

Application, Installation, & Service Manual

CA-300 4-Stage Air Purifier



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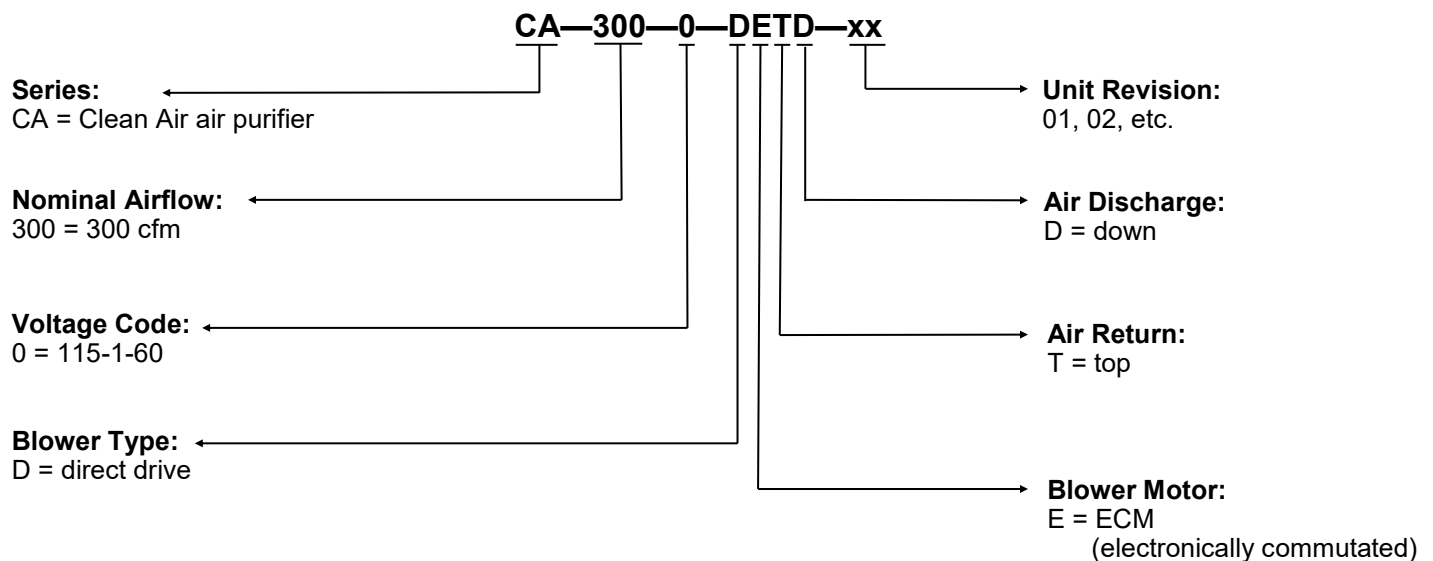


SAFETY PRECAUTIONS



- WARNING:** Ensure all access panels are in place and properly secured before applying power to the unit. Failure to do so may cause electrical shock.
- WARNING:** Before performing service or maintenance on the system, ensure all power sources are DISCONNECTED. Electrical shock can cause serious personal injury or death.
- CAUTION:** Safety glasses and work gloves should be worn at all times whenever the system is serviced.

Model Nomenclature



APPLICATION TABLE							
SERIES	NOMINAL AIRFLOW	VOLTAGE	BLOWER / MOTOR	REVISIONS			
CA	300	0	D E T D	03	04	05	

This manual applies only to the models and revisions listed in this table.

Maritime Geothermal Ltd. has a continuous improvement policy and reserves the right to modify specification data at any time without prior notice .

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CA-Series System Description

The NORDIC CA-300 is an institutional-grade air filtration system (or air purifier). It can be used standalone to filter air in a room, or with an intake duct to draw air from another point.

Dust, microorganisms, viruses, bacteria, other aerosolized particles, fungal spores, chemicals, and odours are removed with a high degree of effectiveness from the air that passes through the air purifier.

The air is drawn in the top of the unit, and travels downward through its 4 stages of air treatment:

1. A pleated 2" MERV8 filter removes larger particles from the air stream. It will remove 90% of particles >2 μm (microns) in size.
2. The air is next treated by an LED UV-C lamp with an optimized germicidal wave of 275 nm (as opposed to the 254 nm of mercury lamps).
3. Next, an 11.5" HEPA H14 filter removes 99.995% of remaining particles of size 0.3 μm , which is the hardest particle size to capture with a mechanical filter. Capture efficiency is even greater for smaller & larger particles. The large thickness reduces air pressure drop and increases service interval.
4. Finally, a 2" activated carbon filter removes chemicals and odours.

