# ASTON LOW SILL SERIES

## COMMERCIAL

Geothermal/Water Source Heat Pumps

0.75-1.5 Tons

Submittal Data

English Language

IP/Metric Units

SD1012CGC 12/18

GEOSTAR

Contractor: _____ P.O.: _____

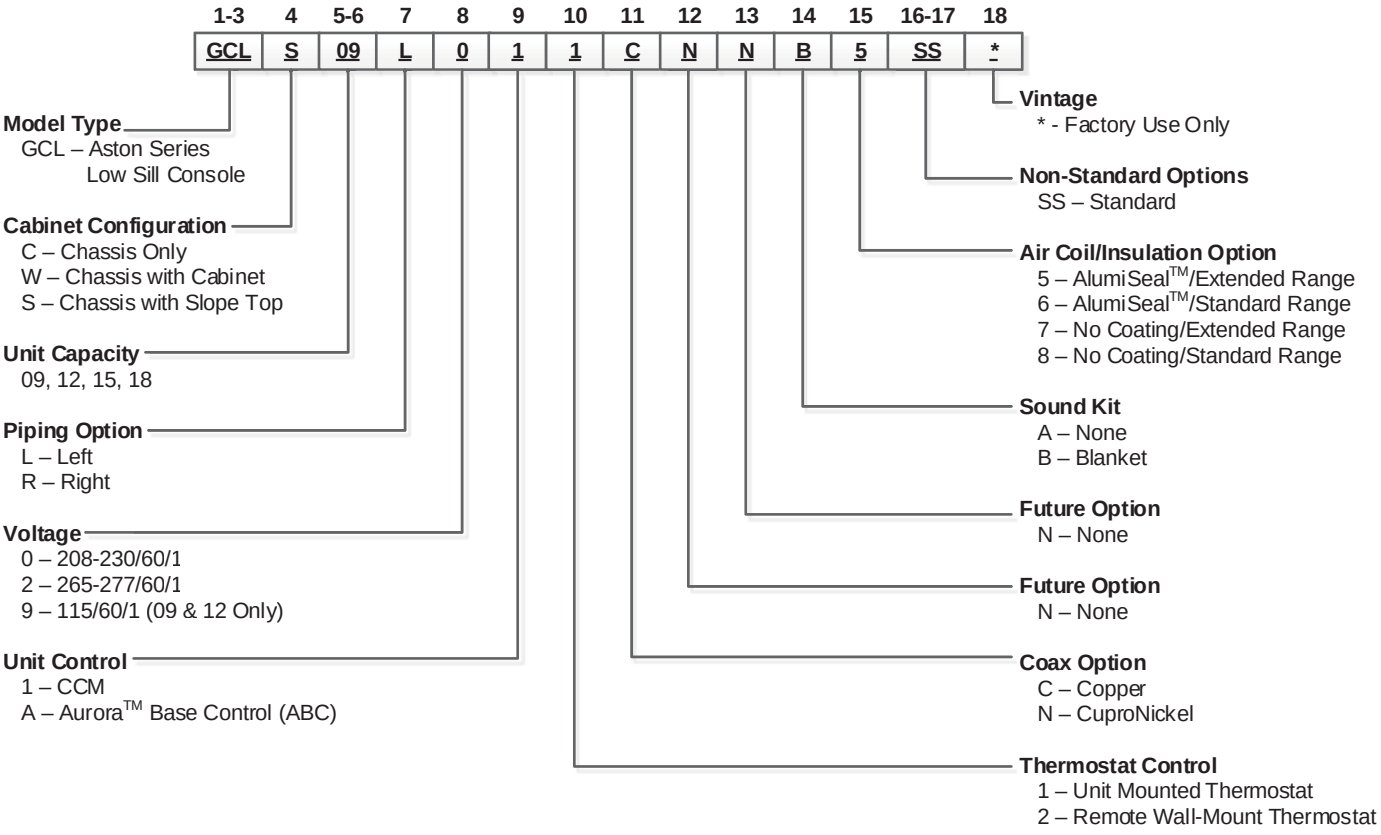
Engineer: _____

Project Name: _____ Unit Tag: _____

**Aston Low Sill Series Commercial**
**Geothermal/Water Source Heat Pumps**
**0.75-1.5 Tons, 60Hz**

GEOSTAR

# Model Nomenclature




NOTES: Chassis only available with left piping option.

Contractor: _____ P.O.: _____

Engineer: _____

Project Name: _____ Unit Tag: _____



# AHRI Data

### ECM Motors

AHRI/ASHRAE/ISO 13256-1
English (IP) Units

| Model | Flow Rate | | Water Loop Heat Pump | | | | Ground Water Heat Pump | | | | Ground Loop Heat Pump | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Cooling EWT 86°F | | Heating EWT 68°F | | Cooling EWT 59°F | | Heating EWT 50°F | | Cooling EWT 77°F | | Heating EWT 32°F | |
| | gpm | cfm | Capacity Btuh | EER Btuh/W | Capacity Btuh | COP | Capacity Btuh | EER Btuh/W | Capacity Btuh | COP | Capacity Btuh | EER Btuh/W | Capacity Btuh | COP |
| 09 | 2.5 | 300 | 8,500 | 13.4 | 10,500 | 4.4 | 10,200 | 22.5 | 8,700 | 3.8 | 9,000 | 16.0 | 6,700 | 3.1 |
| 12 | 3.5 | 350 | 10,500 | 12.3 | 14,400 | 4.3 | 12,400 | 19.5 | 11,800 | 3.7 | 11,000 | 14.2 | 9,500 | 3.5 |
| 15 | 4.5 | 450 | 13,500 | 13.6 | 17,000 | 4.9 | 16,200 | 22.0 | 14,000 | 4.1 | 14,200 | 15.9 | 10,500 | 3.4 |
| 18 | 5.5 | 500 | 16,200 | 12.5 | 21,000 | 4.4 | 19,000 | 19.6 | 17,000 | 3.7 | 16,600 | 15.1 | 13,300 | 3.1 |

Cooling capacities based upon 80.6°F DB, 66.2°F WB entering air temperature
Heating capacities based upon 70°F DB, 59°C WB entering air temperature
All ratings based upon 208V operation

5/24/18

### Voltage Availability

| Voltage | Low Sill Console | | | |
|---|---|---|---|---|
| | 09 | 12 | 15 | 18 |
| 115/60/1 | • | • | | |
| 208-230/60/1 | • | • | • | • |
| 265/60/1 | • | • | • | • |

6/10/13

All Aston Series product is Safety listed under UL1995 thru ETL and performance listed with AHRI in accordance with standard 13256-1.

# Definitions

### ABBREVIATIONS AND DEFINITIONS:

cfm = airflow, cubic feet/minute
EWT = entering water temperature, Fahrenheit
gpm = water flow in gallons/minute
WPD = water pressure drop, psi and feet of water
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)
HC = air heating capacity, MBtu/h
TC = total cooling capacity, MBtu/h
SC = sensible cooling capacity, MBtu/h
KW = total power unit input, kilowatts
HR = total heat of rejection, MBtu/h
HE = total heat of extraction, MBtu/h
HWC = hot water generator capacity, MBtu/h
EER = Energy Efficient Ratio = Btu output/Watt input
COP = Coefficient of Performance = Btu output/Btu input
LWT = leaving water temperature, °F
LAT = leaving air temperature, °F
TH = total heating capacity, MBtu/h
LC = latent cooling capacity, MBtu/h
S/T = sensible to total cooling ratio

Contractor: _____ P.O.: _____

Engineer: _____

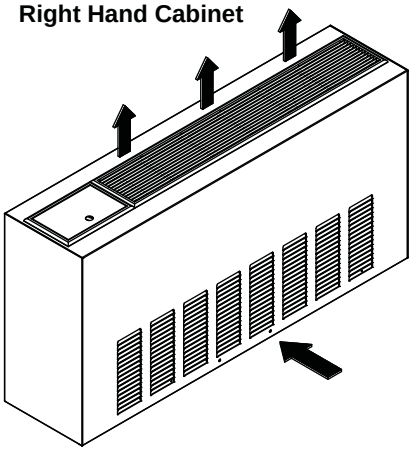
Project Name: _____ Unit Tag: _____

**Aston Low Sill Series Commercial Geothermal/Water Source Heat Pumps 0.75-1.5 Tons, 60Hz**

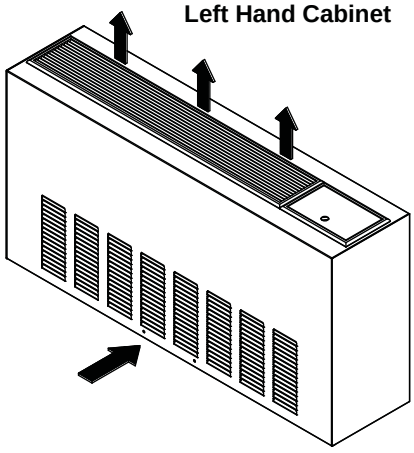
# Dimensional Data - Flat Top Cabinet

## GCLW09-18

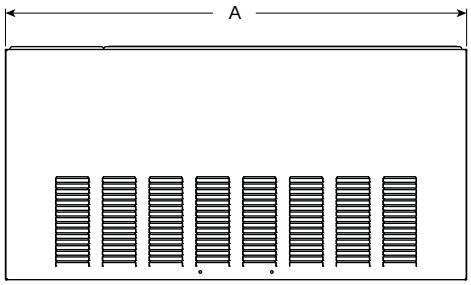
**Right Hand Cabinet**



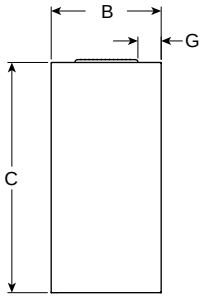
**Left Hand Cabinet**



**TOP**


**FRONT**




**SIDE**

Right return cabinet shown in dimensional views

| Flat Top Configuration | | Overall Cabinet | | | Grille | | | |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G |
| | | Width | Depth | Height | Grille Lid | Grille Length | Grille Width | |
| 09-12 | in. | 45.1 | 10.8 | 22.5 | 9.2 | 35.0 | 6.1 | 2.3 |
| | cm. | 114.6 | 27.4 | 57.2 | 23.4 | 88.9 | 15.6 | 5.8 |
| 15-18 | in. | 50.0 | 12.8 | 22.5 | 9.2 | 35.0 | 6.1 | 3.3 |
| | cm. | 127.0 | 32.4 | 57.2 | 23.4 | 88.9 | 15.6 | 8.3 |

