
Comfort-Cire®

Century®

Submittal Data

HZS, WDG & TAC Series



Table of Contents

What's New with Comfort-Aire/Century's Digital Split Systems?.....3	Part Load Correction Factors.....19
iGate™ Communicating Controls4	Performance Data Selection Notes – vFlow.....20
vFlow™ Internal Variable Water Flow Control.....5	Performance Data.....22
How to Use This Catalog6	Physical Data.....30
HZS Design Features.....8	Electrical Data.....31
TAC Design Features.....11	Dimensional Data33
WDG Design Features12	Electrical Wiring Diagrams37
Unit Model Key14	Submittal Data38
Model Key, Reference Calculations & Legend....15	Accessories & Options.....39
About AHRI/ISO/ASHRAE 13256-116	Revision History40
AHRI/ISO/ASHRAE/ANSI 13256-1 Performance.17	
Full Load Correction Factors18	

What's New with Digital Split Systems?

Comfort-Aire/Century has invested years of experience, research and development into new technologies that set the Digital Split systems apart from the rest by delivering higher cost savings, more reliability and unparalleled comfort.

Building on the new Digital packaged line of products with iGate™ and vFlow™ technology, the Digital split system uses the same components in a more flexible configuration. The Digital split system compressor section can be coupled with Digital Air Handlers (WDG) and (TAC) furnace coils to achieve ultra-high efficiencies, while still providing the flexibility of an all-electric or dual fuel system and a remote compressor section location. Split systems are often used in areas where it would be difficult to install a packaged unit, such as in an attic, crawl space or even outdoors.

High Efficiency = Low Operating Cost

Digital split systems break new ground in efficiency by approaching 25.6 EER part load cooling and 4.3 COP part load heating for ground loop applications. Leveraging the next generation Copeland scroll compressor, variable speed ECM motor, low pressure- drop water-to-refrigerant heat exchanger and variable-speed internal pump / modulating valve, the Digital split systems have been optimized for maximum operating efficiency and lowest operating cost. The Hot-Water Generator further increases operating cost savings by pre-heating hot water for domestic use. Digital Split systems are one of the highest efficiency split heating and cooling systems you can buy.

iGate™ - Digitally Monitor, Control and Diagnose the System



With ground-breaking iGate™ -information gateway- as a standard feature on every unit, Digital Split systems represent a significant breakthrough in monitoring, controlling and diagnosing systems, leveraging the power of 2-way communication with four-wire connections.

The new DXM2 control - the brain of the system - takes input from sensors and smart components to "calculate and communicate to" the system how to operate. Since it is exchanging information instead of just signals, it displays information in plain English on a thermostat/service tool. Compared to old systems with antiquated settings / monitoring using switches/ LEDs, iGate™ represents a quantum leap in access to information and control of the system.

The iGate™ system uses a four-wire connection to connect the compressor section to the communicating thermostat AND Air Handler's AXM controls. This allows airflow configuration through the communicating thermostat and the ability to diagnose the system through the DXM2 or AXM controls.

In service mode, the system communicates not only the fault and possible causes, it also displays the operating conditions of the unit at the time of the fault, to aid in diagnosis.

vFlow™ Variable Water Flow

Built-in vFlow™ is enabled by iGate™, which facilitates intelligent communication between the thermostat, DXM2 control, sensors and internal water pump/valve to make true variable water flow a reality for the first time in geothermal units. Built-in water flow components means quicker, simpler, single and multi-unit installations. In closed loop applications, vFlow™ with variable speed pump saves 70-80% watts in part load compared to single speed water circulators. In open loop applications, vFlow™ with motorized modulating valve also saves watts off the well pump by limiting the flow to the required amount.



System reliability is significantly improved by varying the Waterflow to optimize extraction / absorption of heat and thus better maintaining refrigerant pressures.

ENERGY STAR® Most Efficient – Communicating AND Efficient (Application Pending)

Digital Split systems (HZS) have been recognized as ENERGY STAR Most Efficient 2018 for exceeding stringent efficiency requirements AND for meeting smart communication requirements. With these systems the customer is getting an EFFICIENT system and an INTELLIGENT system – buying a system can't get SMARTER than that!

Easy to Install, Easy to Service – A Technician's Dream Machine

Installations are easier and quicker with Digital Split systems with (1) vFlow™ built-in water flow vs. bulky external flow controllers / water flow components (2) iGate™ 4-wire connection between the compressor section, air handler and thermostat ; Also, system configuration (airflow, water aT, accessories) on the thermostat and (3) iGate™ Manual Operation from thermostat at start up to verify proper operation.



Service is even easier with (1) iGate™ Service Warning on the thermostat for homeowners to call the dealer with fault information (2) iGate™ Service Mode for dealers to see conditions (temperature, flow, input/output, configuration) at the time of fault, for better, quicker diagnosis (3) Easy Access to components with swing-out control board, easy-access panels, refrigerant/ water pressure Schrader ports at the front of the unit.

Comfort-Aire/Century has designed and built the EASIEST geothermal unit to install and service, period.

iGate™ Communicating Controls

iGate™ Information gateway to monitor, control and diagnose your system

The Digital Split Units are equipped with industry-first, iGate™ – Information Gateway – a 2-way communicating system that allows users to interact with their geothermal system in plain English AND delivers improved reliability and efficiency by precisely controlling smart variable speed components. iGate™ makes the Digital series the easiest geothermal products to install and service.

Monitor/Configure – Installers can configure Digital Split Units from the thermostat, including: Air flow, loop ΔT , water-flow option configuration, unit configuration, accessory configuration, and demand reduction (optional, to limit unit operation during peak times). Users can look up the current system status: temperature sensor readings and operational status of the blower and pump.

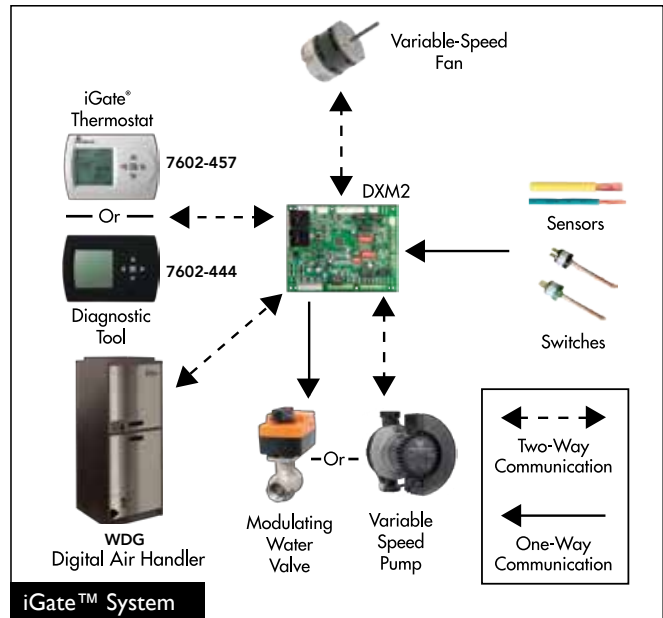
Precise Control - The new DXM2 board enables intelligent, 2-way communication between the DXM2 board and smart components like the communicating thermostat, fan motor, and water pump. The DXM2 control can also directly control the modulating valve and accepts various feedback/input. The Intelligent DXM2 board uses information received from the smart components and sensors to precisely control operation of the variable-speed fan and variable-speed water pump (or modulating valve) to deliver higher efficiency, reliability and increased comfort.

Diagnostics – iGate™ takes diagnosing geothermal units to the next level of simplicity, by providing a dashboard of system and fault information, in plain English, on the iGate thermostat/ service tool.

iGate™ Service Warning warns the homeowner of a fault and displays dealer information (if programmed), fault descriptions, possible causes and current system status (temperature readings, fan RPM and water flow status) to provide to a dealer on the phone.

In iGate™ Service Mode, the service personnel can access fault descriptions, possible causes and most importantly, the conditions (temp, flow, i/o conditions, configuration) at the time of the fault and at the time of the call. Manual Operation mode allows the service personnel to manually command operation for any of the thermostat outputs, blower speed, as well as pump speed or valve position from the thermostat, to help troubleshoot specific components.

With the iGate™ communicating system, consumers and contractors have a gateway to system information never before available.



AIRFLOW SELECTION	
	CFM
HEAT STAGE 1	600
HEAT STAGE 2	750
AUXILIARY HEAT	850
EMERGENCY HEAT	850
COOL STAGE 1	525
COOL STAGE 2	700
COOL DEHUMID 1	425
COOL DEHUMID 2	550
CONTINUOUS FAN	350
HEAT OFF DELAY	60
COOL OFF DELAY	30

◀ PREVIOUS NEXT ▶

POSSIBLE FAULT CAUSES	
LOW WATER COIL TEMP	
LOW WATER TEMP - HTG	
LOW WATER FLOW - HTG	
LOW REFRIG CHARGE - HTG	
INCORRECT LT1 SETTING	
BAD LT1 THERMISTOR	

◀ PREVIOUS

FAULT TEMPERATURE CONDITIONS	
LT1 LOW WATER TEMP	
HEAT 1 11:11 AM 11/14	
LT1 TEMP	28.1
LT2 TEMP	97.3
HOT WATER EWT	121.5
COMP DISCHARGE	157.7
LEAVING AIR	92.7
LEAVING WATER	34.9
ENTERING WATER	42.1
CONTROL VOLTAGE	26.4

◀ PREVIOUS

vFlow™ Internal Variable Water Flow Control

vFlow™ Internal Variable Water Flow

Industry-first, built-in vFlow™ replaces a traditionally inefficient, external component of the geothermal system (water circulation) with an ultra-high-efficient, variable speed, internal water flow system. This saves homeowners 70-80% on operating water circulator vs traditional single speed pump systems. It saves installers time and labor by avoiding installing bulky external flow centers or flow regulators. Multi-unit installations are also much simpler with vFlow™ systems, as the units automatically adjust water flow across the system.

vFlow™ is enabled by iGate™, which facilitates intelligent communication between the thermostat, DXM2 control, sensors and internal water pump/valve to make true variable water flow a reality.

vFlow™ is available for three applications:

- 1) Closed loop – individual unit pumping: vFlow™ Internal Flow Controller model ("2" in Position 11 of the unit model number) would be used. This includes variable speed pump, flushing ports, 3 way flushing valves and expansion tank. Copper water coil is standard with this option.
- 2) Closed loop – multi unit / central pumping: vFlow™ Internal Low Pressure Drop (high Cv) Motorized Modulating Valve ("5" in Position 11 of the unit model number) would be used. Copper water coil is standard with this option. Not available in Outdoor Digital Split (TEP).
- 3) Open loop: vFlow™ Internal Motorized Modulating Valve ("6" in Position 11 of the unit model number) would be used. Cupro-Nickel water coil is standard with this option. Valves in open loop models have higher pressure drop than the valves in the closed loop (modulating valve) models for better flow control when used in systems with higher pressure water supply pumps, and are not recommended for closed loop applications. Not available in Outdoor Digital Split (TEP).

vFlow™ delivers three main benefits:

- 1) Easier and quicker unit installation as the flow control is built in to the unit.
- 2) Superior reliability by varying the water flow to deliver more stable operation.
- 3) Higher cost savings by varying the flow (and pump watt consumption) to match the unit's mode of operation.

Internal components

Digital Split Units can be installed more easily and compactly than their predecessors because water-flow components are internal to the unit. It also saves installing contractors labor and time by eliminating the need for an external flow regulator or a bulky external pumping module.

Variable flow

vFlow™ technology enables variable water flow through the unit, with the DXM2 control adjusting the pump speed to maintain an installer-set loop ΔT. By controlling the water flow, the system is able to operate at its optimal capacity and efficiency. vFlow™ provides a lower flow rate for part load where units typically operate 80% of the time and a higher,



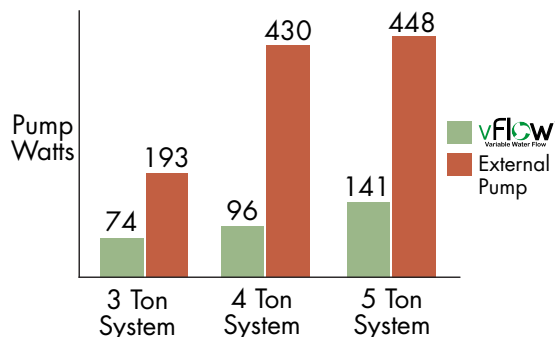
more normal flow rate for full load operation.

