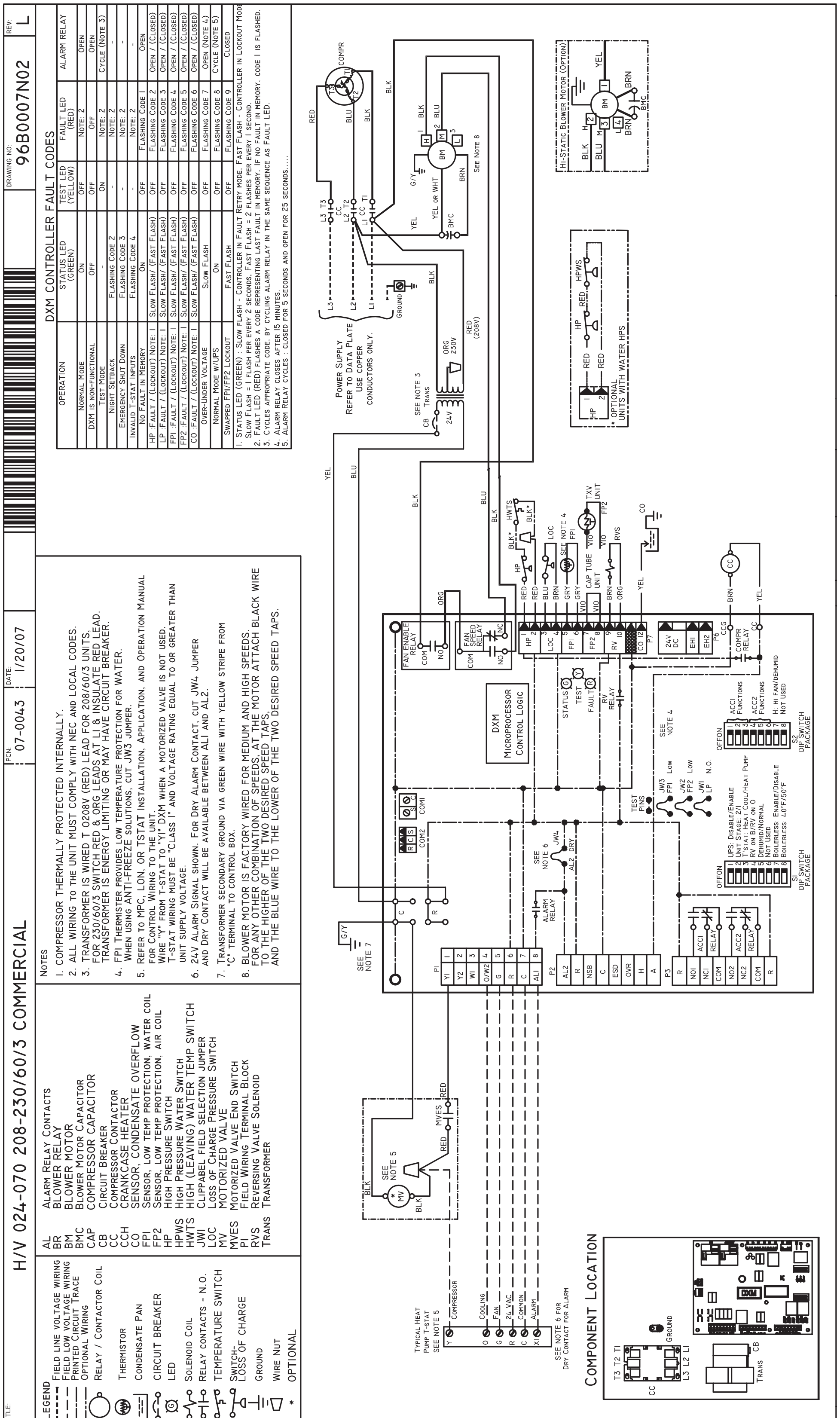
Typical Wiring Diagram Single Phase GS Units With DXM Controller



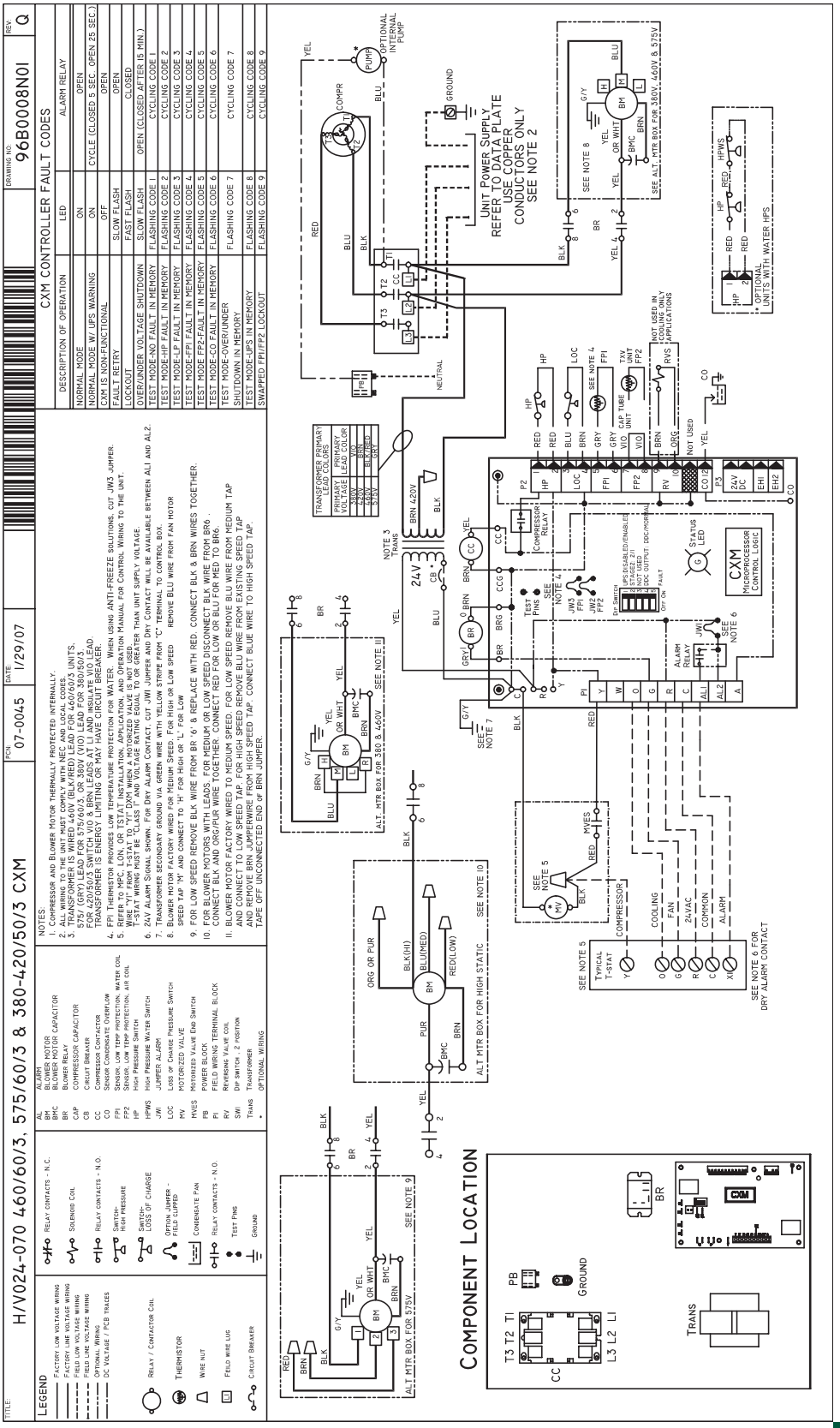
Typical Wiring Diagram
Three Phase 208/230V GS Units
With CXM Controller



