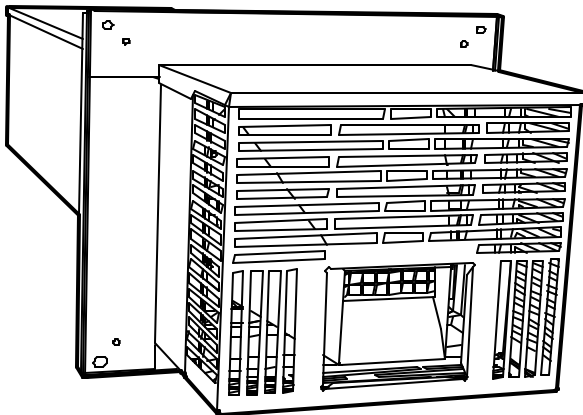


# Installation Instructions and Homeowner's Manual



DNS-0474 Rev A

**Models:**

**SCS-5-08-3**

**SCS-5-20-3**

Manufactured by:

UTC Canada Corporation

**Division ICP**

3400, Industrial Boulevard

Sherbrooke, Quebec

J1L 1V8

**SEALED COMBUSTION  
SYSTEM – OIL FIRED**

**Save these instructions for future reference.**

**Caution : Do not tamper with  
the unit or its controls.**

**Call a qualified service  
technician.**

# PART 1

## NOTICE TO THE INSTALLER

### CAUTION

Please ensure that the area around the vent terminal is kept clear of snow, ice, debris, etc...

### 1.1) SAFETY LABELLING AND WARNING SIGNS

#### DANGER, WARNING AND CAUTION

The words DANGER, WARNING and CAUTION are used to identify the levels of seriousness of certain hazards. It is important that you understand their meaning. You will notice these words in the manual as follows:



### DANGER

Immediate hazards which **WILL** result in death or serious injury.



### WARNING

Hazards or unsafe practices which **CAN** result in death or injury.

### CAUTION

Hazards or unsafe practices which **CAN** result in personal injury, product or property damage.

### 1.2) SCS SYSTEMS

This "SCS" (Sealed Combustion System, also called Balanced Flue System) must be installed in strict accordance with this manual. **A 4 inch diameter flexible aluminium outdoor combustion air pipe must be connected directly to the oil burner and the coaxial vent terminal to ensure the proper functioning of the unit.**

An SCS is by definition a leak-free system. **DO NOT PERFORATE THE VENT OR OUTDOOR COMBUSTION AIR PIPE!** Use the test port in the breach plate supplied with this kit, to take smoke and CO<sub>2</sub> readings. Refer to Figure 7.

The minimum and maximum measured length of the 5 inch diameter flexible stainless steel vent pipe and the 4 inch diameter flexible aluminum combustion air pipe must be according to Table 1. (These dimensions are linear measurements between the vent terminal and the vent breach plate of the appliance for the 5 inch vent pipe and the oil burner air intake for the 4 inch diameter combustion air pipe).

When all adjustments are completed in accordance with this manual and/or furnace installation/operating manual, it is recommended that you ensure that the flue gas temperature at the outlet of the vent terminal is **at least 200° F (93° C)**. In the event that this temperature cannot be reached within 5 minutes from a cold start, it is recommended that one, or a combination of the following options be used to increase same:

- a. Relocate the furnace or boiler to shorten the length of the flue pipe;
- b. Insulate the vent pipe. To do so, use 1 inch of Microlite™ FSK insulation by Johns Manville or an equivalent. Wrap the insulation around the vent pipe and use high temperature aluminum tape to secure it.

After the modifications are made, wait 30 minutes to let the system cool down then take another temperature reading at the outlet of the vent terminal after 5 minutes of operation. The temperature must then be at least 200° F (93° C).

An SCS CAN ONLY be installed on equipment approved for this application. Refer to the furnace rating plate for further information.

### CAUTION

Using this Sealed Combustion System on non-approved unit for this type of evacuation may result in serious injury and/or equipment damage.

### 1.3) MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS

The vent terminal is approved for installation through a combustible wall with ZERO clearance to combustible material. The 9 inch clearance around vent pipe should be respected as indicated in the Installation Code for Oil Burning Equipment CSA – B139-M91. Clearances with specified forms of protection should be in accordance with the Figure 7 and/or Table 8 of the aforementioned Code.

TABLE 1

PIPE DESCRIPTION	MINIMUM LENGTH Ft. / (Meters)	MAXIMUM LENGTH Ft. / (Meters)
<b>5 inch diameter stainless steel vent pipe</b>	3 / (1)	20 / (6)
<b>4 inch diameter aluminum combustion air pipe</b>	3 / (1)	23 / (7)

# PART 2 INSTALLATION

## 2.1) GENERAL

These instructions are intended for qualified technicians who were trained to install this type of equipment.

### CAUTION

Installation of this equipment by an unqualified person may lead to hazardous conditions, resulting in bodily harm and/or equipment damage.

All local and national code requirements must be followed. Refer to CSA-B139-M91 and CSA-C22.1, which govern the installation, wiring and vent connections of oil burning equipment.

An SCS system should not be installed on incinerators, condensing type or solid fuel burning appliances.

The vent terminal unit may be installed through a combustible or non-combustible wall, with a maximum thickness of 22 inches. The minimum wall thickness is 2 inches.

## 2.2) GENERAL INSTALLATION GUIDELINES

The first step in installing the SCS system is to determine a location that conforms to the following criteria:

A vent should not terminate :

- a. Directly above a paved sidewalk or paved driveway, which is located between two buildings and that serves both buildings;
- b. Less than 7 feet above any paved driveway or paved sidewalk;
- c. Within 6 feet of a window, door, or a mechanical air supply inlet to any building, including a soffit opening;
- d. Above a gas meter/regular assembly within 3 feet horizontally of the vertical centre-line of the regulator;
- e. Within 6 feet of any gas service regulator, vent outlet or 3 feet of an oil tank vent or oil tank inlet;
- f. Less than 1 foot above grade level;
- g. Within 6 feet of another combustion appliance air intake;

- h. Within 6 feet of the property line;
- i. Undemeath a veranda, porch or deck;
- j. So that the flue gases are directed toward combustible material or any openings of surrounding buildings that are within 6 feet;
- k. Less than 3 feet from an inside corner of an "L"-shaped structure;
- l. With the bottom of the vent termination opening being less than 1 foot above any surface that may support snow, ice or debris;
- m. So that the flue gases are directed toward brickwork, siding or construction, in such a manner as to cause damage from heat or condensation from flue gases.

## 2.3) LIST OF COMPONENTS

Please refer to Figure 2. The parts being shipped with the SCS system are:

1. 1 only vent terminal assembly with 8 or 20 feet of 5 inch diameter flexible stainless steel pipe;
2. An electrical box with pressure switch, timer and relay, factory wired and mounted;
3. 11 or 23 feet of 4 inch diameter flexible aluminum combustion air intake pipe;
4. A 5 inch diameter breach plate with test opening port;
5. A 5 inch diameter collar with gasket;
6. A Burner Flange Adapter with pressure tap;
7. 4 feet of grey seal strip;
8. A 90° galvanized elbow increaser, 3 inches / 4 inches, for the burner combustion air intake junction with the 4 inch aluminum pipe;
9. 4 inch diameter collar for the aluminum combustion air pipe and 90° elbow joint;
10. Half moon cover;
11. Half moon plate to fix the vent pipe on the vent terminal assembly;
12. 1 only "L" shaped indoor vent terminal end plate;
13. 1 inch thick neoprene outside gasket;
14. One tube of high temperature sealant.

## 2.4) VENT TERMINAL INSTALLATION

### CAUTION

Be sure to remove the 4 inch diameter pipe from inside the 5 inch diameter pipe. The appliance cannot operate with both pipes inside each other. This configuration is used for shipping purposes only.

### 2.4.1) Preparation and requirements

The vent terminal can be installed to accommodate six different vent and combustion air pipe configurations, as shown in Figure 3. Find a location on an outside wall that meets all conditions stated in Part 2, Section 2. An opening of 7.75" x 7.75" should be provided in the wall for the vent terminal installation.

