

American Safe Room, Inc.

Installation and Operation Manual

ASR-100-AOP Adjustable Overpressure Valve



Wall mounted



Ceiling mounted



**Wall mounted
on a Blast Valve**



**Ceiling mounted
on a Blast Valve**

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Contact information

American Safe Room, Inc.
868 Murdock Drive
PO Box 255
Oakland, OR 97462

Telephone: 541-459-1806
FAX: 503-212-6695

E-mail: info@mailasr.com

Websites: www.AmericanBombShelter.com
www.AmericanSafeRoom.com
www.AmericanIsolationRoom.com

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Description and configurations

Description

The ASR-100-AOP Adjustable Overpressure Valve is a one-way check valve that will only open after the shelter has overpressure (positive pressure in relation to the outside pressure). If the pressure in the shelter drops, this valve closes — keeping toxins out of your shelter. It also meters the air flowing out of your shelter — working with the filter to maintain overpressure.

Overpressure

The Safe Cell air filtration system works by drawing outside air through its filter banks and introducing it into the shelter area creating positive pressure (overpressure). This overpressure prevents unfiltered air or toxins from migrating into the protected space through any openings or cracks because all the air is flowing outward.

Valve Functions

The ASR-100-AOP Adjustable Overpressure Valve serves two functions:

1. It works with the Safe Cell to create and maintains an overpressure in the shelter by adding the proper resistance to the exhaust air outflow. The valve is normally closed and opens when the air pressure inside the shelter has reached the adjusted release point of 0.3 to 0.75-inches of water column.
2. It automatically closes when a positive pressure wave from an explosion exceeds the internal pressure of the shelter - up to 2.5 psi. When the outside air pressure returns to normal the overpressure valve automatically returns to its normal operational state. For more protection, the Blast Valve must be installed before the Overpressure Valve. See pages 11 through 13 for more information about this installation.

An airtight shelter must have an exhaust vent with an overpressure valve installed on an opposite wall of the filtration unit output to insure that the sufficient per occupant ventilation rate is taking place as well as proper overpressure.

Installation

Mounting Location

- The overpressure valve body must be installed inside the sheltered area.
- The valve body must be installed over the exhaust port.
- The valve body must be installed vertically — pointing downward.
- All exhaust air must pass through the overpressure valve to maintain overpressure.
- The valve body should be installed on the opposite corner or wall from the Safe Cell NBC air filter to provide ventilation throughout the protected space.

The ASR-100-AOP Adjustable Overpressure Valve can be mounted inside your shelter in three ways:

1. Directly over the air outflow port
2. On a blast valve on a wall or the ceiling
3. Directly on an air outflow pipe with an outer diameter of 4.5-inches (114.3 mm)

For the valve to work correctly, the valve body must be installed vertically — pointed downward. If it is installed any other way, it will not work properly. There is a 90-degree wall adapter that must be used when the air outflow pipe comes in through the wall. When the outflow pipe comes in through the ceiling, no adapter is necessary. Every item for every type of installation is included with every Adjustable Overpressure Valve.

Installations without a blast valve

See pages 7 through 9 and follow these instructions:

1. Locate and cut the exhaust vent hole through the shelter wall - with a minimum diameter of 3-inches (76-mm).
2. Layout and drill holes for lug bolt anchors as shown in figure 2 in the installation section of this manual, taking care to insure that the overpressure valve hole pattern is centered over the exhaust vent hole cutout.
3. For standard residential construction, it is recommended that two of the screw fasteners (either the left or right two holes) be anchored into a wall stud. The other two fasteners should be drywall anchors and screws (not included).
4. Apply a liberal amount of silicone caulking compound to the mating face of the overpressure valve mounting flange.
5. Secure the overpressure valve mounting plate and tighten the anchor screws to their rated torque.

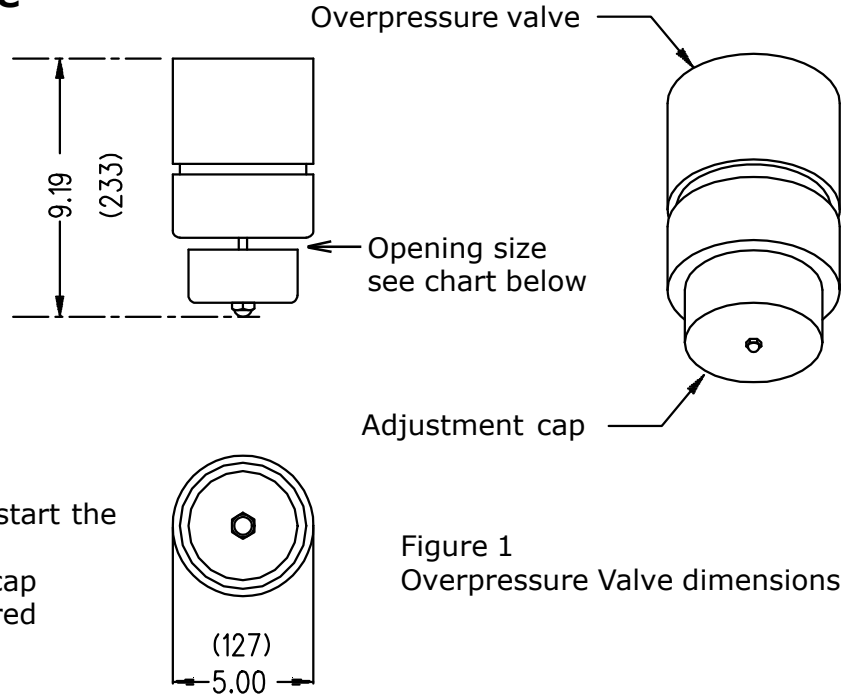
Installations with a Blast Valve

The mounting plate is not used. On ceiling mounted Blast Valves, slip the overpressure valve directly onto the end of the Blast Valve. On wall mounted Blast Valves, use the 90-degree wall adapter. See pages 11 through 13.