It is common to talk about air changes per hour (ACH) in a room of a certain size. With an airflow rate of 200-470 cfm, it is possible to achieve an ACH of 15-35 in an example 10'x10'x8' room. See table in the [Specification Data](#) section for more details.

The blower is a quiet forward curved type, and motor is a 5-speed electronically commutated (ECM) type that retains its high efficiency even at part load speeds.

The galvanized steel cabinet is powder coated bright glossy white, for easy cleaning and professional appearance. The interior is made from aluminum, which is the best multiple-direction reflector of UV-C light, and the space between the inner and outer shells is fully insulated with 1" fiberglass insulation for noise abatement and solidity.

The UV-C bulb has a standard E26 or medium base, so does not use a proprietary connection, and changing the bulb is as easy as changing a household light bulb. Although UV-C light is not visible, the bulb is equipped with an auxiliary blue indicator glow. This glow is visible through a small window near the switches for user verification, and this window is of a material type that blocks harmful UV-C rays, allowing only the visible indicator light to shine through.

The front service door allows periodic changing of the filters and bulb, and is held by a magnetic catch. There is a disconnect switch that powers down most of the electronics when the door is removed, so that accidental exposure to UV-C rays or dangerous moving fan blades does not occur. (Note that before service, it is still necessary to unplug the unit. Also note that when the door is off, a technician can re-power the unit during servicing by pulling out the switch's stopper, where it locks in the "ON" position.)

The CA-300 has a shallow form factor, and comes with locking castors. The unit may also be wall mounted to save floor space.



Specification Data

Table 1 - Electrical Specifications		
Power Supply	V- ϕ -Hz	115-1-60
FLA	Amps	5.1A
MCA	Amps	6.2A
Power Consumption (full speed)	Watts	180W
Max. Breaker	Amps	15A

Table 2 - Shipping Information			
WEIGHT lb. (kg)	DIMENSIONS in (cm)		
	L	W	H
150 (68)	30 (76)	32 (81)	54 (137)

Table 3 - Operating Temperature & Humidity		
Operating temperature range	-25° to 45°C	-13° to 113°F
Operating humidity range	0 to 90%	

Table 4 - Lamp Data	
Emission Type	UV-C
Wavelength	275 nm
Bulb Type	LED (no mercury)
Ozone production	none
Base	E26 / medium / standard
# of bulbs	1
Power	30W
Ancillary Indicator	blue
Lifespan	10,000 h

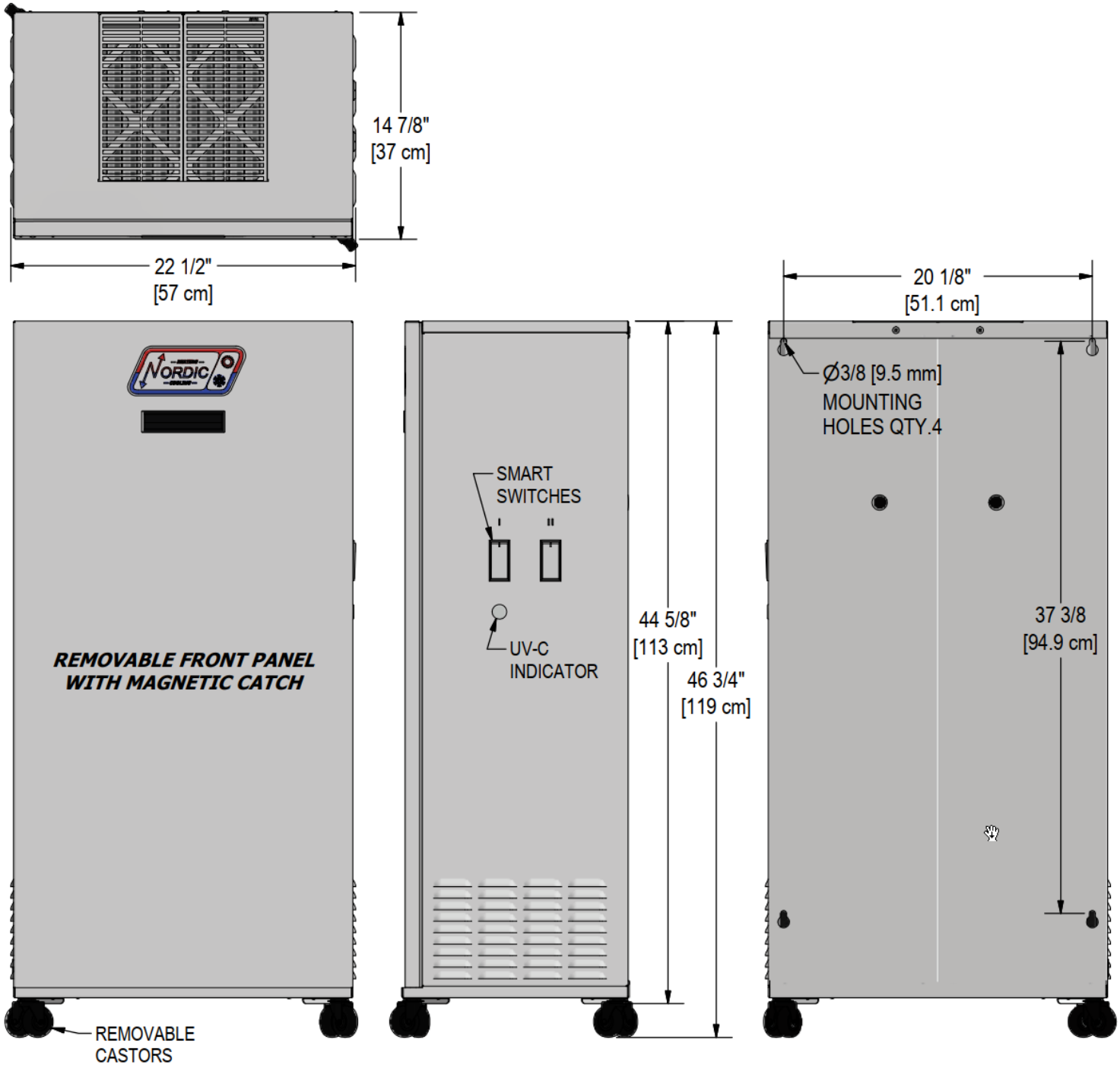
Table 5 - Blower Data	
Motor type	48 frame ECM
Max rpm	1200 rpm
Max. torque	27 oz.ft.
Horsepower	1/3
Max. power draw	250W
RLA	4.6A

