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GENERAL MAC1200 Owner's Manual

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ITEMS INCLUDED:

- 1 - TERSus 1200 or TERSus 2000 Air Purification System
- 1 - 120V Quick Connect Power Cord
- 2 - UVC Germicidal Lamps
- 1 - Instruction Sheet
- 1 - GeneralAire® Product Badge
(For Proper Upright Placement During Field Installation)

The GeneralAire® TERSus Air Purification System installs into the return side of ducted HVAC appliances. The GeneralAire® TERSus Air Purifier not only removes particles, but also attacks viruses, germs, and toxic gases.

This product is not sold as a medical device and is not for the purpose of diagnosis of any disease or condition, nor for use in the mitigation, treatment, or prevention of any disease or condition.

**READ THESE INSTRUCTIONS CAREFULLY AND COMPLETELY
BEFORE PROCEEDING WITH THE INSTALLATION.**

⚠ WARNING: Do not exceed voltage rating. Severe damage to device and or fire could result. Verify proper voltage.

This device **MUST** be installed by a qualified agency in accordance with the manufacturer's installation instructions. The definition of a qualified agency is: any individual, firm, corporation, or company which either in person or through a representative is engaged in, and is responsible for, the installation and operation of HVAC appliances, who is experienced in such work, familiar with all the precautions required, and has complied with all the requirements of the authority having jurisdiction.

For warranty information visit www.generalfilters.com

TERSus 1200 & 2000 Table of Contents

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WARNING!








This symbol indicates: **IMPORTANT INSTRUCTIONS!**
Failure to heed them can result in serious injury or death.




CAUTION!

This symbol indicates: **IMPORTANT INSTRUCTIONS!**
Failure to heed them can result in serious injury or material property damage.

Safety Considerations

-  **WARNING:** Never expose eyes or skin to UVC light from any source.
- Looking directly at the UVC light may cause permanent eye damage or blindness.
 - Never operate the TERSus Air Purifying System out of the plenum.
 - Designed for a closed duct system. Do not mount near a supply or a return air opening.
 - All duct openings in direct line of site of the UV light must be sealed with aluminum tape or equivalent sealing methods.
-  **WARNING:** UV light will break down plastic materials not rated for UV exposure (examples: wire insulation, flex duct, drain pans and humidifiers).
- The unit must be mounted at least 3" from the above stated type of materials.
 - If it is necessary to mount the unit in direct line of site of these types of materials, they must be shielded with aluminum foil, aluminum foil tape, or sheet metal.
-  **WARNING:** DO NOT mount this unit outdoors.
- This product is designed for indoor installation only (i.e. attics, encapsulated crawl spaces, basements, etc.).
-  **WARNING:** The lamp contains mercury. Never touch a broken lamp or the internal contents of a lamp.
- After opening the carton, unpack and inspect the unit and lamp for damage. Do not install this unit if any damage is noticeable. If lamp is damaged, cracked or broken, do not touch lamp or other contents in carton. Close carton and return to seller immediately.
 - In case of accidental exposure to internal contents of lamp, wash hands and any other affected skin area with mild detergent. Remove affected clothing immediately. If skin surface is pierced, seek medical attention immediately.
-  **WARNING:** Before installing or servicing a humidifier, air filter, HVAC system, or this unit, etc., always turn all power OFF and have unit unplugged. Electrical shock can cause personal injury or death. Never expose eyes or skin to direct UVC light from any source.
-  **WARNING:** To prevent water damage or electric shock, do not mount unit under a humidifier.
-  **WARNING:** This product is designed for indoor installation only (i.e. attics, crawl spaces, basements, etc.). For use on gas fired, oil fired, electric and split system heat pump forced air systems.
- * This product is NOT designed to be mounted outdoors on gas fired or heat pump packaged units.
 - * Split system heat pumps are systems where the air handler and the air conditioning compressor are separate units.
 - * Packaged units are systems where the air handler and the air conditioning compressor are built together and are installed outside of the building.

 **WARNING:** Never expose eyes or skin to UVC light from any source. Looking directly at the UVC light may cause permanent eye damage or blindness. Never operate the TERSus outside ductwork. Avoid touching the glass portion of the lamp with bare (ungloved) hands.

