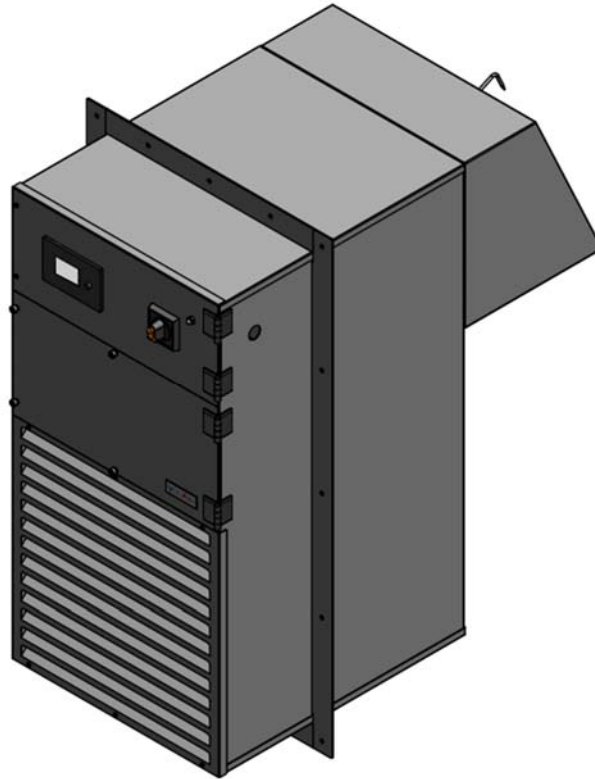




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# INSTALLATION, OPERATION, AND MAINTENANCE MANUAL FOR PU SERIES PRESSURIZATION UNITS



## Pressurization Units with 1600CFM Capacity

Models available in:  
208/230VAC / 1P / 60Hz  
208/230VAC / 3P / 60Hz  
460/480VAC / 3P / 60Hz

\* A more recent revision may be available at [www.voltaresys.com](http://www.voltaresys.com) or the QR Code in the top right corner of every page.



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## 1. IMPORTANT INFORMATION TO REVIEW PRIOR TO INSTALLATION, OPERATION AND MAINTENANCE

- Read the ENTIRE MANUAL prior to installing and maintaining the pressurization unit. Do not install or perform maintenance on the pressurization unit if you do not understand all of the instructions. Contact VoltAire at (407)378-7482 with any technical questions or concerns.
- Warning: Improper installation and operation may cause property damage, personal injury or loss of life. The pressurization unit shall only be installed and maintained by a qualified professional in strict accordance with the requirements within this manual and in accordance with all local, state and federal codes.
- In the event of a conflict, code requirements shall take precedence over the instructions provided within this manual. The installer shall be aware of all code requirements and shall comply fully.
- Use care when transporting and lifting the pressurization unit.
- Remove power from the unit during maintenance and installation, as line voltage may be dangerous, hazardous and lethal.
- Warning: Wear proper personal protection equipment, including but not limited to safety glasses, goggles and gloves. Edges may be sharp.
- These instructions should be retained by the owner and/or with the unit.

## 2. TOOLS / MATERIALS PROVIDED BY INSTALLER

Required tools and materials provided by installer:

- |  |   |
|--|---|
| a) External disconnect                             | d) Sixteen (16) 5/16" Ø fasteners and nylon washers |
| b) Conduit nut and bushing for high voltage wiring | e) 5/16" driver/wrench for fasteners                |
| c) Exterior rated silicone sealant                 |   |



### 3. PRODUCT DESCRIPTION

VoltAire Pressurization Systems provide the ability to apply positive or negative pressure to a building or room. The system automatically maintains pressure relationships with adjacent areas or ambient air with a high efficiency variable capacity fan. Fan speed is controlled through a specially programmed controller in order to provide quick response times to changes in pressure by maintaining a pressure setpoint (measured in inches of water column). The controller maintains all of the functionality of the Pressurization Unit maintaining the differential pressure through adjustable PID loops and providing alarms. All alarms can be acknowledged on the digital display that interacts directly with the controller. Air that passes through the unit is filtered with 1" pre-filter and 2" final filter to ensure that clean air is being supplied. A low pressure alarm is provided via dry contacts which notifies the user/operator of the need to change filters or to identify inadequate pressurization. The air discharge grille exhausts downwards, but may be flipped so it exhausts upwards. The stainless steel cabinet provides for durability and environmental resistance. The unit mounts to any wall that accepts the specified cutout dimensions.