Energy Savings with water circulation control

Units with vFlow™ deliver higher operating cost savings by varying the water flow to match the unit's operation (ex: lower water flow when unit is in part load operation). Lowering the flow results in lower energy consumption by the water pump (=higher cost savings) in vFlow™ units (whether internal or external pump).

In closed loop applications, using vFlow™ with an internal variable-speed (ECM) flow controller, the ECM pump uses fewer watts than a fixed speed (PSC) pump, even at full load (see chart). The ECM pump excels in energy savings in part load, saving 70-80% watts compared to fixed speed pumps (see chart). The ECM pump can operate with independent flow rates for heating and cooling, further saving even more energy.

In open loop applications, when the motorized modulating valve slows down the water flow during part load operation, the external pump consumes fewer watts, thus saving more energy.



How to Use this Catalog

As with any unit selection the first step is to perform a proper load calculation. Once the design cooling and heating loads are known the predominant load can be used to select the appropriate unit. In northern climates the heating load may be used to select the unit, whereas in southern climates the cooling load may be used. Likewise, the anticipated maximum EWT should be used for the cooling mode and the minimum anticipated EWT should be used when selecting for the heating mode. These EWTs may be the same temperature in the case of a ground water application.

Use the Full Load performance pages to select the unit size. Once the unit size is determined read the associated flow rate (gpm) for the needed capacity. Typically this is 1.5 – 2 gpm/nominal ton for ground water applications and 2.25 – 3 gpm/ton for ground loop applications.

For Closed Loop Applications

For closed loop systems where an internal circulating pump is desired, Digital Split Units can be ordered with an internal, variable speed loop circulator. This would typically be for a ground loop or secondary pumping application. This internal loop circulator is the variable speed Grundfos Magna 25-140 for all Digital Split Units. The Grundfos UPM 25-85 is also available for size 024 and 036. Units with UPM pumps should not be combined with units with Magna pumps on the same loop. UPM pumps are best suited for small applications with a single unit. The maximum possible pump curve is shown in the tables below. The pumps can also operate at any point below the curve as a “partial load” pumping condition. The designer/installer should use the information presented in this catalog to determine the available pump head for any external piping/accessories and ground loop (if applicable). This can be done in the following manner.

1. Determine the desired flow rate through Digital Split Units from the performance pages (as described above). Read the associated pressure drop in feet of head for the worst case condition (lowest anticipated entering water temperature) at the required flow rate.
2. Determine the maximum pump head from the pump curve associated with the required flow rate from step 1.
3. Subtract the unit pressure drop (from step 1) from the maximum available pump head (from step 2).
4. The remainder is the available pump head to overcome any external piping/accessories and the ground loop.

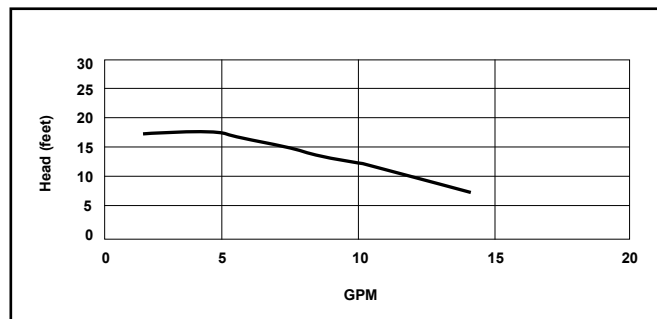
If the available pump head is equal to or greater than the calculated external piping and loop pressure drop, no other steps are required. If the available pump head is less than the calculated pressure drop of all external piping and the loop, then changes to the loop design should be considered.

Typically residential loops consist of ¾” circuit piping and 1 ¼” supply and return piping. If the available pump head is less than the calculated pressure drop of all external piping and the loop, it is recommended that larger pipe sizes be investigated such as 1” circuit piping and/or 1 ½” or 2” supply and return piping. This will significantly reduce system

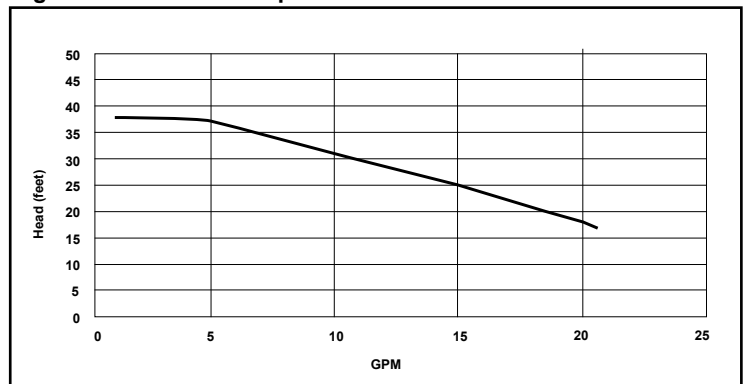
pressure drop with little change in Reynolds number. If this causes the Reynolds number to fall to an unacceptable level, try reducing the overall number of circuits. This will increase the flow rate through each circuit, increasing the Reynolds number.

Another solution might be to allow the system flow rate to be reduced. Typical geothermal flow rates are between 2.25 and 3 gpm/ton. As long as the system flow rate using the internal variable speed circulator is at or above 2.25 gpm/ton it is safe to operate the system. A quick review of the unit performance tables will show that this causes very little change in unit performance.

Standard Head Variable Pump Performance



High Head Variable Pump Performance



How to Use this Catalog

Comfort-Aire/Century's Pressure Drop Software can be used in conjunction with the pump performance information presented here to determine actual flow rate when the internal circulator is not able to provide the desired design flow rate.

For secondary pumping applications follow the above steps except do not consider the pressure drop of the loop. The internal circulator will only need to overcome the pressure drop of the unit and any piping connecting the unit to the primary loop.

Digital Split Units can also be ordered with an internal modulating water control valve for closed loop systems with multiple units and a central pump. In this case the modulating water valve will stop water flow through the unit when the unit is not operating and control the flow rate through the unit during operation, saving pumping energy in both cases.

When using an internal modulating water valve the central pump must be able to overcome the pressure drop of the valve in addition to the pressure drop of the unit. Because of this, internal modulating valves for closed loop systems are designed with a low pressure drop in mind. The minimum pressure drop for the internal closed loop valve is shown in the 'Modulating Valves for Closed Loop Applications' table

below. This pressure drop should be added to the unit pressure drop when determining system pressure drop for central pump selection.

For Open Loop Applications

Digital Split Units can also be ordered with the internal modulating water control valve for open loop systems with an external well pump. In this case the modulating water valve will stop water flow through the unit when the unit is not operating and act as a flow control device to control the flow rate through the unit during operation.

When using an internal modulating water valve the external pump must be able to overcome the minimum pressure drop of the valve in addition to the pressure drop of the unit. The minimum pressure drop for the open loop internal valve is shown in the 'Modulating Valves for Open Loop Applications' table below. This pressure drop should be added to the unit pressure drop when determining overall equipment pressure drop.

Modulating Valves for Closed Loop Applications

HZS024		
Valve Cv = 4.7		
60°F Water		
GPM	Valve ΔP @ GPM (psi)	Valve ΔP @ GPM (ft hd)
2.0	0.181	0.4
3.0	0.407	0.9
4.0	0.724	1.7
5.0	1.132	2.6
6.0	1.630	3.8

HZS036		
Valve Cv = 7.4		
60°F Water		
GPM	Valve ΔP @ GPM (psi)	Valve ΔP @ GPM (ft hd)
3.0	0.2	0.4
4.0	0.3	0.7
5.0	0.5	1.1
6.0	0.7	1.5
7.0	0.9	2.1
8.0	1.2	2.7
9.0	1.5	3.4

HZS048		
Valve Cv = 10		
60°F Water		
GPM	Valve ΔP @ GPM (psi)	Valve ΔP @ GPM (ft hd)
4.0	0.2	0.4
5.0	0.3	0.6
6.0	0.4	0.8
7.0	0.5	1.1
8.0	0.6	1.5
9.0	0.8	1.9
10.0	1.0	2.3
11.0	1.2	2.8
12.0	1.4	3.3

HZS060		
Valve Cv = 19		
60°F Water		
GPM	Valve ΔP @ GPM (psi)	Valve ΔP @ GPM (ft hd)
6.0	0.1	0.2
7.0	0.1	0.3
8.0	0.2	0.4
9.0	0.2	0.5
10.0	0.3	0.6
11.0	0.3	0.8
12.0	0.4	0.9
13.0	0.5	1.1
14.0	0.5	1.3
15.0	0.6	1.4
16.0	0.7	1.6
17.0	0.8	1.8

Modulating Valves for Open Loop Applications

HZS024, 036, & 048		
Valve Cv = 4.7		
60°F Water		
GPM	Valve ΔP @ GPM (psi)	Valve ΔP @ GPM (ft hd)
2.0	0.2	0.4
3.0	0.4	0.9
4.0	0.7	1.7
5.0	1.1	2.6
6.0	1.6	3.8
7.0	2.2	5.1
8.0	2.9	6.7
9.0	3.7	8.5
10.0	4.5	10.5
11.0	5.5	12.7
12.0	6.5	15.1

HZS060		
Valve Cv = 7.4		
60°F Water		
GPM	Valve ΔP @ GPM (psi)	Valve ΔP @ GPM (ft hd)
6.0	0.7	1.5
7.0	0.9	2.1
8.0	1.2	2.7
9.0	1.5	3.4
10.0	1.8	4.2
11.0	2.2	5.1
12.0	2.6	6.1
13.0	3.1	7.1
14.0	3.6	8.3
15.0	4.1	9.5
16.0	4.7	10.8
17.0	5.3	12.2

Digital Split (HZS) Design Features

The Digital Series Split system compressor sections (indoor / outdoor) have abundant features and ultra high efficiency.

Application Flexibility

- Four Capacities 024, 036, 048, and 060.
- Ideal for remote applications like 2nd floor or crawl space areas. Indoor and outdoor models available.
- Can be used as a total electric heat pump or add on heat pump with fossil fuel backup.
- Ideal for unit replacement market, designed for quiet outdoor installations with weather tight cabinet (outdoor model).
- Ground breaking iGate™ communicating controls – Configure, monitor, control and Diagnose from the thermostat
- 4-wire connection between WDG Air Handler, HZS Digital Split and 7602-457 communicating thermostat
- Built-in industry first vFlow™ Variable Waterflow for 60-80% savings in pumping watts (VS pump models)
- Internal Flow Controls-Closed loop models include VS pump, flushing valves, expansion tank and copper water coil
- Motorized Modulating valve-Closed loop models include Motorized Modulating valve, Copper water coil
- Motorized Modulating valve-Open loop models include Motorized Modulating valve, Cupro-Nickel water coil (indoor split only)
- Extended range operation (20-120°F EWT) and flow rates directly controlled by DXM2 control based on ΔT
- Circuit breaker protected loop and hot water generator pumps (indoor model).
- Field selectable low-temperature protection setting for GWHP or GLHP (indoor model).
- Open service-friendly cabinet (i.e., all components in compressor section can be serviced from the front).
- Pre-charged compressor section with back-seating refrigerant service valves for quick installation.
- AHRI matched and rated with Tranquility® Cased coil and Air Handler products.
- Exceeds ASHRAE 90.1 and Energy Star 3.0 efficiencies.*
- Thru-the-Bottom loop access (outdoor model).

* When installed with a Comfort-Aire/Century TAC or WDG product.

Operating Efficiencies

- Exceeds ASHRAE 90.1 and Energy Star Tier 3 efficiency levels
- Energy Star® Most Efficient
- EarthPure® HFC-410A zero ozone depletion refrigerant.
- Among the highest efficiencies in AHRI/ISO/ASHRAE/ANSI 13256-1 ratings for heating COPs, cooling EERs with low water flow rates.
- 25.6 EER/4.3 COP.
- Rugged and highly efficient next generation Copeland UltraTech scroll compressors provide Two-stage operation for ultra-high efficiencies and unsurpassed comfort with reduced cycling losses.
- Optional hot water generator generates hot water at considerable savings.
- Oversized coaxial tube water-to-refrigerant heat exchangers operate at low liquid pressure drop.