Table 6 - Air Filter Data	Rating	Thickness	Outside Dimensions	Replacement Interval
Pre-filter	MERV8 (90% of particles >2 μ m)	2" (51 mm)	12" x 20" (305 x 508 mm)	3 months
HEPA filter	HEPA H14 (99.995% of particles 0.3 μ m, higher for smaller & larger particles)	11.5" (292 mm)	12" x 20" (305 x 508 mm)	1 year
Carbon filter	Removes chemicals and odours	2" (51 mm)	12" x 20" (305 x 508 mm)	3 months

Table 7- Airflow Data		Free Air (Room) Operation NEW FILTERS		Air changes per hour in 8'x10'10' room	With Ducted Intake or RESTRICTED FILTERS		Air changes per hour in 8'x10'10' room
		CFM	L/s		CFM	L/s	
Switch I		200	95	15	150	71	11
Switch II	Tap o	270	127	20	190	90	14
	Tap oo	330	156	25	225	106	17
	Tap ooo	400	190	30	260	123	20
	Tap oooo	470	220	35	300	140	23

Table 8 - Noise Data		Noise level (dBA)		
		1 ft	2 ft	3 ft
Switch I		48.0	47.0	46.0
Switch II	Tap o	53.0	51.8	50.9
	Tap oo	58.1	57.4	56.1
	Tap ooo	61.6	61.8	60.0
	Tap oooo	64.1	64.4	63.7

Dimensions

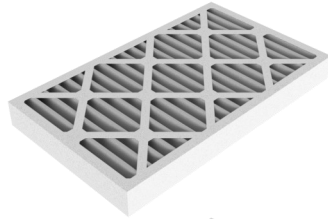


Installation Basics

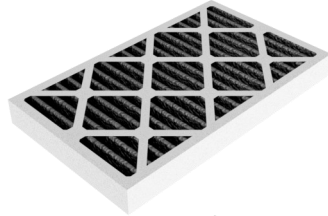
Bill of Materials

CA-SERIES AIR PURIFIER, INCLUDING:

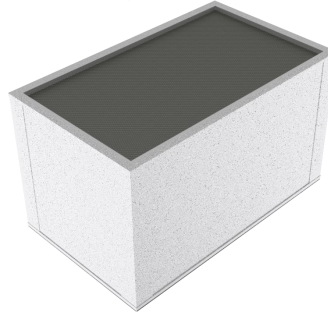
- [1] MERV-8 air filter
(20" x 12" x 2")



- [1] Carbon air filter
(20" x 12" x 2")



- [1] HEPA air filter
(20" x 12" x 11.5")



- [1] UV-C LED E26
(medium base) bulb



- [4] Castors - 2" locking



- [1] Flat wrench for
installing castors



Unpacking the Unit

When the air purifier arrives, it should be unpacked to determine if any damage has occurred during shipment. Any visible damage should be noted on the carrier's freight bill and a suitable claim filed.

