NOVEL AIRE TECHNOLOGIES

HEAT & MASS TRANSFER PRODUCTS

DH-250
Desiccant Dehumidifier

TECHNICAL MANUAL

INSTALLATION, OPERATION & MAINTENANCE

NovelAire Technologies
DH 250 Desiccant Dehumidifier Technical Manual

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SAFETY CONSIDERATION

Follow safety codes. Installation must be in compliance with local and national building codes. Read the instruction thoroughly before installation.

1.0 DESCRIPTION

The NovelAire DH-250 Desiccant Dehumidifier is used in a wide range of applications:

- Dehumidifying storage rooms, vaults, small manufacturing, and industrial processing centers
- Used in restoration and water damage applications.
- Used in military storage applications, this unit produces dry air in the space to increase readiness, prevent corrosion, reduce maintenance and improve *Mean Time Between Failure* (MTBF) for electronic systems.

The major components of this dehumidification package are the proprietary NovelAire dehumidification wheel, electric resistance (PTC type) heaters for regeneration, and two blowers (for the process and regeneration air streams). Other elements include a small drive motor to rotate the wheel through the two air streams, and a control panel.

With a process air flow of 185 CFMs and a dehumidification capacity of up to 8 pounds per hour of moisture removal depending on inlet conditions, the unit has a broad range of applications.

1.1 PRINCIPLE OF OPERATION

The operation of the DH-250 Desiccant Dehumidification system is driven by two counter current air streams flowing through the wheel. Return air from the conditioned space is drawn through the desiccant wheel by the process blower. The desiccant wheel adsorbs moisture from the air stream and returns the dry supply air to the conditioned space. At the same time, the moisture containing portion of the desiccant wheel is rotated into a separate air stream to be regenerated. Fresh air for the regeneration air stream is drawn into the unit by the regeneration blower through an electric resistance heater. The heated air is then drawn through the saturated side of the desiccant wheel where the desiccant wheel desorbs moisture into the heated regeneration air stream and discharged outside of the conditioned space through the exhaust duct, leaving reactivated desiccant to be rotated back into the return air stream. During operation the wheel rotation is continuous between the two air streams. The wheel is designed to run at a 24 RPH (rotation per hour).

1.2 CABINET DESIGN AND SIZE

The cabinet of the DH-250 and all of the components used in the design are of solid construction and selected to withstand rugged use in a wide variety of applications. The interior of the DH-250 is laid out to minimize pressure drop through the wheel and to reduce the overall unit size.

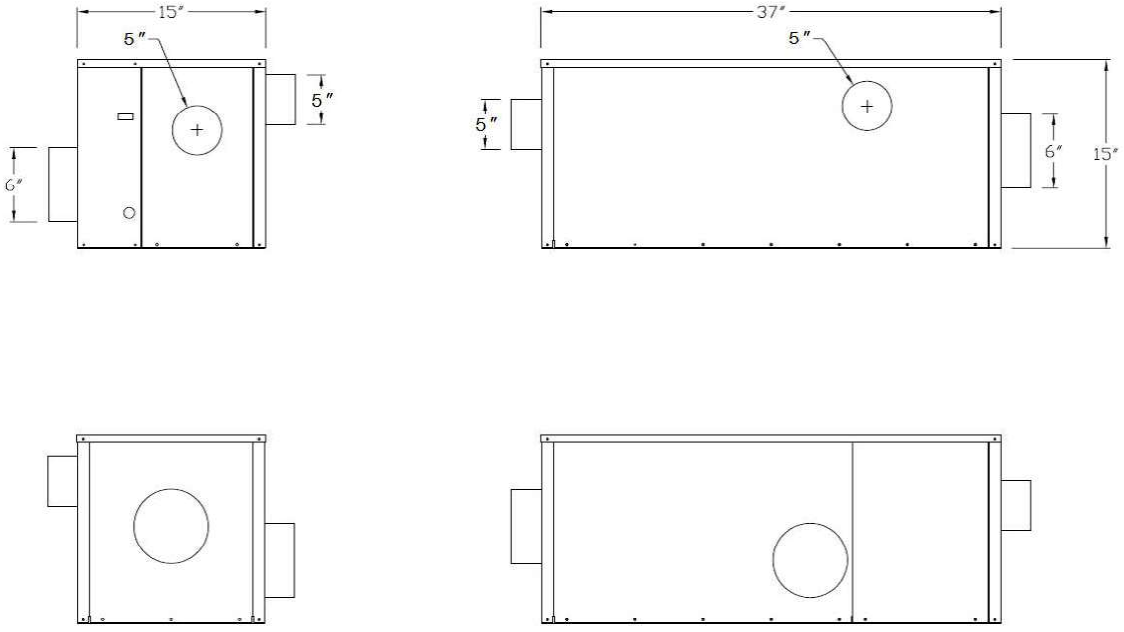
The proprietary desiccant wheel is housed in one chamber and thoroughly sealed to separate the process and regeneration air streams.