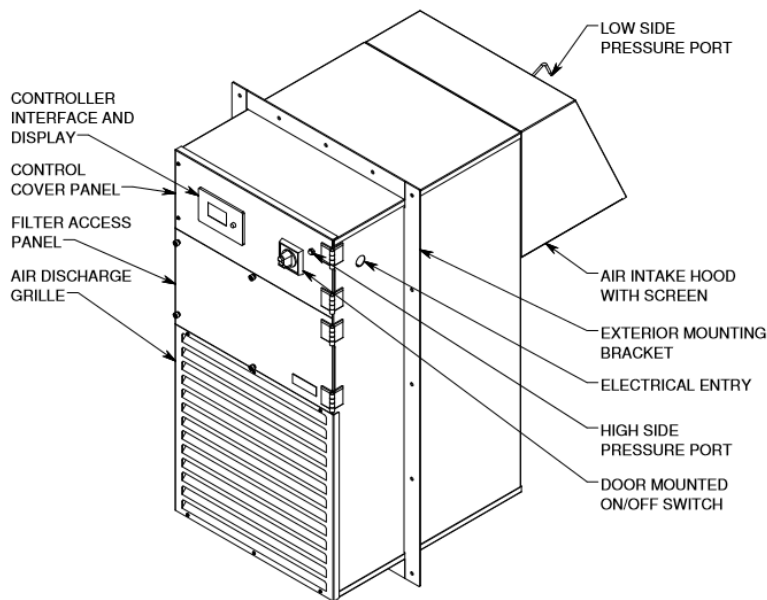


Figure 1 – Isometric View with Descriptions



## 4. GENERAL PRODUCT DATA

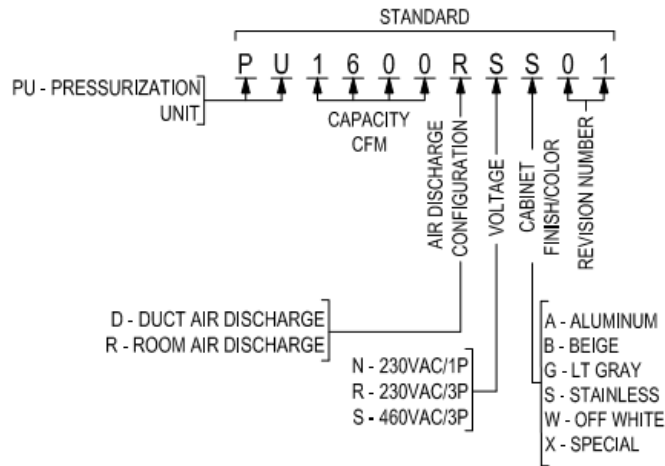


Figure 2 – Product Nomenclature

MODEL NUMBER <sup>1</sup>	CFM	MAX FAN STATIC PRESSURE	RATED VOLTAGE	MINIMUM CIRCUIT AMPACITY (AMPS)	Operational Temperature
PU1600_N_ _ _ _	1600	2 in WC	208/230 / 1P / 60Hz	Contact VoltAire	-10° to 140°F (-23° to 60°C)
PU1600_R_ _ _ _			208/230 / 3P / 60Hz	7.5	
PU1600_S_ _ _ _			460/480 / 3P / 60Hz	5.5	

<sup>1</sup> See Figure 2, product nomenclature, for additional model number information.

Table 1 – General Product Specifications

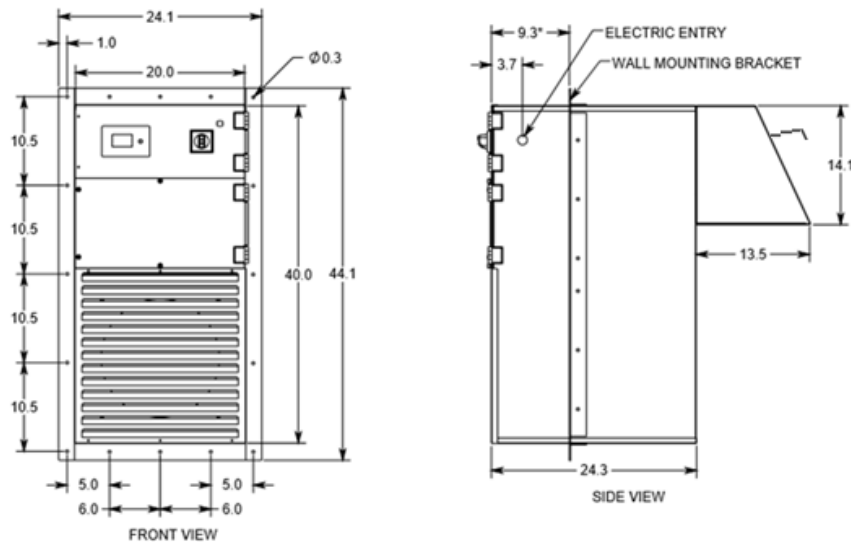


Figure 3 – External Dimensions

All Units are in Inches



## 5. INSTALLATION INSTRUCTIONS

The mounting/cutout drawing reflects the minimum and maximum cutout dimensions for mounting the pressurization unit to a wall.