Specifications

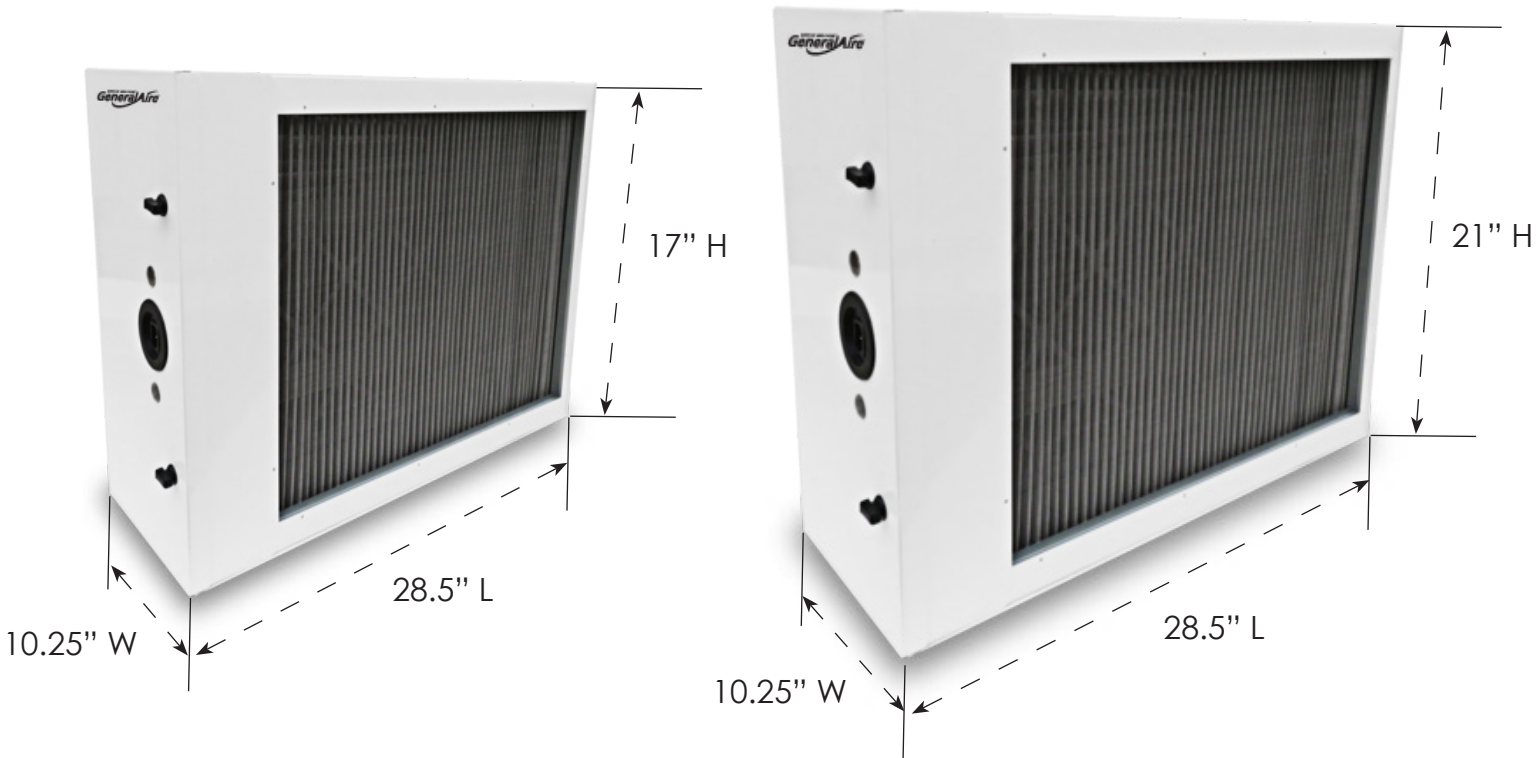
Model TERSus 1200:

Capacity: 1.5 to 3.0 tons
 Power: 120V/60 Hz .6 Amps 49.2 Watts
 Fuse: Replace only with AGC-2 fuse
 Application: 1.5 to 3 Ton Drive Air Handler/Furnace
 Max Face Velocity: 500 FPM
 Max Air Flow: 1200 CFM
 UVC Lamp Service: 1 year service / 2 year replacement
 UVC Lamp Replacement: (2) GFI #4564
 UVC Range: 253.7 nanometers (nm) Germicidal
 Filter Service: 6 to 12 months (6 months recommended)
 Filter Replacement: GFI #4581



Model TERSus 2000:

Capacity: 1.5 to 4.0 tons
 Power: 120V/60 Hz .6 Amps 49.2 Watts
 Fuse: Replace only with AGC-2 fuse
 Application: 1.5 to 4.0 Ton Drive Air Handler/Furnace
 Max Face Velocity: 625 FPM
 Max Air Flow: 1600 CFM
 UVC Lamp Service: 1 year service / 2 year replacement
 UVC Lamp Replacement: (2) GFI #4564
 UVC Range: 253.7 nanometers (nm) Germicidal
 Filter Service: 6 to 12 months (6 months recommended)
 Filter Replacement: GFI #4582



