Installer's Guide

18-CH23D2-8A-EN

MASONRY CHIMNEY VENT KIT

BAYVENT800B

For use with Category I (80%) Upflow Furnaces only!
Not for use with Category II, III, or IV Furnaces!
THIS KIT TO BE APPLIED WITH THE FOLLOWING UPFLOW MODEL FAMILIES ONLY :
***UE1, *UD1, M80, *UD-R-V, CUB, and *UD2**
THIS KIT APPLIES TO ALL INPUTS EXCEPT 40,000 BTU/H
*** - First letter may be "A" or "T"**

⚠WARNING: HAZARDOUS VOLTAGE – DISCONNECT POWER BEFORE SERVICING

IMPORTANT — This Document is customer property and is to remain with this unit. Please return to service information pack upon completion of work.

The following warning complies with State of California law, Proposition 65.

⚠ WARNING

Hazardous Gases!
Exposure to fuel substances or by-products of incomplete fuel combustion is believed by the state of California to cause cancer, birth defects, or other reproductive harm.

⚠ WARNING

FIRE HAZARD
This vent kit shall not be installed on furnaces with 40,000 BTU/H inputs. Failure to follow this warning could result in fire, personal injury, or death.

⚠ WARNING

SAFETY HAZARD
This vent kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency performing this work assumes responsibility for the proper conversion of this appliance with this kit.

⚠ WARNING

FIRE HAZARD
This vent kit is to be used ONLY for venting Category I furnaces. DO NOT use to vent category II, III or IV vent furnaces. Failure to follow this warning could result in fire, personal injury or death.

NOTE:
Read the Installer's Guide before starting the installation.

NOTE:
Codes and local utility requirements governing the installation of gas fired equipment, wiring, plumbing, and flue connections must be adhered to. In the absence of local codes, the installation must conform to the Nation Fuel Gas Code (NFGC) ANSI Z233.1 "latest edition", or National Standard of Canada for Natural Gas and Propane Installation Codes (NSCNGPIC) CAN/CGA B149.1 & .2 "latest edition". The latest code may be obtained from the American Gas Association Laboratories, 400 N. Capital St. NW, Washington D.C. 20001.
1-800-699-9277 or www.aga.org

INTRODUCTION

This Installer's Guide covers the installation of the masonry chimney vent kit on 80% gas fired non-condensing furnace models. The vent kit, when installed for exterior masonry chimneys, will reduce the amount of condensation and prevent premature deterioration of clay tile, brick & mortar joints. **The furnace must be common vented with at least one draft hood equipped appliance.** Common venting of multiple non-condensing furnaces is permitted if they each have a BAYVENT800B kit.

GENERAL

NOTE:
Refer to the Furnace Installer's Guide for equivalent vent lengths.

Venting into a tile-lined exterior masonry chimney (exterior defined as one or more sides exposed to the outdoors below the roof line) may be accomplished by installing this vent kit provided all the following requirements are met:

1. The 99% Winter Design Temperature shall not be lower than -10°F (23°C).
   This information can be found in the ASHRAE Fundamentals Handbook or Appendix G of the National Fuel Gas Code. The figure from the National Fuel Gas Code is recreated as Figure 5 on page 5.

2. The chimney height is limited. Refer to Table 2A.
3. For proper function of the vent kit, the draft induced by the chimney should not be less than -0.02" W.C.
4. Any unused chimney access openings (i.e. chimney cleanout), and the clearance around the vent insert(s) into the masonry chimney must be properly sealed.
5. Vent connector must be Type-B double wall to prevent flue gas heat loss and maintain proper draft. Pipe diameter must be a minimum of 6" for the furnace.
6. To minimize draft loss in the vent connector, avoid placing an elbow directly on top of the vent kit. **Maximize the vertical riser.**
7. The furnace must be common vented with at least one draft hood-equipped appliance to prevent condensation in masonry chimneys. The draft hoodequipped appliance must use Style B double wall vent connector of at least 4 inches diameter.
8. The common vent capacity conforms to the standards as shown in Table 1. Refer to Table 2B for calculation of the chimney inside area.
9. A rain cap must be installed on top of the chimney outlet to prevent rainwater from entering the chimney.
10. The furnace capacity must not exceed 1.2 times the calculated heating load.
11. Chimney construction must be in good condition and must conform to the standard for chimneys as listed in ANSI/NFPA 211 and to any state or local codes applicable. Refer to flow chart 1 on page 8 for an overview on chimney construction inspection.
12. The flow area of the largest section of vertical vent or chimney shall not exceed 7 times the smallest listed appliance categorized vent area, flue collar area, or draft hood outlet area unless designed in accordance with approved engineering methods. Selected outlet area for some sizes are shown in Table 2B.

