NOVELAIRE

ComfortDRY 300

Dehumidifier

TECHNICAL MANUAL

INSTALLATION, OPERATION & MAINTENANCE

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NovelAire Technologies

ComfortDRY 300 Dehumidifier Technical Manual

⚠ 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 ComfortDRY 300 Dehumidifier is designed to provide energy efficient dehumidification by combining the benefits of both DX cooling with desiccant dehumidification. The unit can be used for a variety of both commercial and residential applications.

The major components of this package mapped below (figure 1) are the proprietary NovelAire dehumidification wheel, a compressor, condensing coil, evaporation coil, process fan, regeneration fan and associated controls. Other elements include wheel drive motor and a control panel with fuses, relays and a small condenser fan speed control.

The process air flow delivers 300 CFM and has a dehumidification capacity of 6-8 pounds per hour of moisture removal with regards to inlet conditions. The capacity increases with increased moisture content in the space.

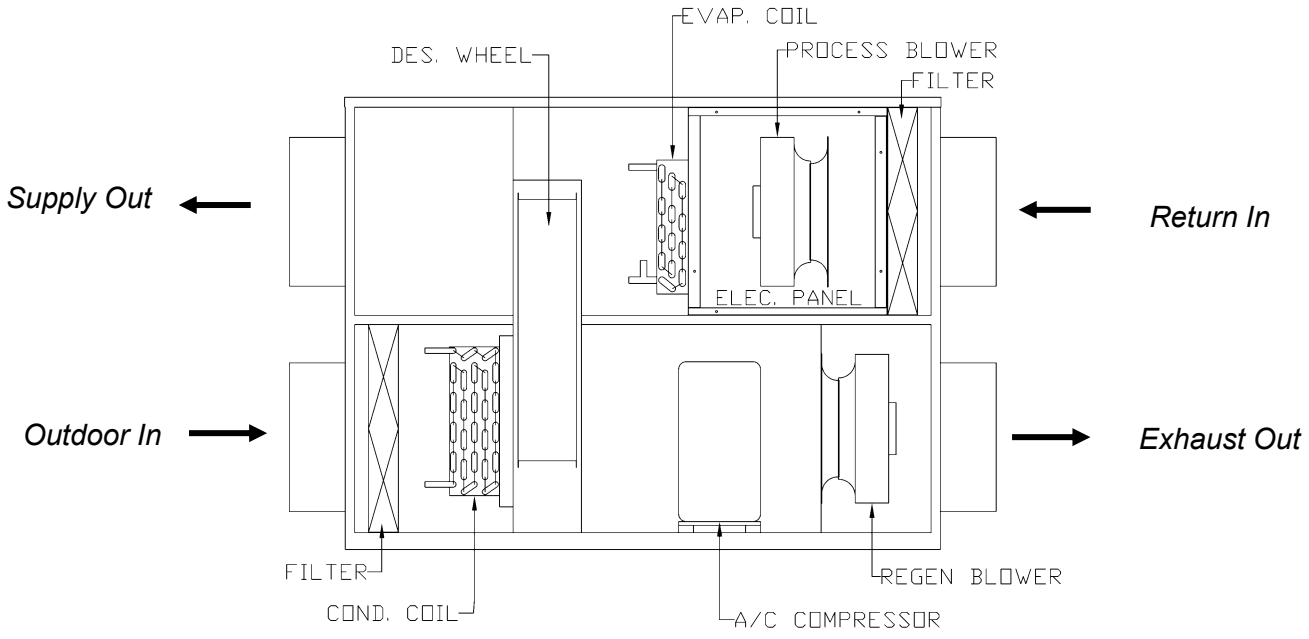


Figure 1

1.1 PRINCIPLE OF OPERATION

The operation of the ComfortDRY 300 is driven by two counter current air streams flowing through the desiccant wheel as shown in Figure 1. Return air from the space is pushed through the unit by the process blower. The flow passes through an evaporator coil which removes heat from the airstream. The cool and saturated air is then passed through the rotating desiccant wheel which dehumidifies the airstream before it is sent back into the space. The supply air leaving the unit is at or slightly below space temperatures but much drier in moisture content. At the same time outdoor air is pulled through a separate air stream on the regeneration side of the unit. The flow passes through the condenser coil where the outdoor air uses waste heat from the refrigeration loop to regenerate the desiccant wheel. At the desiccant wheel, the hot, dry air from the condenser desorbs the moisture from the process airstream and discharges the air to the outdoor ambient conditions.

During operation the wheel rotation is continuous between the two air streams as they work together to produce a dry comfortable air supplied to the area.

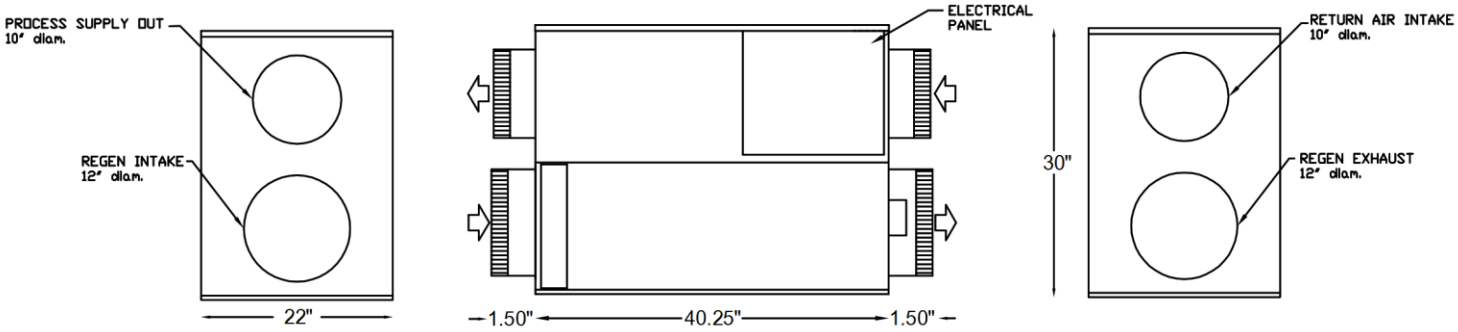
1.2 CABINET DESIGN AND SIZE

The cabinet of the ComfortDRY 300 and all the components used in the design are of solid construction and selected to withstand rugged use in a wide variety of applications. The unit has a two-coat polyester pain finish, and the interior of the ComfortDRY 300 is laid out to minimize pressure drop through the system and to reduce the overall unit size. The chart below will provide you with basic information in regard to the unit's size.

The proprietary desiccant wheel is housed between two rigid face plates with a 40/60 split face area between process and regeneration to allow for low regeneration temperature operation. The face plates are designed and sealed to separate the process and regeneration air streams.

Weight:	225 lbs. (43.9 kg)	Process Inlet Connection:	10”
Length:	40” (102cm)	Process Outlet Connection:	10”
Height:	30” (771cm)	Regen Inlet Connection:	12”
Width:	22” (55cm)	Regen Outlet Connection:	12”

**** Note: Dimensions do not include factory installed duct collars ****



2.0 INSTALLATION

The NovelAire ComfortDRY 300 Desiccant Dehumidifier is typically installed as a stand-alone unit with its own return and supply air ducts as shown in Figure 3.