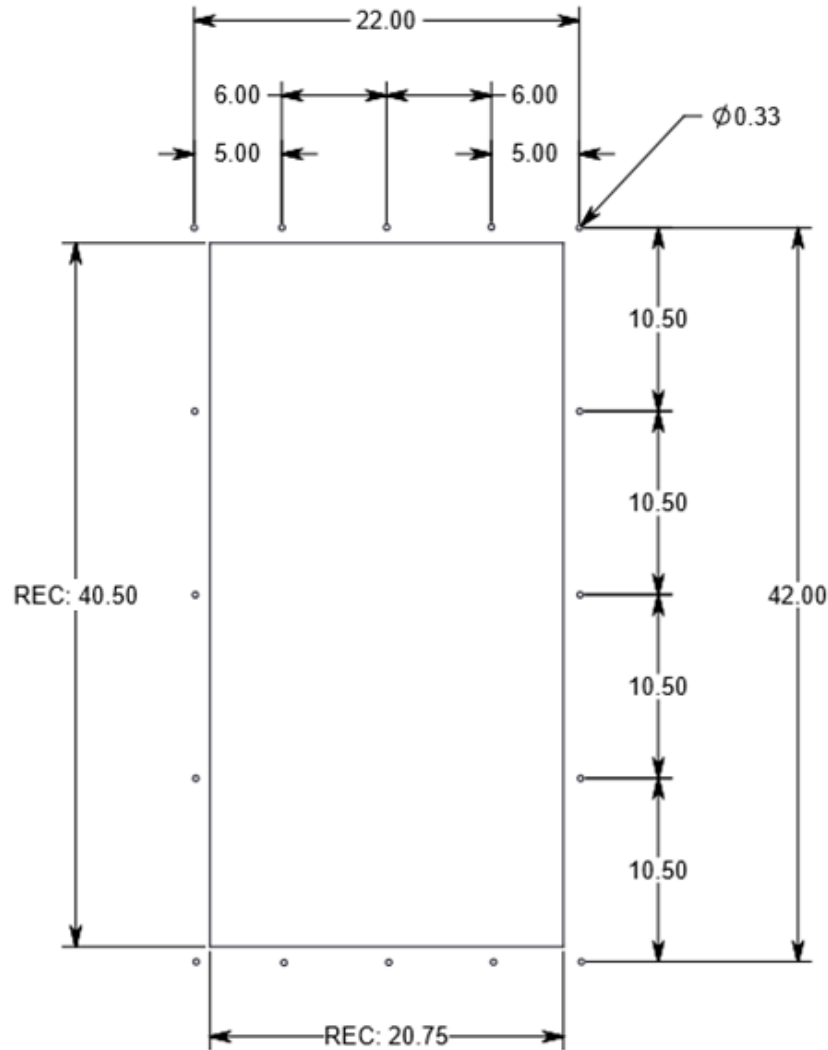


Figure 4 – Wall Cutout  
All Units are in Inches

Provide a rectangular hole in wall in accordance with Figure 4.

Clean the mounting surface to remove any residual debris and dust in order to ensure a proper seal when unit is installed.



Install air intake hood (if applicable) with screen on unit and connect pressure sensor tubing to low side pressure port.

Apply border of field supplied sealant around edges of cutout and around interior perimeter (the surface that mounts against the wall) of the exterior mounting bracket. Install unit into wall using field supplied fasteners. Note that all areas of the unit are maintainable either through the front opening or the duct opening, however all standard maintenance is provided through the front of the unit. Reattach the three front panels and the four hinges and secure them with their respective fasteners.