Installations directly on the outflow pipe

The mounting plate is not used. The overpressure valve will slip right on a pipe coming through the ceiling or onto the 90-degree wall adapter if the pipe comes through the wall. Please note that 4-inch, schedule 40 pipe has the proper outer diameter for the adapters to slip on.

Adjusting the overpressure



Instructions

1. Install valve as per this manual.
2. Close down protected room and start the positive pressure filtration unit
3. Fully open the valve adjustment cap
4. Slowly screw cap in until the desired overpressure is reached

Figure 1
Overpressure Valve dimensions

The ASR-100-AOP adjustable over pressure valve allows the user to set the positive pressure of the shelter to the desired level. Pressure adjustments greater than .75-inch (19-mm) water column (wc) are not recommended as this will impede the rated filtered air outflow of the Safe Cell NBC air filter. As a general rule, the more pressure, the less airflow.

Air flow and air pressure are two properties of forced air that are linked together. As a general rule, the more air pressure, the less air flow. An airflow of 5-CFM (cubic feet per minute) per person at 0.3-inch of water column is recommended by the United States Army Corps of Engineers in the technical letter ETL 1110-3-498. See www.AmericanSafeRoom.com to view this document.

Tested airflow pressure chart:

Opening size	Pressure (in/wc)	Pressure mm/wg)	Airflow
.5 in/12.7 mm	.50 in/wc	12.7 mm/wc	1000 fpm/87 cfm/148 meters ³ /hr
.188 in/4.7 mm	.75 in/wc	19 mm/wc	980 fpm/ 85 cfm/144 meters ³ /hr
.125 in/3.0 mm	1.00 in/wc	25 mm/wc	905 fpm/79 cfm/134 meters ³ /hr
Closed position	1.75 in/wc	44 mm/wc	600 fpm/52 cfm/88 meters ³ /hr

The above pressures were taken in a sealed chamber under ideal conditions. See the drawing above to reference the opening size listed in the first column. To accurately measure the overpressure in your shelter, a differential pressure gauge is necessary. Please see the American Safe Room Differential Pressure Gauge at www.AmericanSafeRoom.com.

All shelters have some leakage. If you shelter fails to reach at least .3 inches of water column, it is not sealed properly. To find out where it is leaking, shut down the pressure gauge to closed, turn on the Safe Cell, and shadow all of the ports in your shelter with a smoke device. Note where the smoke is flowing outward and seal up the leaks.