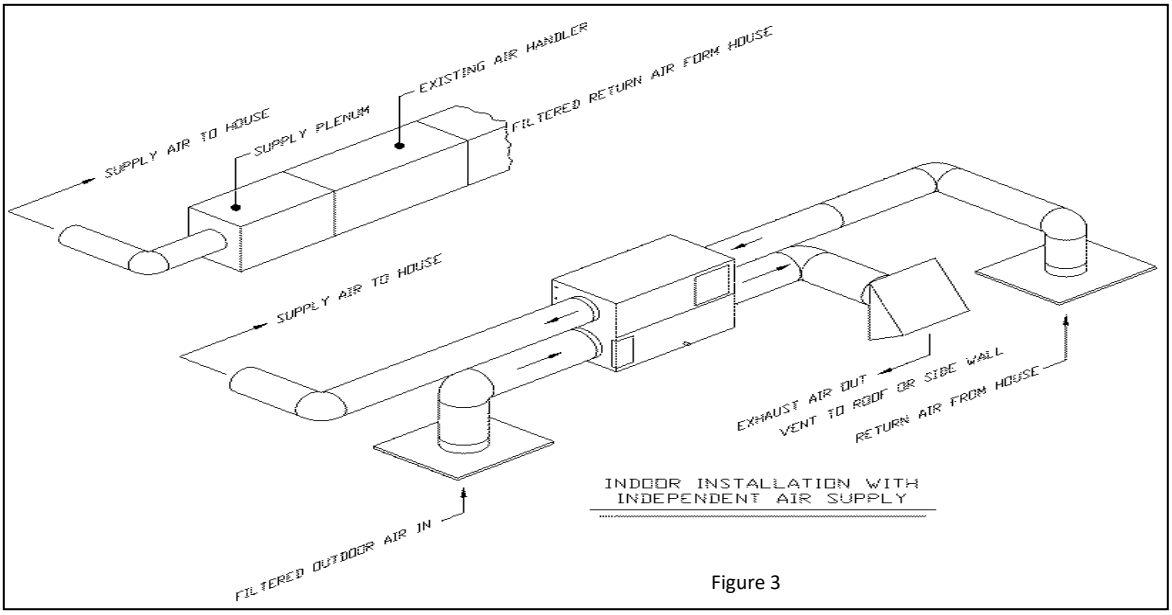


Figure 3

The unit can also be tied into the main air handler of the space with the supply out downstream of the evaporator coil. In this application the return and supply ducts are tied into the main trunk line. A gravity damper will need to be installed on the supply air duct from the ComfortDRY 300 in order to prevent back flow. Figure 4 depicts a typical installation with the unit connected to the air handler.

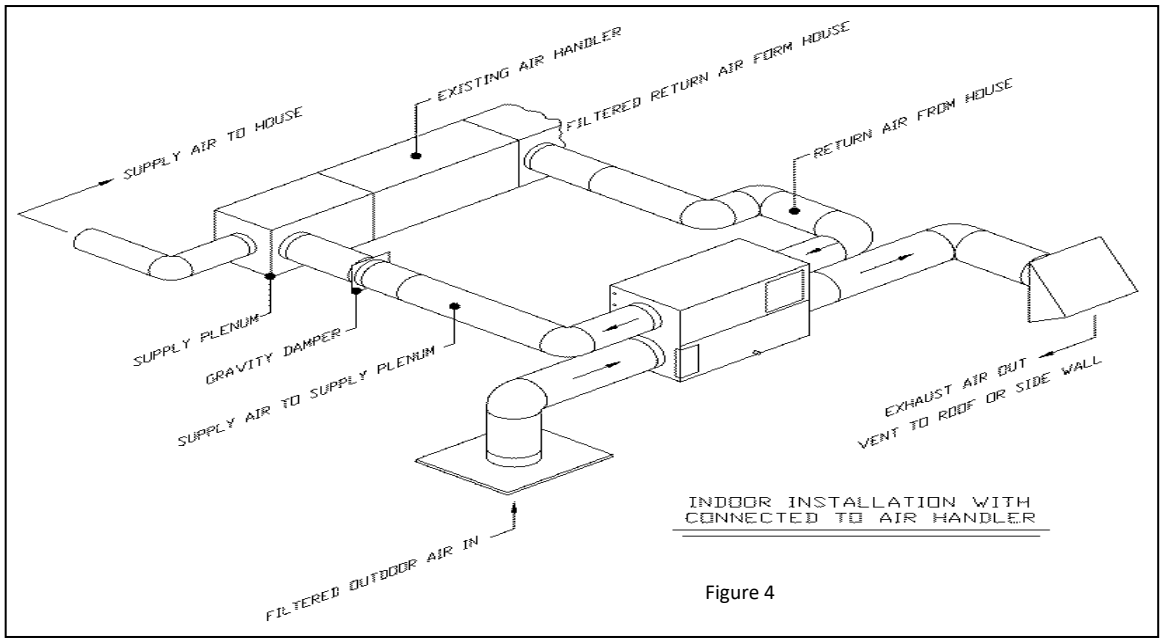


Figure 4

Booster fans should always be placed upstream of the unit and not be excessive in capacity or static pressure.

2.1 GUIDELINES AND CLEARANCE

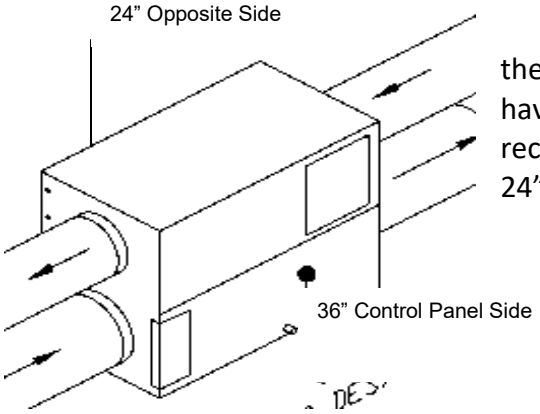
IMPORTANT: The ComfortDRY 300 is designed to supply air at +0.3" H_2O. If the system pressure drop in the ducting is higher than this, air flow will be impeded, and unit performance will be affected.

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: Consideration should be taken concerning the location of the ductwork to prevent the outdoor air intake from being too close to any exhaust duct that may already be present in the area.

IMPORTANT: All duct connections should meet all ACCA, ASHREA and NFPA 5000 Building Codes standards for the application.

Clearance: When considering a location to install the ComfortDRY 300 it is important to note that both sides must have adequate clearance for service and maintenance. Factory recommendations are 36" on the control panel side of the unit and 24" on the opposite side as shown on illustration to the left.



