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Tools of the Trade

Before starting any installation project, it is important to have the following recommended tools:

- ½" (13mm) right angle drill, or a ½" (13mm) drill with ½" (13mm) by 90 drill chuck attachment
- 2 ⅞" (65.1mm) diameter hole cutter such as a Milwaukee Self Feed Bit - 48-25-2561
- ¼" (6.4mm) diameter masonry drill bit
- Wire connectors - correct size for #18-2 (1.00mm) wire
- 2" PVC tubing cutter
- Hacksaw, with 18 teeth per inch blade
- Phillips head screwdriver
- Flathead screwdriver
- Hammer
- Tape measure
- Side cutters
- Flashlight
- Adhesive
- Wire coat hanger
- Clean cloth and rags
- Utility knife or coarse sandpaper
- Tape or clips to secure wire to tubing
- PVC solvent
- 6' or 8' Ladder
- Drywall Saw
- Stud Finder
- Cordless Drill
- 100' Extension Cord
- Reciprocating Saw

Proper planning and installation of the VACUFLO System is the key to maximum performance of the completed VACUFLO System. It is important to thoroughly review and be familiar with this manual, which details the planning and installation of VACUFLO True Cyclonic® and Filtered Cyclonic™ Systems.

Planning a VACUFLO System Layout

The planning process for the VACUFLO System can be categorized into three steps.

1. **Inlet Valve Location** – Be familiar with the house layout or blueprint to determine inlet valve locations.
2. **Power Unit and Exhaust Location** – Determine the best location for the power unit and exhaust.
3. **PVC Tube Location** – Plan a detailed path for the 2" PVC tube runs.

Inlet Valve Location

Correct inlet valve placement allows the 30-foot hose to reach every corner of the house (including closets, ceilings, walls and drapes), while going around all furniture. Inlet valves are typically located on inside walls, hallways, near doors and archways, and the bottom of stairs – avoid areas behind doors or furniture. Valves can also be installed in the floor, if wall space is limited. Garage inlet valves should be placed close to the large garage door so vehicles, campers or boats do not need to be pulled into the garage to clean them. Automatic dust pans can also be considered for kitchens and mud rooms.

How to Measure Hose Reach

Planning inlet valve locations can be done by measuring with a 25-foot piece of string, tape measure or the actual hose itself, to determine reach of the hose – work from the far corners of the room towards the center. The objective is to provide maximum cleaning coverage with a minimum number of inlet valves. Typically the appro-

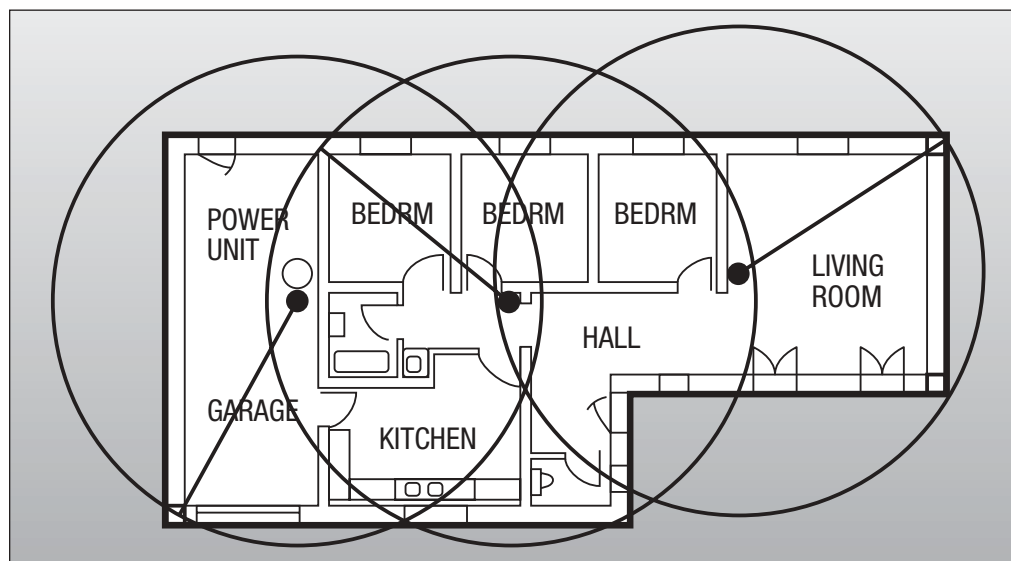
priate number of inlet valves needed can be calculated by dividing a home's total square footage by 600 (if a 30-foot hose is being used).

Power Unit and Exhaust Location

If the power unit location is specified in original layout plans, review and determine whether it is actually the best location.

The power unit should be located:

- in a remote area (i.e. basement, garage, utility room) – **never in an attic**. Closet installations can be considered if there is adequate ventilation such as louvered doors.
- on a dedicated circuit.
- away from heat-producing appliances (i.e. water heaters, dryers, furnaces).
- on an exterior wall (preferably) to run the exhaust line outdoors, with a maximum length of 30 feet.



When planning the exhaust line for the VACUFLO True Cyclonic System, it is important to avoid patios, windows and entryways. Exhaust lines should be kept as short as possible and should not exceed 30 feet. Do not vent into any concealed space of a building or structure, such as a wall, ceiling or attic. (See the illustrations on Page 5 for typical power unit and exhaust locations for a home.)

This floor plan shows the optimum location of three inlet valves and the 30-foot cleaning radius of each.

Selecting a Power Unit

Selecting the proper power unit is critical to the overall performance of a system. The System Capabilities Chart (at right) identifies the recommended power unit based on the size of a home, longest run of tubing, and the number of inlet valves. These figures are estimates, and need to be used with the actual tube layout and valve placement.