Service & Installation Advantages

- Comfort-Aire/Century's Digital Split series incorporates features that are industry firsts, which make it extremely easy to install:
- Ease of installation:
 - 1) vFlow™ - with the industry exclusive features, these units are ready to install out of the box with no requirement for external pumps, expansion tanks, or valves for the ground loop removing a lot of the complexity of installation.
 - 2) Full digital iGate™ controls that communicate with the thermostat and Communicating WDG Air Handler over 4 wires, allowing all unit configuration from the thermostat... the easiest installation setup for any level of installer. Far simpler than the use of dip-switches on the unit control board.
- Digital Split Units only requires 4 wires between the communicating air handler (WDG), communicating thermostat (7602-457) and the unit. Others require up to 9 or 14 wires for full functionality. This is achieved by leveraging the full power of the microprocessor on the control.
- Internal variable speed circulator includes an internal check valve for multiple unit/ shared loop installations.
- Standard corner-post schreader ports provide access to source pressure drop across unit coaxial heat exchanger.
- The communicating iGate™ DXM2 control board diagnostic and communicating thermostat features allow the home owner to tell the service technician what is wrong with the unit before the technician leaves the shop.
- The two-section swing-out and removable control box design provides wide-open service access to the compressor section.
- Multiple unit access panels allow technicians to access any side of the cabinet.
- Service friendly highly accessible high/low refrigerant pressure ports are located on a service bracket at the front of the unit. No other product / manufacturer in the geothermal segment offer this convenience.
- An innovative two-section electrical control box design that tucks the stationary line voltage components safely behind a swing-out low voltage control panel to provide clear service access through the front of the unit. The low voltage panel can even be quickly pulled off the hinges and removed. Harness connections make controller replacement a snap.
- MPT condensate connection directly from condensate drain pan eliminates internal plastic drain tubing that is subject to clogging and avoids the need for a fitting that reduces the drain opening size.
- Diagnostic display of system inputs, outputs, and configuration settings at thermostat or Configuration/ Diagnostic tool.
- Diagnostic display of system temperatures at thermostat (7602-457):
 - Geo source in and out
 - Compressor discharge line
 - LT1 and LT2 Refrigerant Line Temperature Sensors
 - Leaving air
 - Entering potable hot water to HWG
- Immediate manual control of all DXM2 outputs is available

Digital Split (HZS) Design Features

at the thermostat (7602-457) or Configuration/Diagnostic tool (7602-444) for rapid troubleshooting.

- Expansion tank eliminates “flat loop callbacks by working to maintain steady loop pressure.
- Brass swivel geo and hot water connections for quick connection and elimination of wrenches or sealants during installation.
- Intelligent fault retry with history retention.
- Two configurable auxiliary relays for low voltage control of accessories.
- UPS (Unit Performance Sentinel) provides early warning of inefficient operation.

Field Installed Accessories

- iGate™ Communicating, Programmable Thermostat (7602-457)
- Auxiliary Electric Heater
- EarthPure® Polarized Media Electric Air Cleaner
- Communicating Configuration / Diagnostic Tool (7602-444)
- Outdoor/Remote Temperature Sensor (AST008)
- Anti Scald Valve (AVAS4)
- Secure Start Compressor Soft Start Kit (13B0045N01)
- Unit Vibration Isolation Pad
- Unit Stand

Factory Quality & Industry Certifications

All units are built and factory run tested on our Integrated Process Control Assembly System (IPCS). The IPCS is a unique state of the art manufacturing system that is designed to assure quality of the highest standards of any manufacturer in the water-source industry.

Our IPCS system:

- Verifies that the correct components are being assembled.
- Automatically performs special leak tests on all joints
- Conducts pressure tests
- Performs detailed run test
- Automatically disables packaging for a “failed” unit
- Creates computer database for future service analysis and diagnostics from run test results
- All refrigerant brazing is done in a nitrogen atmosphere
- All units are deep evacuated to less than 100 microns prior to refrigerant charging
- All joints are both helium and halogen leak tested to insure annual leak rate of less than ¼ ounce
- AHRI/ASHRAE/ANSI/ISO 13256-1 certified.
- ETL listed.
- US EPA “Energy Star” Tier 3 certified

Advanced Controls

iGate™ communicating control provides advanced unit functionality and comprehensive configuration, monitoring and diagnostic capabilities through digital communication links with the variable-speed fan motor (on TAH), variable-speed source pump (or modulating valve) and communicating thermostat or Configuration/Diagnostic tool.

- 7 temperature sensor inputs for system protection and control
- Anti-short cycle and over/under voltage protection
- High pressure, loss of charge, and condensate overflow protection
- LED fault and status indication at controller
- Service tool port for optional setup and diagnostics at unit

Factory Options & Accessories

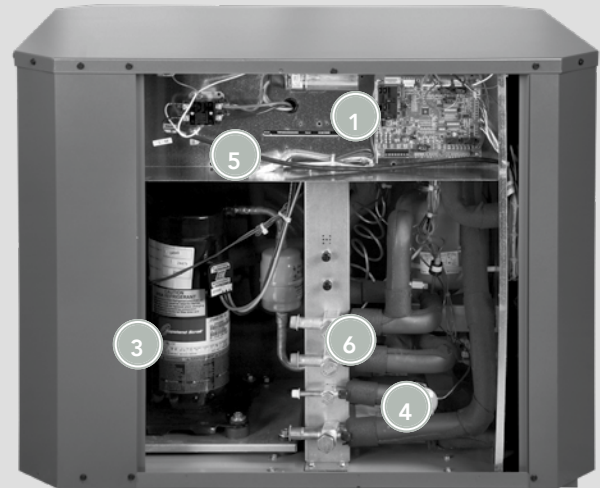
- Hot water generator with internally mounted pump and advanced logic control

Digital Indoor Split (HZS) Design Features

- 1 vFlow™ Internal Variable Water Flow System with Internal Flow Center or Internal Motorized Modulating Valve for optimized efficiency and reliability
- 2 Next generation Copeland™ Ultra-Tech™ Two-Stage Scroll Compressor with dual-level isolation for ultra-quiet and high-efficiency operation
- 3 Two-Section Swing-out Control Box design provides wide-open service access
- 4 Water Schrader Ports located on corner post to easily read pressure drop across water heat exchanger for easy troubleshooting
- 5 Heavy Gauge Galvanized Steel Cabinet is epoxy powder-coated in a durable and attractive black matte finish with stainless steel front access panels



- 1 Exclusive iGate™ Two-Way Communicating Control to configure, monitor and diagnose AT THERMOSTAT
- 2 vFlow™ Internal Variable Water Flow System with Internal Flow Center or Internal Motorized Modulating Valve for optimized efficiency and reliability
- 3 Next generation Copeland™ Ultra-Tech™ Two-Stage Scroll Compressor with dual-level isolation for ultra-quiet and high-efficiency operation
- 4 Fully Insulated Water and Refrigerant Lines
- 5 Large Easily Accessible Control Box
- 6 Backseating Brass Service Valves with Service Port
- 7 Stainless Steel Braided Hoses for Easy Connection to Loop Piping



Cased Coil (TAC) Design Features

The Cased Coil (TAC) Series has abundant features and industry leading efficiency.

Application Flexibility

- Four Capacities 024, 036, 048, & 060.
- Fully convertible vertical upflow or downflow, and horizontal left or horizontal right airflow.
- Thermoset plastic drain pan.
- AHRI matched and rated with HZS products.
- Easily connects to a new or existing fossil fuel furnaces.
- Large removable access panel provide an open service-friendly cabinet.
- Heavy gauge galvanized steel construction with attractive grey powder coat finish.

Operating Efficiencies

- EarthPure® HFC-410A zero ozone depletion refrigerant.
- Highest efficiencies in AHRI/ISO/ASHRAE/ANSI 13256-1 ratings for heating COP's, cooling EER's with low water flow rates when matched with HZS models.
- Exceeds ASHRAE 90.1 and Energy Star 3.0 efficiencies.*

* When matched with a Comfort-Aire/Century split compressor sections.

Service & Installation Advantages

- Large removable access panels.
- Bi-directional thermal expansion valve (TXV).
- Fully convertible.

Factory Quality & Industry Certifications

- All units are built on our Integrated Process Control Assembly System (IPCS). The IPCS is a unique state of the art manufacturing system that is designed to assure quality of the highest standards of any manufacturer in the water-source industry. Our IPCS system:
 - Verifies that the correct components are being assembled.
 - Automatically performs special leak tests on all joints.
 - Conducts pressure tests.
- All refrigerant brazing is done in a nitrogen atmosphere.
- All joints are both helium and halogen leak tested to insure annual leak rate of less than 1/4 ounce.
- Refrigerant suction lines are fully insulated to eliminate condensation problems in low temperature applications.
- Standard 10-year limited warranty on all parts with 5-year labor allowance; Optional additional extended 5-year limited labor allowance available.
- AHRI/ASHRAE/ANSI/ISO 13256-1 certified.
- NRTL & ETL listed.
- US EPA "Energy Star" certified

Features

- Fully convertible vertical upflow or downflow, and horizontal left or horizontal right airflow.

- 1 Fully convertible vertical upflow or downflow, and horizontal left or horizontal right airflow
- 2 Thermoset plastic drain pan
- 3 Large easily removable access panel provide an open service-friendly cabinet
- 4 Heavy gauge galvanized steel construction with attractive grey powder coat finish



Digital Air Handler (WDG) Design Features

The Digital Air Handler (WDG) Series has abundant features and industry leading efficiency.

Application Flexibility

- Four Capacities 024, 036, 048, & 060.
- State-of-the-Art Variable Speed Blower Motor.
- Variable speed ECM fan motor adapts to various duct systems.
- Condensate over-flow protection.
- 230v and 115v field convertible
- Fully field convertible for vertical upflow, downflow, horizontal left and horizontal right airflow.
- Foil faced insulation.
- Less than 2% air leakage.
- AHRI matched and rated with HZS products.
- Three cabinet foot prints: 024 - 18" wide, 024-048 - 22.5" wide, & 036-060 - 25.5" wide.
- Ideal for remote applications like a 2nd floor, crawl spaces, and attics.
- Dehumidification mode for high latent cooling (when matched with 7602-457 Thermostat)
- 1 or 2" compatible filterbase.

Operating Efficiencies

- EarthPure® HFC-410A zero ozone depletion refrigerant.
- Large low RPM blowers with variable speed fan motors provide quiet, efficient air movement with high static capability.
- Exceeds ASHRAE 90.1 and Energy Star 3.0 efficiencies.*
- Highest efficiencies in AHRI/ISO/ASHRAE/ANSI 13256-1 ratings for heating COP's, cooling EER's with low water flow rates when matched with HZS models.

* When matched with a Comfort-Aire/Century split compressor sections.

WDG Service & Installation Advantages

- Low profile control box grants easy access to all internal components.
- Bi-directional thermal expansion valve (TXV).
- Circuit breaker protected 75VA control transformer.
- Fan motors have quick attach wiring harness for fast removal.
- Internal dropout blower for easy servicing.
- Accurate refrigerant sensing low-temperature protection.
- Intelligent fault retry -condensate overflow protection.
- Air coil low temperature cut-out using high accuracy thermistor.
- 24vac accessory relays.
- The communicating DXM2 control board diagnostic and communicating thermostat features allow the home owner to tell the service technician what is wrong with the unit before the technician leaves the shop.
- Large removable access panel provides an open service-friendly cabinet.
- 20 gauge galvanized steel construction with attractive pewter epoxy powder coat paint and stainless steel service access panels.