Contractor: _____ P.O.: _____

Engineer: _____

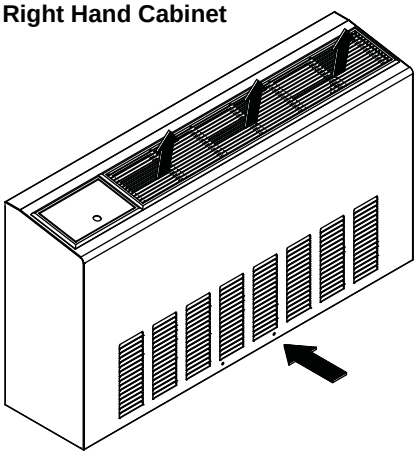
Project Name: _____ Unit Tag: _____

**Aston Low Sill Series Commercial**
**Geothermal/Water Source Heat Pumps**
**0.75-1.5 Tons, 60Hz**

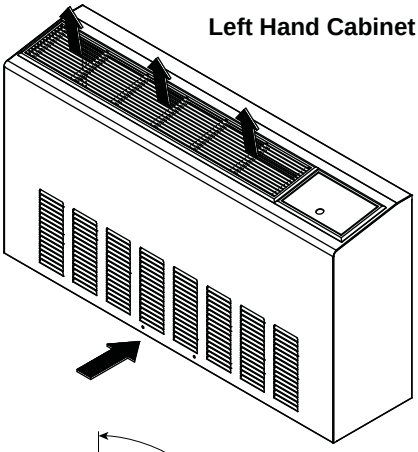
# Dimensional Data - Slope Top Cabinet

## GCLS09-18

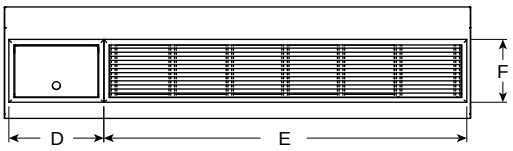
**Right Hand Cabinet**

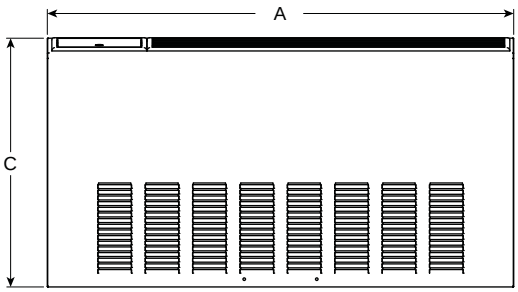


**Left Hand Cabinet**

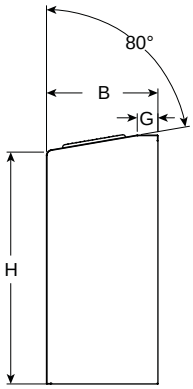


**TOP**




**FRONT**



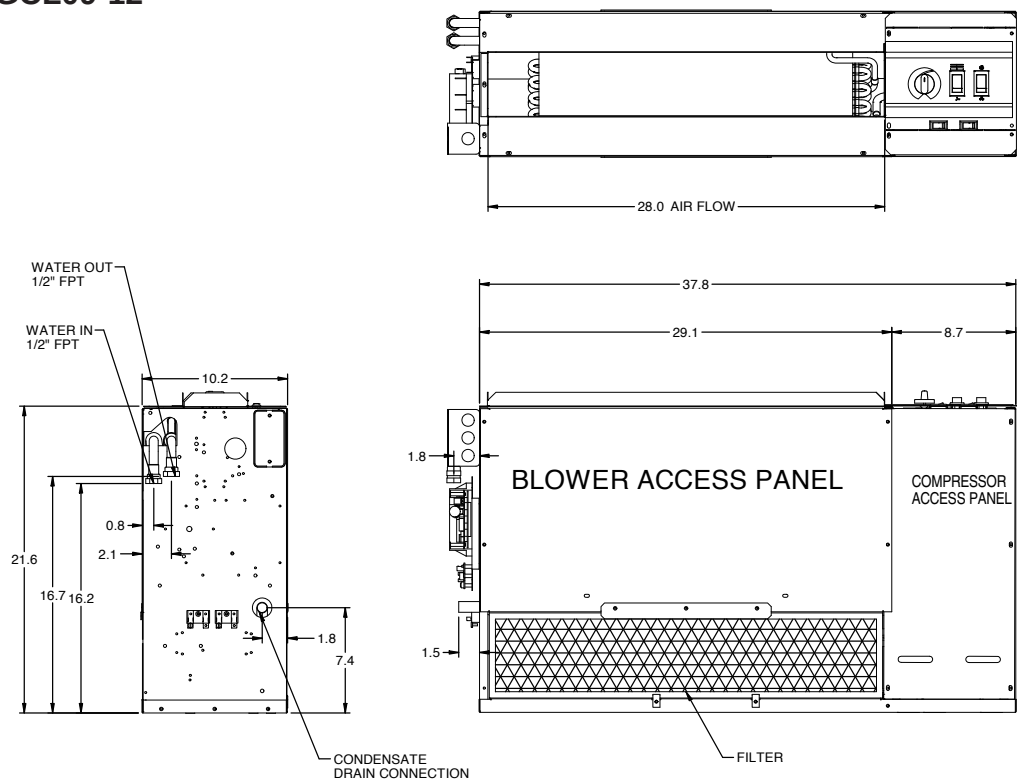

**SIDE**

Right return cabinet shown in dimensional views

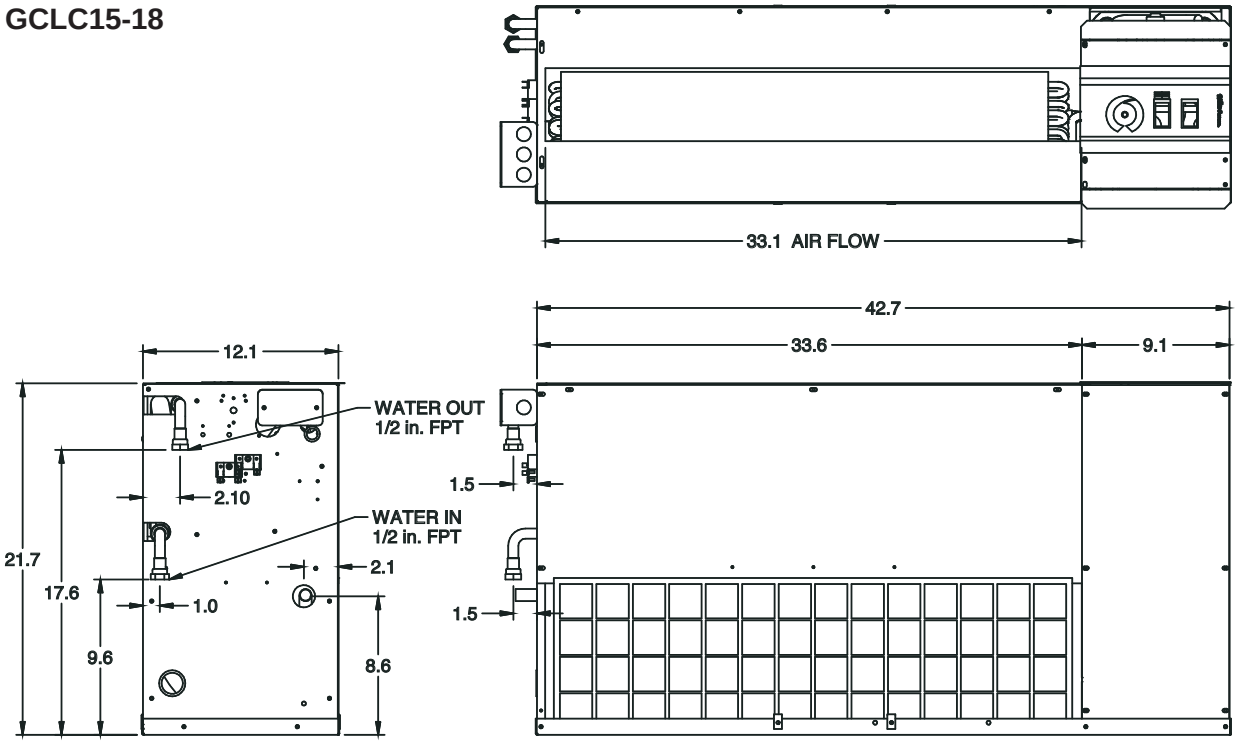
| Slope Top Configuration | | Overall Cabinet | | | Grille | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H |
| | | Width | Depth | Height | Grille Lid | Grille Length | Grille Width | | |
| 09-12 | in. | 45.1 | 10.8 | 24.0 | 9.2 | 35.0 | 6.1 | 2.0 | 22.4 |
| | cm. | 114.6 | 27.4 | 61.0 | 23.4 | 88.9 | 15.6 | 5.1 | 56.9 |
| 15-18 | in. | 50.0 | 12.8 | 24.0 | 9.2 | 35.0 | 6.1 | 2.0 | 22.5 |
| | cm. | 127.0 | 32.4 | 61.0 | 23.4 | 88.9 | 15.6 | 5.1 | 57.2 |

# Dimensional Data - Chassis

## GCL09-12




## GCLC15-18



Contractor: _____ P.O.: _____

Engineer: _____

Project Name: _____ Unit Tag: _____

**Aston Low Sill Series Commercial**
**Geothermal/Water Source Heat Pumps**
**0.75-1.5 Tons, 60Hz**

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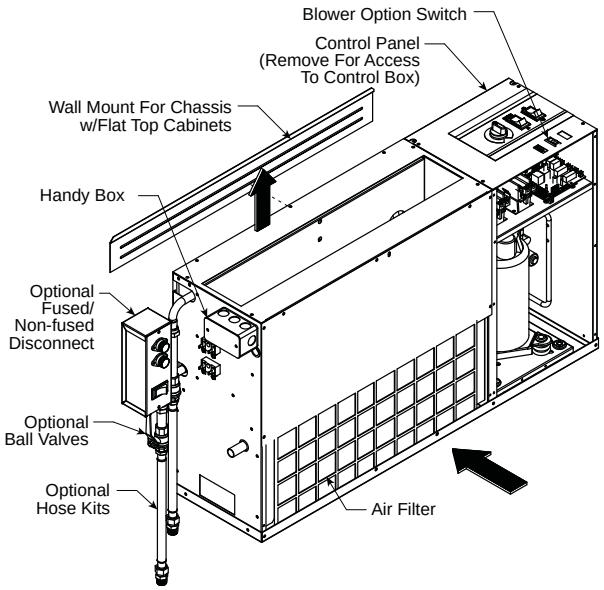
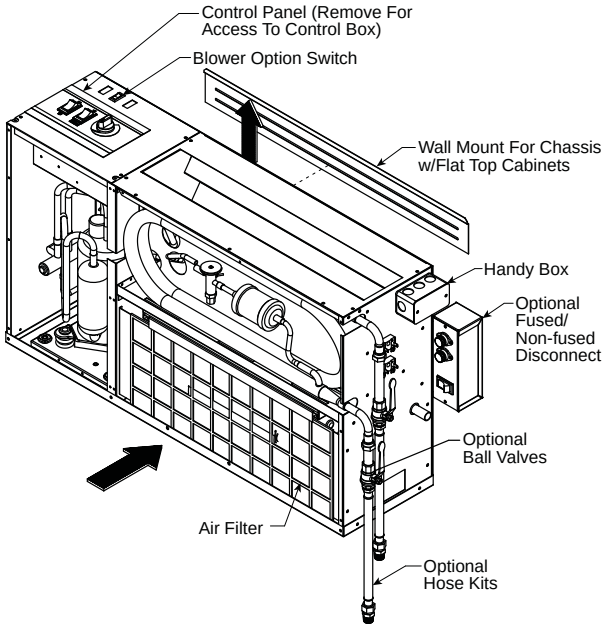
# Dimensional Data - Controls Detail: Flat Top Chassis