Installation parts

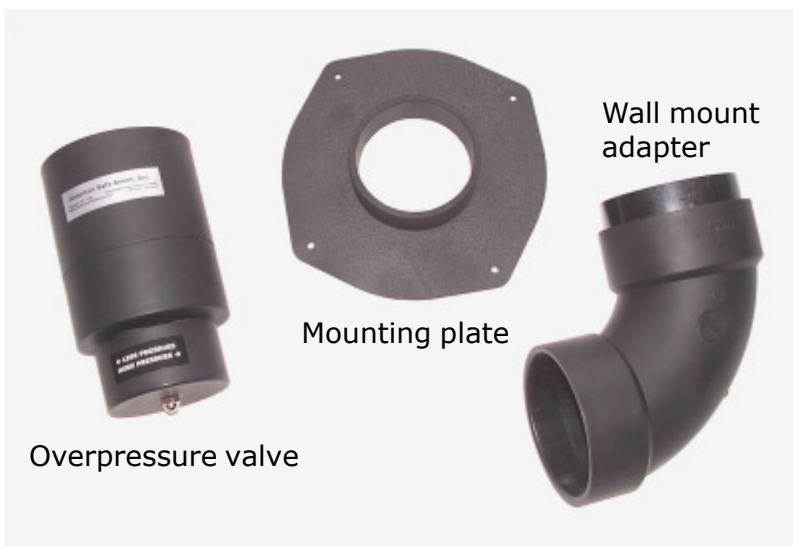
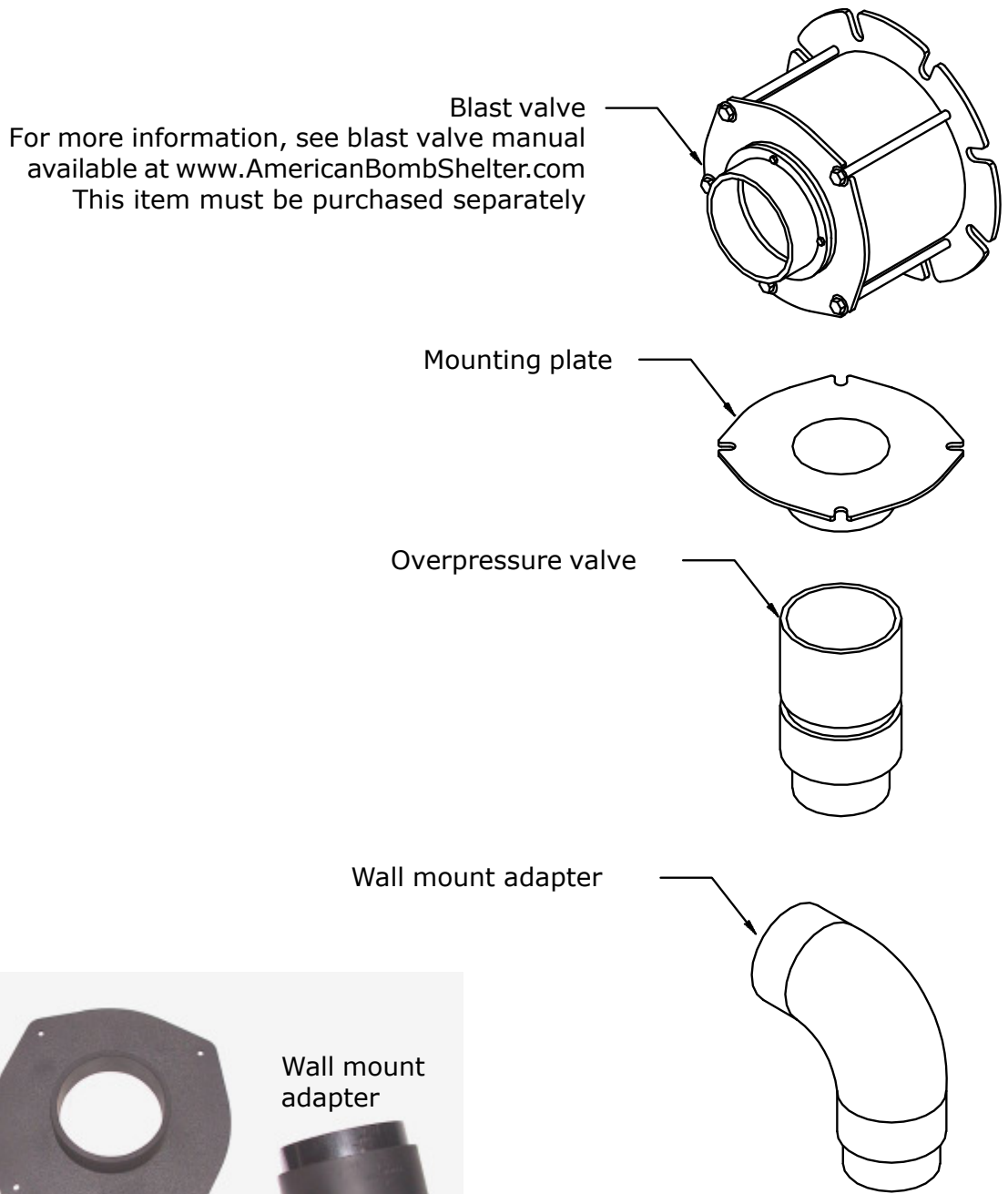
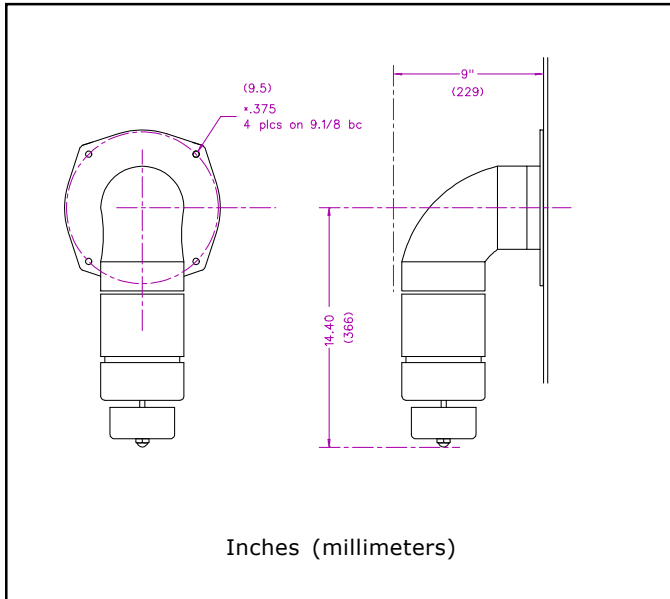
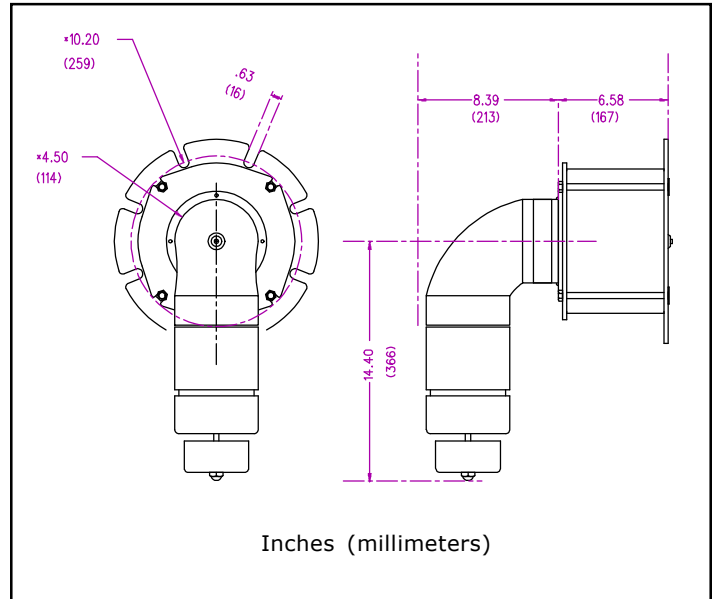