	Pressure Drop			
Model	600 CFM	800 CFM	1000 CFM	1200 CFM
1200	0.07	0.125	0.18	0.25

	Pressure Drop			
Model	1200 CFM	1400 CFM	1600 CFM	2000 CFM
2000	0.18	0.24	0.30	0.45



WARNING:

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Removing & Replacing the Door

To **REMOVE** the door to the TERSus system follow these steps:

1. Twist the two locking knobs such that they are vertical to the short edge of the unit. (See Figure 1)
2. Remove the door at an angle, from the knob side first. (See Figure 2)



FIGURE 1



FIGURE 2

To **REPLACE** the door to the TERSus system follow these steps:

1. Insert the flange of the door into the filter side of the cabinet. (See Figure 3)
2. Close the door at an angle. Twist the 2 locking knobs such that they are horizontal to the short edge of the unit. (See Figure 4)



FIGURE 3

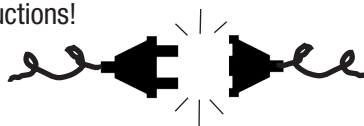


FIGURE 4

Installation

CAUTION: The TERSus installation is specific to direction of airflow and must be properly positioned when choosing up flow, down flow, or horizontal airflow application. Pay attention to directional airflow arrow for proper installation. The TERSus is designed to be installed on indoor HVAC forced air ducted systems. **DO NOT** install TERSus on the supply air side of HVAC equipment. **DO NOT** install outdoors. Product is not designed to be exposed to outdoor elements.

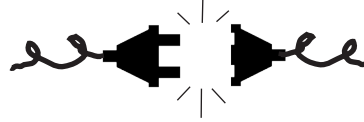
WARNING: Disconnect power to all equipment before beginning this installation! Refer to all warning and cautionary statements as given in the included main installation instructions!



WARNING: Never expose eyes or skin to UVC light from any source. Looking directly at the UVC light may cause permanent eye damage or blindness. Never operate the TERSus outside ductwork. Avoid touching the glass portion of the lamp with bare (ungloved) hands.

Installation, Cont.

WARNING: Make sure unit is unplugged before installing the lamp.



Make sure to install the TERSus so that the inlet or return air enters the side containing the MERV 13 particulate reduction filter cartridge first.



1. Remove the door to the unit per the steps listed previously.
2. Remove the inside module & filter from the outer cabinet. Take care not to bend or distort the cabinet. The ballast is factory set to 120VAC. Please confirm the voltage on both ballasts is correct. The voltage can be changed in the field to 230VAC by sliding the voltage selector switch in (Figure 5) to the 230 volt position. The plug must be replaced and wiring must be done to applicable electrical codes.
3. Mount the outer cabinet to the support plenum.

CAUTION: Do not use a screw length that will extend into or penetrate the inside module containing the TiO2 catalyst or filter cartridge.

4. In some cases the foot print of the air handler may be larger or smaller than the outer enclosure of the TERSus Unit. A metal adapter plate of 18 gage metal should be fabricated to make a suitable transition. (Figure 6)