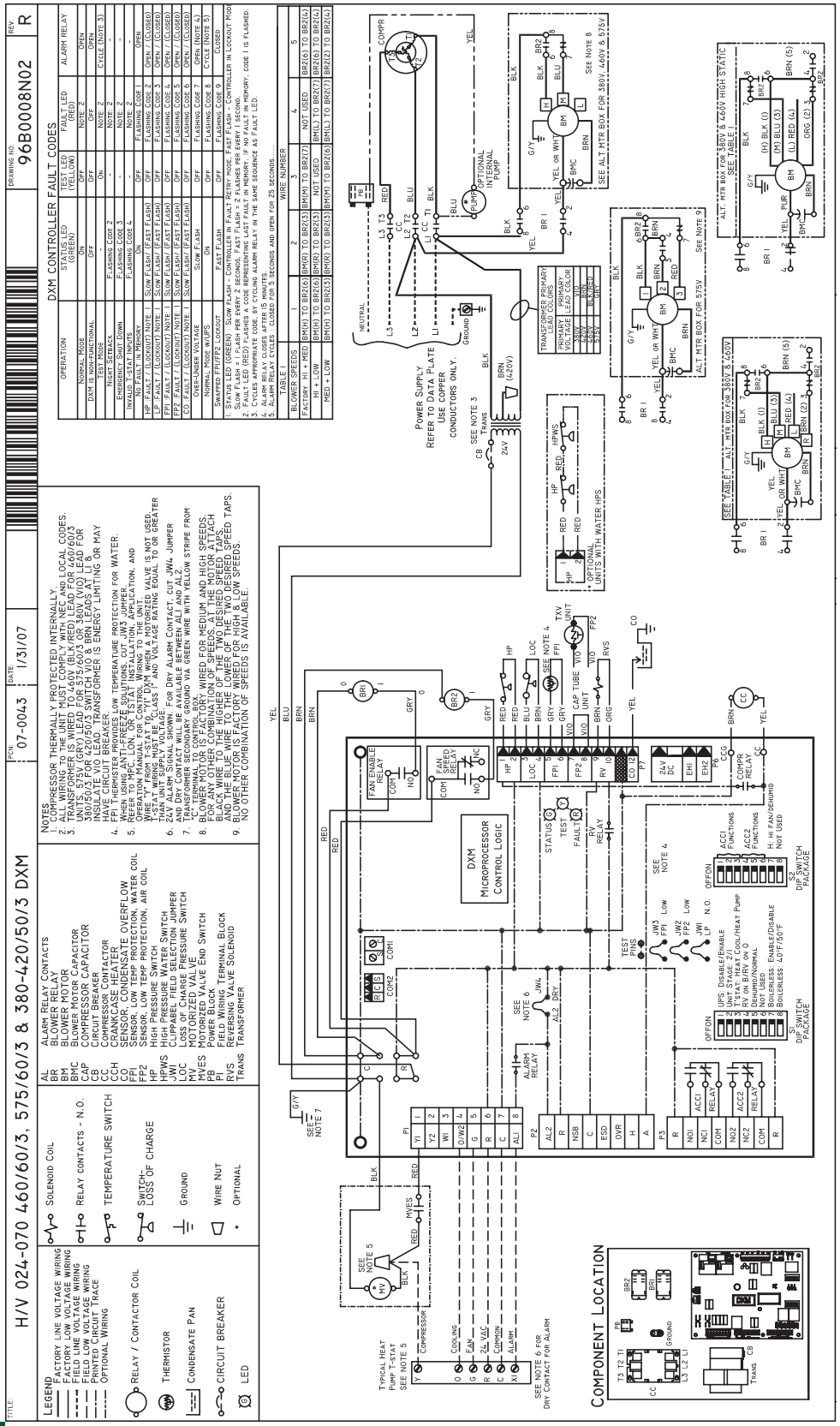
Typical Wiring Diagram
Three Phase 208/230V GS Units
With DXM Controller



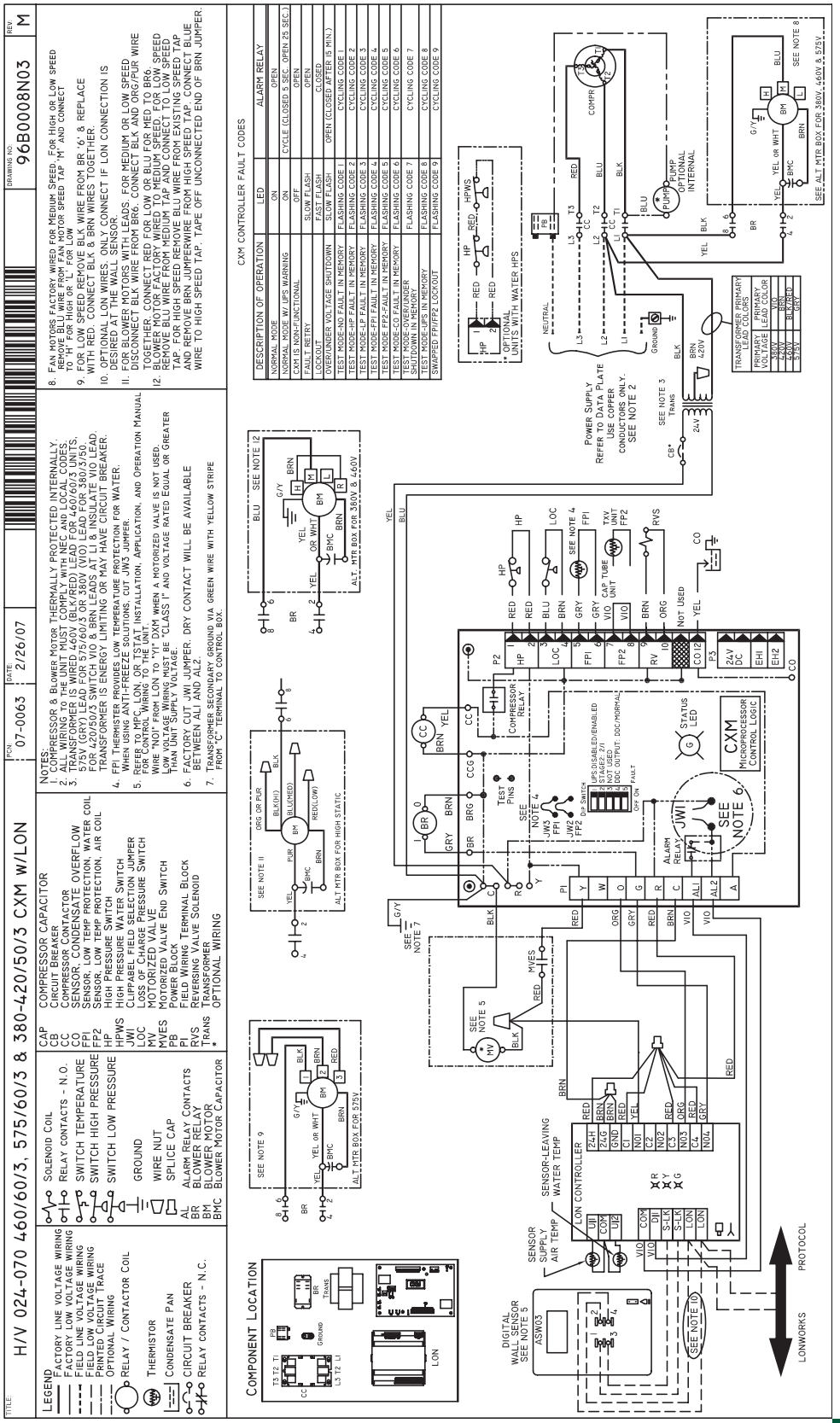
Typical Wiring Diagram
Three Phase 460/575V GS Units
With CXM Controller