$$\text{Maximum Vent of Tile Listed Chimney Flow Area} = \frac{\pi(D^*)^2}{4} \times 7$$

* Draft hood outlet diameter, flue collar diameter, or listed appliance categorized vent diameter.

⚠ CAUTION

Failure to follow any one of the above requirements could led to premature deterioration of clay tile, brick & mortar joints.

The following installation practices are recommended to minimize corrosion caused by condensation of flue products in the furnace and flue gas system.

1. Avoid excessive numbers of pipe bends.
2. Horizontal runs should pitch upward at least ¼" per foot.
3. Horizontal runs should be as short as possible.
4. All vent pipe or connections should be securely supported and must be inserted into, but not beyond the inside wall at the chimney vent.
5. When vent connection must pass through walls or partitions of combustible material, a thimble must be used and installed according to local codes.
6. Where long periods of airflow are desired for comfort, use long fan cycles instead of continuous airflow.
7. Vent connectors serving appliance vented by natural draft or non-positive pressure shall not be connected into any portion of a mechanized draft system operating under positive pressure.
8. Horizontal pipe runs must be supported by hangers, straps or other suitable material in intervals at a minimum of every 3 feet of pipe.
9. A furnace shall not be connected to a chimney or flue serving a separate appliance designed to burn solid fuel.
10. Apply other good venting practices as stated in the venting section of the latest edition of the National Fuel Gas Code ANSI Z233.1 or the CAN/CGA B149.1 & .2 Installation Codes.

INSTALLATION

1. Remove vent kit from the package & inspect contents for damage. Compare list of contents as listed below:
   a. vent kit (sheetmetal assembly with one resettable limit switch and gasket)
   b. screws (qty. 6)
   c. cable tie (qty. 1)
   d. wiring (qty. 2)
   e. ½" B/X conduit with two fittings
   f. conversion responsibility label
2. If installed disconnect electric supply to the furnace. Turn off gas supply at manual gas valve. Final installation is illustrated in Figure 1.
3. Remove the knockout located on the furnace top panel.
4. Pass the wiring harness through the knockout opening.
5. Attach the B/X straight connector to the knockout opening.
6. Install vent kit on top of flue adapter with three sheetmetal screws (supplied with kit).
7. Connect the wiring as shown in fig. 2A &B and wiring diagram 1 for single stage furnaces or diagram 2 for