2.2 DUCTWORK AND FILTRATION

As stated in section 1.2 the duct sizes are both 10" for the process air, and 12" for the regeneration air. It is acceptable to use either flexible ducting or hard pipe ducting with the ComfortDRY 300. Always follow local codes when running ductwork and refer to specifications set forth in ACCA Manual D.

When shipped the unit is equipped with two (2) 14" x 18" x 1" filters for the process and regeneration air stream. It is important not to double filter the air stream as this may cause a problem with the unit performance. If a filter back grill is used on either side of the unit, remove the factory filters.

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 unit must be electrically grounded in accordance with local codes, or in absence of local codes with the National Electrical Code, ANSI/NFPA70. See Section 4.1 for breaker sizing and electrical data. **IMPORTANT:** Use copper wire only between switch and disconnect.

The ComfortDRY 300 is designed to run at 208/230 VAC 1 phase power 60 Hz. The factory does not provide an On/Off switch on the unit. Therefore, it is required that a safety disconnect switch is installed. Locate disconnect within sight from and readily accessible from unit, per Section 440-14 of NEC. Within three feet (3') of the unit per NEC Guidelines.

Ensure all field wiring complies with all national and local codes and the voltage is within the limits shown on the unit rating tag. The factory recommends contacting a local electrical contractor for field wiring to unit.

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

2.4 CONTROL WIRING

The ComfortDRY 300 requires a humidistat for control and operation of the unit. A humidistat is available through NovelAire. The diagram below shows connections for a NovelAire humidistat. If the humidistat was purchased with the unit through NovelAire, use this wiring diagram illustrated in Figure 6 to make your connections.

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

As seen in Figure 5 the LB located on the right is used for control wiring which contains four (4) wires. The four wires are as followed:

Red (1) 24V from internal transformer
Red (2) 24V from internal transformer
Blue Common wire
Yellow unit run signal input
*** A green wire is provided if Fan Only was requested when ordering ***

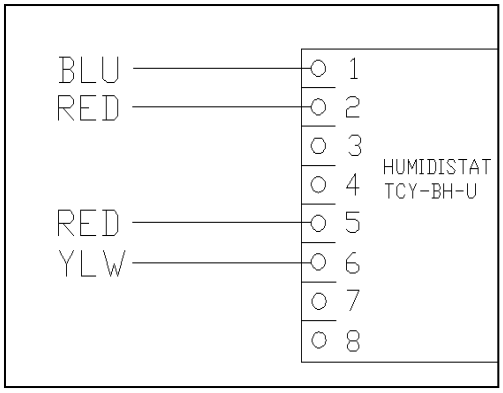


Figure 6

Figure 6 illustrates the wiring connection when using a NovelAire TCY-BH-U humidistat. Red (1) is used for powering the humidistat; Red (2) is used to close the contact when the humidistat calls for the unit to run.

2.5 DRAIN LINE CONNECTION

The drain connection for the ComfortDRY 300 is located on the control panel side of the unit. The connection is a ¾" Female NPT PVC fitting as shown in Figure 7.



Figure 7

IMPORTANT: In all installations a secondary drain pan with a condensate overflow switch should be provided by the installer and placed under the entire unit. This pan is required in the event that there is a leak or the main drain is blocked. The overflow switch must be wired so as to disable unit operation in the event of a drain malfunction.

IMPORTANT: When plumbing the condensate drain line always confer with local plumbing codes or Uniform Plumbing Codes (UPC) to confirm proper installation.

IMPORTANT: DO NOT attempt to run unit without proper primary condensate drain line attached to the unit.

The drain line should have a slope of not less than 1/8" per foot and should be installed with a seal trap. A properly designed trap should allow water to drain out while preventing any air leakage through the drain line. Factory recommendation is a 2" trap for normal applications.

It is recommended that a "tee" be installed before the trap with a 4" riser and cap for maintenance purposes.

Always insulate drain lines in unconditioned space.

2.6 SAFETY CONTROLS

There are several safety devices associated with the ComfortDRY 300 that provide protection to the unit and the components. The tables below provide information on each of the safety devices. Should one of the components fail, always replace with the OEM specified component.

Fuses and Manual Resets:

Fuse	Size	Protection
F1	0.5 Amp	Transformer L1
F2	0.5 Amp	Transformer L2
F3	3.2 Amp	24V Control

High Pressure Switch: (Auto Reset)

Switch	Cut Out	Cut In
High Pressure	600 psig	425 psig
Low Pressure	75 psig	105 psig

The internal compressor is thermally protected with an internal device that will disable the operation of the compressor when the internal temperature of the compressor reaches 302°F and will reset when it cools to 158°F.

2.7 REFRIGERANT CIRCUIT DATA

Main Circuit: 1 lb 14 oz



Refrigerant Safety Group A2L

WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an electric heater

Do not pierce or burn

Be aware that refrigerants may not contain an odor.

The unit is charged with R-454B from the factory which is classified as mildly flammable. Ensure that only equipment rated for higher pressures of R-454B are used for servicing. Under no circumstances should any work be conducted on the refrigerant lines which includes brazing and any other hot surface devices which could be a potential ignition source until a thorough recovery of refrigerant is done.

3.0 OPERATION AND CONTROL

The control panel for the ComfortDRY 300 is located at the side of the unit by the process intake duct. Once the ComfortDRY 300 is connected to the proper power source, and the drain line, ducting, and humidistat, the unit is essential ready to run.

3.1 CONTROL

A run signal from the humidistat will allow the unit to run. Ensure that humidistat set point is lower than the current level reading on the display. The "standard" %RH setting for the ComfortDRY 300 is 50%, however, the unit is designed to control at whatever %RH is set, up to the capacity of the system.

The ComfortDRY 300 is designed as a 100% return air system but could provide up to 20% outdoor air depending on the outdoor conditions, and up to the capacity of the system.

3.1.1 First Time Start Up of the ComfortDRY 300

1. Ensure there are no obstructions to the free flow of air into or out of the unit.
2. Ensure that the drain line is correctly connected to the unit.
3. Ensure that the unit has been properly and has the correct voltage.
4. Ensure that the humidistat is connected, and display is illuminated.
5. Ensure all mechanical and electrical codes have been followed
6. Select the proper voltage for the transformer at the voltage control switch
7. Turn on all circuit breakers and safety switches for the unit.
8. Set the humidistat at desired level.
9. The unit is now ready for routine operation.

3.1.2 Normal Operation of the ComfortDRY 300

1. The ComfortDRY 300 is operated by the humidistat. Lowering the set point below the current humidity level will start the unit and raising the set point above room conditions will stop the unit.
2. For optimal performance of the unit factory recommendation is to leave the humidistat at the comfort level desired and allow the humidistat to cycle on and off as needed.
3. NovelAire recommends that the minimum run time be set at 20 minutes to ensure that unit is not cycling too often.

3.2 MAINTENANCE AND SERVICE

IMPORTANT: This unit contains R-454B refrigerant that operates at extremely high pressure. Only trained service technicians are recommended by the factory to address suspected issues with refrigerant circuit.