- Using box cutters, cut around the bottom of the box.
- Lift the box off the unit.
- Remove package cushioning and plastic wrap.
- Remove the unit front cover.
- Remove the boxed UV-C bulb, castors, and cardboard packaging at both sides of the HEPA filter.
- Remove the HEPA filter.
- Install the UV-C bulb by screwing it into the lamp holder just above the HEPA filter.
- Re-install the HEPA filter making sure the arrow is pointing downwards and foam seal is on the bottom.
- Protecting the finish with cardboard or foam packaging, lie the unit on its back.
- Install the four castors by screwing them into the threaded nuts that are built into the base of the unit. Tighten using the provided flat wrench.
- After all 4 castors are secured, lift the unit upright.
- Install the front door by placing the bottom first and letting the magnets up top connect for an airtight seal.

Unit Placement

The air purifier should be placed against a wall, as centrally as possible in the room, near a wall plug. Any air currents passing by the unit will be beneficial in ensuring the unit has access to as much of the air in the room as possible. The most common examples of such air currents are those from a ducted heating/cooling system. Additional air movement through the room can also be provided with portable fans.

The air purifier should have the following clearances for proper airflow and to facilitate servicing:

- ⇒ 6" (15cm) on each side
- ⇒ 2" (5 cm) at the bottom, which is the castor height
- ⇒ 2 ft at the front (or less if unit can be moved for servicing)
- ⇒ no back clearance is required



IMPORTANT: If not wall mounted, it is important to install the provided castors so as to not restrict the air discharge on the bottom of the unit.

The air purifier can be wall-mounted. See the [Dimensions](#) on preceding page for mounting bolt pattern on wall. Four 5/16" lag bolts into solid wood or equivalent must be used to carry the significant weight of the air purifier.



WARNING: Inadequate wall mounting will create a significant falling hazard.

Remote Switch

There is a connection point for a remote switch, possibly mounted on an intake duct or arm, that will have the same function as **switch II**. Unplug the blue wires from each other located just under the top grill, and wire to the new remote switch.

Operation

Switch Function

There are two large switches on the right side of the unit, labeled "I" and "II", which are used for everyday operation of the air purifier.

When the unit is first plugged in, and when it is OFF, the indicator lights on both switches should be ON. This is to assist the user in finding the switches when they first enter the room, and to direct their attention to the switch that may need to be turned on. When a switch is activated, its indicator light turns off.

Switch I (closer to the front of the unit) turns on the UV-C lamp and activates the blower at the lowest speed. This should be used to activate the unit when the room is occupied (or at all times), so that the air is being treated in a continuous but unobtrusive manner; that is, as quietly as possible.

Switch II (closer to the back of the unit) turns on the UV-C lamp and activates the blower at a higher speed. This should be used to treat air more vigorously when a procedure that may introduce contaminants is taking place, or in a location where a slightly higher noise level is acceptable (e.g. hallway, industrial area, or storage area).

If both switches are activated simultaneously, switch II overrides switch I.

Blower Speed Taps

The blower speed associated with **switch II only** can be adjusted by changing a wire jumper on the terminal strip inside the electrical box. This is set initially by the installer according to the application, and will not be adjusted during everyday use.

There are 4 higher speeds to choose from. The highest speed will normally be chosen, to give the highest air treatment rate during procedures, unless the acceptable noise level or application dictate a lower "turbo mode" airflow.

See the wiring diagram located near the end of this manual for location of the wire jumper. It is marked as follows:

- switch II's lowest airflow
- switch II's second-lowest airflow
- switch II's second-highest airflow
- switch II's highest airflow (default)

The installer will move the blue wire with the fork terminal to the position corresponding to the desired "turbo mode" airflow level.

Smart Switch Programming

Both **switch I** and **switch II** are smart switches, which can be remotely controlled through a 2.4G wifi network. (Most wifi routers are 2.4G or have simultaneous 2.4G/5G modes.) This functionality can be used to manually turn modes on or off through a smart phone app, or schedule modes according to time of day.

Be aware that apps are continuously being updated and their functions are expanding, so the following instructions are subject to change.

Option 1: Smart Life App

1. Be sure wifi is enabled on your smart phone, it is connected to a 2.4G wifi network, and air purifier is plugged in.
2. Install the **Smart Life** app from Google Play or the Apple App Store, and open it.
3. Register for an account.
4. Click the top right "+" icon to add a device manually.
5. Select "Switch (Wi-Fi)" or "Wall Switch".
6. Select your 2.4G wifi network and enter your wifi password.
7. On the switch you want to control remotely (switch I or switch II), hold it down for 5 seconds until you see its light blinking rapidly.
8. Hit "confirm blinking" and "continue" in the app.
9. The app will now connect to the light switch. You can name it using the pencil icon, e.g. "Room 1" or "Room 1 high speed".