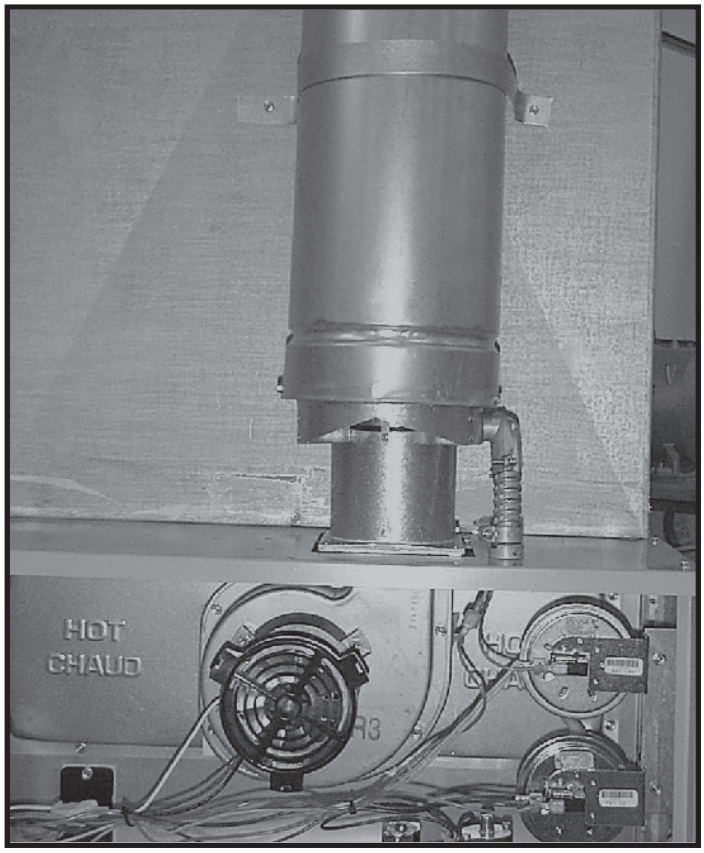


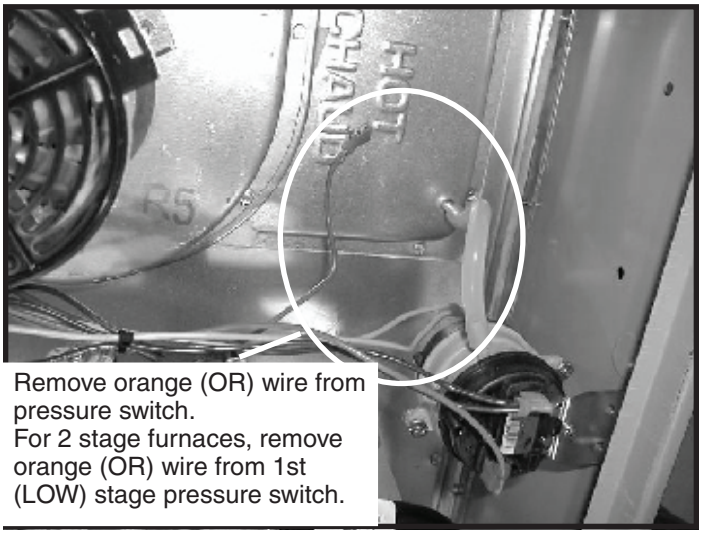
FIGURE 1

⚠ WARNING

CARBON MONOXIDE HAZARD
Hazardous Gases!
Failure to follow the wiring instructions as specified in these directions could result in carbon monoxide poisoning or death.

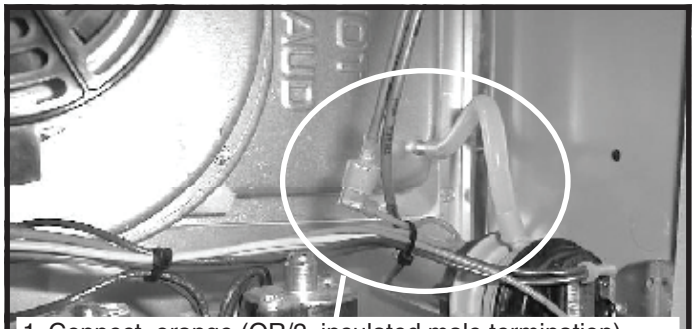
two stage furnaces.

8. Use the cable tie to secure the excess wiring.
9. Connect 6" Type-B double wall vent pipe to the vent kit. Attach the piping with sheetmetal screws & metal strapping (field supplied) to secure the vent pipe in place as shown in Figure 3.
10. Common vent the furnace vent pipe with a draft hood equipped appliance. The vent pipe for the vent connector must be Type-B double wall.
11. The appliances may be connected to the chimney flue through separate openings or shall be permitted to be connected through a single opening if joined by a suitable fitting located as close as practical to the chimney. Fill all gaps and open cavities with an approved sealing method as listed in ANSI/NFPA 211 and to any state or local codes applicable.
12. Seals all air leaks from the supply air plenum or evaporator coil casing which can cause irregular airflow in and around the vent kit.
13. Adhere the conversion responsibility label to the front surface of the blower door.
14. Turn on the gas supply at the manual gas valve and reconnect the electrical supply to the furnace.