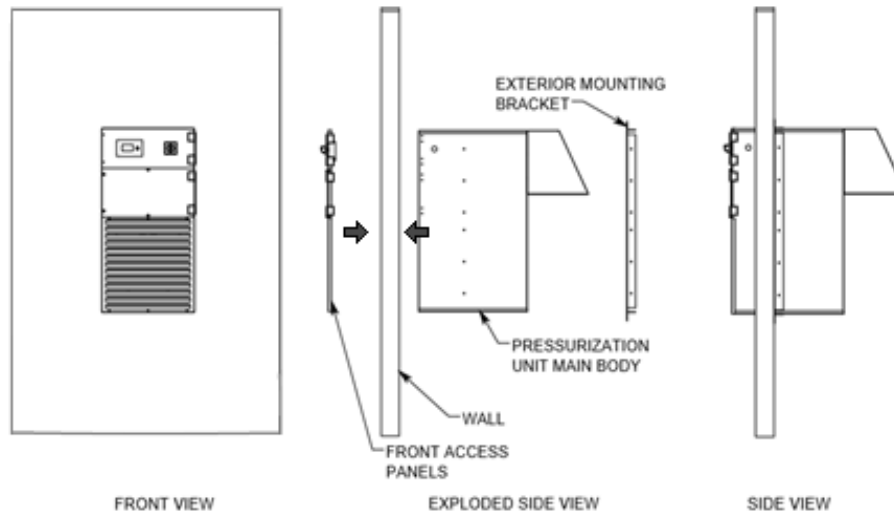


Figure 5

Install the field supplied disconnect adjacent to the unit and install conduit and wire through electric entry hole. Run high voltage wires in accordance with the electrical schematic, shown in Figure 11, through the electrical opening. The installer shall provide electrical service and wire size in strict accordance with the National Electric Code and any other applicable codes.

**For Units with Remote Shutdown (Low Leakage Damper):** Utilizing the electrical entry hole labeled 115VAC ENTRY below the main electric entry (230V or 460V), install conduit and wire. Supply the unit with 115VAC in accordance with the electrical schematic, shown in Figure 11. The 115VAC signal should be provided to the unit for normal operation and removed for emergency shutdown, as removal will close the low leakage damper and shutdown the PU1600 fan. The damper is powered open, spring close.

If external alarm notification is being used the installer may provide a second entry point into the electrical panel and run low voltage wires for the alarm to the low voltage terminal block specified in the electrical schematic. Dry contacts are rated at 8 amps at 240 VAC.

The unit is provided with fire smoke shutdown terminals F1 and F2. The unit is shipped with these terminals jumped out. If the unit is to be connected to an external smoke/fire monitoring and control system these



terminals are to be used for a field supplied relay. Removal of this jumper will disengage the unit operation to immediately eliminate airflow. Do not apply voltage to the F1 and F2 terminals.

## 6. START-UP AND CONTROLS INSTRUCTIONS

**STOP AND READ BEFORE PROCEEDING!** It is important to understand the controls and functionality of the unit in order to achieve desired performance levels. The pressure controller is used to monitor differential pressure across two environments to ensure consistent positive pressure in the room/building that is being pressurized. The on-panel display can be used to adjust desired setpoints for the building's differential pressure in inches of water column.

The display has three main parts of its interface as seen in Figure 6.



**FIGURE 6 – User Interface Overview**  
Display shown is default Pressure Controls

- 1) The screen displays the digital user interface.
- 2) The rotary dial allows you to scroll through the interface and select/input options. Scrolling through the interface is achieved through rotating the dial clockwise or counterclockwise. Selecting/inputting options or values is achieved through pressing on the rotary dial.
- 3) The return button returns you to the prior screen and can be used to cancel inputs and return to your prior selection.



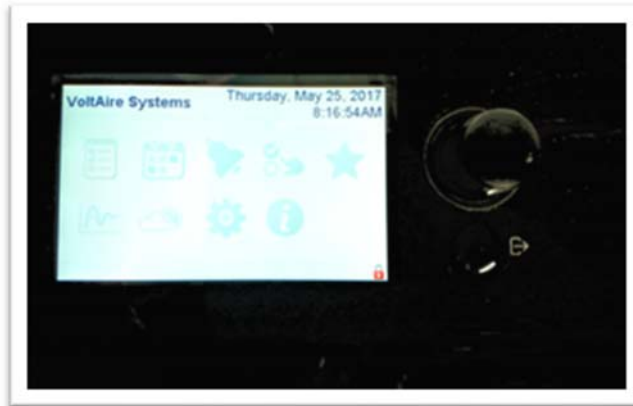


Figure 7 – Lock Screen

VoltAire Systems has a uniquely programmed password protected user interface for the Pressurization Unit as shown in Figure 7 (shows lock screen). This interface is used to provide security over different functionality of the pressurization unit. There are three main users that may be selected through the password screen. You can enter password select mode by pressing the rotary dial on the lock screen. Doing so prompts you with a password input as seen in Figure 8. Through password input. Default user and password information is found in Table 1. Guest and Operator passwords may be changed by the installer. Admin is not available and is not required.