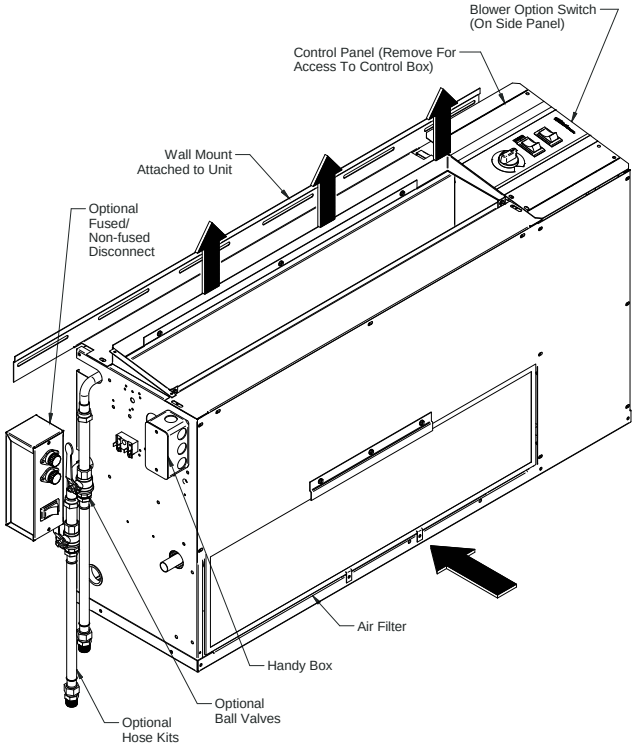
### Left Return

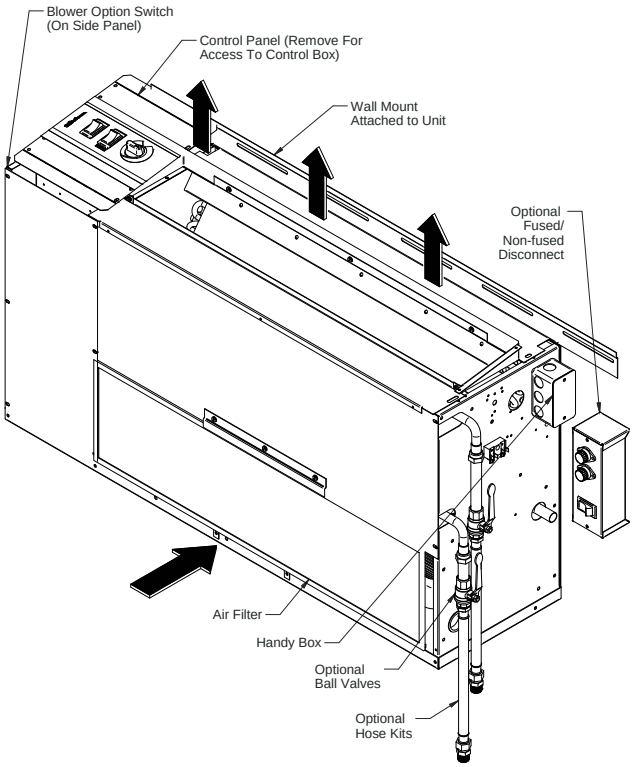



### Right Return




# Dimensional Data - Controls Detail: Slope Top Chassis



# Physical Data

| Model | | Console | | | |
|---|---|---|---|---|---|
| | | **09** | **12** | **15** | **18** |
| Compressor (1 each) | | Rotary | | | |
| Factory Charge R410A, oz [kg] | | 27 [0.77] | 27 [0.77] | 36 [1.02] | 34 [0.96] |
| Blower Motor & Blower | | | | | |
| Blower Motor Type/Speeds | ECM | 3 Speeds | | | |
| Blower Motor - hp [W] | ECM | 0.25 [186] | 0.25 [186] | 0.25 [186] | 0.25 [186] |
| Blower Wheel Size (Dia x W), in. [mm] | ECM | 5.75 x 5.5 [146 x 140] | 5.75 x 5.5 [146 x 140] | 6.0 x 6.5 [152 x 165] | 6.0 x 6.5 [152 x 165] |
| Coax and Water Piping | | | | | |
| Water Connection Size - FPT - in [mm] | | 1/2" [12.7] | 1/2" [12.7] | 1/2" [12.7] | 1/2" [12.7] |
| Coax & Piping Water Volume - gal [l] | | 0.15 [0.6] | 0.18 [0.7] | 0.15 [0.6] | 0.18 [0.7] |
| Air Coil | | | | | |
| Air Coil Dimensions (H x W), in. [mm] | | 8 x 22 [203 x 559] | 8 x 22 [203 x 559] | 8 x 30 [203 x 762] | 8 x 30 [203 x 762] |
| Air Coil Total Face Area, ft2 [m2] | | 1.2 [0.114] | 1.2 [0.114] | 1.7 [0.16] | 1.7 [0.16] |
| Air Coil Tube Size, in [mm] | | 3/8 [9.5] | 3/8 [9.5] | 3/8 [9.5] | 3/8 [9.5] |
| Air Coil Number of rows | | 3 | 3 | 4 | 4 |
| Filter Standard - Throwaway, in [mm] | | 23 x 9.6 [584 x 244] | 23 x 9.6 [584 x 244] | 32 x 9.6 [813 x 244] | 32 x 9.6 [813 x 244] |
| Weight - Packaged, lb [kg] | | 200 [91] | 205 [93] | 215 [98] | 220 [100] |

5/24/2018

Contractor: _____ P.O.: _____

Engineer: _____

Project Name: _____ Unit Tag: _____



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# Blower Performance Data

| Model | CFM | | |
|---|---|---|---|
| | Low Speed | Medium Speed | High Speed |
| 09 | 300 | 325 | 400 |
| 12 | 300 | 325 | 400 |
| 15 | 350 | 450 | 600 |
| 18 | 350 | 450 | 600 |

Factory settings are in Bold 5/24/2018

Air flow values are with dry coil and standard filter

For wet coil performance first calculate the face velocity of the air coil (Face Velocity [fpm] = Airflow [cfm] / Face Area [sq ft]).

# Electrical Data

| Model | Rated Voltage | Voltage Min/Max | Compressor | | | Fan Motor FLA | Total Unit FLA | Min Circ Amp | Max Fuse/ HACR |
|---|---|---|---|---|---|---|---|---|---|
| | | | MCC | RLA | LRA | | | | |
| 09 | 115/60/1 | 104/127 | 12.5 | 8.0 | 50.0 | 4.25 | 12.3 | 14.3 | 20 |
| | 208-230/60/1 | 187/253 | 6.4 | 4.1 | 21.0 | 2.6 | 6.7 | 7.7 | 10/15 |
| | 265/60/1 | 238/292 | 6.7 | 4.3 | 22.0 | 2.5 | 6.8 | 7.9 | 10/15 |
| 12 | 115/60/1 | 104/127 | 14.8 | 9.5 | 50.0 | 4.25 | 13.8 | 16.1 | 25 |
| | 208-230/60/1 | 187/253 | 7.7 | 4.9 | 25.0 | 2.6 | 7.5 | 8.8 | 10/15 |
| | 265/60/1 | 238/292 | 7.0 | 4.5 | 22.0 | 2.5 | 7.0 | 8.1 | 10/15 |
| 15 | 208-230/60/1 | 187/253 | 9.2 | 5.9 | 29.0 | 2.6 | 8.5 | 10.0 | 15 |
| | 265/60/1 | 238/292 | 7.8 | 5.0 | 28.0 | 2.5 | 7.5 | 8.8 | 10/15 |
| 18 | 208-230/60/1 | 187/253 | 10.4 | 6.7 | 33.5 | 2.6 | 9.3 | 10.9 | 15 |
| | 265/60/1 | 238/292 | 8.7 | 5.6 | 28.0 | 2.5 | 8.1 | 9.5 | 15 |

HACR circuit breaker in USA only 5/24/18

# Pressure Drop

| Model | GPM | Pressure Drop (psi) | | | | |
|---|---|---|---|---|---|---|
| | | 30°F | 50°F | 70°F | 90°F | 110°F |
| **09** | 1.2 | 1.0 | 0.9 | 0.8 | 0.7 | 0.6 |
| | 1.8 | 2.3 | 2.2 | 2.0 | 1.9 | 1.8 |
| | 2.5 | 3.8 | 3.7 | 3.5 | 3.3 | 3.1 |
| **12** | 1.5 | 0.9 | 0.8 | 0.7 | 0.6 | 0.5 |
| | 2.3 | 1.7 | 1.5 | 1.4 | 1.3 | 1.1 |
| | 3.5 | 3.0 | 2.7 | 2.5 | 2.4 | 2.2 |
| **15** | 2.0 | 1.7 | 1.6 | 1.5 | 1.4 | 1.3 |
| | 3.0 | 3.3 | 3.2 | 3.0 | 2.9 | 2.8 |
| | 4.5 | 5.7 | 5.5 | 5.3 | 5.1 | 4.9 |
| **18** | 3.0 | 1.7 | 1.6 | 1.5 | 1.4 | 1.3 |
| | 4.0 | 4.1 | 4.0 | 3.9 | 3.7 | 3.6 |
| | 5.5 | 7.9 | 7.6 | 7.4 | 7.2 | 6.9 |

6/10/13

# Antifreeze Corrections

| Antifreeze Type | Antifreeze % by wt | Cooling Capacity | Heating Capacity | Pressure Drop |
|---|---|---|---|---|
| **EWT -** degF [DegC] | | **90 [32.2]** | **30 [-1.1]** | **30 [-1.1]** |
| **Water** | 0 | 1.000 | 1.000 | 1.000 |
| **Ethylene Glycol** | 10 | 0.991 | 0.973 | 1.075 |
| | 20 | 0.979 | 0.943 | 1.163 |
| | 30 | 0.965 | 0.917 | 1.225 |
| | 40 | 0.955 | 0.890 | 1.324 |
| | 50 | 0.943 | 0.865 | 1.419 |
| **Propylene Glycol** | 10 | 0.981 | 0.958 | 1.130 |
| | 20 | 0.969 | 0.913 | 1.270 |
| | 30 | 0.950 | 0.854 | 1.433 |
| | 40 | 0.937 | 0.813 | 1.614 |
| | 50 | 0.922 | 0.770 | 1.816 |
| **Ethanol** | 10 | 0.991 | 0.927 | 1.242 |
| | 20 | 0.972 | 0.887 | 1.343 |
| | 30 | 0.947 | 0.856 | 1.383 |
| | 40 | 0.930 | 0.815 | 1.523 |
| | 50 | 0.911 | 0.779 | 1.639 |
| **Methanol** | 10 | 0.986 | 0.957 | 1.127 |
| | 20 | 0.970 | 0.924 | 1.197 |
| | 30 | 0.951 | 0.895 | 1.235 |
| | 40 | 0.936 | 0.863 | 1.323 |
| | 50 | 0.920 | 0.833 | 1.399 |

***Warning**: Gray area represents antifreeze concentrations greater than 35% by weight and should be avoided due to the extreme performance penalty they represent.*

# Correction Factor Tables

### Cooling Capacity Corrections

| Entering Air WB ºF | Total Clg Cap | Sensible Cooling Capacity Multipliers - Entering DB ºF | | | | | | | | | | Power Input | Heat of Rejection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 60 | 65 | 70 | 75 | 80 | 80.6 | 85 | 90 | 95 | 100 | | |
| 55 | 0.898 | 0.723 | 0.866 | 1.048 | 1.185 | * | * | * | * | * | * | 0.985 | 0.913 |
| 60 | 0.912 | | 0.632 | 0.880 | 1.078 | 1.244 | 1.260 | * | * | * | * | 0.994 | 0.927 |
| 65 | 0.967 | | | 0.694 | 0.881 | 1.079 | 1.085 | 1.270 | * | * | * | 0.997 | 0.972 |
| 66.2 | 0.983 | | | 0.655 | 0.842 | 1.040 | 1.060 | 1.232 | * | * | * | 0.999 | 0.986 |
| **67** | **1.000** | | | 0.616 | 0.806 | **1.000** | 1.023 | 1.193 | 1.330 | * | * | **1.000** | **1.000** |
| 70 | 1.053 | | | | 0.693 | 0.879 | 0.900 | 1.075 | 1.250 | 1.404 | * | 1.003 | 1.044 |
| 75 | 1.168 | | | | | 0.687 | 0.715 | 0.875 | 1.040 | 1.261 | 1.476 | 1.007 | 1.141 |

11/10/09

**NOTE:** * Sensible capacity equals total capacity at conditions shown.

### Heating Corrections

| Ent Air DB ºF | Htg Cap | Power | Heat of Ext |
|---|---|---|---|
| 45 | 1.062 | 0.739 | 1.158 |
| 50 | 1.050 | 0.790 | 1.130 |
| 55 | 1.037 | 0.842 | 1.096 |
| 60 | 1.025 | 0.893 | 1.064 |
| 65 | 1.012 | 0.945 | 1.030 |
| 68 | 1.005 | 0.976 | 1.012 |
| **70** | **1.000** | **1.000** | **1.000** |
| 75 | 0.987 | 1.048 | 0.970 |
| 80 | 0.975 | 1.099 | 0.930 |