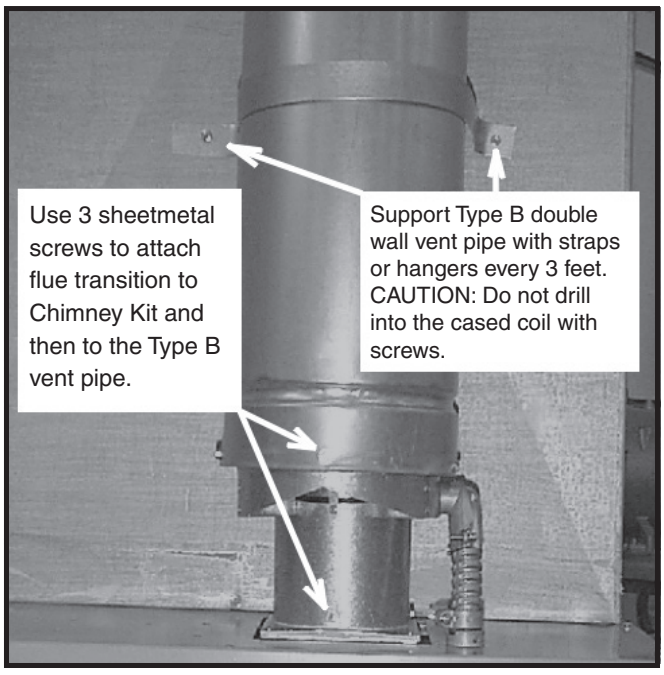
Remove orange (OR) wire from pressure switch.
For 2 stage furnaces, remove orange (OR) wire from 1st (LOW) stage pressure switch.

FIGURE 2A



1. Connect orange (OR/2, insulated male termination) from chimney kit to orange (OR, insulated female termination).
2. Connect orange (OR/3, insulated female termination) from chimney kit to pressure switch. For 2 stage furnaces, connect orange (OR/3) wire to the 1st (LOW) stage pressure switch.

FIGURE 2B



Use 3 sheetmetal screws to attach flue transition to Chimney Kit and then to the Type B vent pipe.

Support Type B double wall vent pipe with straps or hangers every 3 feet.
CAUTION: Do not drill into the cased coil with screws.

FIGURE 3

⚠ WARNING

CARBON MONOXIDE POISONING HAZARD
Follow all vent system installation instructions. Failure to follow the installation and operation instructions for the venting system's operation could result in carbon monoxide poisoning or death.

Carbon monoxide, fire or smoke can cause serious bodily injury, death, and/or property damage.
A variety of potential sources of carbon monoxide can be found in a building or dwelling such as gas-fired clothes dryers, gas cooking stoves, water heaters, furnaces and fireplaces. The U.S. Consumer Product Safety Commission recommends that users of gas-burning appliances install carbon monoxide detectors as well as fire and smoke detectors, listed by a nationally recognized agency (e.g. Underwriters Laboratories or International Approval Services), to help alert dwelling occupants of the presence of fire, smoke or unsafe levels of carbon monoxide.

CHECKOUT

Inspecting for proper draft & spillage

1. Inspect the venting system for proper size and horizontal pitch as required in the National Fuel Code, ANSI Z233.1 or the CAN/CGA B149.1 & .2 Installation Codes and these instructions. Determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
2. In so far as is practical, close all building doors and windows and all doors between the space in which the appliance(s) connected to the venting system are located and other spaces of the building. Turn on clothes dryers and any appliance not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
3. Follow the lighting instructions as described in the Installer's Guide shipped with the furnace. Place the appliance being inspected in operation. Adjust the thermostat so the appliance shall operate continuously.
4. Test for draft hood equipped appliance spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle to check for draft & spillage. Repeat steps 3 & 4 for each appliance.
5. After it has been determined that each appliance remaining connected to the venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliance to their previous condition of use.
6. If improper venting is observed during any of the above tests, the venting system must be corrected.

Verifying safety vent switch for proper operation.

1. Adjust the thermostat so the furnace operates continuously.
2. Allow the furnace to operate under normal condition for 5 minutes.
3. Block the chimney outlet 100 percent.
4. The vent safety switch (VSS) located within the vent kit should extinguish the furnace within 5 minutes of blockage.
5. Failure to shut off the furnace within the above time limit indicates a faulty vent safety switch and/or leakage in the vent pipe and/or chimney.
6. Remove the blockage and reset the vent safety switch by pressing on the push pole located in the center of the vent safety switch.
7. Furnace should begin to operate upon resetting of the vent safety switch (manual reset, see fig. 4). Failure to operate indicates problems with the vent safety switch.
8. Upon successful operation of the vent kit, adjust the thermostat to its normal setting.