Option 2: Google Assistant / Alexa

You can continue on to use Google Assistant or Apple's Alexa to control the device, and set schedules using Smart Home functionality. To get started:

1. Open the Smart Life app and log into your Smart Life account.
2. Click on the already-installed switch you want to use, and then on the pencil icon in the top right corner.
3. Under the Third-party Control section, click on Google Assistant or Alexa.
4. Follow the app's instructions. On Android devices, you will be guided through installation of the Google Home app.
5. Once Google Home is running, one of the options at the top of the screen right under the word "Home" will be "Connect Smart Life". Enter your Smart Life account credentials, and now your switch should be available for use in Google Home.
6. Note that schedules can be created in Google Home by clicking on "Routines" and then the big multi-coloured "+" symbol at the bottom right.

Routine Maintenance

ROUTINE MAINTENANCE SCHEDULE		
Item	Interval	Procedure
Pre-filter (MERV8)	3 months	<ol style="list-style-type: none"> 1. Unplug unit from wall. 2. Remove door by separating from magnetic catch. 3. Slide out the top filter and replace with a genuine MERV8 replacement from MARITIME GEOTHERMAL LTD.. 4. Change carbon filter at same time (lowest filter). 5. Replace door and plug unit back in.
UV-C bulb	Every 10,000 hr: ⇒ If run for 8 hours/day weekdays , change every 4 years ⇒ If run for 8 hours/day every day , change every 3 years ⇒ If run for 12 hours/day weekdays , change every 3 years ⇒ If run for 12 hours/day every day , change every 2 years ⇒ If run continuously , change every year .	<ol style="list-style-type: none"> 1. Unplug unit from wall. 2. Remove door by separating from magnetic catch. 3. Slide out the large HEPA filter. 4. Unscrew the LED UV-C bulb and replace with a genuine 275nm LED replacement bulb from MARITIME GEOTHERMAL LTD.. 5. Replace large HEPA filter. 6. Replace door and plug unit back in.
HEPA filter	1 year	<ol style="list-style-type: none"> 1. Unplug unit from wall. 2. Remove door by separating from magnetic catch. 3. Slide out the large HEPA filter and replace with a genuine HEPA H14 replacement from MARITIME GEOTHERMAL LTD..
Carbon filter	3 months	<ol style="list-style-type: none"> 1. Unplug unit from wall. 2. Remove door by separating from magnetic catch. 3. Slide out the bottom filter and replace with a genuine carbon replacement from MARITIME GEOTHERMAL LTD.. For identification, note that carbon filters have BLACK pleated filter media. 4. Change MERV8 pre-filter at same time (highest filter). 5. Replace door and plug unit back in.
<p>Note that it is easiest for many professional users to enter into a maintenance contract with the installing firm, so that they may concentrate on their professional activities without concern regarding air quality.</p>		

Troubleshooting Guide

Problem	Possible Cause	Verification	Recommended Action
No power to unit.	Breaker in electrical service panel is off.	If breaker is off, determine why.	Turn on breaker if safe to do so.
	Plug or power cord damaged.	Unplug unit and inspect power cord and plug and power connections inside electrical box.	Repair or replace if damaged.
	Door interlock switch has turned unit off.	Check to see door is properly installed, and that door interlock switch on middle tray is not damaged or misaligned.	Install door, or repair interlock switch.
	Unit not plugged in.	Check power plug.	Plug in unit to a grounded receptacle.
No blue light in indicator window when switch I or II turned on, but blower runs.	LED UV-C bulb is loose.	Bulb has a standard light bulb base, and will not work if not securely screwed in.	Tighten bulb by turning clockwise.
	LED UV-C bulb is burned out.	Remove bulb and briefly test it in a standard light fixture. (Do not leave it on for more than a second or two, since UV-C rays can be damaging.)	Replace bulb if burned out.
	One of the two lamp relays are not working.	Remove door, remove bulb, pull door interlock switch plunger out to pull-on-lock position, and activate switch I or II. Use a voltmeter to see if there is 115vac at lamp base.	If blower is activated but there is no high voltage to lamp, replace lamp relay corresponding to whichever switch was turned on (I or II).
Blower does not run when switch I or II turned on, but blue indicator light is visible in window.	Blower wires are loose, or plugs are not seated into motor.	Inspect motor wires and plugs. Pull out wiring plugs from motor, remove bulb, pull door interlock switch plunger out to pull-on-lock position, and activate switch I or II. Use a voltmeter to verify 115vac on power plug terminals L-N, and 24vac on one of C-1/2/3/4/5.	Correct loose wiring and firmly seat wiring plugs into motor.
	Faulty blower motor.	No loose wires or plugs, but motor does not operate.	Replace motor according to instructions in Repair Procedures .
Switch I has no effect.	Faulty smart switch.	Remove door, remove bulb, pull door interlock switch plunger out to pull-on-lock position. Jumper black to red on terminal strip where switch I wires are connected.	If unit operates with jumper in place, replace switch according to instructions in Repair Procedures .
	Transformer I burned out.	Power transformer with 115v on its primary terminals and check for 24vac on its secondary terminals.	Replace transformer if faulty.
Switch II has no effect.	Remote switch is off (if installed).	Check if remote switch is installed.	Turn on remote switch.
	Remote switch wires are disconnected from one another (if no remote switch installed).	Check that connectors on blue wires just under air intake grill are plugged into one another.	Plug wires together if disconnected.
	Faulty smart switch.	Remove door, remove bulb, pull door interlock switch plunger out to pull-on-lock position. Jumper black to red on terminal strip where switch II wires are connected.	If unit operates with jumper in place, replace switch according to instructions in Repair Procedures .
	Transformer II burned out.	Power transformer with 115v on its primary terminals and check for 24vac on its secondary terminals.	Replace transformer if faulty.