PVC Tube Location

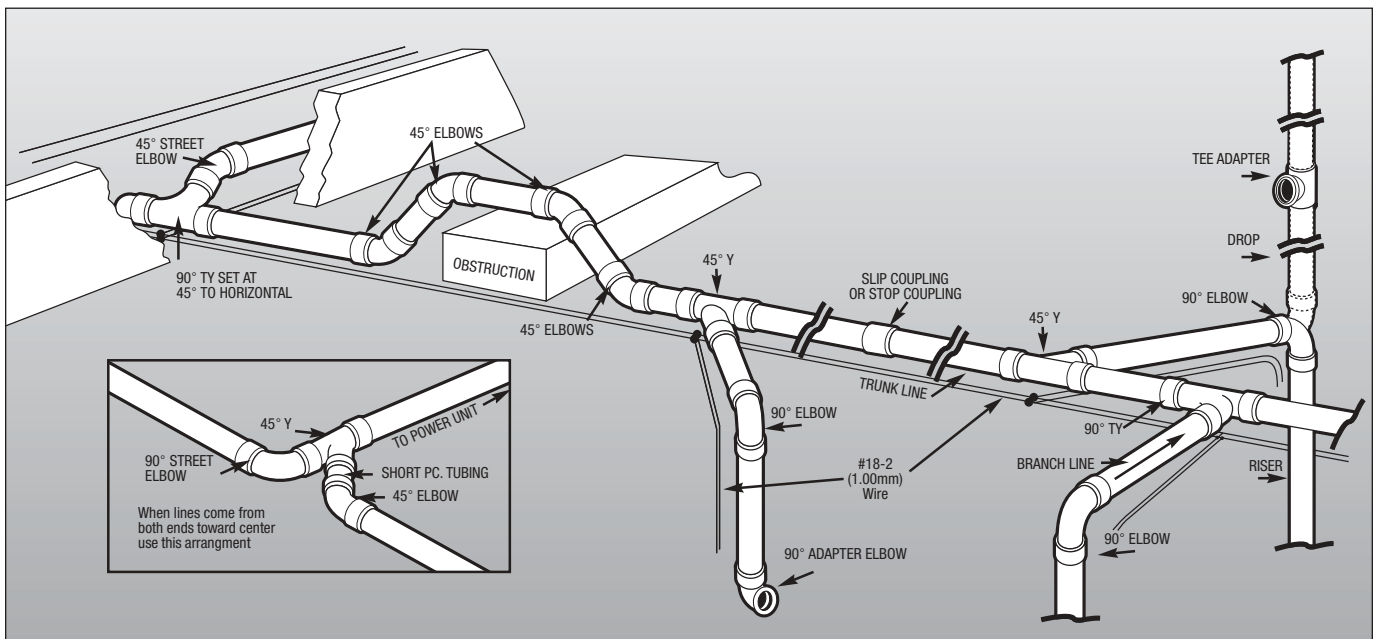
Planning the most efficient tube path (from power unit to inlet valves) will insure maximum airflow at the inlet valves. The main trunk line should run from the farthest inlet valve to the power unit, with branch lines running to each individual inlet valve. Tubing can be installed in partitions, crawl spaces, under or between floor joists, on the face of walls or columns in the basement, or in attics. If tubing is placed in attics, insulation should be laid over the tubing to reduce the possibility of condensation (moisture) forming inside the tubing. **For optimal airflow, both the trunk and branch lines should be as straight as possible using a minimal amount of elbows** (see illustration below).

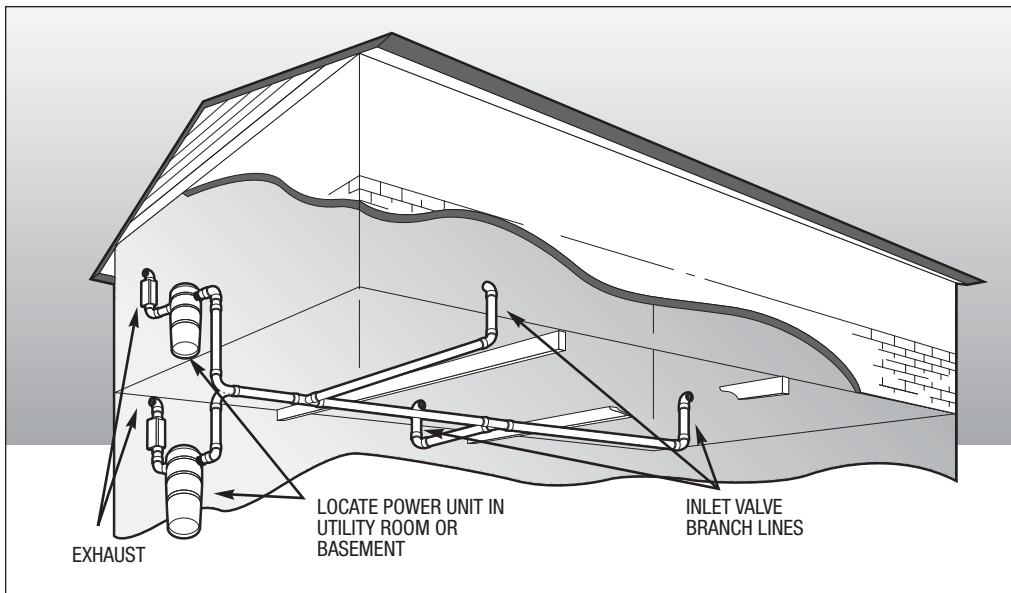
Thorough tube path planning will save time and effort. Check the proposed tubing path plans for possible obstructions (i.e. heating ducts, plumbing) or problem areas, and adjust inlet valve locations if necessary.

Longest Tubing Runs

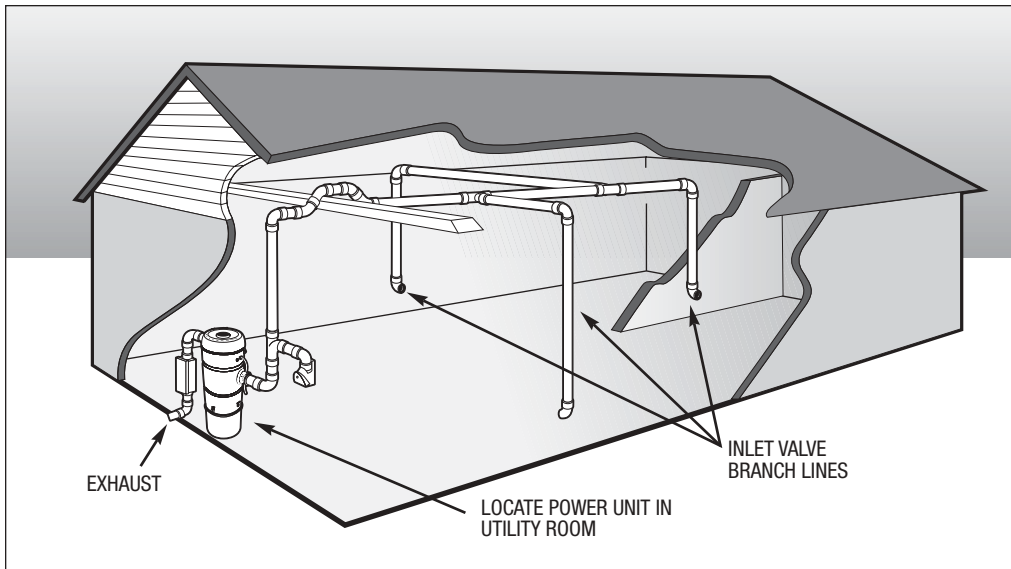
The length of tubing running from the exhaust location (including the length of tubing used for the exhaust) to the furthest inlet valve from the power unit, should be no longer than that recommended in the System Capabilities Chart (right). Excessively long tubing runs can affect performance.