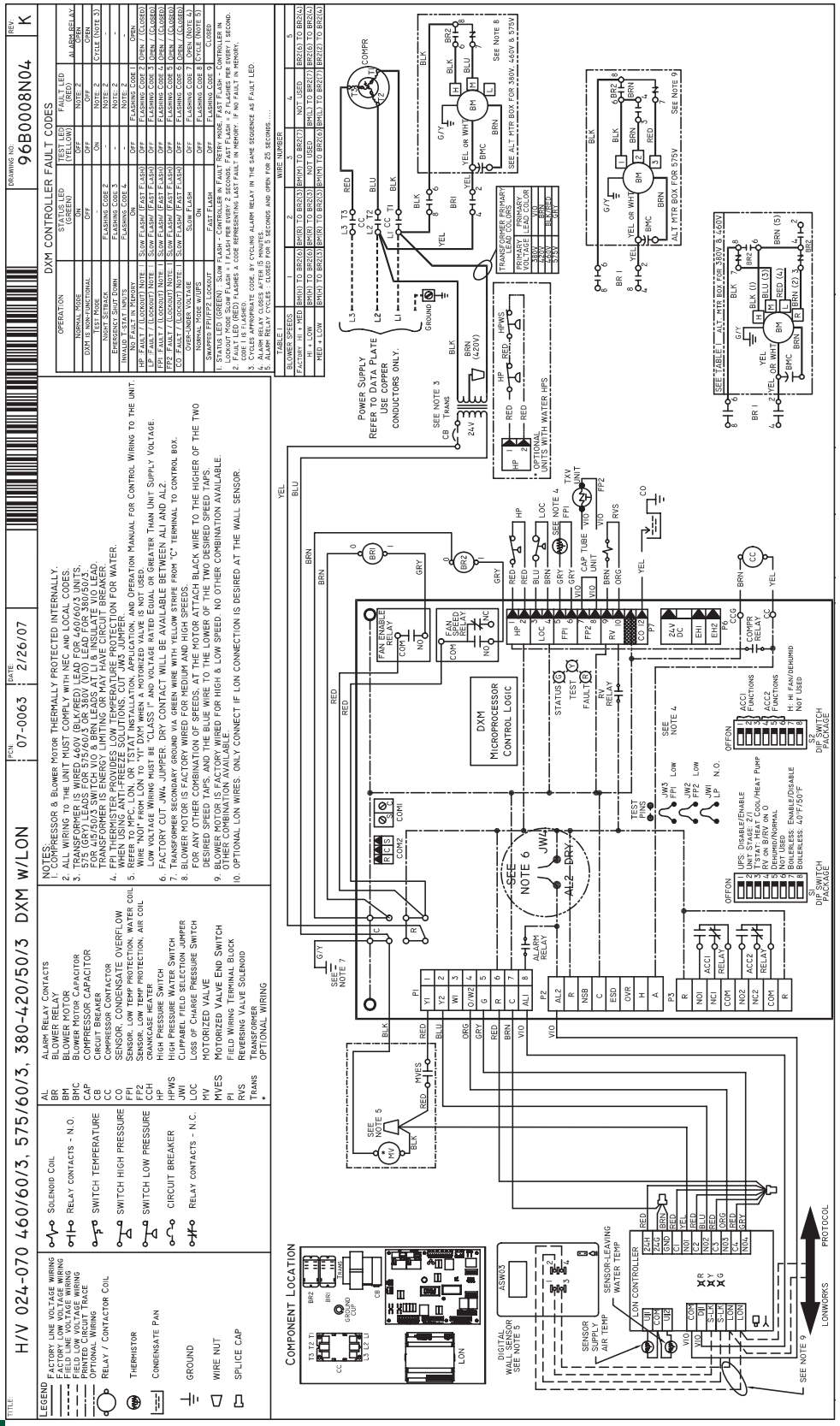
Typical Wiring Diagram
Three Phase 460/575V GS Units
With DXM Controller