Factory Quality & Industry Certifications

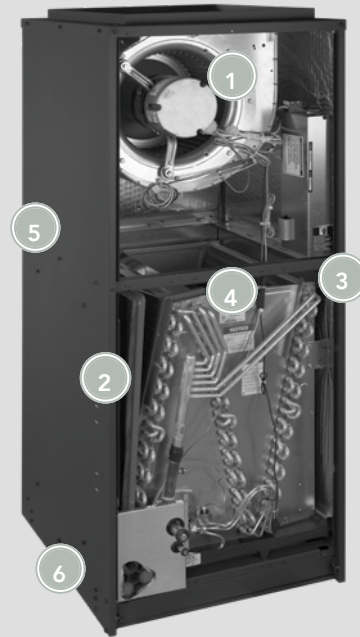
- All units are built on our Integrated Process Control Assembly System (IPCS). The IPCS is a unique state of the art manufacturing system that is designed to assure quality of the highest standards of any manufacturer in the water-source industry. Our IPCS system:
 - Verifies that the correct components are being assembled.
 - Automatically performs special leak tests on all joints.
 - Conducts pressure tests.
 - Performs highly detailed run test unparalleled in the HVAC industry.
 - Automatically disables packaging for a "failed" unit.
 - Creates computer database for future service analysis and diagnostics from run test results.
- Heavy gauge galvanized steel cabinets are epoxy powder coated for durable and long-lasting finish.
- All refrigerant brazing is done in a nitrogen atmosphere.
- All joints are both helium and halogen leak tested to insure annual leak rate of less than 1/4 ounce.
- Comfort-Aire/Century residential class heat pumps are backed by a ten-year limited warranty on all unit parts, including the following accessories when installed with Comfort-Aire/Century units: Flow Controllers, Thermostats & Electric Heaters.
- AHRI/ASHRAE/ANSI/ISO 13256-1 certified.
- ETL listed.
- US EPA "Energy Star" certified.

Options & Accessories

- iGate™ Communicating, Programmable Thermostat (7602-457)
- Electronic communicating auto-changeover thermostat with 3-stage heat, 2-stage cool and indicator LED's.

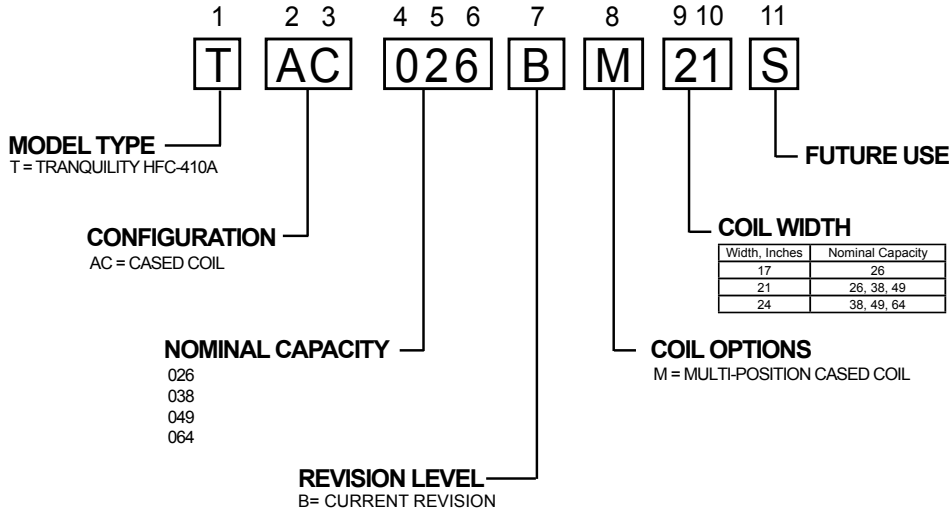
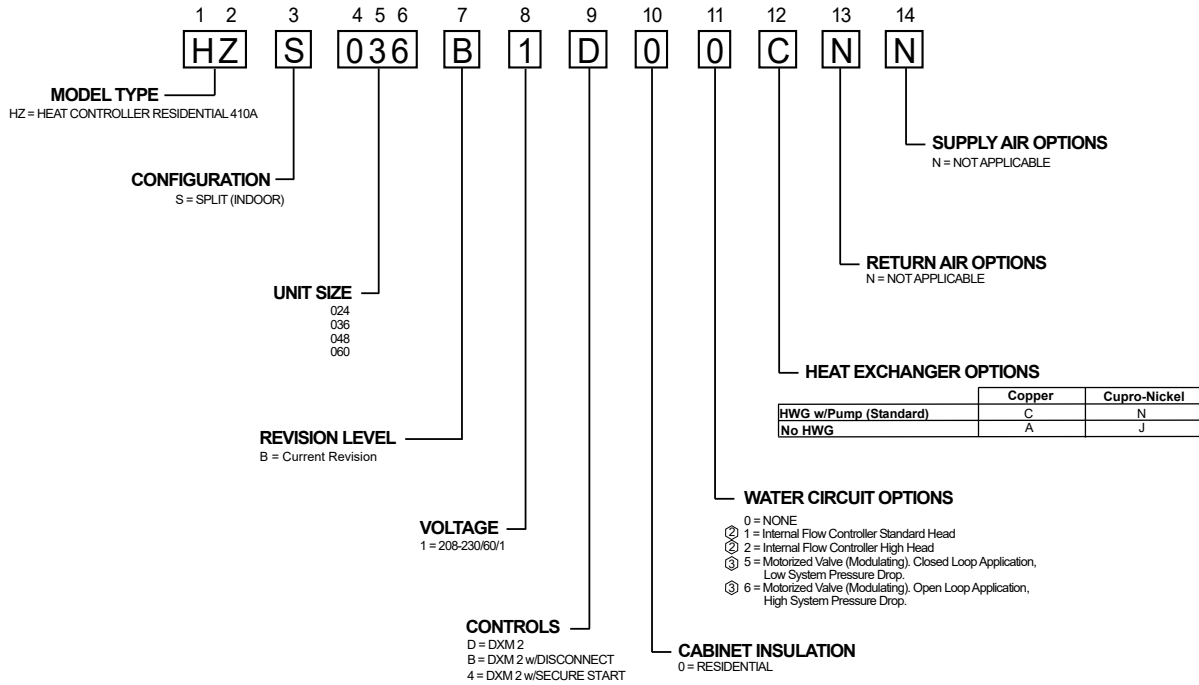
Digital Air Handler (WDG) Design Features

- 1 State-of-the-Art Variable Speed Blower Motor
- 2 Fully field convertible
- 3 Two Lift-out Service Access Panels with Stainless Steel Front Panels
- 4 LT2 sensor factory mounted
- 5 20 gauge galvanized steel construction with attractive pewter epoxy powder coat paint and stainless steel service access panels
- 6 Condensate over-flow protection

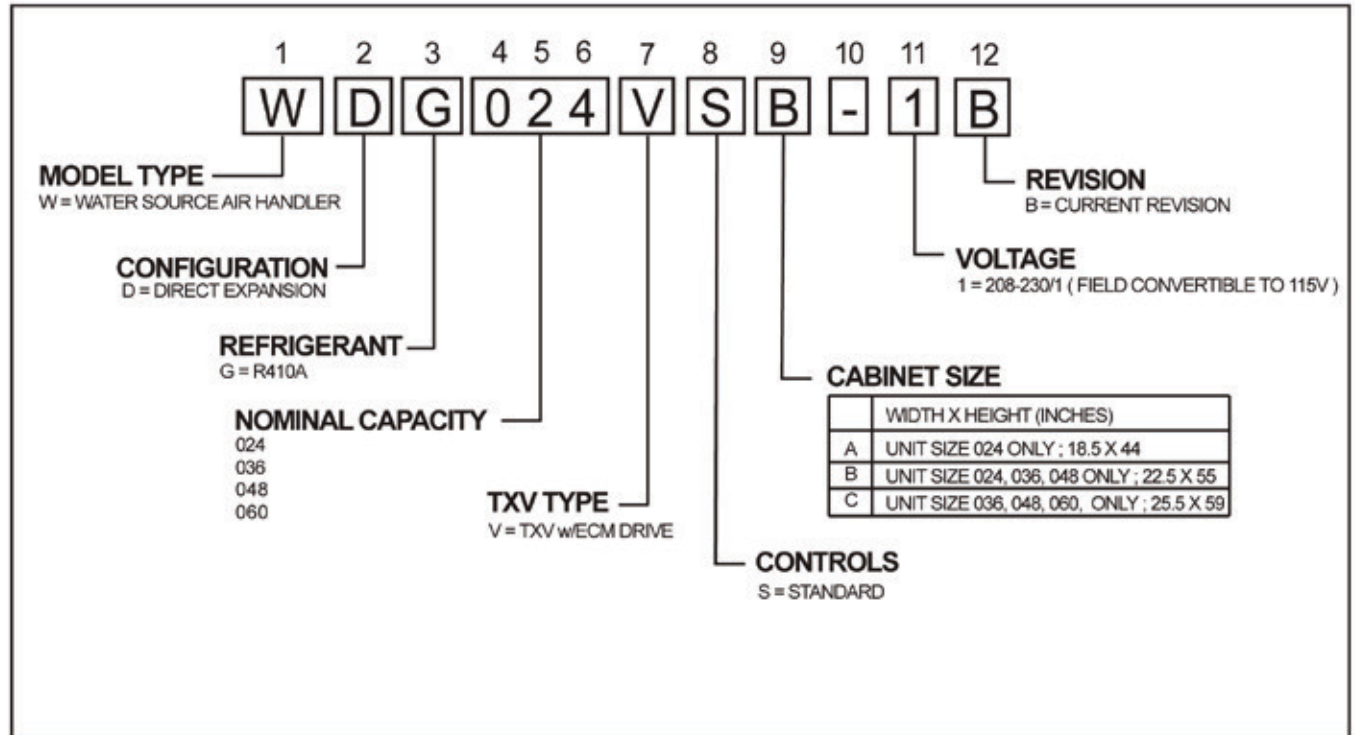


Model Key

Unit Model Key



Model Key, Reference Calculations & Legend



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

Hot Water Generator capacities (HWC) are based on potable water flow rate of 0.4 gpm per nominal equipment ton and 90°F entering potable water temperature.

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

About AHRI/ISO/ASHRAE 13256-1

About AHRI/ISO/ASHRAE 13256-1

AHRI/ASHRAE/ISO 13256-1 (Air-Conditioning and Refrigeration Institute/American Society of Heating, Refrigerating and Air Conditioning Engineers/International Standards Organization) is a certification standard for water-source heat pumps used in the following applications:

- WLHP (Water Loop Heat Pump – Boiler/Tower)
- GWHP (Ground Water Heat Pump – Open Loop)
- GLHP (Ground Loop Heat Pump – Geothermal)

The directory at <http://www.ahrinet.org/> is constantly being updated and immediately available on the Internet. All ratings are submitted by the manufacturer for certification, and must be approved by AHRI. Therefore, there is a significant difference between AHRI "certified" and AHRI "rated." Thirty percent of a manufacturer's basic models must be tested each year. AHRI selects models at random from stock for testing on the basis of its evaluation of a participant's certification data.

Units that fail one or more certified test (90% of declared performance or lower) may be declared defective. If the initial failure is a performance test, the manufacturer must obsolete all units within the same basic model group or elect to have a second sample tested. If the second unit fails a performance test, it must be obsoleted, together with all units within the same basic model group. Comfort-Aire/Century takes certification seriously. We were recently awarded a certificate for consecutive years of no AHRI failures.

Temperatures used in AHRI certification standards are S.I. (Système International – metric) based. For example, typical catalog data for cooling is shown at 80°F DB/67°F WB [26.7°C DB/19.4°C] entering air temperature, but the AHRI standard for cooling is 80.6°F DB/66.2°F WB [27°C DB/19°C], since it is based upon whole numbers in degrees Celsius. Water and air temperatures for the standard are shown below.

Test Condition Comparison Table

	WLHP	GWHP	GLHP
Cooling			
Entering Air Temperature - DB/WB °F [°C]	80.6/66.2 [27/19]	80.6/66.2 [27/19]	80.6/66.2 [27/19]
Entering Water Temperature - °F [°C]	86 [30]	59 [15]	77 [25]
Fluid Flow Rate	*	*	*
Heating			
Entering Air Temperature - DB/WB °F [°C]	68 [20]	68 [20]	68 [20]
Entering Water Temperature - °F [°C]	68 [20]	50 [10]	32 [0]
Fluid Flow Rate	*	*	*

*Flow rate is specified by the manufacturer

Data certified by AHRI include heating/cooling capacities, EER (Energy Efficiency Ratio – Btuh per Watt) and COP (Btuh per Btuh) at the various conditions shown above. Pump power correction is calculated to adjust efficiencies for pumping Watts. Within each model, only one water flow rate is specified for all three groups, and pumping Watts are calculated using the formula below. This additional power is added onto the existing power consumption.