USER	PASSWORD	ACCESS	ABILITIES
Guest (Read Only)	[No Password]	<ul style="list-style-type: none"> <li>• Favorites</li> <li>• Settings</li> <li>• Information</li> </ul>	Read only permission for Accessible Options
Operator	2016	<ul style="list-style-type: none"> <li>• Favorites</li> <li>• Settings</li> <li>• Information</li> </ul>	Read and Write Permission for Accessible Options

Table 1 – User List

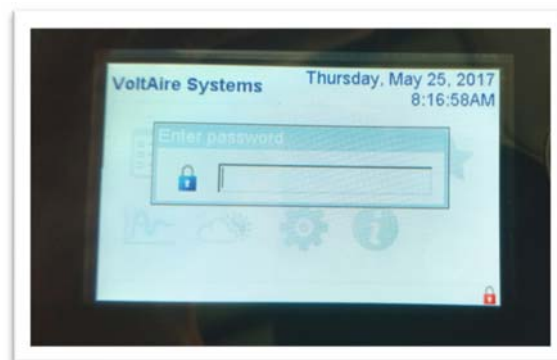


Figure 8 – Password Input Screen

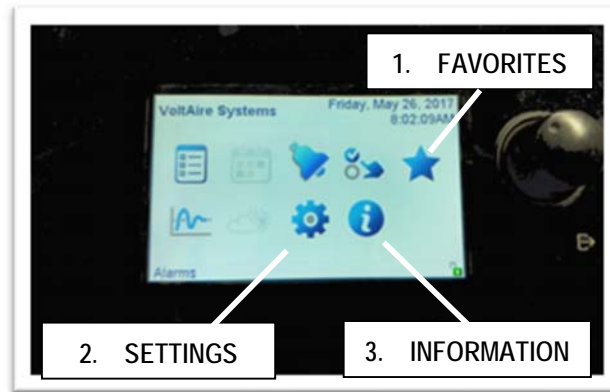


Figure 9 – Main User Screen (Options depend on User Access)

1. **FAVORITES:** Users can read and access information and setpoints (via “operator” mode). Information is grouped based on relevance to functionality and operation of the unit.

**BUILDING PRESSURE STATUS:** The system allows the user to monitor the various variables

NAME	DESCRIPTION
Building Pressure	The current differential pressure being in inches of water column.
Fan Speed Command	Controller output command percentage based on 0-10V.
General Alarm	If there is an active alarm, the general alarm will be active. Check alarms section in favorites for active alarms.

**SETPOINTS:** The system allows the user to input setpoints in order to control the functionality of the pressurization unit. An operator will have the ability to set and adjust these setpoints while the guest user is only able to view the setpoint value.

NAME	DESCRIPTION
Building Press. Setpoint	Desired building differential pressure.
Building Press Alarm SP	If building pressure falls below this alarm setpoint, a timer will start that will be compared to the building pressure alarm delay.
Building Press Alarm Delay	Delays alarm output to avoid nuisance alarms.
Filter Alarm Setpoint	Setpoint used to control the dirty filter alarm.

**ALARMS:** The system will notify the user when an alarm is active. The blue bell will change to red if there is an active alarm. An operator may read and acknowledge these alarms while the guest user is only able to read the alarm.



ALARM NAME	DESCRIPTION
Building Pressure Alarm	Alarm triggers if 'Building Pressure' remains below 'Building Press. Alarm SP' for greater than or equal to the 'Building Press. Alarm Delay'.
Dirty Filter Alarm	Alarm triggers if 'Filter Pressure' exceeds 'Filter Alarm Setpoint'.
Fan Failure Alarm	Fan failure alarm triggers if fan detects internal fault.
Fire/Smoke Alarm	Fire/smoke alarm triggers if external dry contact opens.

*Note: Controller will continue to drive fan during an alarm, except for fire/smoke shutdown.*

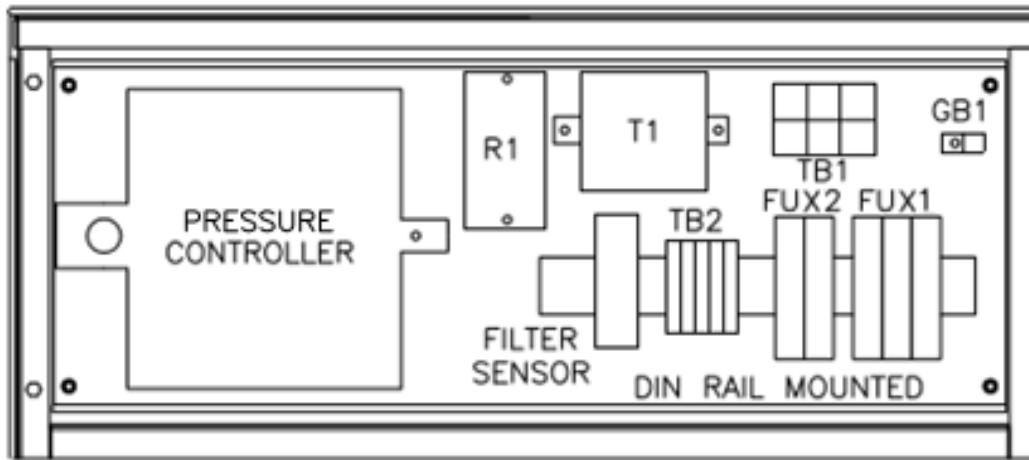
**CONFIGURATION:** The PID functionality of the controller enables variable responsiveness to changes in differential pressure. This allows for the unit to properly adjust fan speed so that the differential pressure matches the desired setpoint.