11/10/09

Contractor: _____ P.O.: _____

Engineer: _____

Project Name: _____ Unit Tag: _____



GEOSTAR

# GCL*09 - Performance Data

## Single Speed ECM (300 cfm)

| EWT °F | Flow GPM | WPD | | HEATING - EAT 70°F | | | | | COOLING - EAT 80/67°F | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PSI | FT | HC Mbtu/h | Power kW | HE Mbtu/h | LAT °F | COP | TC Mbtu/h | SC MBtu/h | S/T Ratio | Power kW | HR MBtu/h | EER |
| **20** | 1.2 | 1.1 | 2.5 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 1.8 | 2.4 | 5.5 | | | | | | | | | | | |
| | 2.5 | 3.8 | 8.8 | 6.3 | 0.67 | 4.0 | 87.3 | 2.74 | | | | | | |
| **30** | 1.2 | 1.0 | 2.3 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 1.8 | 2.3 | 5.3 | 7.5 | 0.72 | 5.0 | 91.0 | 3.02 | 12.2 | 8.1 | 0.67 | 0.50 | 13.9 | 24.3 |
| | 2.5 | 3.8 | 8.8 | 7.4 | 0.72 | 5.0 | 90.9 | 3.02 | 12.4 | 8.3 | 0.67 | 0.47 | 14.0 | 26.2 |
| **40** | 1.2 | 1.0 | 2.3 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 1.8 | 2.3 | 5.3 | 8.3 | 0.75 | 5.7 | 93.6 | 3.26 | 11.6 | 7.9 | 0.68 | 0.56 | 13.5 | 20.8 |
| | 2.5 | 3.8 | 8.8 | 8.5 | 0.75 | 5.9 | 94.2 | 3.32 | 11.9 | 8.1 | 0.68 | 0.52 | 13.7 | 22.7 |
| **50** | 1.2 | 0.9 | 2.1 | 8.8 | 0.76 | 6.2 | 95.3 | 3.41 | 10.7 | 7.5 | 0.70 | 0.65 | 12.9 | 16.5 |
| | 1.8 | 2.2 | 5.1 | 9.2 | 0.77 | 6.6 | 96.3 | 3.50 | 11.0 | 7.7 | 0.70 | 0.61 | 13.1 | 17.9 |
| | 2.5 | 3.7 | 8.5 | 9.6 | 0.78 | 6.9 | 97.6 | 3.60 | 11.4 | 7.9 | 0.69 | 0.58 | 13.4 | 19.8 |
| **60** | 1.2 | 0.9 | 2.1 | 9.9 | 0.79 | 7.2 | 98.4 | 3.68 | 10.1 | 7.2 | 0.72 | 0.71 | 12.5 | 14.4 |
| | 1.8 | 2.1 | 4.9 | 10.3 | 0.79 | 7.6 | 99.7 | 3.79 | 10.4 | 7.4 | 0.71 | 0.67 | 12.7 | 15.5 |
| | 2.5 | 3.6 | 8.3 | 10.7 | 0.81 | 8.0 | 101.1 | 3.91 | 10.8 | 7.6 | 0.71 | 0.64 | 13.0 | 17.0 |
| **70** | 1.2 | 0.8 | 1.8 | 10.9 | 0.81 | 8.1 | 101.6 | 3.94 | 9.5 | 7.0 | 0.73 | 0.76 | 12.1 | 12.5 |
| | 1.8 | 2.0 | 4.6 | 11.3 | 0.82 | 8.5 | 103.0 | 4.06 | 9.9 | 7.2 | 0.73 | 0.73 | 12.4 | 13.5 |
| | 2.5 | 3.5 | 8.1 | 11.9 | 0.83 | 9.0 | 104.6 | 4.19 | 10.3 | 7.4 | 0.72 | 0.70 | 12.6 | 14.8 |
| **80** | 1.2 | 0.8 | 1.8 | 12.2 | 0.82 | 9.4 | 105.6 | 4.33 | 9.1 | 6.8 | 0.75 | 0.82 | 11.9 | 11.0 |
| | 1.8 | 2.0 | 4.6 | 12.5 | 0.83 | 9.7 | 106.6 | 4.39 | 9.3 | 6.9 | 0.74 | 0.79 | 12.0 | 11.9 |
| | 2.5 | 3.4 | 7.9 | 12.9 | 0.85 | 10.0 | 107.7 | 4.47 | 9.6 | 7.1 | 0.74 | 0.76 | 12.2 | 12.6 |
| **90** | 1.2 | 0.7 | 1.6 | 13.5 | 0.84 | 10.6 | 109.5 | 4.70 | 8.7 | 6.7 | 0.77 | 0.90 | 11.8 | 9.7 |
| | 1.8 | 1.9 | 4.4 | 13.7 | 0.85 | 10.8 | 110.2 | 4.71 | 8.8 | 6.7 | 0.76 | 0.86 | 11.7 | 10.3 |
| | 2.5 | 3.3 | 7.6 | 13.9 | 0.86 | 10.9 | 110.8 | 4.73 | 9.0 | 6.8 | 0.76 | 0.83 | 11.8 | 10.9 |
| **100** | 1.2 | 0.7 | 1.6 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 1.8 | 1.8 | 4.2 | | | | | | 8.2 | 6.5 | 0.79 | 0.93 | 11.4 | 8.8 |
| | 2.5 | 3.2 | 7.4 | | | | | | 8.3 | 6.6 | 0.79 | 0.90 | 11.4 | 9.3 |
| **110** | 1.2 | 0.6 | 1.4 | | | | | | Operation not recommended | | | | | |
| | 1.8 | 1.8 | 4.2 | | | | | | 7.5 | 6.2 | 0.83 | 1.00 | 10.9 | 7.5 |
| | 2.5 | 3.1 | 7.2 | | | | | | 7.7 | 6.3 | 0.82 | 0.97 | 11.0 | 7.9 |
| **120** | 1.2 | 0.6 | 1.4 | | | | | | Operation not recommended | | | | | |
| | 1.8 | 1.7 | 3.9 | | | | | | 6.8 | 5.8 | 0.86 | 1.08 | 10.4 | 6.2 |
| | 2.5 | 3.0 | 6.9 | | | | | | 6.9 | 5.9 | 0.86 | 1.05 | 10.5 | 6.6 |

6/20/11

Contractor: _____ P.O.: _____

Engineer: _____

Project Name: _____ Unit Tag: _____



GEOSTAR

# GCL*12 - Performance Data

## Single Speed ECM (340 cfm)

| EWT °F | Flow GPM | WPD | | HEATING - EAT 70°F | | | | | COOLING - EAT 80/67°F | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PSI | FT | HC Mbtu/h | Power kW | HE Mbtu/h | LAT °F | COP | TC Mbtu/h | SC MBtu/h | S/T Ratio | Power kW | HR MBtu/h | EER |
| **20** | 1.5 | 1.0 | 2.3 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 2.3 | 1.7 | 3.9 | | | | | | | | | | | |
| | 3.5 | 3.2 | 7.4 | 8.1 | 0.85 | 5.2 | 90.1 | 2.80 | | | | | | |
| **30** | 1.5 | 0.9 | 2.1 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 2.3 | 1.7 | 3.9 | 9.3 | 0.89 | 6.3 | 93.3 | 3.07 | 14.2 | 8.8 | 0.62 | 0.62 | 16.3 | 22.8 |
| | 3.5 | 3.0 | 6.9 | 9.3 | 0.91 | 6.2 | 93.3 | 2.99 | 14.3 | 9.0 | 0.63 | 0.58 | 16.3 | 24.6 |
| **40** | 1.5 | 0.9 | 2.1 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 2.3 | 1.6 | 3.7 | 10.3 | 0.92 | 7.1 | 96.0 | 3.28 | 13.5 | 8.6 | 0.63 | 0.68 | 15.8 | 19.7 |
| | 3.5 | 2.9 | 6.7 | 10.6 | 0.94 | 7.4 | 96.8 | 3.30 | 13.9 | 8.8 | 0.63 | 0.64 | 16.1 | 21.7 |
| **50** | 1.5 | 0.8 | 1.8 | 11.0 | 0.94 | 7.8 | 97.9 | 3.43 | 12.5 | 8.1 | 0.65 | 0.78 | 15.2 | 15.9 |
| | 2.3 | 1.5 | 3.5 | 11.3 | 0.95 | 8.1 | 98.9 | 3.49 | 12.9 | 8.3 | 0.65 | 0.75 | 15.4 | 17.2 |
| | 3.5 | 2.7 | 6.2 | 11.9 | 0.97 | 8.6 | 100.3 | 3.59 | 13.4 | 8.6 | 0.64 | 0.70 | 15.8 | 19.2 |
| **60** | 1.5 | 0.8 | 1.8 | 12.2 | 0.98 | 8.9 | 101.4 | 3.68 | 11.9 | 7.9 | 0.66 | 0.85 | 14.8 | 13.9 |
| | 2.3 | 1.4 | 3.2 | 12.6 | 0.99 | 9.2 | 102.3 | 3.74 | 12.2 | 8.0 | 0.66 | 0.82 | 15.0 | 14.9 |
| | 3.5 | 2.6 | 6.0 | 13.2 | 1.01 | 9.7 | 103.8 | 3.84 | 12.7 | 8.3 | 0.65 | 0.77 | 15.4 | 16.5 |
| **70** | 1.5 | 0.7 | 1.6 | 13.5 | 1.01 | 10.1 | 104.8 | 3.92 | 11.3 | 7.6 | 0.67 | 0.92 | 14.4 | 12.2 |
| | 2.3 | 1.4 | 3.2 | 13.9 | 1.02 | 10.4 | 105.8 | 3.98 | 11.6 | 7.8 | 0.67 | 0.89 | 14.6 | 13.0 |
| | 3.5 | 2.5 | 5.8 | 14.4 | 1.04 | 10.9 | 107.3 | 4.07 | 12.1 | 8.0 | 0.67 | 0.85 | 14.9 | 14.2 |
| **80** | 1.5 | 0.7 | 1.6 | 14.9 | 1.07 | 11.2 | 108.5 | 4.09 | 10.7 | 7.4 | 0.69 | 1.00 | 14.1 | 10.7 |
| | 2.3 | 1.3 | 3.0 | 15.2 | 1.08 | 11.5 | 109.3 | 4.12 | 11.0 | 7.6 | 0.69 | 0.95 | 14.2 | 11.5 |
| | 3.5 | 2.5 | 5.8 | 15.6 | 1.10 | 11.8 | 110.4 | 4.17 | 11.3 | 7.7 | 0.68 | 0.92 | 14.5 | 12.2 |
| **90** | 1.5 | 0.6 | 1.4 | 16.2 | 1.12 | 12.4 | 112.2 | 4.24 | 10.2 | 7.3 | 0.72 | 1.08 | 13.9 | 9.4 |
| | 2.3 | 1.3 | 3.0 | 16.5 | 1.14 | 12.6 | 112.8 | 4.25 | 10.3 | 7.4 | 0.72 | 1.03 | 13.9 | 10.0 |
| | 3.5 | 2.4 | 5.5 | 16.7 | 1.15 | 12.8 | 113.5 | 4.26 | 10.6 | 7.5 | 0.71 | 1.00 | 14.0 | 10.6 |
| **100** | 1.5 | 0.6 | 1.4 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 2.3 | 1.2 | 2.8 | | | | | | 9.6 | 7.1 | 0.74 | 1.12 | 13.5 | 8.6 |
| | 3.5 | 2.3 | 5.3 | | | | | | 9.8 | 7.1 | 0.73 | 1.09 | 13.5 | 9.0 |
| **110** | 1.5 | 0.5 | 1.2 | | | | | | Operation not recommended | | | | | |
| | 2.3 | 1.1 | 2.5 | | | | | | 8.8 | 6.7 | 0.76 | 1.21 | 12.9 | 7.3 |
| | 3.5 | 2.2 | 5.1 | | | | | | 9.0 | 6.8 | 0.76 | 1.18 | 13.0 | 7.7 |
| **120** | 1.5 | 0.5 | 1.2 | | | | | | Operation not recommended | | | | | |
| | 2.3 | 1.1 | 2.5 | | | | | | 7.9 | 6.4 | 0.80 | 1.31 | 12.4 | 6.0 |
| | 3.5 | 2.1 | 4.9 | | | | | | 8.1 | 6.5 | 0.80 | 1.27 | 12.4 | 6.4 |

6/20/11

Contractor: _____ P.O.: _____

Engineer: _____

Project Name: _____ Unit Tag: _____



# GCL*15 - Performance Data

## 3-Speed ECM (450 cfm)

| EWT °F | Flow GPM | WPD | | HEATING - EAT 70°F | | | | | COOLING - EAT 80/67°F | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PSI | FT | HC Mbtu/h | Power kW | HE Mbtu/h | LAT °F | COP | TC Mbtu/h | SC MBtu/h | S/T Ratio | Power kW | HR MBtu/h | EER |
| 20 | 2.0 | 1.5 | 3.5 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 3.0 | 5.1 | 11.8 | | | | | | | | | | | |
| | 4.5 | 6.1 | 14.2 | 9.7 | 1.05 | 6.2 | 88.0 | 2.72 | | | | | | |
| 30 | 2.0 | 1.5 | 3.5 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 3.0 | 5.0 | 11.6 | 12.5 | 1.10 | 8.8 | 93.8 | 3.33 | 17.0 | 11.9 | 0.70 | 0.71 | 19.4 | 23.7 |
| | 4.5 | 6.0 | 13.9 | 11.1 | 1.08 | 7.4 | 90.8 | 3.02 | 17.2 | 12.2 | 0.71 | 0.67 | 19.5 | 25.6 |
| 40 | 2.0 | 1.4 | 3.2 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 3.0 | 4.9 | 11.3 | 13.5 | 1.11 | 9.7 | 95.8 | 3.55 | 16.9 | 11.8 | 0.70 | 0.78 | 19.6 | 21.7 |
| | 4.5 | 5.9 | 13.6 | 13.1 | 1.11 | 9.4 | 95.0 | 3.48 | 17.2 | 12.0 | 0.70 | 0.73 | 19.7 | 23.7 |
| 50 | 2.0 | 1.4 | 3.2 | 14.1 | 1.12 | 10.3 | 97.0 | 3.70 | 16.7 | 11.7 | 0.70 | 0.88 | 19.7 | 18.9 |
| | 3.0 | 4.8 | 11.1 | 14.5 | 1.12 | 10.7 | 97.9 | 3.79 | 16.9 | 11.7 | 0.69 | 0.84 | 19.8 | 20.1 |
| | 4.5 | 5.8 | 13.4 | 15.2 | 1.13 | 11.3 | 99.2 | 3.92 | 17.3 | 11.8 | 0.69 | 0.79 | 19.9 | 22.0 |
| 60 | 2.0 | 1.3 | 3.0 | 15.2 | 1.13 | 11.4 | 99.3 | 3.95 | 15.7 | 11.5 | 0.74 | 0.97 | 19.0 | 16.2 |
| | 3.0 | 4.7 | 10.9 | 15.7 | 1.13 | 11.8 | 100.3 | 4.05 | 15.8 | 11.6 | 0.73 | 0.93 | 19.0 | 17.0 |
| | 4.5 | 5.7 | 13.2 | 16.4 | 1.14 | 12.5 | 101.7 | 4.20 | 16.1 | 11.7 | 0.73 | 0.88 | 19.1 | 18.4 |
| 70 | 2.0 | 1.3 | 3.0 | 16.3 | 1.14 | 12.4 | 101.6 | 4.19 | 14.6 | 11.4 | 0.78 | 1.05 | 18.2 | 13.8 |
| | 3.0 | 4.6 | 10.6 | 16.8 | 1.14 | 12.9 | 102.7 | 4.31 | 14.7 | 11.5 | 0.78 | 1.02 | 18.2 | 14.5 |
| | 4.5 | 5.5 | 12.7 | 17.6 | 1.15 | 13.7 | 104.3 | 4.49 | 14.9 | 11.6 | 0.77 | 0.97 | 18.2 | 15.5 |
| 80 | 2.0 | 1.2 | 2.8 | 18.3 | 1.14 | 14.4 | 105.7 | 4.71 | 15.1 | 10.9 | 0.72 | 1.15 | 19.1 | 13.2 |
| | 3.0 | 4.5 | 10.4 | 18.7 | 1.15 | 14.8 | 106.6 | 4.77 | 15.3 | 11.0 | 0.72 | 1.10 | 19.1 | 14.0 |
| | 4.5 | 5.4 | 12.5 | 19.3 | 1.16 | 15.3 | 107.7 | 4.87 | 15.6 | 11.1 | 0.71 | 1.06 | 19.2 | 14.7 |
| 90 | 2.0 | 1.2 | 2.8 | 20.3 | 1.14 | 16.4 | 109.8 | 5.22 | 15.7 | 10.4 | 0.66 | 1.25 | 19.9 | 12.5 |
| | 3.0 | 4.4 | 10.2 | 20.6 | 1.16 | 16.7 | 110.5 | 5.23 | 15.9 | 10.5 | 0.66 | 1.19 | 20.0 | 13.3 |
| | 4.5 | 5.3 | 12.2 | 20.9 | 1.17 | 17.0 | 111.1 | 5.25 | 16.2 | 10.6 | 0.65 | 1.16 | 20.2 | 14.1 |
| 100 | 2.0 | 1.2 | 2.8 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 3.0 | 4.3 | 9.9 | | | | | | 15.0 | 10.1 | 0.68 | 1.32 | 19.4 | 11.4 |
| | 4.5 | 5.2 | 12.0 | | | | | | 15.2 | 10.2 | 0.67 | 1.27 | 19.5 | 11.9 |
| 110 | 2.0 | 1.1 | 2.5 | | | | | | Operation not recommended | | | | | |
| | 3.0 | 4.2 | 9.7 | | | | | | 13.8 | 9.7 | 0.70 | 1.43 | 18.7 | 9.7 |
| | 4.5 | 5.1 | 11.8 | | | | | | 14.1 | 9.8 | 0.69 | 1.39 | 18.9 | 10.1 |
| 120 | 2.0 | 1.1 | 2.5 | | | | | | Operation not recommended | | | | | |
| | 3.0 | 4.1 | 9.5 | | | | | | 12.7 | 9.3 | 0.73 | 1.56 | 18.0 | 8.1 |
| | 4.5 | 5.0 | 11.6 | | | | | | 13.0 | 9.4 | 0.73 | 1.52 | 18.2 | 8.5 |