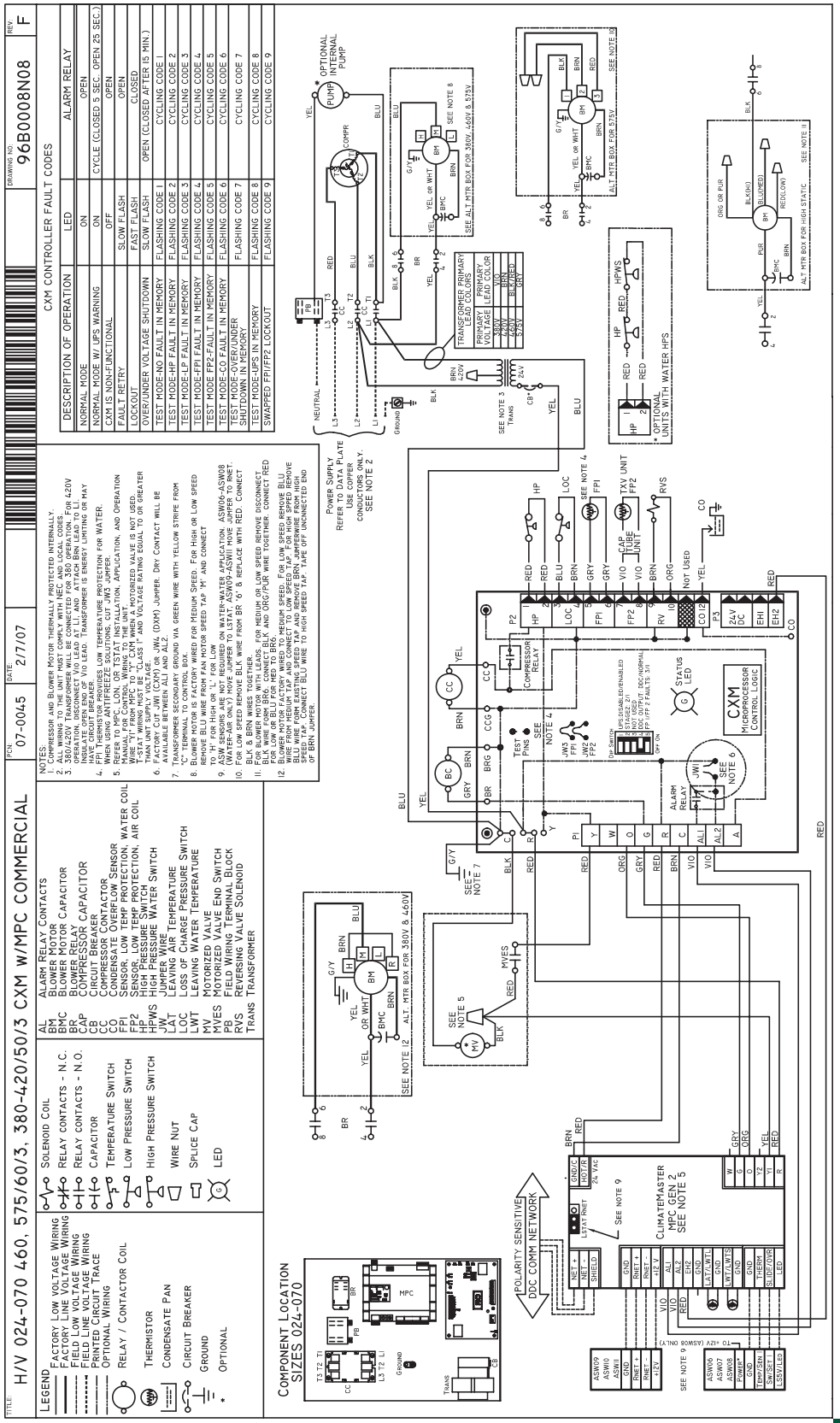
Typical Wiring Diagram
Three Phase 460/575V GS Units
With CXM & LON Controller



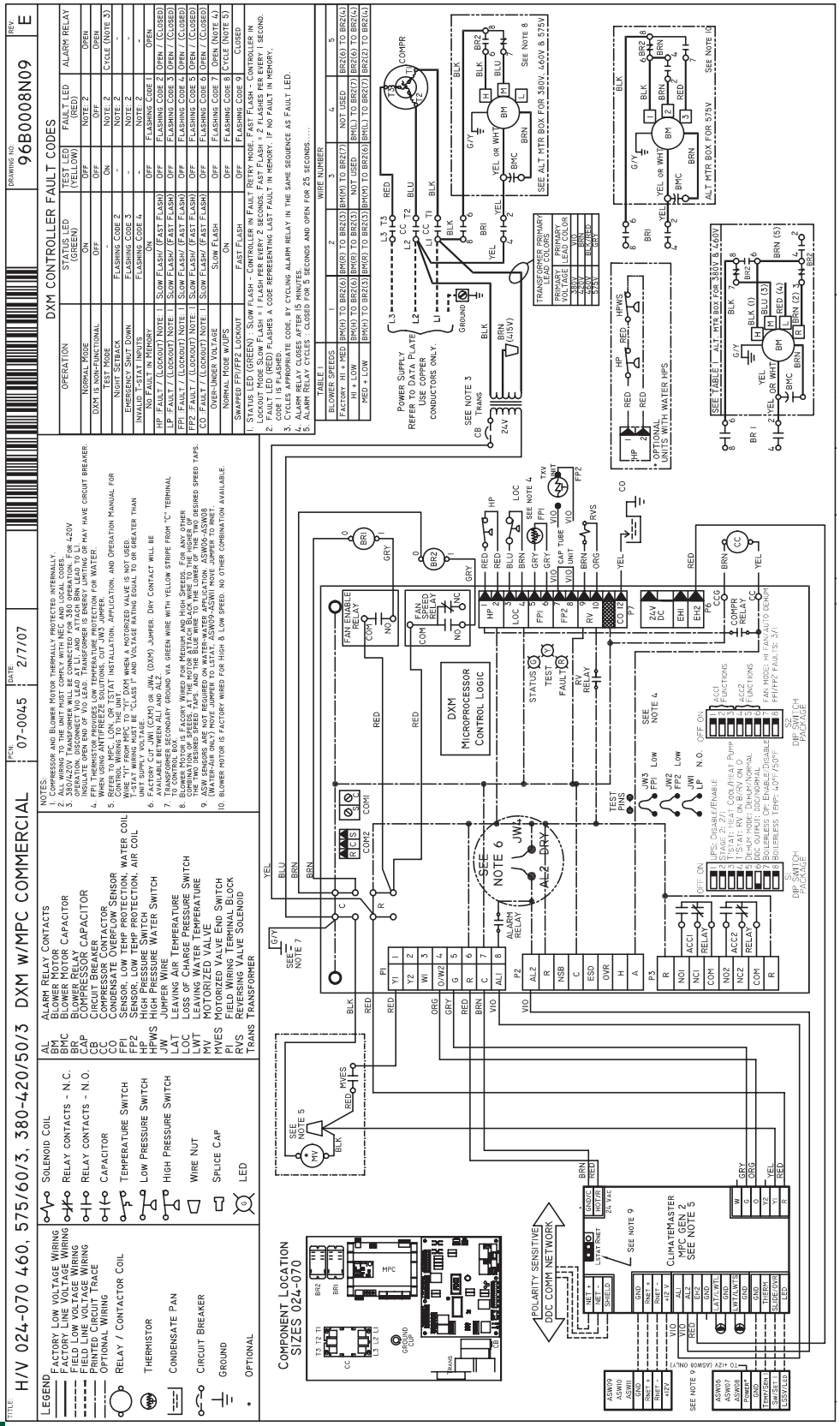
Typical Wiring Diagram
Three Phase 460/575V GS Units
With DXM & LON Controller



Typical Wiring Diagram
Three Phase 460/575V GS Units
With CXM & MPC Controller



Typical Wiring Diagram
Three Phase 460/575V GS Units
With DXM & MPC Controller



Genesis Ultra (GS) Series 60Hz
Engineering Specifications Rev.: 04/02/07

General:
Furnish and install ClimateMaster "Genesis" Water Source Heat Pumps, as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Capacities and characteristics as listed in the schedule and the specifications that follow.