### 2.4.2) Orientation of the flexible connection

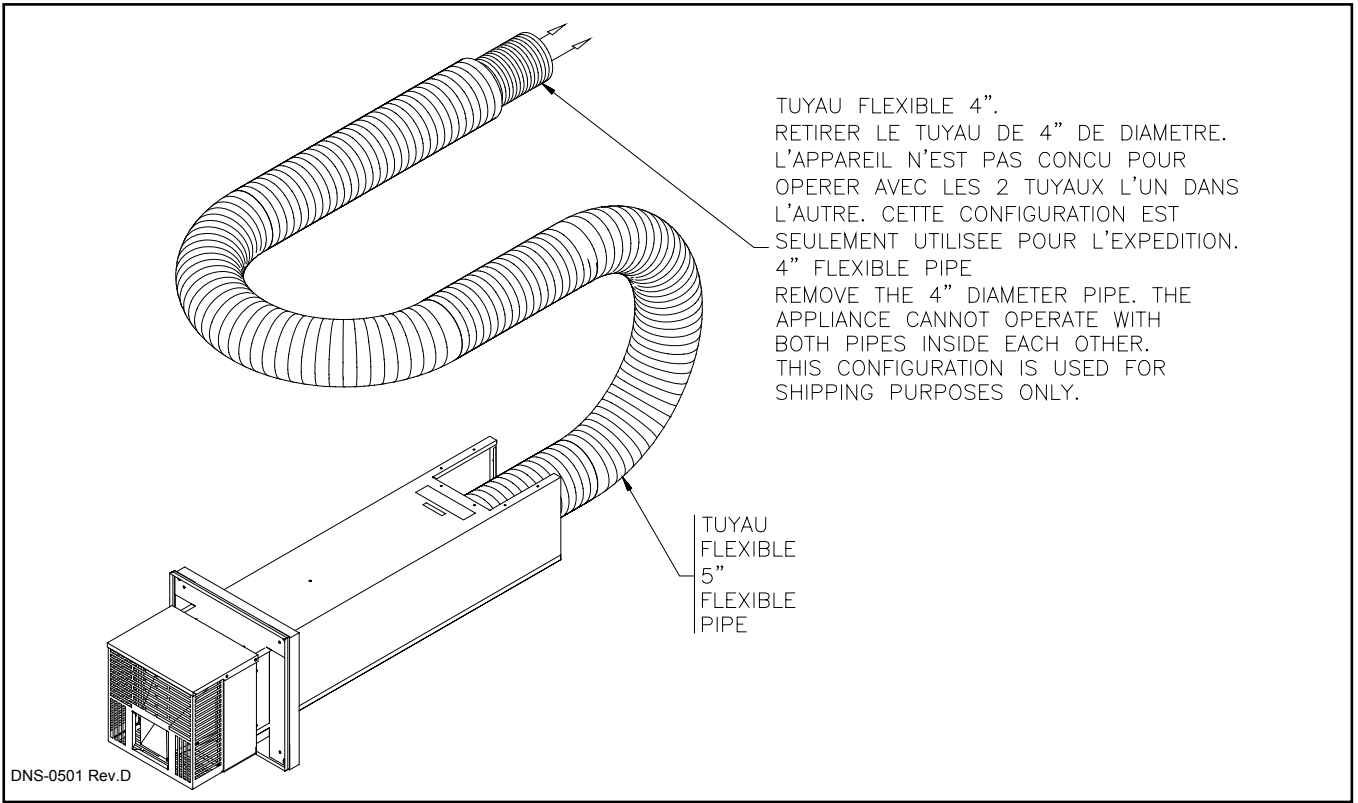
The vent terminal is factory assembled with the vent pipe and is ready for use if your application calls for configuration # 1 or # 4 as shown in Figure 3. If the required configuration is # 1 or # 4, go directly to Section 2.4.3. If one the other configurations is required for the application such as # 2, # 3, # 5 or # 6, proceed as per the following instructions:

1. Take the outdoor flanged guard off by removing the 8 stainless steel metal screws identified as "A" in Figure 4;
2. Take the outdoor end cone diffuser off by removing the 8 stainless steel metal screws identified as "B" in Figure 4;
3. Turn the square casing to the required position;
4. Screw the outdoor end cone diffuser assembly (see Note 2) onto the square casing;
5. Screw the outdoor flange guard to the square casing section of the vent terminal and make sure that the square opening of the guard is aligned with the outdoor end cone diffuser.

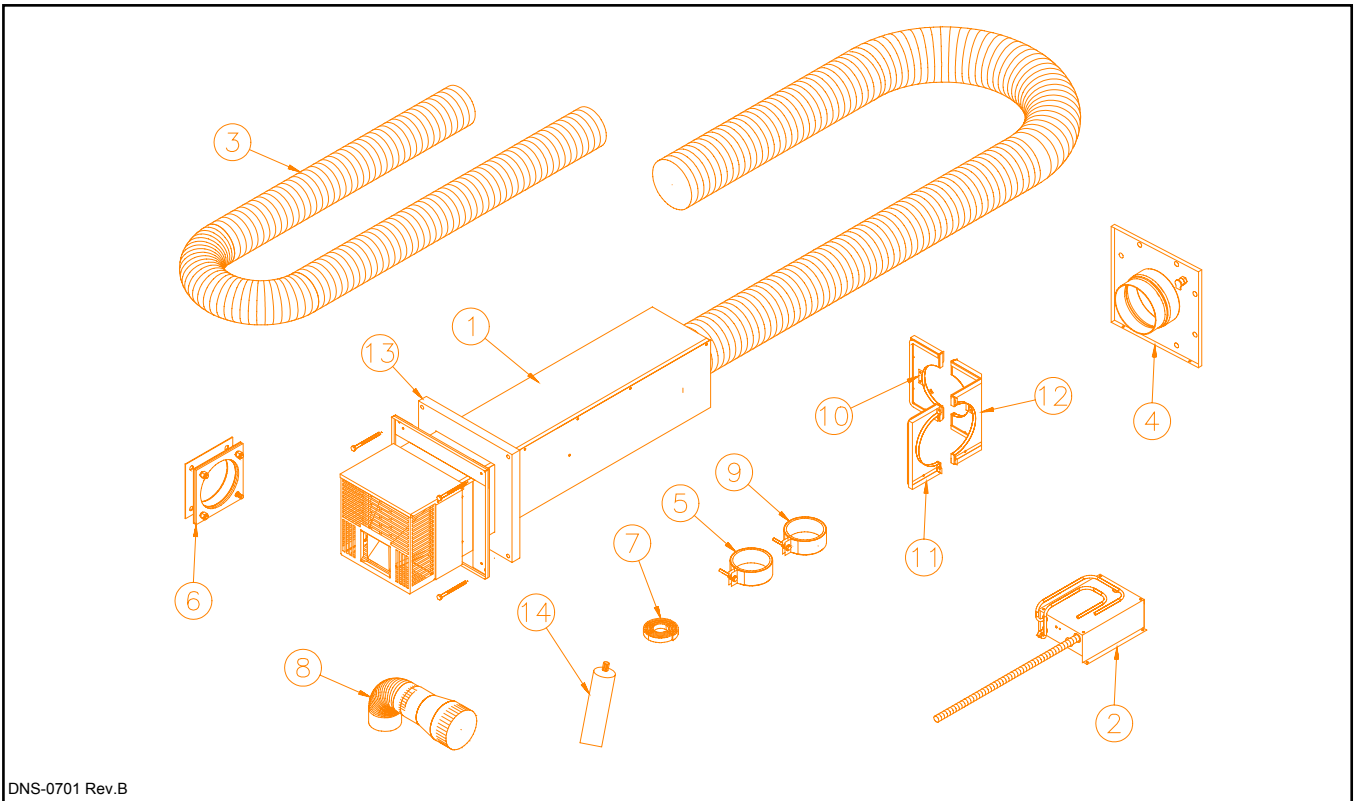
**Note:** 1- The cone diffuser and vent pipe assembly stay together during this operation.  
2- The slope direction of the outdoor end cone diffuser should be down when the vent terminal is installed.

**To establish a Horizontal Side connection for either the combustion air pipe or the vent pipe you should rotate the square casing 90° CW or CCW depending of your needs.**