6/10/13

Contractor: _____ P.O.: _____

Engineer: _____

Project Name: _____ Unit Tag: _____



GEOSTAR

# GCL*18 - Performance Data

## 3-Speed ECM (600 cfm)

| EWT °F | Flow GPM | WPD | | HEATING - EAT 70°F | | | | | COOLING - EAT 80/67°F | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PSI | FT | HC Mbtu/h | Power kW | HE Mbtu/h | LAT °F | COP | TC Mbtu/h | SC MBtu/h | S/T Ratio | Power kW | HR MBtu/h | EER |
| 20 | 3.0 | 3.3 | 7.6 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 4.0 | 5.4 | 12.5 | | | | | | | | | | | |
| | 5.5 | 9.2 | 21.3 | 11.5 | 1.32 | 7.0 | 89.2 | 2.55 | | | | | | |
| 30 | 3.0 | 3.2 | 7.4 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 4.0 | 5.3 | 12.2 | 14.1 | 1.34 | 9.5 | 94.2 | 3.09 | 20.2 | 12.6 | 0.62 | 0.93 | 23.4 | 21.7 |
| | 5.5 | 9.0 | 20.8 | 13.2 | 1.35 | 8.5 | 92.4 | 2.85 | 20.5 | 12.8 | 0.63 | 0.88 | 23.5 | 23.4 |
| 40 | 3.0 | 3.1 | 7.2 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 4.0 | 5.1 | 11.8 | 15.6 | 1.39 | 10.8 | 96.9 | 3.28 | 20.3 | 13.2 | 0.65 | 0.98 | 23.6 | 20.6 |
| | 5.5 | 9.1 | 21.0 | 15.4 | 1.41 | 10.6 | 96.5 | 3.20 | 20.5 | 13.4 | 0.65 | 0.94 | 23.7 | 21.9 |
| 50 | 3.0 | 3.0 | 6.9 | 16.9 | 1.44 | 12.0 | 99.3 | 3.43 | 20.2 | 13.8 | 0.68 | 1.06 | 23.8 | 19.0 |
| | 4.0 | 5.0 | 11.6 | 17.2 | 1.45 | 12.2 | 99.8 | 3.47 | 20.3 | 13.9 | 0.68 | 1.04 | 23.9 | 19.6 |
| | 5.5 | 8.9 | 20.6 | 17.6 | 1.46 | 12.6 | 100.5 | 3.53 | 20.5 | 14.0 | 0.68 | 1.00 | 23.9 | 20.6 |
| 60 | 3.0 | 2.9 | 6.7 | 18.7 | 1.50 | 13.6 | 102.7 | 3.66 | 18.9 | 13.5 | 0.71 | 1.18 | 22.9 | 16.1 |
| | 4.0 | 4.8 | 11.1 | 19.0 | 1.50 | 13.9 | 103.2 | 3.70 | 19.0 | 13.5 | 0.71 | 1.15 | 22.9 | 16.5 |
| | 5.5 | 8.6 | 19.9 | 19.5 | 1.51 | 14.3 | 104.0 | 3.77 | 19.1 | 13.6 | 0.71 | 1.11 | 22.9 | 17.3 |
| 70 | 3.0 | 2.8 | 6.5 | 20.6 | 1.56 | 15.2 | 106.1 | 3.87 | 17.6 | 13.1 | 0.75 | 1.29 | 22.0 | 13.6 |
| | 4.0 | 4.7 | 10.9 | 20.9 | 1.56 | 15.5 | 106.7 | 3.92 | 17.6 | 13.1 | 0.75 | 1.26 | 21.9 | 14.0 |
| | 5.5 | 8.3 | 19.2 | 21.4 | 1.57 | 16.0 | 107.5 | 3.99 | 17.7 | 13.2 | 0.74 | 1.21 | 21.9 | 14.6 |
| 80 | 3.0 | 2.7 | 6.2 | 21.8 | 1.56 | 16.4 | 108.3 | 4.08 | 16.5 | 12.7 | 0.77 | 1.44 | 21.4 | 11.5 |
| | 4.0 | 4.5 | 10.4 | 22.1 | 1.58 | 16.7 | 109.0 | 4.11 | 16.6 | 12.8 | 0.77 | 1.37 | 21.3 | 12.1 |
| | 5.5 | 8.0 | 18.5 | 22.5 | 1.59 | 17.1 | 109.7 | 4.15 | 16.8 | 12.8 | 0.76 | 1.33 | 21.4 | 12.7 |
| 90 | 3.0 | 2.6 | 6.0 | 23.0 | 1.57 | 17.6 | 110.6 | 4.29 | 15.4 | 12.3 | 0.80 | 1.56 | 20.7 | 9.8 |
| | 4.0 | 4.3 | 9.9 | 23.4 | 1.59 | 17.9 | 111.3 | 4.30 | 15.6 | 12.4 | 0.79 | 1.49 | 20.7 | 10.5 |
| | 5.5 | 7.7 | 17.8 | 23.7 | 1.61 | 18.2 | 111.9 | 4.31 | 15.9 | 12.5 | 0.78 | 1.44 | 20.9 | 11.1 |
| 100 | 3.0 | 2.5 | 5.8 | Operation not recommended | | | | | Operation not recommended | | | | | |
| | 4.0 | 4.2 | 9.7 | | | | | | 14.6 | 11.8 | 0.81 | 1.63 | 20.1 | 9.0 |
| | 5.5 | 7.5 | 17.3 | | | | | | 14.8 | 11.9 | 0.81 | 1.58 | 20.2 | 9.4 |
| 110 | 3.0 | 2.4 | 5.5 | | | | | | Operation not recommended | | | | | |
| | 4.0 | 4.0 | 9.2 | | | | | | 13.4 | 11.2 | 0.84 | 1.76 | 19.4 | 7.6 |
| | 5.5 | 7.2 | 16.6 | | | | | | 13.7 | 11.4 | 0.83 | 1.71 | 19.5 | 8.0 |
| 120 | 3.0 | 2.3 | 5.3 | | | | | | Operation not recommended | | | | | |
| | 4.0 | 3.9 | 9.0 | | | | | | 12.0 | 10.8 | 0.90 | 1.92 | 18.5 | 6.2 |
| | 5.5 | 6.9 | 15.9 | | | | | | 12.2 | 10.9 | 0.89 | 1.86 | 18.6 | 6.6 |

6/10/13

Contractor: _____ P.O.: _____

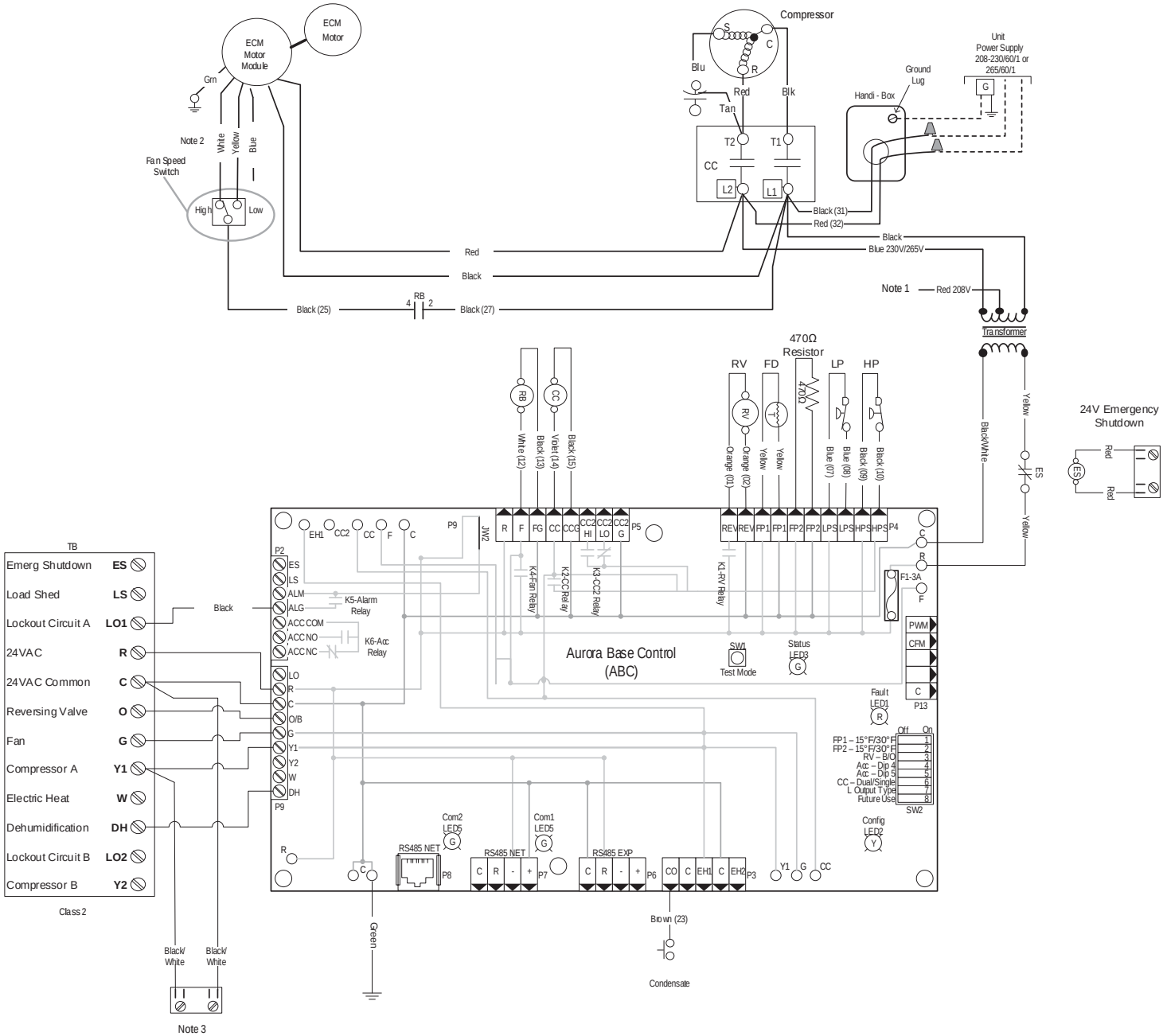
Engineer: _____

Project Name: _____ Unit Tag: _____

**Aston Low Sill Series Commercial**
**Geothermal/Water Source Heat Pumps**
**0.75-1.5 Tons, 60Hz**

# Wiring Schematics

**ABC - ECM with Remote Stat - 208-230-265/60/1**



# Wiring Schematics cont.

## ABC - ECM with Remote Stat - 208-230-265/60/1

### Notes:

1 – Swap blue and red leads for 208V operation.
2 – Factory wired. Refer to blower table settings.
3 - When field installed 24VAC motorized valve is used, connect to C and Y.