- Pump power correction = (gpm x 0.0631) x (Press Drop x 2990)/300

Fan power is corrected to zero external static pressure using the equation below. The nominal airflow is rated at a specific external static pressure. This effectively reduces the power consumption of the unit and increases cooling capacity but decreases heating capacity.

- Fan Power Correction = (cfm x 0.472) x (esp x 249)/300

Capacities and efficiencies are calculated using the following equations:

- ISO Cooling Capacity = Cooling Capacity (Btuh) + [Fan Power Correction (Watts) x 3.412]
- ISO EER Efficiency (Btuh/W) =
ISO Cooling Capacity (Btuh)/[Power Input (Watts) – Fan Power Correction (Watts) + Pump Power Correction (Watts)]
- ISO Heating Capacity = Heating Capacity (Btuh) – [Fan Power Correction (Watts) x 3.412]
- ISO COP Efficiency (Btuh/Btuh) =
ISO Heating Capacity (Btuh) x 3.412/[Power Input (Watts) - Fan Power Correction (Watts) + Pump Power Correction (Watts)]

AHRI/ISO/ASHRAE/ANSI 13256-1 Performance

ASHRAE/AHRI/ISO 13256-1. HZS with WDG Air Handler

Model	Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 59°F		Heating 50°F		Full Cool 77°F Part Cool 68°F		Full Heat 32°F Part Heat 41°F	
	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
*HZS024 Part	20,400	27.8	18,700	4.8	20,900	24.0	15,300	4.0
*HZS024 Full	25,600	22.4	24,900	4.5	25,800	17.7	18,800	3.6
**HZS024 Part	21,500	30.9	17,700	4.9	20,500	25.6	15,500	4.3
**HZS024 Full	27,300	24.0	22,800	4.4	24,900	18.3	18,700	3.8
HZS036 Part	28,800	29.7	23,700	4.8	28,200	24.7	21,000	4.3
HZS036 Full	40,500	23.4	32,700	4.5	38,100	17.8	26,200	3.8
HZS048 Part	40,700	29.4	34,300	4.6	39,500	23.8	29,600	4.0
HZS048 Full	52,800	23.0	45,900	4.2	49,200	16.9	35,900	3.5
HZS060 Part	48,100	26.0	41,700	4.3	46,000	21.7	35,900	3.8
HZS060 Full	62,400	20.3	56,600	4.0	57,800	15.5	44,300	3.4

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
 Ground Loop Heat Pump ratings based on 15% methanol antifreeze solution
 All ratings based upon operation at lower voltage of dual voltage rated models
 * w/17" wide coil
 ** w/21" wide coil

ASHRAE/AHRI/ISO 13256-1. HZS with TAC Cased Coil

Model	Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 59°F		Heating 50°F		Full Cool 77°F Part Cool 68°F		Full Heat 32°F Part Heat 41°F	
	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
*HZS024 Part	20,100	28.0	28.0	4.9	19,600	23.6	15,800	4.4
*HZS024 Full	25,200	22.4	22.4	4.5	24,000	17.4	18,800	3.9
**HZS024 Part	21,100	28.8	28.8	4.9	21,000	24.8	15,500	4.3
**HZS024 Full	26,400	22.5	22.5	4.5	26,000	18.0	18,600	3.8
HZS036 Part	29,300	28.2	28.2	4.6	28,500	23.5	21,400	4.1
HZS036 Full	40,200	22.3	22.3	4.4	38,000	17.3	26,600	3.7
HZS048 Part	41,300	27.9	27.9	4.5	38,400	22.2	30,000	4.0
HZS048 Full	52,000	21.3	21.3	4.2	48,400	16.4	36,000	3.5
HZS060 Part	45,000	23.7	23.7	4.1	44,200	20.5	36,400	3.8
HZS060 Full	58,700	19.3	19.3	3.8	54,500	15.2	44,000	3.4

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
 Ground Loop Heat Pump ratings based on 15% methanol antifreeze solution
 All ratings based upon operation at lower voltage of dual voltage rated models
 * w/17" wide coil
 ** w/21" wide coil

Full Load Correction Factors

Air Flow Correction Table

Airflow % of Nominal	Heating				Cooling			
	Htg Cap	Power	Heat of Extraction	Total Cap	Sens Cap	S/T	Power	Heat of Rejection
60.00	0.946	1.153	0.896	0.925	0.788	0.852	0.913	0.922
68.75	0.959	1.107	0.924	0.946	0.829	0.876	0.926	0.942
75.00	0.969	1.078	0.942	0.960	0.861	0.897	0.937	0.955
81.25	0.977	1.053	0.959	0.972	0.895	0.921	0.950	0.968
87.50	0.985	1.032	0.974	0.983	0.930	0.946	0.965	0.979
93.75	0.993	1.014	0.988	0.992	0.965	0.973	0.982	0.990
100.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
106.25	1.006	0.989	1.011	1.007	1.033	1.027	1.020	1.009
112.50	1.012	0.982	1.019	1.012	1.064	1.052	1.042	1.018
118.75	1.018	0.979	1.027	1.016	1.092	1.075	1.066	1.025
125.00	1.022	0.977	1.033	1.018	1.116	1.096	1.091	1.032
130.00	1.026	0.975	1.038	1.019	1.132	1.110	1.112	1.037

Entering Air Correction Table

Full Load Heating Corrections			
Entering Air DB°F	Heating Capacity	Power	Heat of Extraction
40	1.052	0.779	1.120
45	1.043	0.808	1.102
50	1.035	0.841	1.084
55	1.027	0.877	1.065
60	1.019	0.915	1.045
65	1.010	0.957	1.023
68	1.004	0.982	1.010
70	1.000	1.000	1.000
75	0.989	1.045	0.974
80	0.976	1.093	0.946

* = Sensible capacity equals total capacity
 AHRI/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

Cooling													
Entering Air WB°F	Total Capacity	Sensible Cooling Capacity Multiplier - Entering DB °F										Power	Heat of Rejection
		60	65	70	75	80	80.6	85	90	95	100		
45	0.832	1.346	1.461	1.603	*	*	*	*	*	*	*	0.946	0.853
50	0.850	1.004	1.174	1.357	*	*	*	*	*	*	*	0.953	0.870
55	0.880	0.694	0.902	1.115	1.331	*	*	*	*	*	*	0.964	0.896
60	0.922		0.646	0.875	1.103	1.329	1.356	*	*	*	*	0.977	0.932
65	0.975			0.639	0.869	1.096	1.123	1.320	*	*	*	0.993	0.979
66.2	0.990			0.582	0.812	1.039	1.066	1.262	1.482	*	*	0.997	0.991
67	1.000			0.545	0.774	1.000	1.027	1.223	1.444	*	*	1.000	1.000
70	1.040				0.630	0.853	0.880	1.075	1.297	1.517	*	1.011	1.035
75	1.117					0.601	0.627	0.821	1.046	1.275	1.510	1.033	1.101

* Sensible capacity equals total capacity.

Part Load Correction Factors

Air Flow Correction Table

Airflow % of Nominal	Heating				Cooling			
	Htg Cap	Power	Heat of Extraction	Total Cap	Sens Cap	S/T	Power	Heat of Rejection
60.00	0.946	1.153	0.896	0.925	0.788	0.852	0.913	0.922
68.75	0.959	1.107	0.924	0.946	0.829	0.876	0.926	0.942
75.00	0.969	1.078	0.942	0.960	0.861	0.897	0.937	0.955
81.25	0.977	1.053	0.959	0.972	0.895	0.921	0.950	0.968
87.50	0.985	1.032	0.974	0.983	0.930	0.946	0.965	0.979
93.75	0.993	1.014	0.988	0.992	0.965	0.973	0.982	0.990
100.00	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
106.25	1.006	0.989	1.011	1.007	1.033	1.027	1.020	1.009
112.50	1.012	0.982	1.019	1.012	1.064	1.052	1.042	1.018
118.75	1.018	0.979	1.027	1.016	1.092	1.075	1.066	1.025
125.00	1.022	0.977	1.033	1.018	1.116	1.096	1.091	1.032
130.00	1.026	0.975	1.038	1.019	1.132	1.110	1.112	1.037

Entering Air Correction Table

Full Load Heating Corrections			
Entering Air DB°F	Heating Capacity	Power	Heat of Extraction
40	1.084	0.732	1.161
45	1.073	0.764	1.140
50	1.060	0.802	1.117
55	1.046	0.846	1.090
60	1.031	0.893	1.061
65	1.016	0.945	1.031
68	1.006	0.978	1.013
70	1.000	1.000	1.000
75	0.984	1.058	0.968
80	0.968	1.117	0.936

* = Sensible capacity equals total capacity
 AHR/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

Cooling													
Entering Air WB°F	Total Capacity	Sensible Cooling Capacity Multiplier - Entering DB °F										Power	Heat of Rejection
		60	65	70	75	80	80.6	85	90	95	100		
45	0.876	1.286	1.302	1.389	*	*	*	*	*	*	*	0.981	0.895
50	0.883	1.002	1.099	1.241	*	*	*	*	*	*	*	0.985	0.901
55	0.903	0.706	0.871	1.060	1.271	*	*	*	*	*	*	0.989	0.918
60	0.935		0.617	0.844	1.079	1.319	1.349	*	*	*	*	0.993	0.945
65	0.979			0.595	0.849	1.096	1.128	1.342	*	*	*	0.998	0.982
66.2	0.991			0.531	0.789	1.040	1.070	1.284	1.522	*	*	0.999	0.993
67	1.000			0.486	0.747	1.000	1.030	1.245	1.481	*	*	1.000	1.000
70	1.035				0.583	0.842	0.873	1.090	1.327	1.552	*	1.003	1.030
75	1.105					0.552	0.584	0.811	1.057	1.290	1.510	1.008	1.086

* Sensible capacity equals total capacity.

Performance Data Selection Notes – vFlow Models

Operation in Shaded Area: Closed Loop Application

For operation in the shaded area, appropriate levels of a proper antifreeze should be used in systems with leaving water temperatures of 40°F or below and the JW3 jumper should be clipped. 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 systems without antifreeze.

Open Loop Application:

For operation in shaded area (below 40°F LWT) in open loop applications, ΔT (on DXM2) should be set such that the LWT (=EWT - ΔT) doesn't drop below 40°F. JW3 should NEVER be clipped for systems without antifreeze.

Recommended in this range. Also Clip JW3 on DXM2 board

Heating - EAT 70°F

TD	FT	CFM	HC	kW	COP	HE	LAT	LWT	HWC
5	5.8	725	11.3	1.1	2.9	7.4	84	16.7	1.2
5	5.8	850	11.5	1.1	3.1	7.7	82	16.6	1.2
7	1.7	725	12.5	1.1	3.2	8.6	86	22.4	1.4
7	1.7	850	12.7	1.1	3.4	8.9	84	22.1	1.3
3	3.0	725	13.1	1.1	3.3	9.1	87	24.6	1.4
3	3.0	850	13.2	1.1	3.5	9.5	84	24.4	1.4
0	4.6	725	13.4	1.1	3.4	9.4	87	25.8	1.4
0	4.6	850	13.5	1.1	3.6	9.8	85	25.7	1.4
1.2		725	14.5	1.2	3.7	10.6	89	30.6	1.6
1.2		850	14.7	1.1	3.9	10.9	86	30.3	1.5
2.4		725	15.2	1.2	3.9	11.3	89	33.4	1.6
2.4		850	15.4	1.1	4.1	11.7	87	33.1	1.6
3		725	15.6	1.2	4.0	11.7	90	34.8	1.6
3		850	15.8	1.1	4.2	12.1	87	34.6	1.6
4.6		725	16.6	1.2	4.2	12.6	91	38.8	1.6
4.6		850	16.8	1.1	4.4	13.0	88	38.6	1.6
5.8		725	17.5	1.2	4.4	13.5	92	41.8	1.6
5.8		850	17.7	1.1	4.7	14.1	89	41.6	1.6

Performance Data Selection Notes - Models without vFlow™

For operation in the shaded area when water is used in lieu of an antifreeze 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). Otherwise, appropriate levels of a proper antifreeze solution should be used in systems with leaving water temperatures of 40°F [4.4°C] or below and the JW3 jumper should be clipped. 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.