PID VARIABLE	DESCRIPTION / FUNCTIONALITY
PID_P	Proportional term; increasing the value results in a larger change (less accurate, quicker response to large changes in differential pressure), decreasing the value results in a smaller change (more accurate, slower response to large changes in differential pressure) in output for error.
PID_I	Integral term; increasing the value results in an accelerated movement of the process towards the setpoint, decreasing the value results in decelerated movement towards the setpoint.
PID_D	Derivative term; increase the value to improve settling time for PID loop.  Suggested: Use default value and only adjust if a slower, faster or more precise operation is needed.  <b>WARNING:</b> Incorrect adjustment of the derivative term may result in PID loop instability. If adjusting, gradually increase value in small increments making sure to record last working value. Once the loop is no longer stable, input the last working value.
PID_Deadband	This value reduces the frequency of the activation of the output. It is recommended that this value remains unchanged unless the installer/operator is familiar with PID loops.

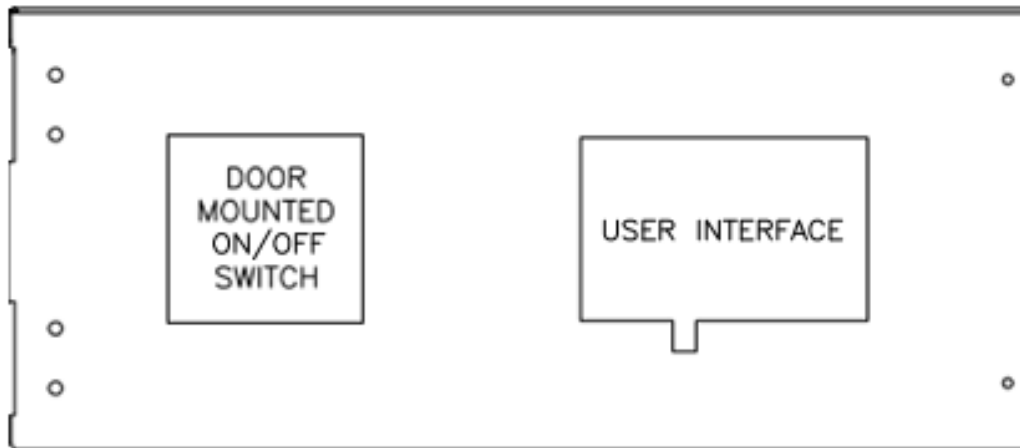
2. **SETTINGS:** Displays unit interface settings. Used to adjust display brightness and language.
3. **INFORMATION:** Displays Voltaire website address and contact phone number.