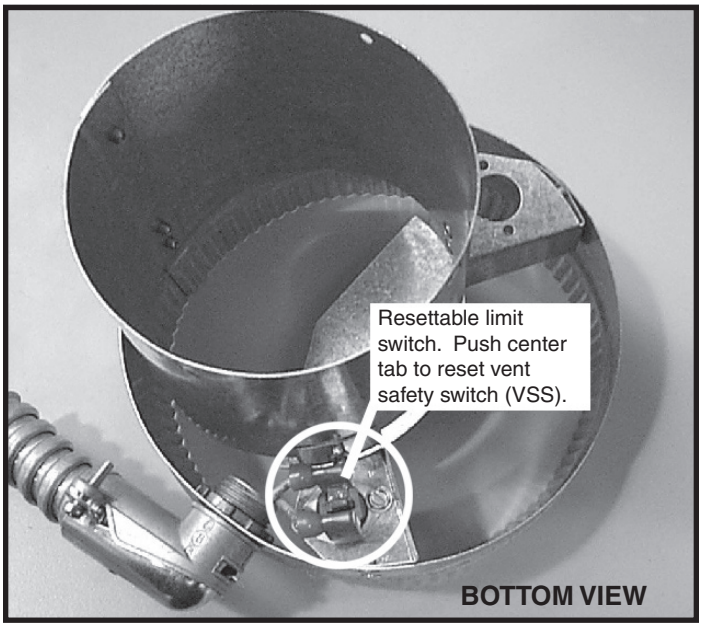


FIGURE 4

FIGURE 5

99% Winter Design Temperatures for the Contiguous United States
From the National Fuel Gas Code Z223.1-112

EXAMPLE:

The homeowner requires a 100,000 Btu/hr furnace to be installed in their home in an area with a 99% Heating DB of 7°F (-14°C). If possible, the furnace will be vented through a nominal 8 X 8 masonry tile-lined exterior chimney with 20 feet of vent height and a 2 foot connector rise. The installation also has a 4" diameter outlet draft hood-equipped domestic hot water heater with an input rate of 40,000 Btu/hr. Is it possible to use the BAYVENT800B masonry chimney kit for this installation? If so, what size is required for the furnace vent connector?

Solution: From Table 2B, the equivalent area of the chimney is 42.7 square inches. The vent height is 20 feet, which is less than the maximum of 35 feet as shown in Table 2A for this furnace input rate. The combined input rating of the furnace and water heater is within the capacity of the chimney as shown in Table 1. Therefore, provided the other requirements as specified by this Installer's Guide and the National Fuel Gas Code are met, the BAYVENT800B kit can be used in this installation. The furnace must be common vented with the water heater using at least the 4" vent connector to use the BAYVENT800B with the masonry chimney for venting. From Table 3, for a 20 foot chimney and a 2 foot connector rise, the smallest diameter connector that will allow the 100,000 Btu/hr furnace is 6" diameter Type B vent connector, which is the minimum diameter required for the BAYVENT800B.

The 4 inch diameter water heater outlet gives the smallest vent area in this installation (12.6 square inches). The flow area of the chimney (42.7 square inches) does not exceed 7 times the smallest vent area.

Table 1
Exterior Masonry Chimney Installations with Type B double wall vent connectors.*

Vent Height (feet)	Minimum Internal Area of Chimney (square inches)					
	28	38	50	63	78	113
	NAT + NAT	NAT + NAT	NAT + NAT	NAT + NAT	NAT + NAT	NAT + NAT
6	71	103	143	188	246	NR
8	82	119	163	218	278	408
10	90	131	177	236	302	454
15	106	152	212	283	365	546
20	122	172	243	325	419	648
30	137	198	278	381	496	749
35	NR	NR	281	401	524	792