The ComfortDRY 300 is a sealed system and comes from the factory pre-charged with proper refrigerant. It is not necessary to connect a gauge manifold to the system during regular maintenance. Gauges should only be connected if there is a suspected problem with the refrigeration charge.

3.2.1 Routine Maintenance:

SAFETY CONSIDERATION

Always disconnect power before performing service or maintenance on unit.

1. Filters on outdoor inlet and return inlet should be inspected monthly and changed as needed. See Section 4, Technical Data for filter sizes.
2. During peak operations ensure the filters are replaced, filters need to be replaced at least every 3 months.
3. Condenser and evaporator coils should be inspected annually and cleaned with water as needed. ***(Heavy Detergents, Alkaline or Acidic based cleaners should not be used in standard cleaning.)***
4. Inspect drain line annually for algae and debris, you may pour one cup of standard bleach to one gallon of water to clear drain line.
5. Seals on the desiccant wheel and the drive belt and drive system should be inspected annually.
6. Motors and bearings are sealed and do not require lubrication.

3.2.2 Troubleshooting:

Understand that the ComfortDRY 300 is a complex piece of equipment. The troubleshooting guide is a basic guideline for service. Know your limitations before attempting to service. It is recommended that you contact a qualified HVAC service technician or our Technical Service Team if you are unsure of the problem. The contact information can be found in Section 4.

PROBLEM	CAUSE	SOLUTIONS
Entire unit not running	Humidistat set higher than actual space relative humidity	Lower humidity set point.
	Humidistat not working	At control panel, install jumper across terminals 7 and 8. If unit comes up, humidistat is faulty or improperly wired.
	No power to unit.	Check all fuses and breakers in relation to incoming power to the unit.
	Internal power problem	Check F1-F3, and replace if needed. Use chart in section 2.4 for proper fuse sizes.
	Unit tripped on high pressure	Contact service technician or factory to determine if the problem is the refrigeration circuit.
Unit running, but not dehumidifying	Desiccant wheel not rotating	Check MR1/MR2, reset if needed. Ensure belt is on the wheel and tight, check tensioner system. (note: contact factory if there is a problem with the drive system of the wheel)

Unit running, but not dehumidifying (cont.)	One or more fans not operating	Check for fan operation. If not running, check fan motor relays and or speed control. Regeneration fan speed control can be bypassed to troubleshoot. (contact factory)
	Airflow blocked	Check that all air inlets and outlets are not blocked and allow unobstructed air flows to and from unit.
		Check and clean air filters as required.
Unit is cooling, but humidity is too high	Condensing coil is not heating regeneration air.	Ensure compressor is running, see below for details
	Desiccant wheel not rotating	Check drives motor and belt.
	Process air flow exceeds limits	Contact service technician or factory to determine airflow requirements.
Unit cycles on and off, no dehumidification	Unit tripped on high pressure	Contact service technician or factory to determine if the problem is the refrigeration circuit.

IMPORTANT: For further troubleshooting advice, contact the factory Technical Support, be sure to have the model and serial number of the unit when calling.

3.3 INTEGRAL COMPONENTS

MOTORS: The regeneration and process blowers are both PCS motors rated at 400 cfm at 2" H_2O. The regeneration blower is wired into a Nimbus™ speed controller that modulates the speed of the fan based on the condenser leaving air temperature. The process blower runs at full speed all the time.

REFRIGERANT CIRCUIT: The refrigerant circuit of the system is based on 12,000 btu/h capacity that contains a one (1) ton compressor, an evaporator, a condenser, and a factory set thermostatic expansion valve (TXV).

DESICCANT WHEEL: The wheel used in the ComfortDRY 300 units are manufactured by NovelAire Technologies and are the wheel technology is proprietary in nature. DES 440mm x 100 mm.

4.0 TECHNICAL INFORMATION

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.

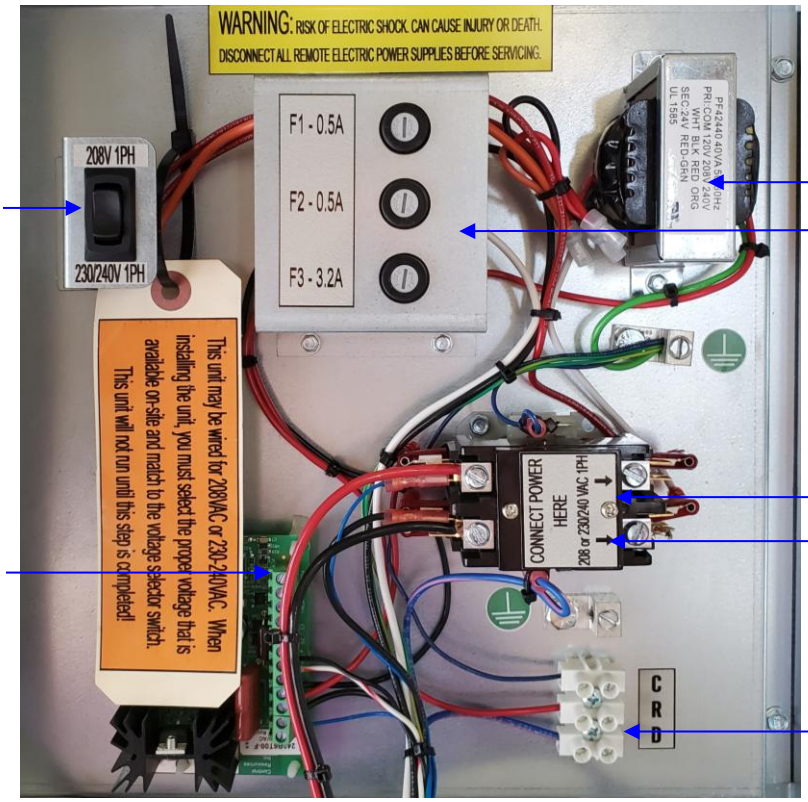
Voltage:	208-230 VAC / 1 Phase / 50-60 Hz.
Unit FLA:	8.3 Amps
Unit MCA:	10.3 Amps
Unit MOP:	20.0 Amps

Recommended Circuit Breaker Size: 20 AMP

The RLA of the unit is based on space and ambient conditions.