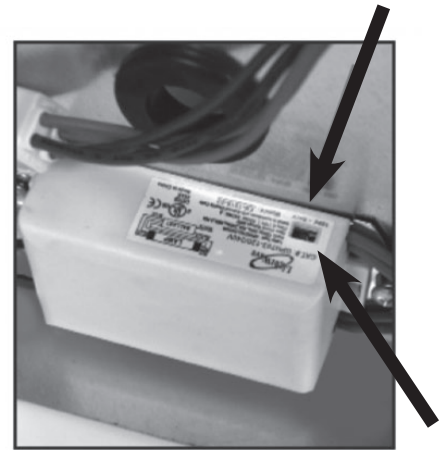


FIGURE 5

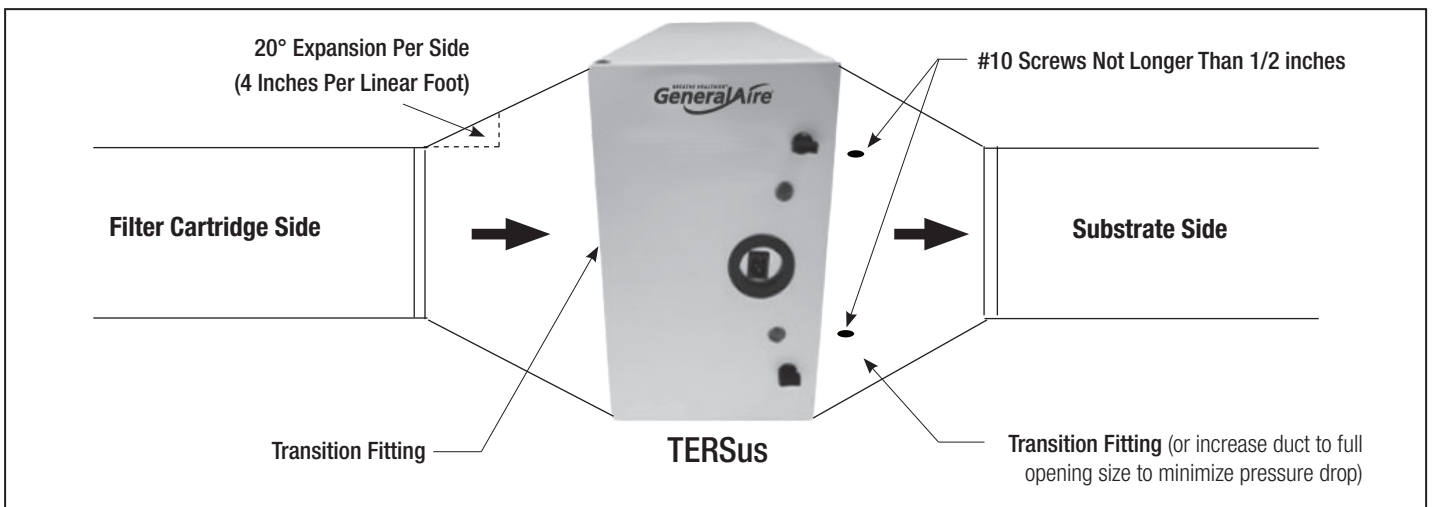
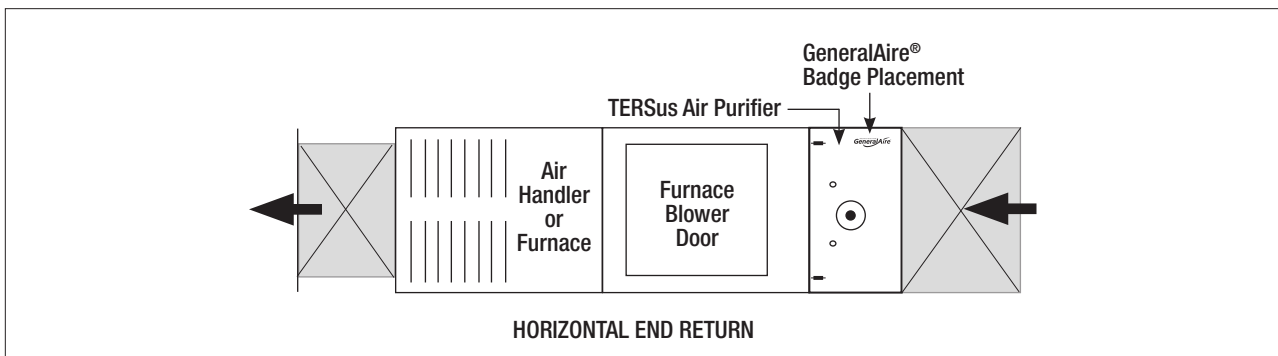
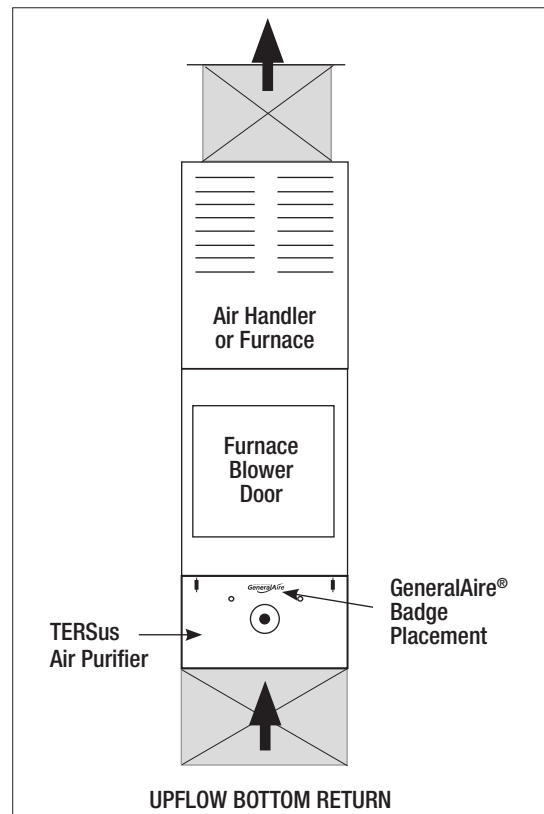
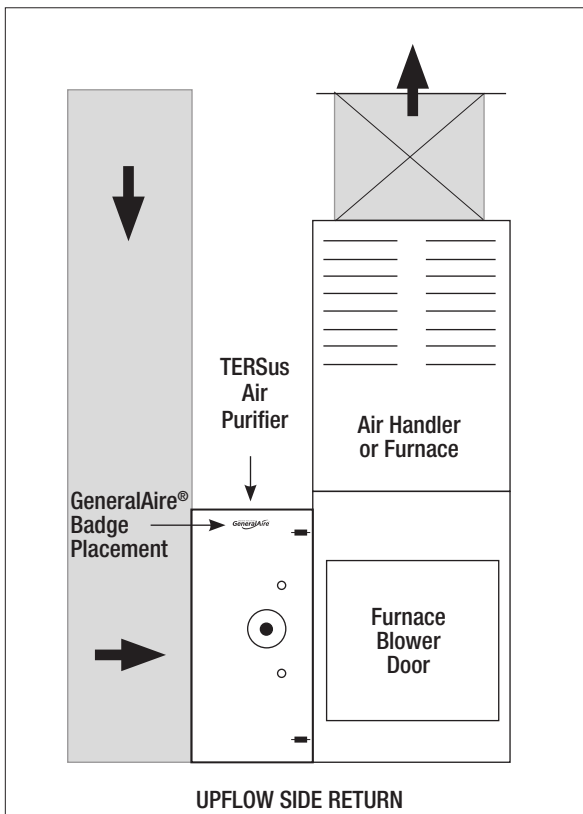