* NOTES: NR = Vent configuration is NOT RECOMMENDED

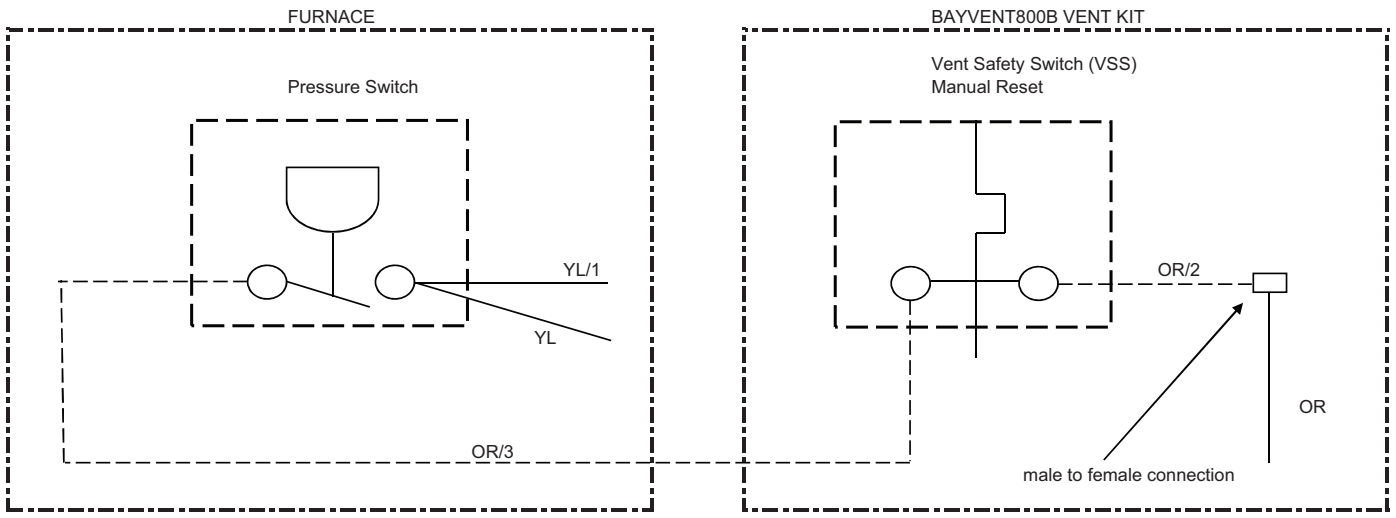
1. Use sea level input rating when determining maximum capacity for high altitude installations.
2. The venting tables include allowance for two 90-degree turns. For each additional 90-degree turn, or equivalent, the maximum capacity listed in the venting tables shall be reduced by 10% (0.90 x maximum table capacity).
3. The maximum vent connector horizontal length shall be 1 1/2' (18") for each inch of connector diameter. The maximum capacity of the vent connector shall be reduced 10% for each additional multiple of the length. For example, the maximum length listed above for a 4" connector is 6'. With a connector length greater than 6' but not exceeding 12', the maximum capacity must be reduced by 10% (0.90 x maximum vent capacity). With a connector length greater than 12' but not exceeding 18', the maximum capacity must be reduced by 20% (0.80 x maximum vent capacity).
4. The flow area of the chimney shall not exceed 7 times the smallest flue collar area, or draft hood outlet area.
5. Connector rise (R) for each appliance connector shall be measured from the draft hood outlet or flue collar to the centerline where the vent gas streams come together. Refer to TABLE 3 for maximum permissible vent connector capacity.

Table 2A Chimney Liner Nominal Size and Inside Area				
Furnace Input Rate	Maximum Chimney Height	Masonry Chimney Clay Tile Liner		
		Maximum Nominal Liner Size, or	Maximum Inside Diameter, or	Maximum Equivalent Area
(Btu/hr)	(Feet)	(Inches x Inches)	(Inches)	(Square Inches)
60,000	30	8 X 8	7.4	42.7
80,000	30		8	50.3
100,000	35		8	50.3
120,000	35	8 X 12	9	63.6
140,000	35	12 X 12	10.4	83.3