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.

$$TD = HE / (GPM \times 500)$$

$$TD = 22,500 / (4.5 \times 500)$$

$$TD = 10^\circ F$$

$$LWT = EWT - TD$$

$$LWT = 50 - 10 = 40^\circ F$$

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).

Heating - EAT 70°F

ENTER	Airflow CFM	HC	kW	HE	LAT	COP
	825	11.7	1.02	8.4	83.2	3.38
	710	13.6	1.09	10.1	87.8	3.66
38.3	825	13.8	1.06	10.3	85.5	3.81
39.2	710	14.2	1.09	10.7	88.5	3.81
39.2	825	14.4	1.06	10.9	86.1	3.97
39.8	710	14.4	1.09	10.9	88.8	3.86
39.8	825	14.6	1.06	11.1	86.3	4.02
35.3	710	16.1	1.15	12.3	90.9	4.08
35.3	825	16.2	1.12	12.6	88.2	4.25
37.9	710	16.7	1.15	13.0	91.8	4.25
37.9	825	16.9	1.12	13.3	89.0	4.42
38.3	710	16.9	1.16	13.2	92.1	4.30
38.3	825	17.1	1.12	13.5	89.2	4.47
30.7	710	18.3	1.18	14.5	93.9	4.56
30.7	825	18.5	1.14	14.8	90.8	4.75
38.4	710	19.1	1.18	15.2	94.8	4.73
38.4	825	19.3	1.15	15.5	91.6	4.93
38.4	710	19.3	1.18	15.4	95.1	4.78
38.4	825	19.5	1.15	15.7	91.9	4.98
38.4	710	20.4	1.21	16.5	96.6	4.98
38.4	825	20.6	1.18	16.8	93.2	5.18
38.4	710	20.9	1.22	17.3	97.1	5.18

Performance Data Selection Notes – vFlow Models

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

Physical Data

Physical Data		HZS			
Model	024	036	048	060	
Compressor [1 Each]	Copeland UltraTech Two-Stage Scroll				
Factory Charge HFC-410A (oz) [kg]	96 [2.72]	104 [2.95]	126 [3.57]	192 [5.44]	
Water Connection Size					
(In)	1 (Swivel)				
HWG Connection Size					
(In)	1 (Swivel)				
Line Set Connection Size					
Liquid Line Sweat Connection (in.)	3/8	3/8	3/8	1/2	
Vapor Line Sweat Connection (in.)	3/4	7/8	7/8	7/8	
Weight - Operating, (lbs) [kg]	233 [106]	251 [114]	280 [127]	295 [134]	
Weight - Packaged, (lbs) [kg]	248 [112]	266 [121]	295 [134]	310 [141]	

Units have grommet compressor mounting, TXV expansion devices, and 1/2" [12.2mm] & 3/4" [19.1mm] electrical knockouts.

Unit Maximum Working Water Pressure	
Options	Max Pressure PSIG (kPa)
Base Unit	500 (3,447)
Unit with Internal Flow Controller	145 (999)
Unit with Internal Modulating Water Valve	300 (2,068)

		TAC					
Model	026BM17	026BM21	038BM21	038BM24	049BM21	049BM24	064BM24
Connections - Sweat							
Liquid I.D. - in	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Suction I.D. - in	3/4	3/4	7/8	7/8	7/8	7/8	7/8
Cased Coil Dimensions							
A - Width - in [cm]	17 1/2 [44.5]	21 [53.3]	21[53.3]	24 1/2 [62.2]	21 [53.3]	24 1/2 [62.2]	24 1/2 [62.2]
B - Coil Height - in [cm]	14 1/2 [36.8]	17 1/2 [44.5]	25 7/8 [65.7]	25 3/8 [64.5]	25 7/8 [65.7]	25 3/8 [64.5]	30 [76.2]
C- Height - in [cm]	20 [50.8]	20 [50.8]	28 [71.1]	32 [81.3]	28 [71.1]	32 [81.3]	32 [81.3]
Weight							
Coil Weight lbs. [kg]	43 [20]	49 [22]	71 [32]	83 [38]	71 [32]	83 [38]	100 [45]
Shipping Weight lbs. [kg]	48 [22]	54 [24]	78 [35]	93 [42]	78 [35]	93 [42]	110 [50]

		WDG					
Model	024-A	024-B	036-B	036-C	048-B	048-C	060-C
Liquid I.D. in.	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Suction I.D. in.	3/4	3/4	7/8	7/8	7/8	7/8	7/8
Fan Motor Type/Speeds	ECM Variable						
Fan Motor (hp)	1/2				1		
Blower Wheel Size (Dia x W) in. [mm]	9 x 7 [229 x 178]			11 x 10 [279 x 254]			
Air Coil Dimensions (H x W) in. [mm]	14 x 17 [356 x 432]			24 x 17 [610 x 432]			24x17 [610 x 432]
Filter Standard - 1" [25mm] Thick Throwaway in. [mm]	16 x 20 [406 x 508]	20 x 20 [508 x 508]		20 x 24 [508 x 610]	20 x 20 [508 x 508]	20 x 24 [508 x 610]	
Weight - Operating lbs. [kg]	80 [36]	163 [74]	173 [78]	181 [82]	180 [82]	188 [85]	198 [90]
Weight - Packaged lbs. [kg]	96 [44]	179 [81]	198 [90]	206 [93]	218 [99]	226 [103]	236 [107]

Electrical Data

Electrical Data (HZS without Flow Controller)

Model	Compressor			HWG FLA	Total Unit FLA	Min Circuit Amps	Max Fuse/HACR
	RLA	LRA	Qty				
024	11.7	58.3	1	0.5	12.2	15.1	25
036	15.3	83.0	1	0.5	15.8	19.6	30
048	21.2	104.0	1	0.5	21.7	27.0	45
060	27.1	152.9	1	0.5	27.6	34.3	60

Rated Voltage of 208/230/60/1
All fuses Class RK-5

Min/Max Voltage of 197/252

Electrical Data (HZS with High Head Flow Controller)

Model	Compressor			Loop Pump FLA	Total Unit FLA	Min Circuit Amps	Max Fuse/HACR
	RLA	LRA	Qty				
024	11.7	58.3	1	1.44	13.1	16.1	25
036	15.3	83.0	1	1.44	16.7	20.6	35
048	21.2	104.0	1	1.44	22.6	27.9	45
060	27.1	152.9	1	1.44	28.5	35.3	60

Rated Voltage of 208/230/60/1
All fuses Class RK-5

Min/Max Voltage of 197/252

Electrical Data (HZS with Standard Head Flow Controller)

Model	Compressor			HWG Pump FLA	Loop Pump FLA	Total Unit FLA	Min Circuit Amps	Max Fuse/HACR
	RLA	LRA	Qty					
024	11.7	58.3	1	0.5	0.7	12.9	15.8	25
036	15.3	83.0	1	0.5	0.7	16.5	20.3	35

Rated Voltage of 208/230/60/1
All fuses Class RK-5

Min/Max Voltage of 197/252

Electrical Data

Electrical Data (HWG)

HWG Module	Voltage	Pump FLA	Total FLA	Min Circuit Amps
AHWG1BASS	115/60/1	0.52	0.52	1.20
AHWG1BGSS	208/230/60/1	0.40	0.40	0.90

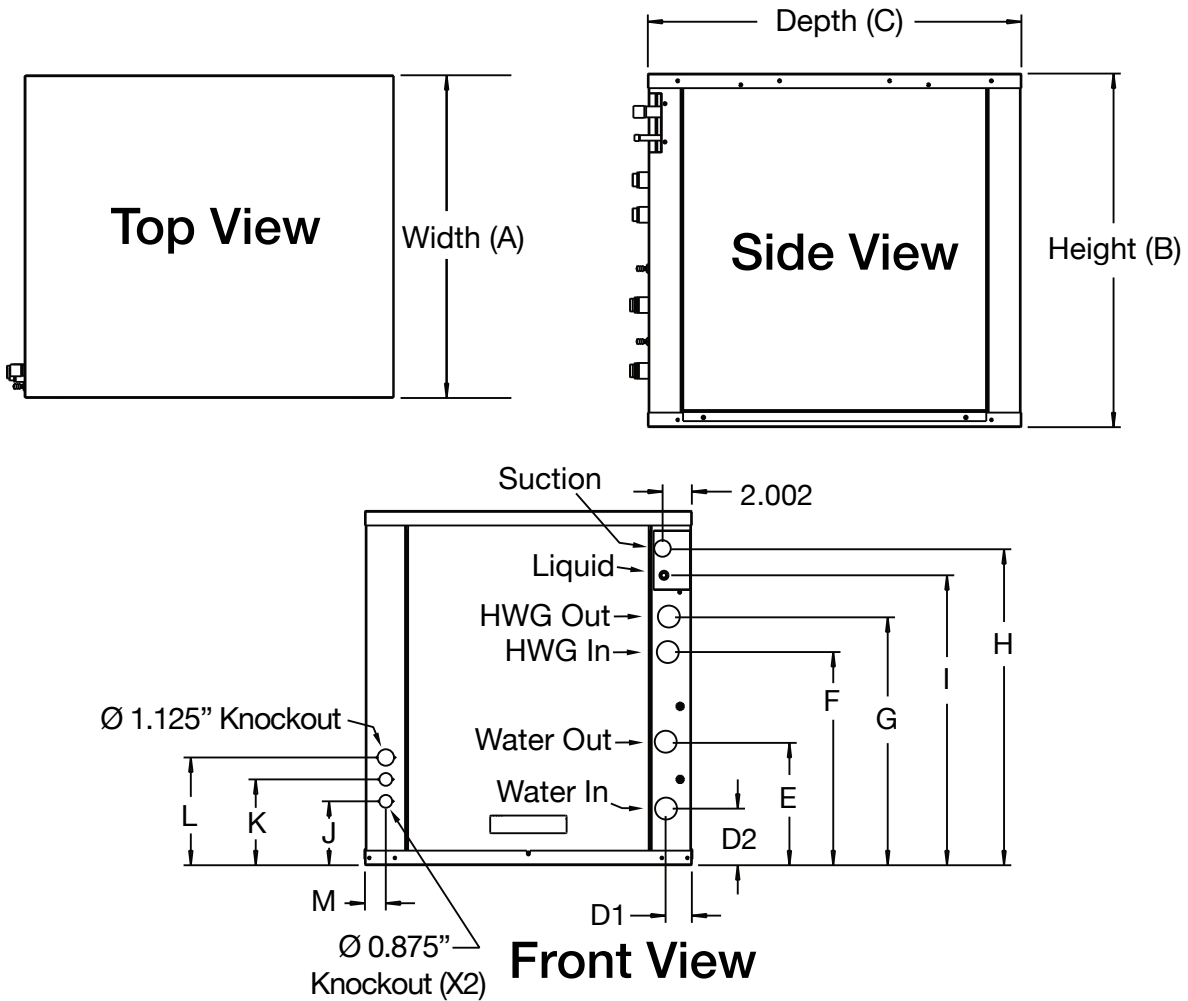
Electrical Data (WDG)

Model	Fan Motor FLA	Fan Motor HP	Max Fan ESP	Min Circ Amp (120) 208/230	Total Unit FLA	Max Fuse/HACR (120) 208/230
024	(7.7) 4.3	1/2	0.5	(7.8) 4.9	(7.7) 4.3	(15) 15
036	(7.7) 4.3	1/2	0.5	(7.8) 4.9	(7.7) 4.3	(15) 15
048	(12.8) 7	1	1	(14.4) 8.6	(12.8) 7	(25) 15
060	(12.8) 7	1	1	(14.4) 8.6	(12.8) 7	(25) 15

Dual Rated Voltate: (115) 208/230
 Min/Max Voltage: 115: 114/132
 Min/Max Voltage: 208/230: 197/252