System Capabilities										
Use these figures as a guideline when planning a VACUFLO system.										
Home Size in Sq. Ft.	Recommended # of Inlets	Model FC300	Model 260	Model FC550	Model 466Q	Model FC650	Model 566Q	Model 760	Model FC1550	Model 960
1,500	2	X	X							
2,000	3	X	X							
2,500	4	X	X							
3,000	5		X	X	X					
3,500	6			X	X					
4,000	7			X	X					
4,500	8			X	X	X	X			
5,000	9			X	X	X	X			
5,500	10					X	X			
6,000	10					X	X			
6,500	11					X	X			
7,000	12					X	X	X	X	X
7,500	13					X	X	X	X	X
8,000	14					X	X	X	X	X
9,000	15							X	X	X
10,000	17							X	X	X
11,000	19							X	X	X
12,000	20							X	X	X
15,000	25								X	X
17,000	28								X	X
18,000	30								X	X
No-Vent Option		Yes	No	Yes	No	Yes	No	No	Yes	No
Longest Run of Tubing		100 ft.	125 ft.	150 ft.	150 ft.	175 ft.	175 ft.	200 ft.	250 ft.	250 ft.





Typical power unit and exhaust locations for a home with a basement or crawlspace. The trunk line is run in the basement or crawlspace, below the floor joists.



Typical power unit and exhaust locations for a slab-style home – trunk line is run in the attic.

Tubing Tips

When planning your VACUFLO system layout, it is important to remember that:

- Approximately 20 feet of tubing is required for each inlet valve location.
- The straighter the tube run, the greater the airflow (suction) to the hose.
- Using the least amount of bends or elbows in a run, reduces the chance of clogging.

NOTE: Exterior exhausting is required for VACUFLO True Cyclonic units, but is optional for Filtered Cyclonic power units.

Planning and Installation Tips for Existing Multi-level Homes

During new construction of both single and multi-level homes, roughing in the tube lines is a relatively simple process. However, existing multi-level homes can present unique installation conditions that require careful and thorough planning before installation begins.

In a multi-level home, it is sometimes preferable to run a trunk line directly into the attic or crawl space. From this point, branch lines can be run across the attic to partitions and down within partition walls to inlet valves.

Tube lines carrying dirt upward should never exceed one story. If dirt must be lifted higher than one story, run at least 8 feet (2.4 m) of tubing horizontally between the two floors.

Depending on the existing construction of the house, there are several methods that can be used to gain access to the second floor or the attic:

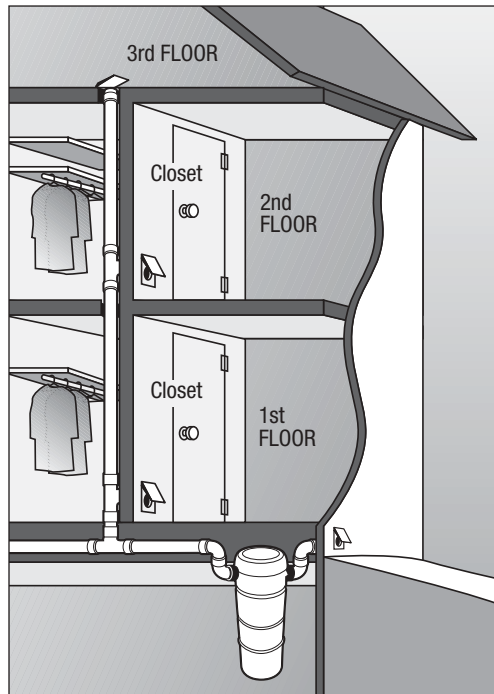
- Closet installation
- Wall installation beside a soil pipe
- Partition wall installation

Closet Installation

Installing vertical tube lines in a closet is probably the easiest and most common way of gaining access to upper floors, especially when a closet on the second floor is directly above a closet on the first floor (shown at right). Tubing installed in the rear corner of a closet, pantry or cabinet is quite inconspicuous (shown below).

Wall Installation Beside a Soil Pipe

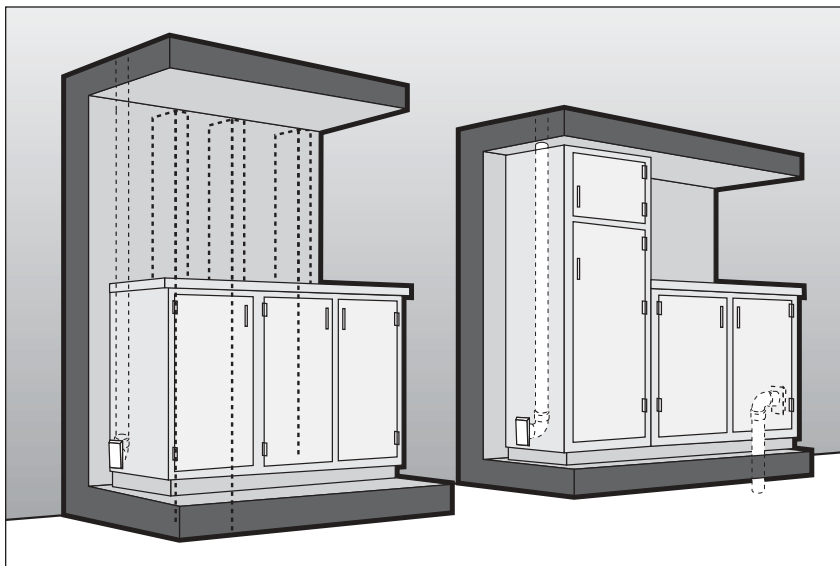
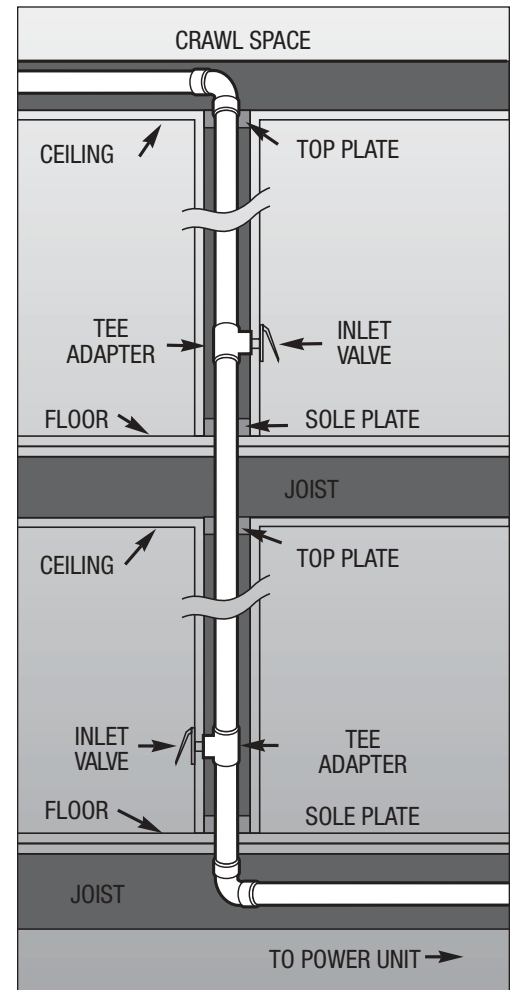
Frequently, the soil pipe in an existing house will run straight from the basement to the roof. This soil pipe is also typically found in a wall that is often 6" (152mm) or greater in thickness, rather than the conventional stud width, and is seldom blocked off with cross bridging. To



accommodate the soil pipe, holes cut in the top and sole plate of the wall are usually much larger than necessary. Therefore when this situation exists, a ready-made avenue for the vertical tubing to the attic is available.