The exterior of the unit has a pre painted metal finish and the interior is galvanized sheet metal.

The chart below will give you basic information in regards to the unit's construction.

DH-250 Desiccant Dehumidifier Properties:

Weight:	95 lbs. (43.9 kg)	Process Inlet Connection:	6"
Length:	37" (93.3cm)	Process Outlet Connection:	6"
Height:	15" (38.1cm)	Regen Inlet Connection:	5"



2.0 INSTALLATION

The DH 250 Desiccant Dehumidifier is designed to be a stand-alone unit. It is designed to be installed inside of the conditioned space with proper exhaust ducting or an adjacent covered area and ducted to the space to be conditioned. Whichever installation location is selected, it is recommended that the DH 250 be installed so that the front control panel and the power connection are easily accessible.

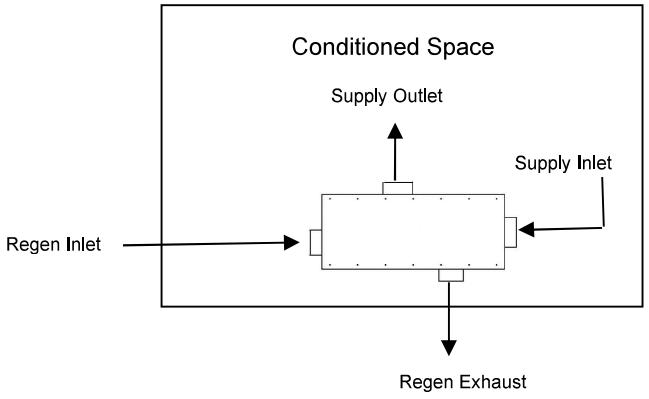
IMPORTANT - In any installation, the wheel is designed to operate in the vertical orientation.

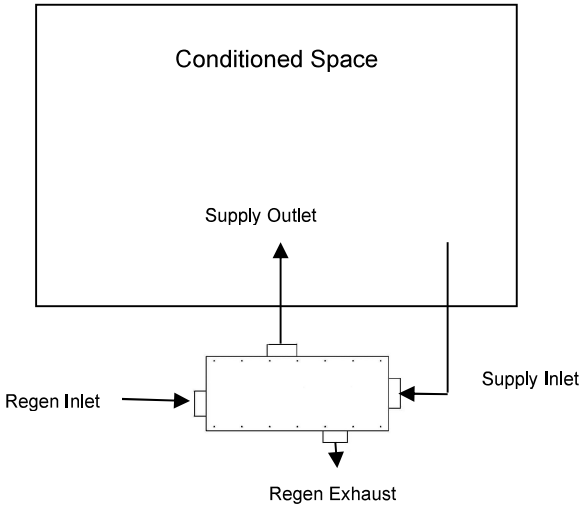
IMPORTANT – To achieve proper operation of the dehumidifier, the supply air must always be connected to discharge inside the conditioned space, and the exhaust air must always be connected to discharge outside the conditioned space.

IMPORTANT – For proper operation of the DH 250, it is necessary that the air flow into and out of the unit be unimpeded. For optimum operation, it is recommended that there be 12 inches clear in front of both the inlet and outlet air streams of the DH 250.

2.1 EXAMPLES

Shown are two examples of the DH 250 as it might be installed for different applications. Note that the Regen Air is always outside the Conditioned Space in each example and the Supply Air always discharges inside the Conditioned Space. Best performance will be obtained using the recommended Installation. Care should be exercised with additional installations options. Contact manufacturer for information about installation options.