Figure 2
Installation parts

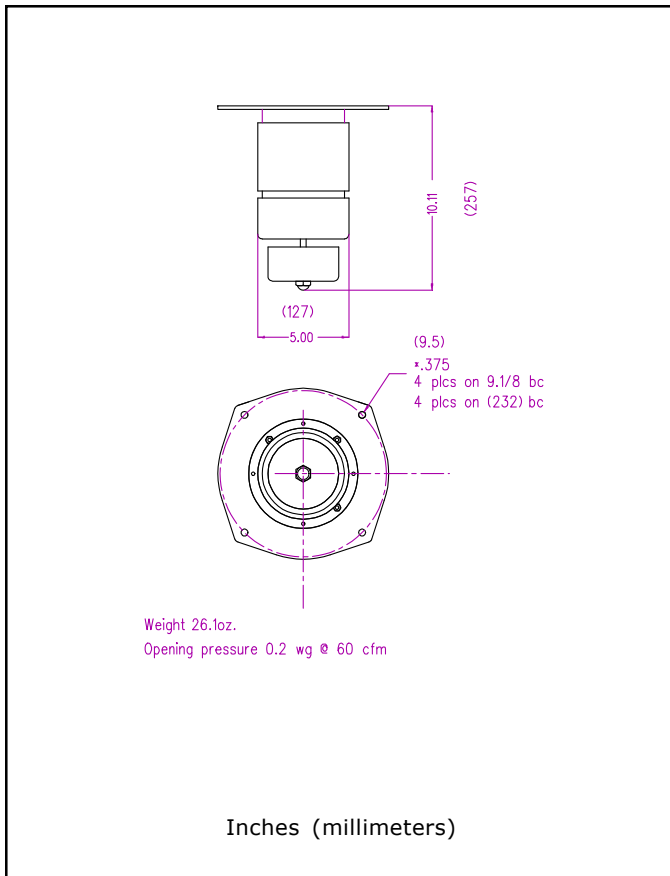
Dimensions



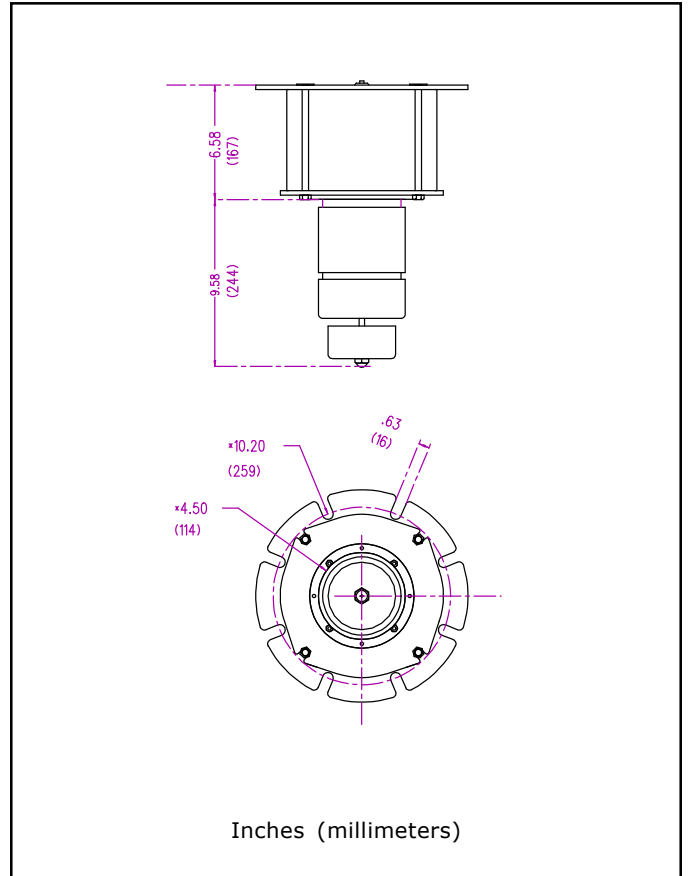
Wall mount



Wall mount with Blast Valve



Ceiling mount



Ceiling mount with Blast Valve

Installation drawing - without the blast valve

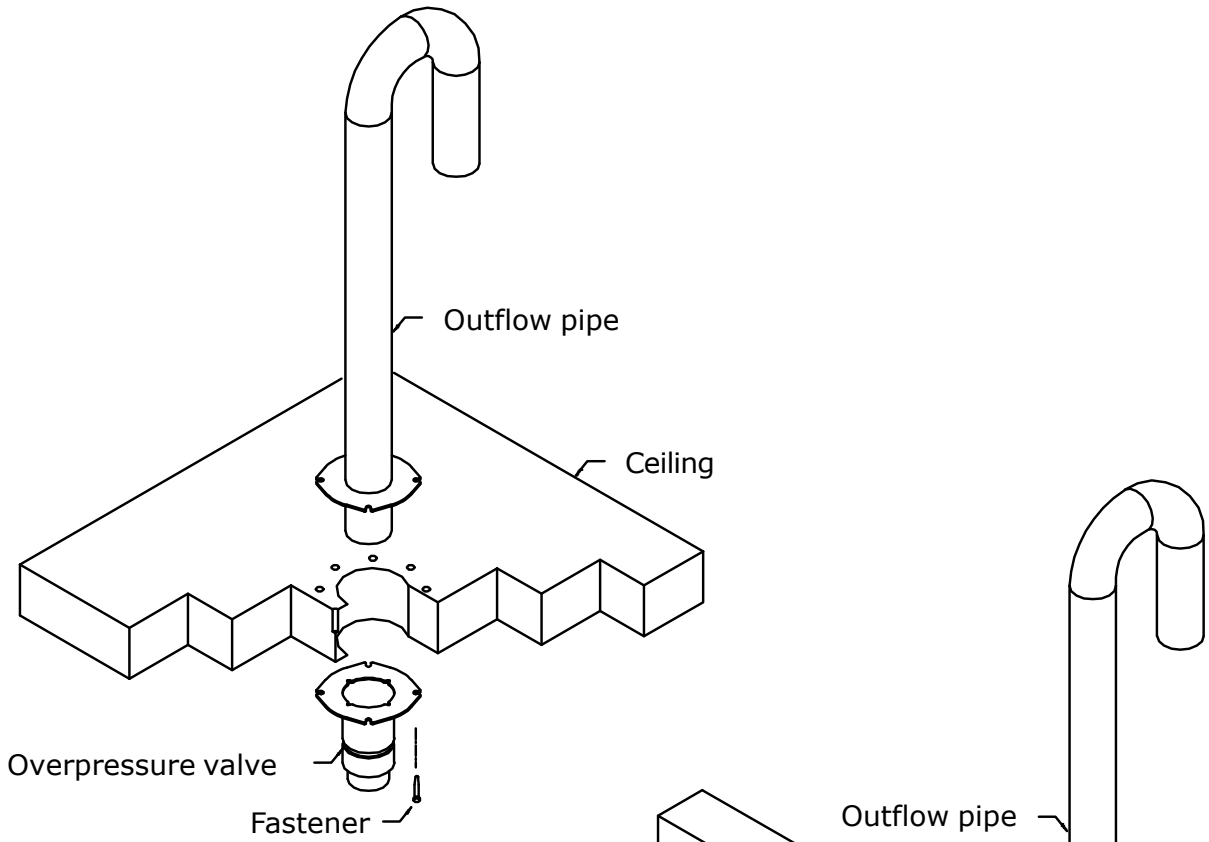


Figure 3A
ceiling mounted
without Blast Valve

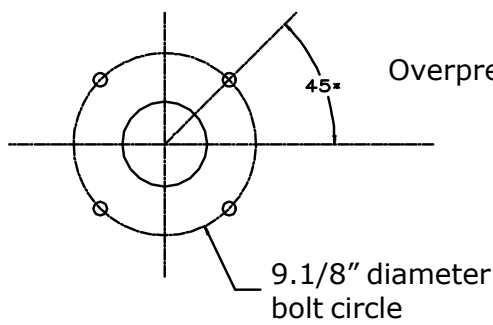