Partition Wall Installation

Although partition wall installation is more difficult than other methods, it can be used if access is available to partitions where one is directly over another (below). Avoid switches, wiring or other obstacles when running the tubing.



Installation of a VACUFLO System

Installing Inlet Valves

Several techniques are used when installing inlet valves in existing homes:

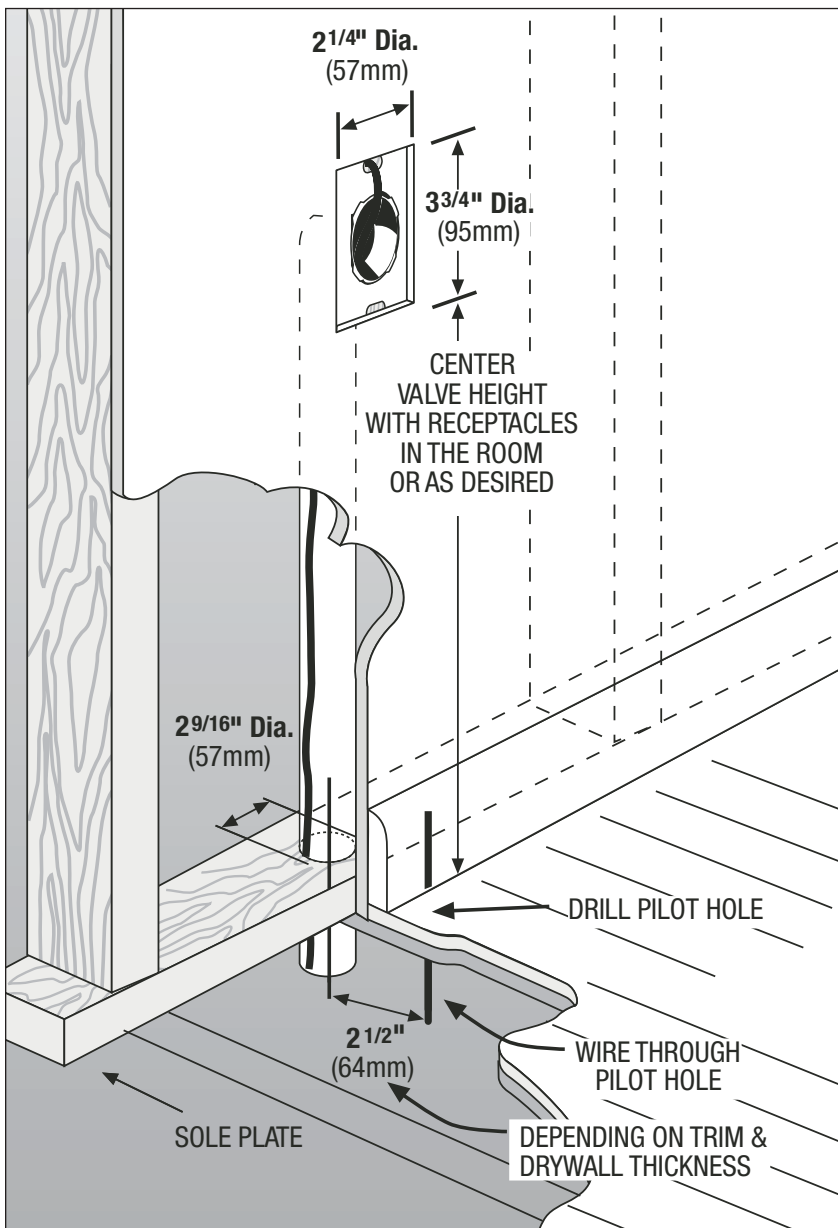
- Wall Installation
- Utility Valve Installation (used in basements, garages or where tubing is exposed)
- Floor Installation (used occasionally when floor plan or construction dictates)

Wall Installation of Inlet Valves (8-Step Process)

1. Determine inlet valve location and sole plate hole

As shown below, the hole in the wall for the inlet valve should be located between studs, and clear of any obstructions (i.e. plumbing, wiring, heating ducts). The minimum stud depth to accept the adapter elbow clearance is 2-3/4" (70mm). For aesthetics, the height of inlet valves should be consistent and centered at the same level as electrical outlets.

Determine the exact location of the inlet valve and locate a point on the floor directly below the vertical center of the desired location. Drill a small pilot hole against the wall through both the flooring and sub-flooring – be careful not to snag carpeting. Next, insert a wire into the pilot hole (the straight section of a coat hanger makes a good pilot hole probe). From beneath the floor, be sure the wire does not interfere with any cold air returns.



Also, use the wire as a guide to measure approximately 2-1/2" (64mm) from the pilot hole, and drill a 2-9/16" (57mm) diameter hole in the center of the sole plate. To avoid weakening the floor joists, be sure to stay clear of areas where electrical and plumbing holes have already been drilled. (NOTE: Check the electrical codes in your area, you may be required to drill a separate adjacent hole for the low-voltage wire.)

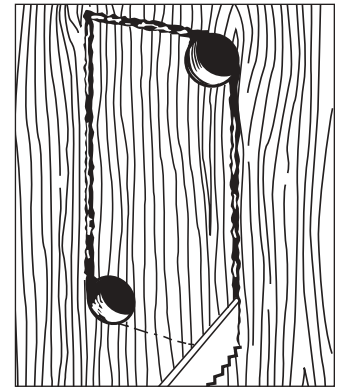
2. Check for obstructions and cut inlet valve hole

Before cutting the 2-1/4" (57mm) by 3-3/4" (95mm) hole for the inlet valve, drill a 2-1/4" diameter hole up through the sole plate, use mounting plate as template. At this point, it is extremely important to make certain there are no obstructions in the wall. Therefore:

- Visually inspect the interior of the wall through the sole plate hole with a flashlight.
- Physically probe the wall by inserting tubing to where the inlet valve hole is to be cut.

After deter-

mining there are no obstructions in the wall, cut a hole 2-1/4" (57mm) by 3-3/4" (95mm) for the inlet valve.



3. Run tube and wire to inlet valve hole

After the inlet valve hole is cut, pass tubing up through the hole in the sole plate to the inlet valve opening. (Tubing can also be passed down to the inlet valve location in the wall if the main trunk line is overhead.) At the same time, run

#18-2 wire

(1.00mm) for the low-voltage switch.

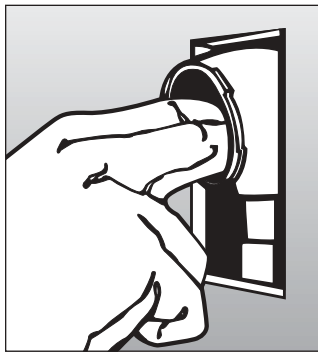
To allow for easier wiring of the inlet valve later, leave approximately 10" (254mm) of

wire beyond the end of the tube.