**FIGURE 1**



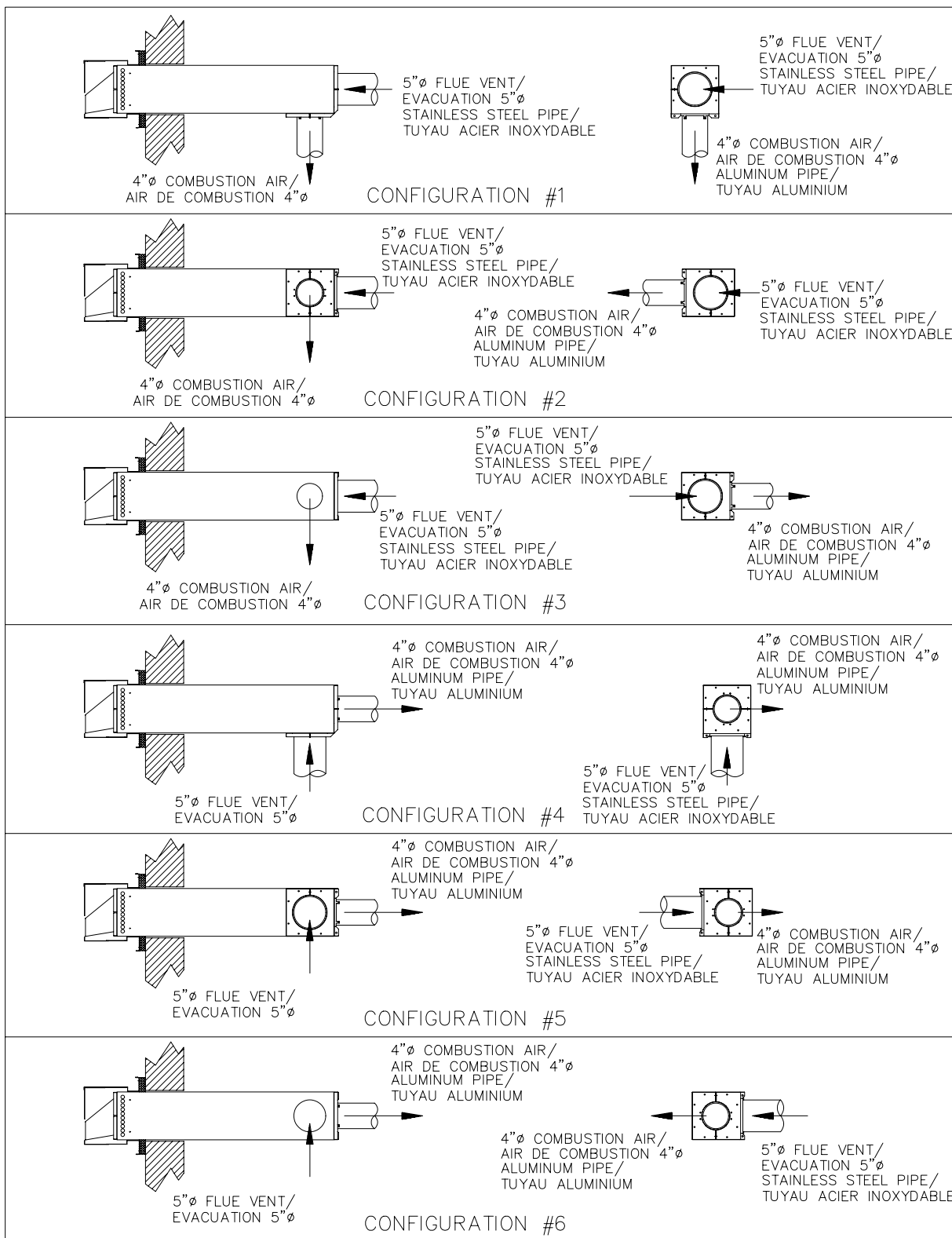
**FIGURE 2**



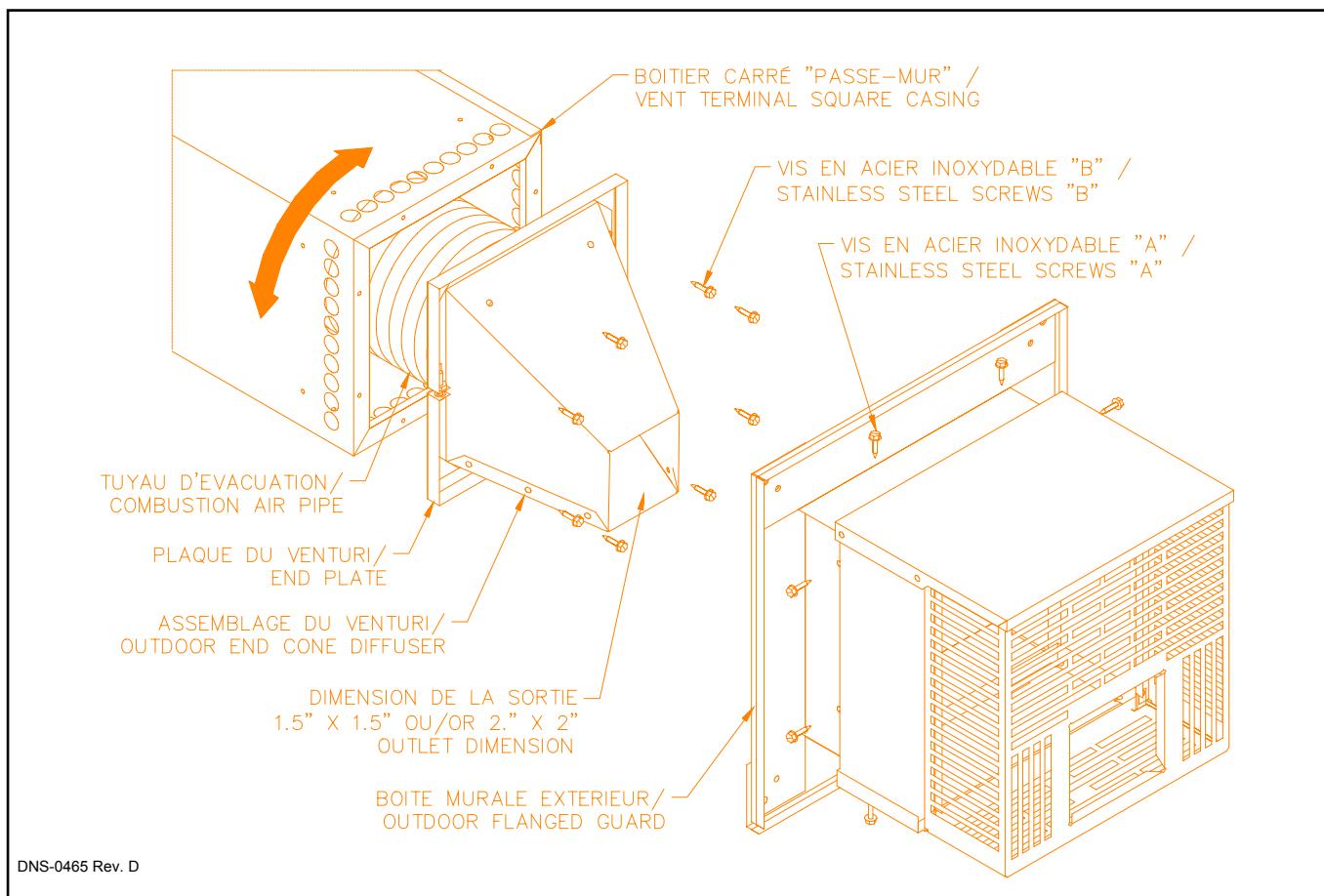
→ **FIGURE 3**

**SIDE VIEW**

**REAR VIEW**



→ **FIGURE 4**



DNS-0465 Rev. D

### 2.4.3) Installing terminal in the wall

At this stage, you are ready for the installation of the terminal in the wall. Make sure that the 1 inch thick black neoprene gasket is in place squeezed between the outside flanged guard and the exterior wall. Insert the vent pipe and vent terminal assembly into the 7.75" x 7.75" opening in the wall, from the outside going in.

The vent terminal should be horizontal and level. Use the four 3½ inch long lag screws to attach the vent terminal to the wall. The 1 inch thick exterior Neoprene gasket (see Figure 2, Item 11) should seal the joint and any gaps up to ½". If necessary, use a silicone sealant around the joint to prevent any water infiltration.

### 2.4.4) Completion of the vent terminal assembly

The next steps will be to secure the vent pipe and the combustion air pipe to the vent terminal, according to the installation configuration in Figure 3.

1. Chose the right position of the "L" shaped end cover to accommodate the installation of the 5 inch diameter vent pipe on the side or end connection as shown in Figure 5 or Figure 6;
2. Use four metal screws to fasten the "L" shaped cover in place;
3. Install the grey seal strip, supplied with the kit, between the vent pipe, the "L" shaped and half moon covers, to produce a permanently sealed joint;

#### **IMPORTANT**

**Do not drill holes into the 5 inch diameter stainless steel vent pipe.**

4. Use the machine bolts and nuts, supplied with the, kit to fasten the "L" shaped cover and the 5 inch diameter half Moon cover;

- Secure the 5 inch diameter half moon cover with four metal screws to completely seal the vent pipe to the vent terminal.

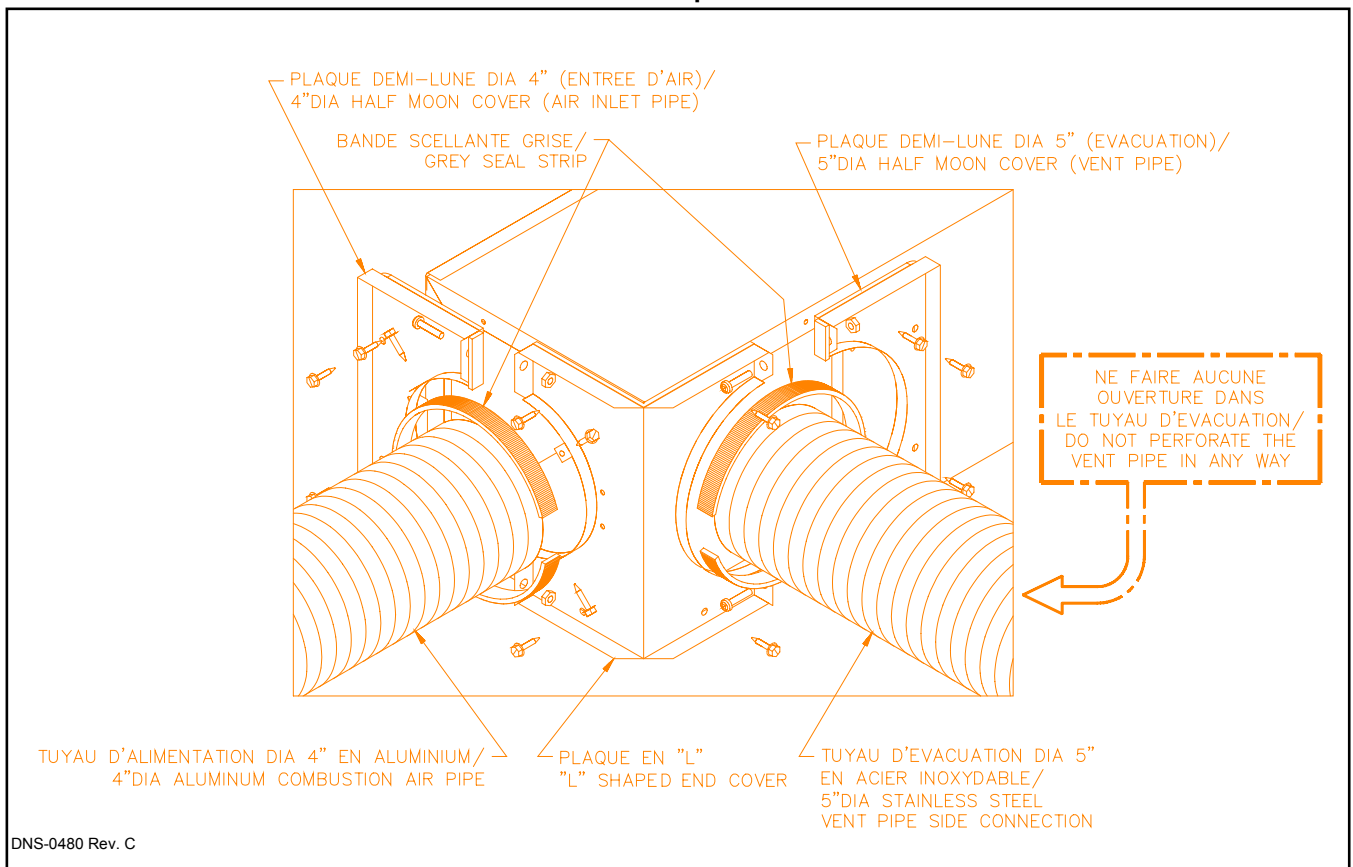
**Note :** The aluminum combustion air pipe supplied with the kit is extensible up to 2 times the supplied length;

- Install the extruded grey gasket supplied with the kit all around the 4 inches diameter combustion air pipe to provide a permanent seal joint between the pipe and the "L" shape cover and the 4 inches diameter half moon cover;
- Use the machine bolts and nut to fasten the "L" shape cover and the 4 inches diameter half moon cover;
- Secure the combustion air pipe with 4 metal screws through the collar tabs and the pipe;
- Secure the 4 inches half moon cover with four metal screws.

