Submittal Specification

Preparation Date:

Project #: City: State: Owner:

Engineer:

Tag: DryComfort Dehumidification Solution Q4 Model # Q4DC-1-2000-SM-

Version: 1.1

Date:

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Q4 ENERGY SOLUTIONS
creative mechanical systems

DRY COMFORT
dehumidification solutions

MANUFACTURED BY:

Innovent
Air Handling Equipment

Submitted by:
Q4 Energy Solutions, Inc.
871 Eastwind Drive
Westerville, OH 43081
614.392.0741

Version: 1.1

Date:

Equipment list for project:

Units

Tag No	Model No	Description

Accessories

Tag No	Field Model	Description

Notes

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PERFORMANCE DATA SUMMARY

TAG: **ELEVATION:** **0 FT**

FILTER

CFM	HEIGHT (INCHES)	WIDTH (INCHES)	QUANTITY	FT²	FPM
2,000	24	24	1	4.0	500
			Total	4.0	500

AIR-TO-AIR HEAT EXCHANGER: CROSS FLOW FLAT PLATE — ENERGY RECOVERY

CFM	EDB/WB (°F)	LDB/WB (°F)	CFM	EDB/WB (°F)	LDB/WB (°F)
RETURN AIR DATA			PROCESS AIR DATA		
2,000	75.0/62.5	55.4/55.2	2,000	38.6/38.6	58.1/48.3

COOLING: — INTEGRAL REFRIGERATION: AIR COOLED CONDENSING

CFM	REF.	FPM	EDB/WB (°F)	LDB/WB (°F)	MBH (T/S)	ROWS	FPI
2,000	R-410A	485	55.4/55.2	38.6/38.6	78.3/36.8	8	10

COOLING TONS	CND EDB/WD (°F)	CND LBD/WB (°F)	CIRCUITS	# OF STAGES	REF. EER
6.5	58.1/48.3	104.1/66.0	1	MOD	12.6

FAN/MOTOR ASSEMBLY: — SUPPLY

CFM	SIZE	QTY	TSP ("WC)	RPM	VFD FREQ (Hz)	BHP	MOTOR HP
2,000	13.8"	1	3.84	2514	NA	1.98	2.55

ESP	1.00	FILTER	0.25	HW COIL	-	CND COIL	0.31
HX (ER)	-	FINAL FILTER	-	STM COIL	-	DX COIL	0.87
HX (PLATE-PC)	0.57	S/A HEPA FILTER	-	FURNACE	-	DEC	-
HX (PLATE-RH)	0.54	FILTER LOADING	-	HGR COIL	-	LOUVER	-
PLENUM	0.30	ELECTRIC HEATER	-	HUMIDIFIEF	-	TSP:	3.84 "WC

* If fan quantity is greater than 1: RPM, VFD Frequency, BHP and Motor HP are per fan

ELECTRICAL INFORMATION: — SINGLE POINT POWER

COMPONENT	VOLTS	PHASE	FREQ.	DISCONNECT	FUSING	MOP	MCA	ETL
UNIT	208	3	60	60	N/A	50	35.8	LISTED
UNIT	460	3	60	30	N/A	30	19.1	LISTED

7 Ton Compressor		Space Temperature (°F)					
		70			75		
Space Dew Point Temperature (°F)	50	EAT: %RH	LBS/HR	EER	EAT: %RH	LBS/HR	EER
		49	25.3	13.2	41.4	25.3	12.7
		LAT: DB	LAT: WB	LAT: DPT	LAT: DB	LAT: WB	LAT: DPT
		91	61.4	38.1	96.6	63.3	38.1
	55	EAT: %RH	LBS/HR	EER	EAT: %RH	LBS/HR	EER
		59.9	39.5	13.4	49.8	36.9	13
		LAT: DB	LAT: WB	LAT: DPT	LAT: DB	LAT: WB	LAT: DPT
		99.7	64.4	38.1	103.8	66.1	39.5
	60	EAT: %RH	LBS/HR	EER	EAT: %RH	LBS/HR	EER
		70.6	48.2	13.3	59.6	45.1	12.9
		LAT: DB	LAT: WB	LAT: DPT	LAT: DB	LAT: WB	LAT: DPT
		104.8	67.2	42.3	107.8	68.6	43.8