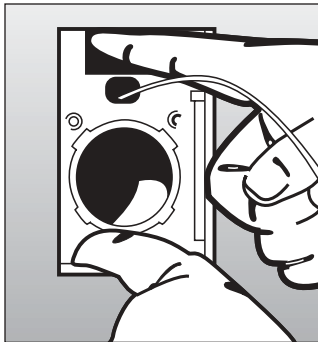
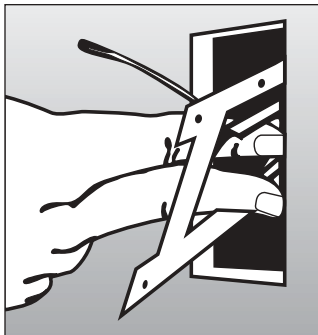
4. Install the adapter elbow

Attach a 90° adapter elbow to the tubing by applying adhesive to the outside of the tubing only – never put adhesive on the inside of the elbow. Insert the adapter elbow through the wall opening and onto the tubing. Twist the tubing to create a tight seal and wipe off the excess glue. A sharp 90° adapter elbow is installed behind each inlet valve to help prevent large items from entering the tube system and causing obstructions.



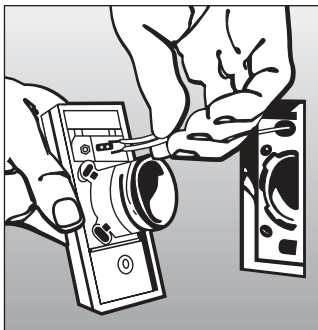
5. Install the mounting plate

Pull the #18-2 (1.00mm) wire out through the top oval hole in the mounting plate, and insert the mounting plate diagonally through the wall opening (as shown at right). When installing the mounting plate, make sure the plate's four bent tabs are facing the adapter elbow in the wall. To attach the elbow to the plate, line up the slots on the mounting plate with the adapter elbow tabs, then rotate the mounting plate into an upright position. Approximately 6" (152mm) of the #18-2 (1.00mm) wire should be dangling from the top oval hole of the mounting plate (shown at right).



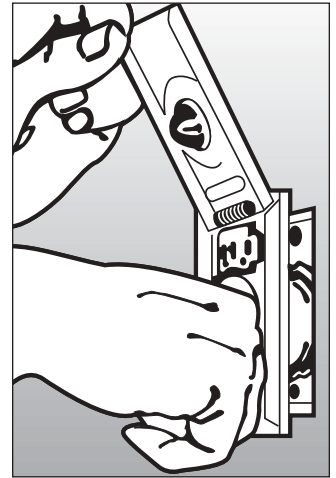
6. Wire the inlet valve

As illustrated, take the #18-2 (1.00mm) wire dangling from the front of the mounting plate and split it apart at least 1" (25mm). Next, strip 3/8" (10mm) of insulation from each wire (use the wire strip gauge located on the back of the inlet valve to measure each wire). Insert the wires into the two switch holes located on the back of the inlet valve and push firmly to engage.



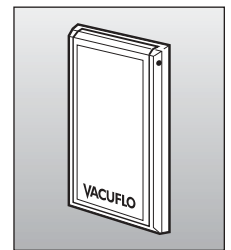
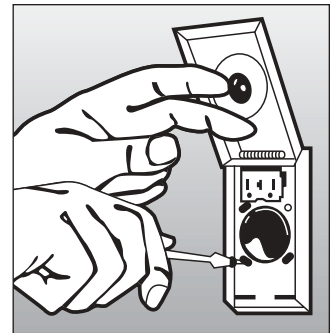
7. Insert inlet valve stem into adapter elbow

Before inserting the inlet valve stem into the adapter elbow, make certain the rubber gasket seal is in place. For walls 1/4" (6mm) thick or less, the rubber gasket seal on the inlet valve stem should be moved forward to the front groove to insure a proper seal. A slot is provided 3/8" (10mm) from the end of the stem so it can easily be sawed off with a standard hacksaw if necessary.

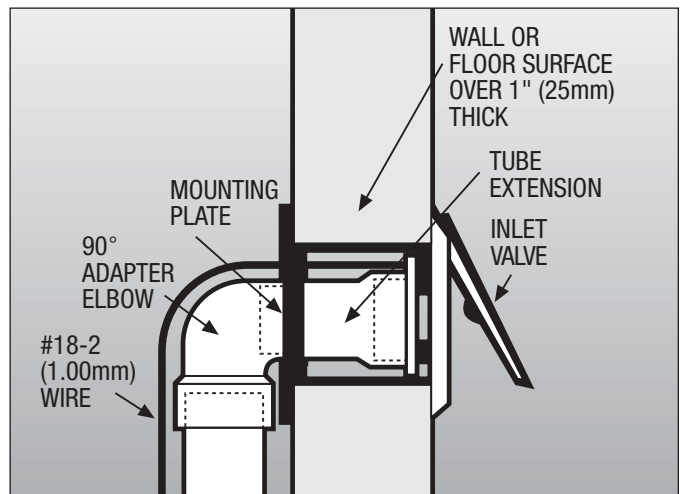


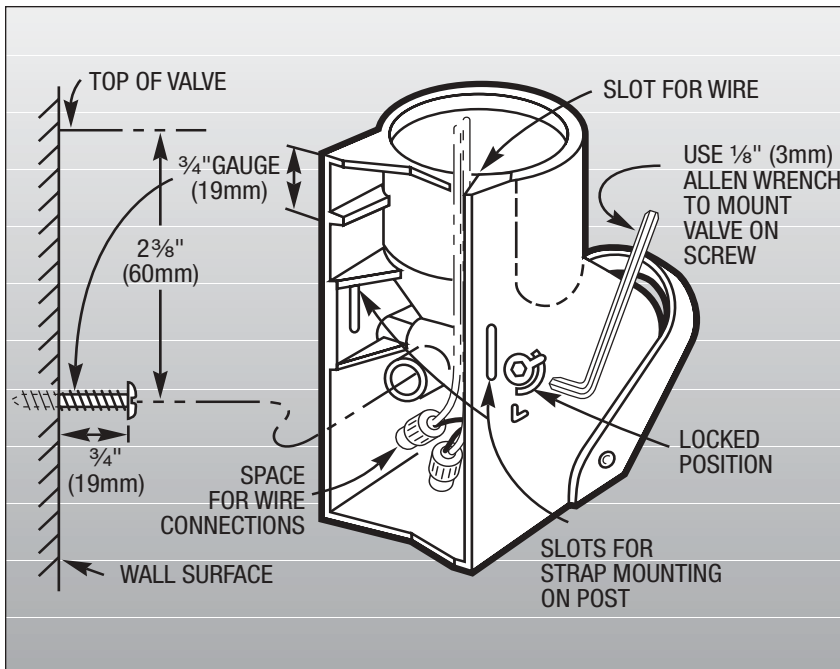
8. Complete the inlet valve installation

To complete the installation (shown at right), secure the inlet valve in place with four screws (provided) – do not over-tighten the screws. Make certain the inlet valve is straight and covers the hole on all sides. If the inlet valve does not cover the hole entirely, use an inlet valve trim plate. The trim plate fits behind the valve and covers any oversized hole up to 1/2" (13mm). When finished, the inlet valve lid should open and close freely (right).