Repair Procedures

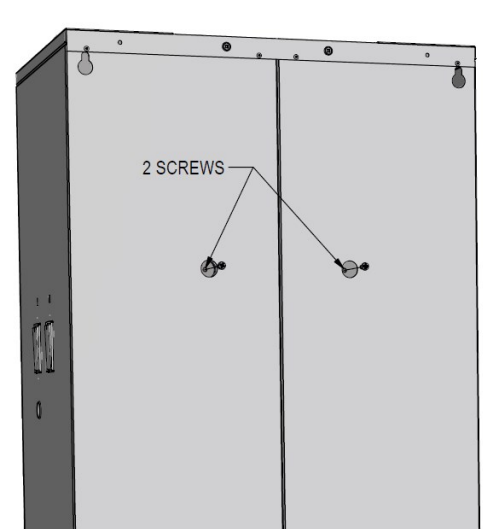
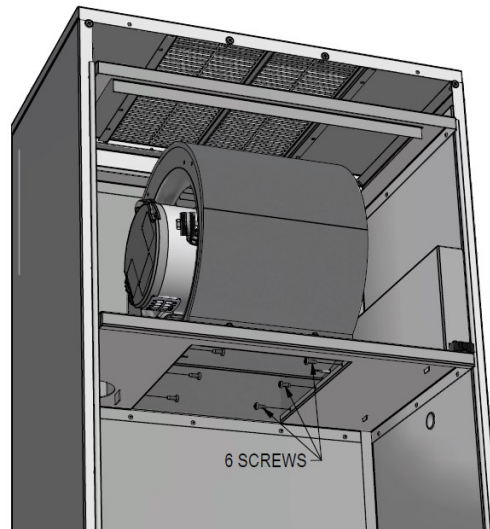


WARNING: UNPLUG UNIT BEFORE SERVICING.
Electric shock can cause severe injury or death.

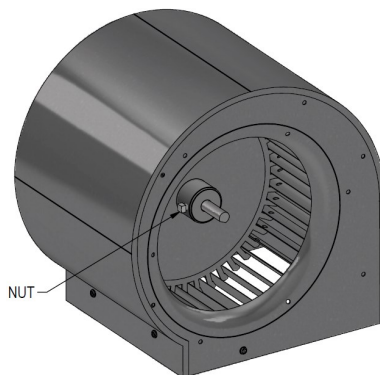
Blower Motor Change Procedure

1. Be sure to have a factory programmed motor on hand before starting procedure.
2. Unplug the unit from wall plug and remove door (magnetic catch).
3. Unplug the two wiring plugs from motor.

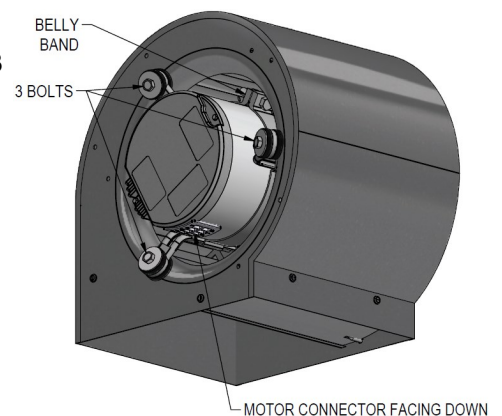
4. To replace blower motor, it is necessary to remove the blower from the cabinet. Undo the 8 screws pictured and remove blower.