## 7. ELECTRICAL LAYOUT AND SCHEMATIC

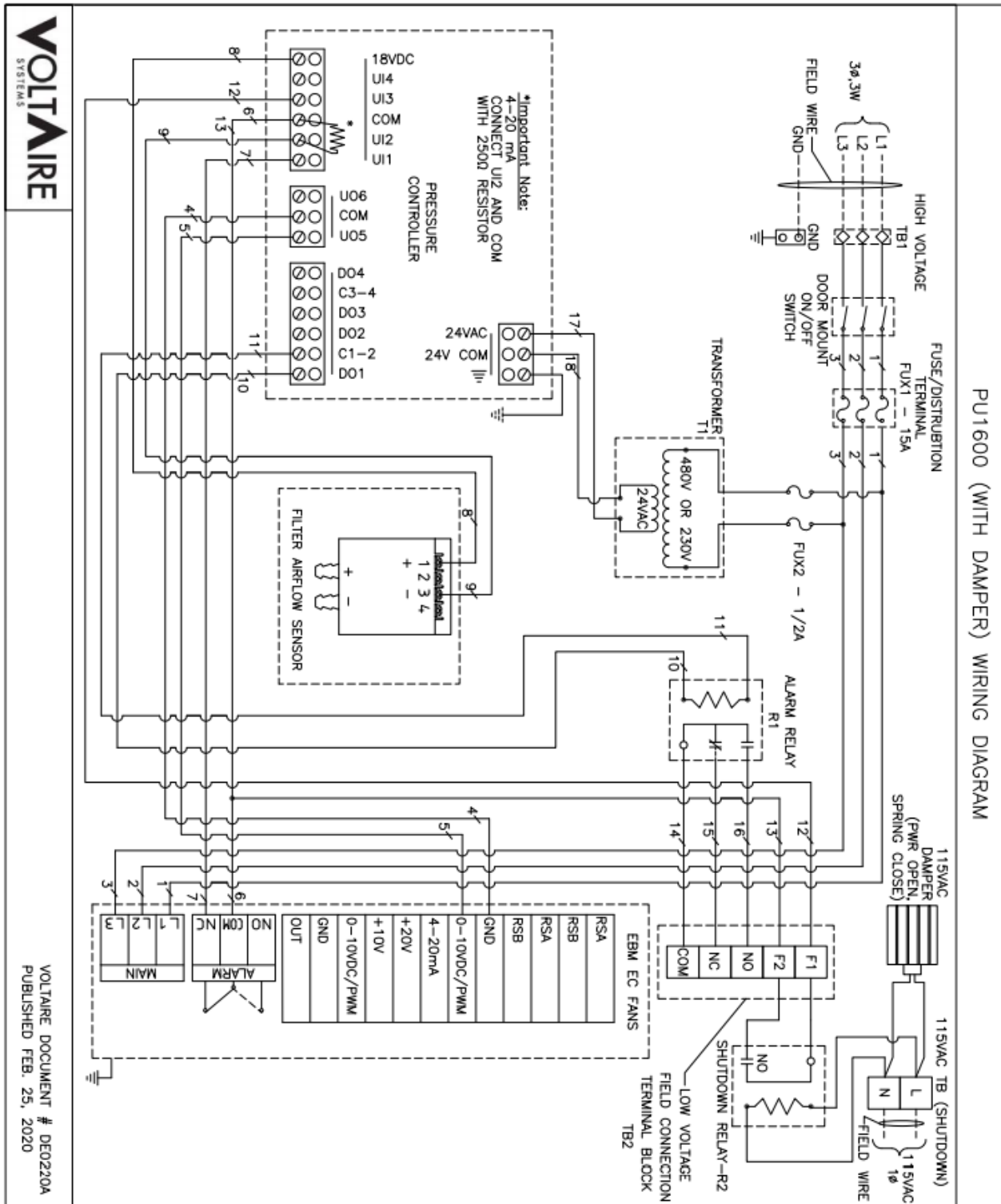


Cabinet Interior



Back of Electrical Access Door

Figure 10 – Control Panel Layout



**VOLT AIRE**  
SYSTEMS

VOLT AIRE DOCUMENT # DE0220A  
PUBLISHED FEB. 25, 2020

Figure 11 – Electrical Schematic



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## 8. RECOMMENDED MAINTENANCE

Although the pressurization units are designed to require minimal maintenance, it is recommended that the units be inspected periodically for proper operation. All systems are accessible through either the thumb screw or the security screw secured front panels. The following items can be reviewed during routine maintenance of the cabinet or equipment:

- Verify operation of the fan. First ensure that the voltage is being delivered to the fan. If the proper amount of power is being delivered, you can use a fan speed override as an operator or an admin in order to check to see if the fan is working.
- An important safety feature is the fire/smoke cutoff. While verifying operation of a running fan, please open the contact between the two fire/smoke terminals on terminal block two (TB2) to ensure that the fan immediately turns off.
- Verify that the unit is sealed properly. The field sealing of the unit to the wall should be inspected to ensure proper sealing (See Section 5).
- The pressurization unit has two filters, a 1" pre-filter and a 2" final filter. Ensure that these filters are not being blocked with dust, dirt, or other debris. If filters must be changed, please contact Voltaire Systems for replacements. A filter alarm will be displayed on the unit when there is too much blockage and the filters must be replaced in order for the pressurization unit to properly function. It is important that the filters are maintained before blockage becomes an issue.



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## 9. SYSTEM TROUBLESHOOTING

The Pressurization Unit internal controller has alarm functionality for a variety of different components.

If trying to troubleshoot an alarm, please review the following:

- An initial check to see if the controller is displaying an alarm can help diagnose many potential performance issues.
- Building Pressure Alarm: Pressurization Unit is unable to maintain the differential pressure for the room after the declared delay value. This can be a result of building/room leakage, impeded airflow, a fan failure, or the lack of capacity of the fan to pressurize the room.
  - If airflow is impeded, check for blockages in the unit. Start by checking the status of the Dirty Filter Alarm. Other blockages could have occurred in the external mesh located on the intake duct on the exterior side of the unit.
  - For fan failure, start with checking the status of Fan Failure alarm.
  - If the unit stopped working after adjusting the PID settings, please revert them to their default settings or the most recent working settings.
- Dirty Filter Alarm: Check the 1" and 2" filters. If they are too saturated with debris and the dirty filter alarm is not active, adjust the filter alarm differential pressure setpoint accordingly so that the Dirt Filter Alarm activates when the filters need to be changed for its installed environment/situation.
- Fan Failure Alarm: The fan control operates from 0 to 10V with 1.5V as the minimum voltage necessary for the fan to run. To check to see if the fan is running correctly, adjust the building pressure setpoint to 1" WC. This will force the fan to run at 100% fan speed through the software because the unit will attempt, but will never be able to achieve, to reach that differential pressure. If unsuccessful, disconnect controller connections UO5 and COM and jump the 10V output on the fan to the 0-10V PWM input on the fan. The fan should run at 100% speed when properly supplied with the correct voltage.
- Fire/Smoke Alarm: Alarm will deactivate when the two points on terminal block two (TB2) are jumped together. If alarm is still active, check connections UI3 and Com on the controller.