NOTE: If a wall or floor is more than 1" (25mm) thick, use an inlet valve extension (Part #5018). Shorten the extension as necessary for a precise fit. The flange on the extension should be 1/4" (6mm) beyond the surface (wall or floor) to insure valve fits properly (below).





and described on Pages 7 and 8. For easier access and use, the inlet valve should open to the left (facing the wall). If the floor is more than 1" (25mm) thick, use an inlet valve stem extension.

Automatic Dustpan Option

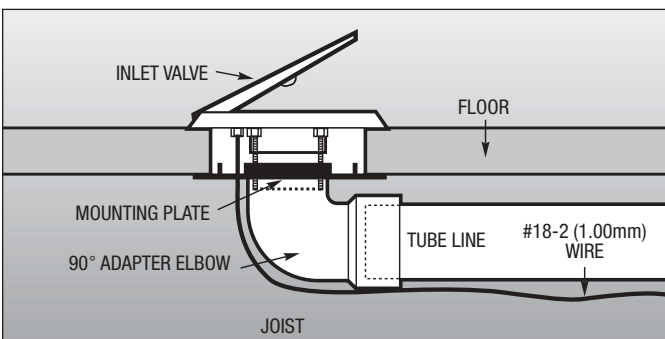
VACUFLO's automatic dustpans can be installed with any new or existing central vacuum system. Automatic dustpans are typically installed in areas requiring frequent cleanups or sweeping, such as kitchens, laundry rooms, garages or workshops. The flush-mounted design is easy to install beneath all styles of cabinets (shown below), in baseboards, or at the base of a wall, making them accessible but barely noticeable.

Utility Valve Installation

A utility valve (shown above) is used in basements, garages, and other areas where tubing is exposed. To install, put the screw provided into the wall (using an anchor if necessary) until it protrudes 3/4" (19mm). For an accurate measurement, check the 3/4" (19mm) protrusion with the gauge located on the back of the valve. Connect the low-voltage wire leads in the valve and push the connections into the space provided. Next, change the valve to the unlocked position by placing an 1/8" (3mm) allen wrench over the screw and turning it to the locked ("L") position. If not snug, remove the valve and adjust the screw slightly.

Floor Installation of Inlet Valves

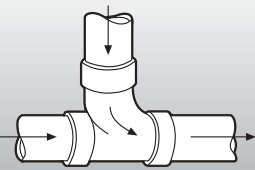
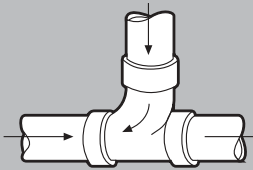
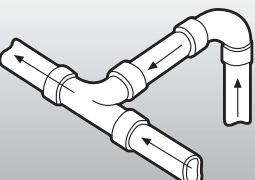
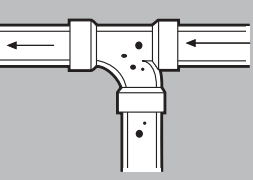
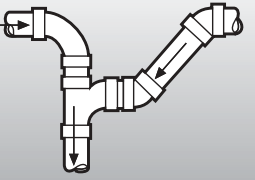
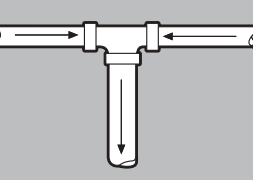
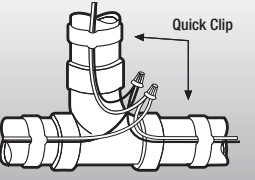
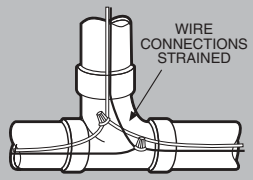
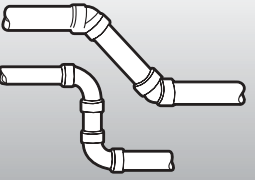
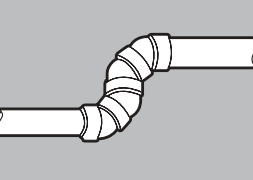
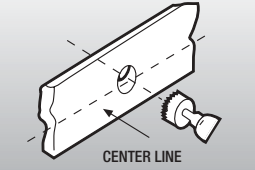
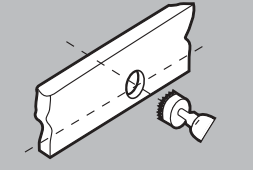
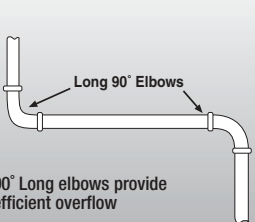
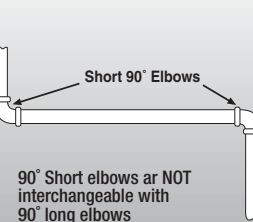
Although inlet valves are typically installed in walls, occasionally one must be installed in the floor. When this occurs, the inlet valve should be placed about 2" (51mm) from the wall in a low-traffic area. As with wall installations, drill a small pilot hole and make sure the location is clear of any obstructions (Step 1 on Page 7). Next, cut a hole 2-9/16" (57mm) wide by 3-3/4" (95mm) long. After checking for obstructions and cutting the inlet valve hole, attach the mounting plate from below to the 90° adapter elbow and assemble inlet valve as shown below



Installing the Tubing System

Once the inlet valves are installed, roughing in the tubing system begins. Start with the most distant inlet valve and extend the trunk line towards the power unit. Connect the branch lines to the trunk with 90° TYs, making sure to maintain a directional flow towards the power unit. As with the trunk line, branch lines should be kept as straight as possible to maximize the airflow that reaches the hose. Avoid creating tight corners in the tube run by using 45° fittings instead of 90° fittings whenever possible. Always run a branch line out of the side or top of the trunk line. **NEVER** drop a branch line directly out of the bottom of a trunk line – this creates a pocket for dirt to accumulate in.

Low-voltage wire #18-2 (1.00mm) follows the tubing from each inlet valve to and along the trunk line. Therefore at each branch or TY, junctions or splices are made using wire connectors (observe local code). To secure the wire along the tube run, tape it to the tubing or staple it to the joists. Connect the wires to the low-voltage terminals located at the power unit.