## 2.5) CONNECTION TO THE BOILER BREACH

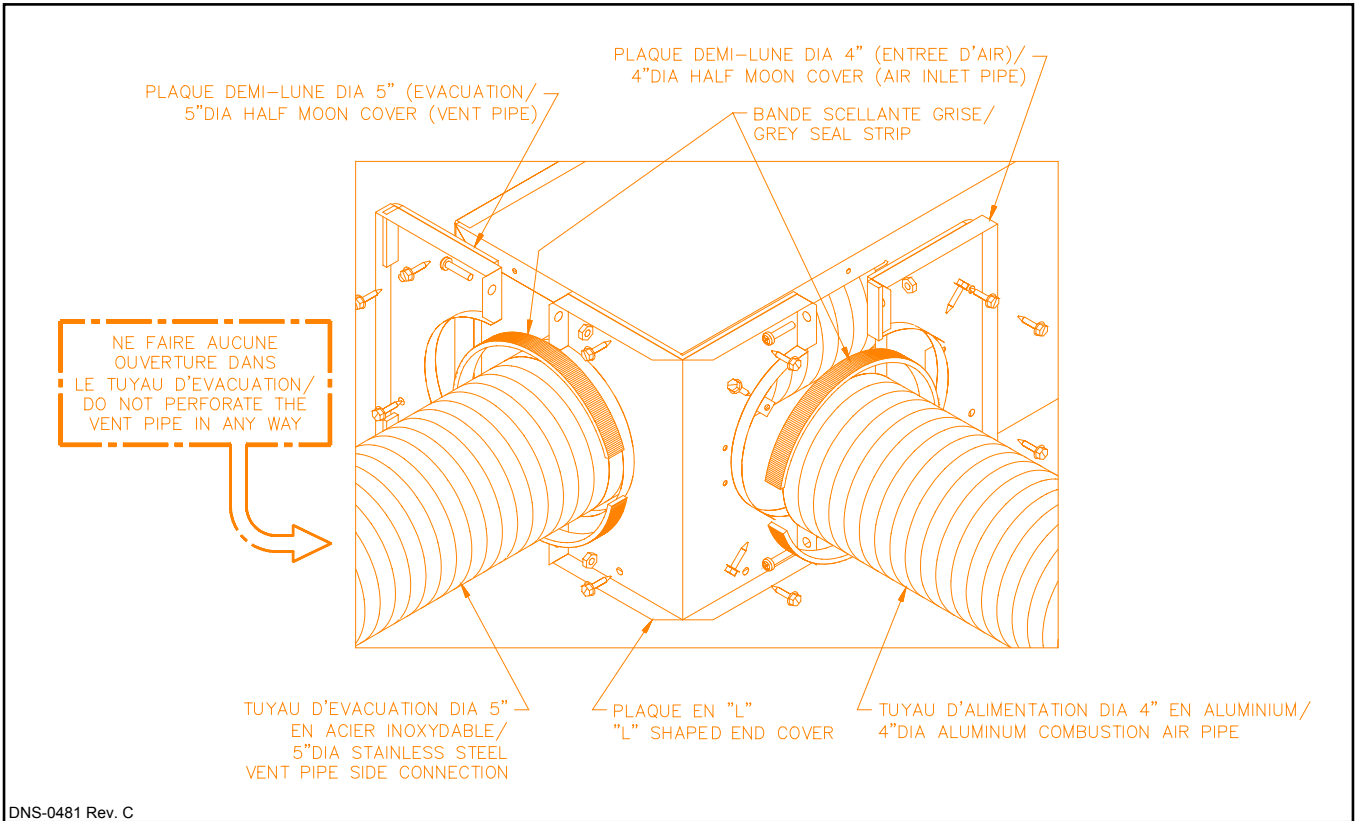
- Replace the 6 inch diameter boiler breach plate with the 5 inch diameter breach plate supplied in the kit (see Figure 8);
- Cut the 5 inch flexible stainless steel vent pipe to the required length;
- As illustrated in Figure 7, insert the 5 inch flexible vent pipe into the smaller diameter boiler breach. Secure the pipe on the breach with three metal screws, 3/8" from the end of the vent pipe;
- Apply the high temperature sealant supplied with the kit, 1/2" from the end and all around the vent pipe;
- Install the white breach gasket and the stainless steel collar to create a watertight and permanent seal as shown in Figure 7;
- Make sure that stainless steel collar is well centred over the vent pipe and breach joint; then firmly tighten the collar on the assembly.

→ **FIGURE 5**  
5 inch diameter Vent Pipe / Side Connection

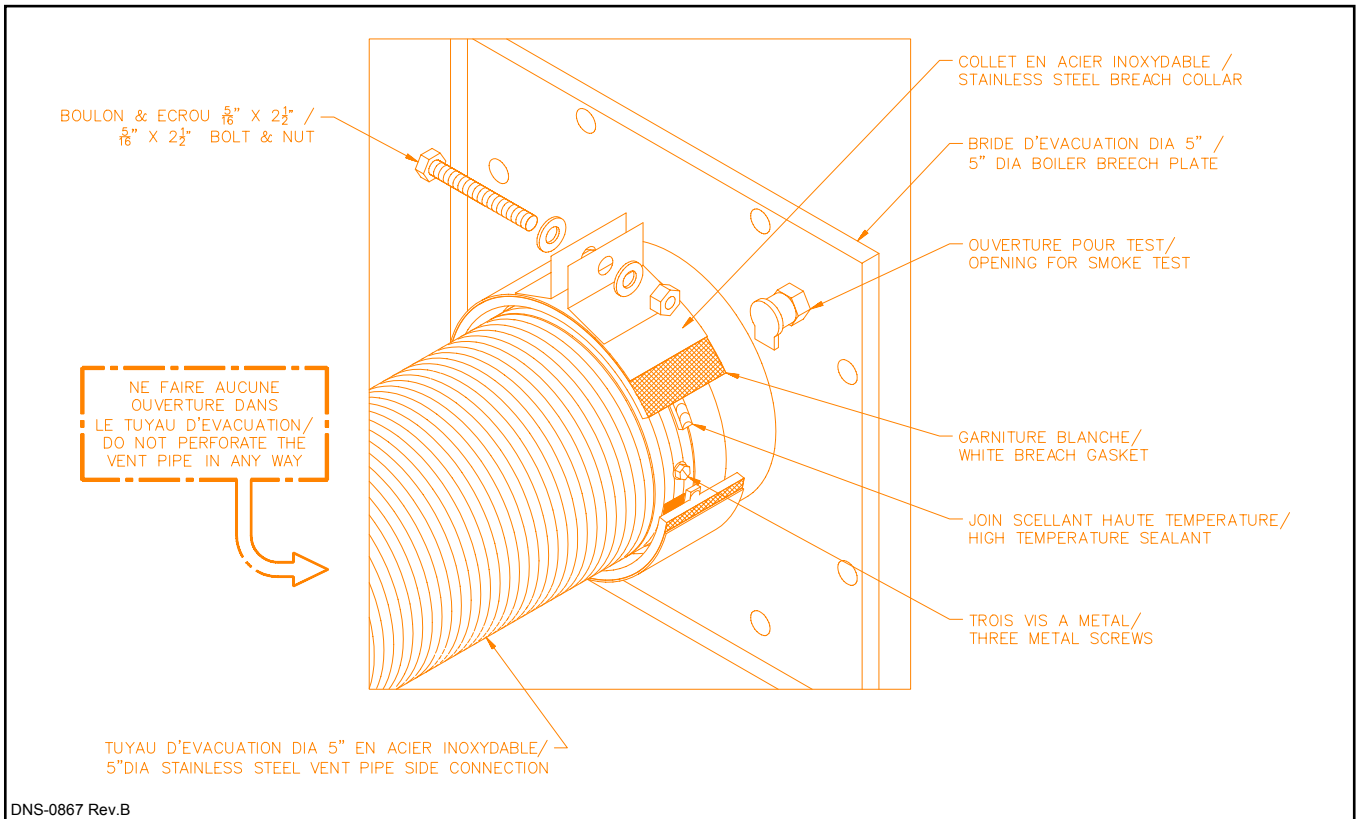




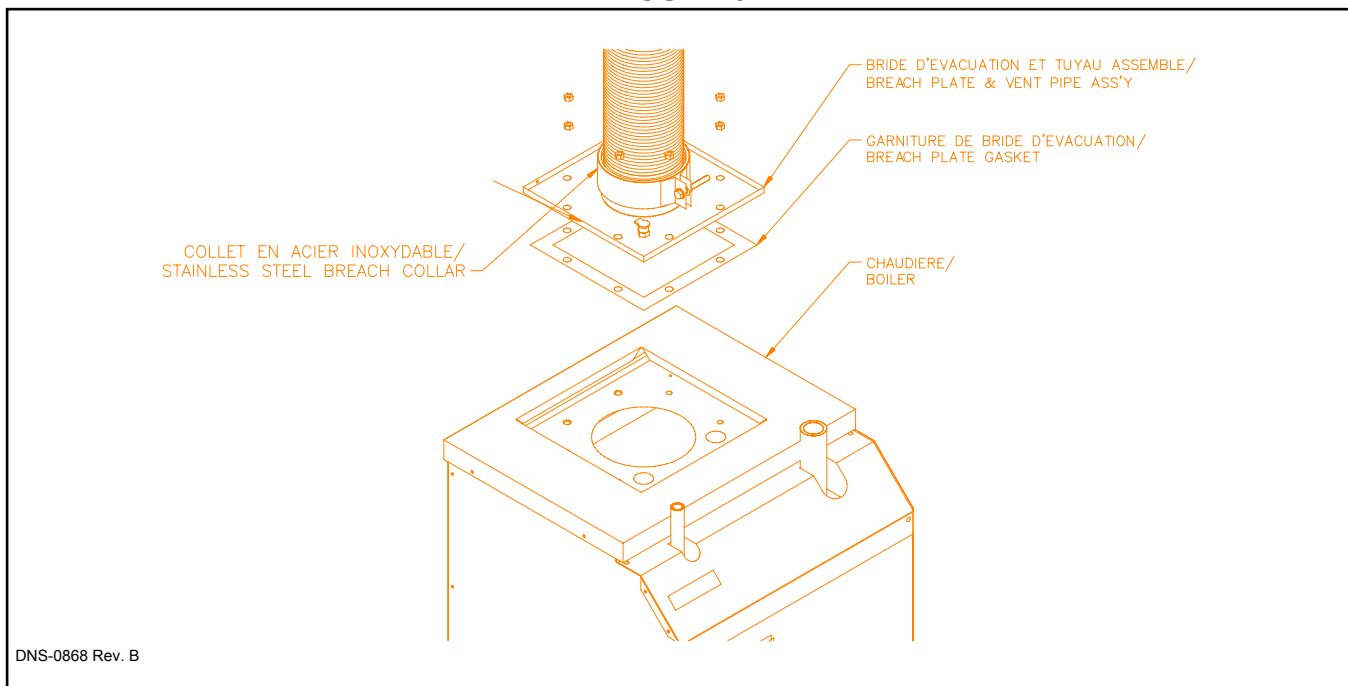
→ **FIGURE 6**  
**5 inch diameter Vent Pipe / End Connection**