| Accessory Relay | | |
|---|---|---|
| Operation | SW2-4 | SW2-5 |
| Cycle with Blower | On | On |
| Cycle with Compressor | Off | Off |
| Water Valve Slow Open | On | Off |
| Outdoor Air Damper | Off | On |

| Aurora Timing Events | | |
|---|---|---|
| Event | Normal Mode | Test Mode |
| Random Start Delay | 5 to 80 seconds | 1 second |
| Compressor On Delay | 5 seconds | < 1 second |
| Compressor Minimum On Time | 2 minutes | 5 seconds |
| Compressor Short Cycle Delay | 4 minutes | 15 seconds |
| Blower Off Delay | 30 seconds | 2 seconds |
| Fault Recognition Delay – High Pressure | Less than 1 second | Less than 1 second |
| Start-Up Bypass – Low Pressure | 2 minutes | 30 seconds |
| Fault Recognition Delay – Low Pressure | 30 seconds | 30 seconds |
| Start-Up Bypass – Low Water/Air Coil Limit | 2 minutes | 30 seconds |
| Fault Recognition Delay – Low Water/Air Coil Limit | 30 seconds | 30 seconds |
| Fault Recognition Delay – Condensate Overflow | 30 seconds | 30 seconds |
| Thermostat Call Recognition Time | 2 seconds | 2 seconds |
| Auxiliary Heat Staging Delay | 5 minutes | 20 seconds |
| Emergency Heat Staging Delay | 2 minutes | 7.5 seconds |
| Water Valve Slow Open Delay | 90 seconds | 90 seconds |
| Reheat Delay | 30 seconds | 30 seconds |

| Aurora LED Flash Codes | |
|---|---|
| Slow Flash | 1 second on and 1 second off |
| Fast Flash | 100 milliseconds on and 100 milliseconds off |
| Flash Code | 100 milliseconds on and 400 milliseconds off with a 2 second pause before repeating |

| Random Start Delay | |
|---|---|
| Status LED (LED1, Green) | Fast Flash |
| Configuration LED (LED2, Yellow) | Fast Flash |
| Fault LED (LED3, Red) | Fast Flash |

| Status LED (LED1, Green) | | Configuration LED (LED2, Yellow) | | Fault LED (LED3, Red) | |
|---|---|---|---|---|---|
| Normal Mode | ON | No Software Override | Flash ECM Setting | Normal Mode | OFF |
| Control is Non-Functional | OFF | DIP Switch Override | Slow Flash | Input Fault Lockout | Flash Code 1 |
| Test Mode | Slow Flash | ECM Configure Mode | Fast Flash | High Pressure Lockout | Flash Code 2 |
| Lockout Active | Fast Flash | Reset Configure Mode | Off | Low Pressure Lockout | Flash Code 3 |
| Dehumidification Mode | Flash Code 2 | | | Low Air Coil Limit Lockout - FP2 | Flash Code 4 |
| Reserved | Flash Code 3 | | | Low Water Coil Limit Lockout - FP1 | Flash Code 5 |
| Reserved | Flash Code 4 | | | Reserved | Flash Code 6 |
| Load Shed | Flash Code 5 | | | Condensate Overflow Lockout | Flash Code 7 |
| ESD | Flash Code 6 | | | Over/Under Voltage Shutdown | Flash Code 8 |
| Reserved | Flash Code 7 | | | Reserved | Flash Code 9 |
| | | | | Reserved | Flash Code 10 |
| | | | | Air/Water Coil Limit Sensor Error | Flash Code 11 |

| Chart 1 | | |
|---|---|---|
| Blower Settings | | |
| | High | Low |
| GCL*09 | Yellow | White |
| GCL*12 | Blue | Yellow |
| GCL*15 | Yellow | White |
| GCL*18 | Blue | Yellow |

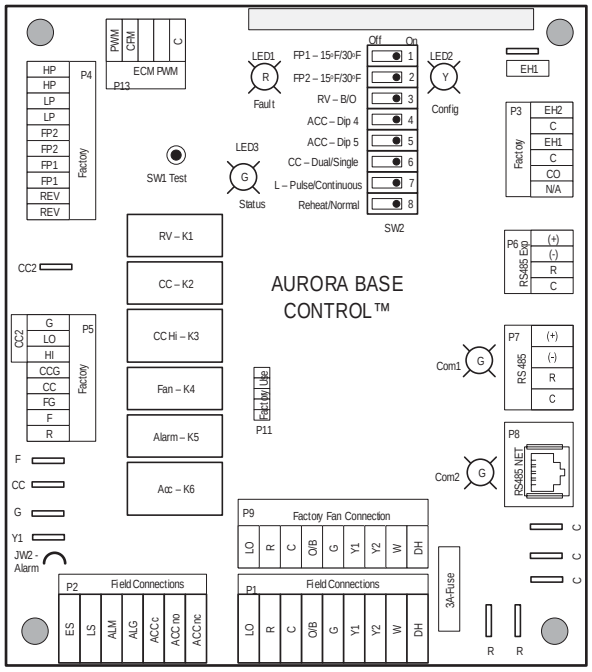
### Legend

Factory Low Voltage Wiring
Factory Line Voltage Wiring
Field Low Voltage Wiring
Field Line Voltage Wiring
Optional Block
DC Voltage PCB Traces
Field Zone Sensor Wiring
Internal Junction
Quick Connect Terminal
L1 Field Wiring Lug
Ground
Relay Contacts – N.O., N.C.
Capacitor
Fuse
Temperature Switch

Thermistor
Relay Coil
Switch - Condensate Overflow
Switch - High pressure
Switch - Low pressure
3 2 1 Polarized connector
G Light Emitting Diode - Green
Y Light Emitting Diode - Yellow
R Light Emitting Diode - Red
Wire nut

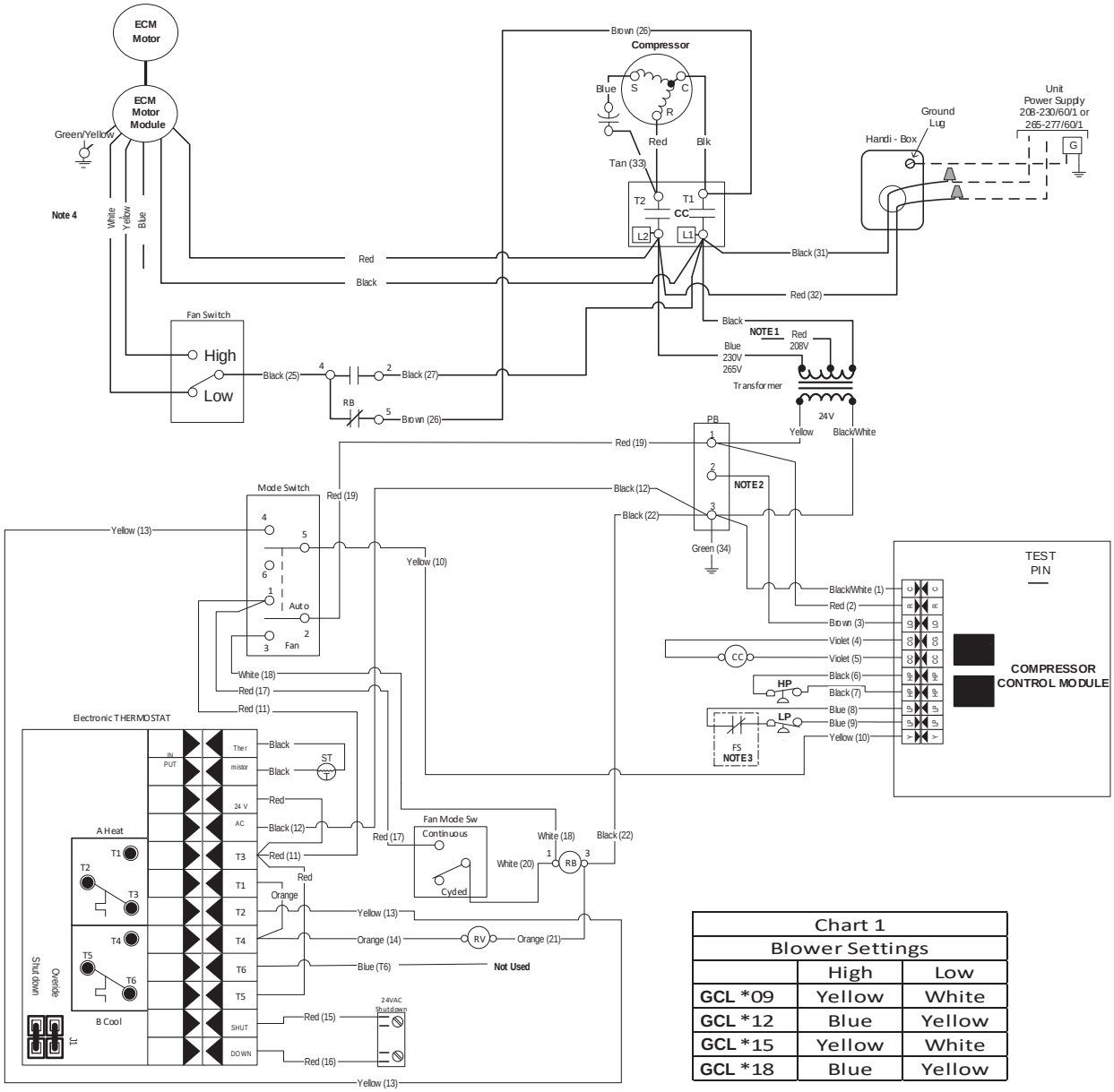
CC – Compressor Contactor
CO – Condensate Overflow Sensor
ES – Emergency Shutdown
HP – High Pressure Switch
LP – Low Pressure Switch
FD – Freeze Detection Sensor
F1 – Fuse

SW1 – Push button
SW2 – DIP package 8 position
PB – Power Block
RB – Blower Relay
RV – Reversing Valve Coil



# Wiring Schematics cont.

### CCM - with ECM Motor and Unit Mounted Thermostat - 208-230-265/60/1




| Chart 1 | | |
|---|---|---|
| Blower Settings | | |
| | High | Low |
| GCL *09 | Yellow | White |
| GCL *12 | Blue | Yellow |
| GCL *15 | Yellow | White |
| GCL *18 | Blue | Yellow |

## Legend

- Factory low voltage wiring
- Factory line voltage wiring
- Field low voltage wiring
- Field line voltage wiring
- Quick connect terminal
- Wire nut

CC - Compressor Contactor
DT - Damper Terminal Block
FS - Freeze Sensing Device
HP - High Pressure Switch
LP - Low Pressure Switch
PB - Power Block
RB - Blower Relay
RV - Reversing Valve Coil
ST - Entering Air Temperature Sensor