Important Installation Rules	
CORRECT	WRONG
 <p>Assemble TYs to provide smooth airflow to power unit.</p>	 <p>Improper installation causes poor airflow.</p>
 <p>Assemble TYs so that dirt enters trunk line from side or top.</p>	 <p>Gravity causes dirt to fall down the wrong tube.</p>
 <p>Airflow does not conflict with proper installation.</p>	 <p>Improper installation causes a conflict in airflow.</p>
 <p>Quick Clip Leave slack in wires at the connection and clip or tape in place.</p>	 <p>WIRE CONNECTIONS STRAINED Strained wire connections may pull apart.</p>
 <p>A proper installation provides good airflow.</p>	 <p>Poor airflow results from improper installation.</p>
 <p>CENTER LINE Drilling in the center of beams and rafters keep them strong.</p>	 <p>Drilling off center weakens beams and rafters.</p>
 <p>Long 90° Elbows 90° Long elbows provide efficient overflow</p>	 <p>Short 90° Elbows 90° Short elbows are NOT interchangeable with 90° long elbows</p>

Cutting and Cementing PVC Tubing and Fittings

Measuring

Measurements should be taken from the base of the pipe-stop on the inside of the fitting hub when sizing the tubing. As each section of tubing is cut it should be dry fitted before the next measurement is taken.

Cutting

The tubing should be cut as straight and square as possible. It is best to use a tube cutter. All rough edges must be removed with a deburring tool, utility knife or coarse sandpaper (inside and outside).

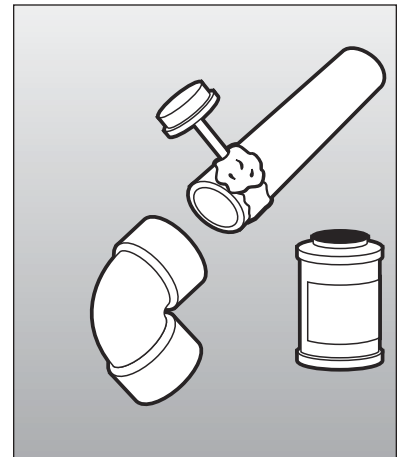


Dry fitting

Once all the pieces are cut, they should be dry fitted to check for correct fit. The markings on the fittings can be utilized to assure proper alignment.

Gluing

PVC solvent cement actually welds the fitting to the tubing. A chemical reaction permanently joins the molecules from each surface to produce an airtight seal. Before cementing both the tubing and the fitting, they must be free of PVC burrs, dirt and grime. The components should be wiped with a clean cloth if necessary. **Cement should be applied to the outside of the tubing only** (pictured above). Never apply adhesive to the inside of the fitting – this causes cement to accumulate inside, which reduces airflow and could cause a clog. The tubing should be inserted all the way into the fitting and twisted a quarter turn to evenly distribute the cement. All excess cement should be removed with a rag. The glue should be allowed several hours to set before the vacuum system is used.



Installing the Power Unit

When installing VACUFLO Twin Motor Power Units, refer to the specific installation instructions shipped with the product. For all other VACUFLO power units, use the following instructions.

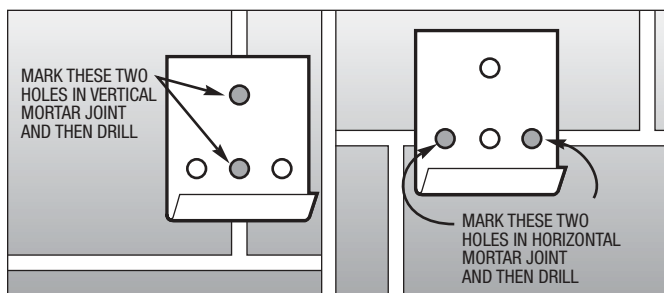
NOTE: VACUFLO True Cyclonic power units must be vented outside. However, venting is optional when installing VACUFLO Filtered Cyclonic units. To ensure the quietest performance, mufflers are recommended for all VACUFLO power units.

Mounting the Power Unit

The power unit should be mounted on an exterior wall, or within 30 feet of an exterior wall, to minimize the length of the exhaust line. The unit should also be mounted at a height about 6 feet (1.8m) from the floor to the top of the mounting bracket, to provide easy access to the dirt receptacle. To comply with UL standards, and for proper ventilation and access, the wall-mounting bracket must be at least 13-1/2" (343mm) from the ceiling, 14" (356mm) from a side wall, and at least 46" from the floor (illustrated below).

To mount on a masonry wall, use the wall-mounting bracket as a template to locate and mark two holes on a mortar joint or on the surface of a cement block. Drill

the two marked holes 1" (25mm) deep using a 1/4" (6.4mm) masonry drill bit. Securely mount the wall bracket with anchors by inserting a 1/4" (6.4mm) plastic anchor in each hole and using two #12 by 1" (B5.5 x 25mm) sheet metal screws. If working in a framed or drywalled area, position the wall-mounting bracket on a stud and secure with two #14 by 1-1/2" (B6.3 x 38mm) screws through the two vertical holes. Once the mounting brackets are properly installed (as shown below) and secured, hang the power unit.



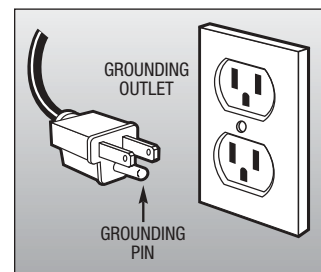
Proper wall bracket mounting for vertical mortar joints (left) and for horizontal mortar joints (right)

Electrical Requirements and Grounding Instructions

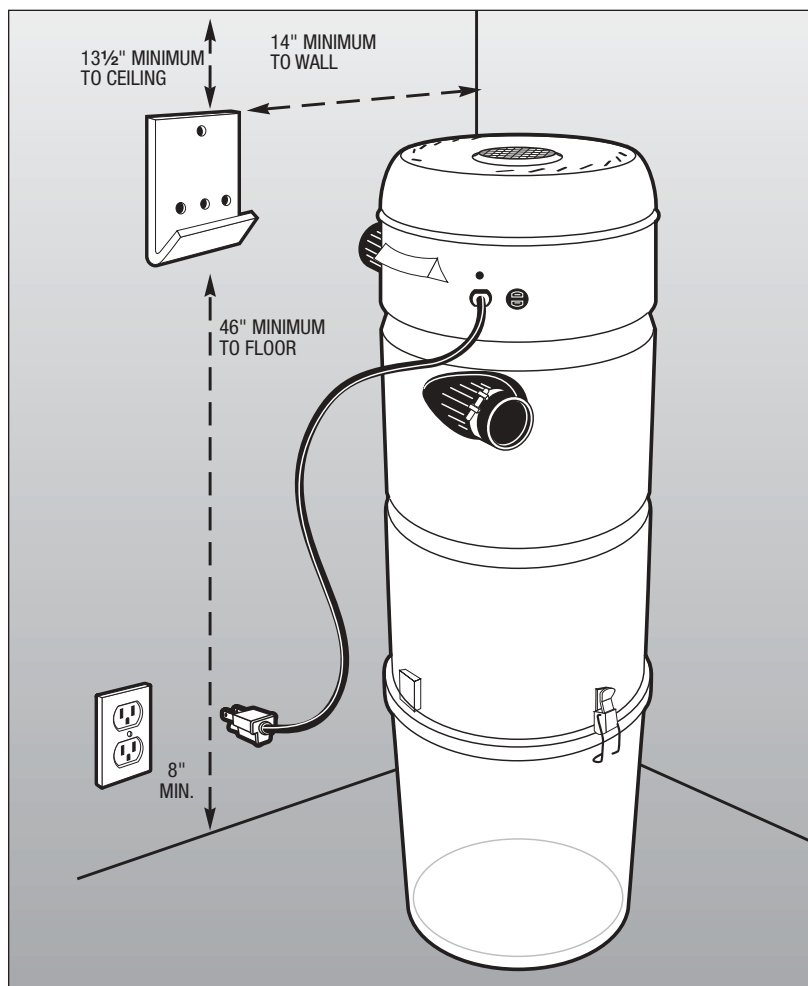
VACUFLO power units operate on a nominal 120-volt circuit, and come equipped with a power supply cord