→ **FIGURE 7**



→ **FIGURE 8**



## 2.6) BURNER SLEEVE WITH PRESSURE TAP

The SCS system is equipped with a safety control device. A burner sleeve with pressure tap (Figure 9) is used for the overfire pressure reading. The burner sleeve must be installed with the pressure tapping at the top as shown on Figure 9. The Riello 40-BF5 burner should be installed on the burner sleeve with an insertion length of 3 ½ inches.

## 2.7) CONNECTION OF THE COMBUSTION AIR INTAKE TO THE BURNER

1. Install the 90° galvanized elbow supplied with the kit on the 3 inch diameter burner air intake. Secure in place with ¾" long metal screws;
2. Insert the 4 inch combustion air pipe into the 4 inch end of the elbow;
3. Install the grey seal strip all around the joint;
4. Install the 4 inch collar on the 4 inch diameter aluminum pipe and centre it over the seal strip;
5. Firmly tighten the collar on the assembly.

## 2.8) SAFETY CONTROL BOX

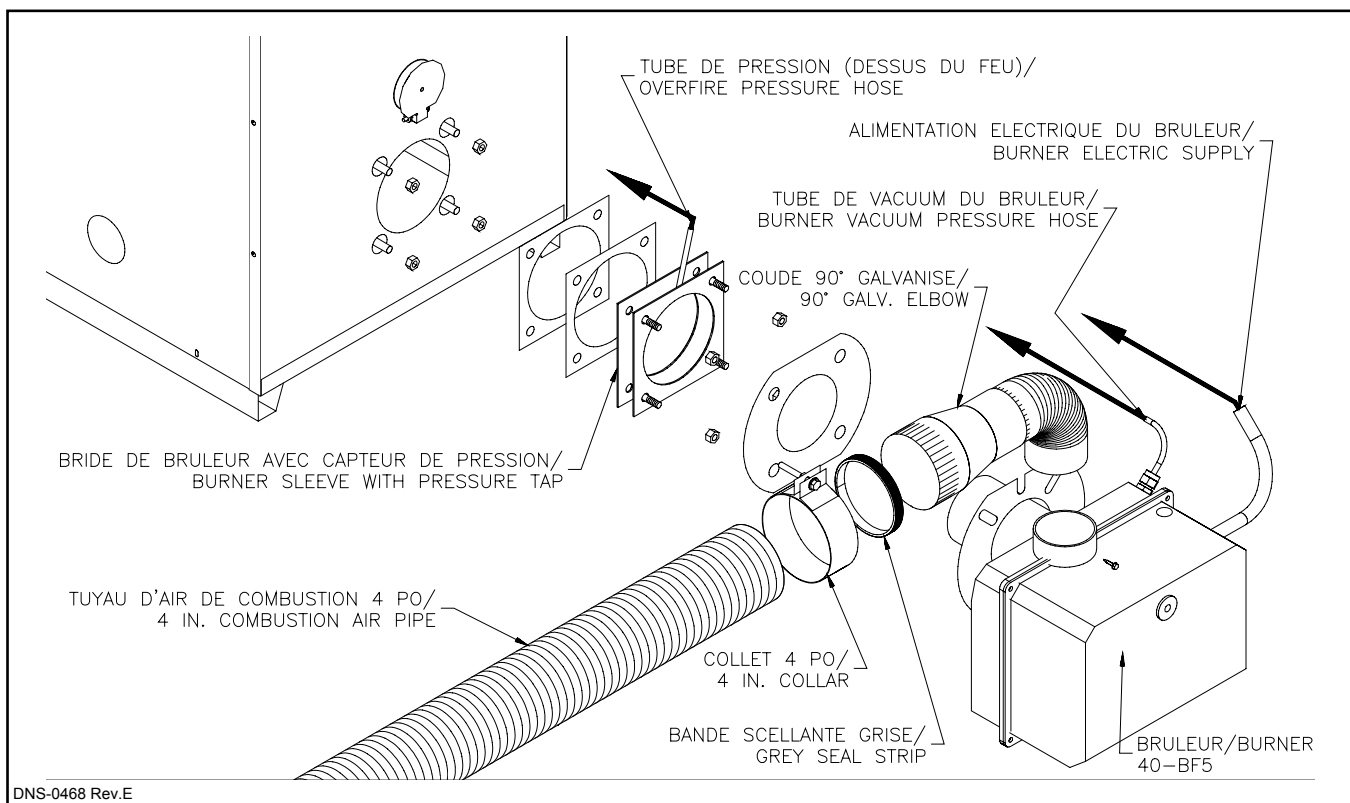
1. The electrical box supplied with this kit comprises a pressure switch, which **must be installed vertically to** respect its calibration;
2. The positioning on an actual installation and for proper operation, is shown in the Figures 11 and 12;
3. Install the silicone hose identified as "VACUUM", with the compression fitting supplied in the kit, on the 5/8" diameter opening at the top right side of the Riello 40-BF5 Oil Burner. Refer to Figures 11 and 12 for correct positioning of the tubing;

### IMPORTANT

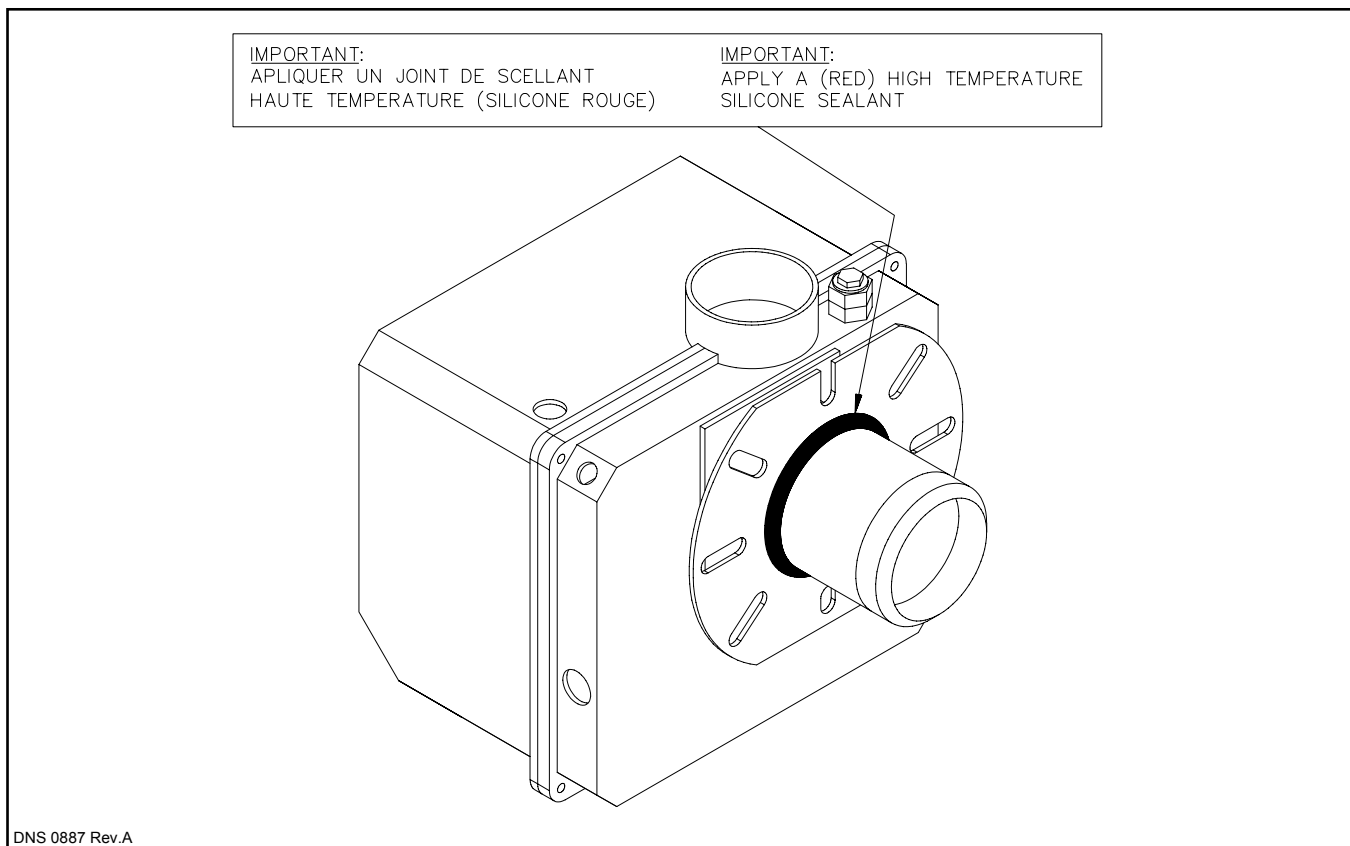
The hoses must be installed such a way as to allow the flow of the water from the control to the burner and burner sleeve. They must be cut to the appropriate length, if necessary.