FIGURE 6

WARNING: Never expose eyes or skin to UVC light from any source. Looking directly at the UVC light may cause permanent eye damage or blindness. Never operate the TERSus outside ductwork. Avoid touching the glass portion of the lamp with bare (ungloved) hands.

Installation, Cont.



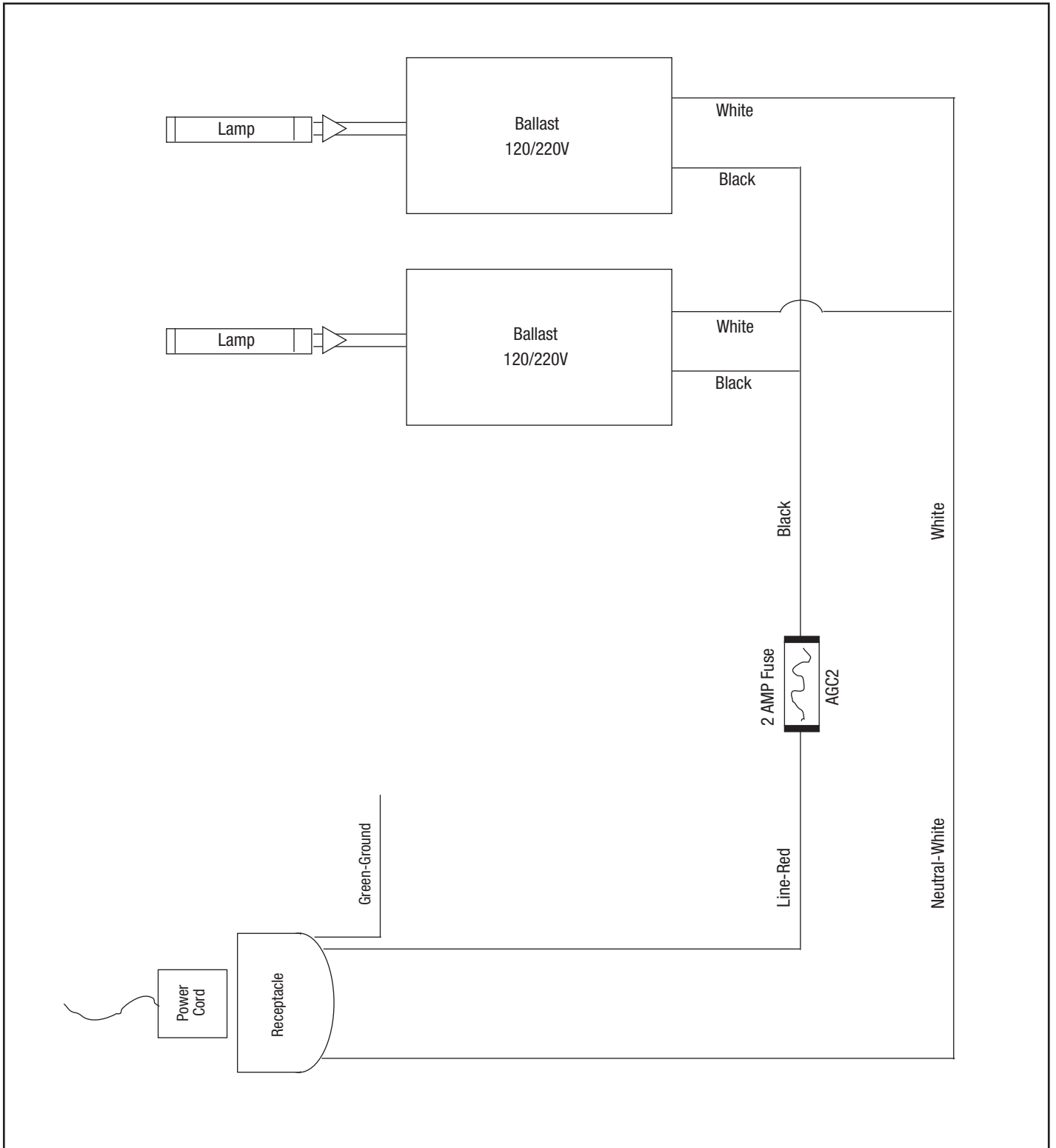
5. Seal all seams with an approved air duct sealant between the air handler and the outlet side of the TERSus so that there can be no air bypassing the system.
6. Attach the air handler to the outlet side of the TERSus and fasten with #10 x 3/8 self-drilling sheet metal screws.
NOTE: Only 1/2 inch of clearance has been provided between the outer and inner case.
7. Slide the filter into the upstream slot of the cabinet, ensuring the correct air flow direction (See Figure 13; Page 10) . Slide the inner module into the downstream slot of the cabinet. The catalytic aluminum substrate should be facing downstream such that the lamps are not exposed to the open duct.
8. Replace the door on the unit per the steps listed previously.
9. Plug in the power cord to any 120VAC outlet and check both sight ports to make sure both lamps are illuminated. Ultraviolet lamps must remain on at all times regardless of thermostat settings.
10. Set your home's thermostat to operate the furnace air handler unit fan for at least 20-30 minutes every hour. If air quality problems persist after one week, increase the fan unit operating time by five-minute intervals.