***** This current model is not designed or manufactured for outdoor use *****

2.2 FILTERS

Unit filtration is extremely important for not only indoor air quality but safe operation of the unit as well. Dirt and debris that enter into the system could be a fire hazard. The DH 250 requires external filtration for the return and regeneration inlets. Ensure that the unit is properly filtered at the grill before operation of the DH 250.

When sizing your return and regeneration inlet grills, always ensure you have at least 144 sq in of surface face on each grill.

Example:
12" x 12" filter back grill = 144 sq. in. of surface space.

2.3 ELECTRICAL CONNECTIONS

⚠ **SAFETY CONSIDERATION** ⚠

Electrical installations must comply with the applicable provisions of the current editions of the National Electrical Safety Code, and any Local Codes where the unit is installed.

When installed, the appliance must be electrically grounded in accordance with local codes or in absence of local codes with the National Electrical Code, ANSI/NFPA 70. *See Section 1.3 for breaker sizing and electrical data.*

The unit is designed to have 208/230VAC 1 phase 60 Hz power connected to the terminal block in the control panel in the unit. (See picture at right)

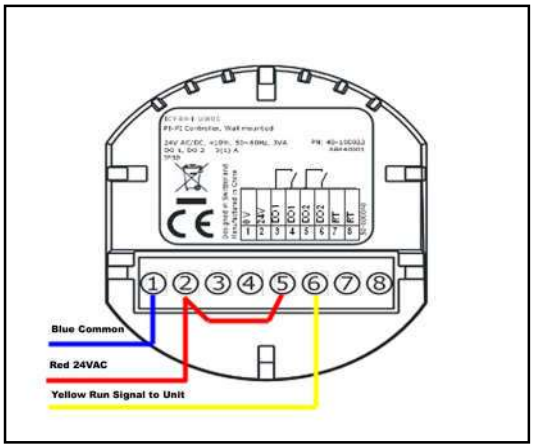
IMPORTANT: The 24VAC transformer is designed to accommodate 208VAC or 230VAC power. A switch is located in the control panel and the proper voltage must be selected before operation of the unit.

Ground wire is tied into the ground lug. 208/230 VAC is connected to the circuit breaker.

2.4 CONTROL WIRING

On the same panel where the power enters the unit are the external controls. The unit is designed to be connected to a humidistat. The unit will run whenever the 24VAC signal from R is closed on D. Typically C, R, and D will be wired to a humidistat that is placed inside of the conditioned space. The humidistat will close the signal to the unit to keep the space at the desired set point. If using a NovelAire humidistat, see the next section for more wiring details. The picture to the right shows the terminal block located on the side of the unit.

Humidistat Wiring



A humidistat is available through NovelAire. The diagram to the right shows connections for a NovelAire TCY-BH-U humidistat. If the humidistat was purchased with the unit through NovelAire, use this wiring diagram to make your connections.

If you are using a separate humidistat not provided by NovelAire, refer to that manufacturers wiring diagram.

Control Power is as follows:

- C: 24VAC (common from internal transformer or -)
- R: 24 VAC (hot from internal transformer or +)
- Y: Unit Run signal input. (closes circuit for unit to start)

2.5 SAFETY CONTROLS

The unit is protected by a 20 amp circuit breaker inside the control panel. The two thermal resets protect the gear motor for the desiccant wheel. Always verify there is no voltage on the unit before attempting to service or troubleshoot.

There are also two temperature limit controls for unit protection wired in series.

- The 150ºF snap disk limit control is located in the exhaust air stream. The limit opens if the temperature reaches 150ºF and will close once the temperature falls to 130ºF. This limit control will automatically reset if opened.

- The 160ºF snap disk limit control is located in the supply air stream. The limit will open if the temperature reaches above 160ºF and will have to be reset manually. To reset the limit you will need to open the control panel and press the red reset on the back of the limit. See picture for location of the switch and reset.

3.0 START UP AND OPERATION

Before operation, ensure that the unit has been properly wired to a humidistat in the conditioned space. Without a humidistat, the unit will not receive a run signal and will not operate.