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## 10. SPARE PARTS

Refer to [www.voltairesys.com](http://www.voltairesys.com) or the QR code in the top right corner of the page

## 11. WARRANTY

### VOLTAIRE SYSTEMS THERMAL UNITS LIMITED WARRANTY AND LIMITATIONS OF LIABILITY

(Applies to All Heat Exchangers, Pressurization Units, Fan Units, and Air Conditioners)

The VoltAire Systems, LLC ("VoltAire") Non-Transferable Limited Warranty ("Limited Warranty") is applicable for 12 months following the shipment of the product to the original purchaser ("Purchaser") defined as the "Warranty Period". VoltAire warrants to the original purchaser during the Warranty Period that all materials and workmanship are free of defects of quality and operation that would impair the usefulness of the original air conditioner, fan unit, or heat exchanger (collectively herein referred to as "Product") during the Warranty Period. This Limited Warranty is for all components of the Product, except filters, when installed and operated under the following conditions:

- A. In strict accordance with the Product's Installation and Operation Manual, as may be revised from time to time with the latest version available at [www.voltairesys.com](http://www.voltairesys.com).
- B. Maximum voltage variation no greater than plus or minus 10% of nameplate nominal rating.
- C. Maximum frequency variation no greater than plus or minus 3 Hz. of nameplate nominal rating.
- D. Must not exceed minimum and maximum stated temperatures on the nameplate.
- E. Not to exceed (BTU/Hr.) rating, including any heat sink, as indicated on the nameplate.
- F. Installed per all local, State and Federal Codes
- G. The unit must not be restarted for a period of five (5) minutes after intentional or accidental shut-off of a compressor. (This does not apply to heat exchangers or pressurization units.)

The Limited Warranty is void and not applicable if:

- A. The Product is installed improperly
- B. The Product is not maintained properly, including prolonged operation with dirty filters or coils.
- C. The Product is modified, abused and/or tampered
- D. The Product is applied in an incorrect manner, including operation within a corrosive atmosphere (including but not limited to coastal applications)
- E. The Product is used with the incorrect refrigerant (air conditioners only)
- F. The Product is damaged and/or inoperable due to accidents or events beyond the reasonable control of VoltAire and Acts of God
- G. The Product is repaired with parts not provided by VoltAire
- H. The Product is installed and operated outside the United States, Mexico, and/or Canada.

Damage during freight is not included with this Limited Warranty. The Purchaser must insure the Product is installed by a competent, professional, qualified contractor, following all local, state, and national codes and industry standards. The Purchaser must provide adequate maintenance (e.g. filter changes, coil cleanings).





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The Limited Warranty covers the Product only during the Warranty period, and the Limited Warranty does not include any labor, freight, and/or consequential damages or loss. Upon Notification by the Purchaser, VoltAire solely reserves the right to either:

- Ship replacement parts to the Purchaser for the Purchaser's infield replacement of the part. Infield replacement will require the Purchaser to provide a purchase order to VoltAire for the standard cost of the part and after infield replacement return the original part to VoltAire with freight cost by Purchaser. Within fourteen (14) days of receipt of the returned part VoltAire will review and analyze the returned part. If the part is found to be defective by VoltAire a credit will be issued to the customer. Parts returned to VoltAire and found not to be defective will result in no credit applied to Purchaser's account and the Purchaser will be required to pay for the replacement part.
- Or request the return of the Product for evaluation. Return of the Product must be preceded by the issuance of a VoltAire Return Merchandise Authorization (RMA). The RMA will require that shipping costs be paid by the Purchaser to return the Product to VoltAire. Within fourteen (14) days of receipt of the returned Product VoltAire will review and analyze the Product. If the Product is determined by VoltAire to be defective, VoltAire may repair or replace the Product, and will ship the Product to the Purchaser for the Purchaser's installation in the field with no labor costs reimbursed by VoltAire. If the Product is determined by VoltAire to NOT be defective, the Purchaser will be notified and a Purchase Order must be issued in the amount required for the Product to be Packaged and returned to the Purchaser.

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THIS LIMITED WARRANTY CONSTITUTES THE ENTIRE WARRANTY FOR THE VOLTAIRE PRODUCT AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING ANY WARRANTY OR MERCHANTABILITY AND WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

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