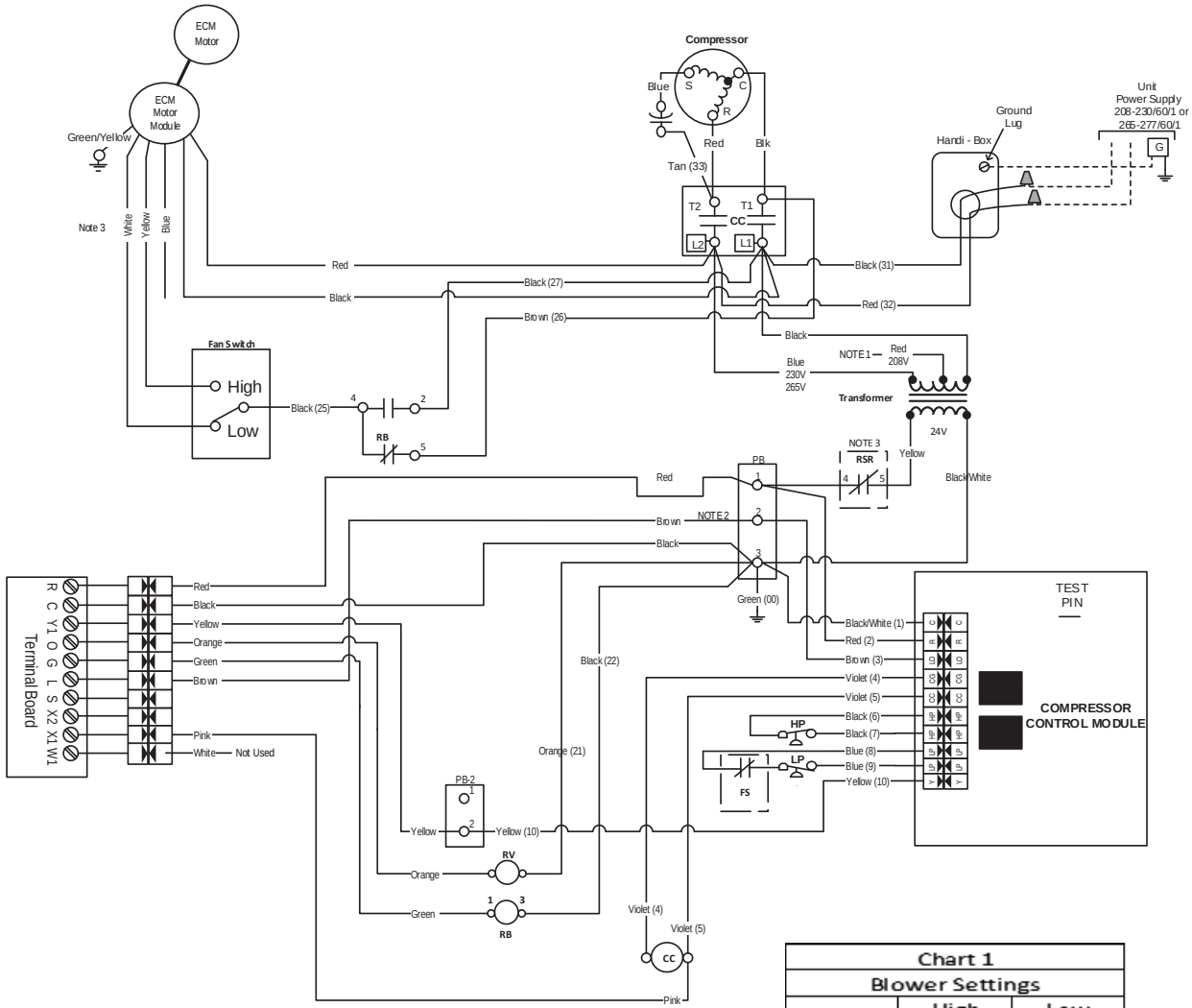
- Fieldwire lug
- Earth Ground
- Relay Contacts - N.O., N.C.
- Polarized connector

- Switch - High Pressure
- Switch - Low Pressure
- Relay coil
- Capacitor
- Thermistor
- Temperature Switch

Notes:
1. Switch Red and Blue wires for 208 volt operation
2. Terminal C of 24 V PB is used as "L" output for Brown wire 3 for Lockout.
3. Optional field installed freeze sensing device.
4. Factory wired. Refer to blower table settings.

# Wiring Schematics cont.

### CCM - Low Sill with Remote Stat and ECM Motor - 208-230-265/60/1




| Chart 1 | | |
|---|---|---|
| Blower Settings | | |
| | High | Low |
| GCL*09 | Yellow | White |
| GCL*12 | Blue | Yellow |
| GCL*15 | Yellow | White |
| GCL*18 | Blue | Yellow |

## Legend

- Factory low voltage wiring
- Factory line voltage wiring
- Factory low voltage wiring
- Factory line voltage wiring
- Quick connect terminal
- Wire nut

CC - Compressor Contactor
DT - Damper Terminal Block
FS - Freeze Sensing Device
HP - High Pressure Switch
LP - Low Pressure Switch
PB - Power Block
RB - Blower Relay
RSR – Remote Start/Stop Relay
RV - Reversing Valve Coil
ST - Entering Air Temperature Sensor

- L1 Wiring lug
- Ground
- Relay Contacts - N.O., N.C.

- HP Switch - High Pressure
- LP Switch - Low Pressure
- Relay coil
- Capacitor
- Thermistor
- Temperature Switch

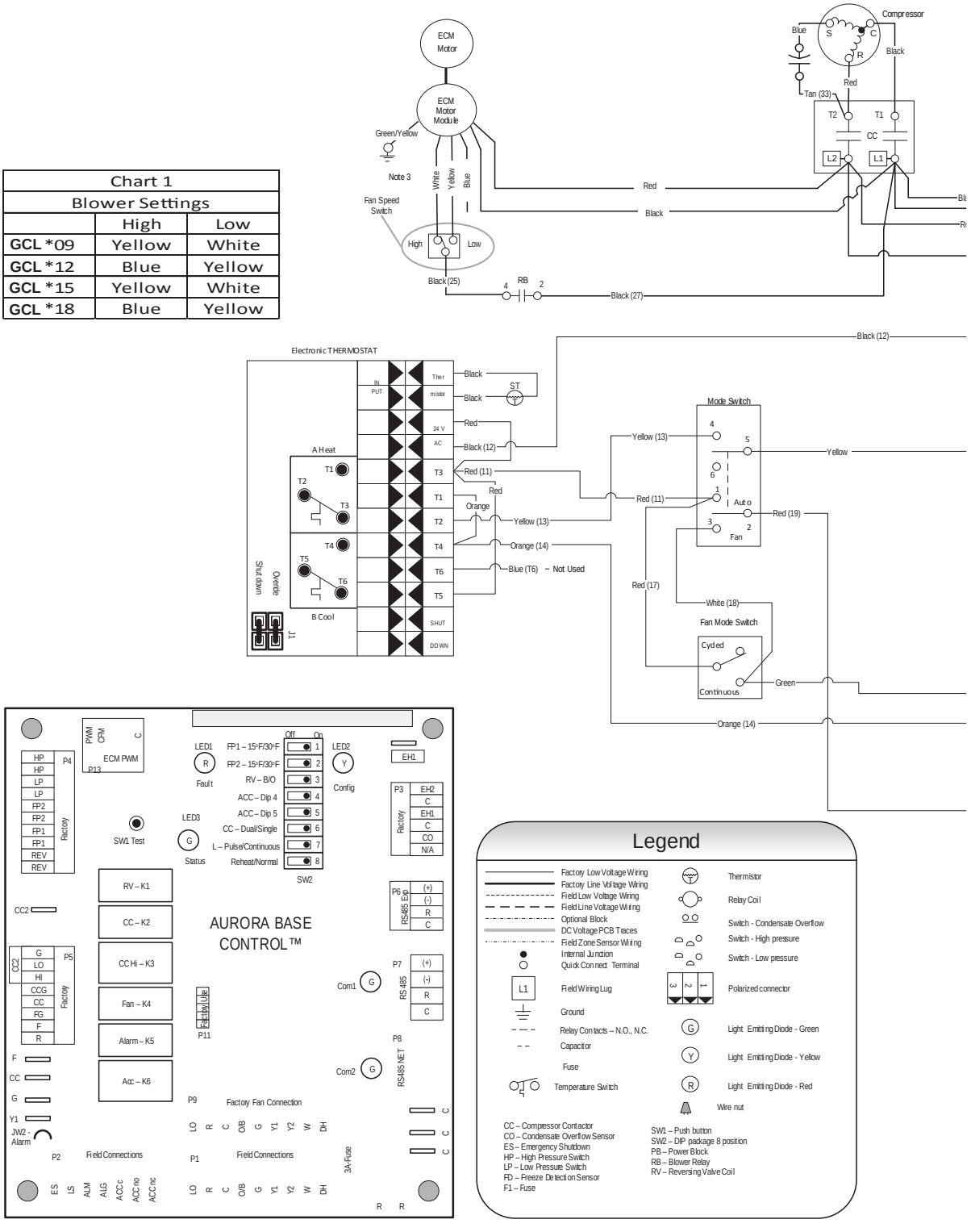
**Notes:**

1. Switch Red and Blue wires for 208 volt operation.
2. Terminal C of the 24V PB is used as "L" output for Brown wire 3 for Lockout.
3. Factory wired. Refer to blower table settings.

# Wiring Schematics cont.

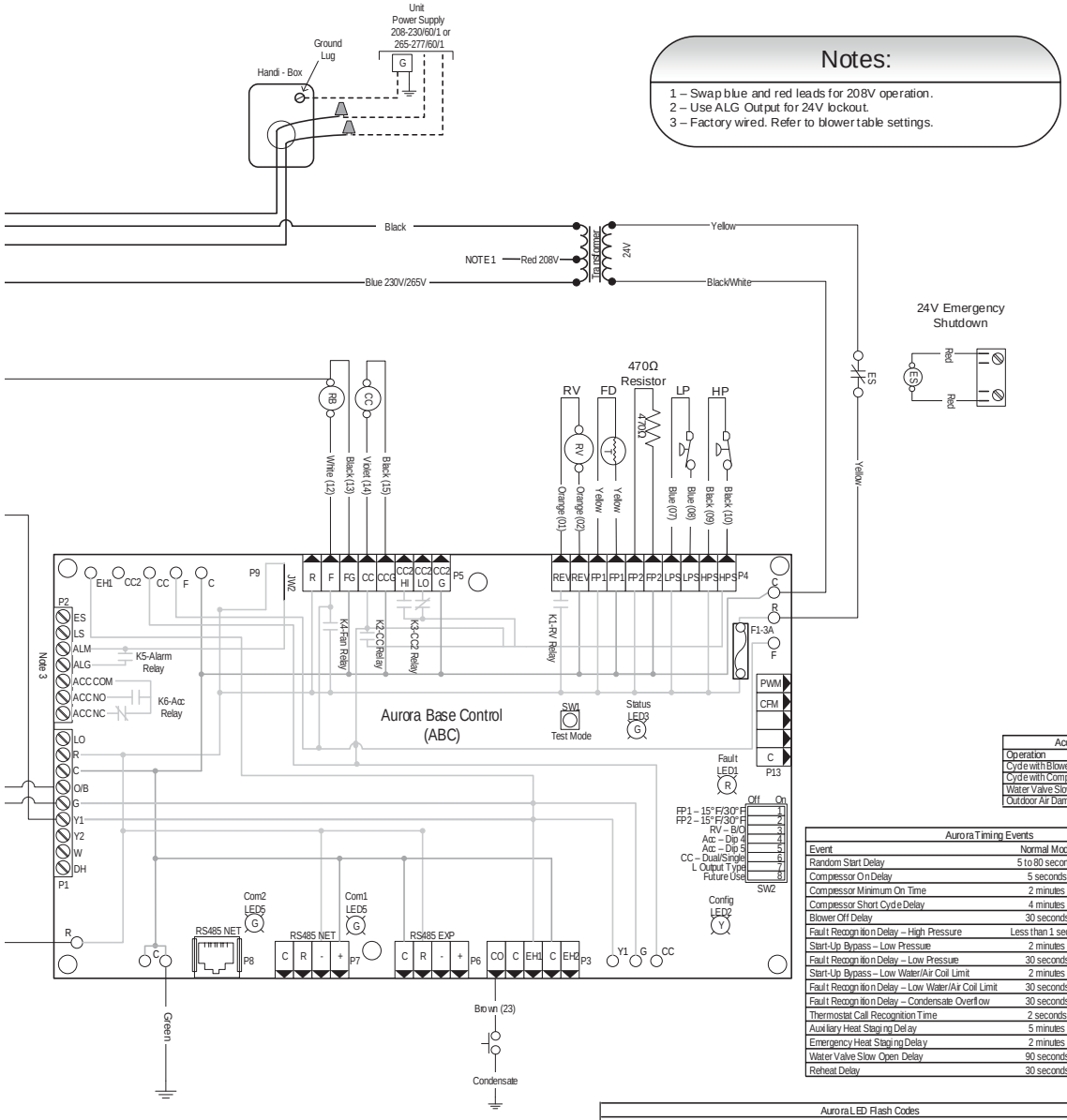
### ABC - with ECM Motor and Electronic Stat - 208-230-265/60/1

| Chart 1 | | |
|---|---|---|
| Blower Settings | | |
| | High | Low |
| GCL *09 | Yellow | White |
| GCL *12 | Blue | Yellow |
| GCL *15 | Yellow | White |
| GCL *18 | Blue | Yellow |



# Wiring Schematics cont.

### ABC - with ECM Motor and Electronic Stat - 208-230-265/60/1




**Notes:**

1 – Swap blue and red leads for 208V operation.
2 – Use ALG Output for 24V lockout.
3 – Factory wired. Refer to blower table settings.