WARNING:

Never expose eyes or skin to UVC light from any source. Looking directly at the UVC light may cause permanent eye damage or blindness. Never operate the TERSus outside ductwork. Avoid touching the glass portion of the lamp with bare (ungloved) hands.

Wiring Diagram

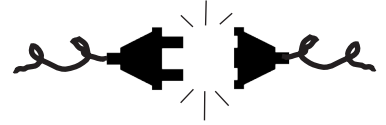


WARNING:

Never expose eyes or skin to UVC light from any source. Looking directly at the UVC light may cause permanent eye damage or blindness. Never operate the TERSus outside ductwork. Avoid touching the glass portion of the lamp with bare (ungloved) hands.

Maintenance Frequency

WARNING: Disconnect power to the unit before commencing inspection and cleaning.



CAUTION: Wear disposable, non-absorbent protective gloves prior to inspection procedure in case of accidental glass breakage.

1. Inspect and clean the lamp at least every 6 months. Increased frequency depends upon the environment, such as the type of air filter, duration of use, and replacement cycle.
2. To maintain maximum output intensity, replace the UV lamp annually. The lamp should operate continuously for maximum lamp life and light effectiveness.
3. Replace the MERV 13 filter every six (6) months.
4. Do not attempt to clean the catalytic aluminum substrate with cleaning solutions. The catalyst is radiated with short wave ultraviolet light during period of non-air flow and is self-cleaning. If there is build-up blocking the catalytic cells, sit the unit on end on a flat surface with electrical enclosure facing up. Use low-pressure, compressed air to blow the surface of the catalytic cells free of blockage.

Cleaning the Lamps

WARNING: Disconnect power to the transformer or unplug the 120V power cord before starting replacement procedure.

CAUTION: Wear disposable, non-absorbent protective gloves prior to replacement procedure in case of accidental glass breakage.

1. Unplug the quick disconnect power cord from the TERSus.
2. Remove the door to the unit per the steps listed previously.
3. Remove the inside module from the outer cabinet.
4. Unplug UVC germicidal lamps, loosen retaining knobs, and remove lamps. (See Figures 9, 10, & 11).
(Note that in the below images the ungloved hand is not touching the glass portion of the lamp, but rather only the end)



FIGURE 9



FIGURE 10



FIGURE 11

5. Use a cotton cloth with isopropyl alcohol and gently clean the surface of the lamp.
6. Slide the lamp back into the module. Tighten the retaining knob (finger tight ONLY or the lamp may be damaged). Plug the ballast connector back on to the lamp.

WARNING: Never expose eyes or skin to UVC light from any source. Looking directly at the UVC light may cause permanent eye damage or blindness. Never operate the TERSus outside ductwork. Avoid touching the glass portion of the lamp with bare (ungloved) hands.