Figure 3B
hole pattern of
mounting plate

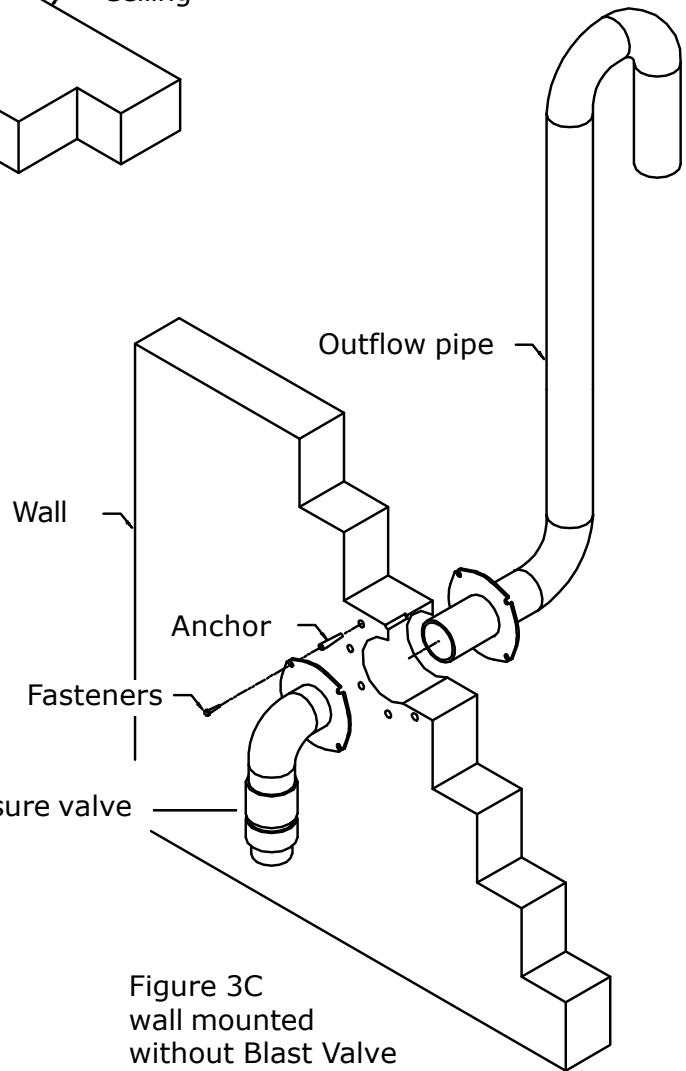


Figure 3C
wall mounted
without Blast Valve

Ceiling installation without blast valve

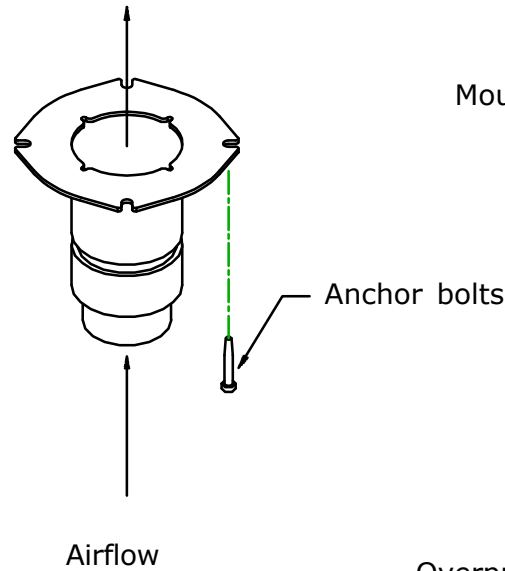


Figure 4A
finished ceiling installation
without blast valve

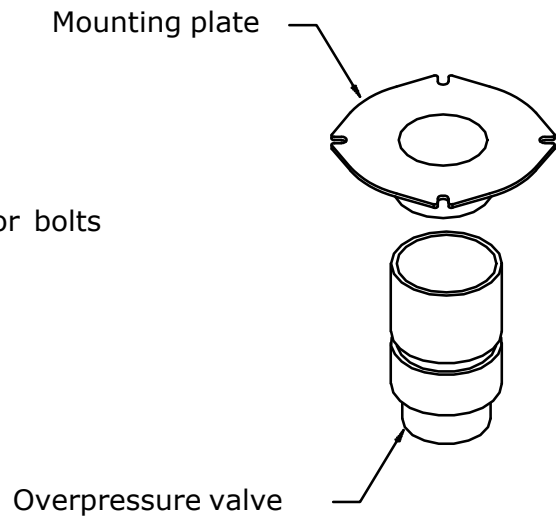


Figure 4B
ceiling installation
without blast valve

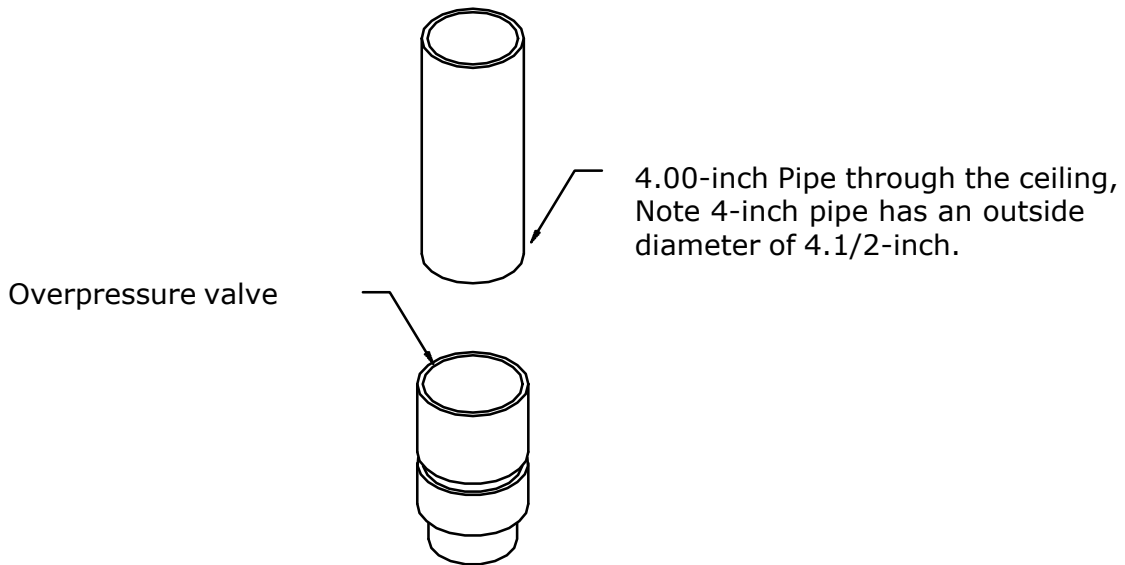