3.1 FIRST TIME START UP

Before connecting ductwork to unit. Perform the following steps to ensure the unit is fully functional.

1. Ensure correct voltage is running to unit.
2. Ensure voltage switch is set to correct voltage.
3. Ensure transformer is wired for the correct voltage. (See orange Tag inside control panel)
4. Ensure the humidistat is properly wired and power unit up.
5. Ensure the humidistat has closed the unit run signal and confirm rotation of the desiccant wheel visually by looking through exhaust duct. Wheel should rotate in a counterclockwise direction at 24 RPH.
6. Confirm operation of the Process Blower by feeling air flow at the Supply Air Outlet on the end of the unit near the control board.
7. Confirm operation of the Regen Blower by feeling air flow at the Exhaust Air Outlet at the opposite end of the unit.
8. The unit is now ready for routine operation.

3.2 NORMAL OPERATION

1. For automatic operation with humidistat control – Connect humidistat into the terminal block and set humidistat at desired %RH.
2. To turn unit off, set the humidistat at the highest set point.

3.3 MAINTENANCE

The only routine maintenance required for the DH 250 is the cleaning and/or replacement of the inlet air filters in the ductwork.

Return Air Inlet	Replace every 3 months
Regen Air Inlet	Replace every 3 months

4.0 TECHNICAL DATA

4.1 ELECTRICAL DATA:

The following electrical ratings, listed below, are posted in the Certification Construction Report filed with ETL and are valid for safe operation.

Voltage:	208/230 VAC / 1 Phase / 50-60 Hz.
Unit FLA:	22.5 Amps
Unit MCA:	27.6 Amps
Unit MOP:	30.0 Amps

Recommended Circuit Breaker Size: 30 AMP

It should be noted the unit RLA will increase with decreasing ambient temperature, and conversely decrease with increasing ambient temperatures.

The chart below will give you specifics on each component of the system.

Motor	**IM Number**	**Watts**	**RLA**	**FLA**
Process Fan (250 CFM)	19050300	100 W	.70	.85 A
Regen Fan (125 CFM)	19050305	70 W	.70	.85 A
Gear Motor (4 RPM)	19010077	37 W	.33	.25 A
Heater #1 (5 Bank)	50200230	2000 W	9.7 A	13.4 A
Heater #2 (3 Bank)	50200230	1200 W	5.8 A	8.1 A

4.2 BASIC TROUBLESHOOTING

Listed on the next page is a basic troubleshooting guide. It will not go into detail on every repair. If unit does not operate properly beyond the guide, it is recommended that you contact a qualified service technician or NovelAire Technologies for assistance.

Manufacture technical support is available by using the contact information found in section 4.3

PROBLEM	CAUSE	SOLUTIONS
Entire unit is not running	Flipped breaker	Flip breaker. If persistent call service technician.
	No power to unit	Check main power supply.
	Heater not operating	Check for warm air at Exhaust Air Outlet; if not warm, consult factory.
	One or more fans not operating	Confirm high volume air flow from both Supply and Exhaust Air Outlets. See 3.2.1.4 on previous page. If low flow or unbalanced flow, consult factory.
	Wheel not rotating	Confirm rotation of wheel. See 3.2.1.3 on previous page. If wheel not rotating, consult factory.
Unit running, but not dehumidifying	Air flow blocked	Check that all air inlets and outlets are not blocked and allow unobstructed air flows to and from unit.
		Check and clean both air inlet filters as required.
	Exhaust Air Duct leaking or improperly returning moist exhaust to conditioned space.	Check that all Exhaust Air is ducted outside of the conditioned space.
	Temperature reached above 160 F in supply air.	Reset limit switch

4.3 TECHNICAL SUPPORT AND SERVICE

Factory	NovelAire Technologies
Address:	10132 Mammoth Drive
	Baton Rouge, LA 70814-4420
Telephone:	(225) 924-0427
	(800) 762-1320
Fax No.:	(225) 934-0340
E-mail:	service@novelaire.com