Motor	IM Number	Watts	RLA	FLA
Process Fan (300 CFM)	19040022	230 W	.70 A	1.0 A
Regen Fan (300 CFM)	19040022	230 W	.70 A	1.0 A
Gear Motor (7 RPM)	19010075	37 W	.33 A	.25 A
Compressor (1 ton)	502100100	1222 W	5.6 A	8.3 A

Figure 8: Control Panel



Mains Voltage Selector

Nimbus® Speed Control

24V Control Transformer

Fuses

Contactor

High Voltage Power

Low Voltage Terminal Block

4.2 SPECIFICATIONS

Model:	ComfortDRY 300
Revision:	REV 3.0
Serial Number:	
Voltage:	208-230 VAC / 1 phase / 50-60 Hz
Cabinet	20 gauge, galvanized metal w/ polyester coating
Control and Interlock:	24 VAC (internal transformer)
Unit FLA:	8.3 Amps
Unit MCA:	10.3 Amps
Unit MOP:	20.0 Amps
Size:	L 40" x W 30" x H 22"
Weight:	225 lbs.
Process Inlet Duct Size:	10"
Process Outlet Duct Size:	10"
Regen Inlet Duct Size:	12"
Regen Outlet Duct Size:	12"
ETL Certifications:	Household And Similar Electrical Appliances, Part 1: General Requirements [UL 60335-1:2016 Ed.6] [CSA C22.2#60335-1:2011Ed.1] Household and Similar Electrical Appliances - Safety - Part 2 - 40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners, and Dehumidifiers [UL 60335-2-40:2022 Ed.4] [CSA C22.2#60335-2-40:2022 Ed.4]
Process Volume:	300 CFM
External Static:	0.3" W.C.
Refrigerant	R-454B
Refrigerant Charge:	1 lb. 14 oz.
Cooling Capacity: (Net)	9,000 btu/H
Dehumidification Capacity:	8.1 lbs./hr. @ (space conditions: 79°F / 84 gr/lb) (outdoor conditions: 88°F / 126 gr/lb)
Desiccant Wheel:	440mm x 100mm DES
Internal Filter Size:	14" x 18" x 1" filters (2 each)

This unit has been authorized to mark certified and meets UL standards for Safety for Heating and Cooling Equipment UL 60335-2-40:2022 Ed.4 & CSA C22.2#60335-2-40:2022 Ed.4

Please record serial number and leave this paperwork after installation.

4.3 COMPRESSOR SPECIFICATIONS

GMCC TSM140N1UFT

1、适用范围(Application)

空调器类型 A/C Type	冷暖兼用型空调器 Cooling & Heating A/C System
冷媒类型 Refrigerant Type	R454B
最大冷媒充注量 Maximal Refrigerant Charged	1.2 Kg Max
电源类型 Power Source	单相 Single Phase 1φ-208V-60Hz
安全认证 Safety Approval	UL

2、规格参数(Specification)

压缩机类型 Compressor Type	全封闭型电动压缩机 Hermetic Motor Compressor
汽缸容积 Displacement	14.0 cm^3/rev.
冷冻机油充注量 Oil Charged	ESTER OIL VG74 -320±10 ml
总重量（含冷冻机油） Weight (Oil Included)	11.8 Kg
排气管内径 I.D. of Discharge Pipe	8.1 ±0.1mm
吸气管内径 I.D. of Suction Pipe	12.9±0.1mm

3、电机参数(Motor Specification)

电机类型 Motor Type	单相诱导电机-运转电容型 Single Phase Induction Motor- PSC
电机极数 Pole Numbers	2 极/Poles
绝缘等级 Insulation Grade	E 级/Grade
绕组阻值（20℃时） Coil Resistance(at 20℃)	主绕组 辅绕组 Main:2.60±7%Ω Aux.:2.28±7%Ω
堵转电流 Locked Rotor Amps	（at 1φ-50HZ-240V）39 ±10% A
运转电容 Ruing Capacitor	40uF-370V

GMCC TSM140N1UFT

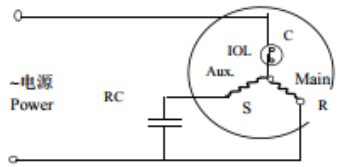
4、额定性能规格(Rated Performance Parameters)

额定能力 Rated Capacity	3755	±5% W
额定输入功率 Rated Input Power	1275	±5% W
额定输入电流 Rated Input Current	6.20	±5% A
能效比(*备注) % COP(*Remarks) %	294	±5%
噪音/NOISE dB(A) (Sound Power Level)	★ 70 以下 MAX	
振动 m/s^2 VIBRATION（切线方向振动实效值）	★ 16 以下 MAX	

测定条件（Rating Condition）

测试项目	性能	噪音振动
电源 Power Source	1φ-60HZ-208V	1φ-60HZ-208V
冷凝温度 Cond. Temp.	54.4℃	54.4℃
蒸发温度 Evap. Temp.	7.2℃	7.2℃
吸气温度 Return Gas Temp.	35℃	35℃
过冷却温度 Liquid Temp.	46.1℃	46.1℃
环境温度 Ambient Temp.	35℃	35℃
排气温 Discharge Tube Temp.	/	/

5、电气配线接线图(Wire Connection Figure)



6、一般特性(Charateristic)

绝缘阻抗 Insulation Resistance	≥50 MΩ	封入氮气时/Nitrogen Charged
绝缘耐压 Withstanding Voltage	AC1500V-1min	
接地阻抗 EARTHING RESISTANCE	以下	

Reference

	0.1 Ω MAX
残留水分量 Residual Moisture	冷凝法 ≤150mg
含尘量 Residual Impurities	≤30mg

7、 系统使用条件(Limit of System Application)

NO.	项目 Item	标准状况下 Standard Cond.	极限状况下 Limit Cond.	对应 冷媒	说明 Note
1	排气压力 Discharge Pressure. （对应的饱和温度）	3.02MPa (54.4℃)	3.85MPa Max (65℃)	R454B	详细压力使用范围见附纸！ See the attached chart of limitation of operation pressure.
2	吸气压力 Discharge Pressure. （对应的饱和温度）	0.813MPa (7.2℃)	0.20MPa~1.05MPa (-25℃~15℃)	R454B	
3	压缩比 Compressing Ratio	8.0 Max	8.0 Max	/	
4	电机绕组温度 Motor Coil Temp.	110℃ Max	125℃ Max		
5	排气温度 Discharge Temp.	100℃ Max	115℃ Max		

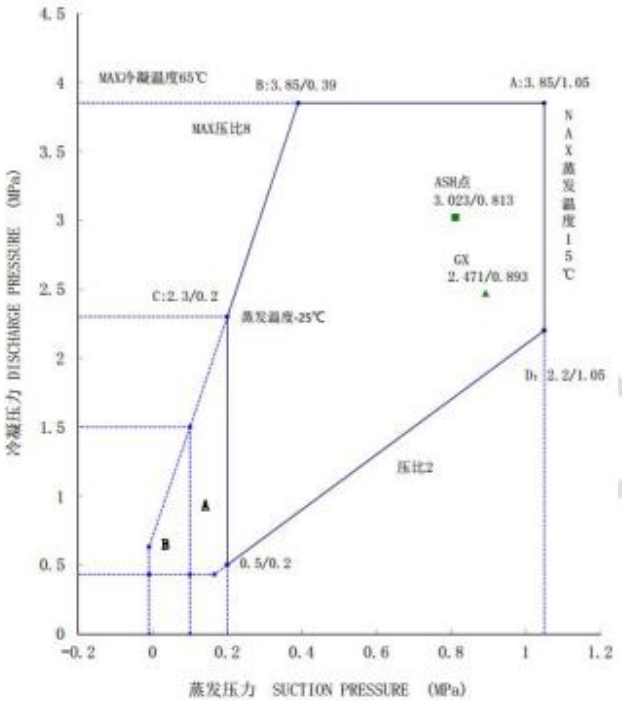
8、 注意事项 Application Notice:

1. 整个运行过程中无液压缩发生。
   No liquid refrigerant go back to compressor during the whole time.
2. 连续运转时（包括除霜、除湿）压缩机底部温度-冷凝器中部温度需大于等于5℃以上；
   When continuous running (include defrost and dehumidify), compressor bottom temp. subtract condensing temp. should be more than 5℃.
   断续运转时压缩机底部温度-冷凝器中部温度需大于等于0℃以上。
   When intermittent running, compressor bottom temp. subtract condensing temp. should be more than 0℃.
3. 断续运转，每一周期5分钟以上，开2分钟以上，停2分钟以上。
   When intermittent running, each cycle should be longer than 5 minutes. (On: over 2 min, Off: over 2 min)
4. 运转电压波动允许范围（187V~253V）
   The supply voltage should be (187V~253V)
5. 高压侧和低压侧压力需保持平衡后才能启动。
   Pressure should be balanced between high and low pressure side.
6. 运转过程中不能有异常噪音发生。
   In operation, abnormal noise is not allowed.
7. 最大允许倾斜角度：5°。
   Tilt angle should be less than 5°.
8. 当压缩机以下状态时，需确认油面水平：

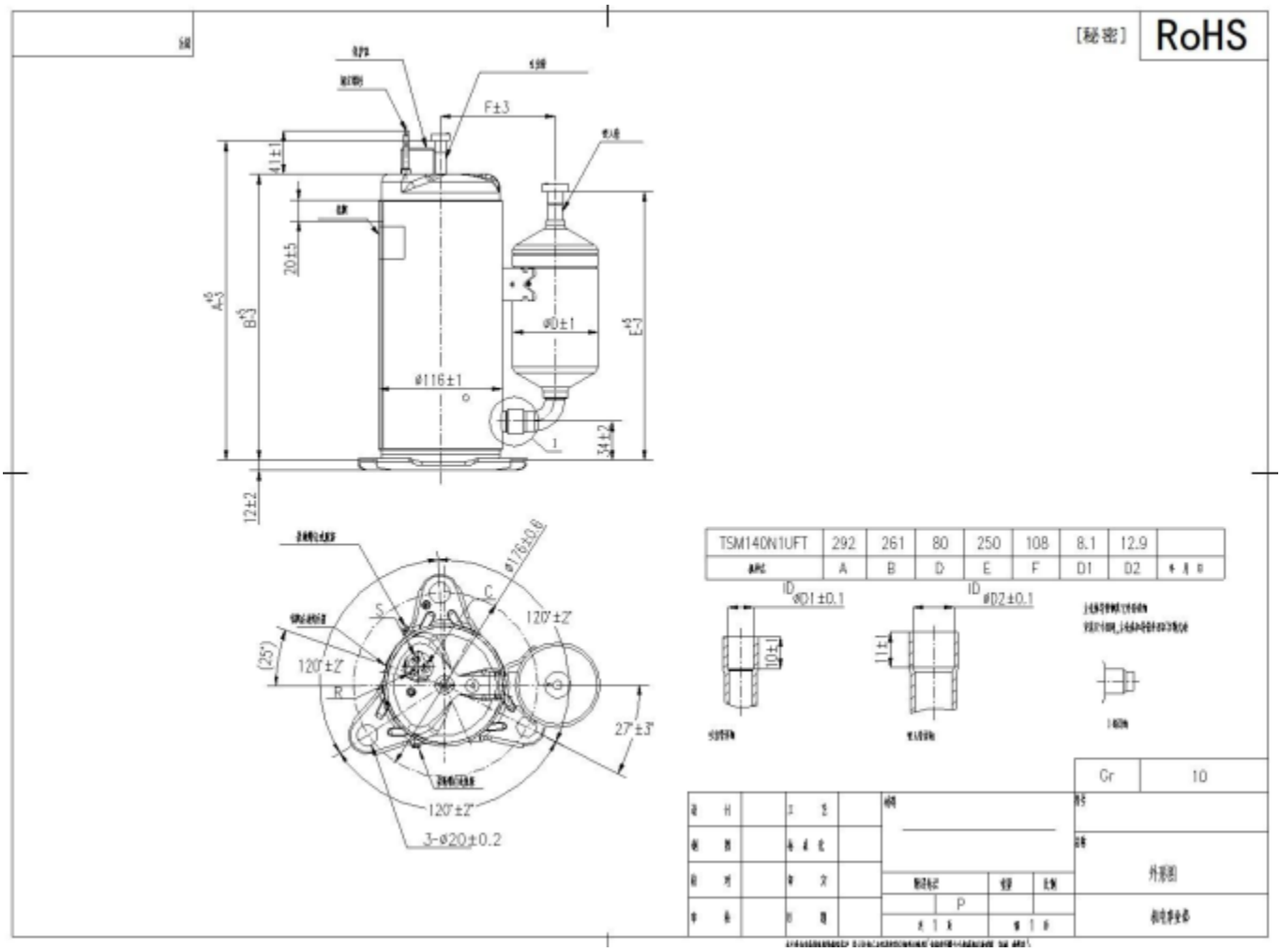
R454B 压缩机运行范围

(Operation Limitation of Compressor)

单位:MPa(表压)
Unit:MPa(G)



Reference



4.4 TECHNICAL SUPPORT AND SERVICE

Factory NovelAire Technologies
Address: 10132 Mammoth Drive
Baton Rouge, LA 70814-4420
Telephone: (225) 924-0427 or
(800) 762-1320
E-mail: service@novelaire.com

4.5 REFRIGERANT CHARGING

Refrigerant Charging Instructions for ComfortDRY 300.

The ComfortDRY 300 comes with a factory charge of 1 pound 14 ounces. The unit is a sealed system and adjustment of charge is not needed. The unit is charged is confirmed using the sliding scale below. If there is a problem with the refrigerant circuit or there is a loss of charge for some reason, you may use the charging curve below to confirm the charge of the unit. (Note: R-454B is a blended refrigerant and must be charged as a liquid.) Always weigh in the charge at first and then use the following procedures to confirm proper operation of the system.

1. Measure the liquid line and temperature at the liquid line near the filter on the process outside of the unit.
2. Make sure the outdoor temperature is above 65 F and the unit is in a steady state.
3. After the unit has run for 15 minutes, plot the temperature and pressure using the charging chart below for the TXV valve.
4. Adjust the charge according to the chart set below.
5. Sub cool temperatures for the liquid line will run between 8° and 10°F.