4. Install the "PRESSURE" silicone hose on the pressure tap fitting on the burner sleeve, previously installed between the burner flange and the boiler. Refer to Figures 11 and 12 for the correct positioning of the tubing;
5. Refer to the electrical wiring diagram shown in Figure 13 for connection. The installation of the equipment should be in accordance with the regulations of authorities having jurisdiction.

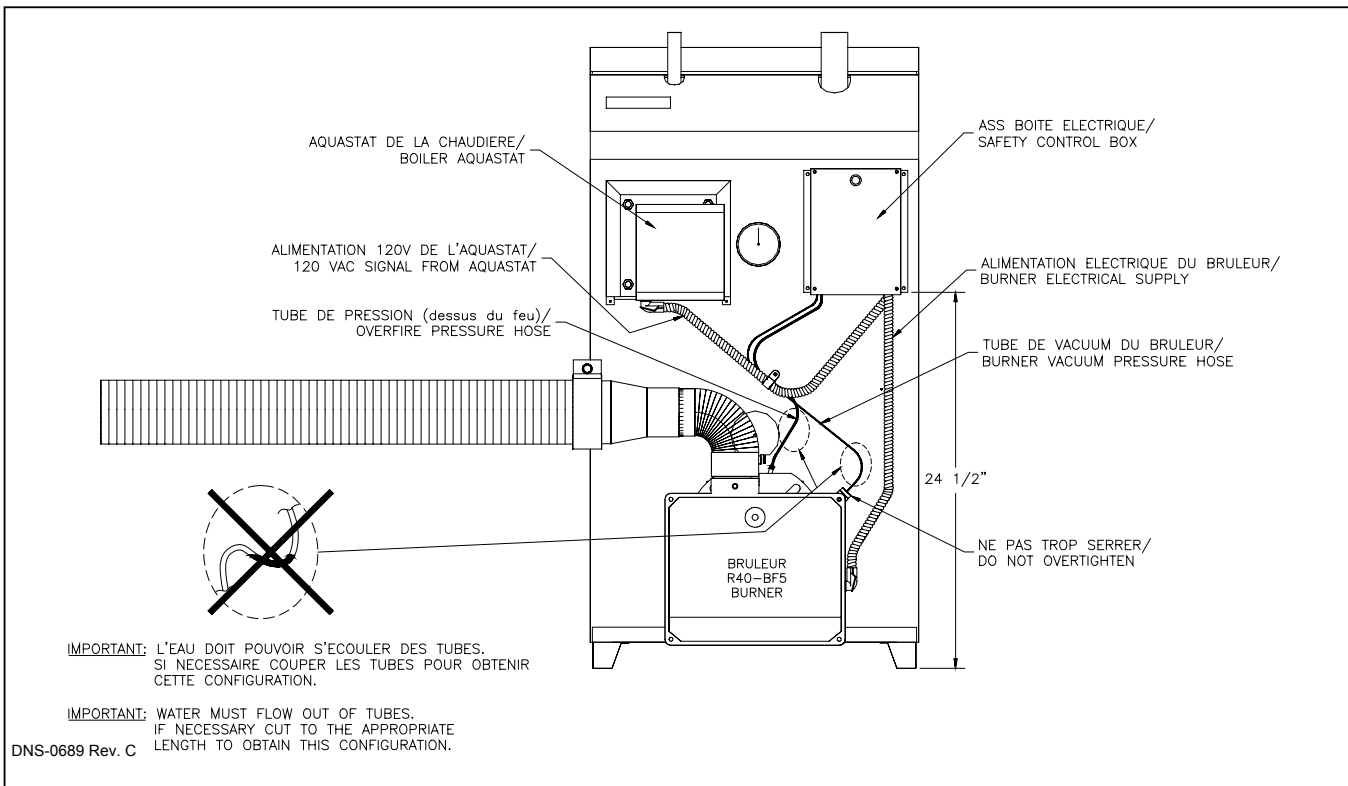
→ **FIGURE 9**



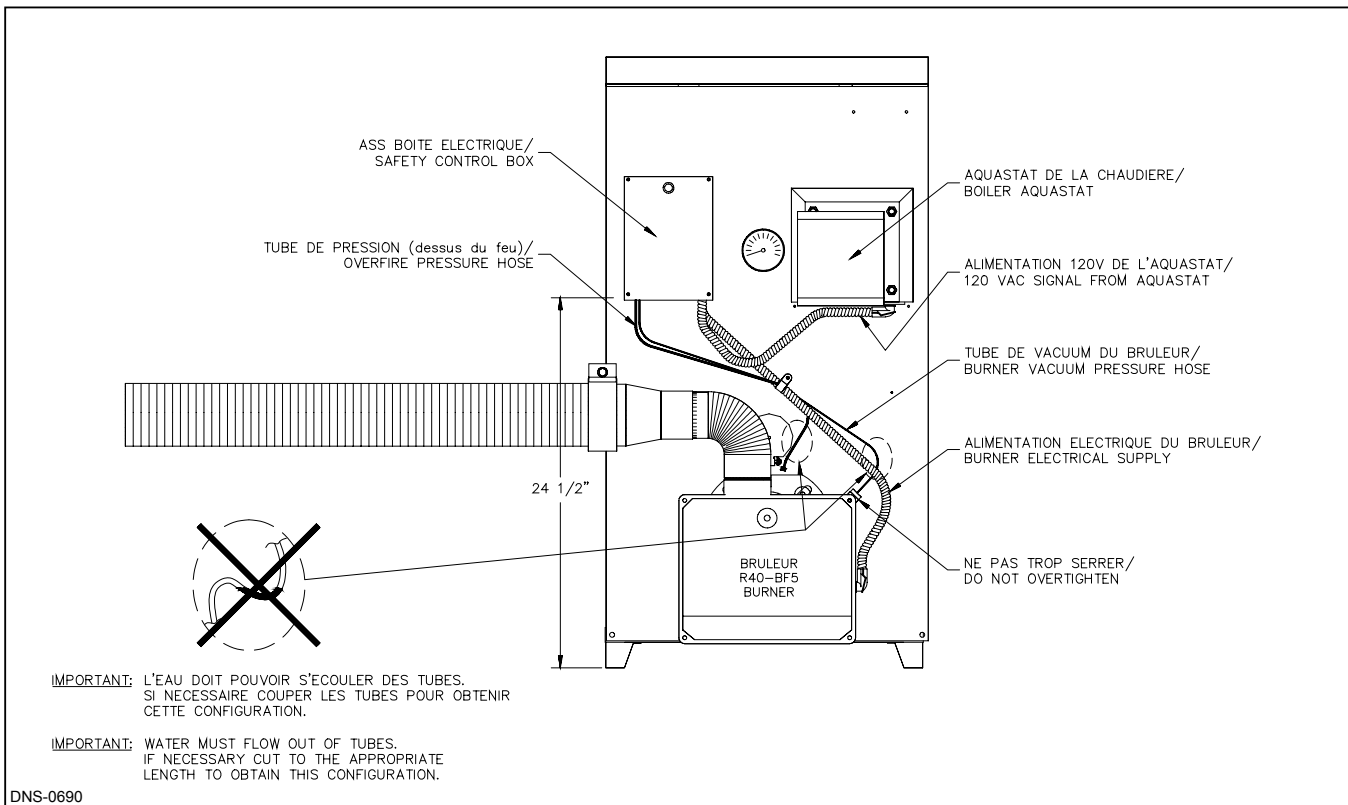
**FIGURE 10**



**FIGURE 11**  
**POSITIONING OF THE TUBES - BOILER WITH TANKLESS COIL AT LEFT**



**FIGURE 12**  
**POSITIONING OF THE TUBES - BOILER WITH TANKLESS COIL AT RIGHT**



# PART 3 OPERATION

## 3.1) START-UP AND ADJUSTMENTS

For the start-up of your heating unit, please refer to the instruction manual that came with it. Using an SCS system is similar to a conventional chimney with the following particularities:

### CAUTION

This procedure should only be performed by a qualified service technician.

### 3.1.1) OIL BURNER SPECIFICATIONS

The SCS system is certified for the RIELLO 40-BF5 oil burner with an input range of 1.00 to 1.35 USGPH. Refer to Table 2 for operating specifications. For oil burner servicing refer to the oil burner Instruction Manual. **An SCS system using the 40-BF5 oil burner should never operate without the provision of outdoor combustion air.**

### 3.1.2) Adjusting the 40-BF5 air damper

**Note:** Variations in flue gas smoke and CO<sub>2</sub> readings will occur with or without the burner cover in place. Therefore, the burner cover must be in place when making the final combustion instrument readings to ensure proper test results.

40-BF5 air damper adjustments can be made with the burner cover in place by :

1. Removing the plastic plug at the top of the burner cover;
2. Using a Phillips screwdriver to reach the air damper adjustment screw;
3. Turning the screw clockwise (+ indicator) to increase combustion air;
4. Turning the screw counter-clockwise (- indicator) to decrease combustion air;
5. Installing back the plastic plug when the air damper adjustment is completed.

### 3.1.3) Smoke and CO<sub>2</sub> test

1. Start the appliance and from the test port provided in the BREACH PLATE of the boiler, proceed with a smoke test and adjust the burner to obtain a rating of between #1 and a "trace" of smoke after at least 5 to 10 minutes of operation, at a minimum of 140° F water temperature;
2. Measure the CO<sub>2</sub> (or O<sub>2</sub>) and note it. This is the vital reference point for further adjustments;  
Example : 13.5 % CO<sub>2</sub> (or 2.6 % O<sub>2</sub>)
3. Open the burner air damper to get 0.5 to 1.5% CO<sub>2</sub> less than the previous reading (0.7 to 2.0 % of O<sub>2</sub> more than the previous reading);  
Example : Reduce CO<sub>2</sub> from 13.5 to 12.5 % (or increase O<sub>2</sub> from 2.6 to 4.2 %)
4. Take a smoke test in this condition. The new smoke reading should give you between a "trace" and #0.