Figure 4C
ceiling mount directly on air outflow pipe
Note: outflow pipe must protrude at least
2-inches inside shelter

Wall installation without blast valve

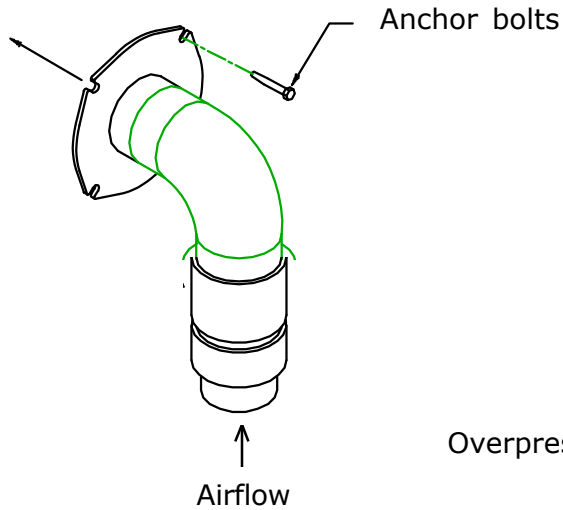


Figure 5A
finished wall installation
without Blast Valve

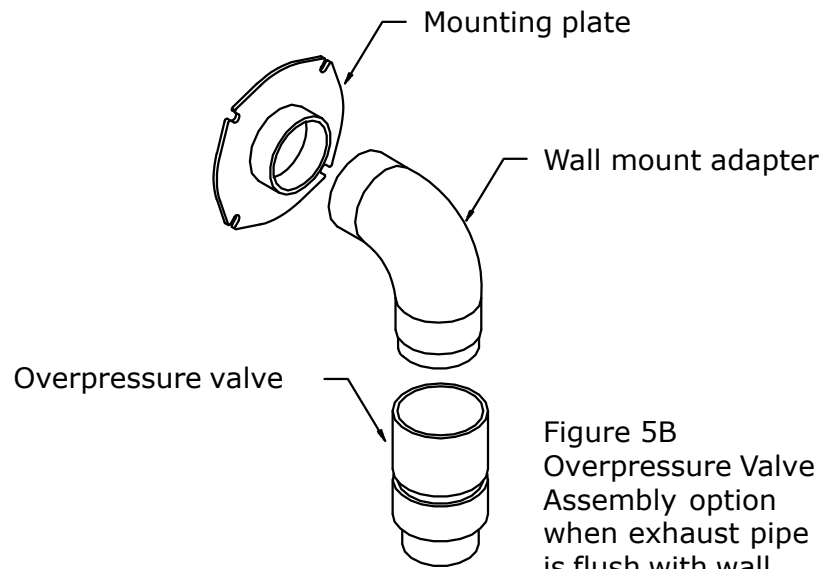


Figure 5B
Overpressure Valve
Assembly option
when exhaust pipe
is flush with wall