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Specifications:

CASING PERFORMANCE:

- Leakage class rating of 5.0 at 8” of total static pressure
- Maximum panel deflection shall not exceed L/250 at 8” total static pressure
- Minimum R-6 insulation value for walls, ceiling and flooring
- The panel insertion loss, per octave band, shall not be less than the following:

Frequency:	100	125	250	500	1000	2000	4000	8000
Insertion loss, dB:	24	16	30	32	33	34	63	60

CASING MATERIALS:

- 2 pcf polyurethane foam insulation in walls, ceiling and floor
- 2” double wall floor panels
- 0.063” aluminum inner floor
- 0.040” aluminum outer floor
- 2” double wall casing panels
- 0.040” aluminum outer wall
- 0.040” aluminum inner wall
- Indoor construction
- Unit shall be shipped as a single piece of equipment

CASING ACCESS:

- Double wall access panels insulated with 2 pcf polyurethane foam as identified on the unit drawings.

AIR TO AIR HEAT EXCHANGER:

- Cross flow flat plate type.
- 8 mil smooth aluminum plates separated by formed ribs
- Aluminum framing & end plates
- 0.063” aluminum drain pan (drains into cooling coil pan)

SUPPLY FAN & MOTORS:

- 6 blade backward curved plenum fan, composite wheel, galvanized steel frame
- Direct drive EC motor
- Fan statically and dynamically balanced within 0.11 in/sec peak velocity
- Electronically commutated motor
- Premium efficient
- Integral variable speed motor control

FILTERS:

RETURN AIR:

- 2" pleated MERV 8 filter, 500 FPM maximum face velocity
- Side access
- Aluminum rack

COOLING:

- Integral air cooled refrigeration system
- DX coil rated in accordance with AHRI 410-2001
  - 0.063” aluminum drain pan
  - .016” thick copper tubes
  - .006” thick aluminum fins
  - 16 ga. stainless steel frame
- Single digital scroll compressor
- Condenser coil with copper tubes and aluminum fins
  - .012” thick copper tubes
  - .006” thick aluminum fins
  - 16 ga. galvanized steel frame
- All refrigerant circuits tested, dehydrated and charged with refrigerant

ELECTRICAL:

- Single point 3-phase power connection with unit mounted disconnect
- Power wiring enclosed in conduit
- All wires terminated at the unit mounted NEMA 3R panel
- Unit is ETL listed per UL standard 1995 and CSA standard C22.2 #236
- Phase protection
- Unit HOA switch with green “on” lamp and red “alarm” lamp mounted on the front of the control panel

CONTROLS:

- Standalone unit controller with remote user terminal provided (factory programmed)
- BACnet IP compatible
- Remote user terminal shall be factory mounted in the control panel and pre-wired to a prefabricated 6 ft. cord.
- Remote user terminal can be field mounted, by others
- Room temperature and humidity sensor provided by Innovent
- Room temperature and humidity sensor shall be installed by the factory, can be
- removed for field installation by others.

ACCESSORIES:

· Units will be packaged for shipment in wooden crates and secured using lag bolts

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SEQUENCE OF OPERATION

The following Sequence of Operation is Q4's recommendation as how to meet the requirements for this job. This is subject to review by the controls operator. Q4 will not be responsible for costs accrued for modification to the sequence after the product has shipped.

Before Operation

- Verify that the supply voltage is the same as the rated voltage on the unit
- Connect the Remote User Terminal (RUT) to the DDC.