Horizontal / Vertical Water Source Heat Pumps:
Units shall be supplied completely factory built for an entering water temperature range from 20° to 110°F (-6.7° to 43.3°C) as standard. Equivalent units from other manufacturers can be proposed provided approval to bid is given 10 days prior to bid closing. All equipment listed in this section must be rated and certified in accordance with American Refrigeration Institute / International Standards Organization (ARI / ISO) and Environmental Testing Laboratories for United States and Canada (ETL-US-C). The units shall have ARI / ISO and ETL-US-C labels. All units shall be fully quality tested by factory run testing under normal operating conditions and water flow rates as described herein. Quality control system shall automatically perform via computer: triple leak check, pressure tests, evacuate and accurately charge system, perform detailed heating and cooling mode tests, and quality cross check all operational and test conditions to pass/fail data base. Detailed report card will ship with each unit displaying all test performance data. Note: If unit fails on any cross check, system shall not be allowed unit to ship. Serial numbers will be recorded by factory and furnished to contractor on report card for ease of unit warranty status. ***Units tested without water flow are not acceptable.***

Basic Construction:
Horizontal Units shall have one of the following air flow arrangements: Left Inlet/Straight (Right) Discharge; Right Inlet/Straight (Left) Discharge; Left Inlet/Back Discharge; or Right Inlet/Back Discharge as shown on the plans. Units must have the ability to be field convertible from straight to back or back to straight discharge with no additional parts or unit structure modification. Horizontal units will have factory installed hanger brackets with rubber isolation grommets packaged separately.

Vertical Units shall have one of the following air flow arrangements: Left Return/Top Discharge, Right Return/Top Discharge, Left Return/Bottom Discharge, Right Return/Bottom Discharge as shown on the plans.

If units with these arrangements are not used, the contractor is responsible for any extra costs incurred by other trades. All units (horizontal and vertical) must have a minimum of three access panels for serviceability of compressor compartment. ***Units having only one access panel to compressor/heat exchangers/expansion device/refrigerant piping shall not be acceptable.***

The heat pumps shall be fabricated from heavy gauge galvanized steel. All interior surfaces shall be lined with 1/2 inch (12.7mm) thick, dual density, 1-3/4 lb/ft3 (28 kg/m3) acoustic type glass fiber insulation. Insulation placement shall be designed in a manner that will eliminate any exposed edges to prevent the introduction of glass fibers into the air stream.

Vertical heat pumps shall be fabricated from heavy gauge galvanized steel with powder coat paint finish. The color will be Polar Ice. Both sides of the steel shall be painted for added protection.

Standard cabinet panel insulation must meet NFPA 90A requirements, air erosion and mold growth limits of UL-181, stringent fungal resistance test per ASTM-C1071 and ASTM G21, and shall meet zero level bacteria growth per ASTM G22. ***Unit insulation must meet these stringent requirements or unit(s) will not be accepted.***

All horizontal units to have factory installed 1" (25.4mm) discharge air duct collars, 1" (25.4mm) filter rails with 1" (25.4mm) filters factory installed, and factory installed unit-mounting brackets. Vertical units to have field installed discharge air duct collar, shipped loose and 1" (25.4mm) filter rails with 1" (25.4mm) filters factory installed. ***If units with these factory installed provisions are not used, the contractor is responsible for any extra costs to field install these provisions, and/or the extra costs for his sub-contractor to install these provisions.***

All units must have an insulated panel separating the fan compartment from the compressor compartment. Units with the compressor in the air stream are not acceptable. Units shall have a factory installed 1 inch (25.4mm) wide filter bracket for filter removal from either side. Units shall have a 1 inch (25.4mm) thick throwaway type glass fiber filter. The contractor shall purchase one spare set of filters and replace factory shipped filters on completion of start-up. Filters shall be standard sizes. If units utilize non-standard filter sizes then the contractor shall provide 12 spare filters for each unit.

Cabinets shall have separate holes and knockouts for entrance of line voltage and low voltage control wiring. All factory-installed wiring passing through factory knockouts and openings shall be protected from sheet metal edges at openings by plastic ferrules. Supply and return water connections shall be copper IPT fittings, and shall be securely mounted flush to the cabinet corner post allowing for connection to a flexible hose without the use of a back-up wrench. ***Water connections that protrude through the cabinet or require the use of a backup wrench shall not be allowed.*** All water connections and electrical knockouts must be in the compressor compartment corner post as to not interfere with the serviceability of unit. ***Contractor shall be responsible for***

any extra costs involved in the installation of units that do not have this feature. Contractor must ensure that units can be easily removed for servicing and coordinate locations of electrical conduit and lights with the electrical contractor.

Option: Contractor shall install 2-inch (50.8mm) filter brackets and 2 inch(50.8mm) glass fiber throwaway filters on all units.

Option: UltraQuiet package shall consist of a discharge muffler (except rotary compressors) and high technology sound attenuating material that is strategically applied to the compressor and air handling compartment casings and fan scroll in addition to the standard ClimaQuiet system design, to further dampen and attenuate sound transmissions.

Option: The unit will be supplied with cupro nickel coaxial water to refrigerant heat exchanger.

Option: The unit will be supplied with internally factory mounted two-way water valve for variable speed pumping requirements. A factory-mounted or field-installed high pressure switch shall be installed in the water piping to disable compressor operation in the event water pressures build due to water freezing in the piping system.

Option: The unit will be supplied with internally factory mounted automatic water flow regulators.

Option: The unit will be supplied with internally mounted secondary pump for primary/secondary applications, specifically one-pipe systems.

Option: The unit shall be supplied with extended range Insulation option, which adds closed cell insulation to internal water lines, and provides insulation on suction side refrigeration tubing including refrigerant to water heat exchanger.

Option: The unit shall be supplied with a hot water generator (desuperheater).

Option: The refrigerant to air heat exchanger shall be "electro-coated" with a low cure cathodic epoxy material a minimum of 0.4 mils thick (0.4 – 1.5 mils range) on all surfaces. The black colored coating shall provide a minimum of 1000 hours salt spray protection per ASTM B117-97 on all galvanized end plates and copper tubing, and a minimum of 2000 hours of salt spray on all aluminum fins. The material shall be formulated without the inclusion of any heavy metals and shall exhibit a pencil hardness of 2H (ASTM D3363-92A), crosshatch adhesion of 4B-5B (ASTM D3359-95), and impact resistance of 160 in-lbs (184 kg-cm) direct (ASTM D2794-93).