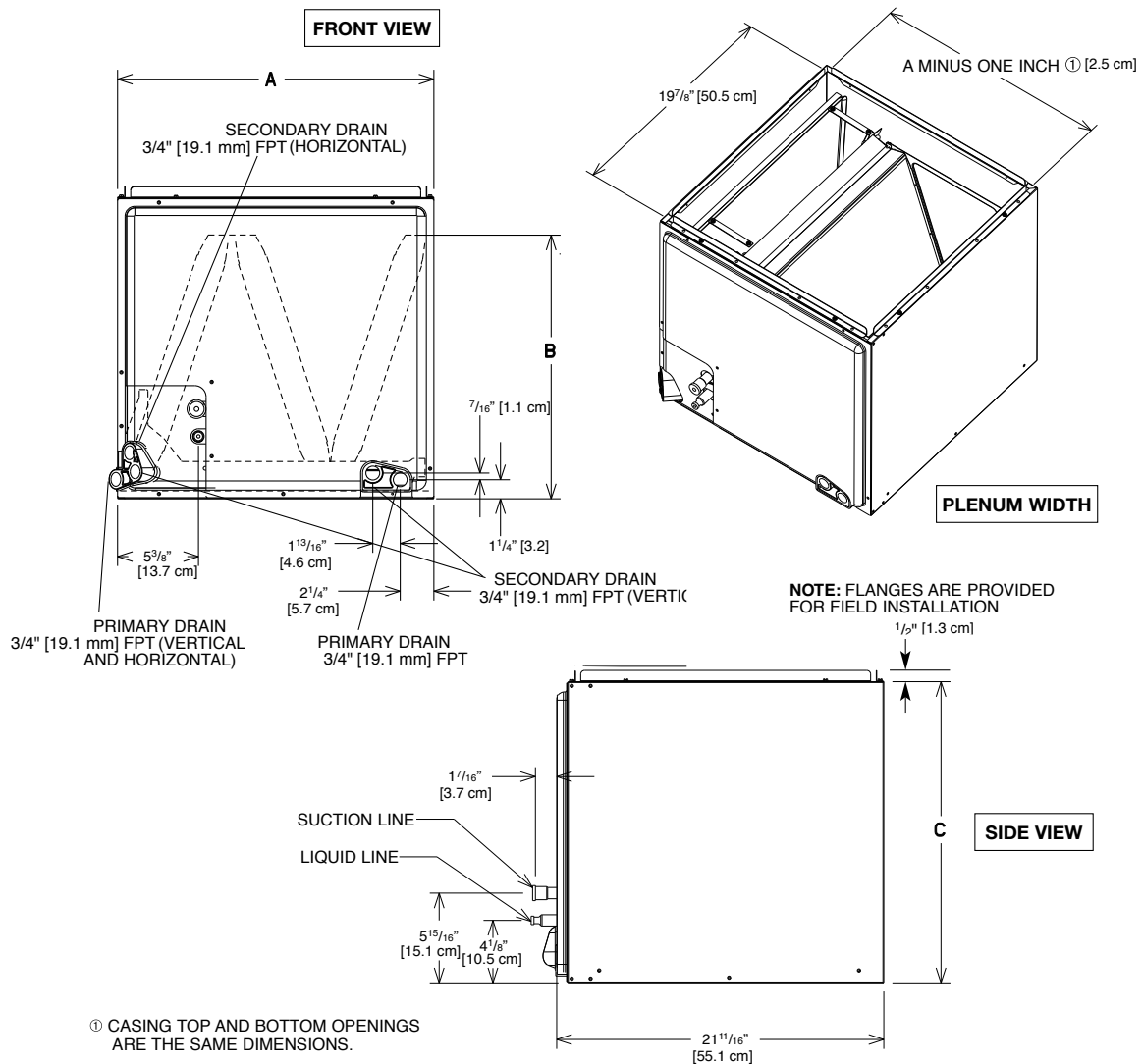
Digital Indoor (HZS) Dimensional Data

Model	Overall Cabinet			Water Connections					Refrigerant Connection				Electrical Knockouts						
	A Width	B Height	C Depth	1 Water In/Out	2 HWG In/Out	D1 Water In	D2 Water In	E Water Out	F HWG In	G HWG Out	3 Suction	4 Liquid	H Suction	I Liquid	J	K	L	M	
				Swivel															
024	in	22.4	24.3	25.6	1"	1"	1.8	3.9	8.4	14.6	17.0	3/4"	3/8"	21.6	19.8	4.4	5.9	7.4	1.4
	cm	56.9	61.7	65.0			4.6	9.9	21.3	37.1	43.2			54.9	50.3	11.2	15.0	18.8	3.5
036	in	25.4	26.3	30.6	1"	1"	2.0	3.9	8.4	15.4	18.7	7/8"	3/8"	23.6	21.8	4.4	5.9	7.4	1.7
	cm	64.5	66.8	77.7			5.1	9.9	21.3	39.1	47.5			59.9	55.4	11.2	15.0	18.8	4.3
048	in	25.4	26.3	30.6	1"	1"	2.0	3.9	8.4	15.4	18.7	7/8"	3/8"	23.6	21.8	4.4	5.9	7.4	1.7
	cm	64.5	66.8	77.7			5.1	9.9	21.3	39.1	47.5			59.9	55.4	11.2	15.0	18.8	4.3
060	in	25.4	26.3	30.6	1"	1"	2.0	3.9	8.4	15.4	18.7	7/8"	1/2"	23.6	21.8	4.4	5.9	7.4	1.7
	cm	64.5	66.8	77.7			5.1	9.9	21.3	39.1	47.5			59.9	55.4	11.2	15.0	18.8	4.3



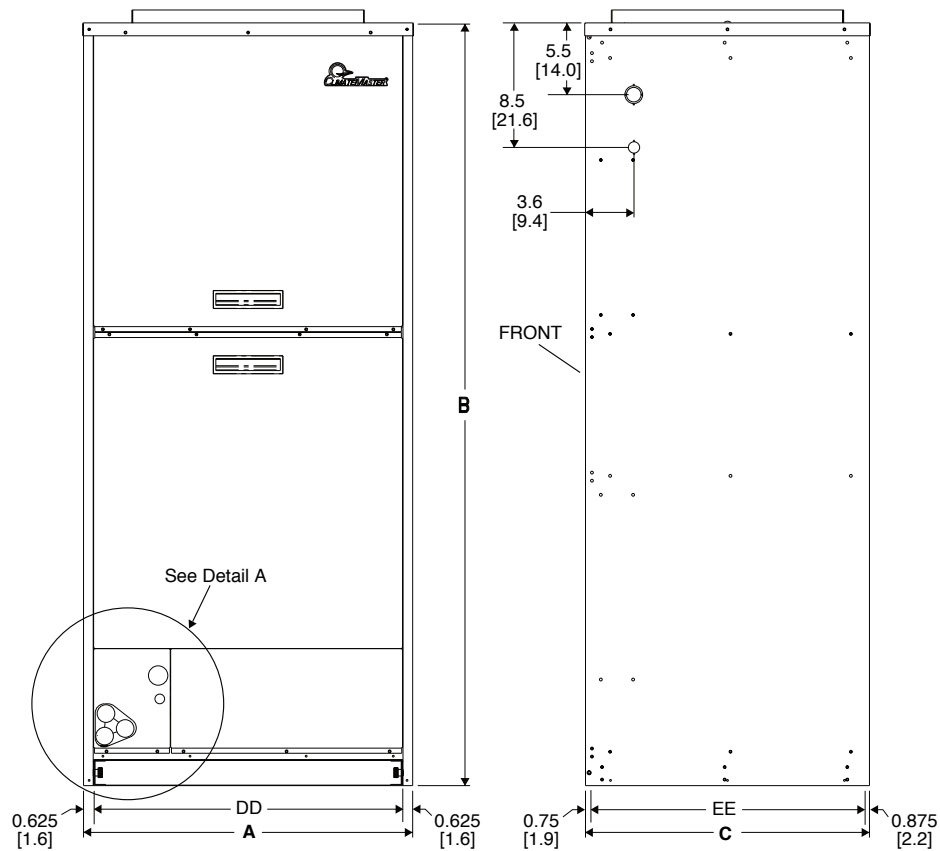
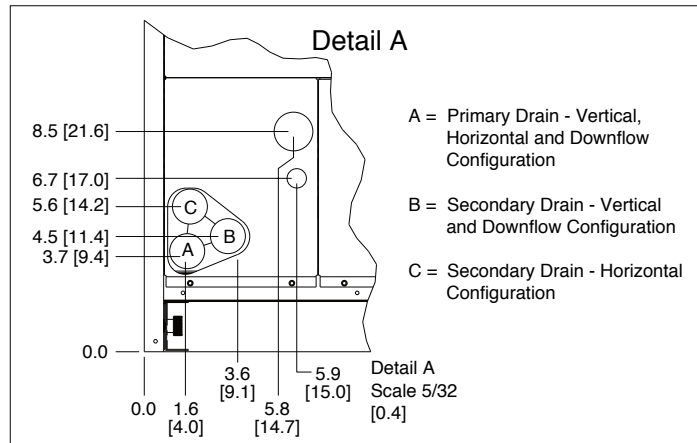
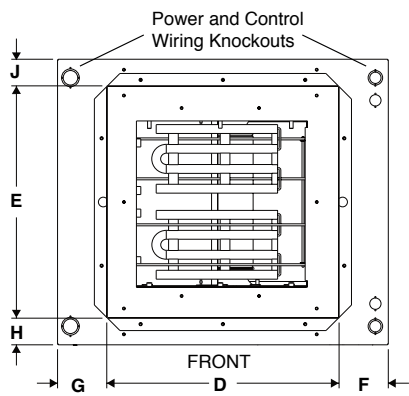
Cased Coil (TAC) Dimensional Data

Model	026BM17	026BM21	038BM21	038BM24	049BM21	049BM24	064BM24
Connections - Sweat							
Liquid I.D. - in	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Suction I.D. - in	3/4	3/4	7/8	7/8	7/8	7/8	7/8
Cased Coil Dimensions							
A - Width - in [cm]	17 1/2 [44.5]	21 [53.3]	21[53.3]	24 1/2 [62.2]	21 [53.3]	24 1/2 [62.2]	24 1/2 [62.2]
B - Coil Height - in [cm]	14 1/2 [36.8]	17 1/2 [44.5]	25 7/8 [65.7]	25 3/8 [64.5]	25 7/8 [65.7]	25 3/8 [64.5]	30 [76.2]
C - Height - in [cm]	20 [50.8]	20 [50.8]	28 [71.1]	32 [81.3]	28 [71.1]	32 [81.3]	32 [81.3]
Weight							
Coil Weight lbs. [kg]	43 [20]	49 [22]	71 [32]	83 [38]	71 [32]	83 [38]	100 [45]
Shipping Weight lbs. [kg]	48 [22]	54 [24]	78 [35]	93 [42]	78 [35]	93 [42]	110 [50]