°F	°C	R-454B
-40	-40.0	9.5
-35	-37.2	12.7
-30	-34.4	16.3
-25	-31.7	20.1
-20	-28.9	24.3
-15	-26.1	28.9
-10	-23.3	34.0
-5	-20.6	39.4
0	-17.8	45.3
5	-15.0	51.7
10	-12.2	58.6
15	-9.4	66.0
20	-6.7	74.0
25	-3.9	82.5
30	-1.1	91.7
35	1.7	101.5
40	4.4	111.9
45	7.2	123.1
50	10.0	135.0
55	12.8	147.6

°F	°C	R-454B
60	15.6	161.0
65	18.3	175.3
70	21.1	190.4
75	23.9	206.4
80	26.7	223.3
85	29.4	241.1
90	32.2	260.0
95	35.0	279.9
100	37.8	300.8
105	40.6	322.8
110	43.3	346.0
115	46.1	370.4
120	48.9	395.9
125	51.7	422.8
130	54.4	450.9
135	57.2	480.4
140	60.0	511.3
145	62.8	543.6
150	65.6	577.4

Vapor Pressure in PSIG

In addition to conventional charging procedures, the following requirements shall be followed:

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it should be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

4.5.1 RECOVERY and EVACUATION

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. In addition, a set of calibrated weighing scales should be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

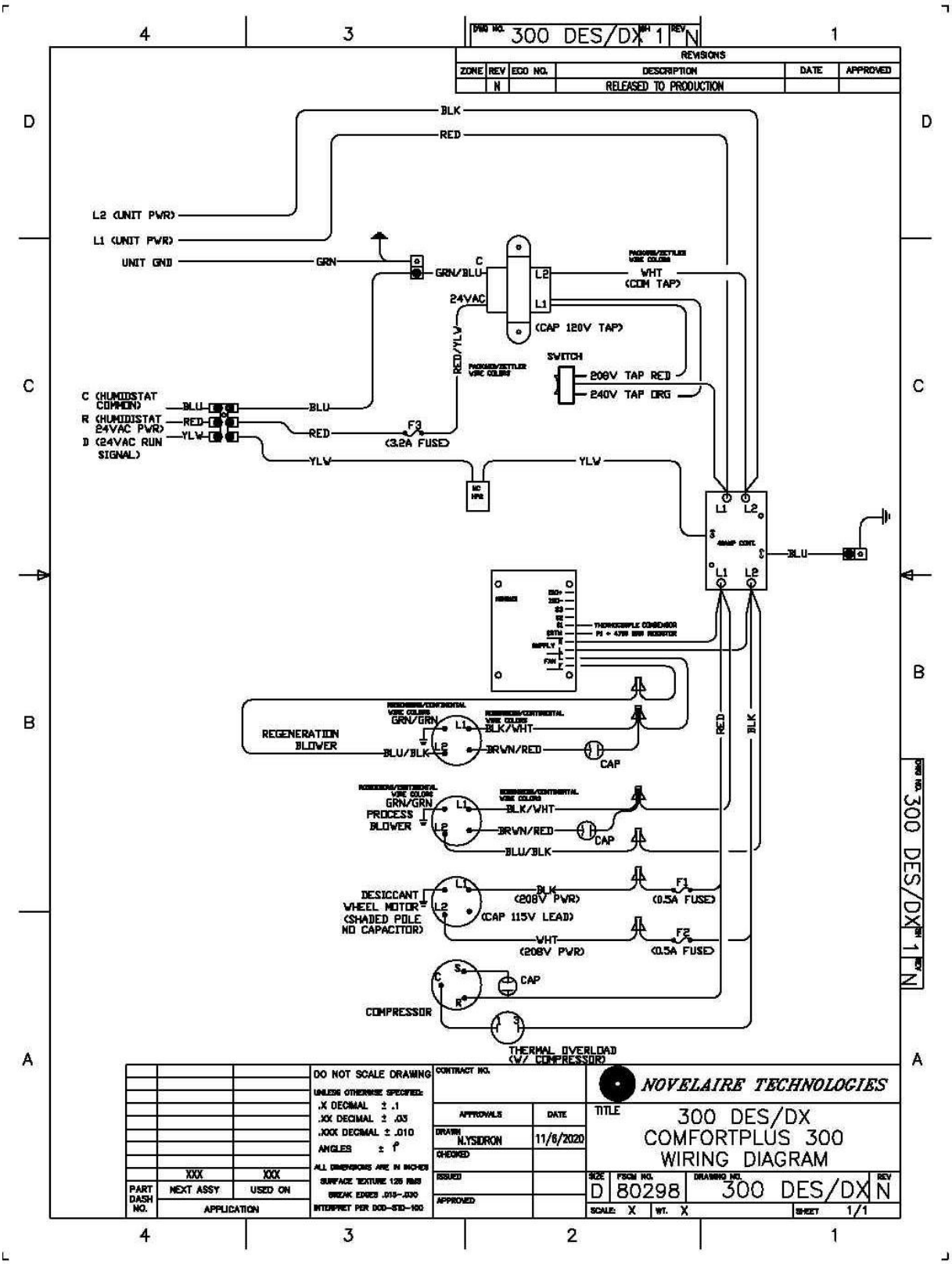
- safely remove refrigerant following local and national regulations.
- evacuate
- purge the circuit with inert gas
- evacuate
- continuously flush or purge with inert gas when using flame to open circuit; and
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

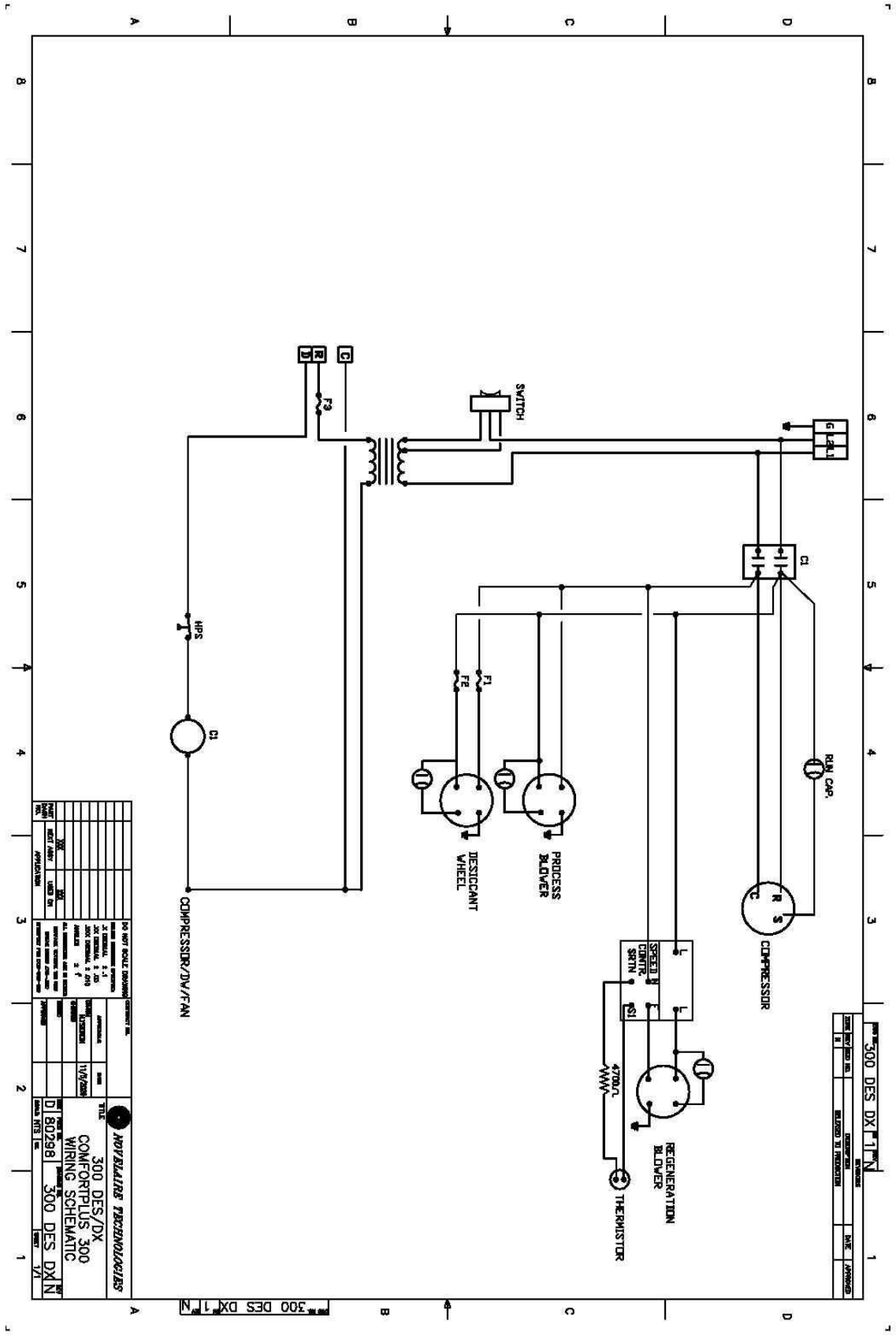
For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