Option: Unit shall include ClimaDry reheat option. Only modulating reheat that will adjust capacity based upon supply air temperature to provide "neutral" (72°F, 22.2°C) constant air temperature will be accepted. "Neutral" supply air temperature shall be provided regardless of entering loop water temperatures (above 55°F, 12.8°C) or refrigerant condensing pressures. Control of reheat must be accomplished via a humidistat or dehumidistat contact closure. Refrigerant circuit must be ARI certified. Approved equal manufacturers may provide pre-engineered integrated modulating hot gas reheat within the unit cabinet, or the installing contractor in conjunction with the "approved equal" unit manufacturer can provide for approval (during the submittal phase) an engineered system consisting of: a duct mounted hot water coil, small circulating pump, modulating control valve, and associated piping using the discharge condenser water off of the unit as the heating medium. All design costs and costs of field installed items including additional power wiring to pump, and control wiring to and from pump and control valve to unit shall be borne by mechanical contractor. ***Refrigerant circuits that are not ARI certified when the reheat option is applied will not be accepted.***

Fan and Motor Assembly:
Blower shall have inlet rings to allow removal of wheel and motor from one side without removing housing. Units shall have a direct-drive centrifugal fan. The fan motor shall be 3-speed (2-speed for 575V), permanently lubricated, PSC type, with internal thermal overload protection. Units supplied without permanently lubricated motors must provide external oilers for easy service. The fan motor on small and medium size units (015-048) shall be isolated from the fan housing by a torsionally flexible motor mounting system with rubber type grommets to inhibit vibration induced high noise levels associated with "hard wire belly band" motor mounting. The fan motor on larger units (060 & 070) shall be isolated with flexible rubber type isolation grommets only. The fan and motor assembly must be capable of overcoming the external static pressures as shown on the schedule. Airflow / Static pressure rating of the unit shall be based on a wet coil and a clean filter in place. ***Ratings based on a dry coil and / or no filter, or on an ESP less than 0.25 in w.g. (6.35 mm w.g.) shall NOT be acceptable.***

Option: High static motor (models GSH030, GSH036, GSV030, GSV036).

Refrigerant Circuit:
Units shall have a sealed refrigerant circuit including a high efficiency scroll or rotary compressor designed for heat pump operation, a thermostatic expansion valve for refrigerant metering, an enhanced corrugated aluminum lanced fin and rifled copper tube refrigerant to air heat exchanger, reversing valve, coaxial (tube in tube) refrigerant to water heat exchanger, and safety controls including a high pressure switch, low pressure switch (loss of charge), water coil low temperature sensor, and air

coil low temperature sensor. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent compressor operation via a microprocessor lockout circuit. The lockout circuit shall be reset at the thermostat or at the contractor supplied disconnect switch. ***Units that cannot be reset at the thermostat shall not be acceptable.***

Hermetic compressors shall be internally sprung. The compressor shall have a dual level vibration isolation system. The compressor will be mounted on computer selected vibration isolation springs to a large heavy gauge compressor mounting tray plate, which is then isolated from the cabinet base with rubber grommets for maximized vibration attenuation. Compressor shall have thermal overload protection. Compressor shall be located in an insulated compartment away from air stream to minimize sound transmission.

Refrigerant to air heat exchangers shall utilize enhanced corrugated lanced aluminum fins and rifled copper tube construction rated to withstand 450 PSIG (3101 kPa) refrigerant working pressure. Refrigerant to water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 450 PSIG (3101 kPa) working refrigerant pressure and 450 PSIG (3101 kPa) working water pressure. The refrigerant to water heat exchanger shall be "electro-coated" with a low cure cathodic epoxy material a minimum of 0.4 mils thick (0.4 – 1.5 mils range) on all surfaces. The black colored coating shall provide a minimum of 1000 hours salt spray protection per ASTM B117-97 on all external steel and copper tubing. The material shall be formulated without the inclusion of any heavy metals and shall exhibit a pencil hardness of 2H (ASTM D3363-92A), crosshatch adhesion of 4B-5B (ASTM D3359-95), and impact resistance of 160 in-lbs (184 kg-cm) direct (ASTM D2794-93).

Refrigerant metering shall be accomplished by thermostatic expansion valve only. Expansion valves shall be dual port balanced types with external equalizer for optimum refrigerant metering. Units shall be designed and tested for operating ranges of entering water temperatures from 20° to 110°F (-6.7° to 43.3°C). Reversing valve shall be four-way solenoid activated refrigerant valve, which shall default to heating mode should the solenoid fail to function. If the reversing valve solenoid defaults to cooling mode, an additional low temperature thermostat must be provided to prevent over-cooling an already cold room.

Drain Pan:
The drain pan shall be constructed of galvanized steel and have a powder coat paint application to further inhibit corrosion. This corrosion protection system shall meet the stringent 1000 hour salt spray test per ASTM B117. If plastic type material is used, it must be HDPE (High Density Polyethylene) to avoid thermal cycling shock stress failure over the lifetime of the unit. Stainless Steel materials are also acceptable. Drain pan shall be fully insulated. Drain outlet shall be located at pan as to allow complete and unobstructed drainage of condensate. Drain outlet for horizontal units shall be connected from pan directly to IPT fitting. ***No hidden internal tubing extensions from pan outlet extending to unit casing (that can create drainage problems) will be accepted.*** The unit as standard will be supplied with solid-state electronic condensate overflow protection. ***Mechanical float switches will NOT be accepted.***

Vertical units shall be furnished with a PVC slip condensate drain connection and an internal factory installed condensate trap. ***If units without an internal trap are used, the contractor is responsible for any extra costs to field install these provisions, and/or the extra costs for his sub-contractor to install these provisions.***

Electrical:
A control box shall be located within the unit compressor compartment and shall contain a 50VA transformer, 24 volt activated, 2 or 3 pole compressor contactor, terminal block for thermostat wiring and solid-state controller for complete unit operation. Reversing valve and fan motor wiring shall be routed through this electronic controller. Units shall be name-plated for use with time delay fuses or HACR circuit breakers. Unit controls shall be 24 Volt and provide heating or cooling as required by the remote thermostat / sensor.

Solid State Control System (CXM):
Units shall have a solid-state control system. ***Units utilizing electro-mechanical control shall not be acceptable.*** The control system microprocessor board shall be specifically designed to protect against building electrical system noise contamination, EMI, and RFI interference. The control system shall interface with a heat pump type thermostat. The control system shall have the following features:

a. Anti-short cycle time delay on compressor operation.
b. Random start on power up mode.
c. Low voltage protection.
d. High voltage protection.
e. Unit shutdown on high or low refrigerant pressures.
f. Unit shutdown on low water temperature.
g. Condensate overflow electronic protection.
h. Option to reset unit at thermostat or disconnect.

i. Automatic intelligent reset. Unit shall automatically reset the unit 5 minutes after trip if the fault has cleared. If a fault occurs 3 times sequentially without thermostat meeting temperature, then lockout requiring manual reset will occur.
j. Ability to defeat time delays for servicing.
k. Light emitting diode (LED) on circuit board to indicate high pressure, low pressure, low voltage, high voltage, low water/air temperature cut-out, condensate overflow, and control voltage status.
l. The low-pressure switch shall not be monitored for the first 120 seconds after a compressor start command to prevent nuisance safety trips.
m. 24V output to cycle a motorized water valve or other device with compressor contactor.
n. Unit Performance Sentinel (UPS). The UPS warns when the heat pump is running inefficiently.
o. Water coil low temperature sensing (selectable for water or anti-freeze).
p. Air coil low temperature sensing.