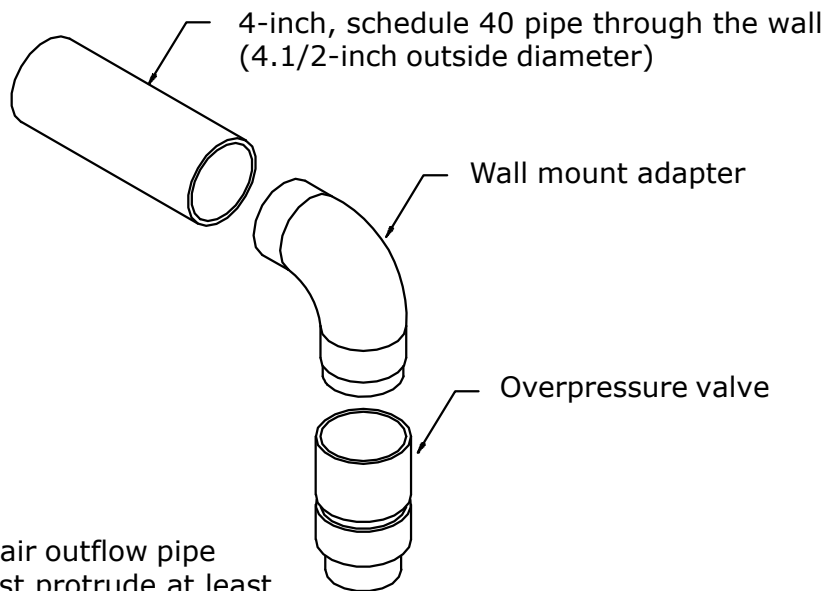


Figure 5C
wall mount directly on air outflow pipe
Note: outflow pipe must protrude at least
2-inches inside shelter