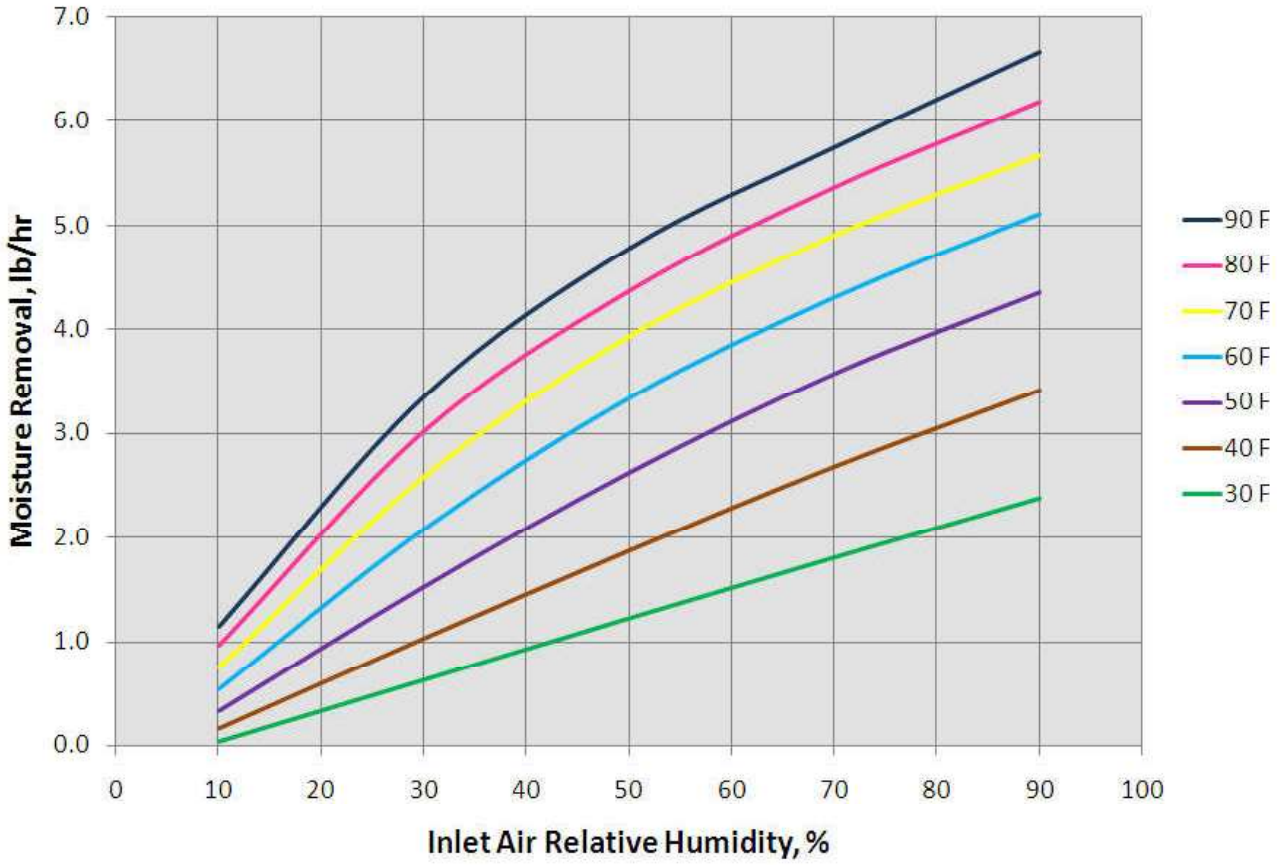
4.4 TECHNICAL AND PHYSICAL INFORMATION

Model:	DH-250 (Desiccant Dehumidifier
Revision:	C
Serial Number:	
Voltage:	208/230 VAC / 1 Phase / 50-60 Hz.
Control and Interlock	24VAC (internal transformer)
Unit FLA:	22.5 Amps
Unit MCA:	27.6 Amps
Unit MOP:	30.0 Amps
Size:	L 37” x W 15.2” x H 15.2”
Weight:	95 Lbs.
Process Inlet Duct Size:	6”
Process Outlet Duct Size:	6”
Regen Inlet Duct Size:	5”
Regen Outlet Duct Size:	5”
ETL Certification :	UL Listed, Control Number: 3058879 (US and Canada)
Process Volume:	185 CFM
External Static:	.2” W.C.