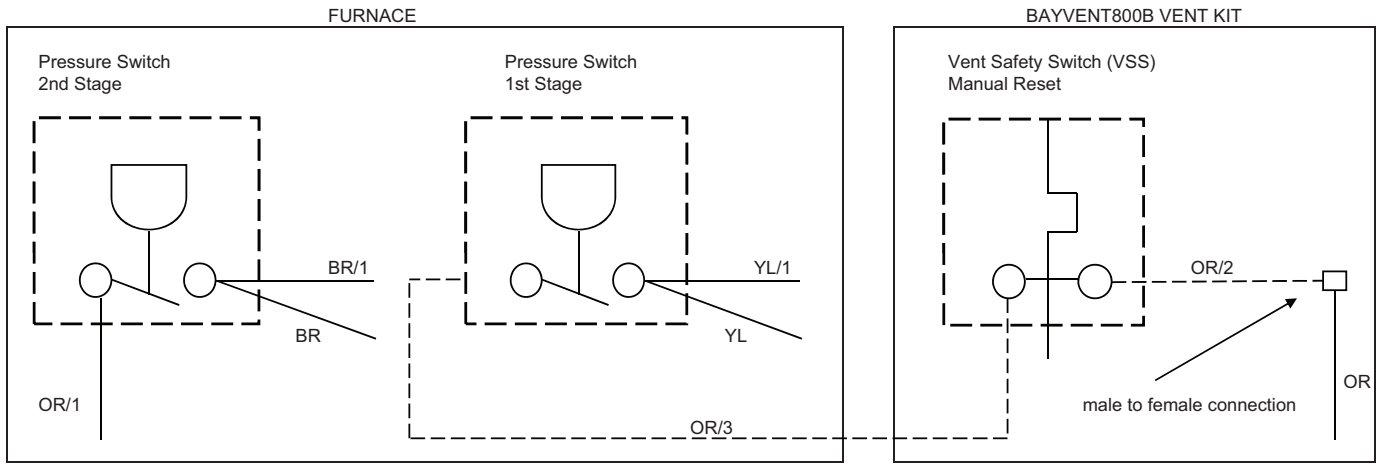
Table 2B Masonry Chimney Liner Dimensions with Circular Equivalents			
Nominal Liner Size	Inside Dimensions of Liner	Inside Diameter or Equivalent Diameter	Equivalent Area
(Inches x Inches)	(Inches)	(Inches)	(Square Inches)
4 X 8	2-1/2 X 6-1/2	4	12.2
		5	19.6
		6	28.3
		7	38.3
8 X 8	6-3/4 X 6-3/4	7.4	42.7
		8	50.3
8 X 12	6-1/2 X 10-1/2	9	63.6
		10	78.5
12 X 12	9-3/4 X 9-3/4	10.4	83.5
		11	95
12 X 16	9-1/2 X 13-1/2	11.8	107.5
		12	113

TABLE 3 Vent Connector Capacity									
Vent Height	Connector Rise	Type B Double-Wall Vent and Connector Diameter - D							
H	R	3"	4"	5"	6"	7"	8"	9"	10"
		Appliance Input Rating Limits in Thousands of Btu per Hour							
(ft)	(ft)	Nat. Max.	Nat. Max.	Nat. Max.	Nat. Max.	Nat. Max.	Nat. Max.	Nat. Max.	Nat. Max.
6	1	21	40	67	101	141	201	253	319
	2	28	52	85	124	173	232	300	378
	3	34	61	97	143	203	270	349	439
8	1	22	41	69	105	148	210	267	335
	2	29	53	86	127	179	240	311	394
	3	34	62	98	145	206	276	358	452
10	1	22	42	71	108	153	216	277	348
	2	29	54	87	129	184	247	321	407
	3	35	63	100	148	209	281	366	463
15	1	23	44	74	114	164	229	297	375
	2	31	55	89	134	192	260	339	432
	3	35	64	102	153	215	292	382	486
20	1	24	46	77	119	173	239	312	397
	2	31	56	91	138	199	270	354	452
	3	35	65	104	157	222	301	396	505
30	1	25	48	82	127	187	255	337	432
	2	32	58	95	145	209	287	378	484
	3	36	66	107	163	233	317	418	535
50	1	25	51	89	143	213	294	392	506
	2	32	61	102	161	235	326	433	558
	3	36	69	115	180	260	357	474	611