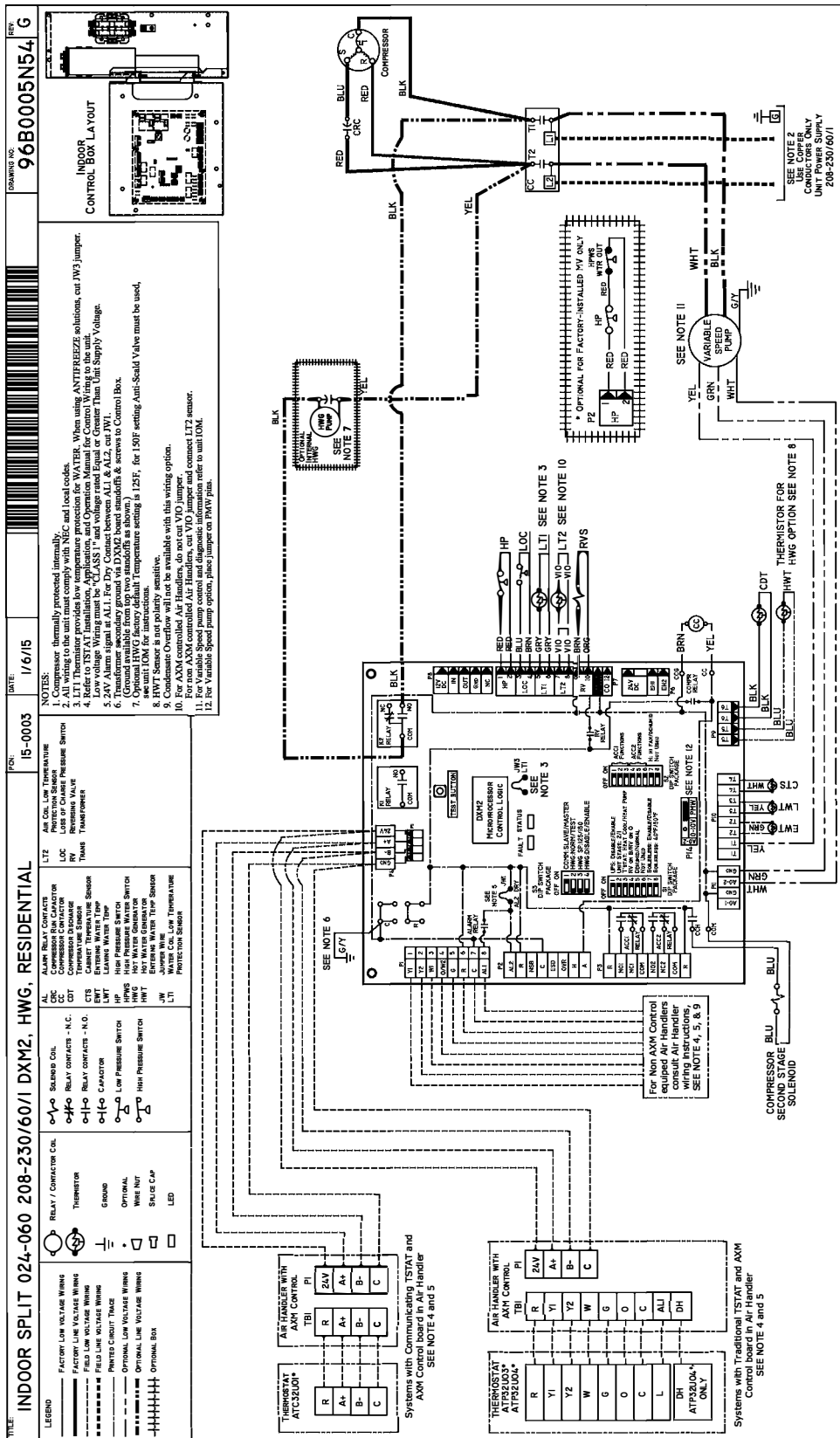


Digital Air Handler (WDG) Dimensional Data

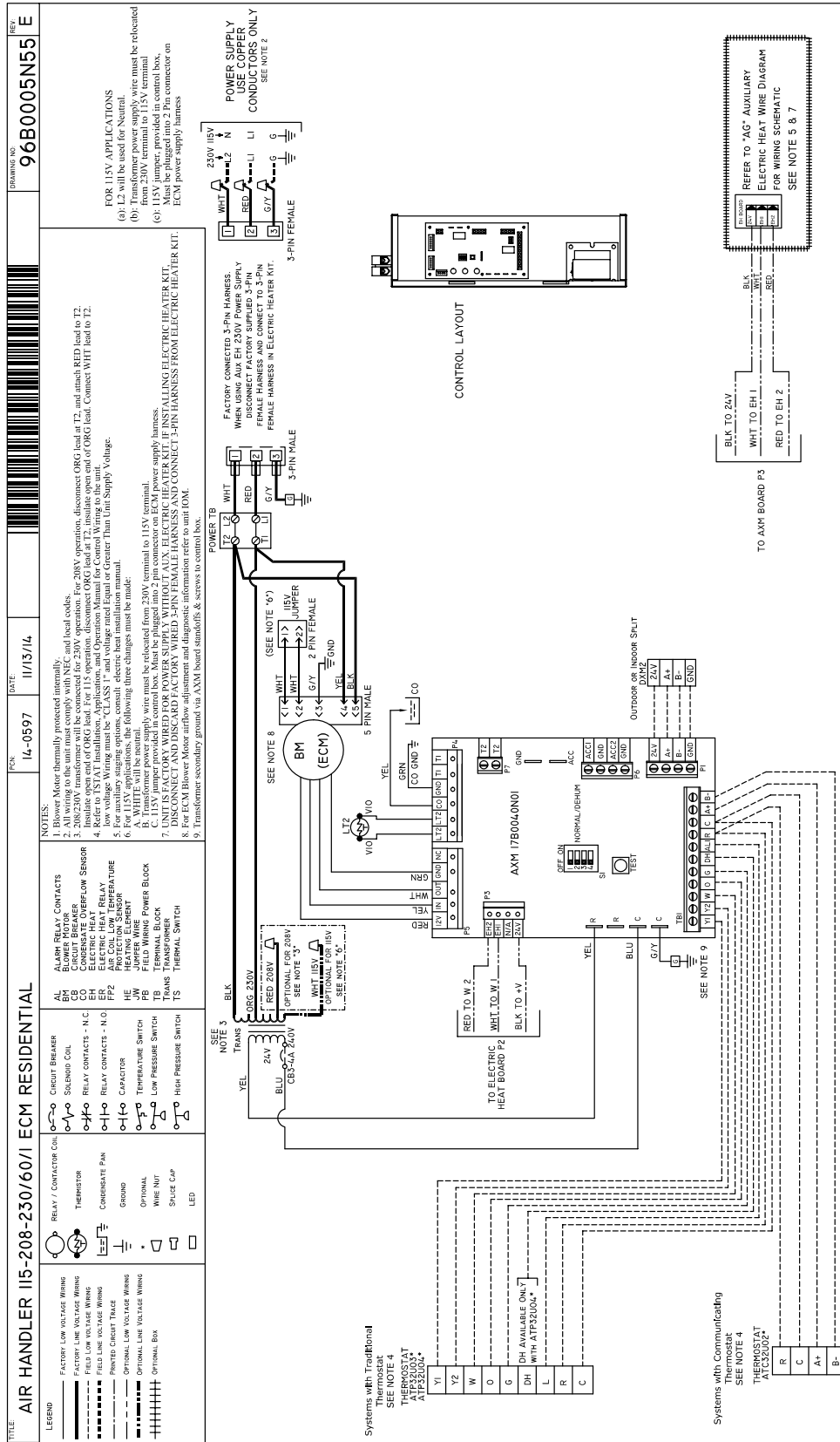
Cabinet Size	Overall Cabinet			Supply Air Opening		Return Air Opening		F	G	H	J	
	A Width	B Height	C Depth	D Width	E Depth	DD Width	EE Depth					
A - Cabinet	in.	18.5	44.0	22.0	14.0	14.0	17.3	20.4	2.3	2.3	4.1	4.1
	cm.	47.0	111.8	55.9	35.6	35.5	43.9	51.8	5.8	5.8	10.3	10.3
B - Cabinet	in.	22.0	55.0	22.0	18.0	18.0	20.8	20.4	2.1	2.1	2.1	2.1
	cm.	55.9	139.7	55.9	45.7	45.7	52.8	51.8	5.2	5.2	5.2	5.2
C - Cabinet	in.	25.5	59.0	22.0	18.0	18.0	24.3	20.4	3.8	3.8	2.1	2.1
	cm.	64.8	149.9	55.9	45.7	45.7	61.7	51.8	9.9	9.9	5.2	5.2



Digital Indoor Split (HZS) Electrical Wiring Diagram - 96B0005N54



Digital Air Handler (WDG) Electrical Wiring Diagram - 96B0005N55



Submittal Data

SUBMITTAL DATA - I-P UNITS

Unit Designation: _____

Job Name: _____

Architect: _____

Engineer: _____

Contractor: _____

PERFORMANCE DATA

Cooling Capacity: _____ Btuh

EER: _____

Heating Capacity: _____ Btuh

COP: _____

Ambient Air Temp: _____ °F

Entering Water Temp (Clg): _____ °F

Entering Air Temp (Clg): _____ °F

Entering Water Temp (Htg): _____ °F

Entering Air Temp (Htg): _____ °F

Airflow: _____ CFM

Fan Speed or Motor/RPM/Turns: _____

Operating Weight: _____ (lb)

ELECTRICAL DATA

Power Supply: 208/230 Volts Single Phase 60 Hz

Minimum Circuit Ampacity: _____

Maximum Overcurrent Protection: _____

SUBMITTAL DATA - I-P UNITS

Unit Designation: _____

Job Name: _____

Architect: _____

Engineer: _____

Contractor: _____

PERFORMANCE DATA

Cooling Capacity: _____ Btuh

EER: _____

Heating Capacity: _____ Btuh

COP: _____

Ambient Air Temp: _____ °F

Entering Water Temp (Clg): _____ °F

Entering Air Temp (Clg): _____ °F

Entering Water Temp (Htg): _____ °F

Entering Air Temp (Htg): _____ °F

Airflow: _____ CFM

Fan Speed or Motor/RPM/Turns: _____

Operating Weight: _____ (lb)

ELECTRICAL DATA

Power Supply: 208/230 Volts Single Phase 60 Hz

Minimum Circuit Ampacity: _____

Maximum Overcurrent Protection: _____

Accessories & Options

vFlow™ Internal Variable Speed Water-flow Control

Comfort-Aire/Century takes ease and speed of installation of geothermal heating and cooling systems to the next level with vFlow™ variable water flow control. vFlow™ integrates water-flow control inside the unit AND matches the flow to the unit's operating requirements. Compared to conventional units that can just turn the water-flow on or off, Digital Split units vary the water-flow, which results in lower operating cost and longer system life. New 2-way communicating control (and communicating Pump / modulating valve) make vFlow™ a reality and are only available on Comfort-Aire/Century Digital systems.

Thermostat (field installed)

The 7602-457 communicating thermostat is a programmable multi-stage auto-changeover electronic digital thermostat. The ATC offers up to 3 heating and 2 cooling stages with precise temperature control. The ATC is capable of controlling heating and cooling stages using a differential or proportional integral control algorithm. Multiple system temperatures and data can be displayed. The ATC is an integral component in system configuration and diagnostics.

Hot Water Generator (Indoor Compressor Section Only)

An optional heat reclaiming desuperheater coil of vented double-wall copper construction suitable for potable water shall be provided. The coil and hot water circulating pump shall be factory mounted inside the unit. A high limit and low compressor discharge line temperature switch shall be provided to disable the pump when these conditions occur.

Hot Water Generator (Outdoor Compressor Section Only)

An optional external heat reclaiming desuperheater module including a vented double-wall heat cupro-nickel exchanger suitable for potable water use shall be provided. The heat exchanger, hot water circulating pump, and a microprocessor control shall be factory installed in an external cabinet. A sensor shall be provided to monitor the entering potable water temperature. A second sensor shall be used to monitor the compressor discharge temperature. A microprocessor shall be provided to control the desuperheater based on the sensor inputs. The Hot Water Generator module shall be 115 vac and listed by a nationally recognized safety-testing laboratory or agency.

Cupro-Nickel Heat Exchanger

An optional corrosion resistant Cupro-Nickel coaxial heat exchanger shall be factory installed in lieu of standard copper construction (indoor section only).

Hose Kits (field installed)

A rubber hose kit shall provide connections between the unit and Flow Controller. Rubber 1" hose allows flexible connection and absorbs vibration transmission between unit

and Flow Controller. Brass elbows with MPT fittings for unit connection, barbed fittings for hose connection and FPT fittings for Pressure/Temperature ports shall be included to allow service and troubleshooting of the unit. Hose clamps shall be used to connect the hose to the brass elbows and Flow Controller.

Revision History

Date	Page #	Description
Jan 23, 2019	6,31	High Head Variable Pump update
April 1, 2016	9	Run test description
January 14, 2016	17	Update Table Data
November 23, 2015	Various	Updated Table Data
October 30, 2015	Various	Revision Updates on Data Tables and Images
October 13, 2015	All	Revision Updates
February 12, 2015	31	Update Electrical Data for External Pump
January 22, 2015	All	Added no vFlow and UPM-Geo Options
October 13, 2013	17	ISO Ratings Updated
June 7, 2013	30	Edits to 038-064 RLA, FLA and MCA
February 15, 2013	3-7	What's New, iGate™ Communicating Controls, vFlow™ Internal Variable Water Flow Control and How to Use pages added
November 9, 2012	All	First Published

Due to ongoing product improvements, specifications and dimensions are subject to change and correction without notice or incurring obligations. Determining the application and suitability for use of any product is the responsibility of the installer. Additionally, the installer is responsible for verifying dimensional data on the actual product prior to beginning any installation preparations.

Incentive and rebate programs have precise requirements as to product performance and certification. All products meet applicable regulations in effect on date of manufacture; however, certifications are not necessarily granted for the life of a product. Therefore, it is the responsibility of the applicant to determine whether a specific model qualifies for these incentive/rebate programs.



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