This unit has been authorized to mark certified and meets UL standards for Safety for Heating and Cooling Equipment, UL 1995/CSA C22.2 No. 236.-05 Third Edition, Dated February 18, 2005.

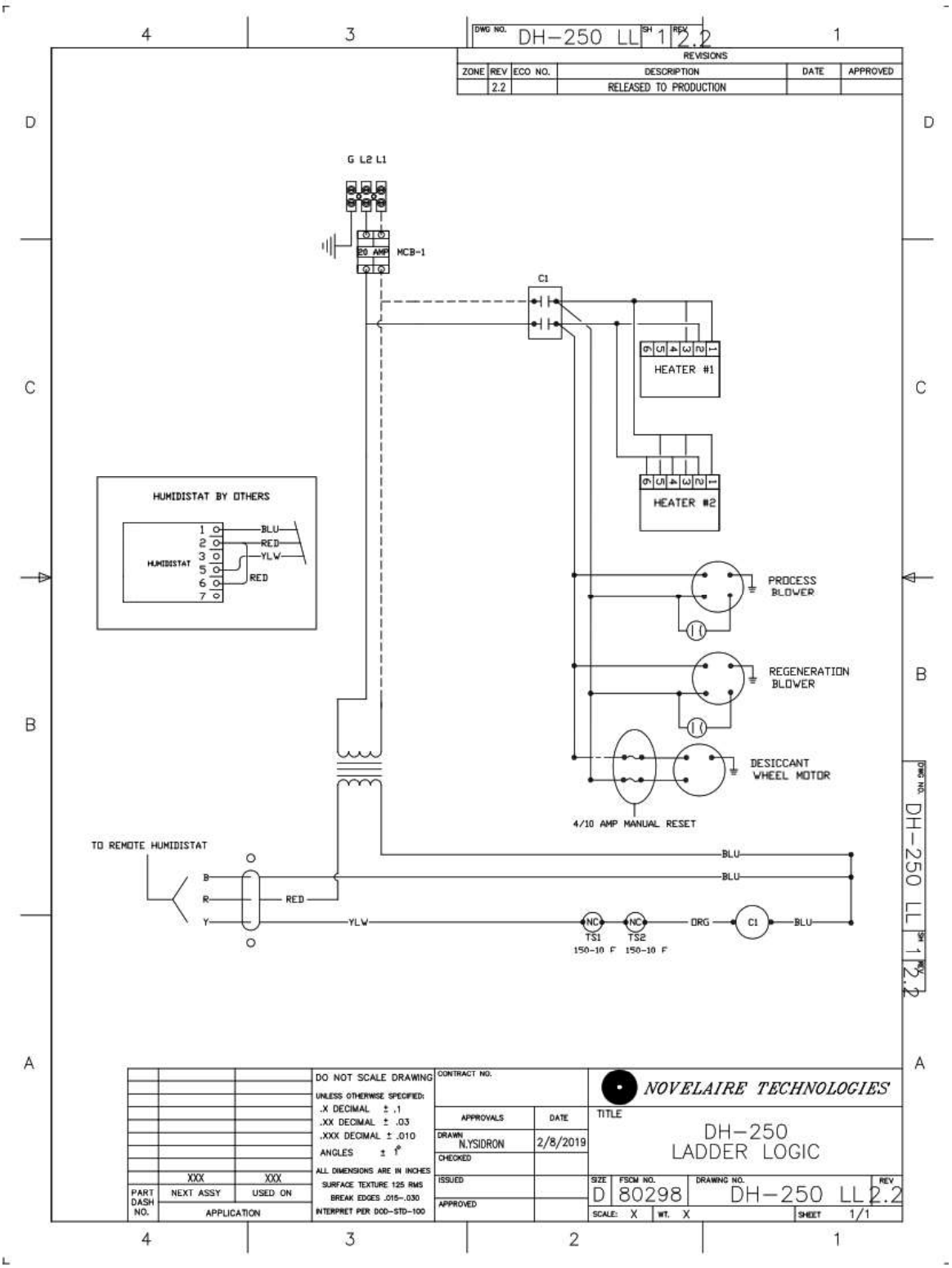
Please record serial number and leave this paperwork with the homeowner after installation.