5. Loosen the shaft nut:



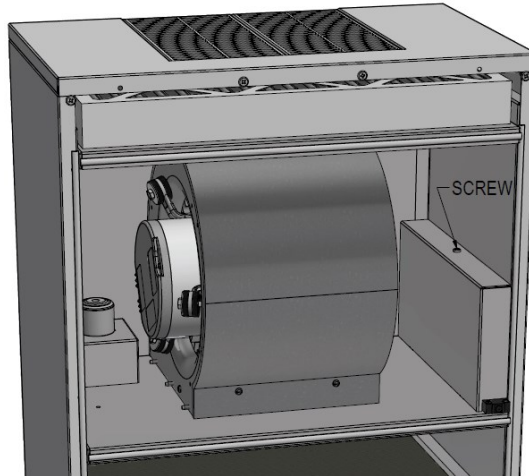
6. Remove motor from blower by removing 3 bolts. Remove belly band (with 3 legs) from motor and install on new motor, being sure to position belly band in exactly the same orientation in relation to wiring connector. Note that installing belly band in a different orientation can cause wheel to hit on blower and not rotate freely.



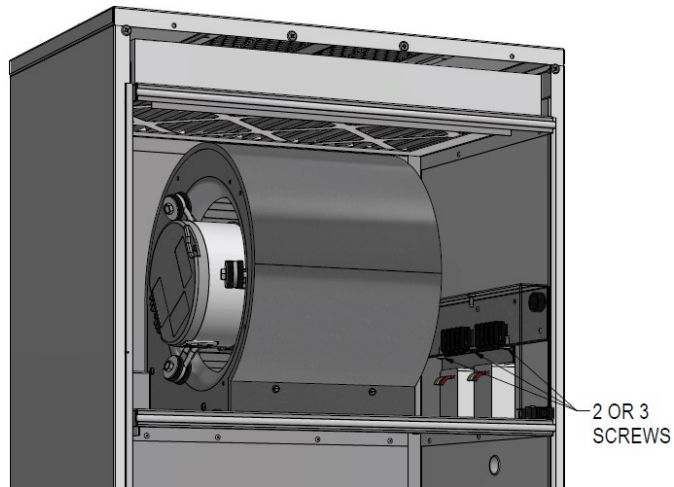
7. Re-install motor in blower, and blower into cabinet. Plug in two wiring connectors and re-install door.