Operating the DryComfort Dehumidifier

- Unit Start Command
  - Disconnect switch in "On" position
  - HOA switch in "Hand" position or HOA in "Auto" position and commanded on through BMS.
  - Dehumidification operation per below.
- Unit Stop Command
  - Disconnect switch in "Off" position, HOA switch in "Off" position, or unit commanded off through BMS and HOA in "Auto" position.
  - Fans and compressor are de-energized
- Unit HOA Modes
  - In 'Hand' mode the unit shall run according to the locally programmed set points and the BMS, if present, will be used for monitoring only. The green LED will be solid while the unit is running in 'Hand' mode. The red LED will be solid only when there are alarms present.
  - In 'Auto' mode the unit shall run according to the BMS set points. If the BMS goes down, the unit will revert to the locally programmed set points and the DDC will alarm over the missing BMS. The green LED will be solid while the unit is running in 'Auto' mode and if the BMS has commanded the unit off, the green LED will flash periodically.
- Dehumidification Set Point
  - The DDC controller shall energize the dehumidification mode when the return (room) air inlet humidity increases above the dehumidification set point (set points adjustable at the Remote User Terminal)
    - Dehumidification Mode Set Point (factory set point = 51; +2F dead band; adjustable from the remote user terminal)
    - BMS to provide return (room) dew point set point through BACnet
      - Dew point range: 45F – 55F
- Dehumidification Mode
  - On a call for dehumidification, the DDC controller shall energize the dehumidification mode:
  - **Maximum Dehumidification Capacity:**
    - Supply fan runs continuously
    - The dehumidifier shall cycle on/off the compressor to maintain the return (room) air inlet humidity at set point. There shall be a minimum on/off time to prevent short cycling of refrigeration system (600 sec, adjustable)

        - When energized the compressor shall modulate to maintain a constant discharge air temperature leaving the DX coil. DX coil leaving air temperature set point = 39F (set point adjustable at the Remote User Terminal)
        - If the cooling coil fin temperature sensor reads 35F for more than 5 minutes the cooling coil discharge air temperature set point shall be reset to 42F for 15 minutes, then reset back to 39F if the cooling coil fin temperature sensor is increased above 35F.
- Suction Line Pressure Low Limit Function
    - If the suction pressure drops below 95psi the compressor capacity command will be reduced. The compressor capacity command is reduced from its current command down to a minimum of 25% as the suction pressure drops from 95 psi (29F) to 85psi (24F). Function: Prevent low refrigeration pressure trips, freezing of the DX coil, and operation outside the operating envelope of the compressor.
- Suction Line Pressure High Limit Function
    - If the suction pressure increases above 170psi the supply fan airflow will be reduced. The supply fan airflow command will be reduced from its current command down to a minimum of 25% as the suction pressure increases from 170 (60F) to 180psi (63F). Function: Prevent compressor operation outside the compressor operating limit.
- Discharge Line High Limit Function
    - When the discharge line pressure rises above 475psi the compressor capacity command will be reduced. The capacity command is reduced from its current command down to a minimum of 25% as the discharge line pressure rises from 475 (130F) to 550psi (145F). Function: Prevent compressor operation outside the compressor operating limit.
- Refrigeration Pressure High & Low Limit Alarms
    - If the refrigeration system high and low-pressure limits are exceeded, the DDC controller shall signal an alarm condition and turn on the red “alarm” lamp. The red “alarm” lamp shall automatically reset when the alarm condition no longer exists. Three alarms within a one-hour period shall hold the red “alarm” lamp on.
- Phase Loss Alarm
    - If the phase loss protector indicates loss of phase the unit shall be de-energized and the DDC controller shall signal an alarm condition and turn on the red “alarm” lamp. The unit shall automatically restart when phase loss alarm has reset.
- Alarm Indication
    - Alarm indications are indicated by the red “alarm” lamp on the front of the control panel. All alarms shall be viewable from the Remote User Terminal