4.5 CAPACITY DIAGRAM

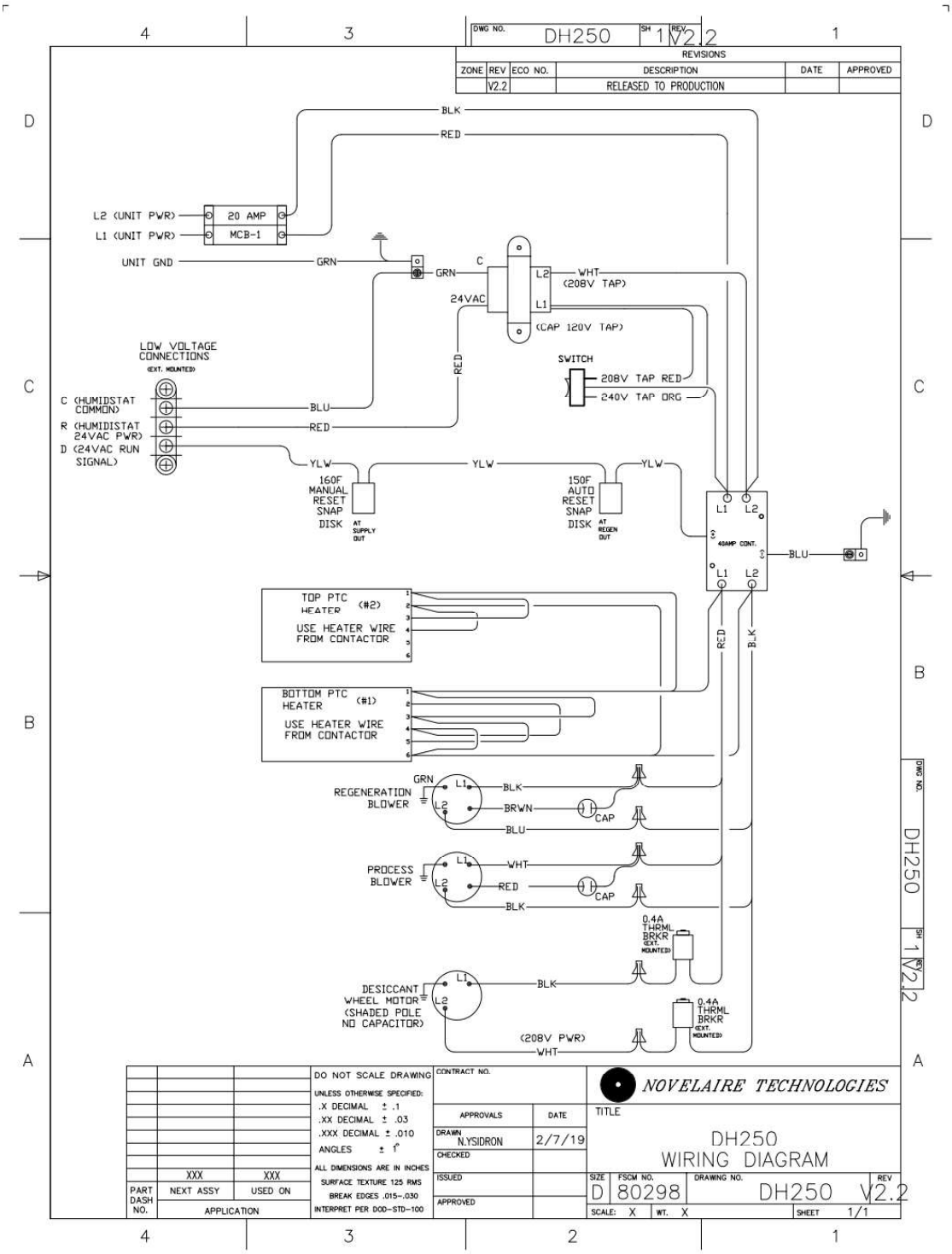


4.6 WIRING DIAGRAMS

Ladder Logic



Connection Diagram



The information contained in this manual is believed to be accurate by NovelAire Technologies, but is not warranted.

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