### 3.1.4) SCS operating sequence

**Note:** Refer to the wiring diagram (Figure 13)

When the thermostat calls for heat, 120 volts of tension is applied on the # 1 and # 2 terminal strip of the SCS electrical box. Then, the CR-1 normally closed contact (NC) of the relay is closed, the TDR-1 delay relay contact is open and no current is going to the R-1 coil or L-1 light. The electric power is applied on terminal strip #3 and #4 and the burner starts running. An integrated pre-purge function on the burner control will run for a period of between 10 and 30 seconds before ignition.

→ TABLE 2

Capacity (BTU / H)	Input (USGPH)	Burner Model	Nozzle		*Turbulator Setting	*Air Band	Pump Press. (PSI)
			Delavan	Danfoss			
118 000	1.00	Riello 40-BF5	0.85-80B	0.85-80AS	2	3	140
141 000	1.2	Riello 40-BF5	1.10-80B	1.10-80AS	2	5	120
158 000	1.35	Riello 40-BF5	1.10-80B	1.10-80AS	3	5	150

\* Air adjustment settings with the burner cover installed. This may change from one unit to another.

### 3.1.5) Effects on pressure switch

When the burner starts, pressure is created in the "pressure" silicone tubing and a vacuum is created in the "vacuum" silicone tubing. It is important to understand that the two forces act in the same way on the pressure switch diaphragm and are, therefore, added together. **In less than 4 seconds, the combined pressure (addition of the pressure and vacuum) should stabilize at between 0.20" and 0.70" W.C.** The normally open PS-1 contact closes at a pressure of 0.8" W.C. or more. Therefore, the PS-1 contacts is open during normal operation of the heating unit. For a complete pressure test, pressure and vacuum, refer to Figure 14.

### 3.1.6) Abnormal operation (Lock out indicator light L-1 is ON)

If the PS-1 contact closes and the TDR-1 contact closes after 4 seconds, current is applied to the R-1 coil. The normally closed CR-1 contact opens and the burner shuts down. In this case, the lock out indicator light remains on. **To restart the system, the electrical supply must be turned off and back on.**

### 3.1.7) Troubleshooting guide

**If the burner stop after 4 seconds and the L-1 light of the SCS control box is on, perform the following checks:**

- Check if the SCS electrical box is in a vertical position (Refer to the instructions in Section 2 for correct positioning);
- Check that the pressure switches are in working order by measuring the total pressure (the vacuum and the pressure). Refer to Figure 14 for testing (install jumper between # 1 and # 4). The burner cover must be in place;
  - The total pressure must not be more then 0.8" W.C. If this is the case, the pressure and vacuum can be verified separately to identify the problem;
  - If the pressure value is greater then 0.8" W.C., there is an obstruction in the flue pipe;
  - If the vacuum value is greater then 0.8" W.C., there is an obstruction in the air inlet.

## PART 4 MAINTENANCE

### CAUTION

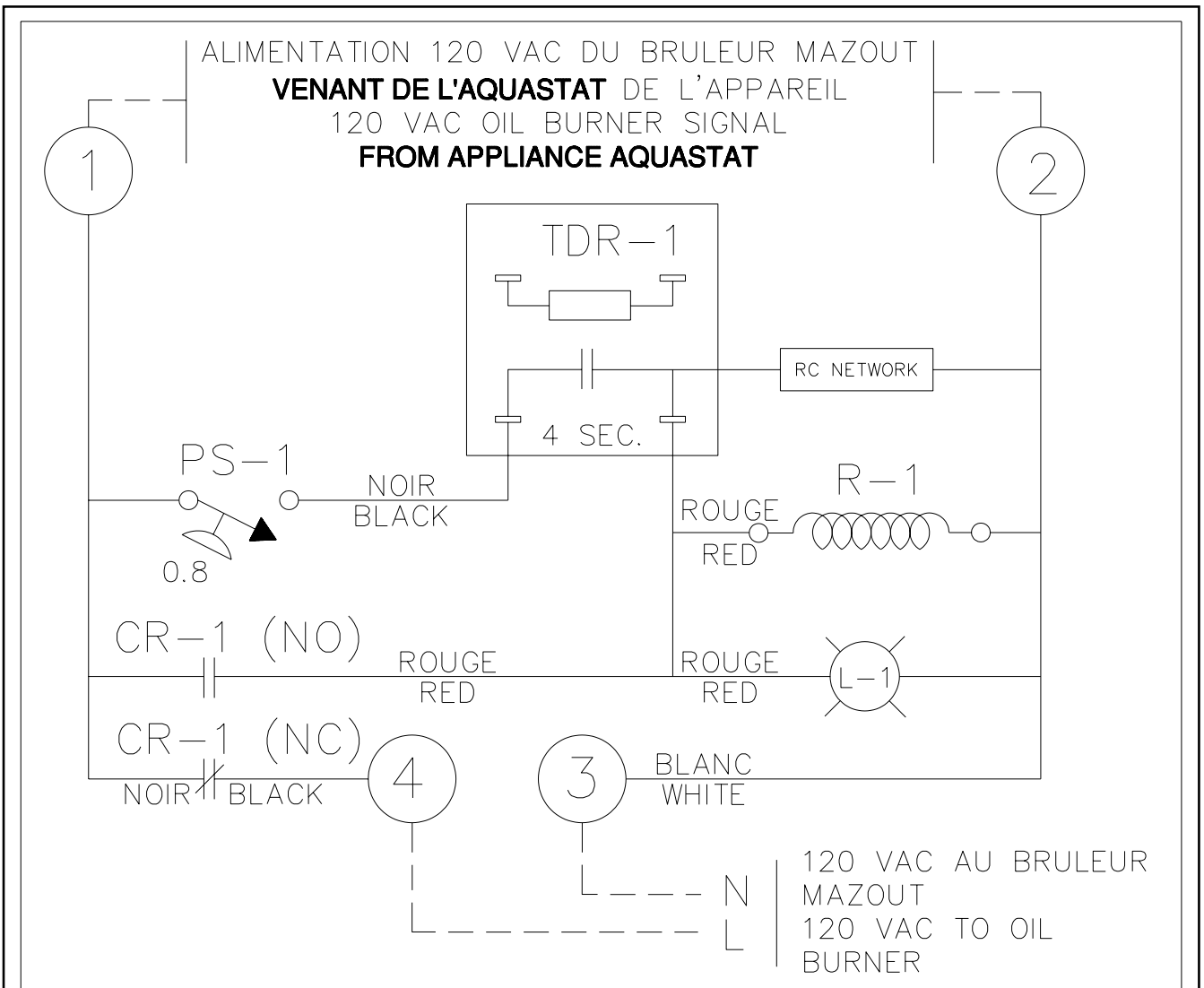
Turn off the power and fuel supply before performing any service work. The 115 volts circuit is a potential electrocution hazard.

For service, refer to the Instruction Manual of the appliance. The maintenance of a Sealed Combustion System is the same as the maintenance of an appliance using a chimney but with the following particularity:

### CLEANING OF THE UNIT

Remove the breach plate and vent pipe assembly from the boiler smoke box as shown in Figure 8. The collar must not be removed from the vent pipe assembly.

**FIGURE 13**  
**Electric wiring diagram**



PS-1: DETECTEUR DE PRESSION N/O 0.8 W.C. # R99F022 - ROUGE  
 PRESSURE SWITCH N/O 0.8" W.C. # R99F022- RED

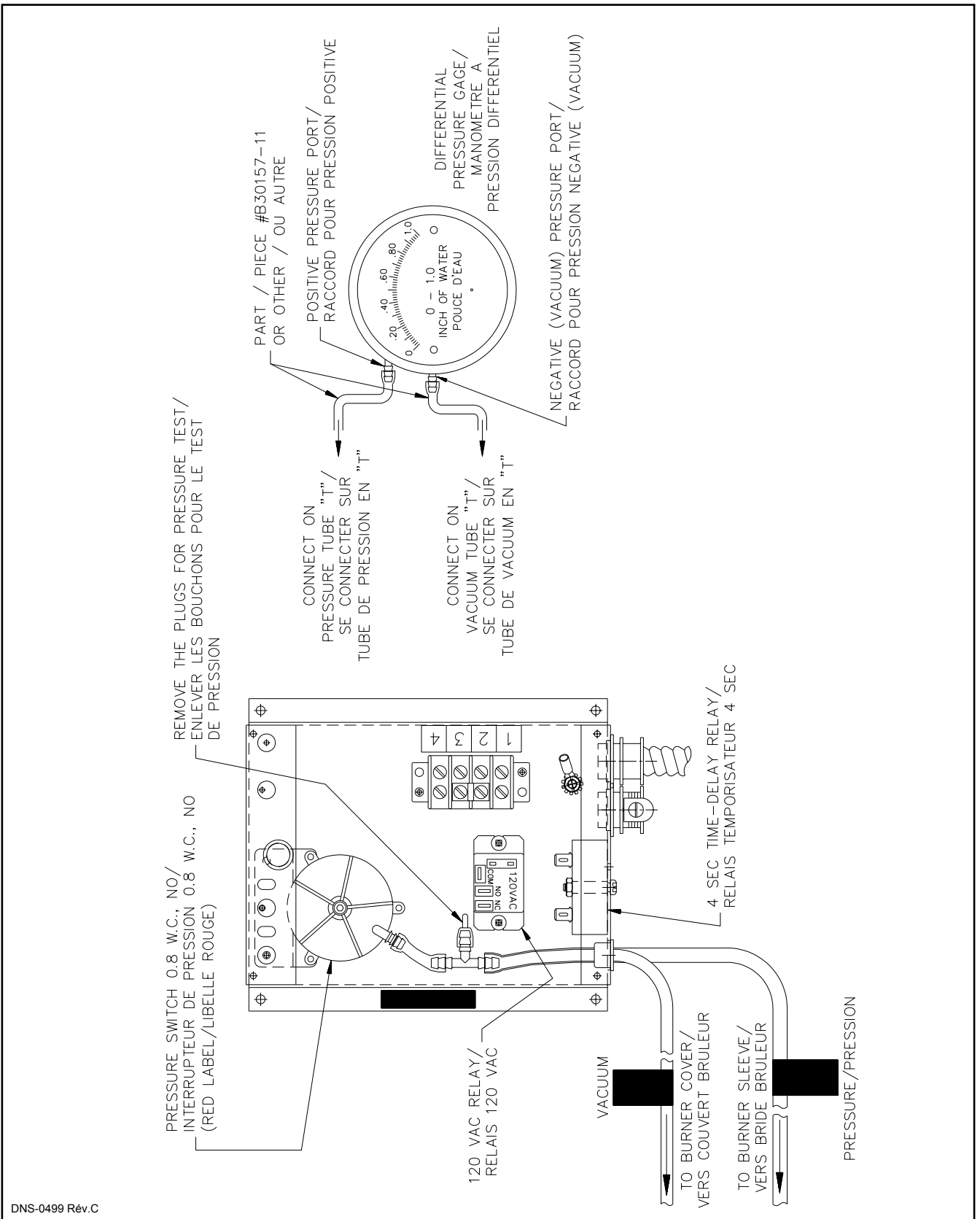
TDR-1: RELAIS TEMPORISATEUR 4 SECONDES # L01H017  
 4 SECONDS TIME-DELAY RELAY # L01H017