Replacing the Lamps

Recommended every 12 months of continuous service.

- Replace only with a germicidal replacement lamp; GFI #4564.
- Follow the steps to remove the lamp (Figure 12). Replace with the new replacement lamp.

CAUTION: If blue light leaks through any portion of ductwork, immediately unplug power supply cord and seal affected areas.

UV lamps contain a small amount of mercury, like a typical fluorescent lamp. Check with your local waste management authority for local disposal or recycling requirements. According to the EPA's Universal Waste Rule, these types of lamps may be disposed of into household waste.

WARNING: Never touch broken lamp or internal contents of lamp. The lamp contains mercury.

CAUTION: In case of accidental exposure to internal contents of lamp, wash hands and any other affected skin area with mild detergent. Remove affected clothing immediately. If skin surface is pierced, seek medical attention immediately.

Replacing the Cartridge Filter

1. Unplug the power cord from the TERSus.
2. Remove the door to the unit per the steps listed previously.
3. Remove old filter cartridge and replace with new filter. Make sure airflow arrow on filter is pointing to the inside of module. (Figure 13)
4. Replace the door on the unit per the steps listed previously. Return power to unit.



FIGURE 12



FIGURE 13

WARNING: Never expose eyes or skin to UVC light from any source. Looking directly at the UVC light may cause permanent eye damage or blindness. Never operate the TERSus outside ductwork. Avoid touching the glass portion of the lamp with bare (ungloved) hands.

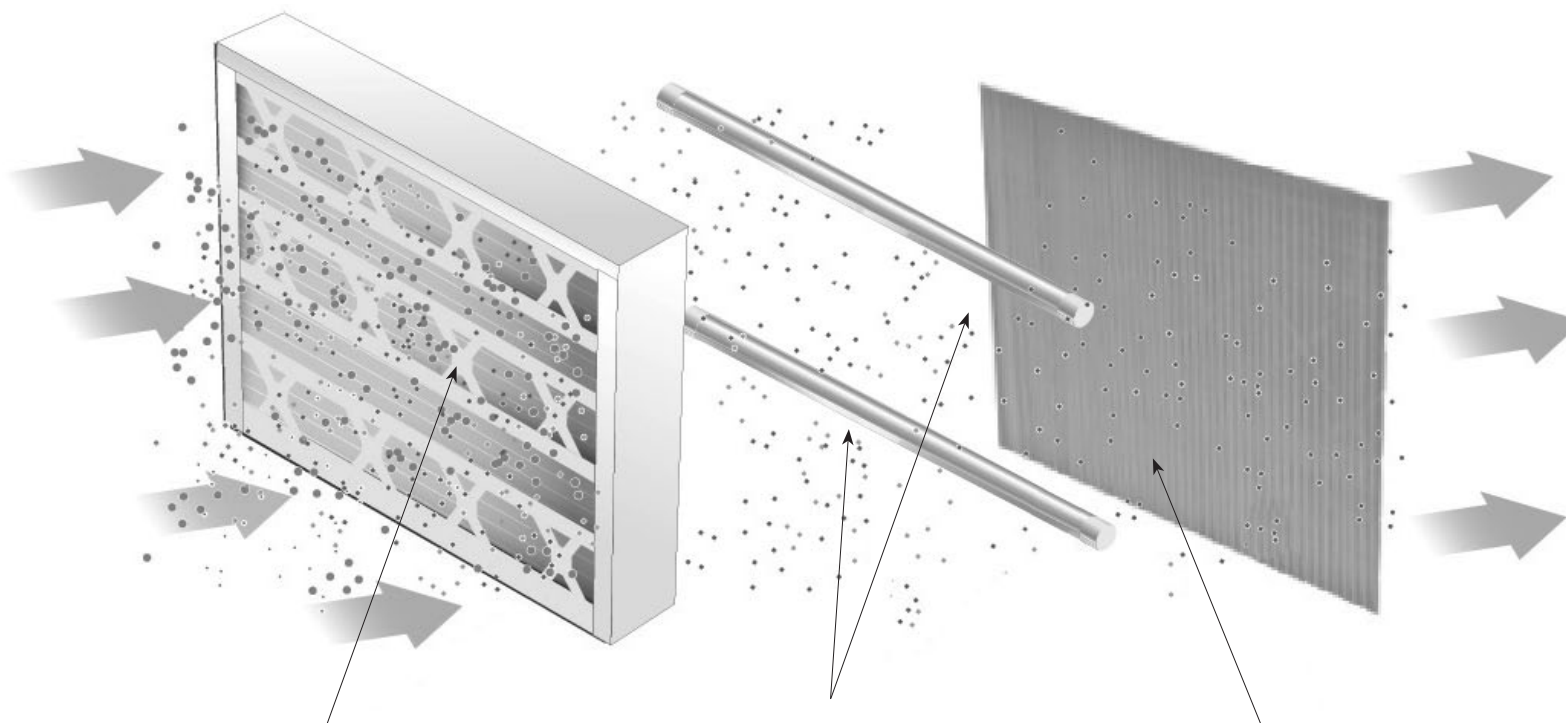
GeneralAire® TERSus Air Purification Operation