NOTE: Units not providing the 8 safety protections of anti-short cycle, low voltage, high voltage, high refrigerant pressure, low pressure (loss of charge), air coil low temperature cut-out, water coil low temperature cut-out, and condensate overflow protections will not be accepted.

Option: Enhanced solid state control system (DXM)
This control system features two stage control of cooling and two stage control of heating modes for exacting temperature and dehumidification purposes.

This control system coupled with a multi-stage thermostat will better dehumidify room air by automatically running the heat pump's fan at lower speed on the first stage of cooling thereby implementing low sensible heat ratio cooling. On the need for higher cooling performance the system will activate the second stage of cooling and automatically switch the fan to the higher fan speed setting. This system may be further enhanced with a humidistat. ***Units not having automatic low sensible heat ratio cooling will not be accepted;*** as an alternate a hot gas reheat coil may be provided with control system for automatic activation.

Control shall have all of the above mentioned features of the CXM control system along with the following expanded features:

a. Removable thermostat connector.
b. Night setback control.
c. Random start on return from night setback.
d. Minimized reversing valve operation (Unit control logic shall only switch the reversing valve when cooling is demanded for the first time. The reversing valve shall be held in this position until the first call for heating, ensuring quiet operation and increased valve life.).
e. Override temperature control with 2-hour (adjustable) timer for room occupant to override setback temperature at the thermostat.
f. Dry contact night setback output for digital night setback thermostats.
g. Ability to work with heat pump or heat/cool (Y, W) type thermostats.
h. Ability to work with heat pump thermostats using O or B reversing valve control.
i. Emergency shutdown contacts.
j. Boilerless system heat control at low loop water temperature.
k. Ability to allow up to 3 units to be controlled by one thermostat.
l. Relay to operate an external damper.
m. Ability to automatically change fan speed from multistage thermostat.
n. Relay to start system pump.
o. 75 VA control transformer. Control transformer shall have load side short circuit and overload protection via a built in circuit breaker.

Remote Service Sentinel (CXM/DXM):
Solid state control system shall communicate with thermostat to display (at the thermostat) the unit status, fault status, and specific fault condition, as well as retrieve previously stored fault that caused unit shutdown. The Remote Service Sentinel allows building maintenance personnel or service personnel to diagnose unit from the wall thermostat. The control board shall provide a signal to the thermostat fault light, indicating a lockout. Upon cycling the G (fan) input 3 times within a 60 second time period, the fault light shall display the specific code as indicated by a sequence of flashes. A detailed flashing code shall be provided at the thermostat LED to display unit status and specific fault status such as over/under voltage fault, high pressure fault, low pressure fault, low water temperature fault, condensate overflow fault, etc. ***Units that do not provide this remote service sentinel shall not be acceptable.***

Option: Lonworks interface system
Units shall have all the features listed above (either CXM or DXM) and the control board will be supplied with a LONWORKS interface board, which is LONMark certified. This will permit all units to be daisy chained via a 2-wire twisted pair shielded cable. The following points must be available at a central or remote computer location:

a. Space temperature
b. Leaving water temperature
c. Discharge air temperature
d. Command of space temperature setpoint
e. Cooling status
f. Heating status
g. Low temperature sensor alarm
h. Low pressure sensor alarm
i. High pressure switch alarm
j. Condensate sensor alarm
k. Hi/low voltage alarm
l. Fan "ON/AUTO" position of space thermostat as specified above
m. Unoccupied / occupied command
n. Cooling command
o. Heating command
p. Fan "ON / AUTO" command
q. Fault reset command
r. Itemized fault code revealing reason for specific shutdown fault (any one of 7)

This option also provides the upgraded 75VA control transformer with load side short circuit and overload protection via a built in circuit breaker.

Option: MPC (Multiple Protocol Control) interface system
Units shall have all the features listed above (either CXM or DXM) and the control board will be supplied with a Multiple Protocol interface board. Available protocols are BACnet MS/TP, Modbus, or Johnson Controls N2. The choice of protocol shall be field selectable/changeable via the use of a simple selector switch. Protocol selection shall not require any additional programming or special external hardware or software tools. This will permit all units to be daisy chain connected by a 2-wire twisted pair shielded cable. The following points must be available at a central or remote computer location:
a. Space temperature
b. Leaving water temperature
c. Discharge air temperature
d. Command of space temperature setpoint
e. Cooling status
f. Heating status
g. Low temperature sensor alarm
h. Low pressure sensor alarm
i. High pressure switch alarm
j. Condensate overflow alarm
k. Hi/low voltage alarm
l. Fan "ON/AUTO" position of space thermostat as specified above
m. Unoccupied / occupied command
n. Cooling command
o. Heating command
p. Fan "ON / AUTO" command
q. Fault reset command
r. Itemized fault code revealing reason for specific shutdown fault (any one of 7)

This option also provides the upgraded 75VA control transformer with load side short circuit and overload protection via a built in circuit breaker.

Warranty:
Climate Master shall warranty equipment for a period of 12 months from start up or 18 months from shipping (which ever occurs first).

Option: Extended 4-year compressor warranty covers compressor for a total of 5 years.

Option: Extended 4-year refrigeration circuit warranty covers coils, reversing valve, expansion valve and compressor for a total of 5 years.

Option: Extended 4-year control board warranty covers the CXM/DXM control board for a total of 5 years.

FIELD INSTALLED OPTIONS

Hose Kits:
All units 120000 BTUH (35 kW) and below shall be connected with hoses. The hoses shall be 2 feet (61cm) long, braided stainless steel; fire rated hoses complete with adapters. Only fire rated hoses will be accepted.

Valves:
The following valves are available and will be shipped loose:
a. Ball valve; bronze material, standard port full flow design, IPT connections.
b. Ball valve with memory stop and PT Port; standard port full flow design, IPT connections.
c. "Y" strainer with cap; bronze material, IPT connections.
d. "Y" strainer with blowdown valve; bronze material, IPT connections.
e. Motorized water valve; slow acting, 24v, IPT connections.

Hose Kit Assemblies:
The following assemblies ship with the valves already assembled to the hose described:
a. Supply and return hoses having ball valve with PT port.
b. Supply hose having ball valve with PT port; return hose having automatic flow regulator valve (Measureflo) with PT ports, and ball valve.
c. Supply hose having "Y" strainer with blowdown valve, and ball valve with PT port; return hose having automatic flow regulator (Measureflo) with PT ports, and ball valve.