Drawings

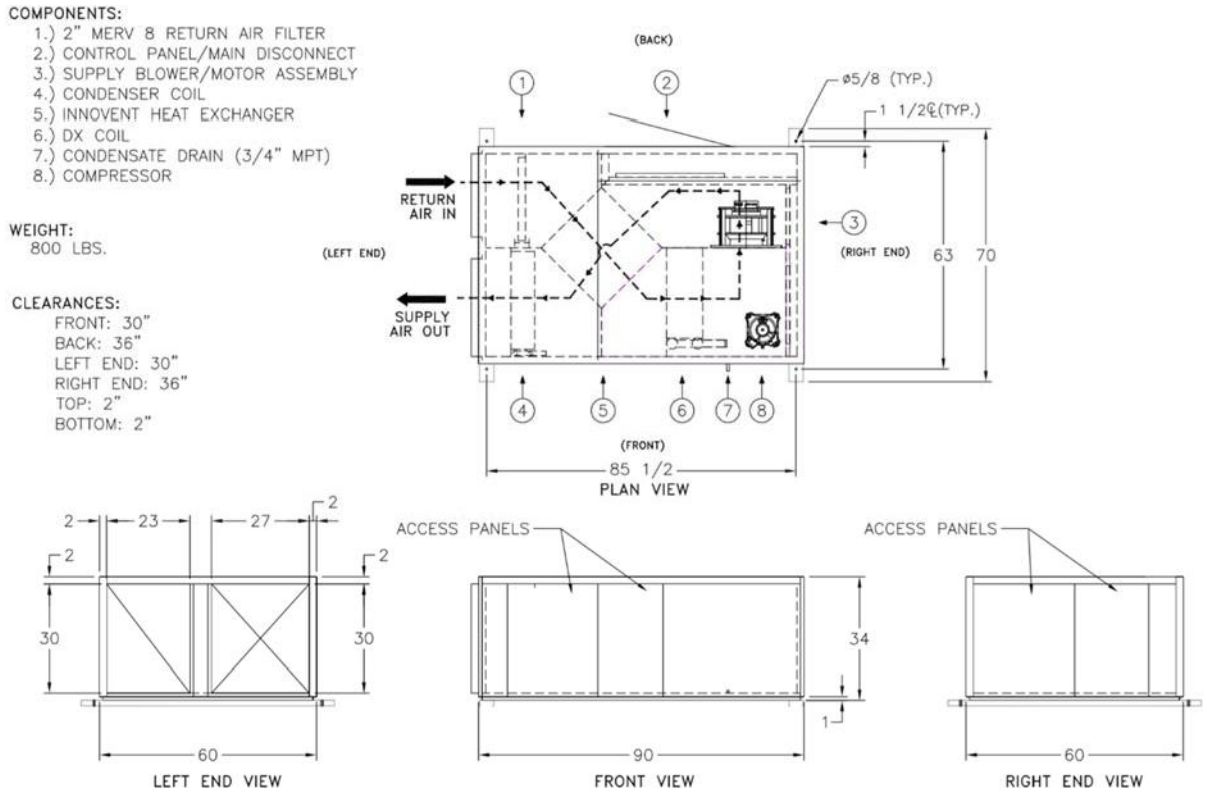

Figure 1: Plan Views

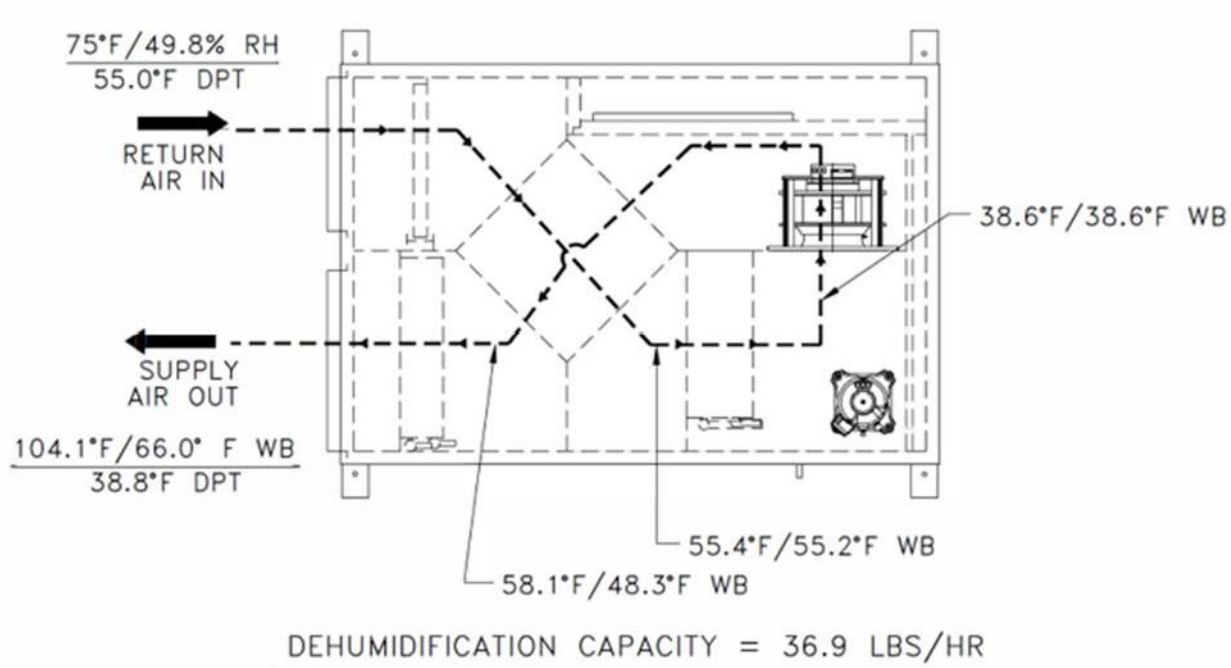

Figure 2: Performance

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