| Accessory Relay | | |
|---|---|---|
| Operation | SW2-4 | SW2-5 |
| Cycle with Blower | On | On |
| Cycle with Compressor | Off | Off |
| Water Valve Slow Open | On | Off |
| Outdoor Air Damper | Off | On |

| Aurora Timing Events | | |
|---|---|---|
| Event | Normal Mode | Test Mode |
| Random Start Delay | 5 to 80 seconds | 1 second |
| Compressor On Delay | 5 seconds | < 1 second |
| Compressor Minimum On Time | 2 minutes | 5 seconds |
| Compressor Short Cycle Delay | 4 minutes | 15 seconds |
| Blower Off Delay | 30 seconds | 2 seconds |
| Fault Recognition Delay – High Pressure | Less than 1 second | Less than 1 second |
| Start-Up Bypass – Low Pressure | 2 minutes | 30 seconds |
| Fault Recognition Delay – Low Pressure | 30 seconds | 30 seconds |
| Start-Up Bypass – Low Water/Air Coil Limit | 2 minutes | 30 seconds |
| Fault Recognition Delay – Low Water/Air Coil Limit | 30 seconds | 30 seconds |
| Fault Recognition Delay – Condensate Overflow | 30 seconds | 30 seconds |
| Thermostat Call Recognition Time | 2 seconds | 2 seconds |
| Auxiliary Heat Staging Delay | 5 minutes | 20 seconds |
| Emergency Heat Staging Delay | 2 minutes | 7.5 seconds |
| Water Valve Slow Open Delay | 90 seconds | 90 seconds |
| Reheat Delay | 30 seconds | 30 seconds |

| Aurora LED Flash Codes | | | | | |
|---|---|---|---|---|---|
| Slow Flash | 1 second on and 1 second off | | | | |
| Fast Flash | 100 milliseconds on and 100 milliseconds off | | | | |
| Flash Code | 100 milliseconds on and 400 milliseconds off with a 2 second pause before repeating | | | | |
| Random Start Delay | | | | | |
| Status LED (LED1, Green) | Fast Flash | | | | |
| Configuration LED (LED2, Yellow) | Fast Flash | | | | |
| Fault LED (LED3, Red) | Fast Flash | | | | |
| Status LED (LED1, Green) | | Configuration LED (LED2, Yellow) | | Fault LED (LED3, Red) | |
| Normal Mode | ON | No Software Override | Flash ECM Setting | Normal Mode | OFF |
| Control is Non-Functional | OFF | DIP Switch Override | Slow Flash | Input Fault Lockout | Flash Code 1 |
| Test Mode | Slow Flash | ECM Configure Mode | Fast Flash | High Pressure Lockout | Flash Code 2 |
| Lockout Active | Fast Flash | Reset Configure Mode | Off | Low Pressure Lockout | Flash Code 3 |
| Dehumidification Mode | Flash Code 2 | | | Low Air Coil Limit Lockout - FP2 | Flash Code 4 |
| Reserved | Flash Code 3 | | | Low Water Coil Limit Lockout - FP1 | Flash Code 5 |
| Reserved | Flash Code 4 | | | Reserved | Flash Code 6 |
| Load Shed | Flash Code 5 | | | Condensate Overflow Lockout | Flash Code 7 |
| ESD | Flash Code 6 | | | Over/Under Voltage Shutdown | Flash Code 8 |
| Reserved | Flash Code 7 | | | Reserved | Flash Code 9 |
| | | | | Reserved | Flash Code 10 |
| | | | | Air/Water Coil Limit Sensor Error | Flash Code 11 |

# Engineering Guide Specifications

## General

Furnish and install GeoStar Water Source Heat Pumps, as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Chassis shall be installed with factory built cabinet or other custom cabinet approved by the manufacturer's engineering department. Chassis SHALL NOT be installed without an approved cabinet enclosure. Capacities and characteristics as listed in the schedule and the specifications that follow. The reverse cycle heating/cooling units shall be floor mounted console type with horizontal air inlet and up-flow air discharge. Units shall be AHRI/ISO 13256-1 certified and listed by a nationally recognized safety-testing laboratory or agency, such as ETL Testing Laboratory. Each unit shall be computer run-tested at the factory with conditioned water and operation verified to catalog data. Each unit shall be mounted on a pallet and shipped in a corrugated box or stretch-wrapped. The units shall be designed to operate with entering liquid temperature between 20°F and 120°F [-6.7°C and 48.9°C].

### Chassis and Cabinet

The cabinet shall be fabricated from heavy-gauge galvanized steel and finished with a beige textured epoxy powder coating on both sides for added protection. This corrosion protection system shall meet the stringent 1000 hour salt spray test per ASTM B117.

The cabinet shall be easily removable to allow for ease of service to the controls compartment, chassis, and piping. The top of the cabinet and grille is a horizontally flat (optional sloped) surface with a hinged control door cover. The return air filter shall be disposable type media.

The return and supply air sections are insulated with a 1/4 in. (6.4 mm) thick, dual density, 2 lb/ft$^3$ (32 kg/m$^3$) coated mat glass fiber with edges sealed or tucked under flanges to prevent the introduction of glass fibers into the discharge supply air through the aluminum grille. 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.

***Option: A Super Quiet Sound package*** shall include multi-density full coverage compressor blanket.

The drain pan shall be of stainless steel construction to inhibit corrosion and bacterial growth. Drain outlet shall be located on pan as to allow complete and unobstructed drainage of condensate. The unit as standard will be supplied with solid-state electronic condensate overflow protection with Aurora Base Control. Mechanical float switches WILL NOT be accepted. Condensate tube shall be constructed of stainless steel and have an internal factory installed condensate trap.

### Refrigerant Circuit

All units shall utilize the non-ozone depleting and low global warming potential refrigerant R-410A. All units shall contain a sealed refrigerant circuit including a hermetic motor-compressor, bi-directional thermostatic expansion valve, finned tube air-to-refrigerant heat exchanger, reversing valve, coaxial tube water-to-refrigerant heat exchanger, and service ports.

Compressors shall be high-efficiency single speed rotary type designed for heat pump duty and mounted on durometer grommets to provide vibration free compressor mounting. Compressor motors shall be single-phase PSC with external overload protection.

The air coil shall be sized for low-face velocity and constructed of lanced aluminum fins bonded to rifled aluminum tubes in a staggered pattern not less than three rows deep for enhanced performance.

***Option: AlumiSeal electro-coated air coil.***

The coaxial water-to-refrigerant heat exchanger shall be designed for low water pressure drop and constructed of a convoluted copper (cupronickel option) inner tube and a steel outer tube. Refrigerant to air heat exchangers shall utilize enhanced corrugated lanced aluminum fins and rifled aluminum tube construction rated to withstand 600 psig (4135 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 600 psig (4135 kPa) working refrigerant pressure and 450 psig (3101 kPa) working water pressure. The thermostatic expansion valve shall provide proper superheat over the entire liquid temperature range with minimal “hunting.” The valve shall operate bi-directionally without the use of check valves.

***Option: Cupronickel refrigerant to water heat exchanger*** shall be of copper-nickel inner water tube and steel refrigerant outer tube design, rated to withstand 600 psig (4135 kPa) working refrigerant pressure and 450 psig (3101 kPa) working water pressure. Water lines shall also be of cupronickel construction.

***Option: ThermaShield coated water-to-refrigerant heat exchanger,*** water lines and refrigerant suction lines shall be insulated to prevent condensation at low liquid temperatures below 50°F.

### Blower Motor and Assembly

The blower shall be a direct drive centrifugal type with a dynamically balanced wheel. The housing and wheel shall be designed for quiet, low outlet velocity operation. The blower housing shall be constructed of galvanized steel and shall be removable from the unit for servicing of the blower motor. The blower motor shall be a two-speed PSC or three-speed ECM type and shall be isolated from the housing by rubber grommets. The motor shall be permanently lubricated and have thermal overload protection.

### Electrical

A control box shall be located within the unit compressor compartment and shall contain a 50VA transformer, 24 Volt activated, 2 pole compressor contactor, and solid-state controller for complete unit operation. 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.

Unit mounted controls shall consist of switches for “OFF”, “FAN”, and “AUTO” or “HEAT/COOL”. An additional switch is provided for blower speed setting of “HI” or “LO”. The unit shall be equipped with a blower switch on the side of the control to provide “CONTINUOUS” or “CYCLED” blower operation. “CYCLED” blower will turn the blower on with the compressor. A unit-mounted

# Engineering Guide Specifications cont.

electronic thermostat with a remote electronic thermistor located in the return air will control compressor operation in heating and cooling modes. Unit mounted thermostat shall be the standard thermostat option. All unit mounted thermostats shall be auto changeover. Manual changeover WILL NOT be accepted. Electromechanical operation WILL NOT be accepted.

## Controls

Standard: A compressor control module (CCM) shall be included to disable compressor operation in the event of a trip of any of the safety switches and to send a signal to activate a fault indicator light at the thermostat. The CCM shall be capable of being reset from the thermostat or from the unit main disconnect switch. A terminal block with screw terminals shall be provided for field connection of all low-voltage wiring.

An Aurora microprocessor-based controller that interfaces with a multi-stage electronic thermostat to monitor and control unit operation shall be provided. The control shall provide operational sequencing, blower speed control, high and low pressure switch monitoring, freeze detection, condensate overflow sensing, lockout mode control, LED status and fault indicators, fault memory, field selectable options and accessory output. The control shall provide fault retry three times before locking out to limit nuisance trips.

A detachable terminal block with screw terminals will be provided for field control wiring. All units shall have knockouts for entrance of low and line voltage wiring. The blower motor and control box shall be harness plug wired for easy removal.

Option: Remote mounted thermostat is available for CCM and Aurora Base Control. A terminal block with screw terminals will be provided for field control wiring.

### Piping

Supply and return water connections shall be 1/2 in. [12.7 mm] FPT copper threaded fittings. All water piping shall be insulated to prevent condensation at low liquid temperatures.

A stainless steel tube stubbed out from the chassis is provided for condensate drain attachment. A short piece of polyvinyl hose is supplied to assist in adapting to drain.

## Accessories

### Hose Kits – Ball Valves (field-installed)

A flexible steel braid hose featuring Kevlar® reinforced EPDM core with ANSI 302/304 stainless steel outer braid and fire rated materials per ASTM E 84-00 (NFPA 255, ANSI/UL 723 & UBC 8-1). Ball valve at one end; swivel connector with adapter at the other end (swivel to adapter connection via fiber or EPDM gasket). Swivel connection provides union between heat pump and piping system. The hoses feature brass fittings, stainless steel ferrules. A full port ball valve shall be provided with integral P/T (pressure/temperature) port on supply hose. Specifications: Temperature range of 35°F [2°C] to 180°F [82°C]. Max. working pressure of 400 psi [2757 kPa] for 1/2 in. and 3/4 in. hose kits; max. working pressure of 350 psi [kPa] for 1 in. and 1-1/4 in. hose kits.

### Hose Kits – Automatic Balancing and Ball Valves

(field-installed)

A flexible steel braid hose featuring Kevlar® reinforced EPDM core with ANSI 302/304 stainless steel outer braid and fire rated materials per ASTM E 84-00 (NFPA 255, ANSI/UL 723 & UBC 8-1). Ball valve at one end; swivel connector with adapter at the other end (swivel to adapter connection via fiber or EPDM gasket). Swivel connection provides union between heat pump and piping system. The hoses feature brass fittings, stainless steel ferrules. A full port ball valve shall be provided with integral P/T (pressure/temperature) port on supply hose and automatic balancing valve with integral P/T ports and full port ball valve on return hose.

Specifications:

- Temperature range of 35°F [2°C] to 180°F [82°C].
- Max. working pressure of 400 psi [2757 kPa] for 1/2 in. and 3/4 in. hose kits; max. working pressure of 350 psi [2413 kPa] for 1 in. and 1-1/4 in. hose kits.
- Minimum burst pressure of four times working pressure.

### Hose Kits – Automatic Balancing and Ball Valves with 'Y' strainer (field-installed)

A flexible steel braid hose featuring Kevlar® reinforced EPDM core with ANSI 302/304 stainless steel outer braid and fire rated materials per ASTM E 84-00 (NFPA 255, ANSI/UL 723 & UBC 8-1). Ball valve at one end; swivel connector with adapter at the other end (swivel to adapter connection via fiber or EPDM gasket). Swivel connection provides union between heat pump and piping system. The hoses feature brass fittings, stainless steel ferrules. A "y" strainer is provided on one end for fluid straining and integral "blowdown" valve. A full port ball valve shall be provided with integral P/T (pressure/temperature) port on supply hose and automatic balancing valve with integral P/T ports and full port ball valve on return hose.

Specifications:

- Temperature range of 35°F [2°C] to 180°F [82°C].
- Max. working pressure of 400 psi [2757 kPa] for 1/2 in. and 3/4 in. hose kits; max. working pressure of 350 psi [2413 kPa] for 1 in. and 1-1/4 in. hose kits.
- Minimum burst pressure of four times working pressure.

# Revision Guide

| Pages: | Description: | Date: | By: |
|---|---|---|---|
| Misc. | ECM Motor Changes | 15 Nov 2018 | JM |
| All | Released ABC Control Option | 01 Sept 2015 | MA |
| 19-20 | Updated Wiring Schematics | 11 May 2015 | MA |
| All | First Published | 10 Mar 2014 | DS |
| All | First Published | 11 Oct 2013 | DS |