R-1: RELAIS 120 VAC SPDT # L01H011  
 SPDT RELAY 120 VAC # L01H011

L-1: LUMIERE TEMOIN DU SYSTEME DE SECURITE # L01L003  
 LOCK OUT INDICATOR LIGHT # L01L003

RC NETWORK: CIRCUIT RC NETWORK # A00373  
 RC NETWORK CIRCUIT # A00373

**FIGURE 14**  
**Verification of the total operating pressure**



DNS-0499 Rév.C



## PART 5 INFORMATION

Model: \_\_\_\_\_ Serial number: \_\_\_\_\_

Installation date of the furnace: \_\_\_\_\_

Service telephone # - Day: \_\_\_\_\_ Night: \_\_\_\_\_

Dealer name and address: \_\_\_\_\_

### START-UP TEST RESULTS

Nozzle: \_\_\_\_\_ Pressure: \_\_\_\_\_ Lbpsi

Burner adjustments:      Primary air      \_\_\_\_\_

   Fine air      \_\_\_\_\_

   Drawer Assembly      \_\_\_\_\_

CO<sub>2</sub>: \_\_\_\_\_ %                      Smoke scale: \_\_\_\_\_ (Bacharach)

Gross stack temperature: \_\_\_\_\_ °F

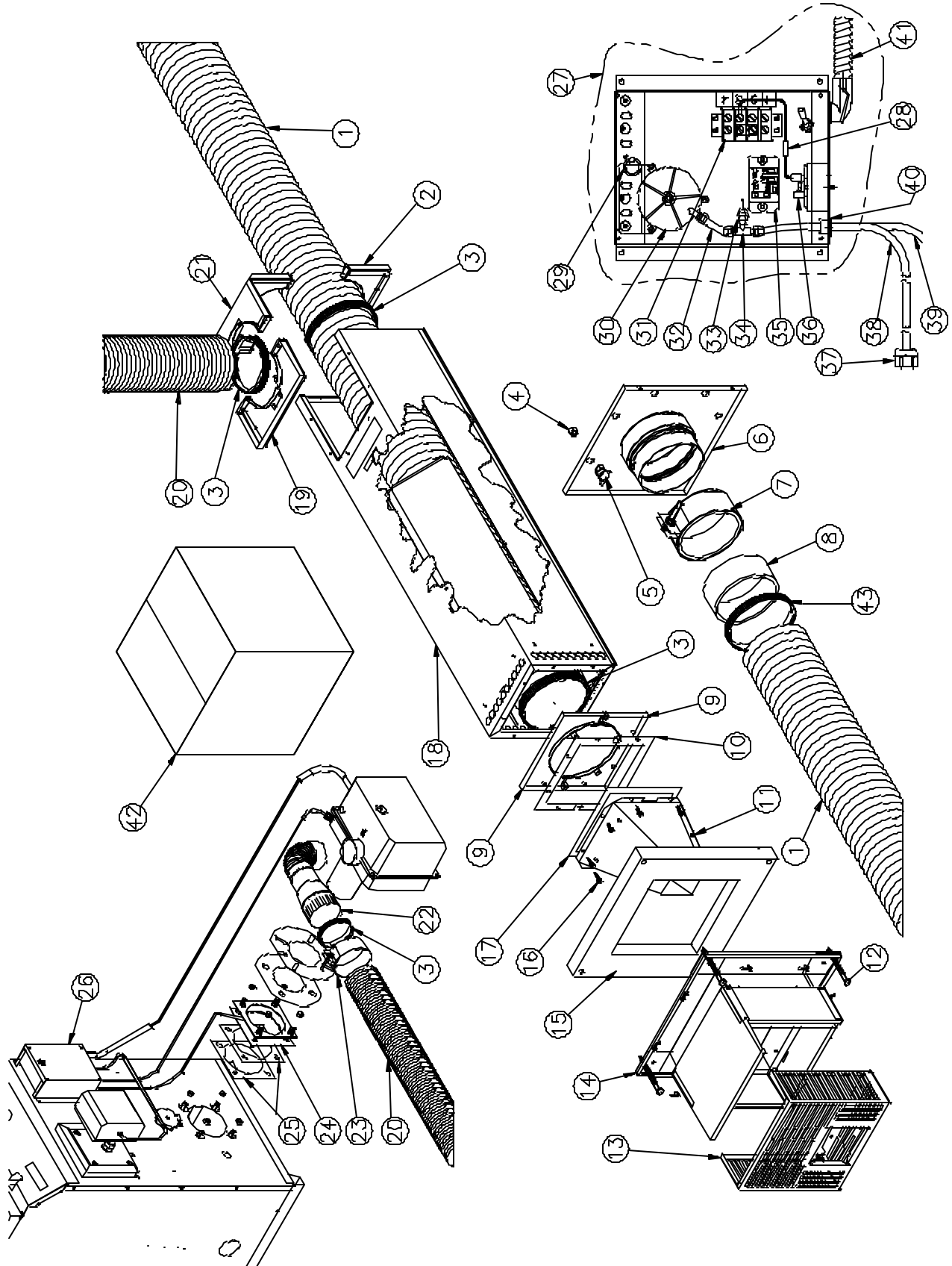
Ambient temperature: \_\_\_\_\_ °F

Chimney draft: \_\_\_\_\_ " W.C.

Overfire draft: \_\_\_\_\_ " W.C.

Test performed by: \_\_\_\_\_

→ PARTS LIST  
Model : SCS-5



→ **PARTS LIST**  
Model : SCS-5

ITEM	DESCRIPTION	NUMBER	COMMENTS
1a	Chimney liner 5" X 8'	Z13G012	For SCS-5-08-3
1b	Chimney liner 5" X 20'	Z13G009	For SCS-5-20-3
2	Hot half cover ass'y	B02046	
3	Seal strip 1/2" X 1/8" X 25'	J06L001	
4	Hex nut M14-1.5 black	F07F025	
5	Smoke plug ass'y	A00334	Smoke plug & gasket included
6	Complete outlet cover ass'y	B02032	
7	Complete collar ass'y 5"	B02048-01	Collar & gasket included
8	Collar gasket	B02027-02	
9	End cone diffuser ass'y	B02018	
10	Outlet gasket	B02009	
11	Venturi ass'y	B02057	
12	Lag screw 1/4" X 3 1/2" zinc	F04J001	
13	Exterior screen ass'y	B02036	
14	Wall box ass'y	B02035	
15	Wall gasket	B02010	
16	Type #a screw hex head slotted #8-18 X 3/4" SS	F03F024	
17	Seal plate joint	B02897	Stainless steel
18	Square casing ass'y	B02058	With short & long interior guide
19	Cold half cover ass'y	B02047	
20a	Flexible pipe 2 walls 4" X 11' AL	Z13I007	For SCS-5-08-3
20b	Flexible pipe 2 walls 4" X 23' AL	Z13I006	For SCS-5-20-3
21	Central cover ass'y	B02045	
22	Adaptor 90 ° 3" X 4" diameter ass'y	B02049	
23	Complete 4" collar ass'y	B02048-03	
24	Complete burner flange ass'y	B02041	
25	Burner flange gasket	B00419	Quantity of 2 per appliance
26	Electrical box cover ass'y	B02044	Complete with label
27	Electrical box ass'y	B02039-01	Complete with cover and controls
28	Electrical wire white / red	A00373	RC Network
29	Amber indicating light	L01L003	
30	Pressure switch 0.8	R99F022	
31	Screw terminal strip 4 positions	L05F004	
32	Tube 3/16" SIL70	B30157-12	
33	Plug .204 X 3/4	G14F010	
34	Tee 3/16" hose X 3/16" hose X 3/16" hose	G07Z015	
35	Relay SPDT 120VAC	L01H011	
36	4 second time-delay relay	L01H017	
37	Liquid tight bushing PG 9	L04I012	Quantity of 3 per appliance
38	Tube 1/8 SIL60	B30157-11	
39	Tube 1/4 SEL65	B30157-14	
39a	Plug .246 X 3/4	G14F009	
40	Bushing 5/8"	L04G014	
41	Burner electrical kit	B00964	
42	Accessories box	B02059	With item 2, 3, 6, 7, 19, 21, 22, 23, 24, 27 & 43
43	High temperature sealant 700 ° F	F10G005	85 g per tube