WIRING DIAGRAM 1 - SINGLE STAGE FURNACE



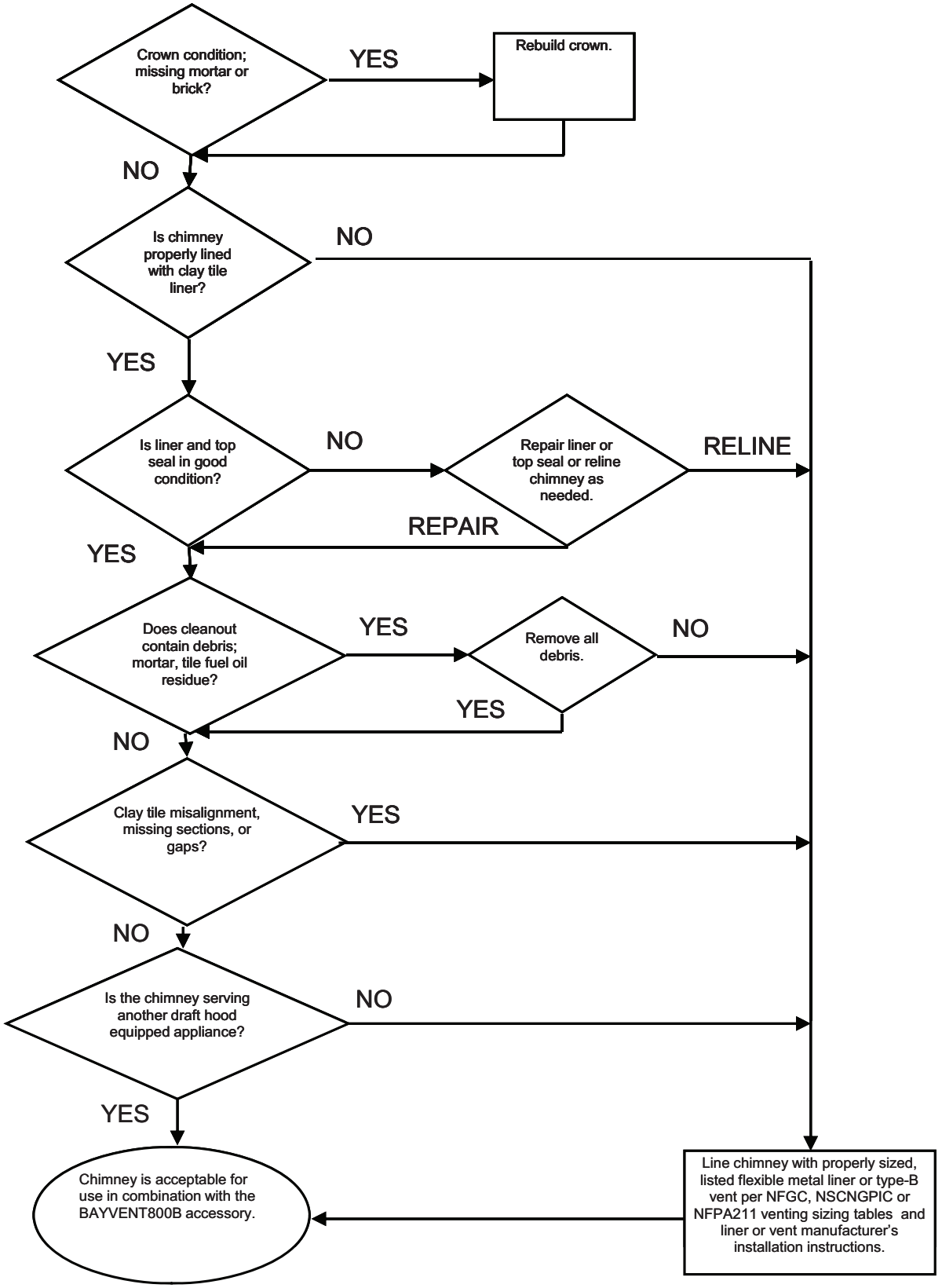
WIRING DIAGRAM 2 - TWO STAGE FURNACE



FLOW CHART 1

CHIMNEY INSPECTION CHART

For additional requirements refer to the National Fuel Gas Code NFPA 54/ANSI Z223.1 and



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