The TERSus Air Purification System installs in the air-inlet side of any heating and air conditioning system. Only operation of the air-handler fan unit is required for filtration, air purification, and sterilization to take place.

NOTE: The UVC germicidal lamps are wired to operate continuously. This feature allows the catalyst to burn off surface impurities, cleaning and reactivating itself during periods of non-use or no airflow.

The TERSus Air Purification System combines three unique technologies to protect people against indoor air pollutants. Photocatalytic Oxidation (PCO) technology combined with high efficiency nano-carbon MERV13 particulate filter and UVC germicidal light that quickly reduces toxic gas-phase chemicals and lung damaging dust and airborne germs from the living environment.

Many new homes have smart programmable thermostats that allow for automatic operation of the air-handler fan unit when there is no demand for heating or air conditioning. It is important and recommended that the TERSus Air Purification System is operating a minimum 20-30 minutes per hour (24) hours per day to remove airborne contaminants from the indoor environment. For optimum performance, program heating &/or cooling system fan to run continually.



**1. MERV 13 Nano-Carbon
High Efficiency Filtration**

Traps particulates, including mold, bacteria, dust, dander, and pollen

2. UVC Germicidal Purification

Neutralizes bacteria, viruses, mold, and fungi

3. PCO Module

Dramatically reduces toxic VOC's and odors



WARNING:

Never expose eyes or skin to UVC light from any source. Looking directly at the UVC light may cause permanent eye damage or blindness. Never operate the TERSus outside ductwork. Avoid touching the glass portion of the lamp with bare (ungloved) hands.

Cleanup of Broken Lamps

UV lamps contain mercury, like a typical fluorescent lamp.

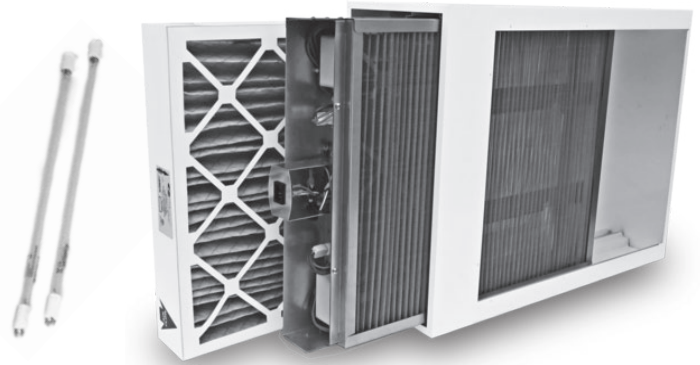


WARNING: DO NOT touch mercury with your bare hands.

1. While wearing disposable, non-absorbent protective gloves, carefully pick up the large pieces of glass with your hands.
2. Vacuum the entire area with a standard household vacuum cleaner ensuring the removal of all lamp material.
3. Dispose of the pieces of glass, the vacuum cleaner bag, and the disposable gloves in a sealed garbage bag.
4. Check with your local waste management authority for local disposal or recycling requirements.
5. Wash hands, and remove and wash clothes for added safety measures.

Replacement Parts List

GFI #4564	Replacement UVC Lamps (Set of 2)
GFI #4565	BT0-12/20 Replacement Ballast Assembly
GFI #4581	1625 MERV 13 Filter w/Carbon (TERSus 1200)
GFI #4582	2025 MERV 13 Filter w/Carbon (TERSus 2000)



Troubleshooting Guide

My lamps do not light up when I plug the unit back in.

1. Check to be sure there is correct voltage to the unit and the ballast is set for the correct voltage.
2. Be sure the lamp connector is fastened securely.
3. Check for loose electrical connections.
4. Test with new lamp and if lamp still does not light, replace ballast.

My lamps never shut off.

1. The UVC germicidal lamps are wired to operate continuously. This feature allows the catalyst to burn off surface impurities, cleaning and reactivating itself during periods of non-use or no airflow.

I forgot to wear gloves while changing the lamp.

1. If you touch the lamp with your bare hands, use a cotton cloth with isopropyl alcohol and gently clean the surface of the lamp to remove any oils your bare hands may have left behind.