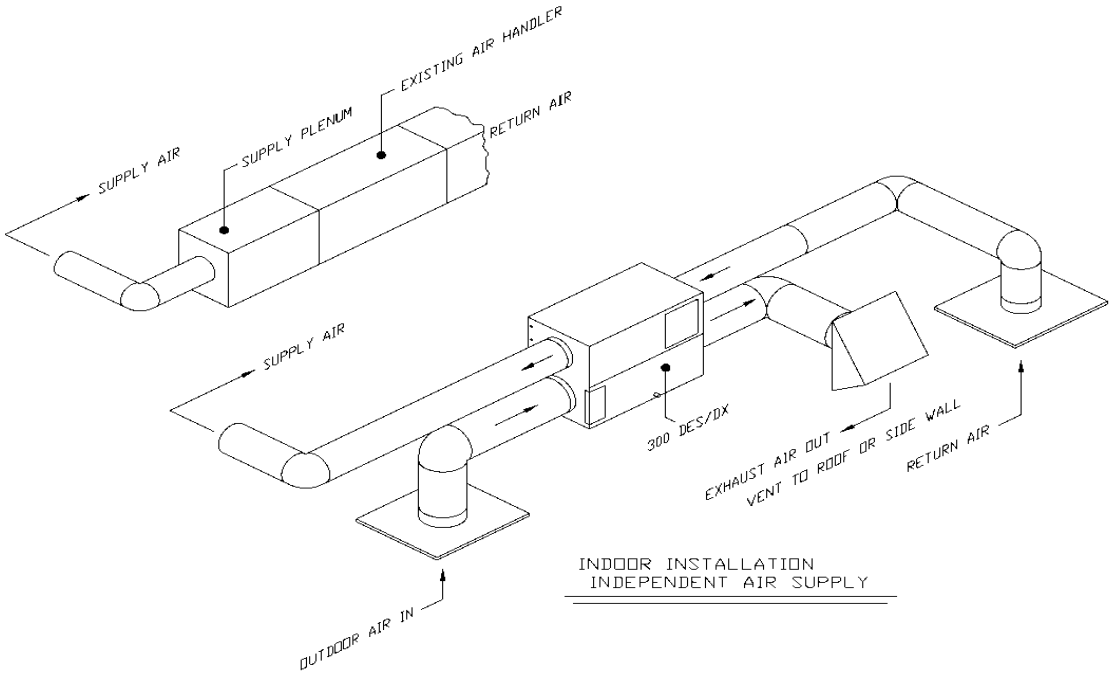
4.6 ELECTRICAL WIRING DIAGRAM



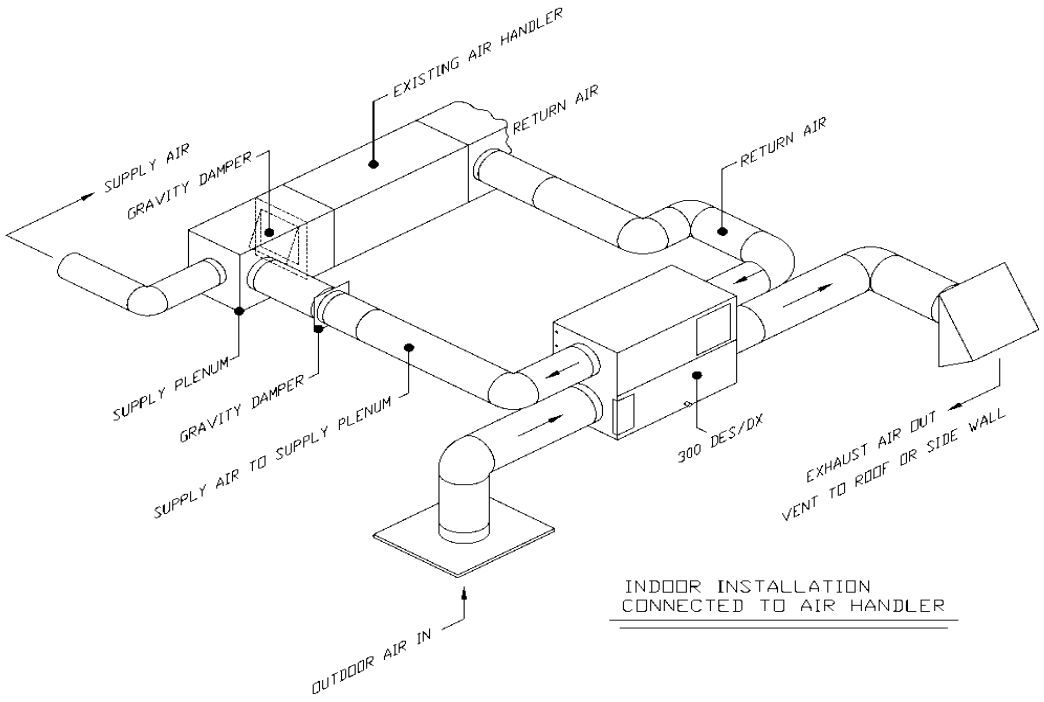
4.7 ELECTRICAL LADDER LOGIC



4.8 INSTALLATION DRAWINGS



INDOOR INSTALLATION
INDEPENDENT AIR SUPPLY



INDOOR INSTALLATION
CONNECTED TO AIR HANDLER

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

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