that has an equipment-grounding conductor and grounding plug. To reduce the risk of electrical shock (if a unit should malfunction or break down),

the power unit must be plugged into a properly grounded electrical outlet on a dedicated circuit that complies with all local codes and ordinances. Make sure the power unit is connected to an outlet having the same configuration as the plug – **no adapter** should be used. The electrical outlet must be within 5 feet of the mounting bracket, but no closer than 8 inches.

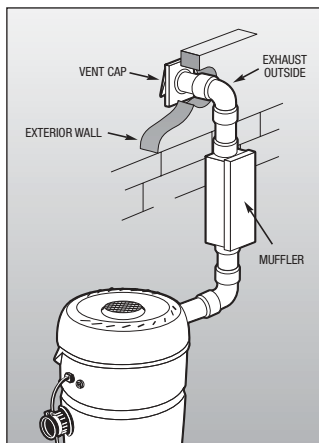


Warning: Improper connection of the equipment-grounding conductor can result in a risk of electrical shock. If there is any doubt as to whether the outlet is properly grounded, check with a qualified electrician or service person. Do not modify the plug provided. If the plug does not fit the outlet, have a proper outlet installed by a qualified electrician.

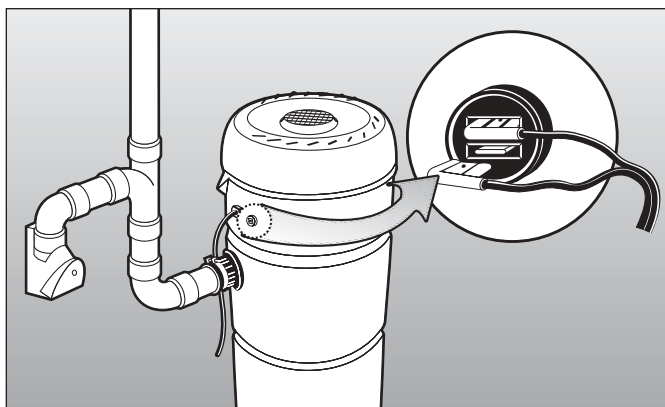


Installing the Exhaust Line

To ensure the quietest operation possible, a muffler should be installed on all power units. (Mufflers are sold separately.) Mufflers can be installed vertically or horizontally in the exhaust line inside the building. To vent the exhaust outside, cut a 2-9/16" diameter hole through the exterior wall and attach a vent cap to the house's exterior (shown at right). Next, glue the 2" PVC tubing to the exhaust vent, being careful not to glue the pivoting vent door to the tube end. **Keep the exhaust line short, 30' or less. Long elbows add 4' per fitting, short elbows add 8'. Don't use short elbows.**



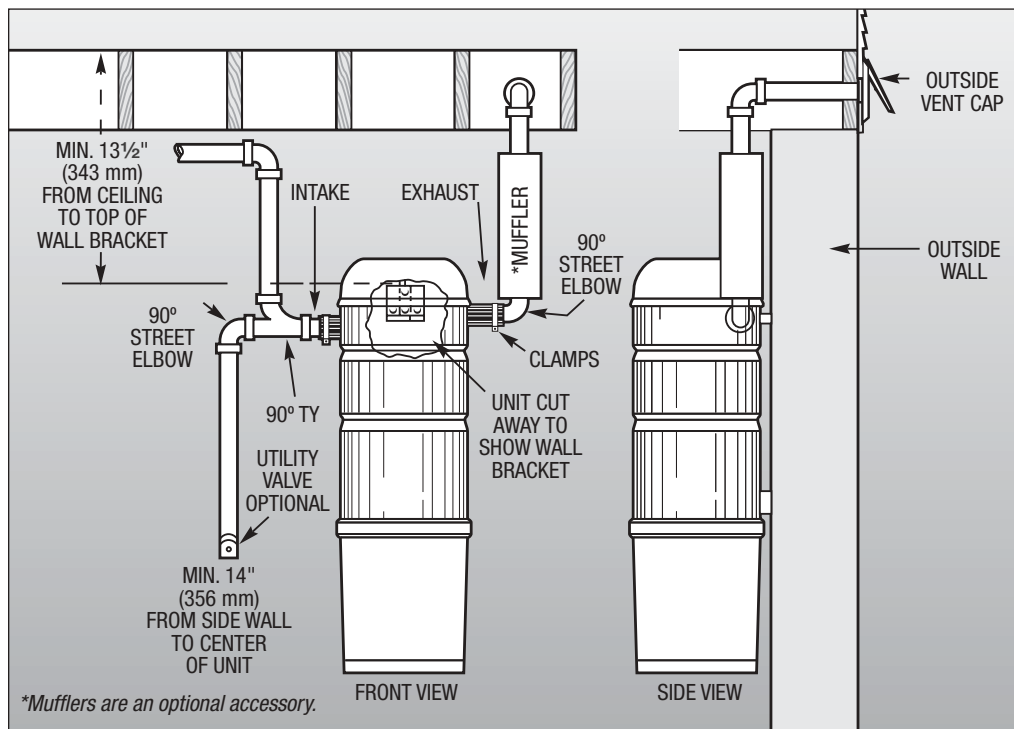
To ensure the quietest operation possible, mufflers are recommended.



Wiring the Power Unit

With the balance of the system installed, the final installation step is to connect the intake line and wire the power unit. To ensure proper wire connections that do not pull apart, it is important to leave slack in the wires at the connection (especially at the power unit), and clip or tape them in place. To connect the power unit valve switches, locate the flag terminals on the back of the power unit and remove them from the tab connectors (shown above). Next, insert the wires from the trunk line into the flag terminals and crimp securely. Then, reinsert the flag terminals onto the tab connectors located on the back of the power unit. Finally, plug in the power unit to be certain it is running properly. While the power unit is on, check to see that the pivoting door

Proper installation of the power unit and exhaust line.



*Mufflers are an optional accessory.

on the vent cap (located on the exterior wall) opens – if the vent cap is glued shut, the power unit will not perform properly. The illustration below shows the proper installation of the power unit and exhaust line. No polarity - wires connected in parallel

Once all wiring connections are complete, and the tubing system, inlet valves and power unit are properly installed, the entire VACUFLO system will operate at maximum power and efficiency. **If any problems occur or you have questions, call VACUFLO Customer Service at 1-800-822-8356.**