Smart Switch Change Procedure

1. Unplug the unit from wall plug and remove door (magnetic catch).
2. Remove cover by removing 1 screw as shown.

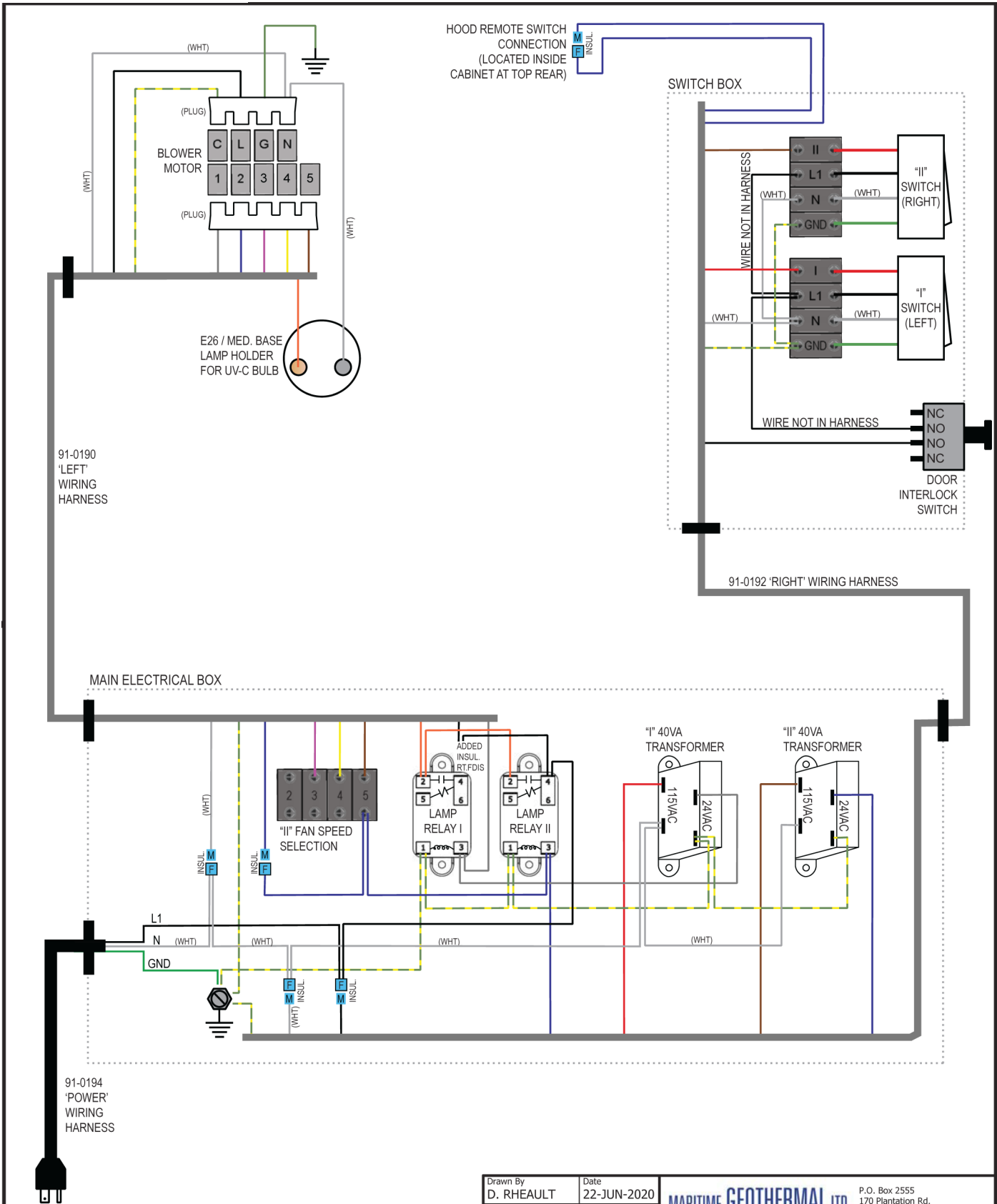


3. Disconnect 4 electrical wires from switch to be replaced from the terminal strip.
4. Using a stubby screwdriver, remove switch bar by removing 2 or 3 screws. The switch can now be removed by sliding and rotating it out.



5. Install new switch. Re-install switch bar, and connect switch wires to terminal strip. Re-install cover, and re-install door.

Wiring Diagram



					Drawn By D. RHEAULT Date 22-JUN-2020	MARITIME GEOTHERMAL LTD. P.O. Box 2555 170 Plantation Rd. Pettitcodiac, NB CANADA E4Z 6H4
					Checked By D. RHEAULT Date 22-JUN-2020	
					Eng. Approved By D. RHEAULT Date 22-JUN-2020	
					Mfg. Approved By Date	
					Approved By Date	
02	Prod. Release	D. RHEAULT	D. RHEAULT	30-JUL-2020	Drawing Name CA-Series Schematic Diagram	
01	Initial Release	D. RHEAULT	D. RHEAULT	22-JUN-2020	Size LET	Drawing Number 002450SCH
REV	ECO#	IMPL BY	APVD BY	DATE	Drawing Rev 02	Sheet 1 / 1

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LIMITED WARRANTY

MARITIME GEOTHERMAL LTD. warrants that its air purifiers shall be free from defects in materials and workmanship for a period of (1) ONE YEAR after the date of commissioning or for a period of (1) ONE YEAR AND (60) SIXTY DAYS after the date of shipment, whichever occurs first. Warranty shall not apply to air filters and UV-C bulbs, which should be changed regularly as part of a maintenance program.

MARITIME GEOTHERMAL LTD. shall, at its option, repair or replace any part covered by this warranty, which shall be returned to MARITIME GEOTHERMAL LTD. transportation charges prepaid, which, upon examination proves to be defective in materials or workmanship. Replacement or repaired parts and components are warranted only for the remaining portion of the original warranty period.

This warranty is subject to the following condition:

1. The air purifier must be properly commissioned and maintained in accordance with MARITIME GEOTHERMAL LTD.'s installation and maintenance instructions.

If the air purifier, provided by MARITIME GEOTHERMAL LTD., fails to conform to this warranty, MARITIME GEOTHERMAL LTD.'s sole and exclusive liability shall be, at its option, to repair or replace any part or component which is returned by the customer during the applicable warranty period set forth above, provided that:

1. MARITIME GEOTHERMAL LTD. is promptly notified in writing upon discovery by the customer that such part or component fails to conform to this warranty.
2. The customer returns such part or component to MARITIME GEOTHERMAL LTD., transportation charges prepaid, within 30 (thirty) days of failure, and
3. MARITIME GEOTHERMAL LTD.'s examination of such component discloses to its satisfaction that such part or component fails to meet this warranty and the alleged defects were not caused by accident, misuse, neglect, alteration, improper installation, repair or improper testing.