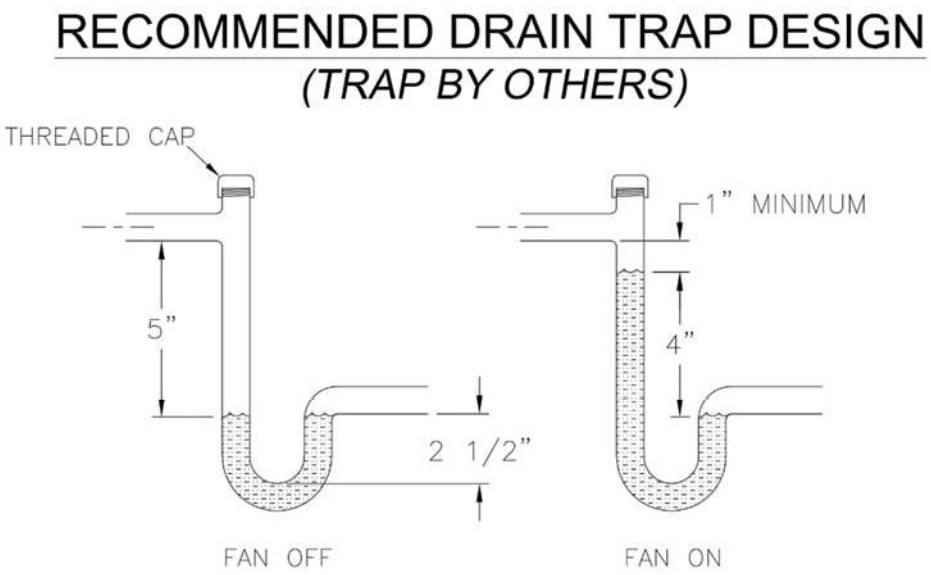

Figure 3: Drain Trap Design

IMPORTANT: Drain Trap Note

Threaded vent cap on P-Trap is for ease of priming to assure proper condensate flow.