Installation drawing - with the Blast Valve

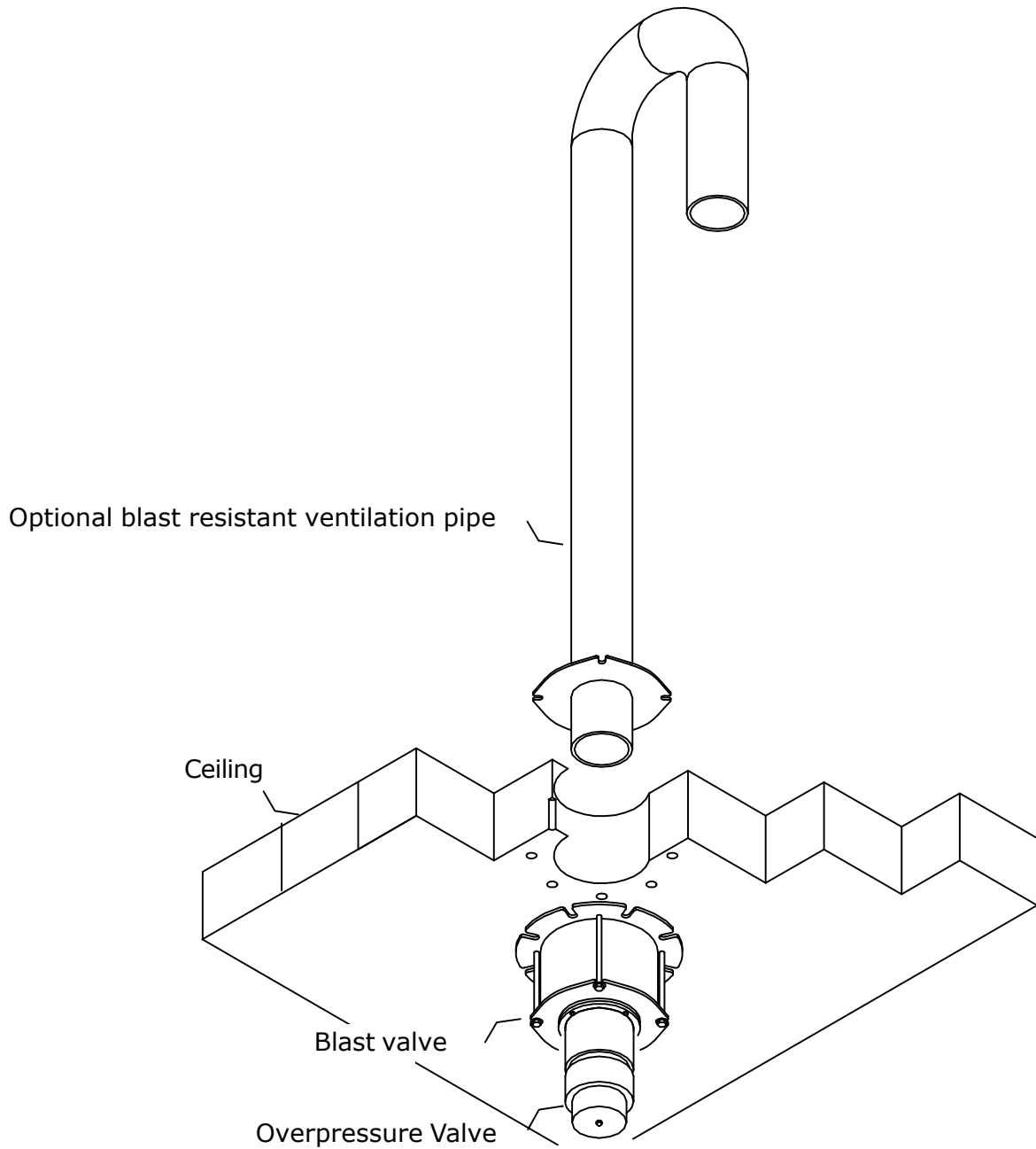


Figure 6
ceiling mount with Blast Valve

Ceiling installation with blast valve

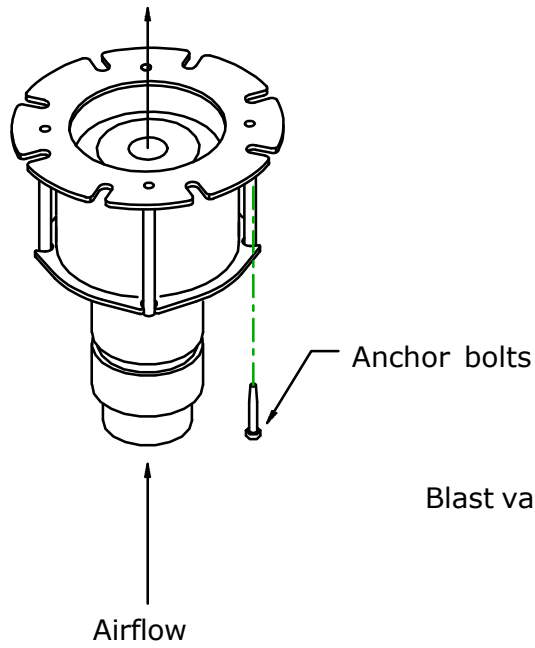


Figure 7A
finished ceiling installation
with Blast Valve

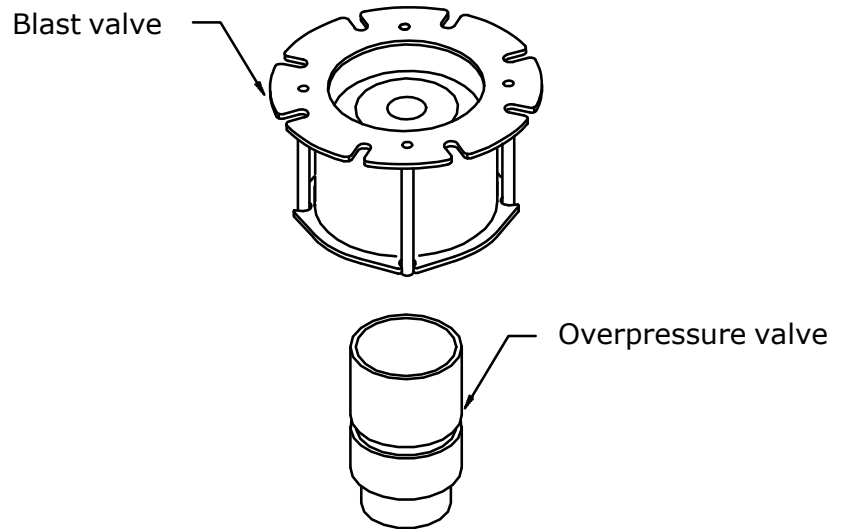


Figure 7B
Overpressure valve when used
with ceiling mounted blast valve

Wall installation with Blast Valve

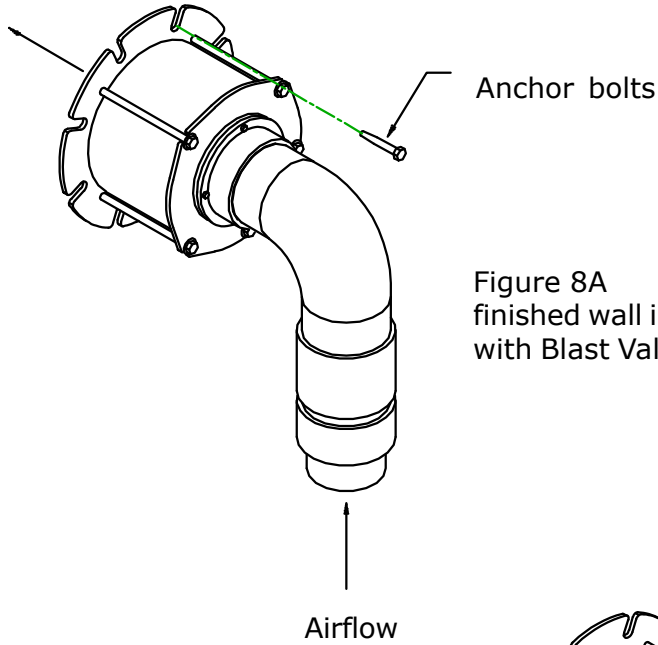


Figure 8A
finished wall installation
with Blast Valve

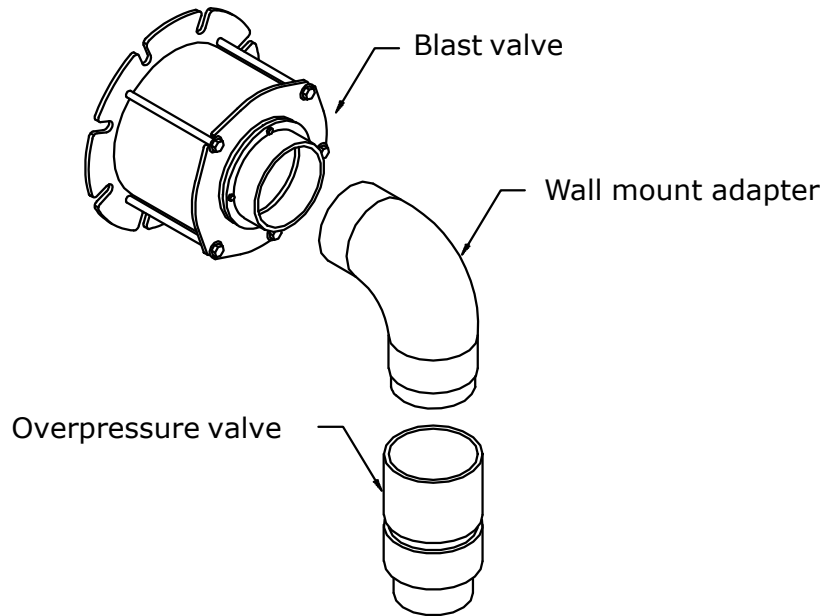


Figure 8B
Overpressure valve when used with
wall mounted blast valve