Thermostats:
The thermostat shall be a ClimateMaster mechanical or electronic type thermostat as selected below with the described features:
a. Single Stage Standard Manual Changeover (ATM11C01)
Thermostat shall be a single-stage, vertical mount, manual changeover with HEAT-OFF-COOL system switch and fan ON-AUTO switch. Thermostat shall have a mechanical temperature indicator and set point indication. Thermostat shall only require 4 wires for connection. Mercury bulb thermostats are not acceptable.
b. Single Stage Digital Manual Changeover with Two-Speed Fan Control (ATM11C03) – DXM and PSC Fan required
Thermostat shall be a single-stage, digital, manual changeover with HEAT-OFF-COOL system switch, fan ON-AUTO switch, and fan LO-HI switch. Thermostat shall have an LCD display with temperature and set-point(s) in °F or °C. The Thermostat shall provide permanent memory of set-point(s) without batteries. A fault LED shall be provided to display specific fault condition. Thermostat shall come standard with remote temperature sensor, but may be operated with internal sensor if desired via installation of a jumper.
c. Single Stage Digital Auto or Manual Changeover (ATA11U01)
Thermostat shall be a single-stage, digital, auto or manual changeover with HEAT-OFF-COOL-AUTO system switch and fan ON-AUTO switch. Thermostat shall have an LCD display with temperature and set-point(s) in °F or °C. The Thermostat shall provide permanent memory of set-point(s) without batteries. A fault LED shall be provided to display specific fault condition. Thermostat shall provide temperature display offset for custom applications.
d. Single Stage Digital Automatic Changeover with Two-Speed Fan Control (ATA11C04) – DXM and PSC Fan required
Thermostat shall be a single-stage, digital, auto or manual changeover with HEAT-OFF-COOL-AUTO system switch, fan ON-AUTO switch, and fan LO-HI switch. Thermostat shall have an LCD display with temperature and set-point(s) in °F or °C. The Thermostat shall provide permanent memory of set-point(s) without batteries. A fault LED shall be provided to display specific fault condition. Thermostat shall come standard with remote temperature sensor, but may be operated with internal sensor if desired via installation of a jumper.
e. Multistage Digital Automatic Changeover (ATA22U01)
Thermostat shall be multi-stage (2H/2C), manual or automatic changeover with HEAT-OFF-COOL-AUTO system settings and fan ON-AUTO settings. Thermostat shall have an LCD display with temperature, set-point(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of set-point(s) without batteries. A fault LED shall be provided to indicate specific fault condition(s). Thermostat shall provide temperature display offset for custom applications. Thermostat shall allow unit to provide better dehumidification with optional DXM controller by automatically using lower fan speed on stage 1 cooling (higher latent cooling) as main cooling mode, and automatically shifting to high speed fan on stage 2 cooling.
f. Single Stage Manual Changeover Programmable 5/2 Day (ATP11N01)
Thermostat shall be 5 day/2 day programmable (with up to 4 set points per day), single stage (1H/1C), manual changeover with HEAT-OFF-COOL system settings and fan ON-AUTO settings. Thermostat shall have an LCD display with temperature, set-point(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of set-point(s) without batteries. Thermostat shall provide convenient override feature to temporarily change set point.
g. Multistage Automatic or Manual Changeover Programmable 5/2 Day (ATP21U01)
Thermostat shall be 5 day/2 day programmable (with up to 4 set points per day), multi-stage (2H/1C), automatic or manual changeover with HEAT-OFF-COOL-AUTO system settings and fan ON-AUTO settings. Thermostat shall have an LCD display

with temperature, set-point(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of set-point(s) without batteries. Thermostat shall provide convenient override feature to temporarily change set point.

h. Multistage Automatic or Manual Changeover Programmable 7 Day (ATP32U01)
Thermostat shall be 7 day programmable (with up to 4 set points per day), multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO system settings and fan ON-AUTO settings. Thermostat shall have a blue backlit dot matrix LCD display with temperature, set-points, mode, and status indication. The temperature indication shall be selectable for °F or °C. Time display shall be selectable for 12 or 24 hour clock. Fault identification shall be provided (when used with ClimateMaster CXM or DXM controls) to simplify troubleshooting by providing specific unit fault at the thermostat with red backlit LCD during unit lockout. The thermostat shall provide permanent memory of set-points without batteries. Thermostat shall provide heating set-point range limit, cooling set-point range limit, temperature display offset, keypad lockout, dead-band range setting, and inter-stage differential settings. Thermostat shall provide progressive recovery to anticipate time required to bring space temperature to the next programmed event. Thermostat shall provide an installer setup for configuring options and for setup of servicing contractor name and contact information. Thermostat shall allow the use of an accessory remote and/or outdoor temperature sensor (AST008). Thermostat navigation shall be accomplished via five buttons (up/down/right/left/select) with menu-driven selections for ease of use and programming.

i. Multistage Automatic or Manual Changeover Programmable 7 Day with Humidity Control (ATP32U02)
Thermostat shall be 7 day programmable (with up to 4 set points per day), multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO system settings and fan ON-AUTO settings. Separate dehumidification and humidification set points shall be configurable for discreet outputs to a dehumidification option and/or an external humidifier. Installer configuration mode shall allow thermostat dehumidification mode to operate with ClimaDry reheat or with ECM fan dehumidification mode via settings changes. Thermostat shall have a blue backlit dot matrix LCD display with temperature, relative humidity, set-points, mode, and status indication. The temperature indication shall be selectable for °F or °C. Time display shall be selectable for 12 or 24 hour clock. Fault identification shall be provided (when used with ClimateMaster CXM or DXM controls) to simplify troubleshooting by providing specific unit fault at the thermostat with red backlit LCD during unit lockout. The thermostat shall provide permanent memory of set-points without batteries. Thermostat shall provide heating set-point range limit, cooling set-point range limit, temperature display offset, keypad lockout, dead-band range setting, and inter-stage differential settings. Thermostat shall provide progressive recovery to anticipate time required to bring space temperature to the next programmed event. Thermostat shall provide an installer setup for configuring options and for setup of servicing contractor name and contact information. Thermostat shall allow the use of an accessory remote and/or outdoor temperature sensor (AST008). Thermostat navigation shall be accomplished via five buttons (up/down/right/left/select) with menu-driven selections for ease of use and programming.

DDC Sensors:
ClimateMaster wall mounted DDC sensor to monitor room temperature and interfaces with optional interface system described above. Several types as described below:

a. Sensor only with no display (LON and MPC).
b. Sensor with override (LON only).
c. Sensor with setpoint and adjustment override (MPC only).
d. Sensor with setpoint and adjustment override, LCD display, status/fault indication (LON and MPC).

Section Change Log

Date:	Item:	Action:
05/23/07	Specifications	Updated for new safety agency
01/01/07	Dimensional Data	Updated Dimensional Data
01/01/07	Specifications	Updated thermostat offering
01/01/07	Wiring Diagrams	Added pressure switch for motorized valve option
01/01/07	Electrical Data	Split reheat and secondary pump data, added high static data, updated compressor RLA and LRA
01/01/07	Performance Data	Added low temperature selection notes
01/01/07	Motorized Valves	Added Cv, MOPD, and WPD data
01/01/06	First Published	

Notes: