Basic Gas Class Guide

TRAVIS INDUSTRIES
HOUSE OF FIRE

CLASS SCHEDULE

TRAVIS INDUSTRIES
HOUSE OF FIRE

Introduction
Review of Pre-Study Material
What Makes Travis Products Different

BREAK: 10:00 to 10:10

Ember-Fyre™ Technology
Venting Direct Vent Products
Millivolt System Components
LP Conversion
Switching Devices
Air Shutters and Restrictors

LUNCH: 12:00 to 1:00

Recap of Morning Training
Diagnostic Test Equipment
Review Lab Activities
Lab Activities

BREAK: 3:00 to 3:15

Lab Activities
Review the Day's Training

THE TRAVIS INDUSTRIES DIFFERENCE

TRAVIS INDUSTRIES
HOUSE OF FIRE

Travis Quality

Safety

Quiz

TRAVIS QUALITY

14-12 Gauge Steel Firebox - Travis Industries uses a heavier gauge steel than other manufacturers in the construction of the firebox on all of their gas appliances. The heavier gauge steel is less likely to warp and make objectionable noises as the steel heats and cools. While Travis uses a 12-14 gauge steel many other manufacturers use a thinner 18-20 gauge steel.

Silica Coated Neo-Ceram® Glass - Travis Industries uses high temperature Neo-Ceram glass which provides strength, durability and excellent heat radiation through the glass into the living space. The glass is coated with silica (both sides) to seal the pores present at the surface of the glass. Sealing the pores allows for easier cleaning of the glass. Often a white residue will result from the burning of gas and or the condensation which will often form on the glass until the appliance warms up. Without the coating the white residue gets baked into the glass pores and permanently damages the glass.

THE TRAVIS INDUSTRIES DIFFERENCE

TRAVIS INDUSTRIES
HOUSE OF FIRE

TRAVIS QUALITY

Patented Burner Technology (Ember-Fyre™) which provides the beauty and realism of a wood fire with the convenience of gas.

Synchronized Intake & Exhaust Restrictor to provide ease of adjustment and a balanced air flow to accommodate the variety of venting configurations.

Self-Balancing Flue System to automatically balance the air flow to minimize the effect on the appearance of the flame due to abnormal atmospheric conditions around the termination.

Platform Technology (to be discussed in detail later) allows for a single stocking unit while providing distinct different looks with the installation of different faces and fireback options.

Unibody Construction provides wrap around construction technology, eliminating multiple unsightly weld seams while increasing the durability and strength of the stove.

LP Conversion Kit & Touch Up Paint Shipped With Each Unit to make the installation and set-up of the gas appliance as simple and convenient as possible.

Multiple Face, Material, & Texture Options provide the perfect atmosphere the client is trying to create for their home by adding a gas appliance.

- Architectural Face Collection
- Classic Arch Face Collection
- Hand-Hammered Artisan™ Face Collection
- Authentic “Arts & Crafts” Furniture Styling
- Cast Iron and Stone Options

Factory Quality Tested gas valves, snap disks, fans, orifices, burners, and pilots which ensure trouble-free installation and start-up.

TRAVIS QUALITY

SAFETY is provided through a tried and proven 30 second thermocouple safety system. If the pilot light ever goes out (for any reason) the gas is shut off in less than 30 seconds.

In addition to a safety shut off, the Travis gas appliances have spring loaded glass catches and pressure relief doors built into each appliance. These devices provide pressure relief to the firebox in the event of a delayed ignition.

Reliability/Durability
Non-Electricity Dependent

Through the use of tried and proven gas technology, the thermocouple and thermopile provide reliability even when there is a power outage. Durability is supported with a “Real World” Seven Year Warranty on all Travis gas gppliances.

THE TRAVIS INDUSTRIES DIFFERENCE

TRAVIS INDUSTRIES
HOUSE OF FIRE

QUIZ - Circle the Correct Answer

1. T F We use the SIT gas control valve in Travis industries products.

2. T F We use a standing pilot system in all of the current gas fireplaces.

3. T F Heat from the Piezo is what lights the pilot gas.

4. T F The orifice for natural gas is smaller then for LP (Propane) gas.

5. T F House gas pressure for LP gas should be 5 to 7 inches.

6. T F We use the DVC scale to read voltage in the DC gas system.

7. T F The thermocouple is used to operate the burner side of the gas control valve.

8. T F The thermopile is used to operate the burner side of the gas control valve.

9. T F The EPU is a part of the pilot side.

10. T F When testing voltage of the thermopile you need to put the test meter on the TH-TP and the TP terminal.

GAS PRODUCT OVERVIEW

TRAVIS INDUSTRIES
HOUSE OF FIRE

Gas Zero Clearance Fireplaces

Freestanding Gas Stoves

Firreplace Gas Inserts

Gas Zero Clearance Fireplace

A self-contained gas appliance that is framed in or chased around and is vented through the wall or through the ceiling.

DV 21 TV (Top Vent) - Lopi & FPX

DV 21 RV (Rear Vent) - Lopi & FPX

DVS - Lopi, FPX & Avalon

DVL - Lopi, FPX & Avalon

35 Custom Builder - FPX

864TRV - FPX

Hearthview - Lopi

Winthrop - Avalon

36 DV-XXL - FPX

44 DV-XXL - FPX

Revolution - FPX

Hideaway 21 TV - Avalon

Hideaway 21 RV - Avalon

Freestanding Gas Stoves

A self-contained gas appliance that sits out in open space of the room and is vented through the wall or ceiling.

Lopi	**Sturbridge**
	Berkshire
	Spirit
	Heritige

Avalon	**Cedar**
	Salish
	Prairie
	Tree of Life

Fireplace Gas Insert

A gas appliance which must be inserted into an existing masonry or factory-built metal fireplace. Fireplace inserts must be vented through the exiting fireplace chimney. Inserts require surround panels to seal off area between insert and fireplace opening.

DVS - Lopi, FPX & Avalon

DVL - Lopi, FPX & Avalon

GAS FIREPLACES

TRAVIS INDUSTRIES
HOUSE OF FIRE

Brands

Platform Technology

21 DV Body

DVS Body

DVL Body

864TRV Body

36 DV-XL Body

44 DV-XXL Body

Revolution

All Brands

- 21 DV/RV Fireplace
- DVS Fireplace
- DVL Fireplace
- 864TRV Fireplace

Fireplace Xtrordinair Only

- 35 CB (Custom Builder) Fireplace
- 36 DV-XL Fireplace
- 44 DV-XXL Fireplace

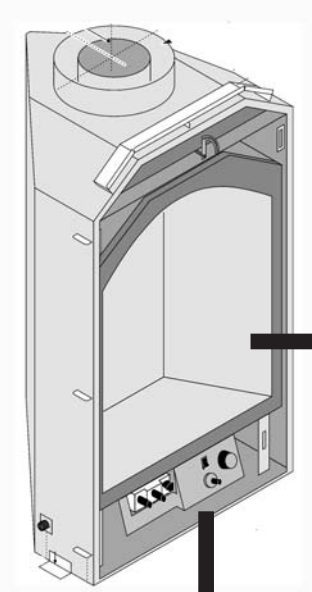
PLATFORM TECHNOLOGY

Travis Industries uses “Platform Technology” in the design of our gas fireplace inserts and our gas fireplaces.

Platform Technology simply means that the platform or body on which the unit is built is the same throughout the different brands.

The platform changes identity when different firebacks and faces are placed on the units which makes the finished product look different to the consumer.

21 DV - Fireplace Xtrordinair



Body

Burnt oak logs and painted black liner standard

Interior Liners

Travertine Tile

Ceramic

Beehive Brick

Ceramic

Cast Shell

Cast Iron

Faces

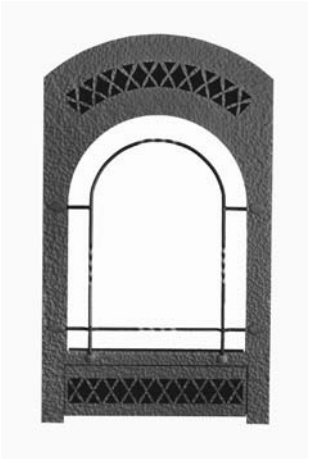
Classic Arch

Black Painted

Brushed Nickel

French Country

Antique Gold Plated

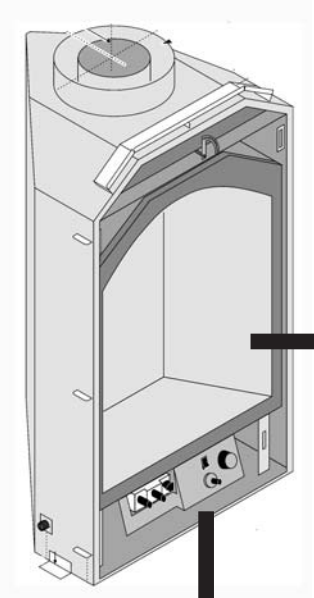


Artisan

Charcoal Painted

Optional Arts and Crafts Grills in Antique Copper or Antique Gold

21 DV - LOPI Looking Glass



Body

Burnt oak logs and painted black liner standard

Interior Liners

Travertine Tile

Ceramic

Beehive Brick

Ceramic

Cast Shell

Cast Iron

Faces

Arabesque Grills

Antique Gold Plated

Antique Pewter Plated

Black Painted

Taupe Enamel

Oxford Brown Enamel

Pendant

Black Painted

Taupe Enamel

Oxford Brown Enamel

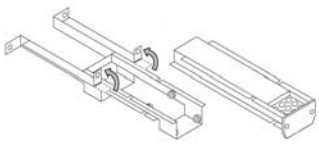
Doors

Black Painted

Taupe Enamel

Oxford Brown Enamel

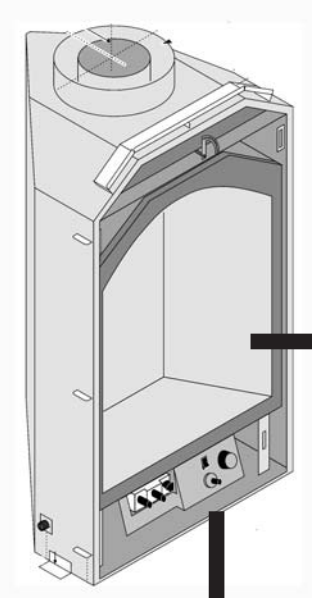
One-Way Mirror Glass



Aromatherapy Tray

Essential Oils

21 DV - LOPI Wilmington



Body

Burnt oak logs and painted black liner standard

Interior Liners

Travertine Tile

Ceramic

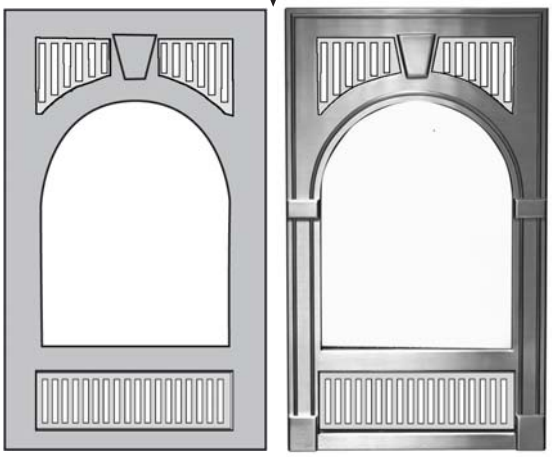
Beehive Brick

Ceramic

Cast Shell

Cast Iron

Faces



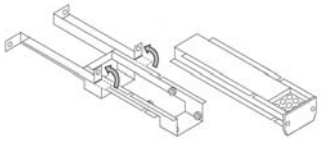
Black Painted

Pewter Plated

Arabesque Grills

Antique Gold Plated

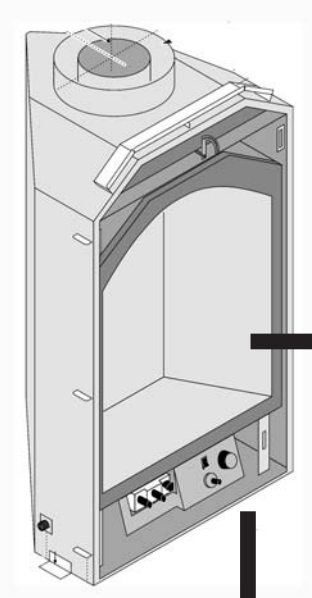
Antique Pewter Plated



Aromatherapy Tray

Essential Oils

21 DV - Avalon Hideaway



Body

Applewood logs and painted brick liner standard

Interior Liners

Rumford Herringbone Brick

Ceramic

Rock Creek

Cast Iron

Faces

Victorian Lace

Black Painted

Victorian Lace

Black Nickel Plated with Bruch Nickel Accents

Bungalow

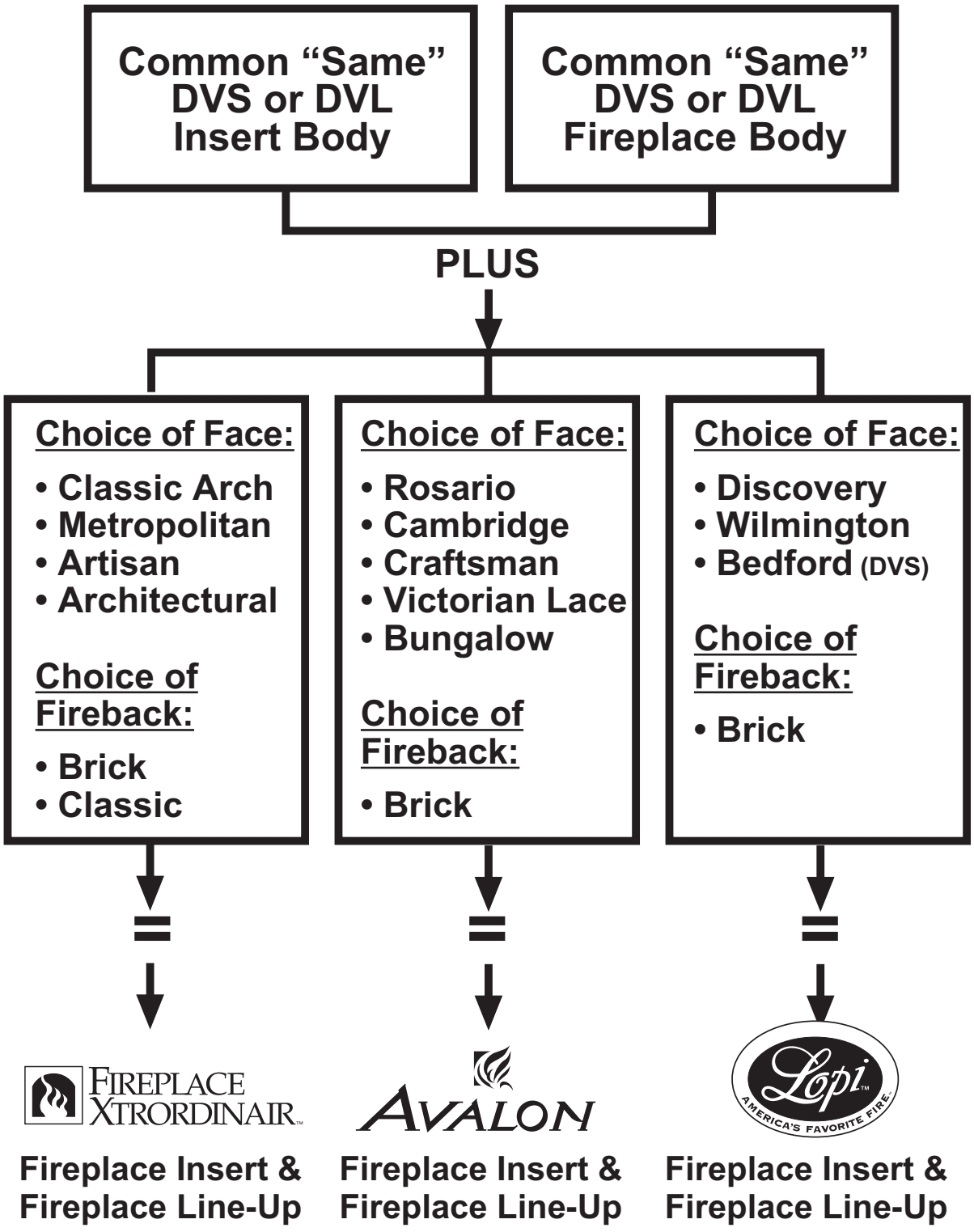
Black Painted Hammered Texture

Tree of Life

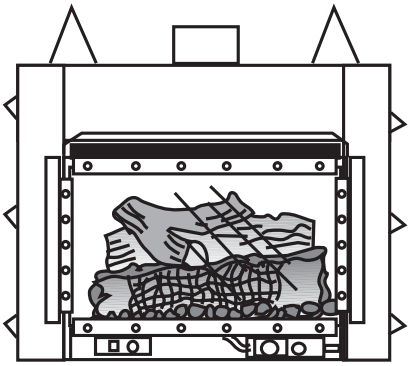
Black Painted Cast Iron

GAS FIREPLACES

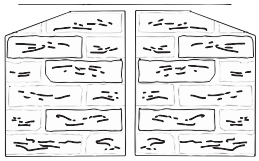
TRAVIS INDUSTRIES
HOUSE OF FIRE



32 DVS - Fireplace Xtrordinair

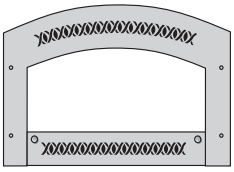


Body



Cast Brick Fireback

Faces



Classic Arch

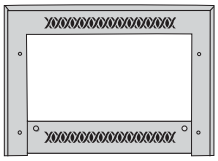
Black Painted

Brushed Nickel

24 Karat Gold Plated

French Countrty Arch

Antique Gold Plated



Metropolitan

Black Painted

Artisan

Black Painted

Antique Nickel Plated

Antique Copper Plated

Architectural Collection

Arts & Crafts

Antique Copper Plated

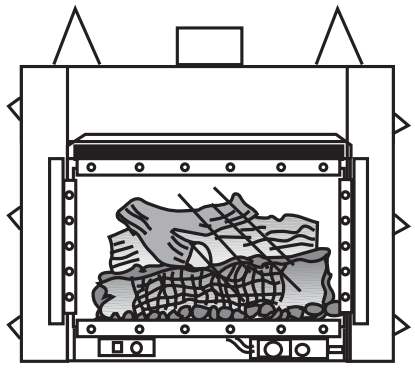
Neo-Classic

Brushed Nickel Plated

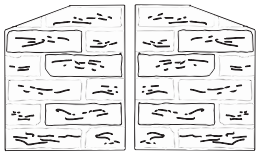
French Country

Antique Gold Plated

DVS - Avalon



Body



Cast Brick Fireback

Faces

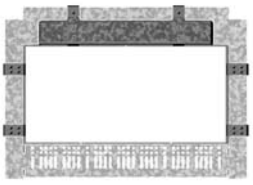
Rosario

Black Painted Door

UPGRADE DOORS

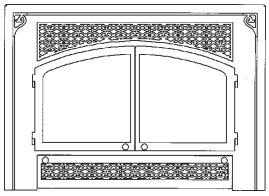
Brushed Nickel

24 Karat Gold Plated



Craftsmen

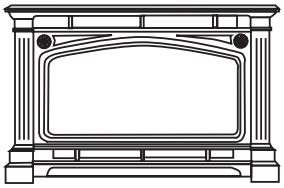
Hand-Hammered Brown Metallic Paint Finish



Victorian Lace

Black Painted

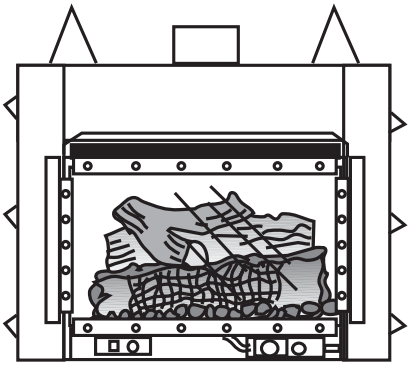
Black Nickel Plated with Brushed Nickel Accents



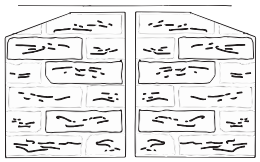
Cambridge

Cast Black Painted

DVS - LOPI

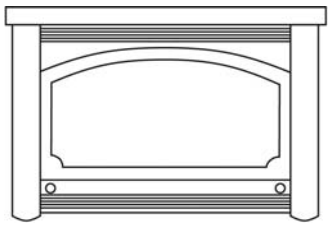


Body



Cast Brick Fireback

Faces



Discovery

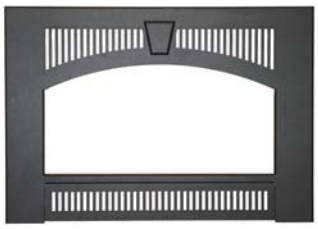
Black Painted Door

UPGRADE DOORS

Brushed Nickel

24 Karat Gold Plated

Antique Gold Plated



Wilmington

Black Painted

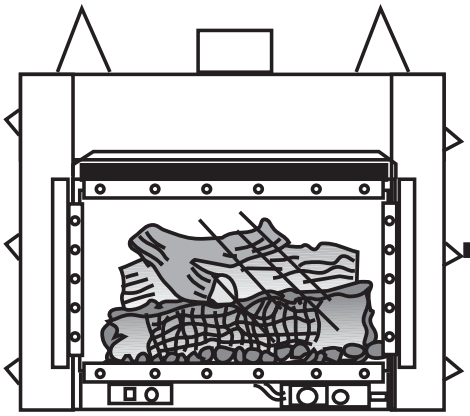
Brushed Nickel Plated

Bedford

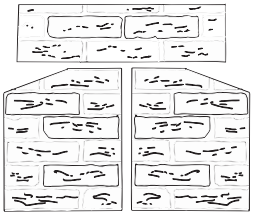
Black Painted

Oxford Brown Enamel

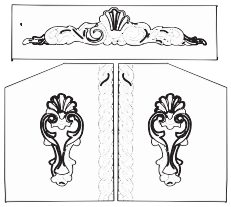
34 DVL - Fireplace Xtrordinair



Body

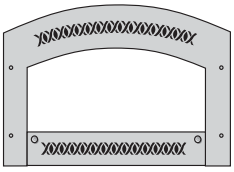


Ceramic Brick Fireback



Cast Classic Fireback

Faces



Classic Arch

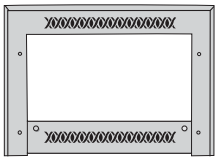
Black Painted

Brushed Nickel

24 Karat Gold Plated

French Countrty Arch

Antique Gold Plated



Metropolitan

Black Painted

Artisan

Black Painted

Antique Nickel Plated

Antique Copper Plated

Architectural Collection

Arts & Crafts

Antique Copper Plated

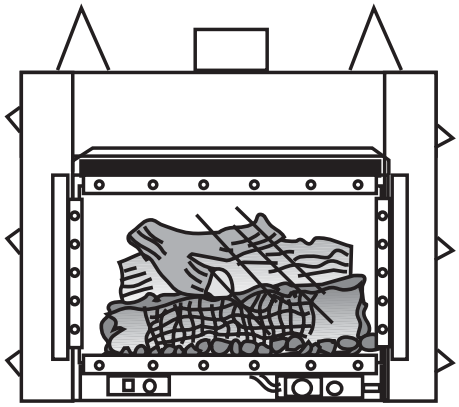
Neo-Classic

Brushed Nickel Plated

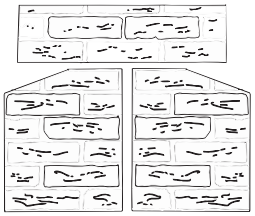
French Country

Antique Gold Plated

DVL - Avalon



Body



Ceramic Brick Fireback

Faces

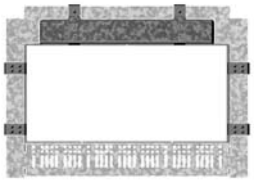
Rosario

Black Painted Door

UPGRADE DOORS

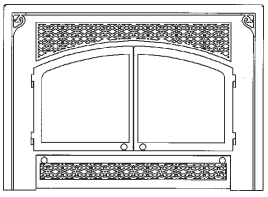
Brushed Nickel

24 Karat Gold Plated



Craftsmen

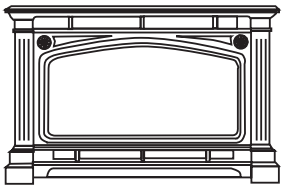
Hand-Hammered Brown Metallic Paint Finish



Victorian Lace

Black Painted

Black Nickel Plated with Brushed Nickel Accents



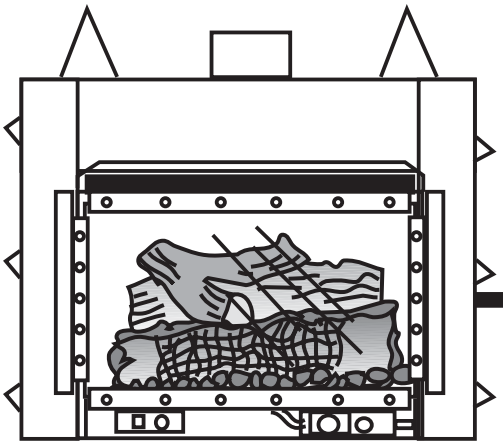
Cambridge

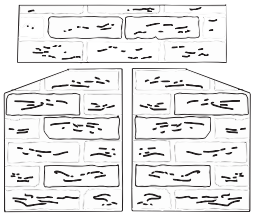
Cast Black Painted

Bungalow

Textured Black Powder Coated

DVL - LOPI

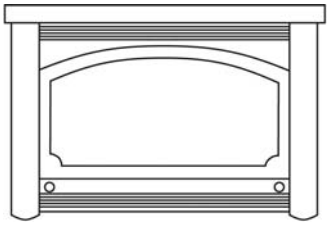




Ceramic Brick Fireback

Body

Faces



Discovery

Black Painted Door

UPGRADE DOORS

Brushed Nickel

24 Karat Gold Plated

Antique Gold Plated

Wilmington

Black Painted

Brushed Nickel Plated

864TRV- Fireplace Xtrordinair

Basic unit comes with standard black grills

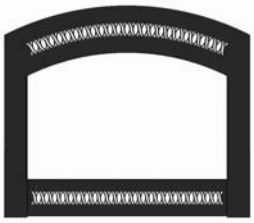
Firebacks

Common Brick

Stucco & Stone

Upgrade Faces

864TRV requires Upgrade Face Kit to attach the faces listed below.

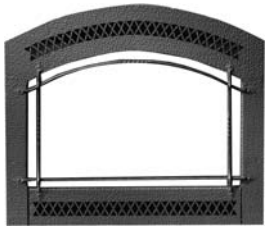


Arch

Black Painted

French Countrty Arch

Antique Gold Plated



Artisan

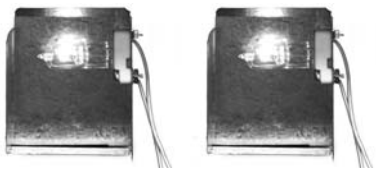
Black Painted

Andirons

Colonial

Arabesque

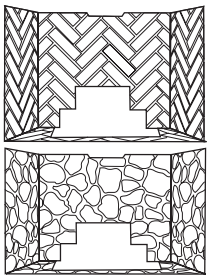
Wrought Iron



Accent Lights

Winthrop (864TRV) - Avalon

Firebacks



Herringbone

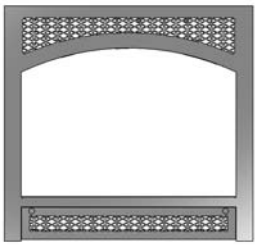
River Rock

Body

Basic unit comes with standard black grills

Upgrade Faces

864TRV requires Upgrade Face Kit to attach the faces listed below.



Victorian Lace

Black Painted

Victorian Lace

Black Nickel Plated
Plated with Brushed
Nickel Accents

Bungalow

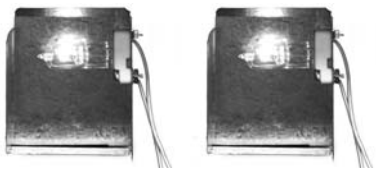
Textured Power
Coated
Black

Andirons

Colonial

Arabesque

Wrought Iron



Accent Lights

Hearthview (864TRV) - LOPI

Fireback

Common Brick

Body

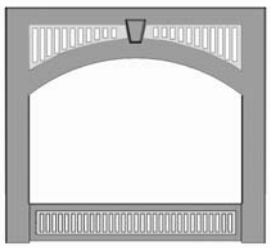
Basic unit comes with standard black grills

Upgrade Faces

864TRV requires Upgrade Face Kit to attach the faces listed below.

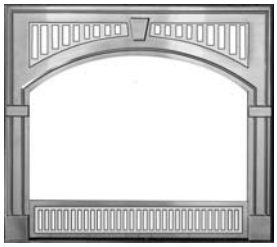
Basic Body Upgrade Grills

Brushed Nickel



Wilmington

Black Painted

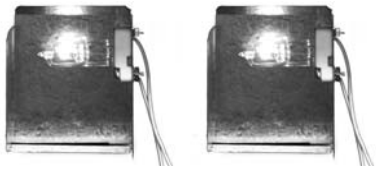


Wilmington

Brushed Nickel Plated Accents

Arabesque Upgrade Grills

For Wilmington Faces
Brushed Nickel



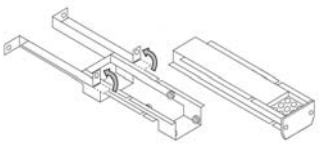
Accent Lights

Andirons

Colonial

Arabesque

Wrought Iron



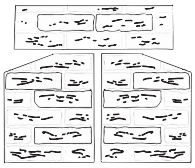
Aromatherapy Tray

Essential Oils

35 CB (Custom Builder) - Fireplace Xtrordinair

Body

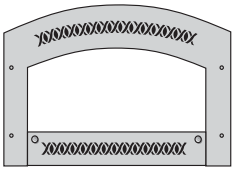
With standard black face



Cast Brick Fireback

Upgrade Faces

Model 35 Custom Builder requires Upgrade Face Kit to attach the faces listed below.



Classic Arch

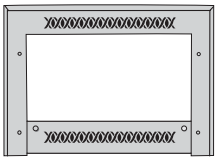
Black Painted

Brushed Nickel

24 Karat Gold Plated

French Countrty Arch

Antique Gold Plated



Metropolitan

Black Painted

24 Karat Gold Plated

Artisan

Black Painted

Antique Nickel Plated

Antique Copper Plated

Architectural Collection

Arts & Crafts

Antique Copper Plated

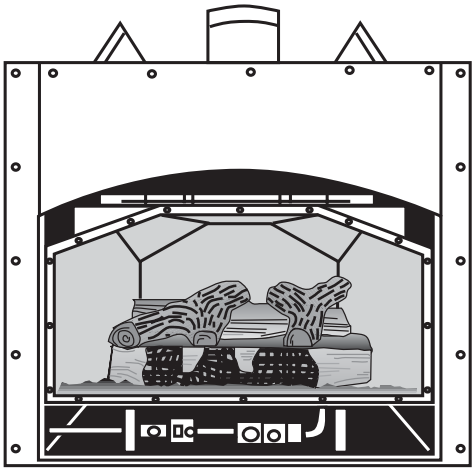
Neo-Classic

Brushed Nickel Plated

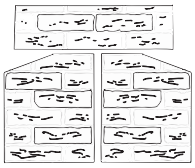
French Country

Antique Gold Plated

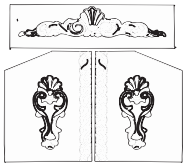
36 DV-XL - Fireplace Xtrordinair



Body

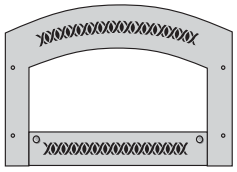


Ceramic Brick Fireback



Cast Classic Fireback

Faces



Classic Arch

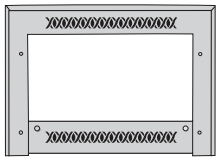
Black Painted

Brushed Nickel

24 Karat Gold Plated

French Countrty Arch

Antique Gold Plated



Metropolitan

Black Painted

24 Karat Gold Plated

Artisan

Black Painted

Antique Nickel Plated

Antique Copper Plated

Double Doors

Black Painted for Classic Arch Faces

Architectural Collection

Arts & Crafts

Antique Copper Plated

Neo-Classic

Brushed Nickel Plated

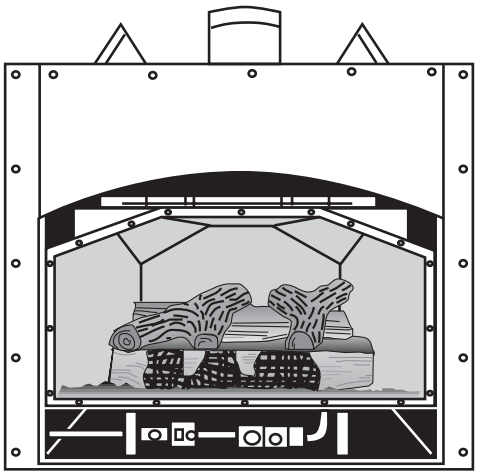
French Country

Antique Gold Plated

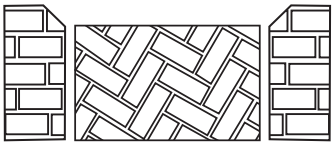
Double Doors

Black Painted for Architectural Collection Faces

44 DV-XXL- Fireplace Xtrordinair

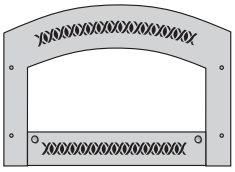


Body



Ceramic Brick Fireback

Faces



Classic Arch

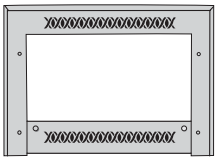
Black Painted

Brushed Nickel

24 Karat Gold Plated

French Countrty Arch

Antique Gold Plated



Metropolitan

Black Painted

Artisan

Black Painted

Antique Nickel Plated

Antique Copper Plated

Architectural Collection

French Country

Antique Gold Plated

Revolution- Fireplace Xtrordinair

Rectangular Body

Reversible Fireback Standard

OPTION

Wrought Iron Trim

Arched Body

Reversible Fireback Standard

OPTION

Fluted Trim

Andirons Options

Colonial

Arabesque

Wrought Iron

GAS STOVES

TRAVIS INDUSTRIES
HOUSE OF FIRE

Brands

Avalon	Tree of Life
	Cedar
	Prairie
	Salish
LOPI	Sturbridge
	Berkshire
	Spirit
	Heritage
	Sweet Dreams

Avalon

- Tree of Life
- Cedar
- Prairie
- Salish

LOPI

- Sturbridge
- Berkshire
- Spirit
- Heritage

Tree of Life - Avalon

40,000 BTU Heater

Available In::

Black Paint

Cashmere Enameled Finish

Majolica Brown Enameled Finish

Verde Mist Enameled Finish

Cedar - Avalon

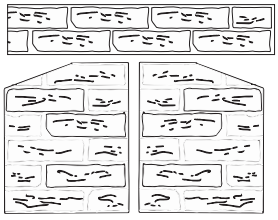
Standard Black Door and Grill

31,000 BTU Heater

Door & Grill Upgrades

24 Karat Gold

Brushed Nickel Plated



Cast Brick Fireback

TRAVIS INDUSTRIES
HOUSE OF FIRE

Prairie - Avalon

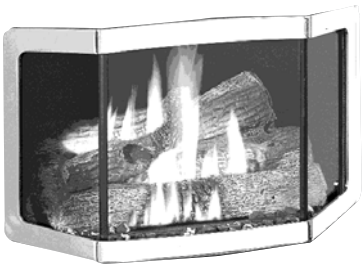
Painted Metallic Brown with
hammered nickel accents

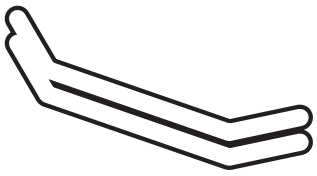
31,000 BTU Heater

Salish - Avalon

Standard Black Door and Grill

43,000 BTU Heater

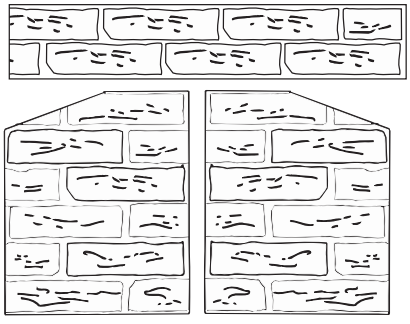




Door & Grill Upgrades

24 Karat Gold

Brushed Nickel Plated



Cast Brick Fireback

Sturbridge - Lopi

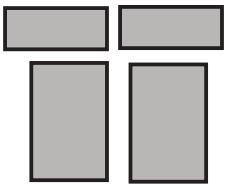
18,000 BTU Heater

Available In::

Black Paint

Cameo Enameled Finish

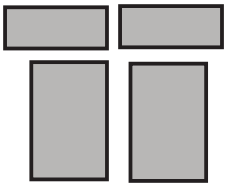
Oxford Brown Enameled Finish



Cast Kit, Enamel

Cameo Enameled Finish

Oxford Brown Enameled Finish

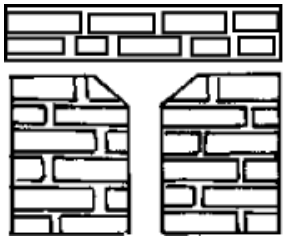


Stone Kit

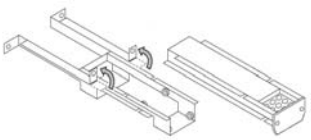
Soapstone

Travertine

Spice Granite



Cast Brick Fireback



Aromatherapy Tray

Essential Oils

Berkshire - Lopi

31,000 BTU Heater

Available In::

Black Paint

Taupe Enameled Finish

Oxford Brown Enameled Finish

Linefold Side & Top Panels

Taupe Enamel

Oxford Brown Enamel

Doors

Black Painted

Taupe Enamel

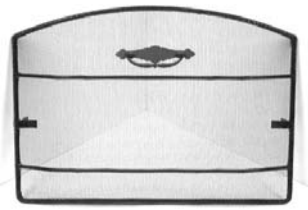
Oxford Brown Enamel

Decorative Grills

Black Painted

Taupe Enamel

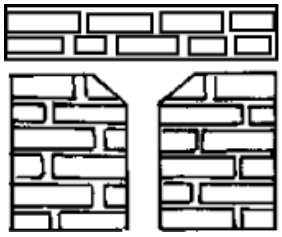
Oxford Brown Enamel



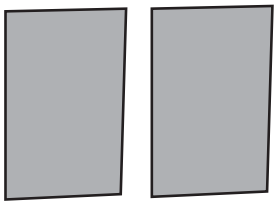
Door Screen

Warming Stone

Spice Granite



Cast Brick Fireback

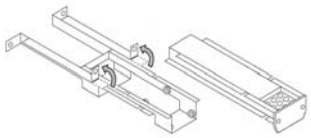


Stone Package

Travertibe

Soapstone

Spice Granite



Aromatherapy Tray

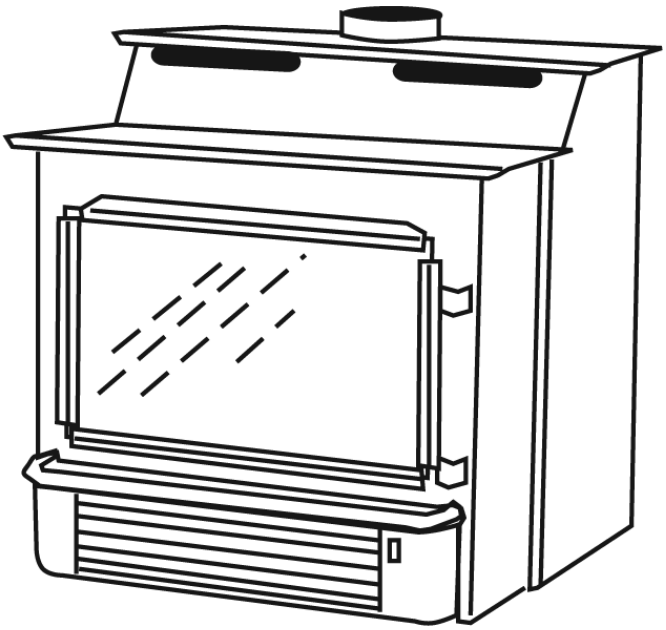
Essential Oils

Spirit - Lopi

31,000 BTU Heater

Available In::

Black Paint Finish



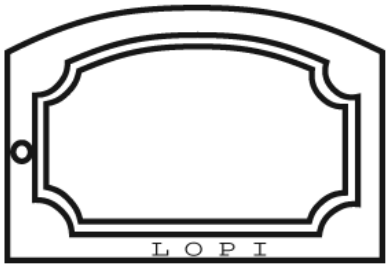
LEGS

Sculptured Black Steel

Sculptured Pewter

Cast Brass

Cast Black

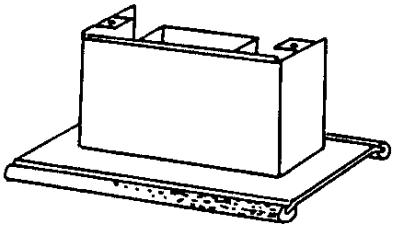


DOOR SHELLS

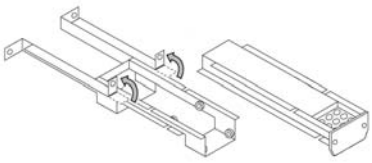
Black Cast

Solid Brass

Pewter



PEDESTAL BASE



Aromatherapy Tray

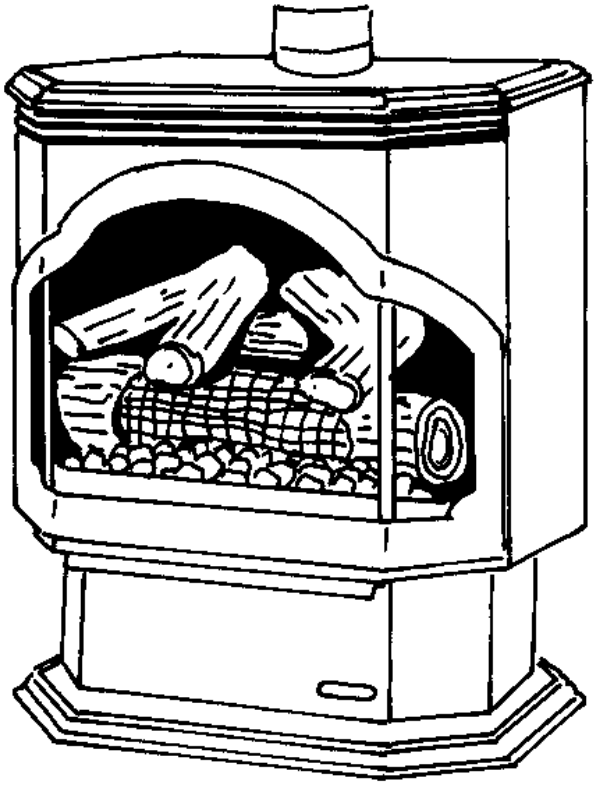
Essential Oils

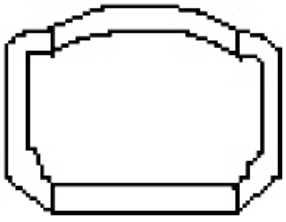
Heritage - Lopi

43,000 BTU Heater

Available In::

Black Paint Finish

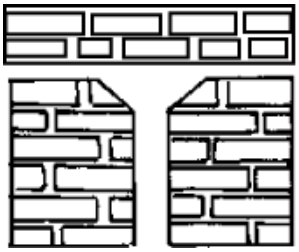




Door & Grill Upgrades

24 Karat Gold

Brushed Nickel Plated



Cast Brick Fireback

Sweet Dreams - Lopi

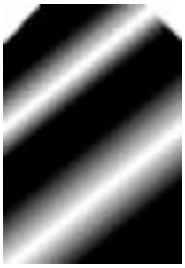
18,000 BTU Heater

Available In::

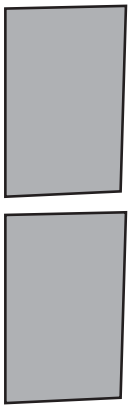
Black Paint

Taupe Enameled Finish

Oxford Brown Enameled Finish



One-Way Mirror Glass



Travertine Stone Kit

Doors

Black Painted

Taupe Enamel

Oxford Brown Enamel

Arabesque Grills

Antique Gold Plated

Antique Pewter Plated

Interior Liners

Travertine Tile

Ceramic

Beehive Brick

Ceramic

Cast Shell

Cast Iron

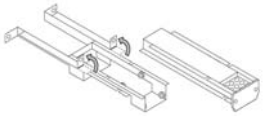
Legs

Black Painted

Taupe Enamel

Oxford Brown Enamel

Reversable Cast Plates



Aromatherapy Tray

Essential Oils

GAS INSERTS

TRAVIS INDUSTRIES
HOUSE OF FIRE

Brands

DVS	FPX
	Avalon
	Lopi
DVL	FPX
	Avalon
	Lopi

PLATFORM TECHNOLOGY

Travis Industries uses “Platform Technology” in the design of our gas fireplace inserts and our gas fireplaces.

Platform Technology simply means that the platform or body on which the unit is built is the same throughout the different brands.

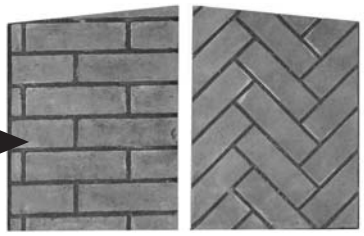
The platform changes identity when different firebacks and faces are placed on the units which makes the finished product look different to the consumer.

All Brands

- DVS Insert
- DVL Insert

32 DVS - Fireplace Xtrordinair

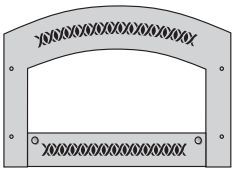
Body



Ceramic Reversable Fireback

Accent Light

Faces



Classic Arch

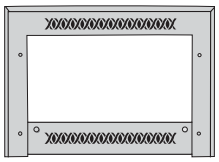
Black Painted

Brushed Nickel

24 Karat Gold Plated

French Countrty Arch

Antique Gold Plated



Metropolitan

Black Painted

Artisan

Black Painted

Antique Nickel Plated

Antique Copper Plated

Architectural Collection

Arts & Crafts

Antique Copper Plated

Neo-Classic

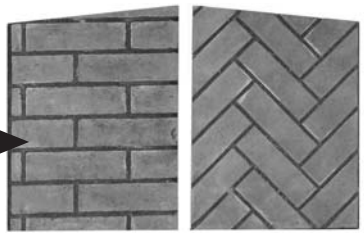
Brushed Nickel Plated

French Country

Antique Gold Plated

DVS - Avalon

Body



Ceramic Reversable Fireback

Accent Light

Faces

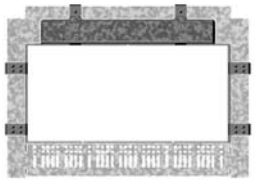
Rosario

Black Painted Door

UPGRADE DOORS

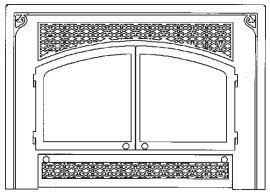
Brushed Nickel

24 Karat Gold Plated



Craftsmen

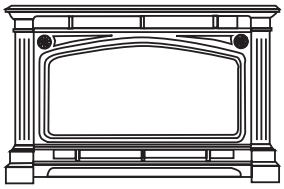
Hand-Hammered Brown Metallic Paint Finish



Victorian Lace

Black Painted

Black Nickel Plated with Brushed Nickel Accents

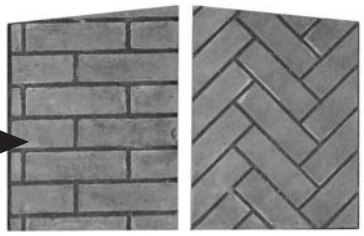


Cambridge

Cast Black Painted

DVS - LOPI

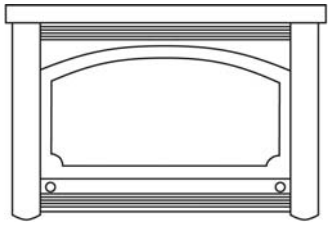
Body



Ceramic Reversable Fireback

Accent Light

Faces



Discovery

Black Painted Door

UPGRADE DOORS

Brushed Nickel

24 Karat Gold Plated

Antique Gold Plated

Wilmington

Black Painted

Brushed Nickel Plated

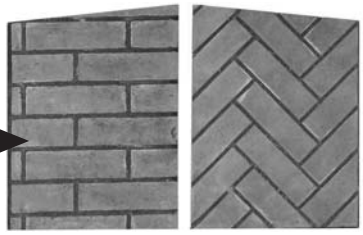
Bedford

Black Painted

Oxford Brown Enamel

34 DVL - FIREPLACE XTRORDINAIR

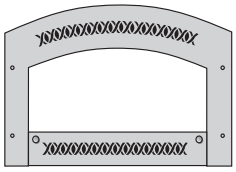
Body



Ceramic Reversable Fireback

Accent Light

Faces



Classic Arch

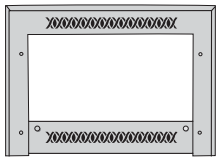
Black Painted

Brushed Nickel

24 Karat Gold Plated

French Countrty Arch

Antique Gold Plated



Metropolitan

Black Painted

Artisan

Black Painted

Antique Nickel Plated

Antique Copper Plated

Architectural Collection

Arts & Crafts

Antique Copper Plated

Neo-Classic

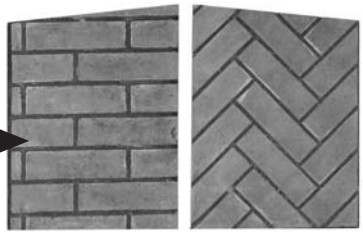
Brushed Nickel Plated

French Country

Antique Gold Plated

DVL - AVALON

Body



Ceramic Reversable Fireback

Accent Light

Faces

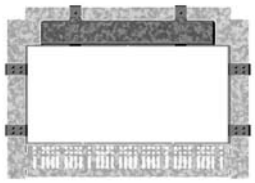
Rosario

Black Painted Door

UPGRADE DOORS

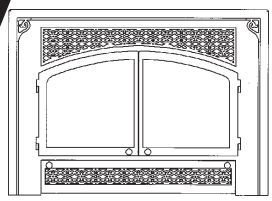
Brushed Nickel

24 Karat Gold Plated



Craftsmen

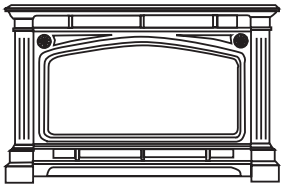
Hand-Hammered Brown Metallic Paint Finish



Victorian Lace

Black Painted

Black Nickel Plated with Brushed Nickel Accents



Cambridge

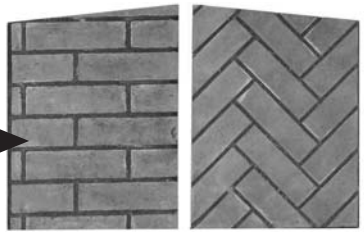
Cast Black Painted

Bungalow

Textured Black Powder Coated

DVL - LOPI

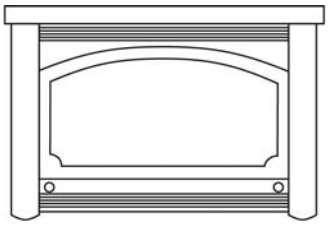
Body



Ceramic Reversable Fireback

Accent Light

Faces



Discovery

Black Painted Door

UPGRADE DOORS

Brushed Nickel

24 Karat Gold Plated

Antique Gold Plated

Wilmington

Black Painted

Brushed Nickel Plated

EMBER-FYRE BURNER

TRAVIS INDUSTRIES
HOUSE OF FIRE

Features

Construction

How It Works

EMBER-FYRE BURNER

TRAVIS INDUSTRIES
HOUSE OF FIRE

- Featured in all Travis gas products except the 35 CB and 864TRV fireplaces
- Top 100 new produc recognition by Popular Science for achievement in science and technology
- Look and feel of a REAL WOOD FIRE
- Large dancing flames
- Glowing wood-like embers and charred logs
- Variable turn down rate of about 50%
- High Efficiency - Up to 86.5%
- Maximum to minimum ember glow adjusted by the consumer

EMBER-FYRE BURNER

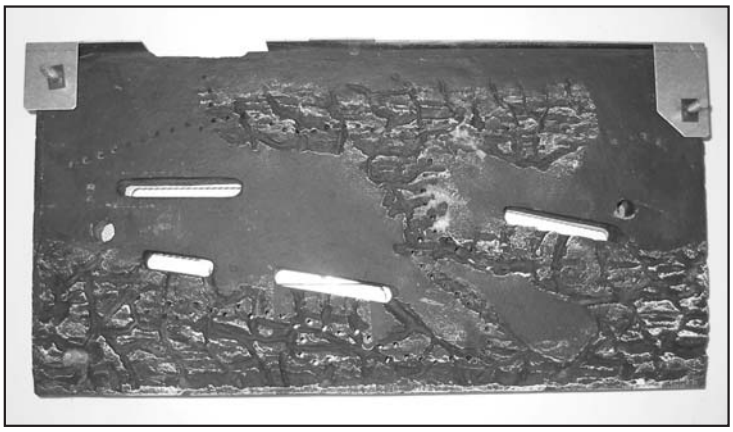
TRAVIS INDUSTRIES
HOUSE OF FIRE

- Burner is constructed of ceramic material
- Ceramic burner glows to deep red of 1200˚ F
- Primary and secondary air flow design provides for a wide range of flame appearance
- The metal pan under the ceramic burner has baffles which control the flow of fuel to the burner
- Hollow cavity in ceramic burner carries gas to precisely placed gas ports
- Pilot placement is such that it is less likely to be disturbed by air flow

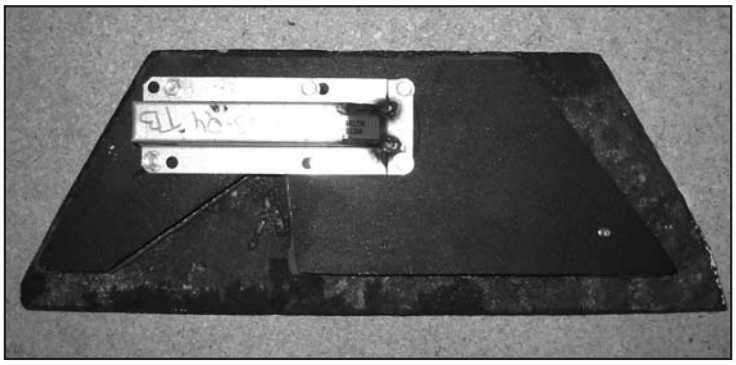
EMBER-FYRE BURNER

TRAVIS INDUSTRIES
HOUSE OF FIRE

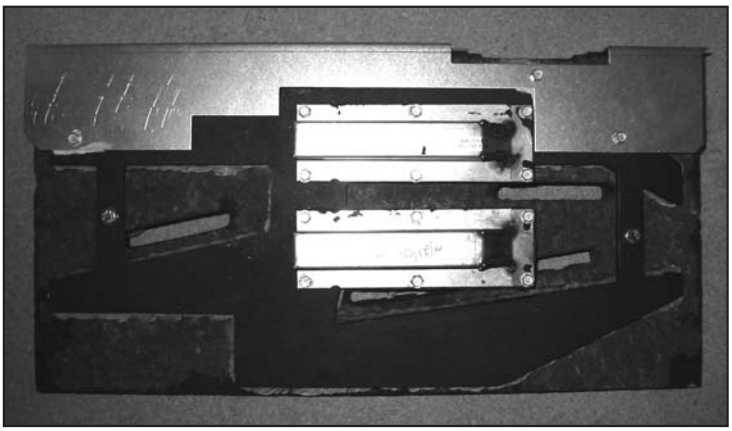
Ember-Fyre Burner (Top View)



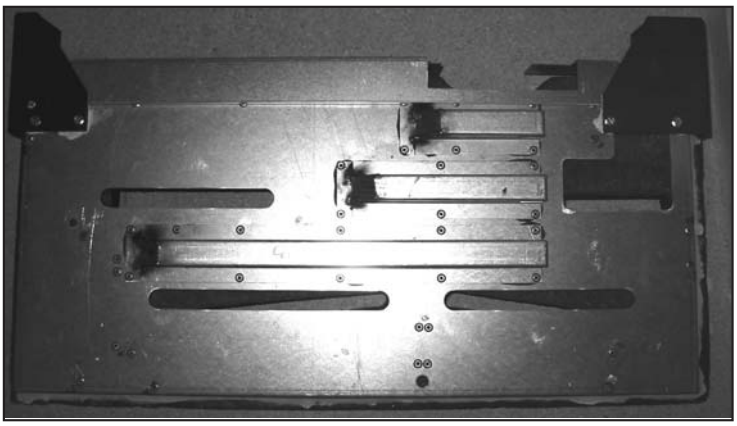
Ember-Fyre Burner - Single Burner Orifice (Bottom View)



Ember-Fyre Burner - Double Burner Orifice (Bottom View)



Ember-Fyre Burner - Triple Burner Orifice (Bottom View)



EMBER-FYRE BURNER

TRAVIS INDUSTRIES
HOUSE OF FIRE

Our patented Ember-Fyre™ gas burner produces a fire so realistic it's often mistaken for a wood fire! Can you tell the difference?

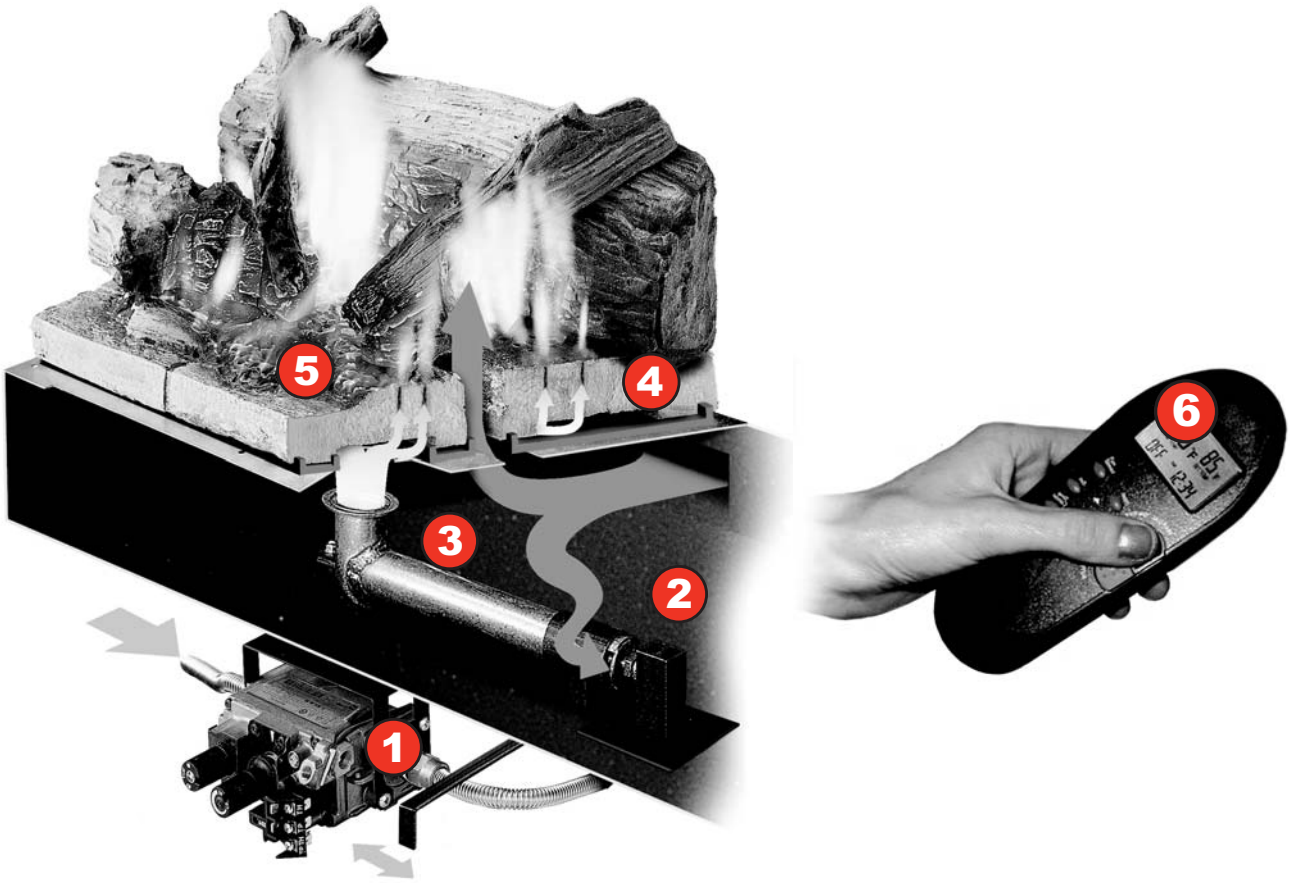
How it works:

(1.) Natural gas or propane is piped to a sophisticated SIT gas valve, controlled by the reliable Piezo ignition system. This gas burner is designed to provide reliable, continuous operation even if the power goes out in your home.

(2.) The low-pressure gas from the gas valve is introduced to the mixing tube via a precisely engineered burner orifice.

(4.) The gas/air mixture flows through a unique array of burner ports in the ceramic base, where it ignites and burns with a warm enchanting glow.

(5.) As the Ember-Fyre heats to a deep red 1200˚F, it mimics the look of glowing wood embers and charred logs. Dancing yellow flames further enhance the look and feel of a wood fire.



(3.) A mixing tube combines the gas with outside combustion air. (The standard mix of air to fuel is set by the installer to compensate for variations in altitude, fuel type, and line pressure.

(6.) For hands-free operation the optional remote control or wall thermostat allows for convenient ON/OFF functions was well as thermostat settings to maintain the comfort level of your home.

GAS VENTING

TRAVIS INDUSTRIES
HOUSE OF FIRE

Two Factors In Venting Draft/Flow

General Venting Principles

Direct Vent

Direct Vent Fireplaces

Direct Vent Stoves

Venting

Measuring Pipe Lengths

Termination

Venting Configurations

Direct Vent Appliances

Direct vented gas appliances work well with new home construction. Today's homes are extremely air tight and indoor air quality has become an important issue.

Direct vent appliances address these major concerns and therefore, all of Travis Industries gas appliances are now direct vent only.

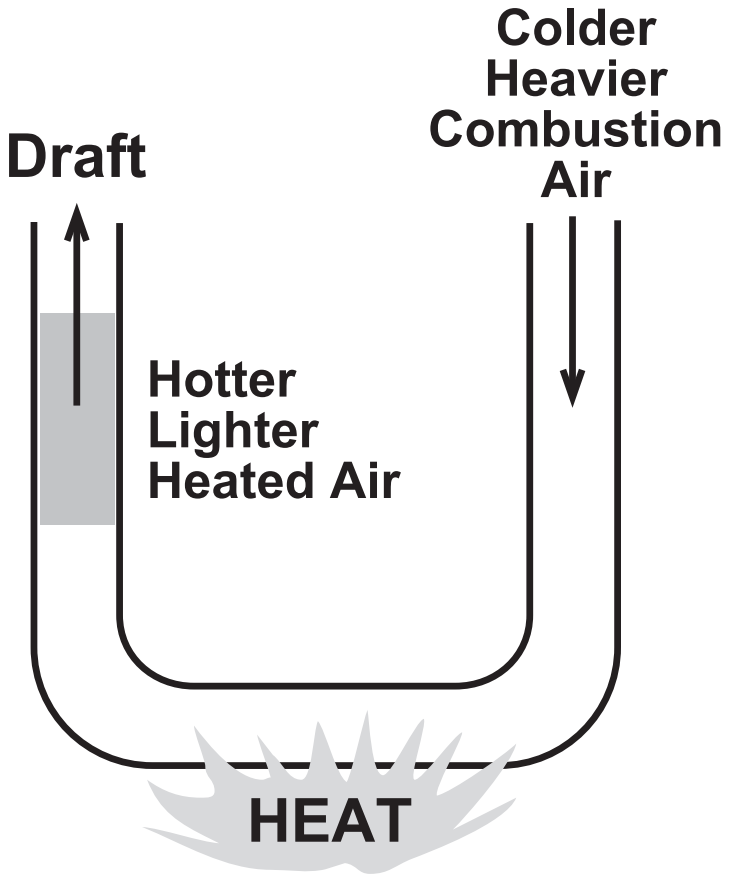
- Sealed combustion chamber.
- No interaction with house.
- Exhaust goes to outside and combustion air comes from the outside.
- Terminates either vertical or horizontal.
- Co-axial and Co-linear venting used.
- Balanced system - exhaust out/air in.
- Operates well in a home with negative pressure up to 25 Pa (pascal).

(1 Pascal =.004" of W.C. or 250 Pa = 1" W.C.).

Venting
1st Factor of Venting

DRAFT: The pressure difference that is available to drive the flow of air and/or combustion gases through an appliance and its venting system.

Draft is created in a venting system by the temperature difference between the air and/or combustion gases in the venting system and the outdoor air. The greater the temperature difference, the greater the draft.



Poor Draft

- **Outside of Travis Venting Parameters**
- **Improper Restrictor Setting**
- **Cooling Vent Gases**
- **Flow restriction**

FLOW: The volume of gases that move through the vent

Venting Flow Restrictions

- **Vent Size**
- **Number of Turns in Vent (Elbows)**
- **"Down Hill" Horizontal Vent Sections**
- **Outside of Travis Venting Parameters**

General Vent Principles

- Follow vent parameters as spelled out in Travis Industries installation directions.

- Keep vents as straight as possible.
  - Minimize offsets and turns
  - Minimize horizontal runs
  - Slope upward not downward 1/4" rise per foot of run
  - Have some rise before elbowing

- Use listed terminations only.

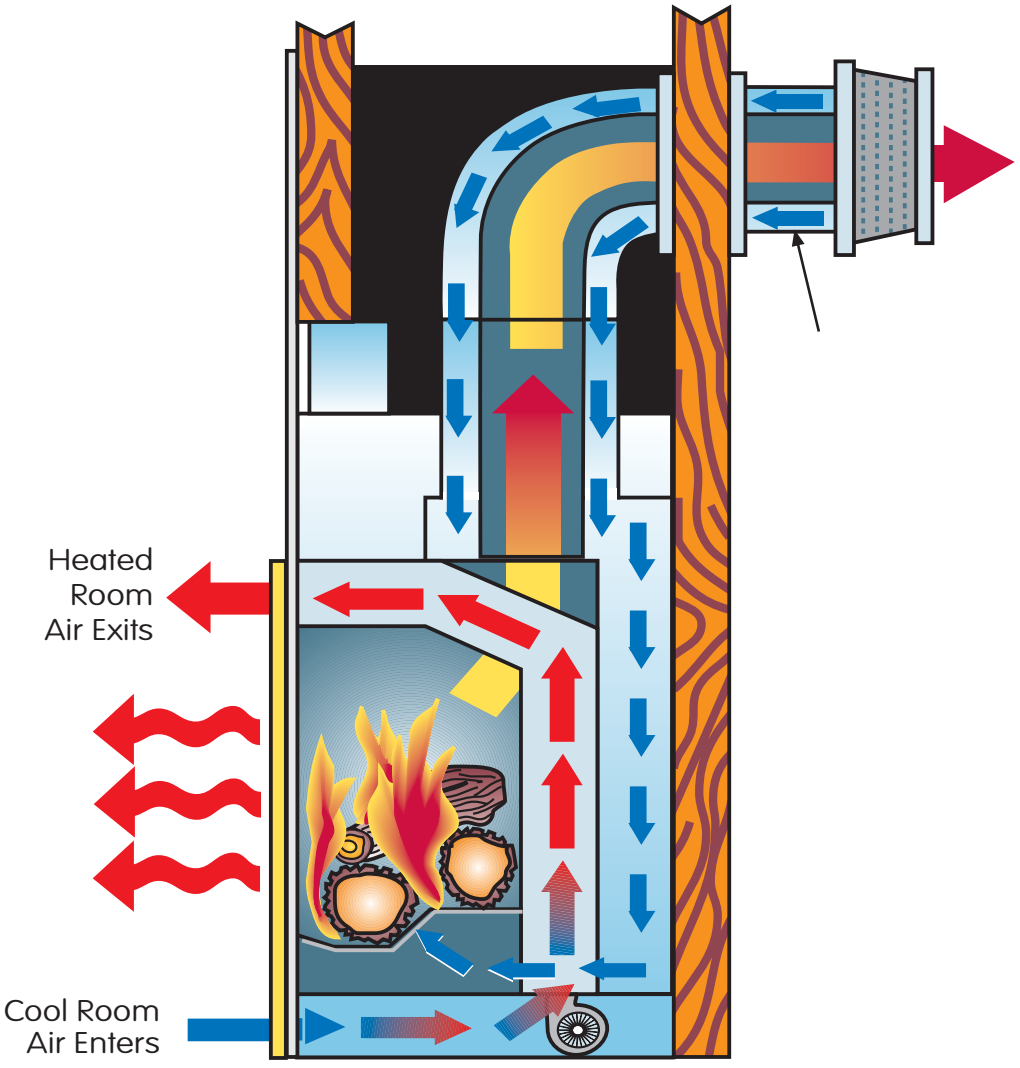
- Hearth gas appliances must be individually vented and should never connect to an active solid fuel burning appliance chimney or other gas appliance.

- Follow Travis Industries termination heights and clearances for proper vent termination.

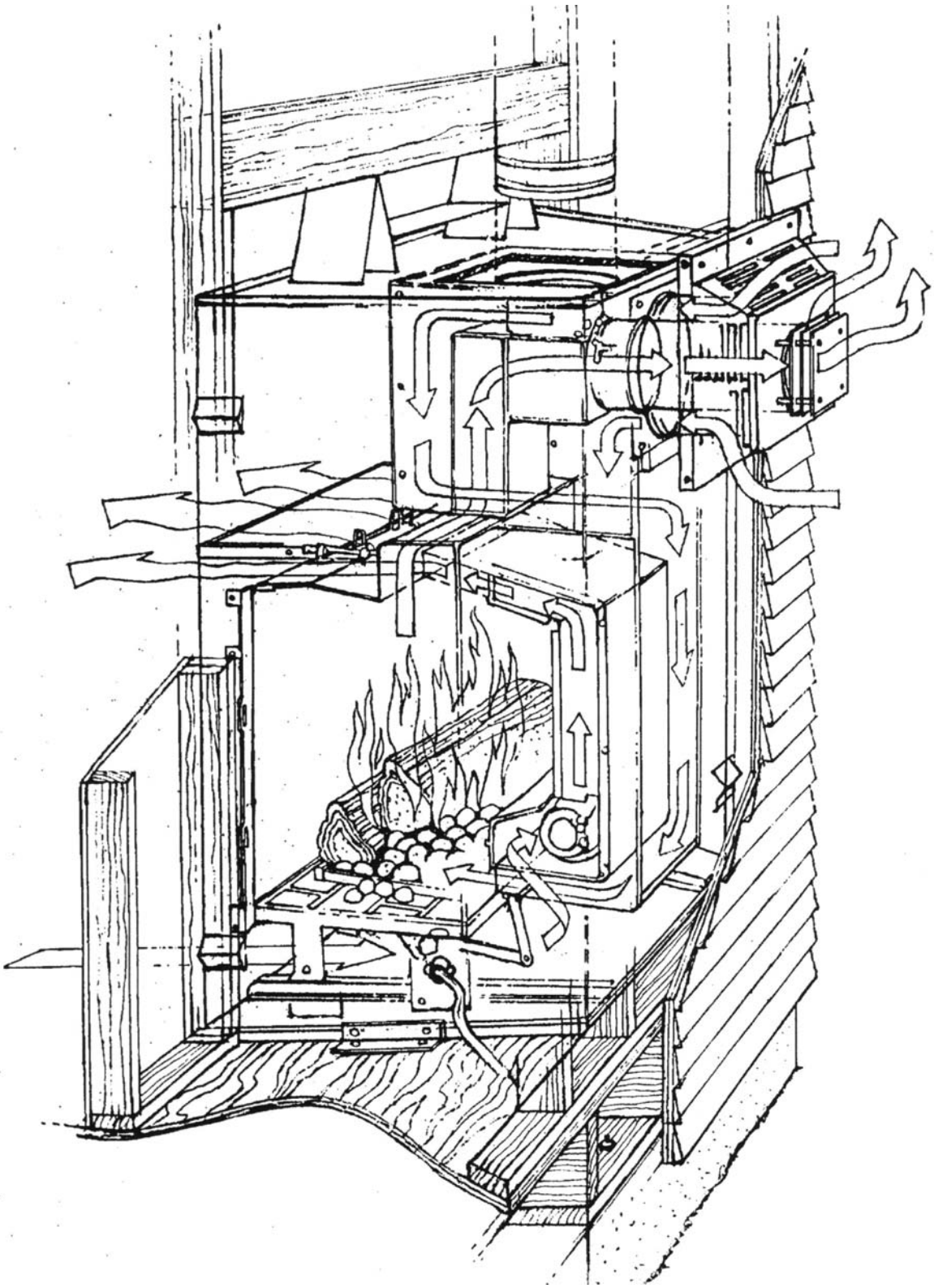
- Keep vents in heated, warm areas.

Direct Vent Appliances

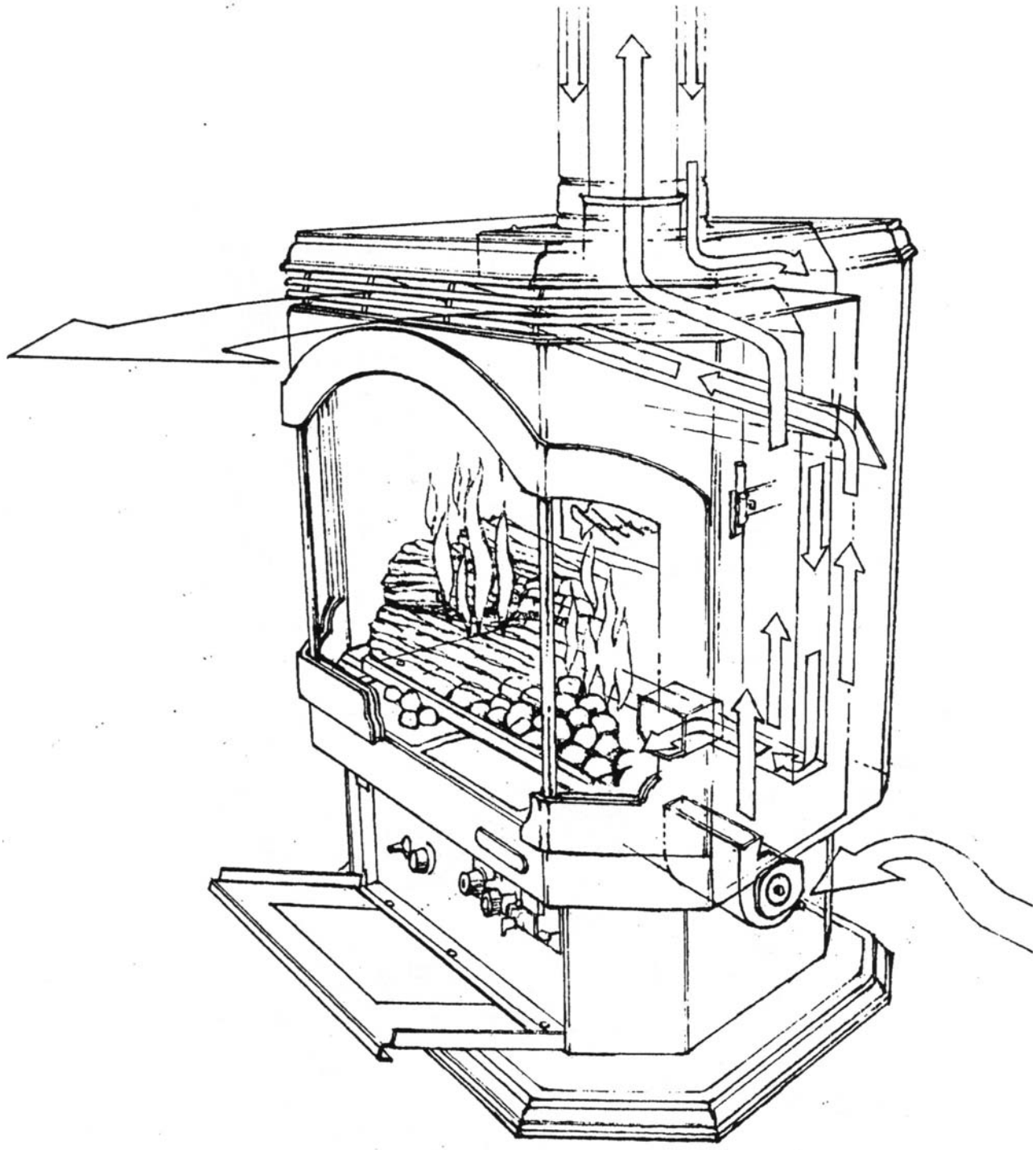
- All combustion air comes from outside the home



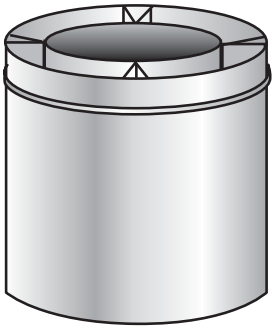
Direct Vent Fireplace Cutaway



Direct Vent Stove Cutaway



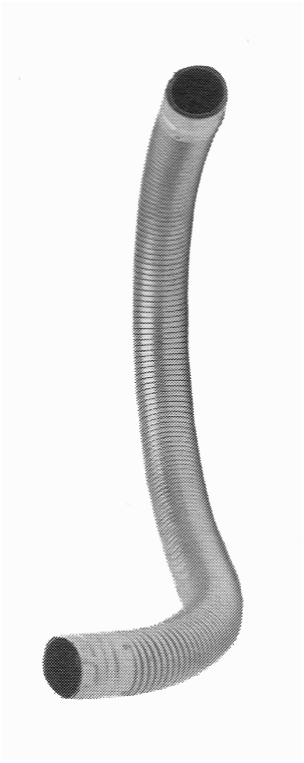
Direct Vent Appliances



CO-AXIAL VENT (Fireplaces)

Inner - Exhaust
Outer - Intake (combustion air)

6 5/8” or 8” Duravent



Flex Liner Label Flow Arrow

CO-LINEAR VENT (Inserts)

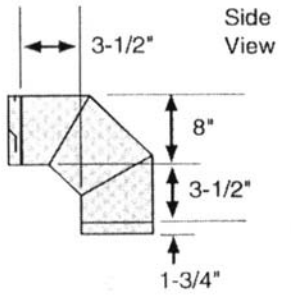
Exhaust - Vent
Intake - Vent (combustion air)

DVS Insert
- 3” Intake
- 3” Exhaust

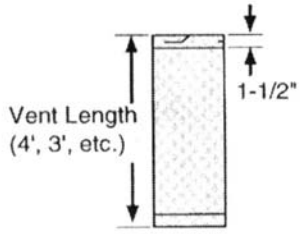
DVL Insert
- 3” Intake
- 4” Exhaust

Measuring Vent Lengths

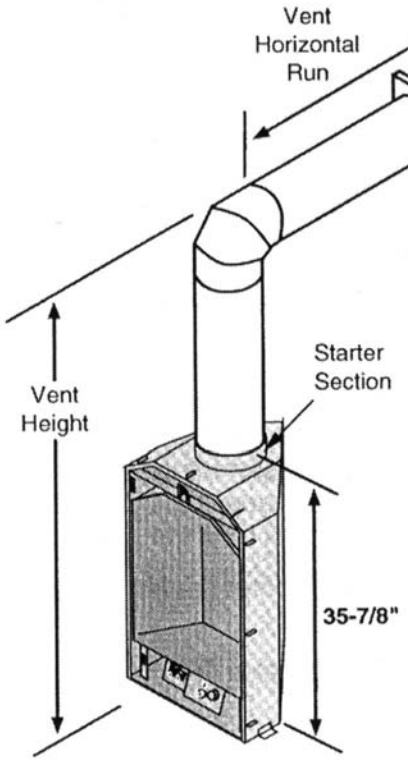
Elbows add 3-1/2" to the length of the vent system.

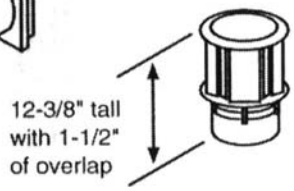


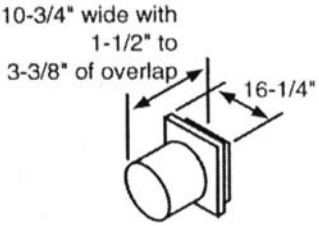
Vent sections overlap each other by 1-1/2"



EXAMPLE:
Two 4' lengths are 7' 10-1/2" long, but when attached to the vent system add 7' 9" to the vent height.







NOTE:
All measurements are for 8" diameter vent.

Direct Vent Gas Stove Venting

- Twist Lock connection.
- Air space clearance as required by individual application installations.
- Vertical and horizontal terminations allowed.
- High-temperature silicone must be used to seal the inner and outer flue (1/8" bead).
- 1/4" rise per foot of run is required.
- See installation directions for:
  - # of Elbows allowed
  - Restrictor Positioning
  - Exhaust Hood Clearances To Door and Window Openings
  - Vertical Termination Requirements
  - Max. and Min. Termination Height
  - Maximum System Offset
- Each GS Vent has a 1 - 1/2" overlap.

Gas Stove Venting

- Direct vented stoves must exit to the outside of the building and never be connected to a solid fuel burning chimney or another gas appliance vent. Each direct vent gas appliance must use its own separate vent system.

- Horizontal sections require non-combustible support every 3' (i.e. Plumber’s strap).

Termination Requirements

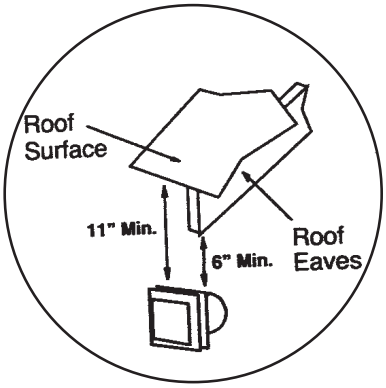
A - Minimum 9” clearance from any door or window

B - Minimum 12” above any grade, veranda, porch, deck or balcony

C - Minimum 12” from outside corner walls

D - Minimum 12” from inside corner walls

E - Minimum 11” clearance below unventilated soffits or roof surfaces
Minimum 18” clearance below vented soffits
Minimum 6” clearance from roof eaves
NOTE: Vinyl surfaces require 24”



F - Minimum 18” clearance below a veranda, porch, deck or balcony (must have two open sides)

G - Minimum 48” clearance from any adjacent building

H - Minimum 84” clearance above any grade when adjacent to public walkways or driveways
NOTE: May not be used over a walkway or driveway shared by an adjacent building

I - Minimum 48” clearance from any mechanical air supply inlet

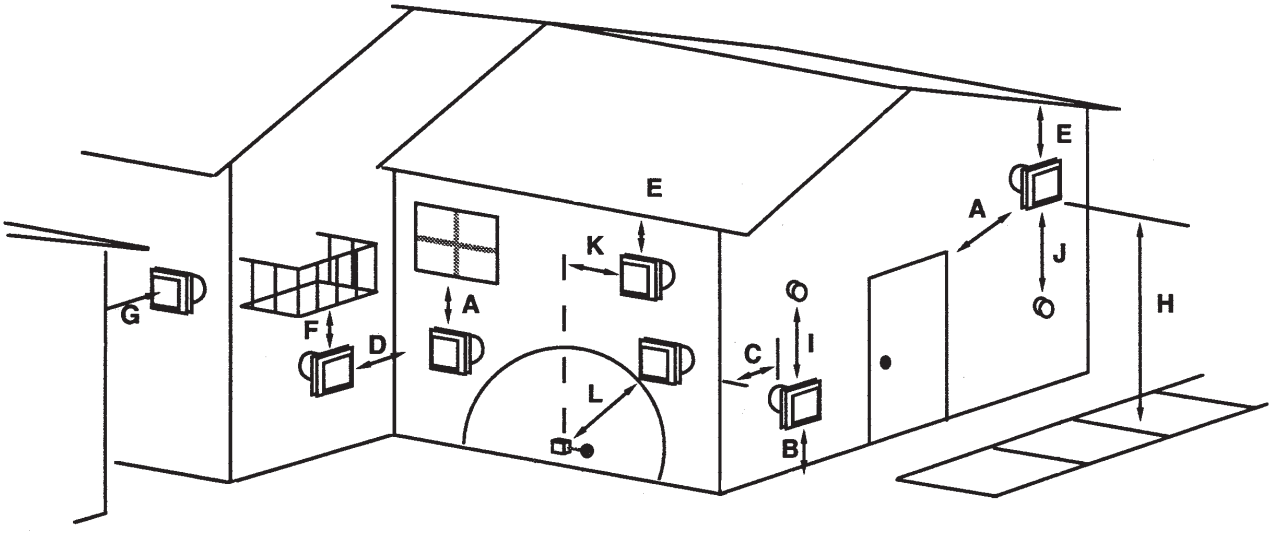
J - Minimum 36” clearance above and 48” below and to the sides of non-mechanical air supply inlet

K - Minimum 36” from the area above the meter/regulator (vent outlet)

L - Minimum 36: from the meter/regulator (vent outlet)

M - Minimum 12” above the roof line (for vertical terminations)

N - Minimum 24” horizontal clearance to any surface (such as an exterior wall) - for vertical terminations



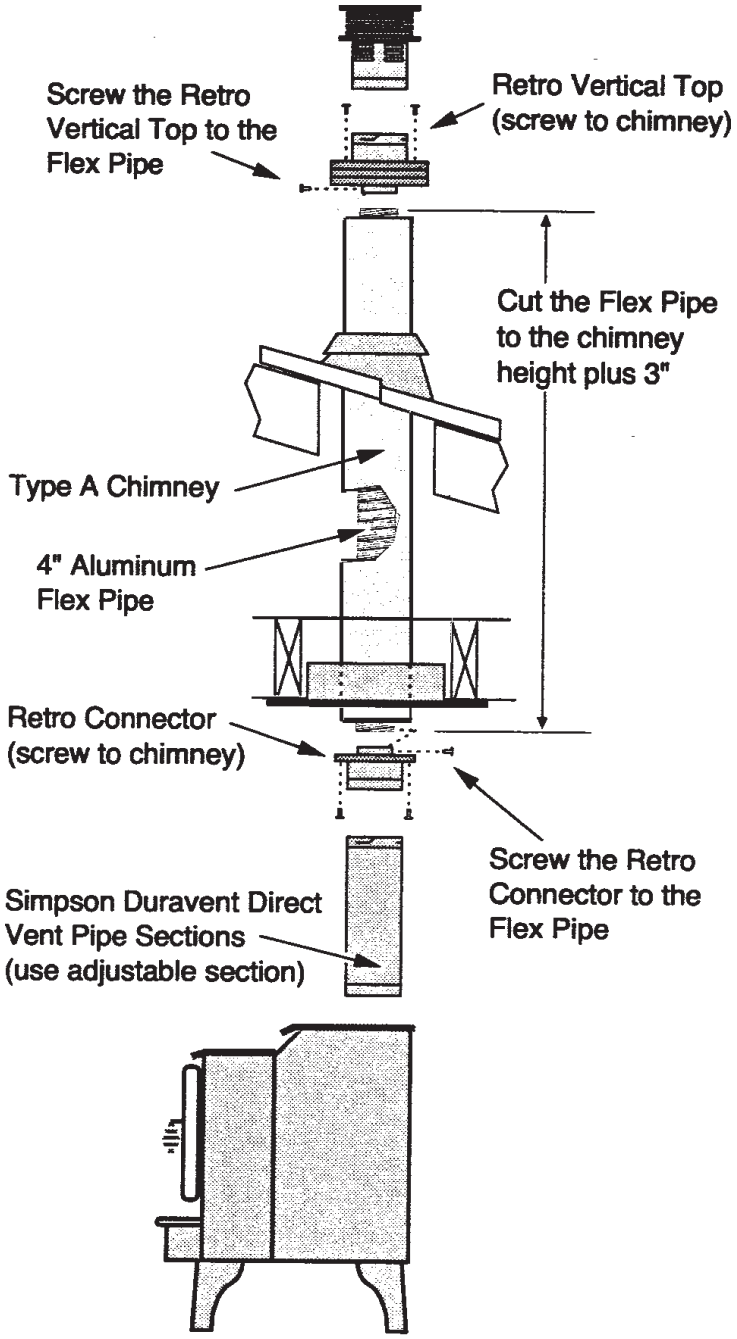
NOTE: Measure clearances to the nearest edge off the exhaust hood

* Use the vinyl siding standoff (#950) when installing on an exterior with vinyl

• Vent termination must be located where it will become plugged by snow or other material

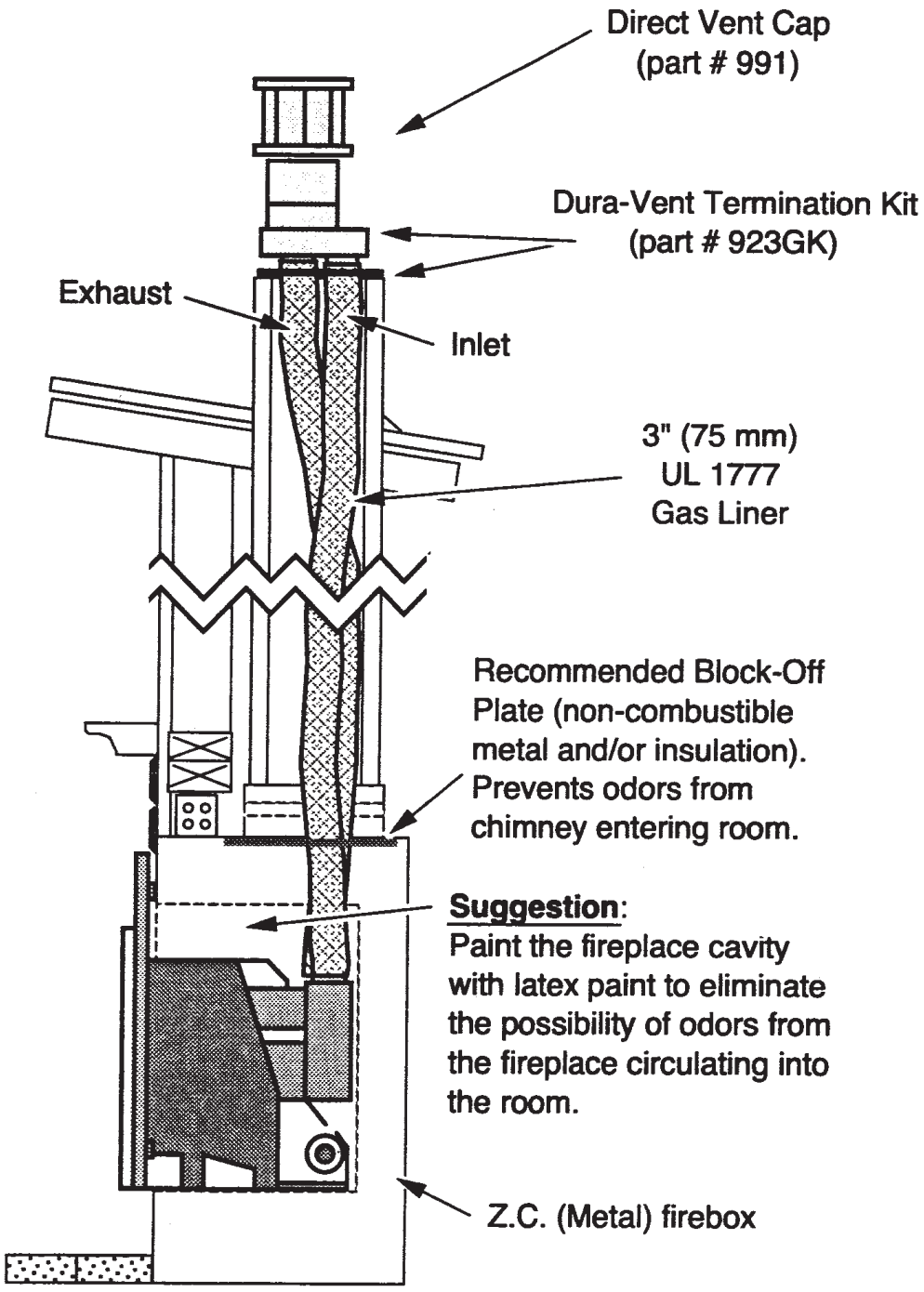
• These clearances meet UMC-1994 and the CNA/CGA-B149 code standards

Direct Vent Into Class "A" Chimney



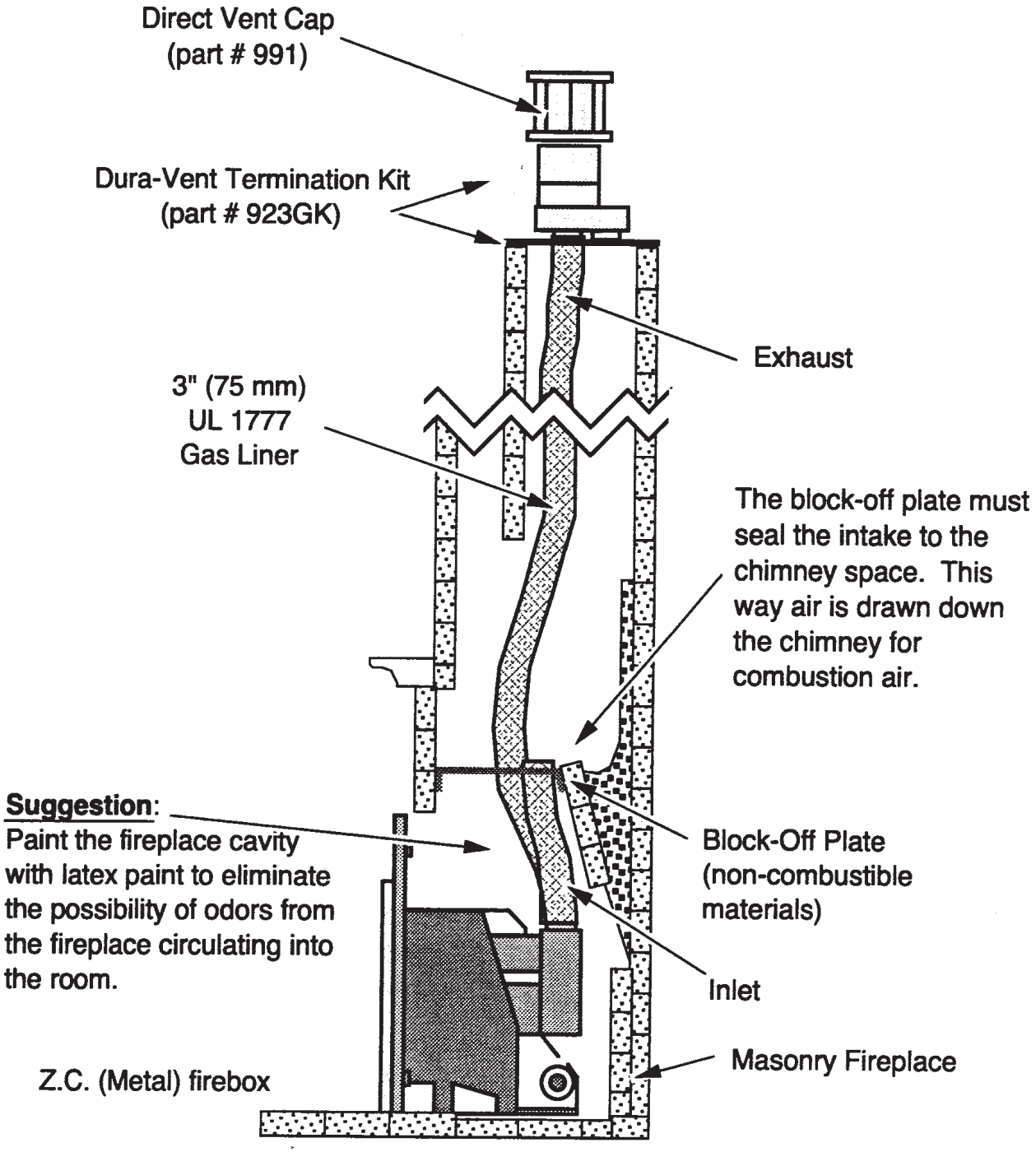
Insert Direct Vent Options

Inlet & Exhaust Re-Line



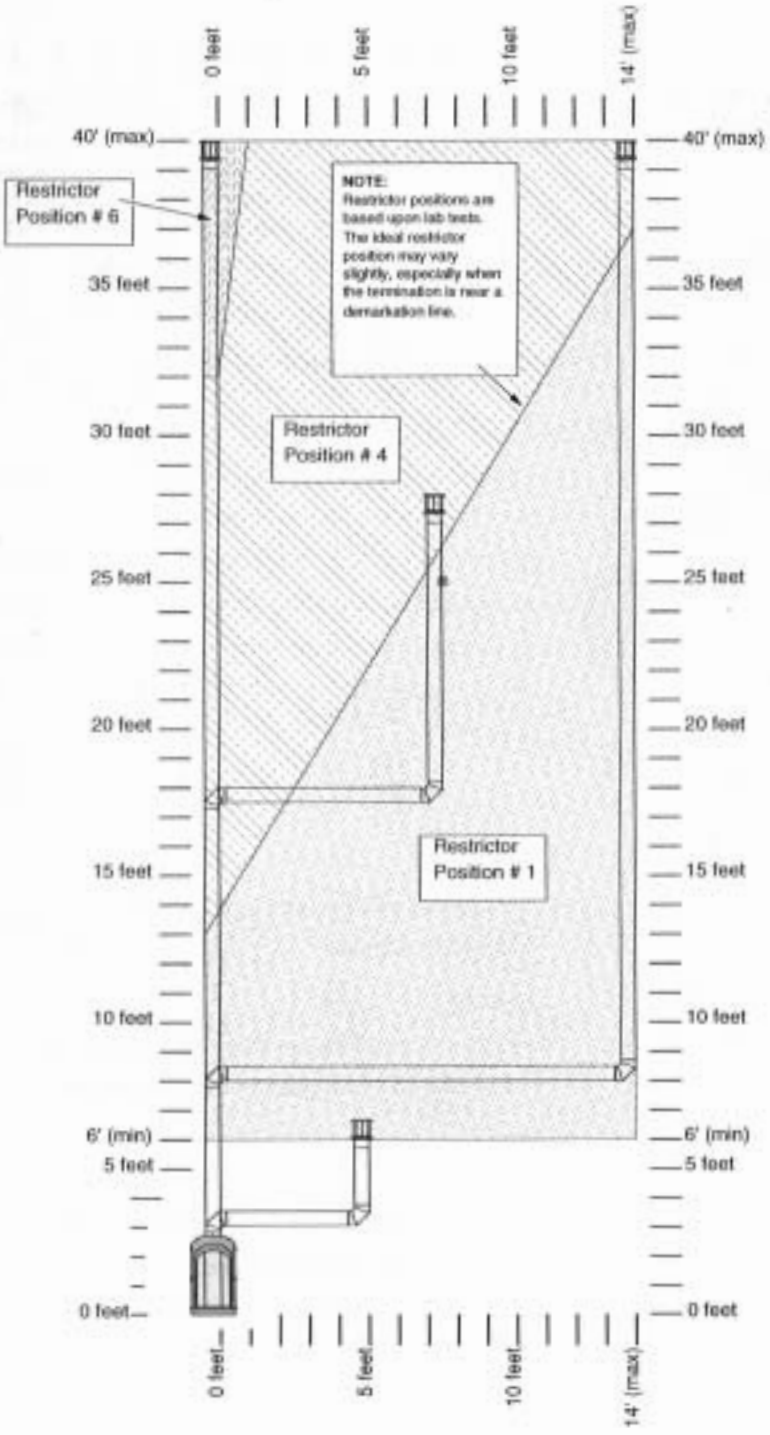
Insert Direct Vent Options

Exhaust Only Re-Line



Vent Configuration with Vertical Vent Termination

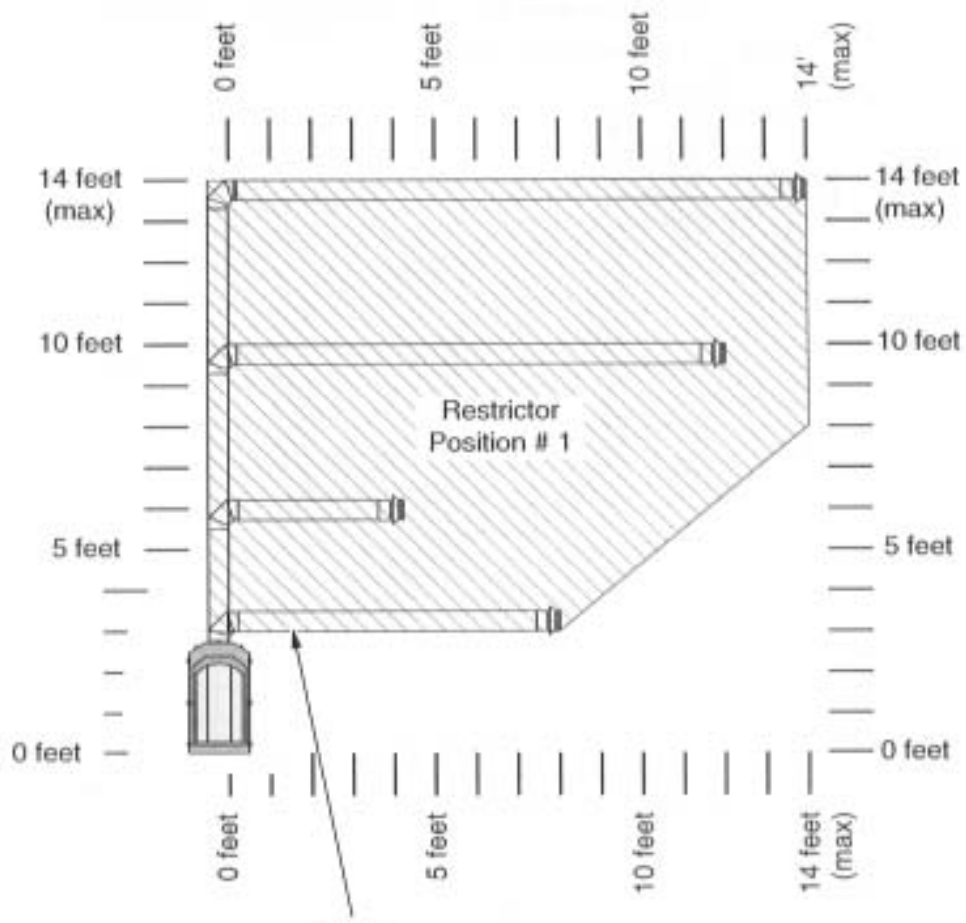
- The termination must fall within the shaded area shown in the chart. Use the indicated restrictor pos
- A maximum of 3 elbows may be used.



Horizontal Termination

Use a single 90° elbow (NOTE: an additional 45° elbow may be used on the horizontal run).

The termination must fall within the shaded area shown in the chart. Use the indicated restrictor position.



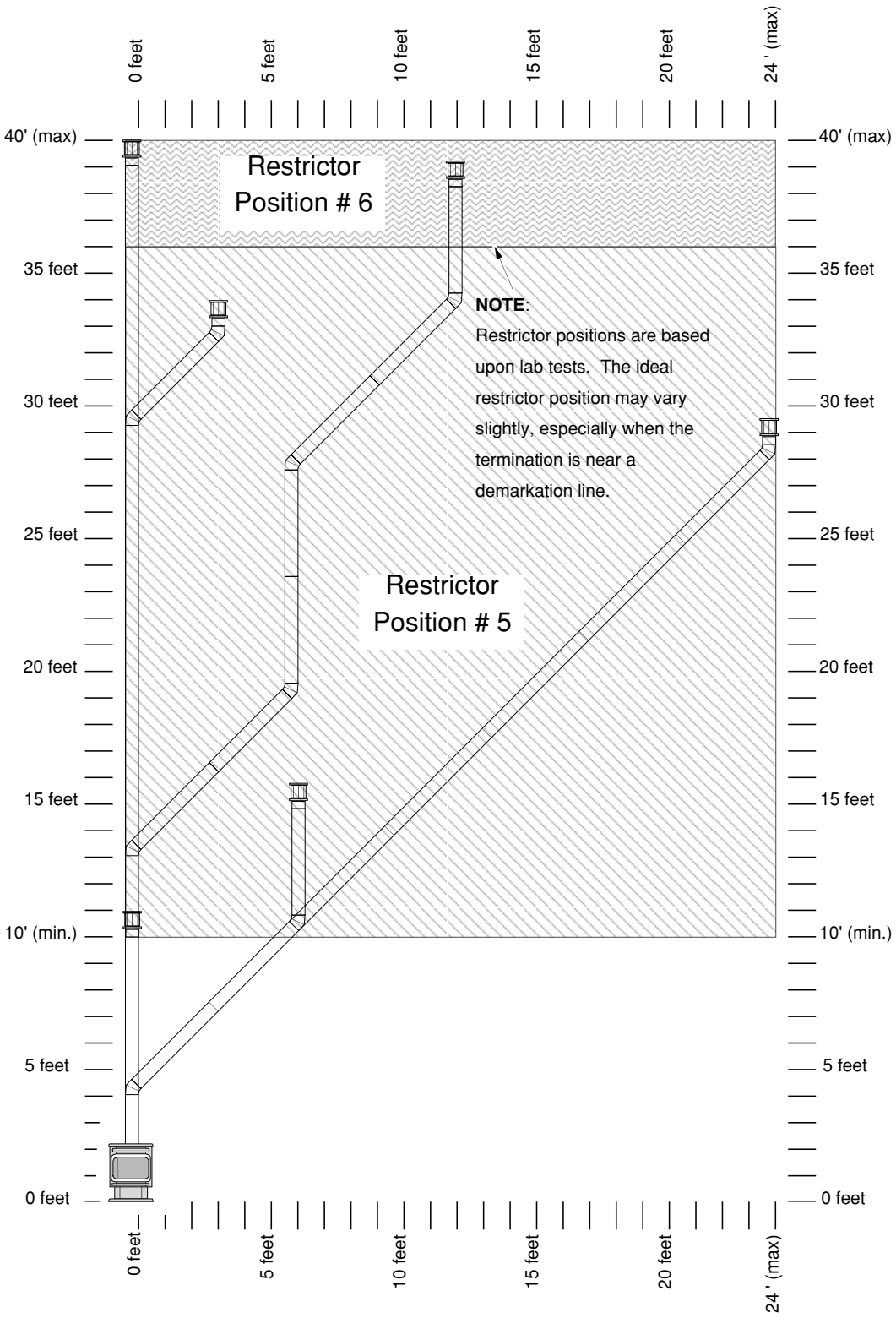
NOTE:

Horizontal sections require a 1/4" rise every 12" of travel.

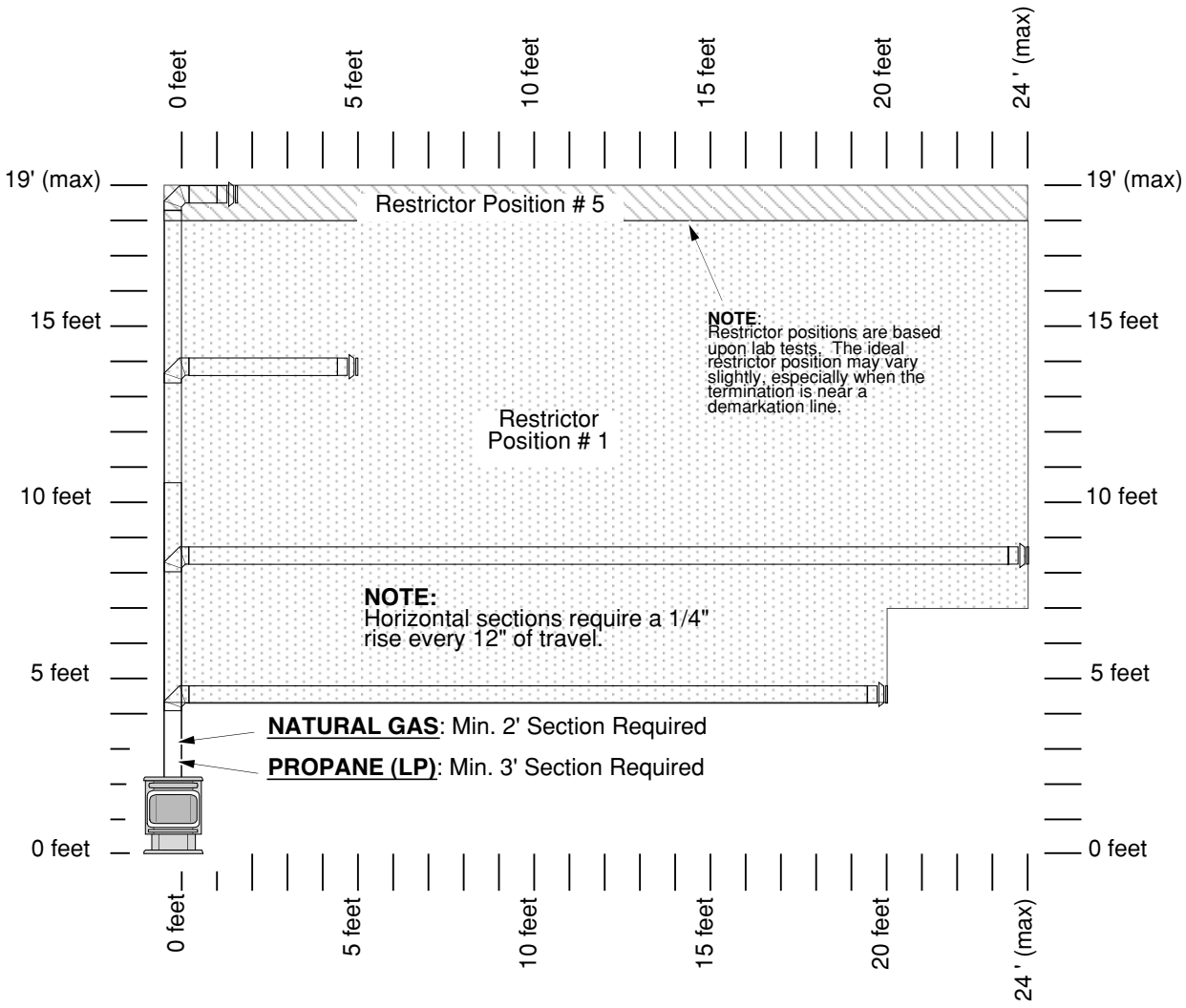
NOTE:

Restrictor positions are based upon lab tests. The ideal restrictor position may vary slightly.

Vertical Terminations with 0, 2, or 4 - 45˚ Offsets

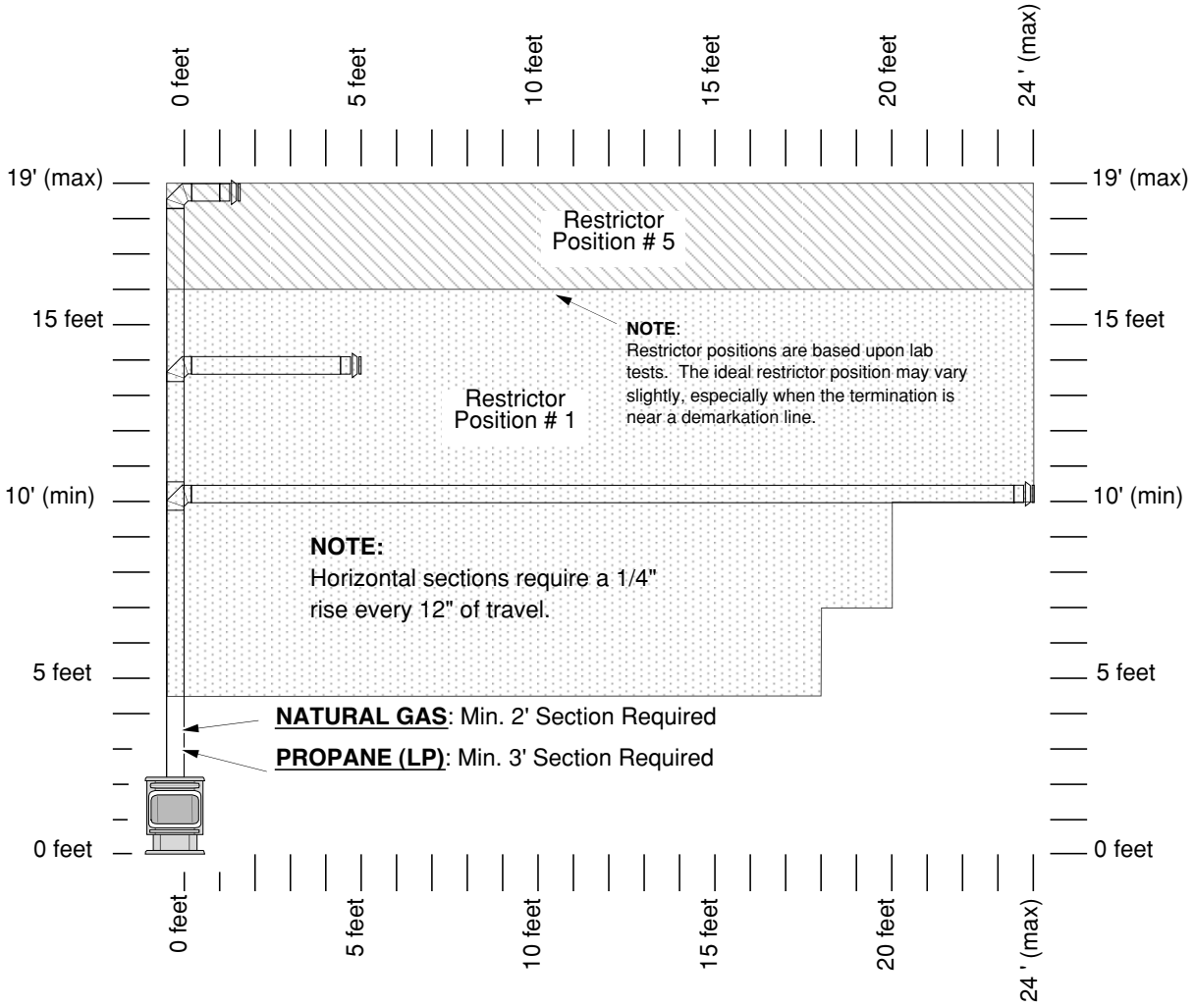


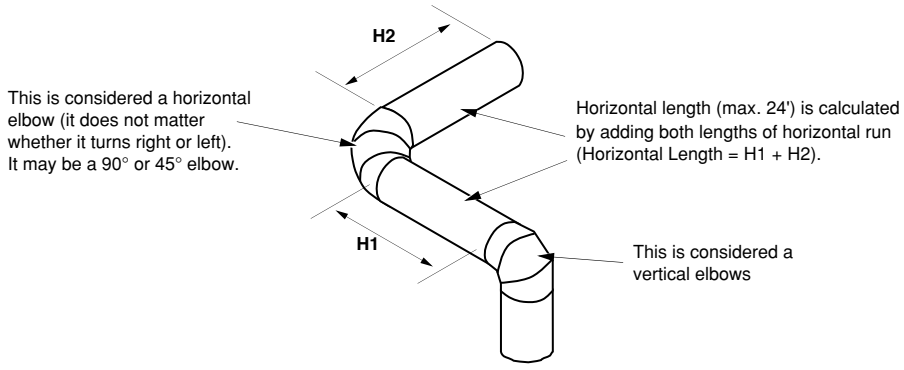
Horizontal Terminations with One 90˚ Offsets



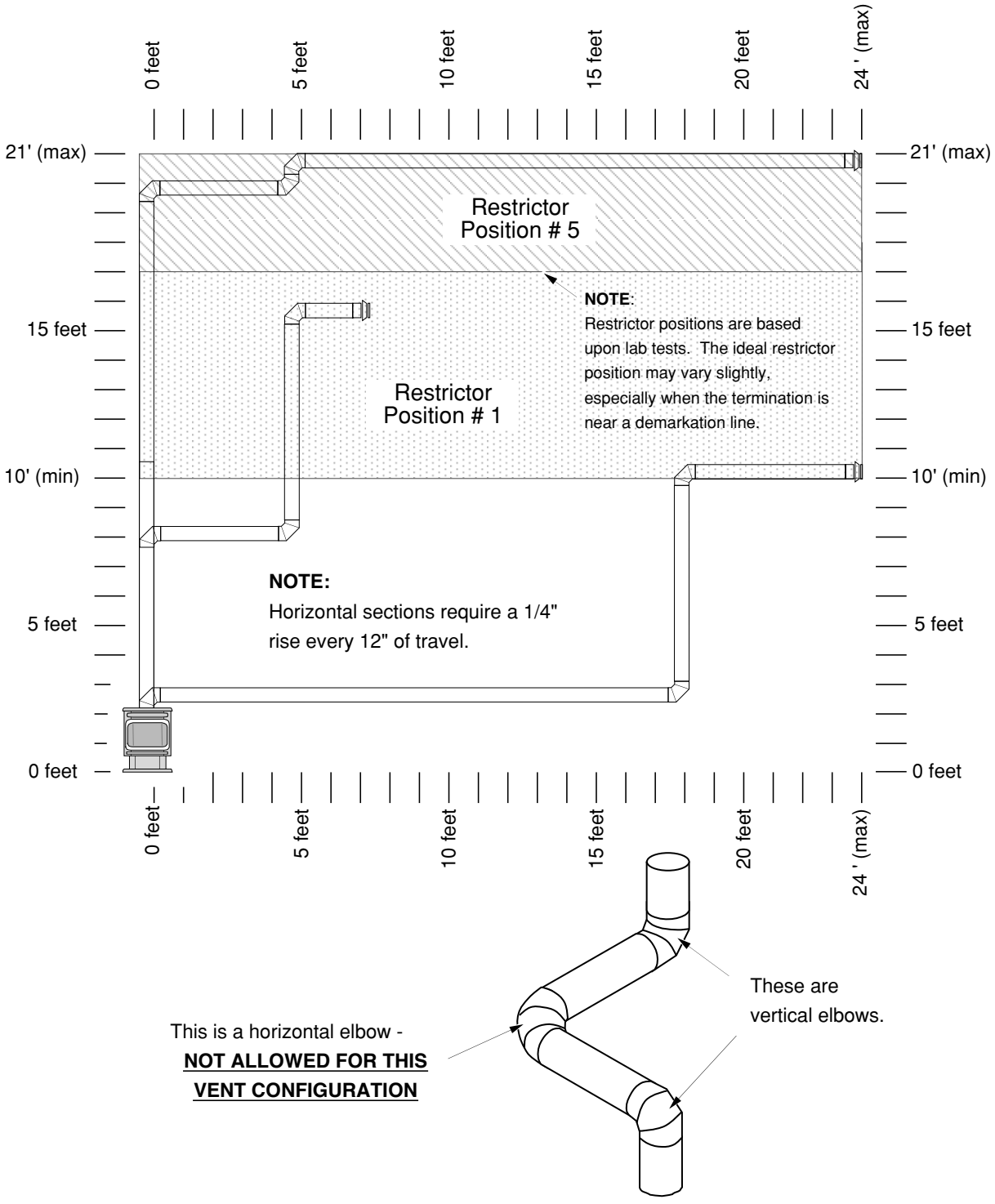
Approved Venting Configurations with a Horizonatal Termination and Two Elbows

(one 90˚ vertical or 45˚ horizontal elbow)

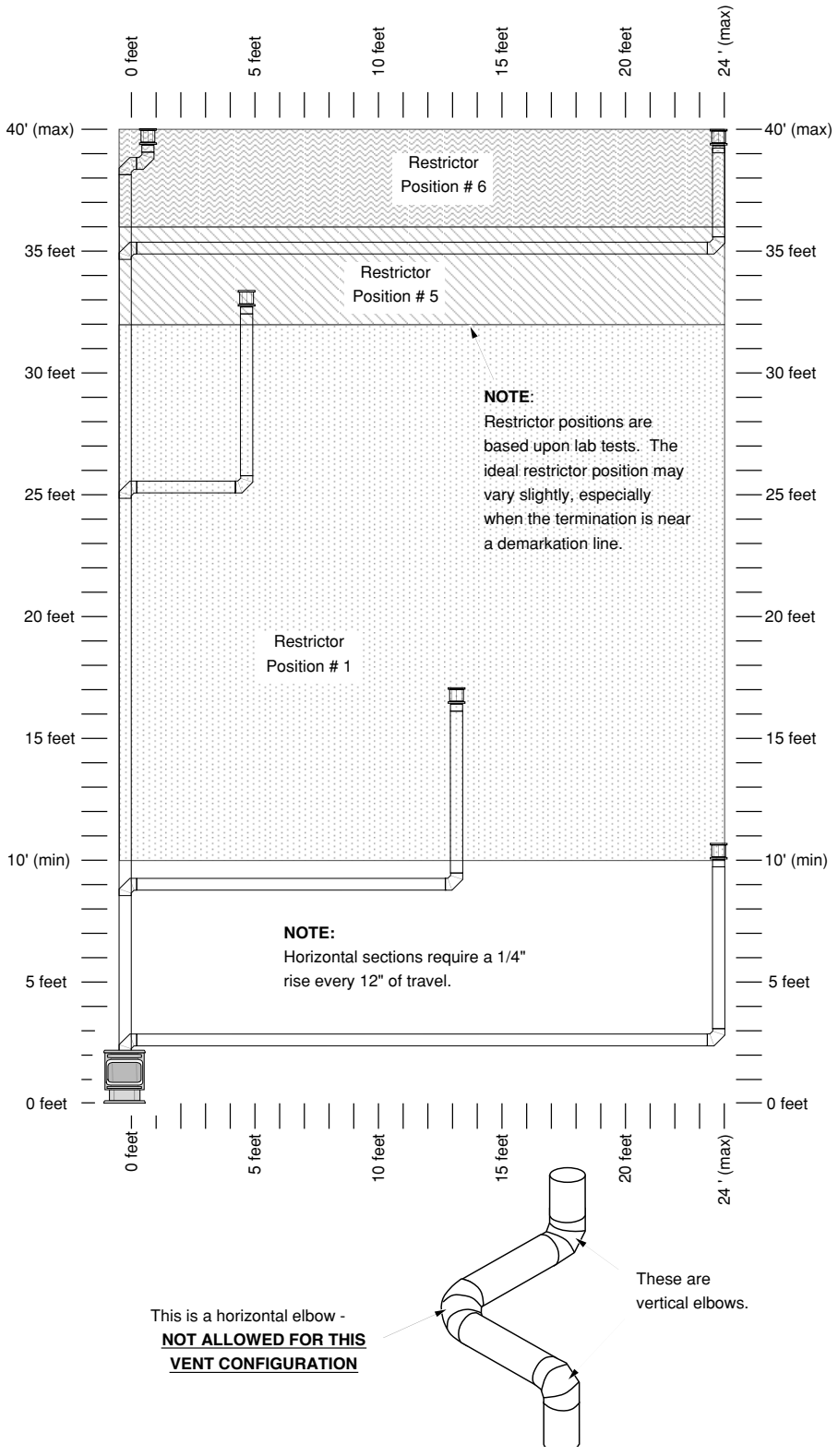




Approved Venting Configurations with a Horizonatal Termination and Three 90˚Elbows (all vertical)

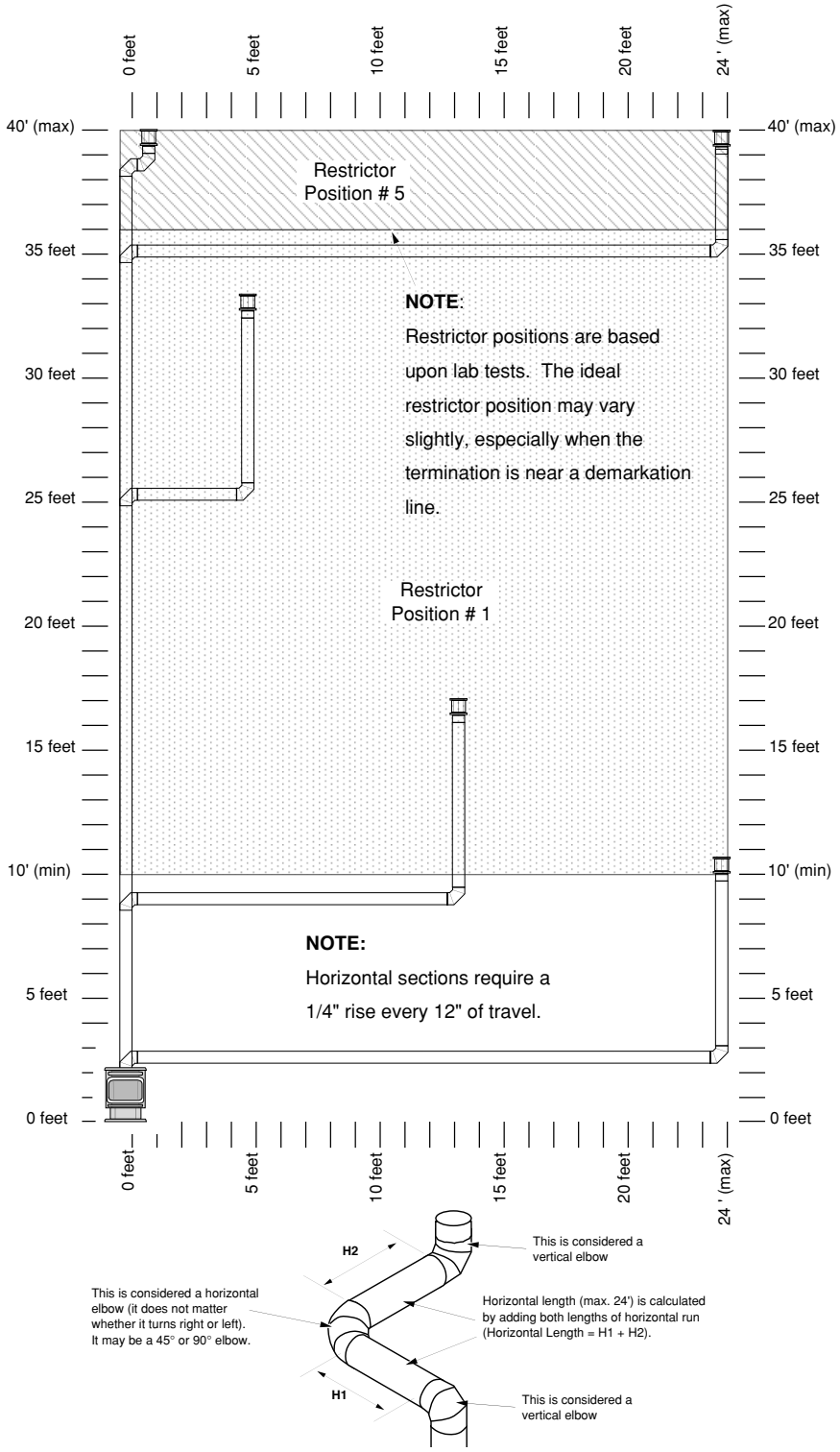


Vertical Venting Configurations with Two 90˚ Elbows



Approved Venting Configuration for Vertical Termination with Three 90˚ Elbows

(Two 90 vertical and one 45˚ or 90˚ horizontal elbow)

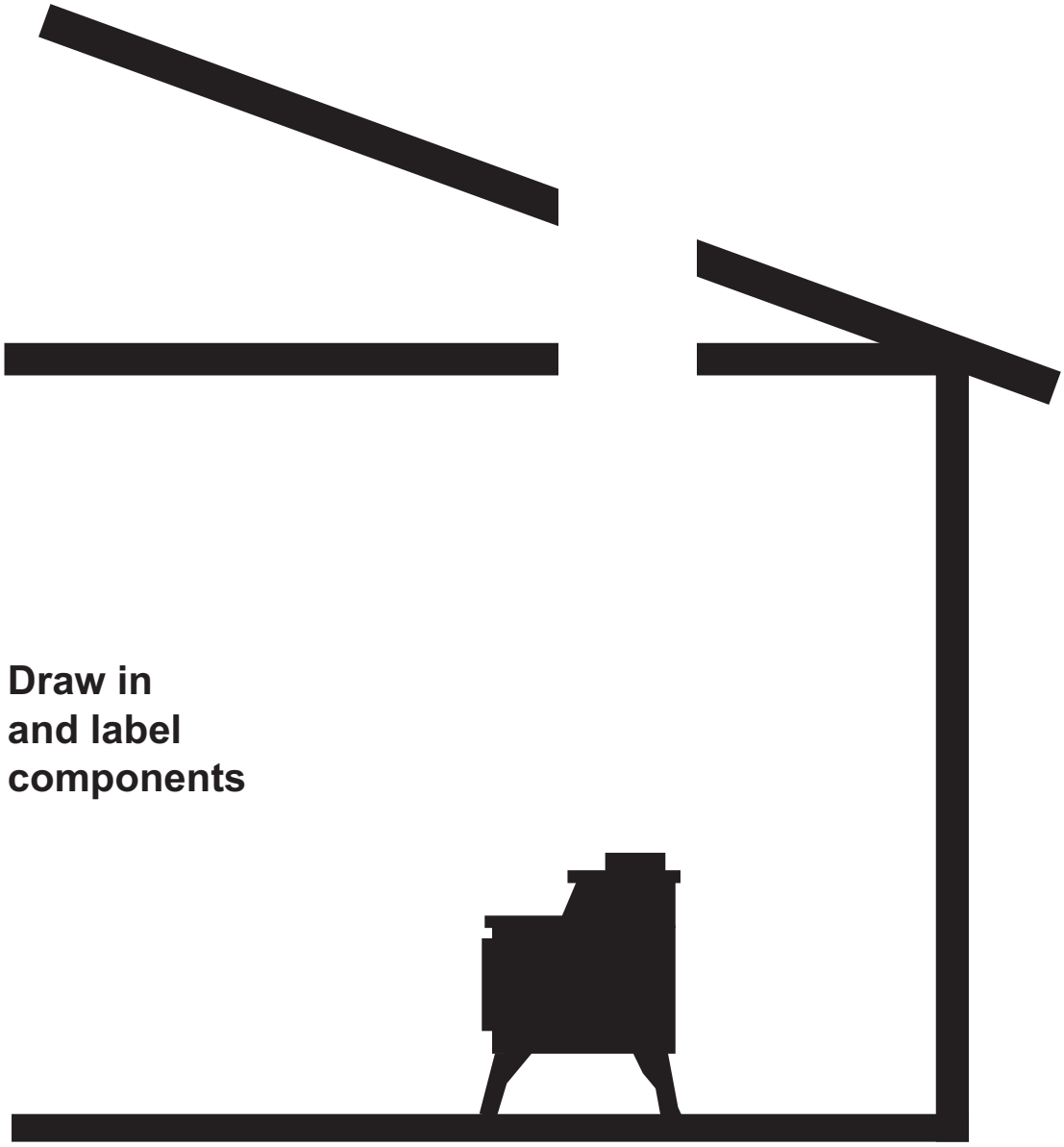


TRAVIS INDUSTRIES
HOUSE OF FIRE

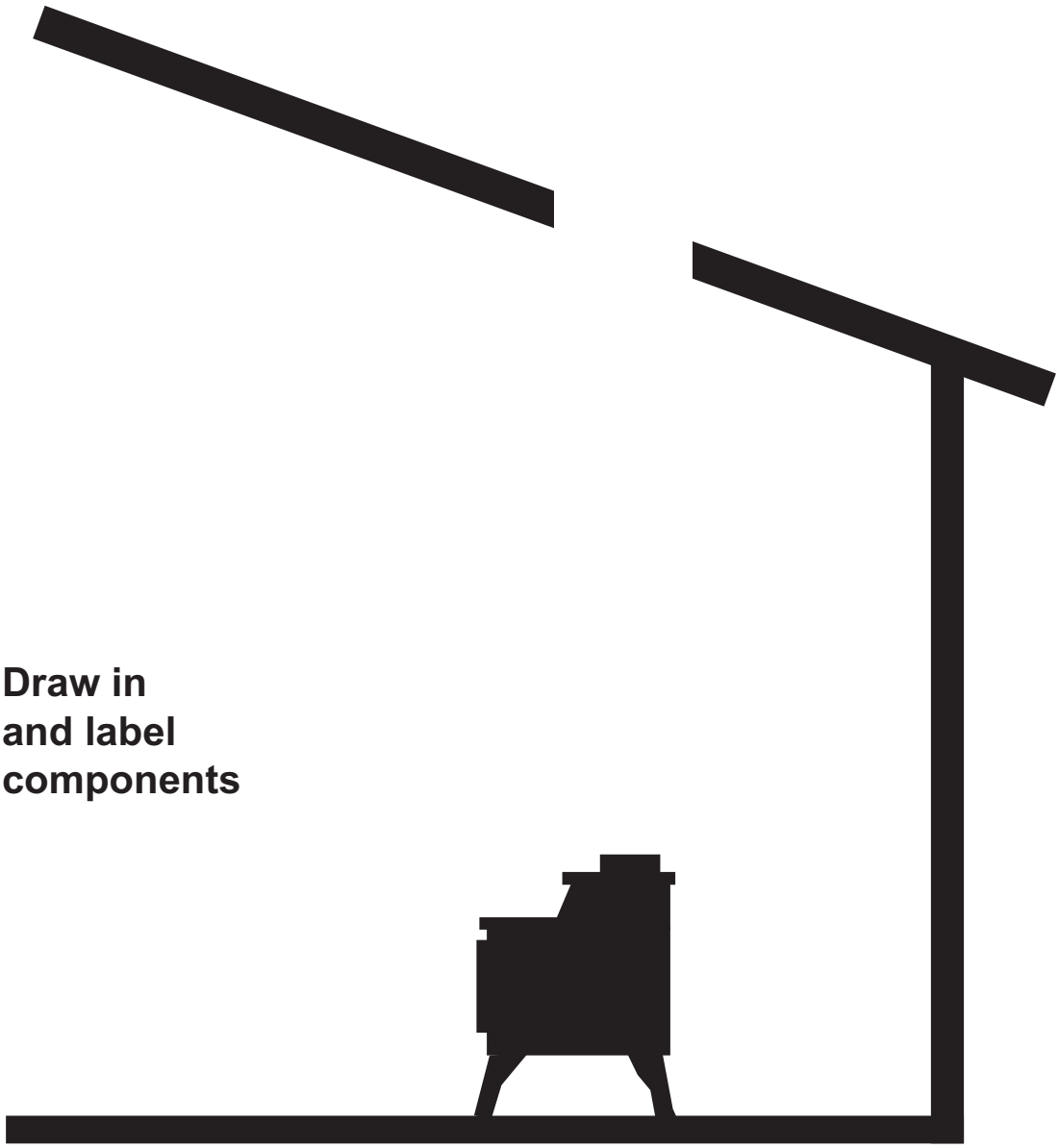
Direct Vent Horizontal
Thru-The-Wall Penetration

Draw in and label components

Direct Vent
Ceiling Penetration



Direct Vent Cathedral Ceiling Penetration



Draw in and label components

MILLIVOLT SYSTEMS

TRAVIS INDUSTRIES
HOUSE OF FIRE

Millivolt Systems & Thermoelectric Energy

Millivolt Systems Advantages & Disadvantages

Function

Gas Valves

Gas Control Valve Operational Sequence

MILLIVOLT SYSTEMS

TRAVIS INDUSTRIES
HOUSE OF FIRE

- Millivolt systems control the operation of all gas appliances produced by Travis Industries.

- The flow of the fuel gas and safety shut-off are all controlled through the use of gas control valves. These gas control devices utilize thermoelectric energy to open and close the gas flow at the appropriate times during normal operation of the gas appliance.

- This thermoelectric energy is measured in millivolts. (1/1000 volt DC)

- Travis Industries uses the SIT gas control millivolt valve.

- Note: Older appliances used RobertShaw gas control valves

MILLIVOLT SYSTEMS

TRAVIS INDUSTRIES
HOUSE OF FIRE

- A standing pilot or millivolt system utilizes thermal-electric energy to operate all functions of the gas valve.

- Millivolt systems utilize a pilot light to function as a safety monitor - if the pilot goes out, the safety system closes all gas flow to the gas valve.

- The pilot light is also used to safely light the main burner.

- Millivolt systems require no outside electrical source for operation (110V household current).

MILLIVOLT SYSTEMS

TRAVIS INDUSTRIES
HOUSE OF FIRE

ADVANTAGES +	DISADVANTAGES -
• Works when electricity is off • Tried and long term proven ignition system • Repair costs are very minimal	• Electrical resistance problems can cause performance concerns • Not understood by many non-hearth gas service people or other tradespeople ie. Gas Co., HVAC Electricians, Etc.

Functions of the Millivolt Gas Control Valve

- Controls Gas Flow
- Maintains A Standing Pilot
- Turns ON the Burner When Called For
- Powered By:

  Thermocouple - Powers Safety Pilot (EPU - Electromagnetic Power Unit)

  Thermopile - Powers Burner Operation

RobertShaw Gas Control Valve
Used on all older gas appliances and some new appliances

SIT Gas Control Valve
Used on most new gas appliances

Gas Valves

- Gas valves used in residential applications have a maximum inlet pressure of 1/2 PSI or 14 inches of water column.

- Higher pressure created by air pressure leakage test or high gas pressure will cause permanent valve damage.

- Make sure the gas valve is segregated from any piping systems undergoing an air pressure leakage test.

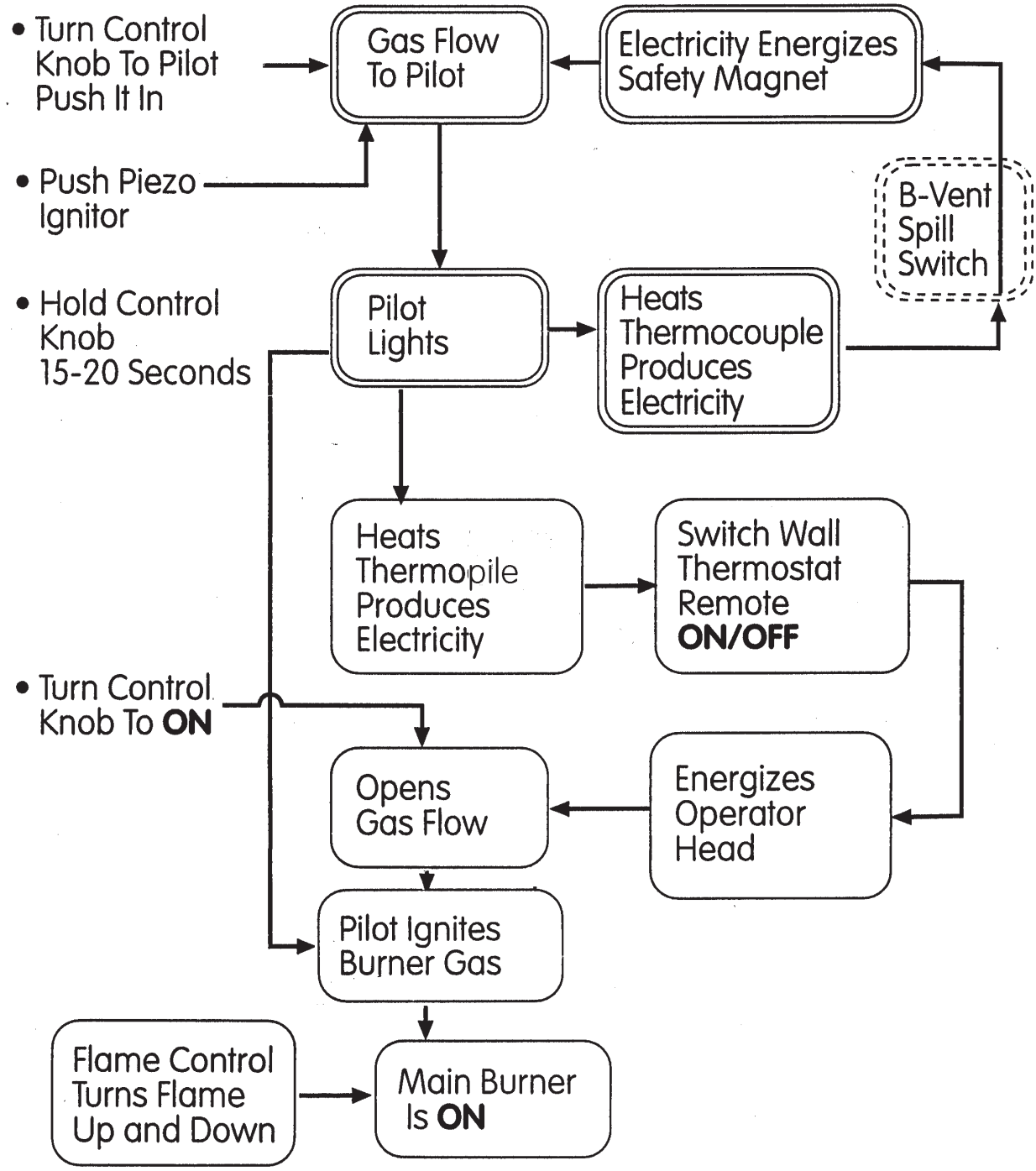
- Gas valves seldom become defective, yet they are the most commonly replaced component by technicians.

- The gas valve will continue to work unless it has been exposed to one of the following highs:

  HIGH PRESSURE
  HIGH VOLTAGE
  HIGH WATER (Flooded)
  HIGH TEMPERATURE

- Always replace defective gas valves with complete new valves of the same kind.

Gas Control Valve Operational Sequence



MILLIVOLT SYSTEMS COMPONENTS

TRAVIS INDUSTRIES
HOUSE OF FIRE

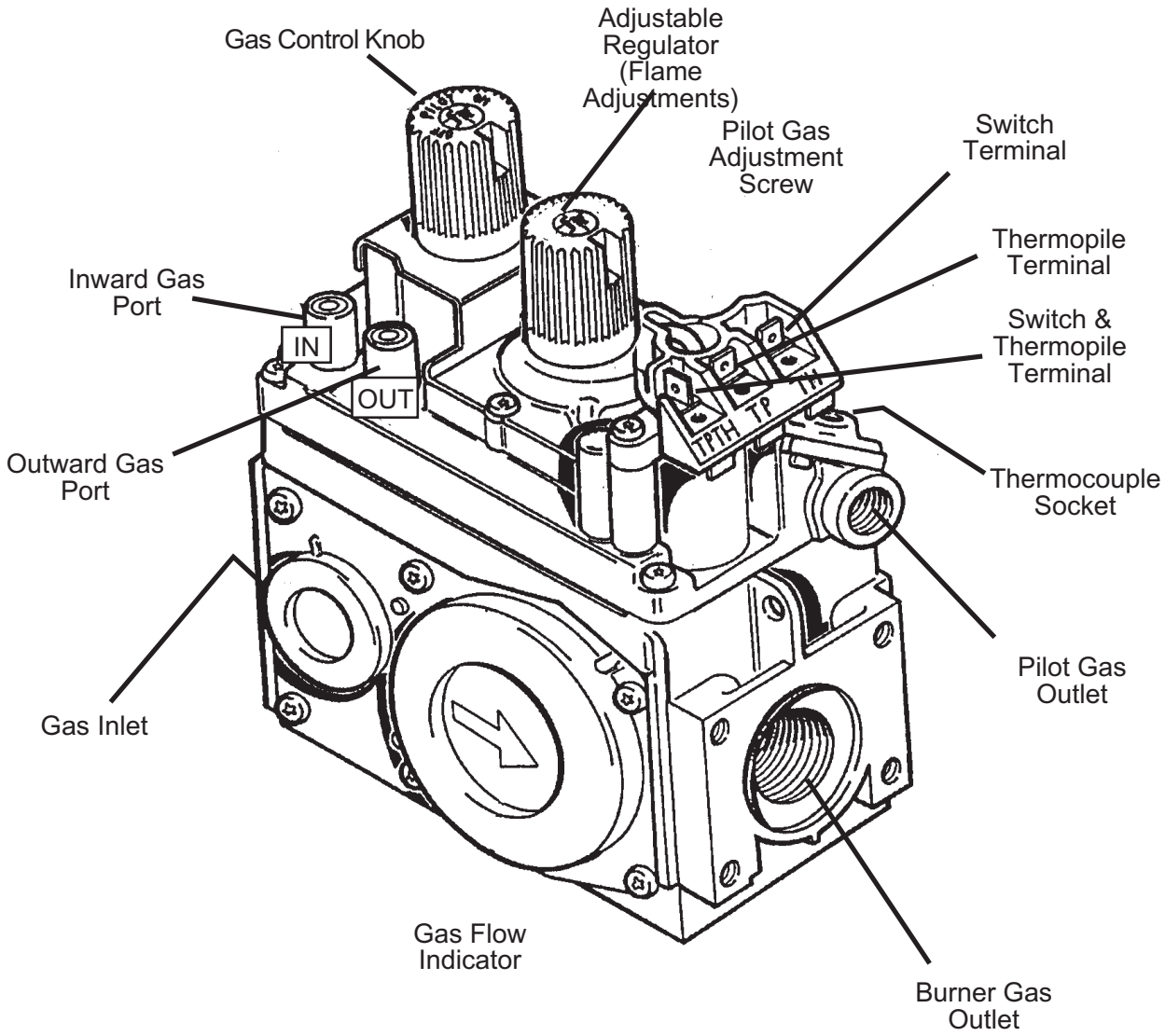
Gas Valve

- SIT
- RobertShaw

Pilot Assembly

- Piezo Igniter
- Thermocouple
- Thermopile
- Snap Disc
- Burner Orifice
- Pilot Orifice
- Pressure Regulator

SIT Gas Control Valve



SIT Gas Control Valve

820 NOVA Gas Control DATA

225˚ F Temperature (MAX)

• Main Operator		• Safety Magnet	
Minimum Voltage 145 MV		Hold-In Current Drop Out Current	Less Than 285 MA Greater Then 125 MA
Coil Resistance	2.25 OHMS ± 0.5 OHMS	Coil Resistance	.018 OHMS + .003 OHMS

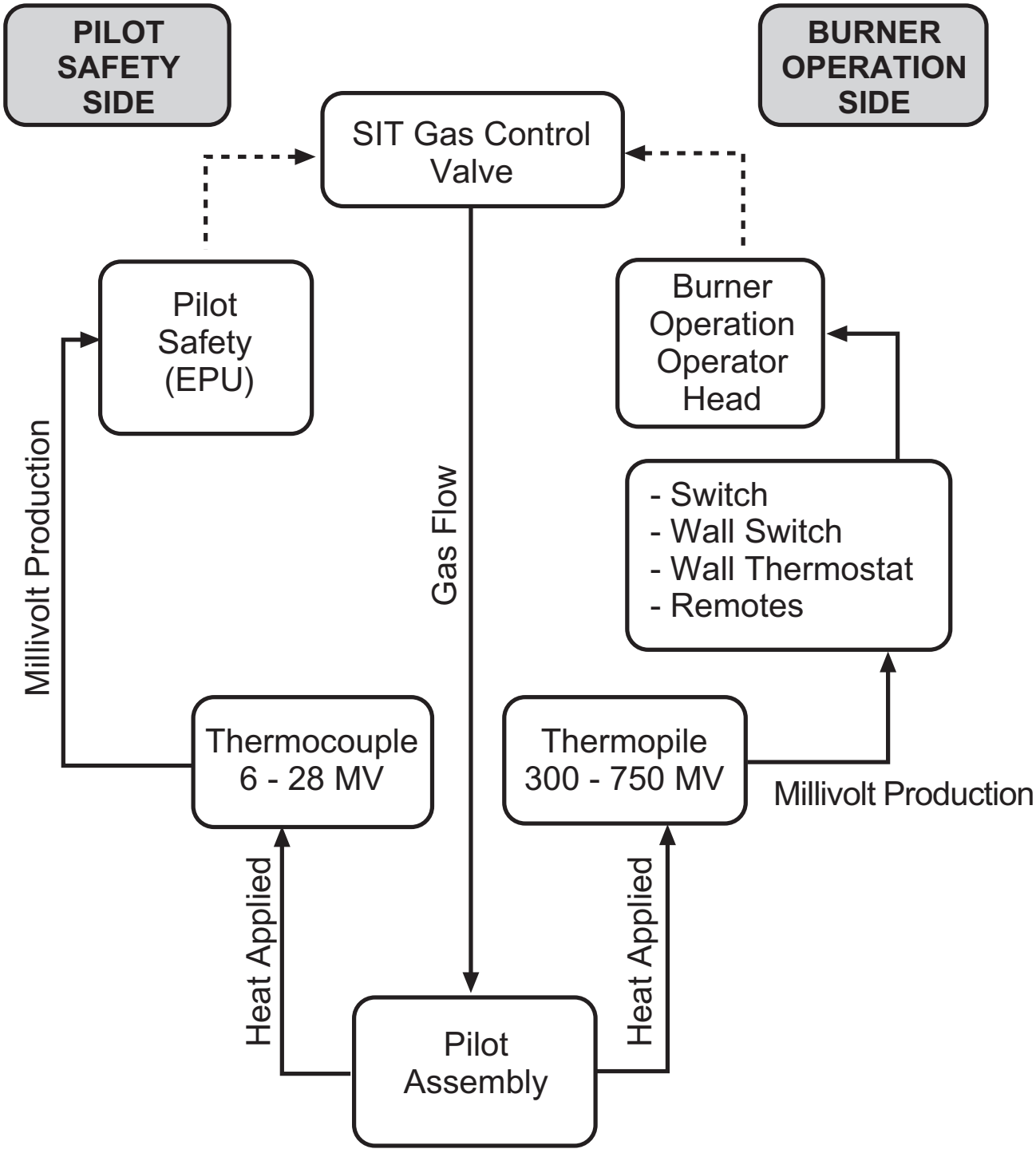
• Thermocouple Hand Tighten then 1/4 Turn with Wrench	Engaged circuit voltage less than 6 MV - Replace

SIT Gas Control/Pilot Assembly

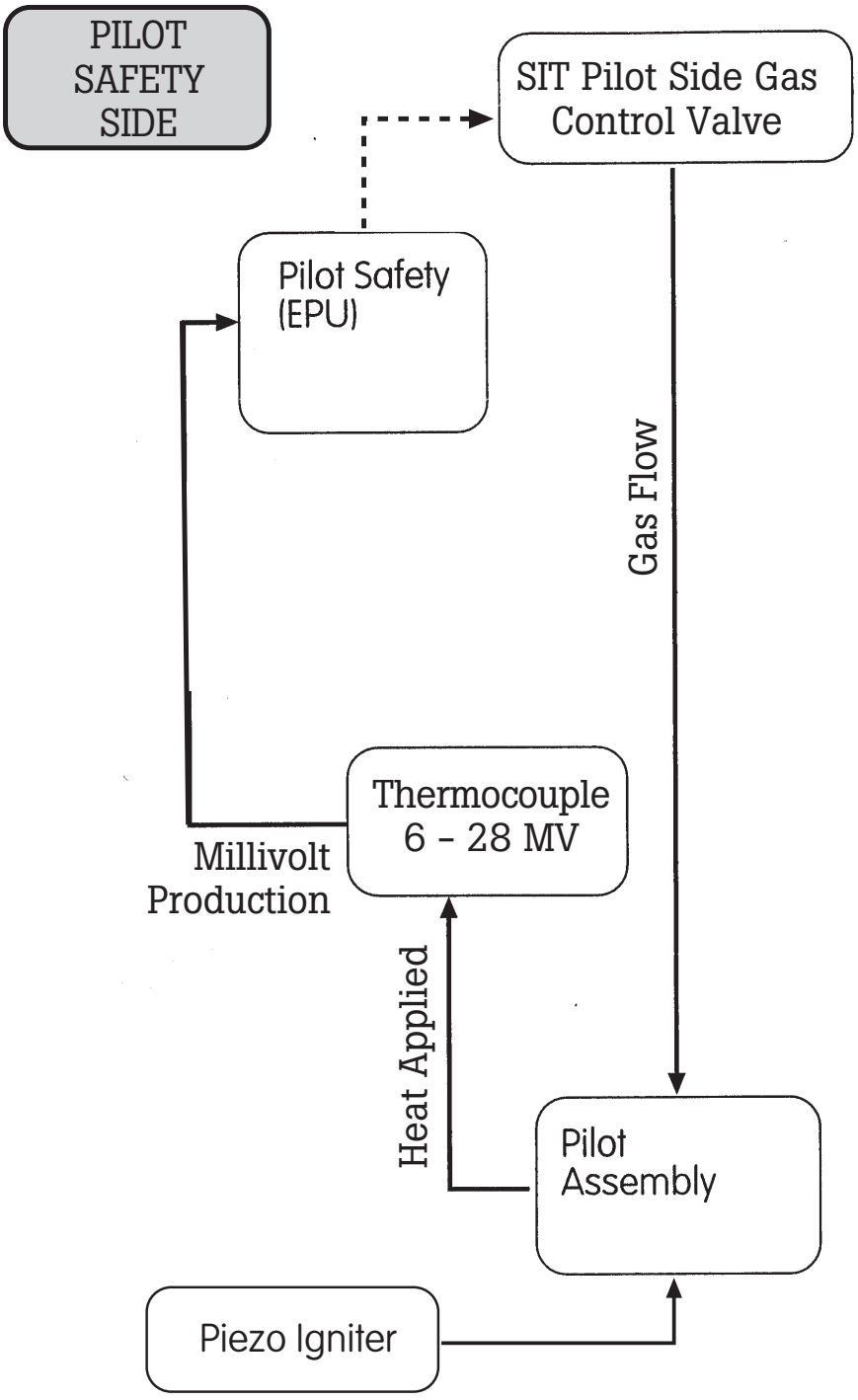
FEATURE	ADVANTAGE	BENEFIT
Gas Pressure Ports	Easy access for service technician	• Purge air from incoming gas • Test incoming and out going gas pressure
NOTE: Use proper sized screw driver - 3/16" straight		
Front Mount Thermocouple Port	Easy access for thermocouple testing or replacement	• Time saving • Ease of access
Pilot Gas Adjustment	No cover cap screw Uses double "O" ring	• No screw to loosen • No gas leaks
NOTE: Use proper sized screw driver - 3/16" straight		
Multiple Operator Head Terminals 6 - Spade Terminals 3 - Screw Terminals	Multiple choices for wire connections	• Direct connection of remotes and thermostats
Safety Lock Out	Prevents accidental Gas Flow Until Safety Disengages	• Total Safety
Replaceable Spark Electrode	Spark Electrode is Replaceable	• Time Saving • Ease of Replacement
Pop Top Pilot Hood	Easy Pilot Orifice Changeover	• Time Saving • Ease of Gas Conversion

TRAVIS INDUSTRIES
HOUSE OF FIRE

SIT Control Divided Into Two Sides

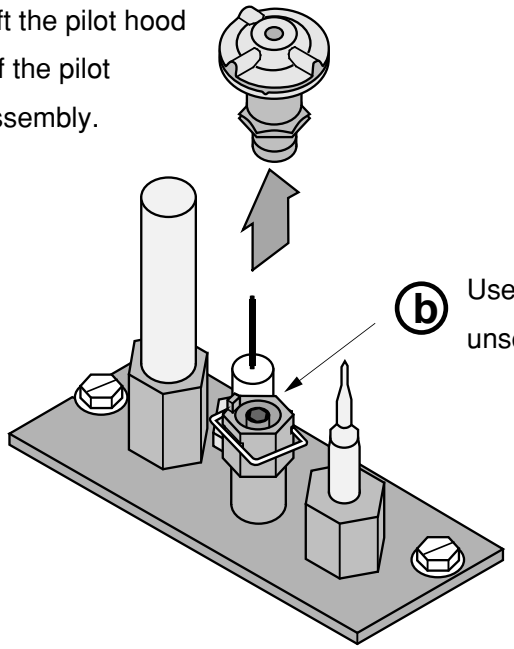


Pilot Side Components of a Gas Control Valve



SIT Pilot Assembly

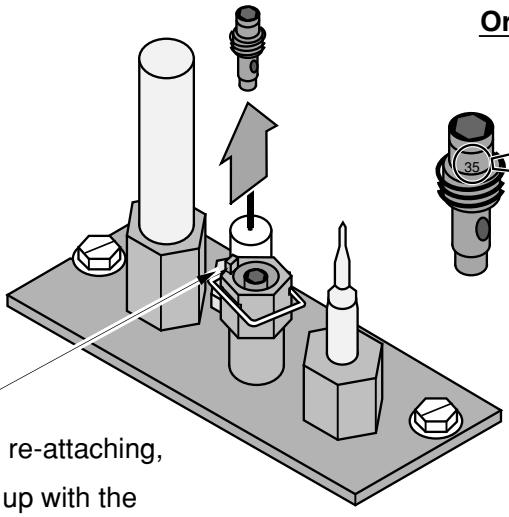
a Lift the pilot hood off the pilot assembly.



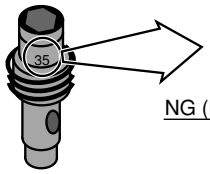
b Use a hex wrench to unscrew the orifice.

5/32" Hex

c Remove the orifice and replace with the LP orifice. Screw the orifice all the way in and replace the pilot assembly.



Orifice Identification:



LP (Propane) Orifice

35

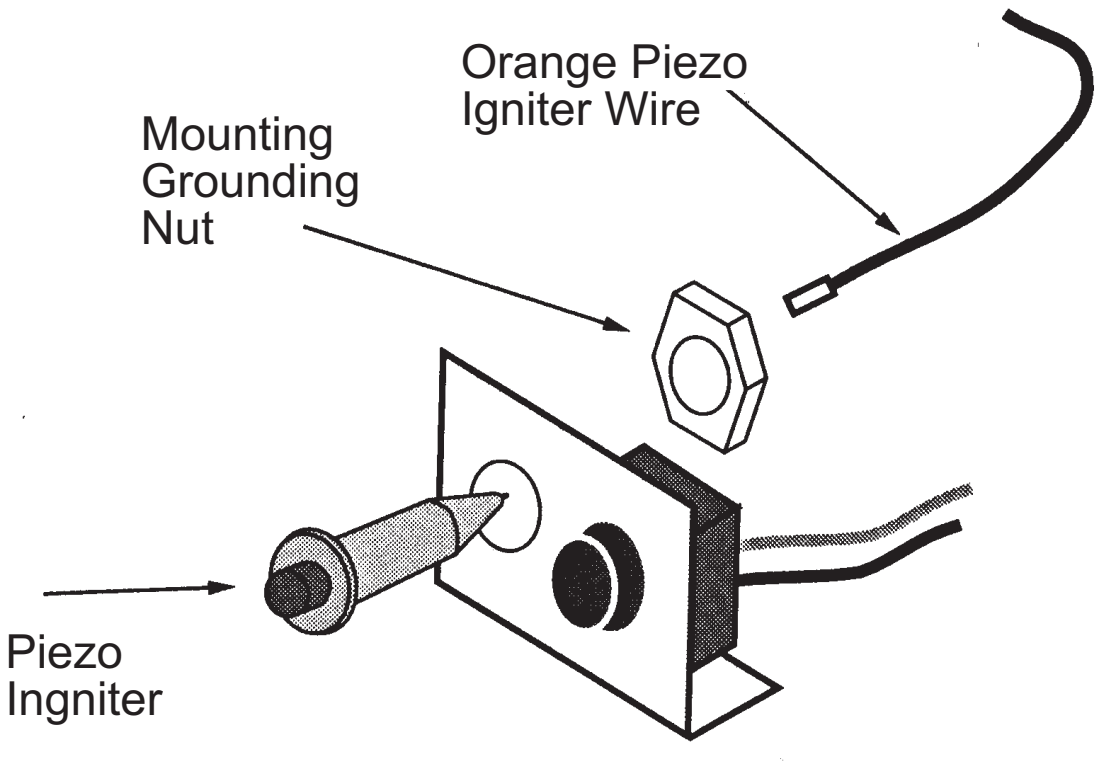
NG (Natural Gas) Orifice

62

NOTE: when re-attaching, this pin lines up with the notch in the pilot hood.

Piezo Igniter

- Used to light the pilot flame
- Spark (BLUE) produces a temperature of 1700˚ F



Piezo Igniter

- A Piezo Igniter is used to light the pilot.

- The Piezo Igniter, also used on many barbecue grills, is named after its inventor, Piezo. Mr. Piezo discovered when pressure was exerted on a crystal, it would produce electricity.

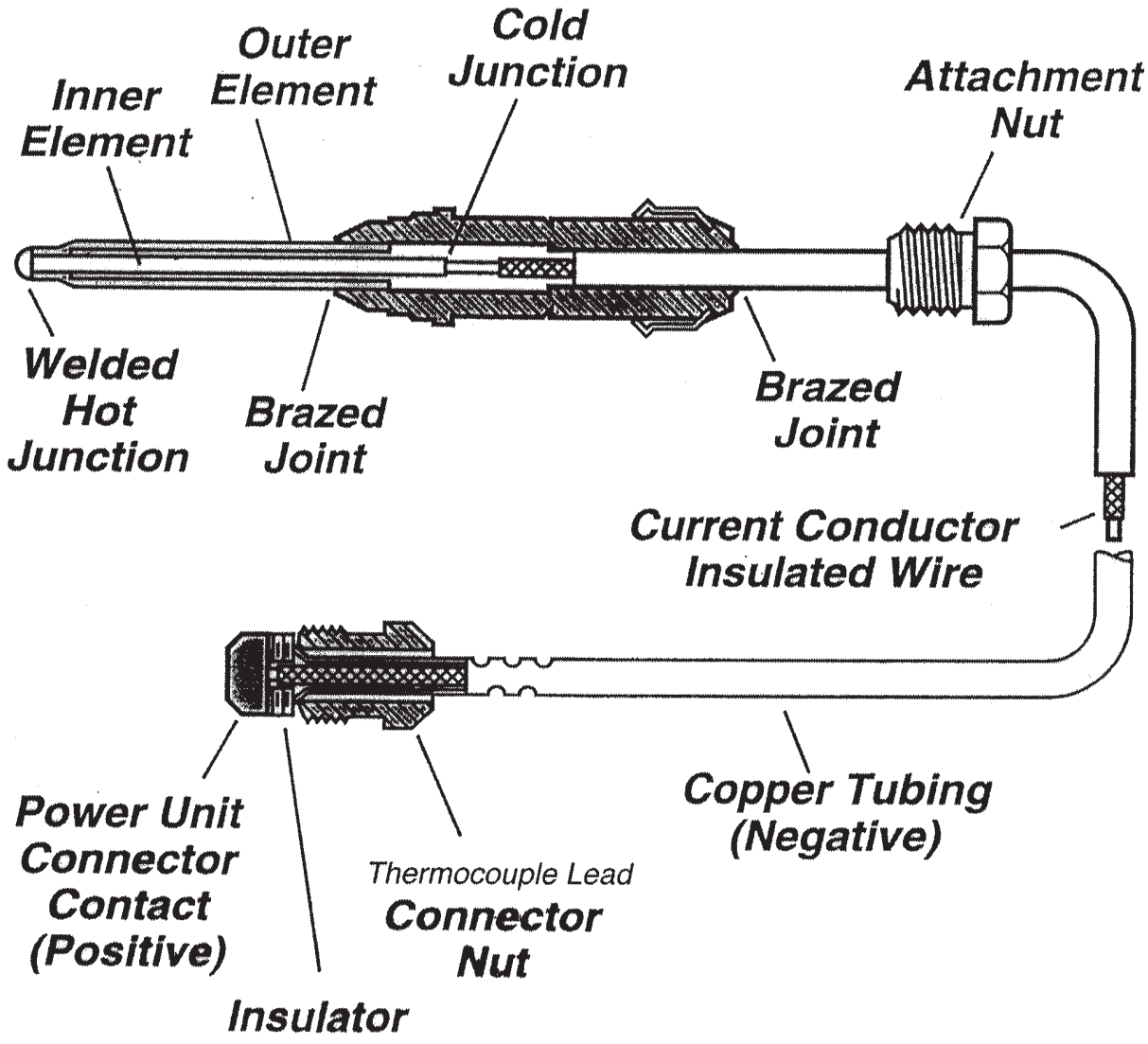
- The crystal in the Piezo Igniter is a man-made crystal which has been soaked in oil, charged with high electrical voltage, and then baked under high temperature.

Piezo Igniter

- With each push of the igniter, 25,000 volts (no amperage) is released to create a heat source at the pilot assembly. The high voltage travels to an electrode, then jumps across (as a heavy blue spark) to the grounded pilot assembly. The voltage then returns to the man-made crystal through the common ground system of the gas appliance. The heavy blue spark produces a temperature of 1700˚ F.

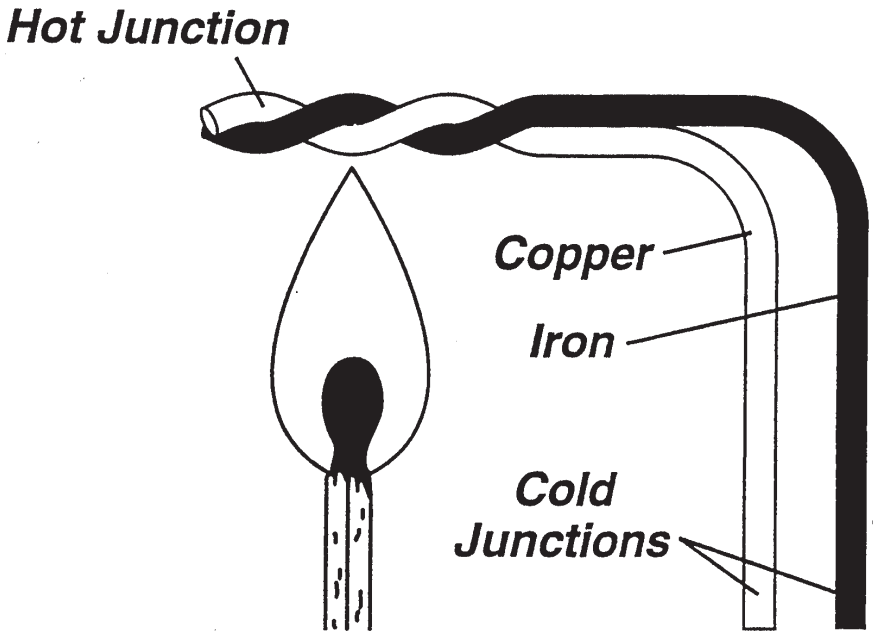
- Should you receive a shock while touching the appliance when pushing the Piezo Igniter, you have become the ground or return path for electricity. This indicates a poorly grounded Piezo Igniter.

Thermocouple



- Millivolt Output = 25-30 Millivolts (no load). Not connected to gas control valve EPU

Thermocouple/Thermopile Principles



- In the late 1800's Thomas J. Seebeck, a German physicist, discovered the principles of thermocouple. Therefore, it is often known as the Seebeck effect.
- Two dissimilar metals, when heated, produce electricity
- Thermo electric energy
- Produces millivolts (1/1000 VDC)

Thermocouple/Thermopile

Operation

- Pilot heats hot junction
- 400˚F is the ideal heat difference between hot and cold junctions (this will produce maximum voltage potential).

Mounting Brackets Provide Heat Sink

This allows heat at the base to properly disapate during operation and cool down

Over-heating Causes No or Low Voltage Production

This is caused by:

- Improper pilot flame location

And results in:

- Heat transfer to cold junction

Which:

- Produces low or no voltage

Important Information About Thermocouples

- Typical voltage production up to 25-30 millivolts (no load - not connected to the gas control valve).
- Produces DC voltage measured in millivolts.
- Millivolt = 1/1000 of a volt D.C. voltage.
- Used with safety pilot system side of the gas control.
- 6 MV (SIT) production minimum required (with pilot on - in use - connected to the gas control valve EPU). A thermocouple adapter is required to measure millivolts if you can not access the solder joint on the back of the valve.
- Dropout time of 30 seconds - within 30 seconds after pilot flame is extinguished the safety system shuts off the total gas supply to the unit.

NEVER - substitute a “universal” thermocouple for original equipment as its shutdown time may be as much as **2 MINUTES.**

Thermocouples

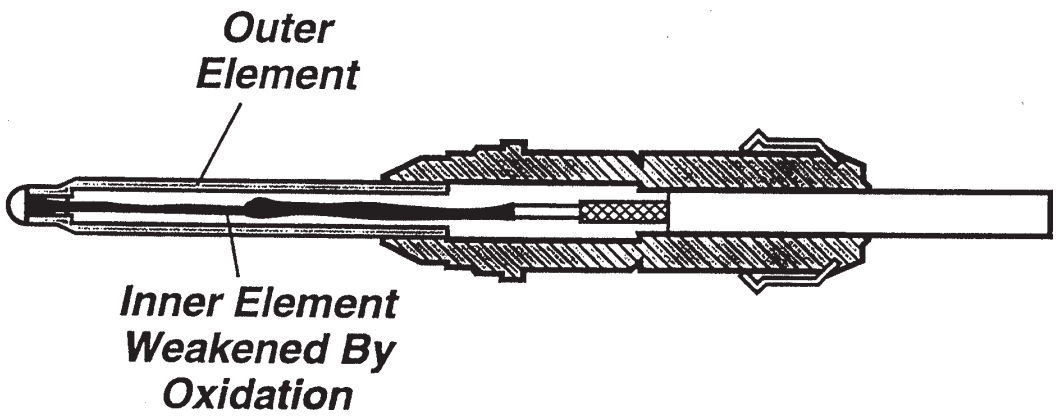
Failure Causes:

- Oxidation of inner elements - you have no control over this.

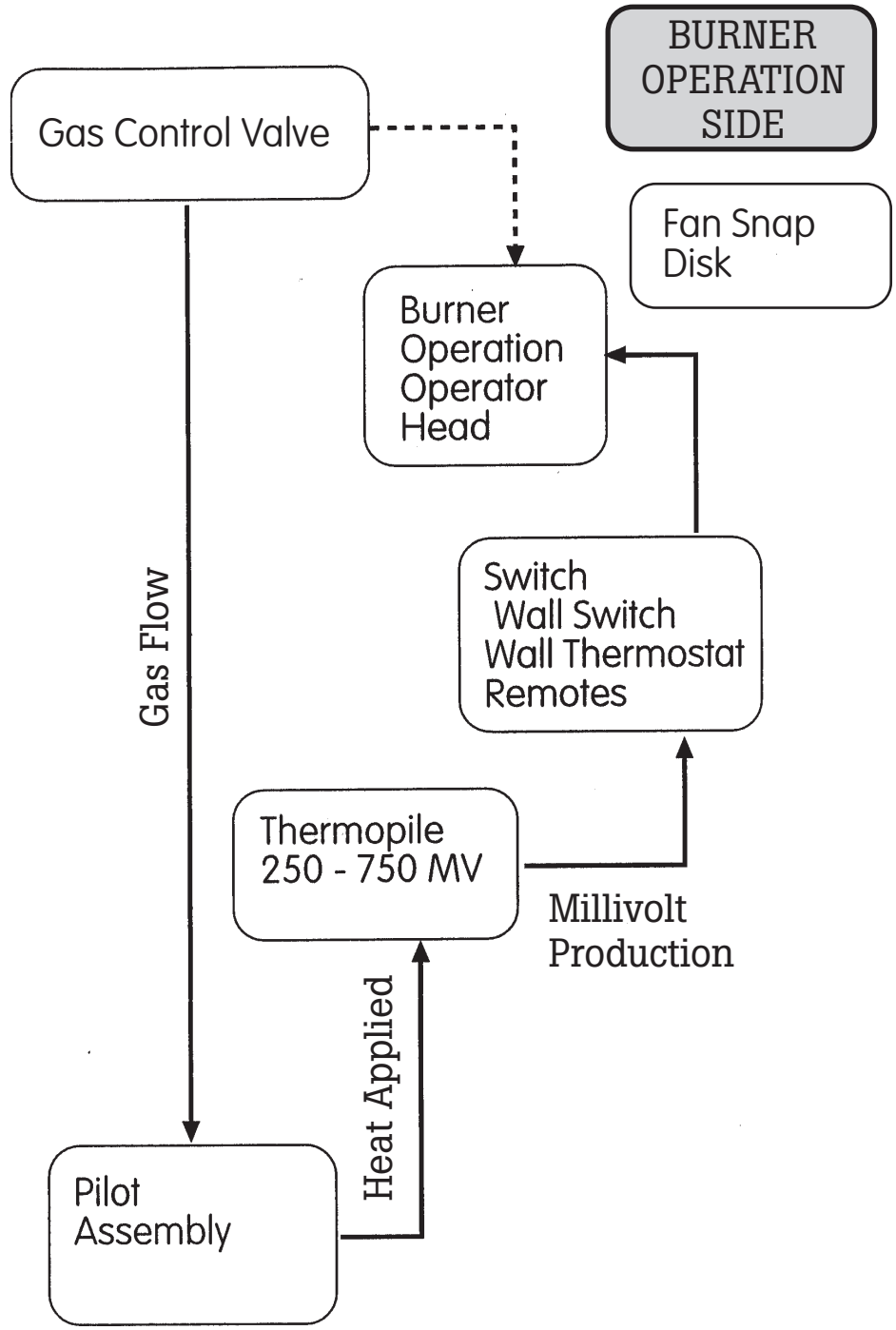
- Over-firing - Each 100˚F increase of 400˚ difference reduces life by 1/2.

  - Caused by oversized a pilot flame.

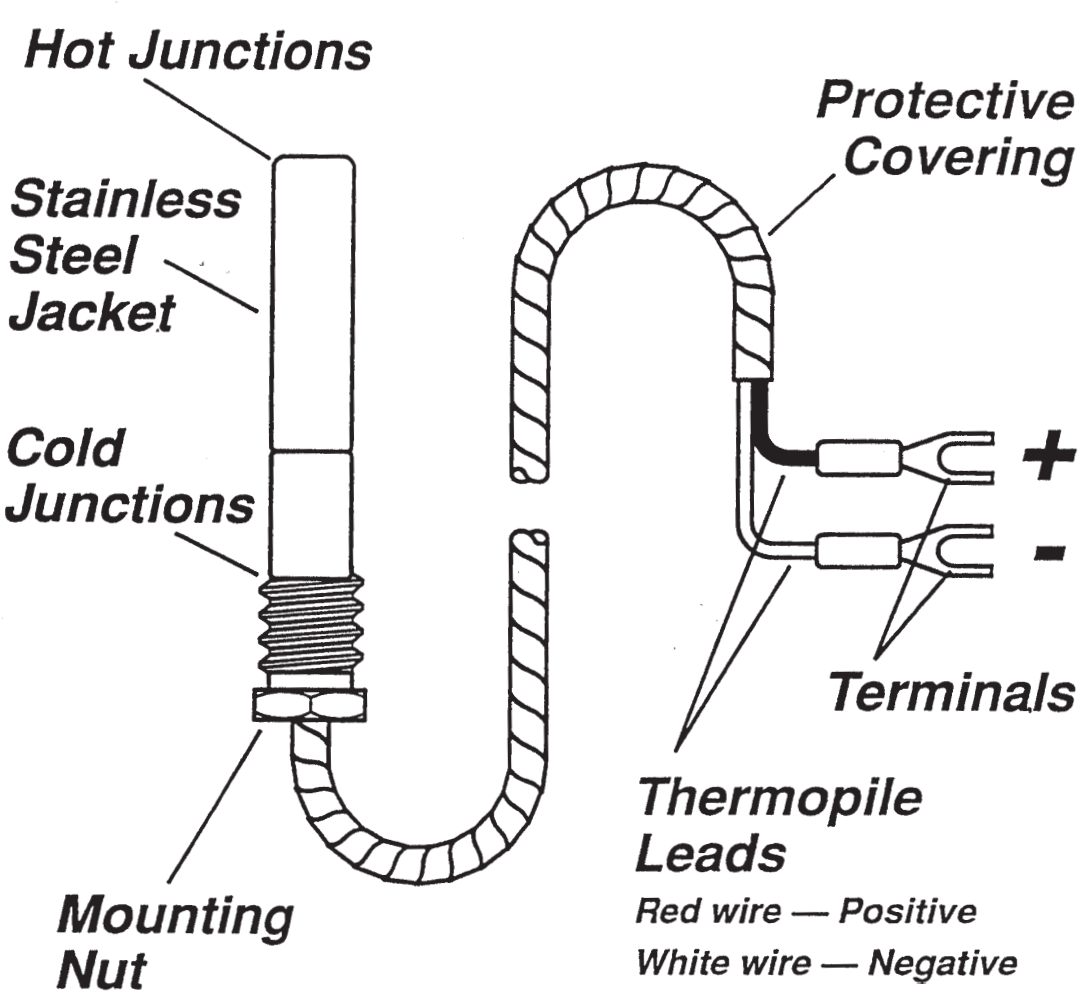
  - Caused by super heating with a propane torch to quickly heat up the system.



Gas Control Burner Side Components



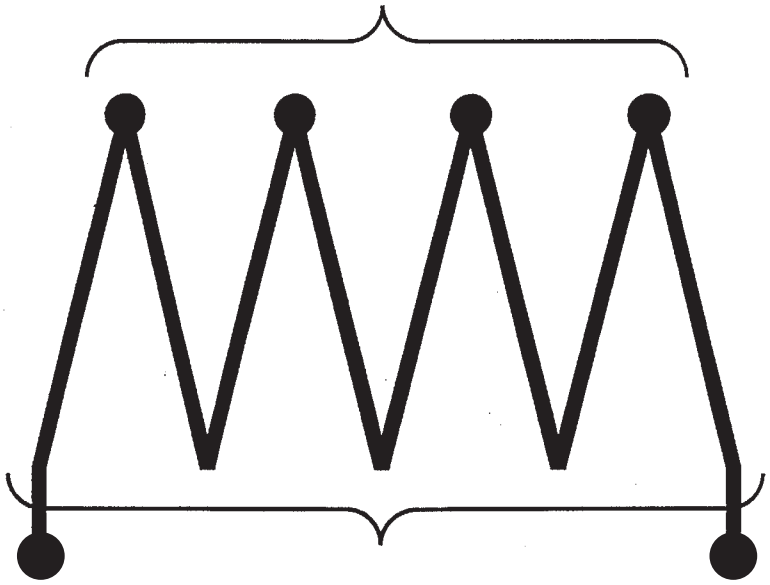
Thermopiles



- Millivolt Output: 250 to 750 Millivolts
- Our older original gas appliances used only a thermopile. They did not use the thermocouple/thermopile.

Thermopiles

HOT JUNCTION



Voltage measured across two open ends

Voltage measured

COLD JUNCTION

Thermocouples Connected in Series

- Each pair of wires is a thermocouple.
- Up to 25 thermocouples connected together.
- Voltage in a series circuit is additive thus producing a capability up to 750 MV.

Thermopiles

Voltage Production:

• 250 millivolts - 750 millivolts

Used with Automatic Valves - Robertshaw and SIT gas control valves.

• Wall switches
• Wall thermostats
• Unit mounted switches
• Remote controls

Minimum Voltage

• 250-300 millivolts pilot ON only - System Engaged (No burner ON).

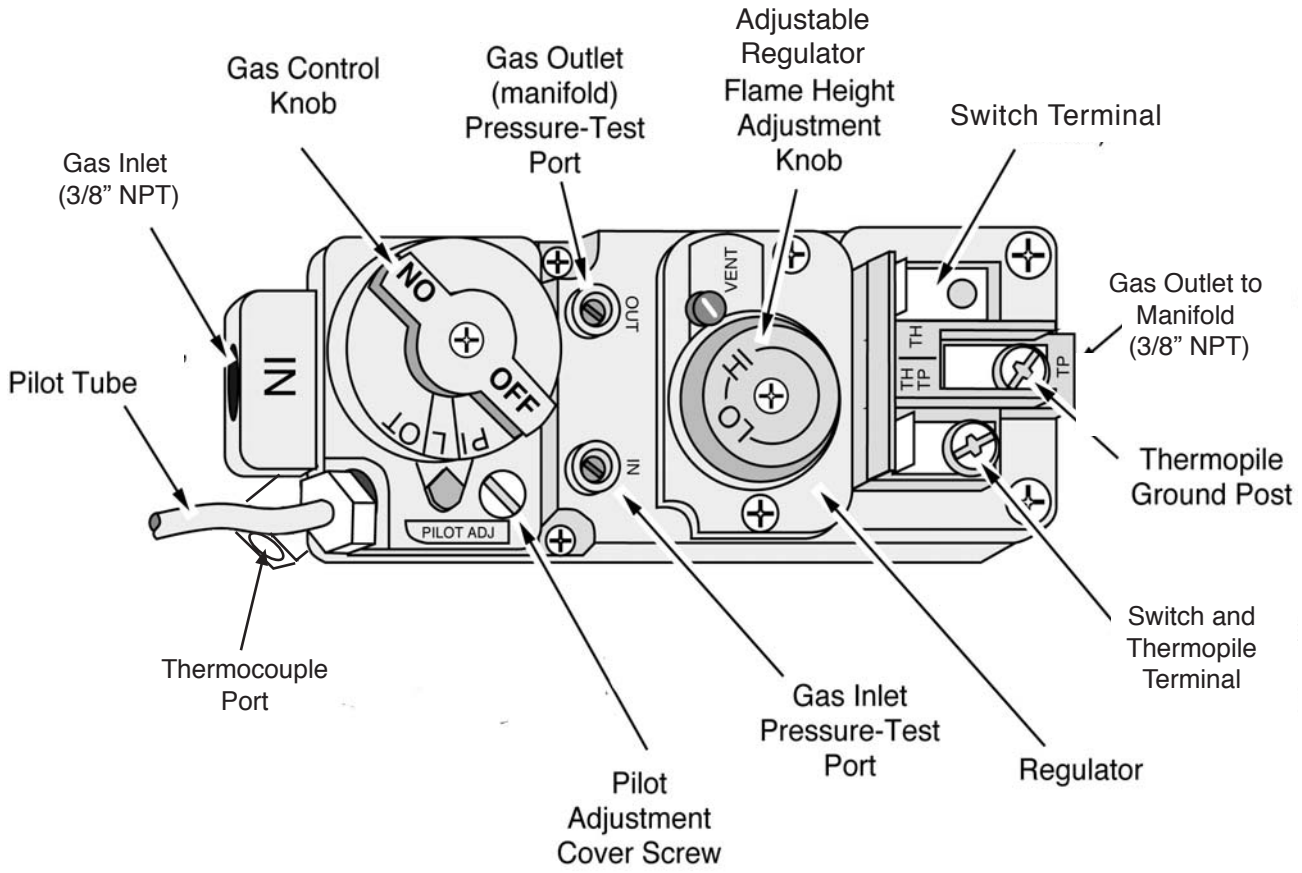
Cool Down

• May take up to three minutes to cool down (safety standard allows up to three minutes).

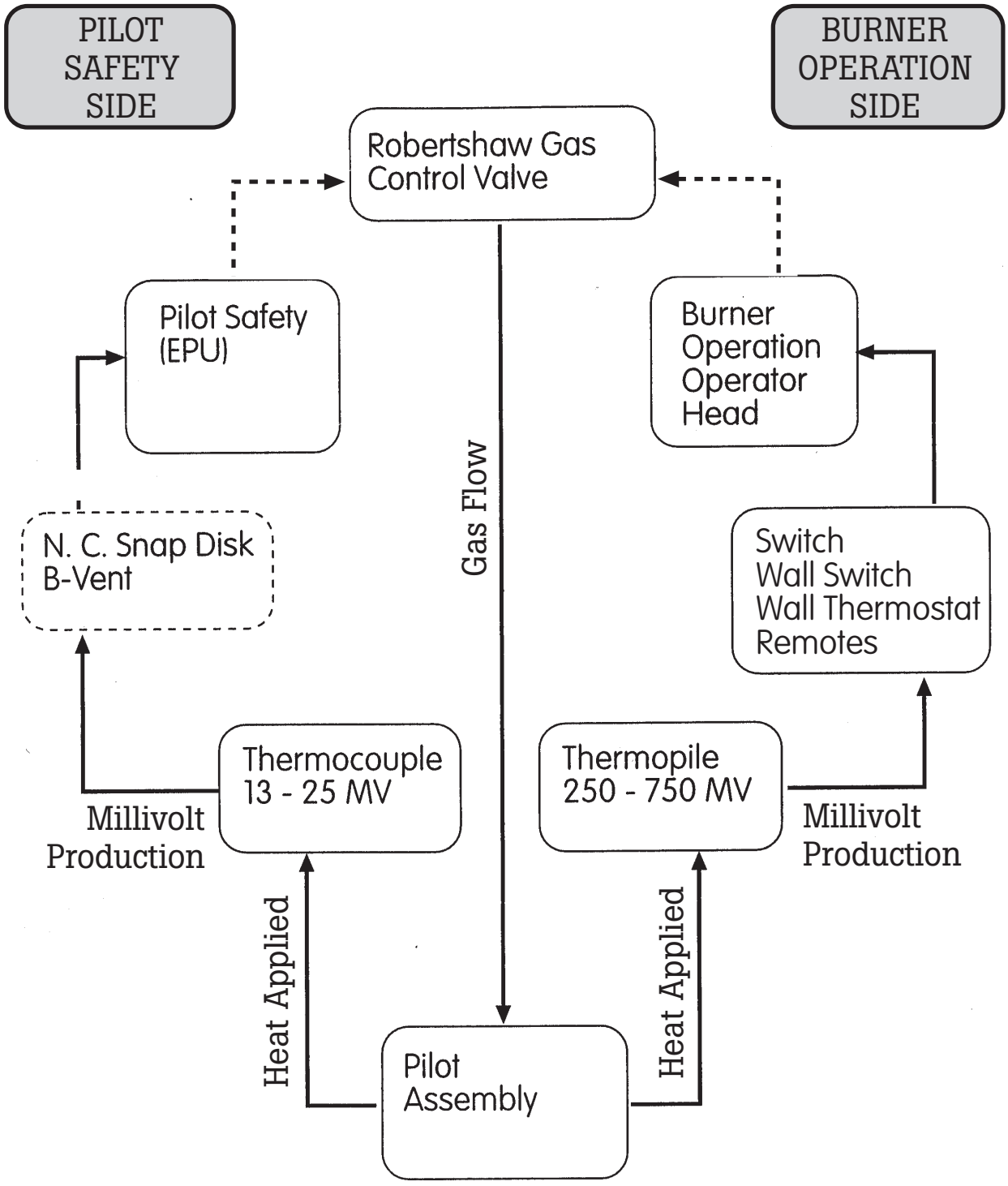
NOTE - On old units using only a thermocouple, you might have up to 3 minutes of pilot gas leakage before the safety will shut off the gas supply.

Gas Control Valve

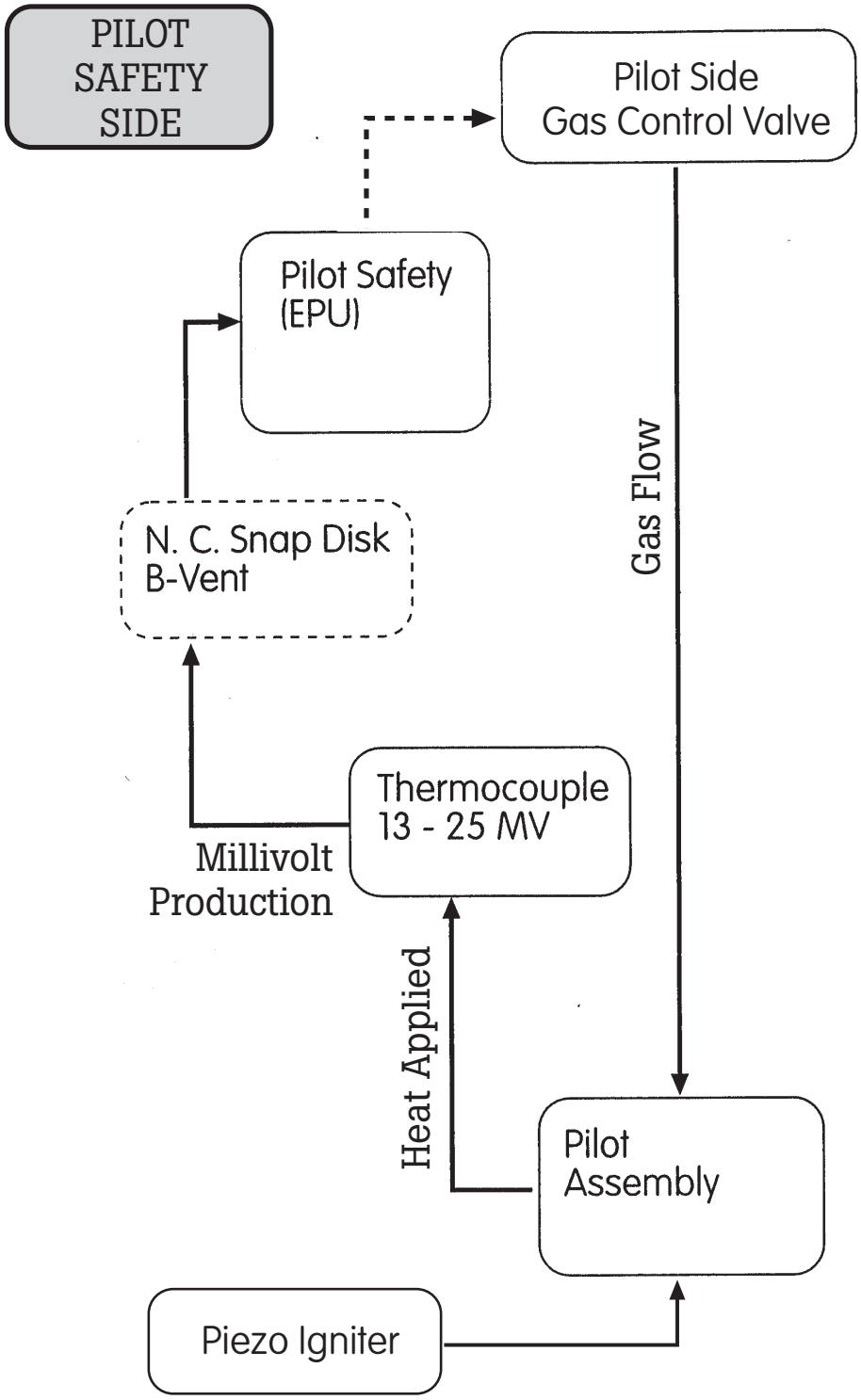
RobertShaw
Millivolt Valve



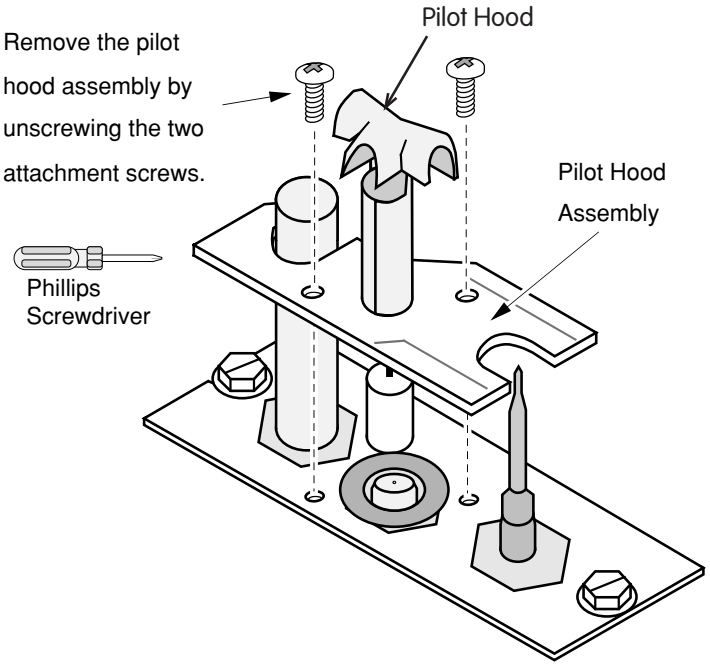
RobertShaw Control Divided Into Two Sides

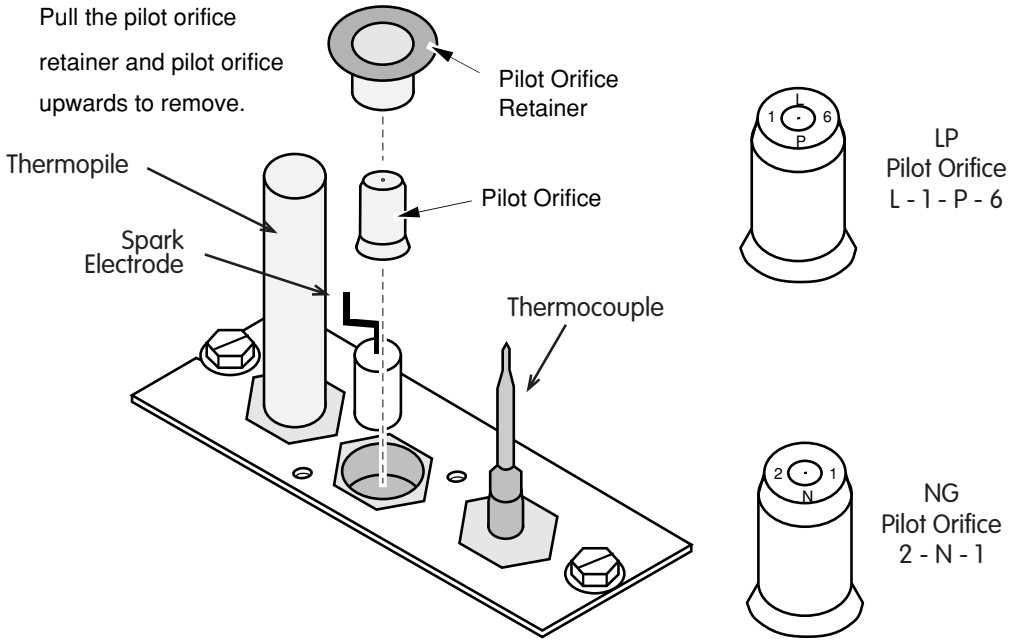


Pilot Side Components of a Gas Control Valve

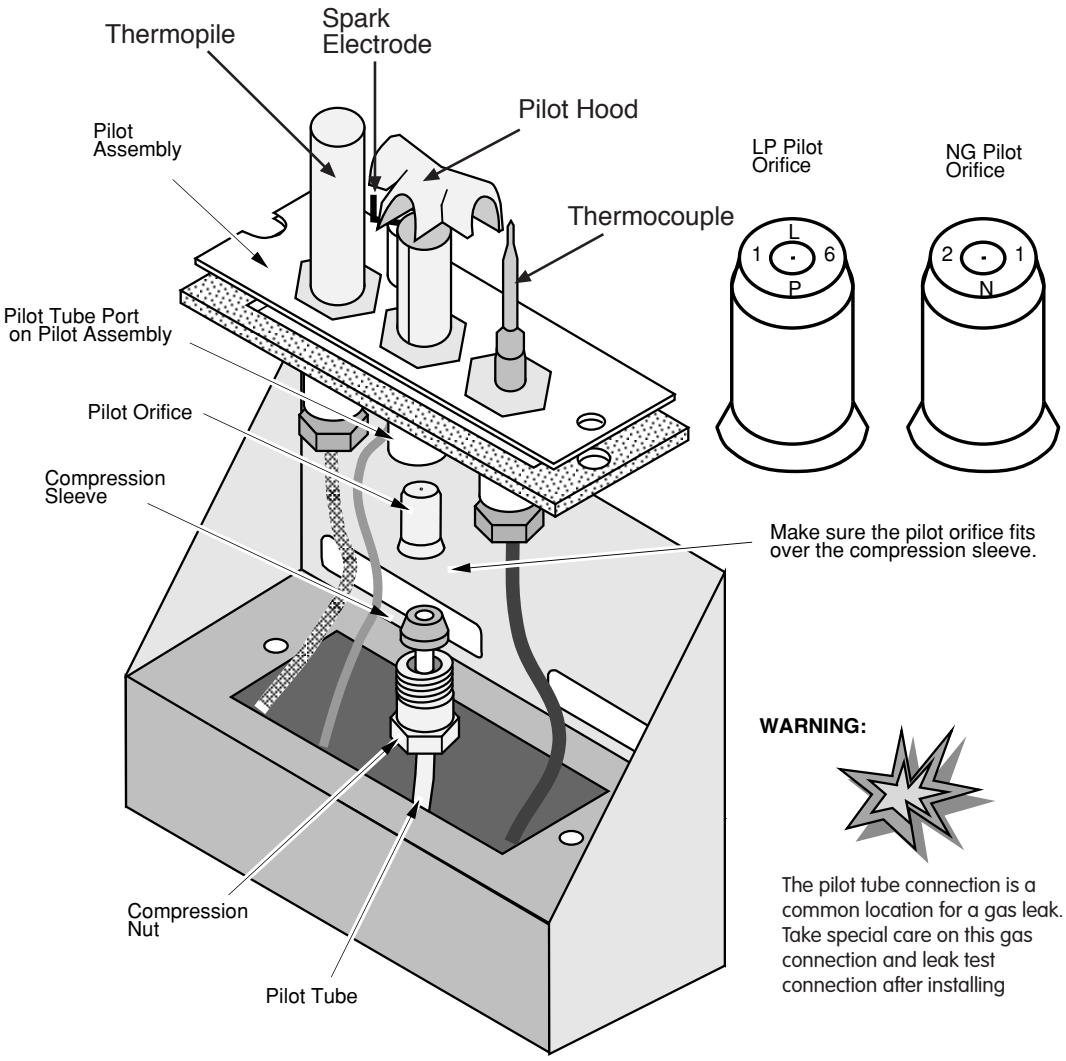


Pilot Assembly
RobertShaw - New Pilot Assembly





Pilot Assembly
RobertShaw - Older Pilot Assembly



NOTE: Thermocouple - power to EPU coil

NOTE: Thermopile - power to head coil (main burner)

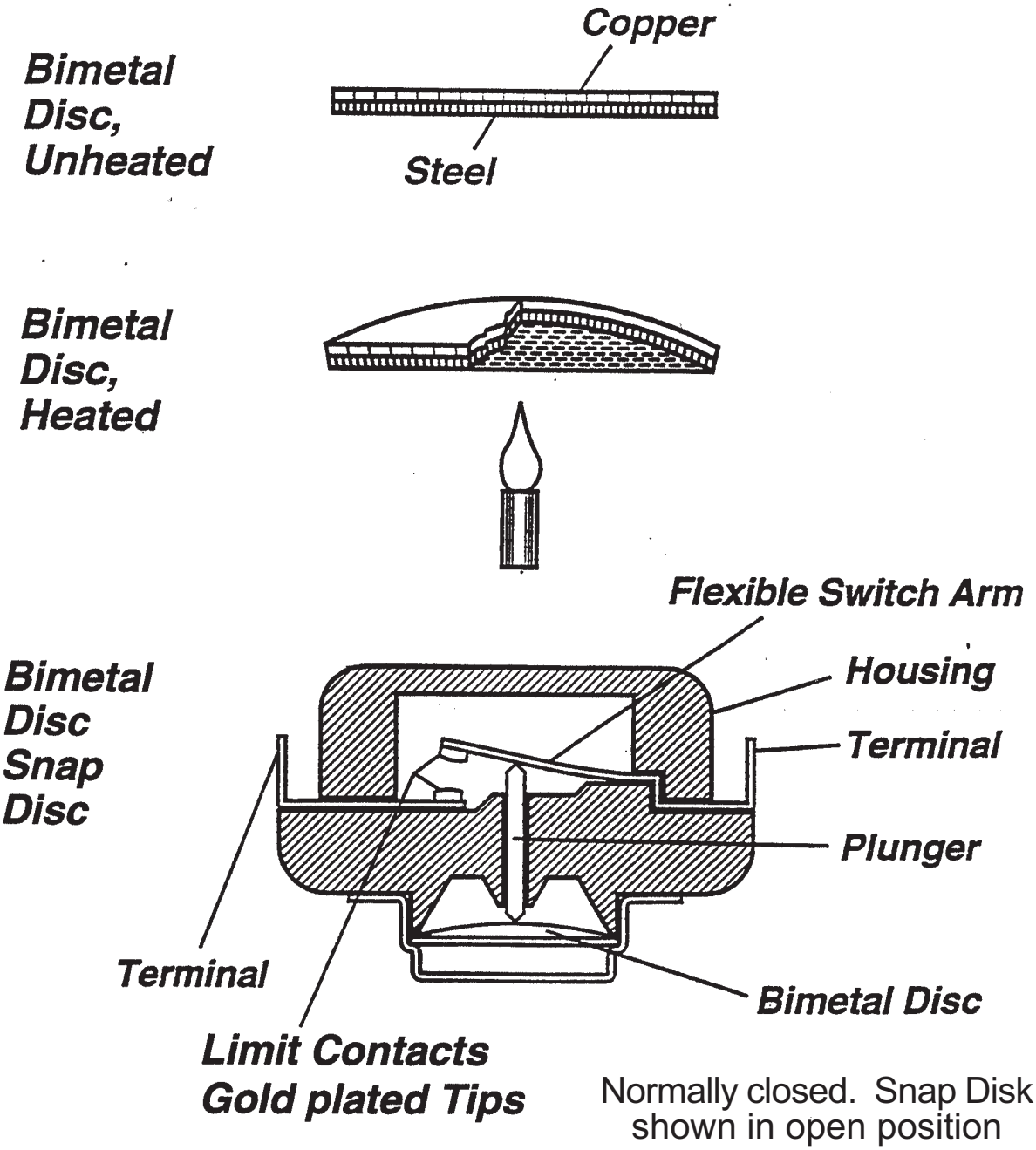
Important Information About Thermocouples

- Typical voltage production up to 25-30 millivolts (no load - not connected to the gas control valve).
- Produces DC voltage measured in millivolts.
- Millivolt = 1/1000 of a volt D.C. voltage.
- Used with safety pilot system side of the gas control.
- 13 MV (RobertShaw) production minimum required (with pilot on - in use - connected to the gas control valve EPU) A thermocouple adapter is required to measure millivolts.
- Dropout time of 30 seconds - within 30 seconds after pilot flame is extinguished the safety system shuts off the total gas supply to the unit.

NEVER - substitute a “universal” thermocouple for original equipment as its shutdown time may be as much as **2 MINUTES.**

Principles of Snap Disc

Used with our fan operation.



Normally closed. Snap Disk shown in open position

Snap Disc

Recognizes rise in temperature

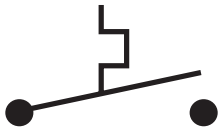
and closes electrical flow

Usage

Fan control (N.O.) - Closes with heat rise

Wired in series

N.O. (Normally Open)



Electrical symbol

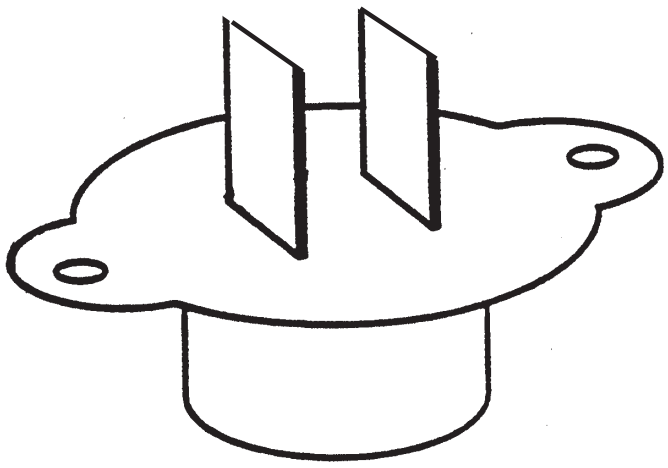
(Fan Snap Disc)

Snap Disc

- Fan N.O. - 120˚F - Set point at which it closes turning fan on.

  Marked on disc as F-120 (F = Fan Control)

- Travis Industries quality checks incoming disc for proper operation.



Automatic Reset Snap Disc

NOTE: Colored Dot Who/When Tested

Orifices

Orifice Types

- Burner
- Pilot

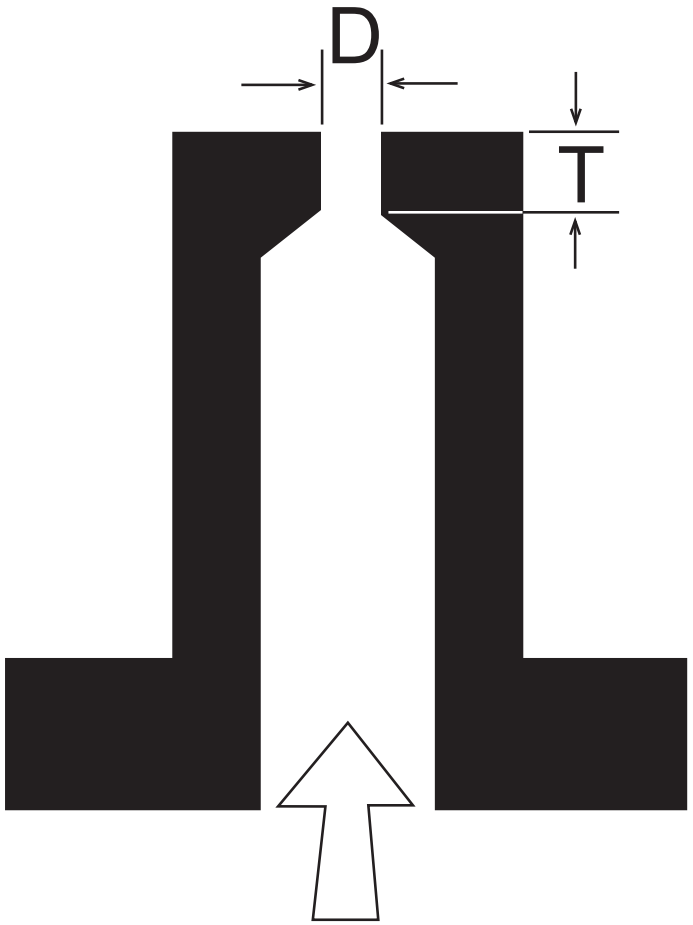
Purpose

- Control amount of gas flow
- Put gas into straight stream

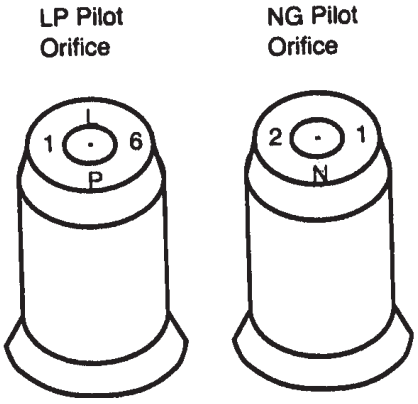
Orifices

Travis Industries deburs (polishes) 100% of our orifices

D = Diameter (Fuel Flow)
T = Thickness



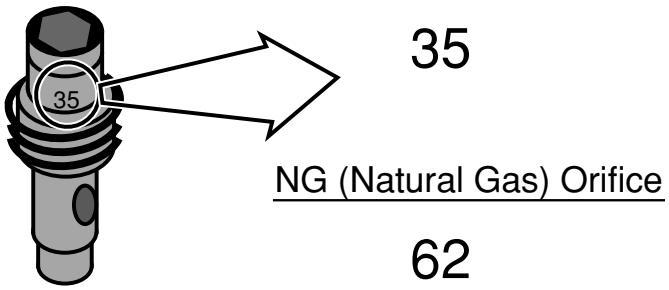
Orifices



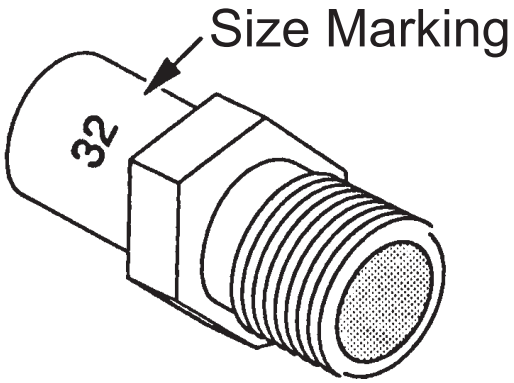
- **Pilot Orifice Markings**
  - 3 Markings for Natural (NG) Gas
  - 4 Markings for Propane (LP) Gas

SIT Pilot Orifices

Orifice Identification:



Burner Orifices



- **Burner Orifice Markings**

  Older orifices used a number plus a letter # Drill Size Plus

  Older orfices used a number plus a letter (N-Natural L-Propane), while new orifices use a number only.

Pressure Regulators Have Two Purposes

- Reduce incoming gas pressure.
- Compensate for gas pressure fluctuation.

There Are Two Types of Pressure Regulators

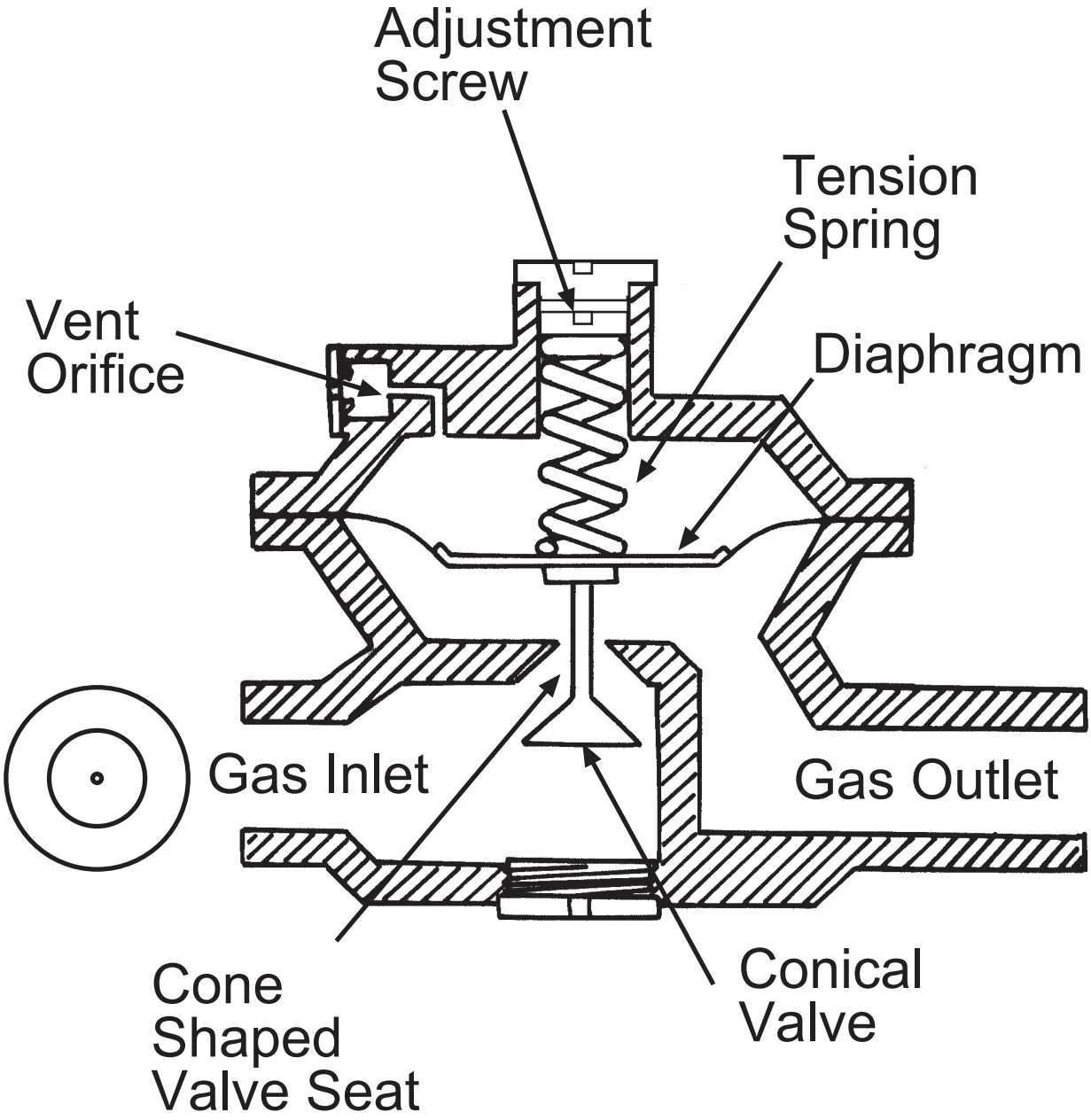
SERVICE REGULATORS

- **This is the regulator outside of the dwelling.**
  It reduces incoming gas from PSI (pounds per square inch) to inches of water column.
- Compensate for gas pressure fluctuation
- Service regulators are the property of the gas supplier and should not be adjusted, serviced or replaced by (you) the technician.
- Service regulators seldom, if ever, fail. Therefore, they are not of high suspect when troubleshooting hearth appliances.

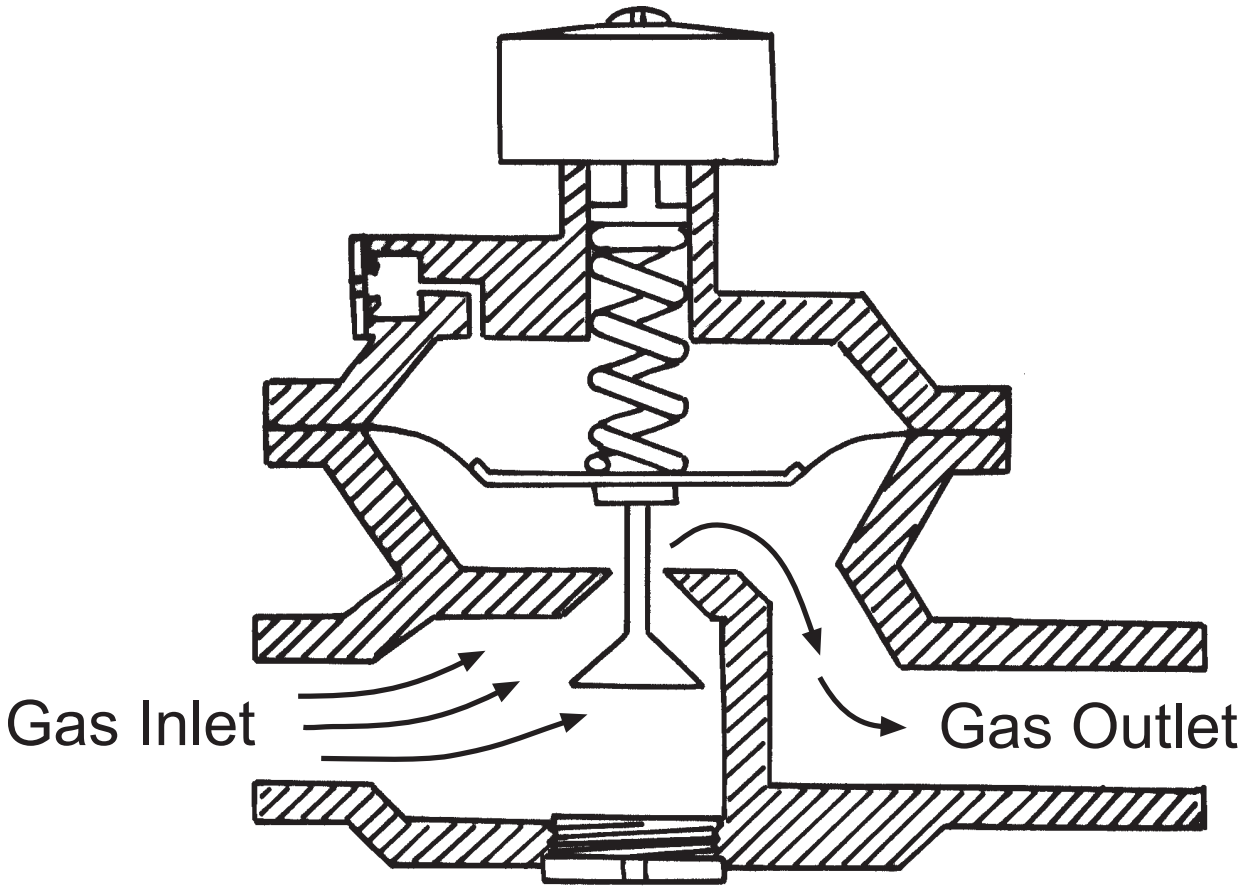
Appliance Regulator

- The appliance regulator is incorporated into the gas valve.
- It controls burner pressure by reducing incoming gas pressure (inches of W.C.) to the appropriate rating for the appliance.
- Appliance regulators have a low failure rate. Therefore, they are low suspects in troubleshooting of gas appliances.
- Adjustments and conversions should only be made by trained technicians using proper gas pressure-measuring equipment.

Parts of a Regulator

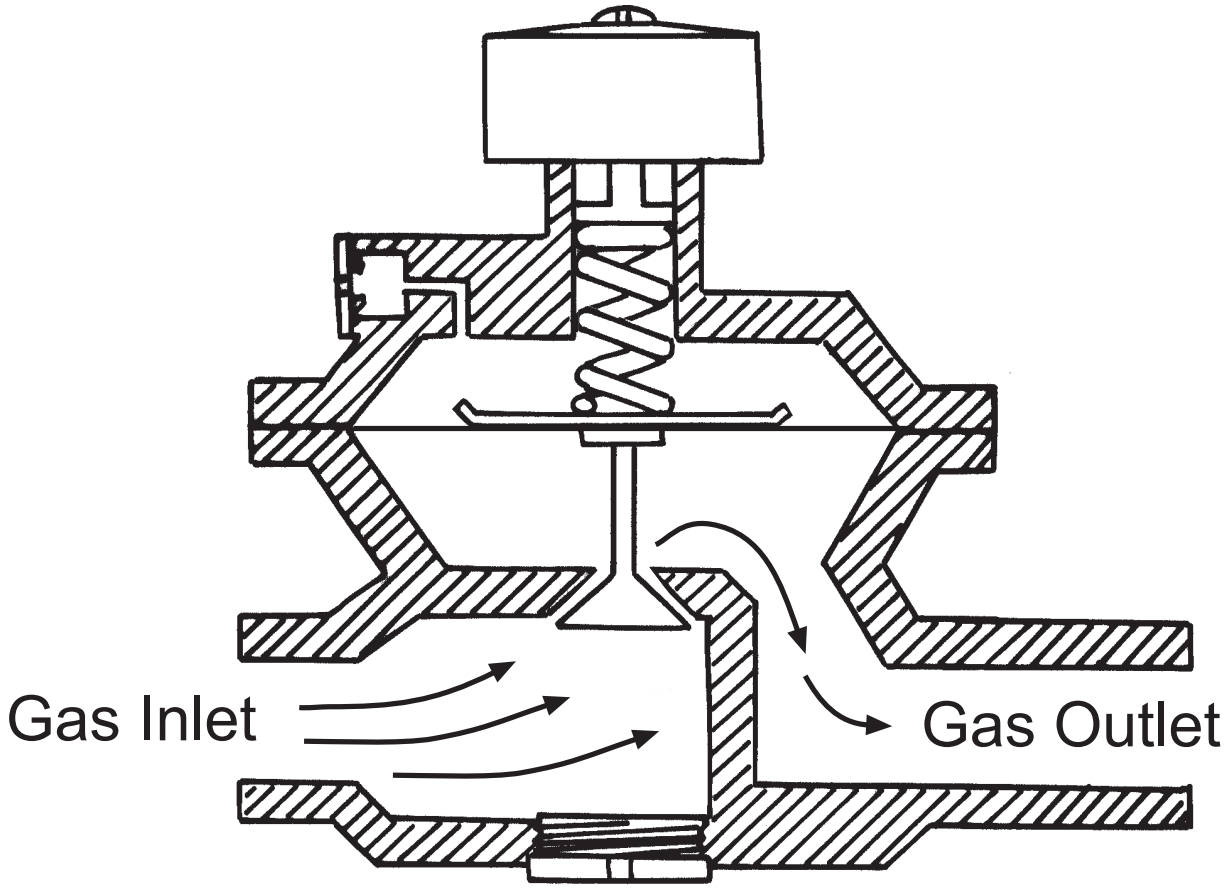


Lower Inlet Pressure



Valve opens through to allow more gas to flow

High Inlet Pressure



Valve closes through to allow less gas to flow

FUEL CONVERSION

TRAVIS INDUSTRIES
HOUSE OF FIRE

5 Step Process

Ember-Fyre™ Burners

Tube Burners

Fuel Conversion

- **This entire section is very important to the safety and proper operation of Travis gas products.**

- **All Travis gas appliances are shipped set-up for natural gas. For your convenience an LP conversion kit is included in each unit.**

- Because propane gas has more BTU's per cubic foot and is heavier than air, a conversion must take place.

5 Step
Conversion Process

1. Burner orifice
2. Pilot orifice
3. Adjustable regulator body
4. Air shutter opening
5. Conversion label

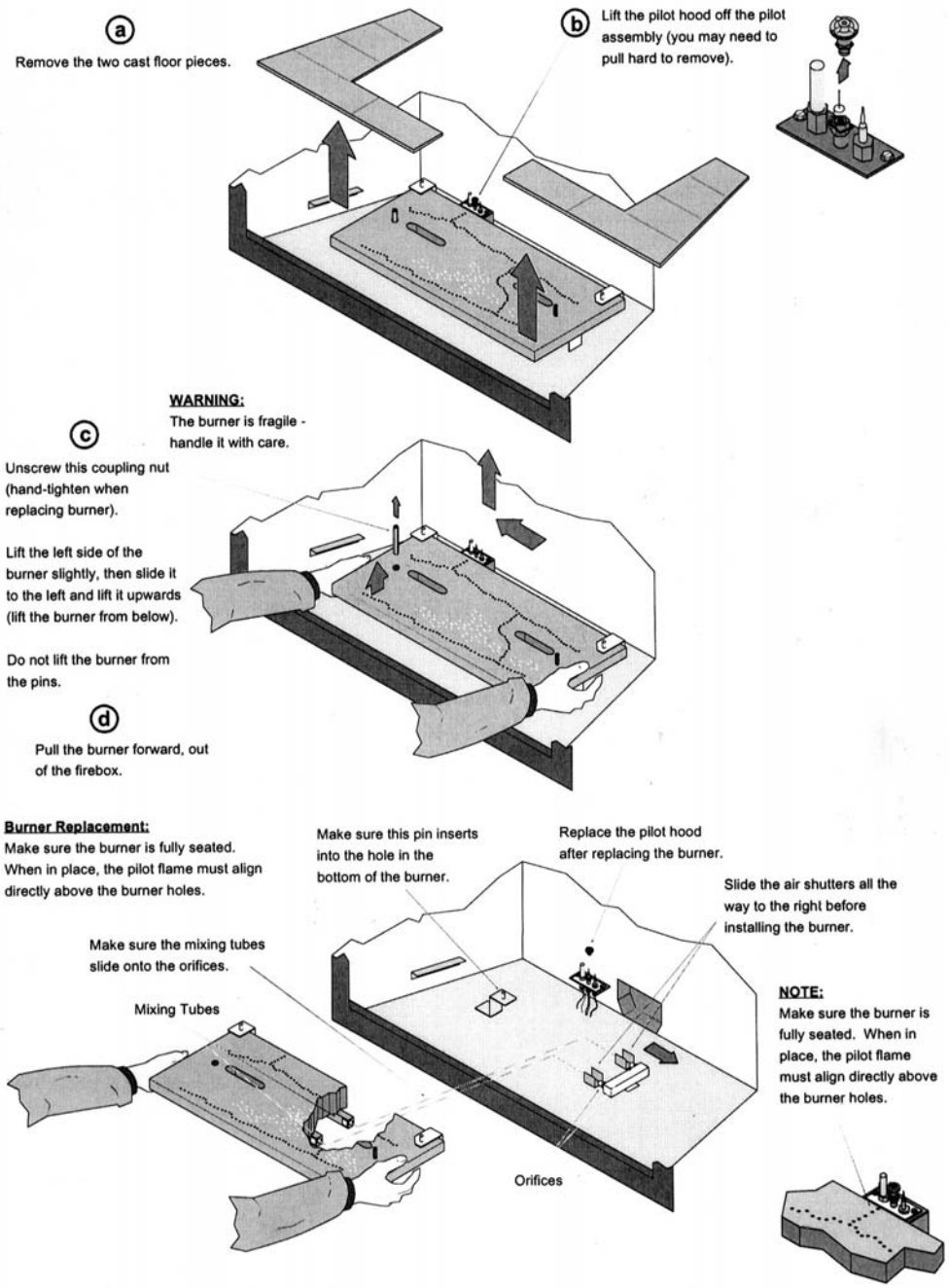
Ember-Fyre™ Burner

LP Conversion Instructions

Install the conversion kit prior to installing the gas line to ensure proper gas use.

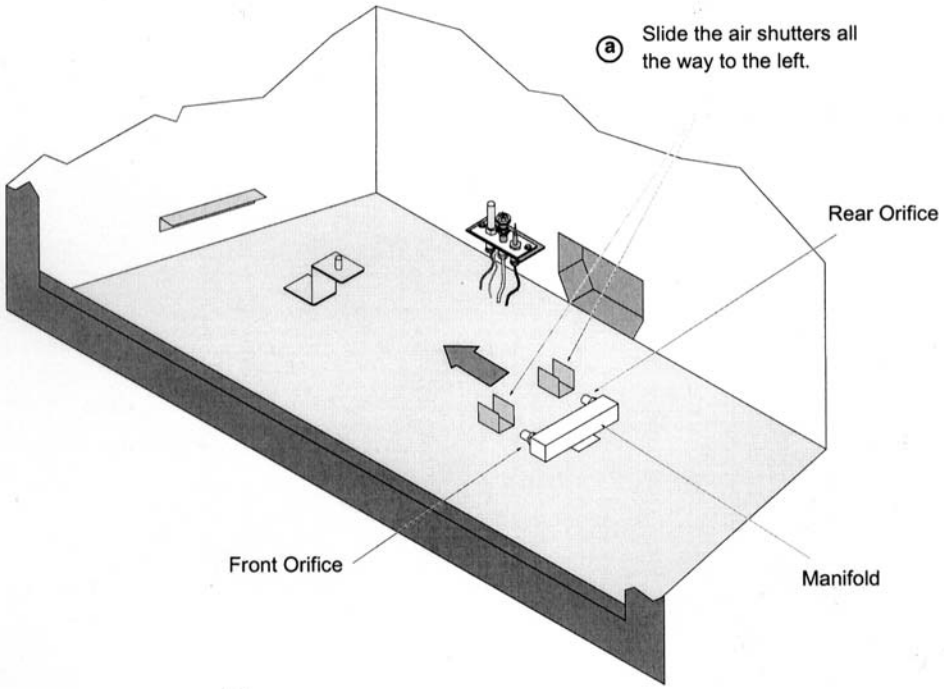
1 Remove the glass (see page 26). Remove the logs and coals (if installed - page 27)

2 Remove the burner (see illustration below).



Ember-Fyre™ Burner

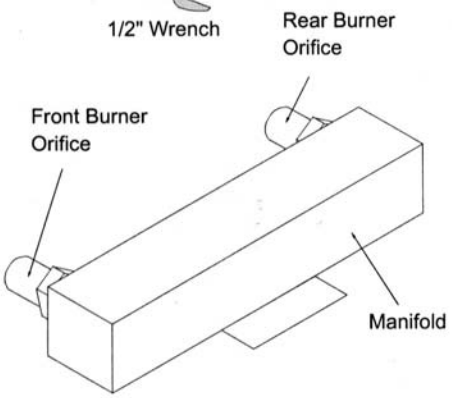
3 Follow the directions below to replace the orifices.



ⓐ Slide the air shutters all the way to the left.

ⓑ Use a 1/2" open end wrench to unscrew both orifices.

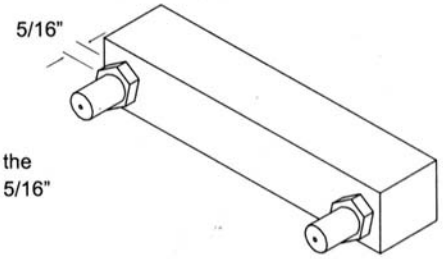
1/2" Wrench



ⓒ Apply thread sealant to the LP orifices prior to installation. Use the chart below to identify the correct orifices.

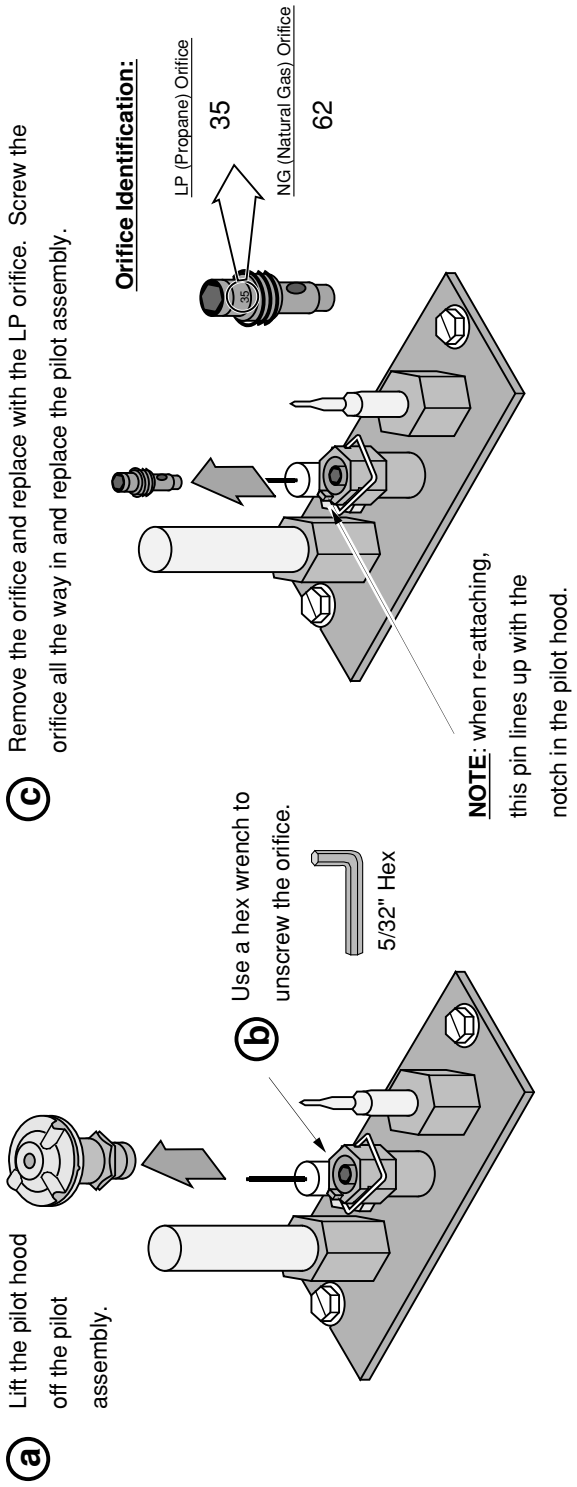
Look here for the orifice identification

	LP	NG
Front	#55	#46
Rear	#54	#43



ⓓ Screw the LP orifice in so the orifice shoulder protrudes 5/16" (indicating full insertion).

Fuel Conversion SIT Pilot Orifice

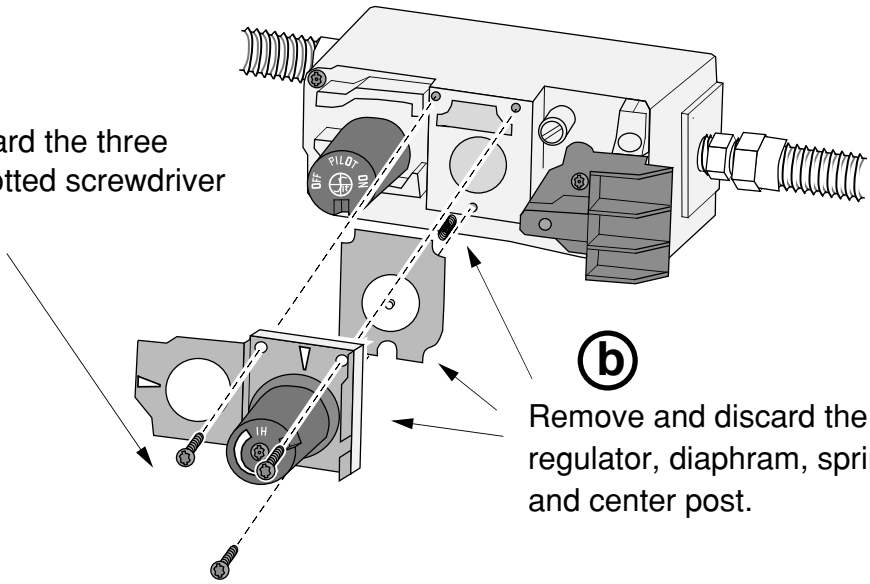


Fuel Conversion SIT Pilot Orifice

Ⓐ

Remove and discard the three screws using a slotted screwdriver of Torx T-20.

Slotted Screwdriver (or T-20 Torx)



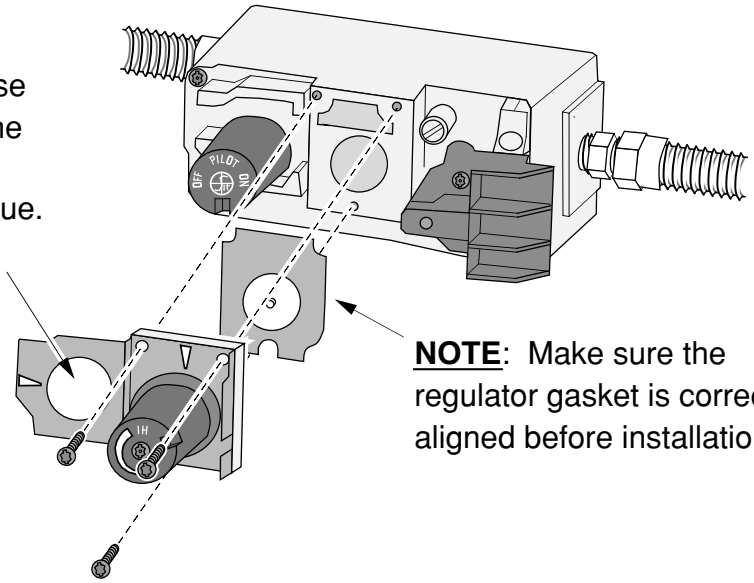
Ⓑ

Remove and discard the regulator, diaphram, spring and center post.

Ⓒ

Install the LP regulator. Use the screws included with the LP regulator. Tighten to approximately 25 Lbs. torque.

Slotted Screwdriver (or T-20 Torx)



NOTE: Make sure the regulator gasket is correctly aligned before installation.

Tube Style Burners

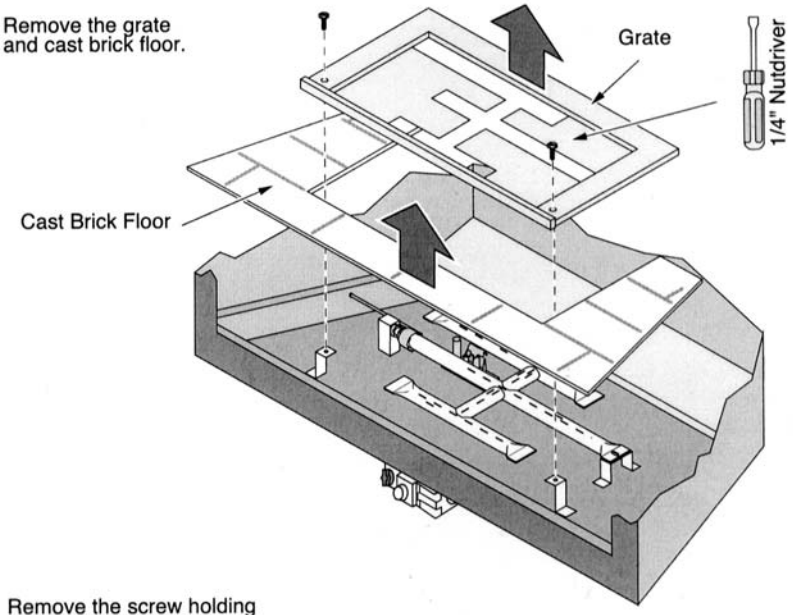
LP Conversion Instructions

Install the conversion kit prior to installing the gas line to ensure proper gas use.

1 Remove the glass (see page 32). Remove the logs and rock wool (if installed - page 33)

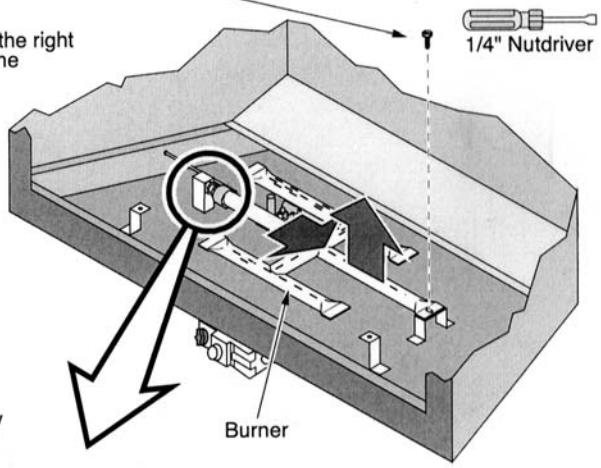
2 Remove the burner (see illustration to the right).

(a) Remove the grate and cast brick floor.

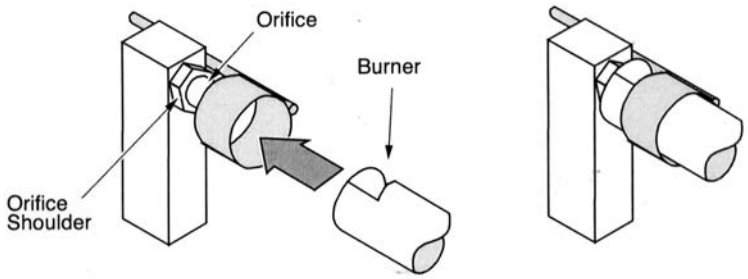


(b) Remove the screw holding the burner in place.

(c) Slide the burner to the right and up to remove the burner.



NOTE:
When replacing the burner, make sure the burner inserts all the way up against the orifice shoulder.



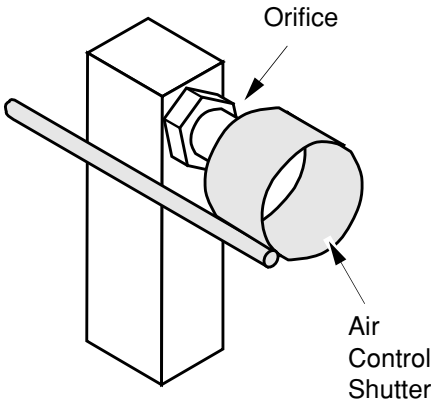
Tube Style Burner Fuel Conversion

TUBE BURNER

Follow the directions below to replace the orifice with the appropriate orifice. When replacing the burner pan, make sure to guide the air control shutter over the burner pan

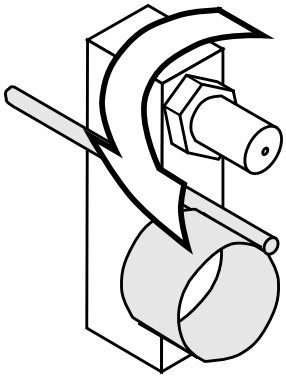
(a)

Loosen the air shutter control (see page 14).



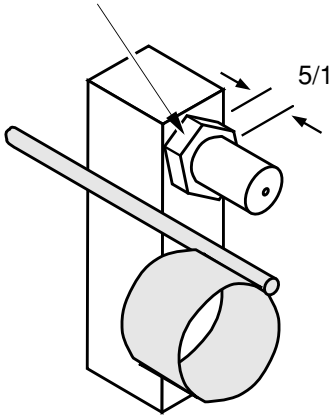
(b)

Rotate the air control shutter away from the orifice.



(c)

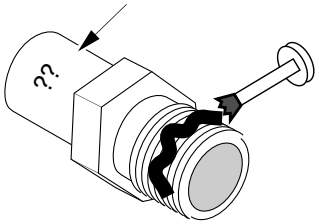
Use a 1/2" open end wrench to unscrew the orifice.



NOTE:
Screw the LP orifice in so the orifice shoulder protrudes 5/16" (indicating full insertion).

(d)

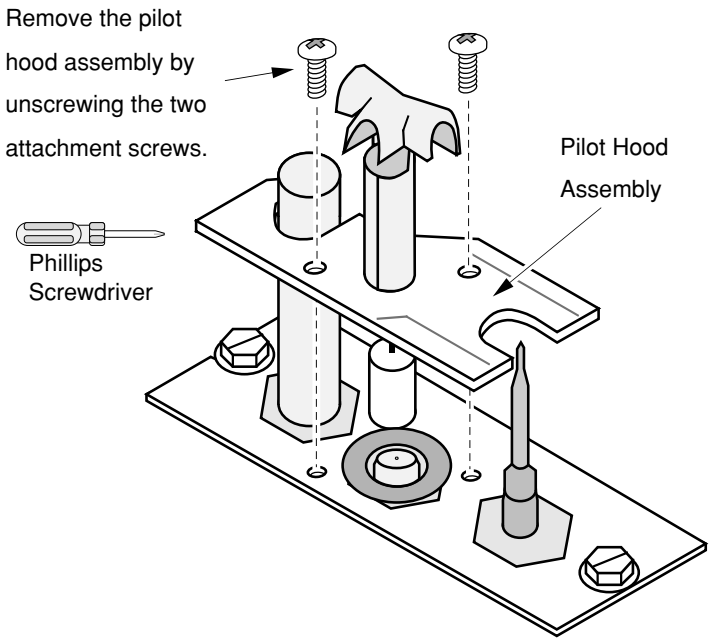
Make sure you are using the correct orifice (see chart below)

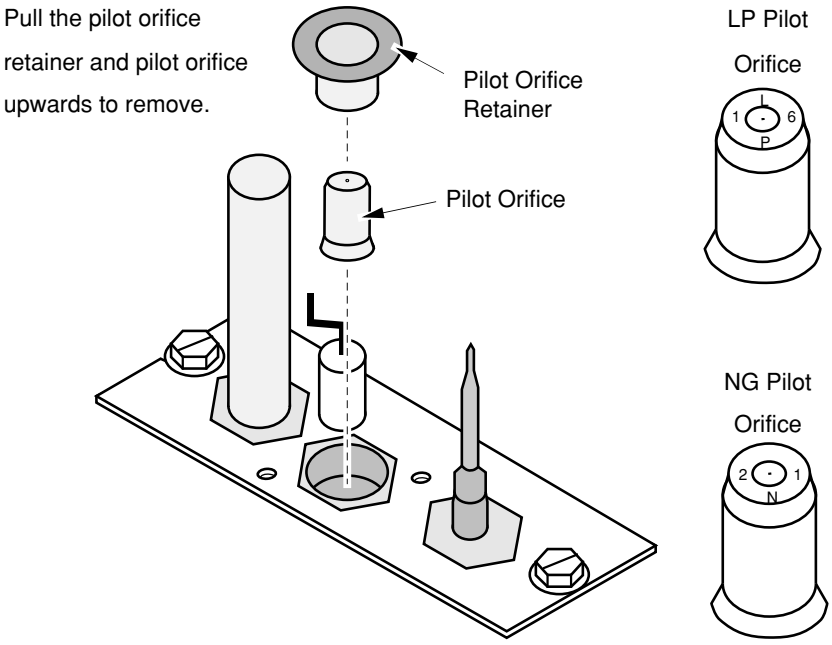


Apply thread sealant to the new orifice prior to installation.

Fuel Conversion
New RobertShaw Pilot Assembly

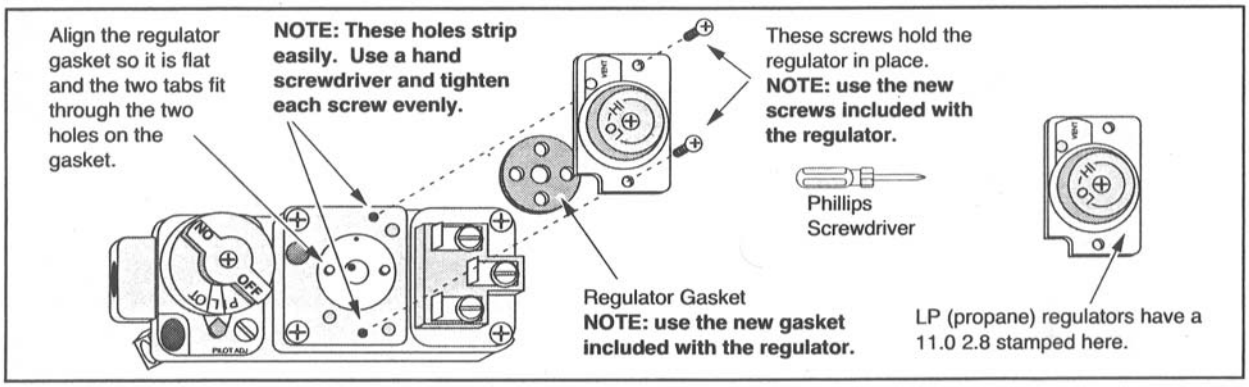
Remove the pilot orifice following the instructions below. Replace with the propane pilot orifice (the LP orifice is .016” diameter - it has “16” stamped on it).



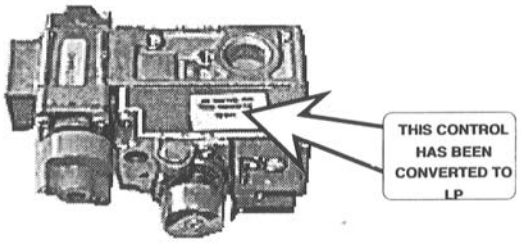


Fuel Conversion
RobertShaw Gas Control

Remove the regulator from the front of the gas control valve. Replace with the propane regulator, using the new gasket and screws included with the regulator. **NOTE: Leak test this area after the heater is installed, gas is connected, and the main burner is lit.**



Place the included propane label over the natural gas label on top of the gas control valve.



SWITCHING DEVICES

TRAVIS INDUSTRIES
HOUSE OF FIRE

Rocker Switch

Wall Thermostat

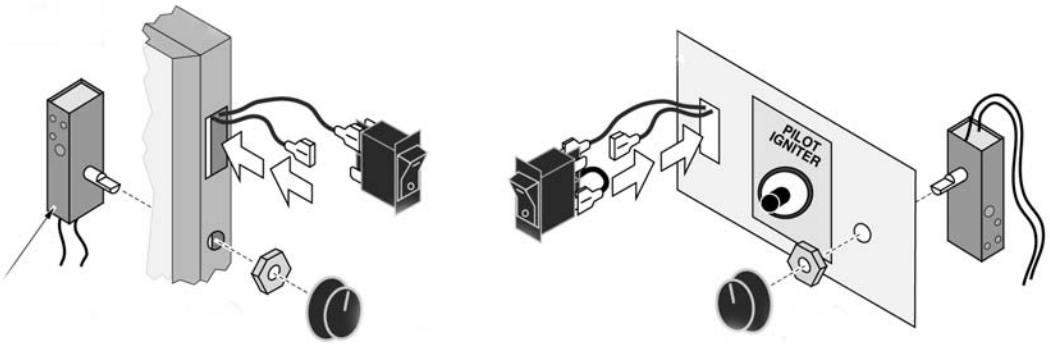
Remote Thermostat Control

Remote Fireplace Thermostat Control

Rocker Switch

Travis Industries gas appliances are designed to be used with multiple on/off burner switching devices.

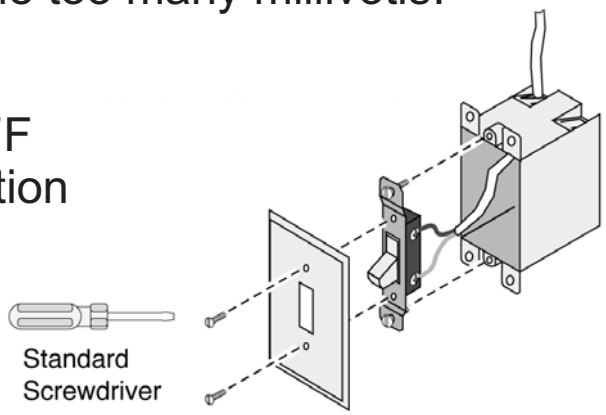
All units come with a convenient rocker switch to turn the main burner ON or OFF.



- Burner ON/OFF
- Rocker switch (Standard in all units)

Another option is a wall switch and is often used in a fireplace application. Care must be taken to not exceed the recommended wire size and length. Do not install a three way switch (Two switches - two points of control) as it will consume too many millivotls.

- Burner ON/OFF
- Wall switch option
- (Fireplace)



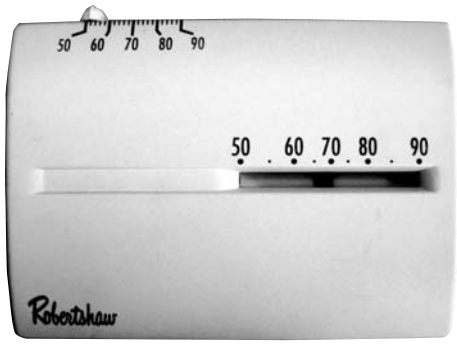
Wall Thermostat

For customers who want total room comfort, a wall thermostat should be considered.

Placement of the thermostat is important to provide proper operation.

Thermostat Placement	
DO	DON'T
Install about 5 foot from floor	Install over other heat source or heat ducts
Install on inside wall	Install over a TV or lamp causing false heat sensing
Place in a central area of the room for best control	Exceed 20 feet of #18 gauge wire

- Burner ON/OFF
  Wall thermostat option
  (Used with all units
  20 foot of #18 wire)



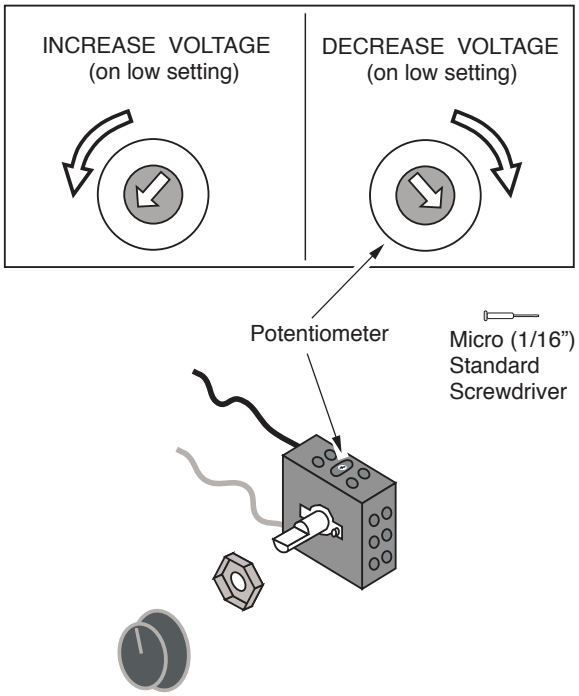
Remote Options

Remote Thermostat	- Personal Thermostat - ON/OFF Function - Timed OFF (up to 2 hours) - Sender uses 3 AA batteries - Receiver operates on 110 volts - Has four operational frequency settings - Has unlimited operational frequency settings - 6 hour, no charge shut off
Remote Fireplace Thermostat	- Personal Thermostat - ON/OFF Function - Timed OFF (up to 2 hours) - Sender uses 3 AAA batteries - Receiver uses 4 AA batteries - ON/OFF manual switch - Receiver is mounted in the wall - 6 hour, no charge shut off

The Positive and Negitives of Switching Devices

DEVICE	POSITIVE	NEGATIVE
ON/OFF Rocker Switch	• Simple to use	• Consumer must get up to turn unit ON/OFF
Wall Thermostat	• Set it and forget it • Best for total room comfort control • Millivolt set back thermostats may be used	• More difficult to install
Remote Thermostat	• Finger tip ON/OFF control • Personal thermostat	• Some consumers will NEVER learn how to use • Batteries will need occasional replacement • Can not be used when electricity goes out - must use manual rocker switch • Temperature control is determined by placement of the hand-held sender
Remote Fireplace Thermostat	• Fingertip ON/OFF control • Personal thermostat • Works without electricity	• Some consumers will NEVER learn how to use • Batteries will need occasional replacement • Temperature control is determined by placement of the hand-held sender • Requires installation into wall

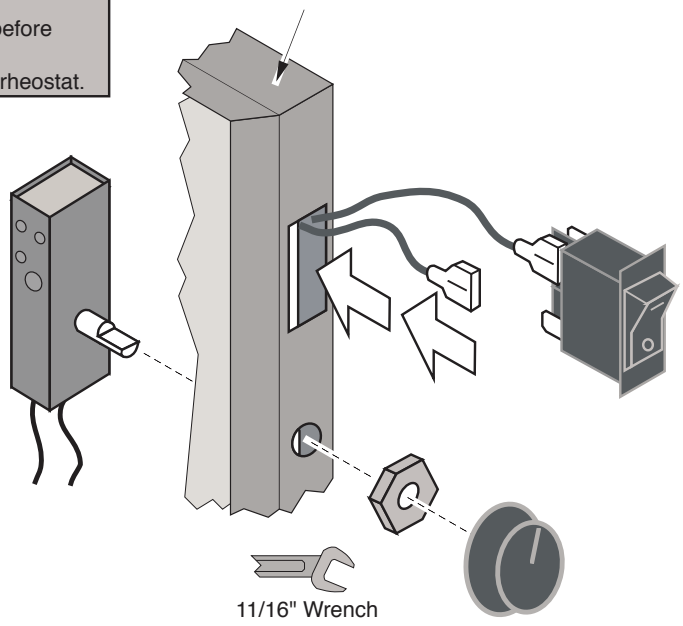
Rheostats



WARNING:

Make sure the heater is unpluged before installing the rheostat.

Upper Right of Trim



Remote Controls

- Burner on/off

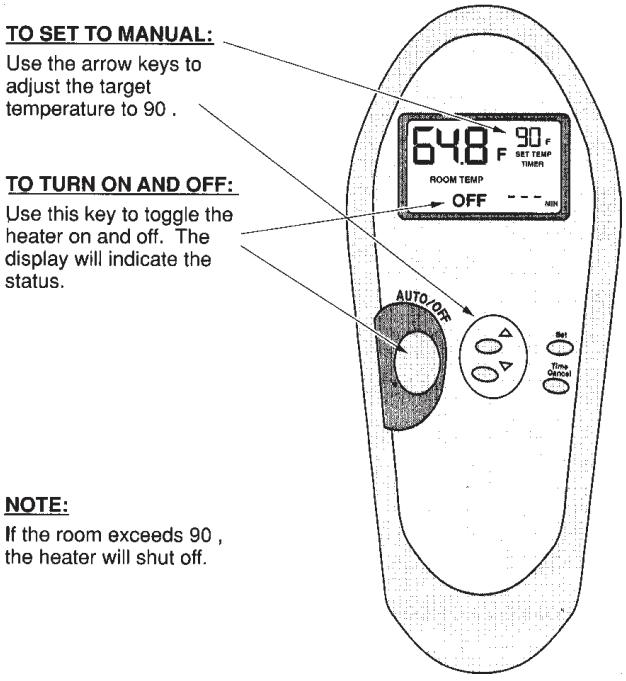
  Remote option (insert and freestanding units)

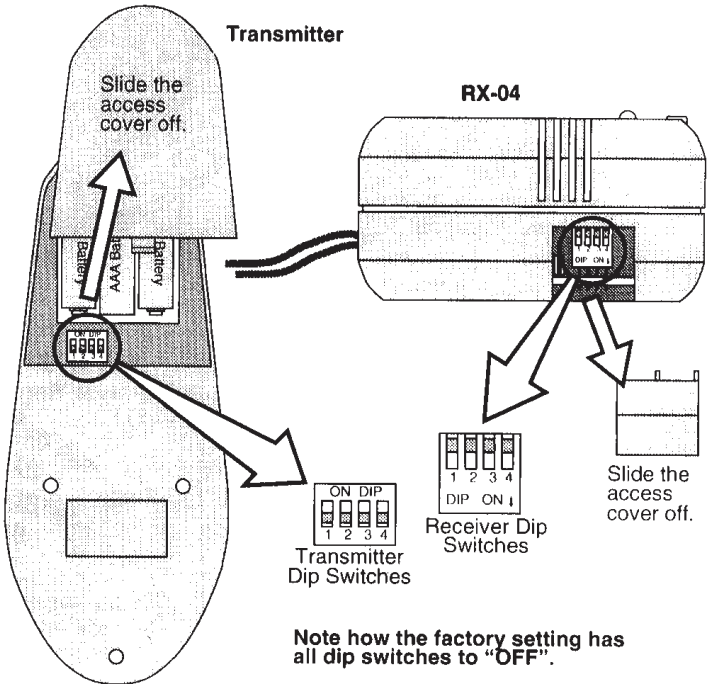
  Remote on/off

  Remote thermostat

  Timed off remote

  Requires 3 AAA batteries 110 Volt

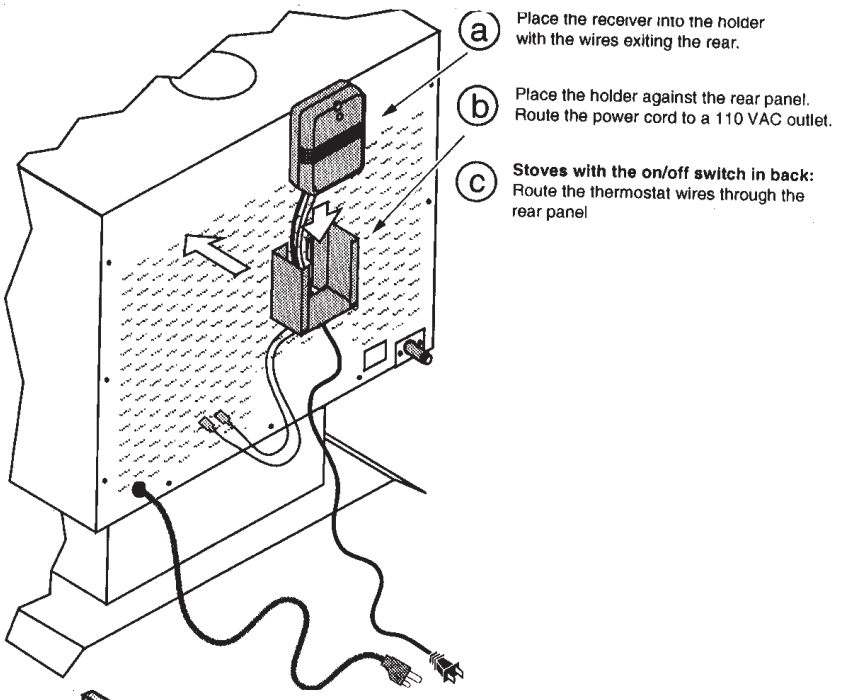




Remote Controls

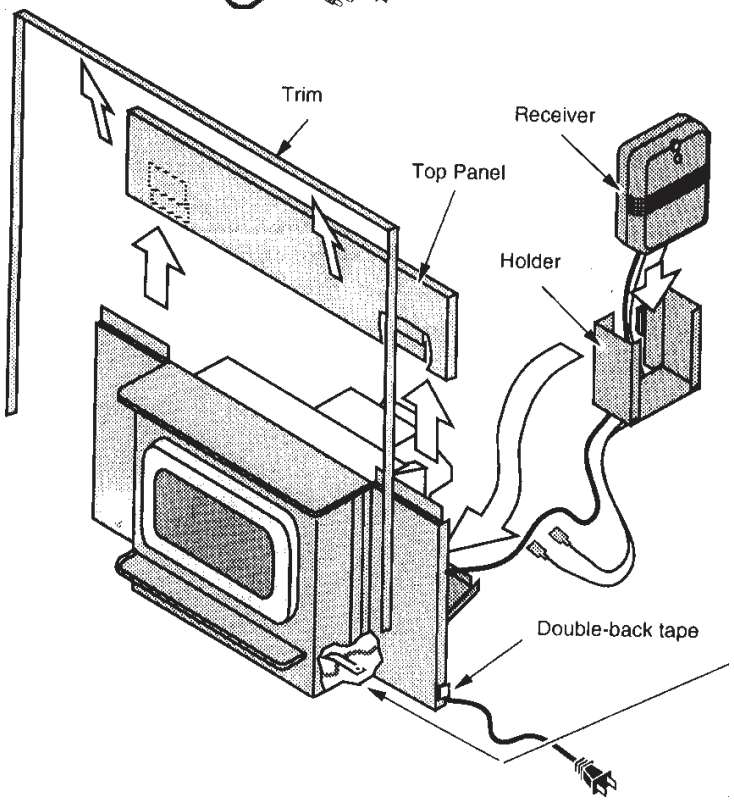
- Remote Control

  Freestanding Stove Installation



- Remote Control

  Fireplace Insert Stove Installation



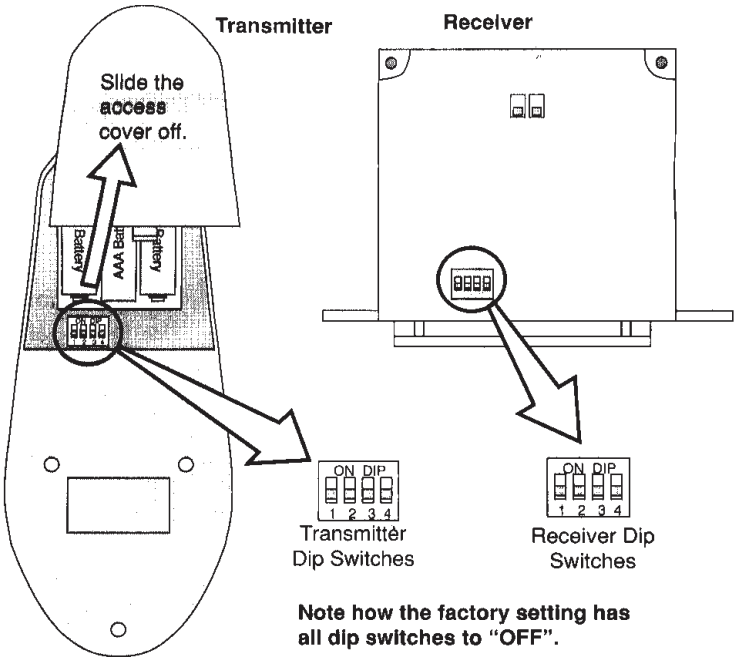
Fireplace Remote Controls

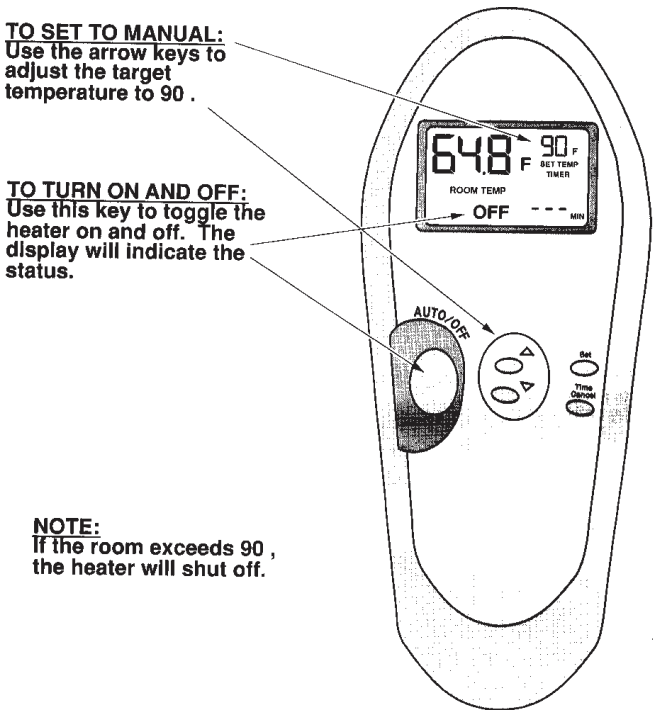
- Burner ON/OFF

- Remote Option (Fireplace)
- Remote ON/OFF
- Remote Thermostat
- Timed OFF Remote

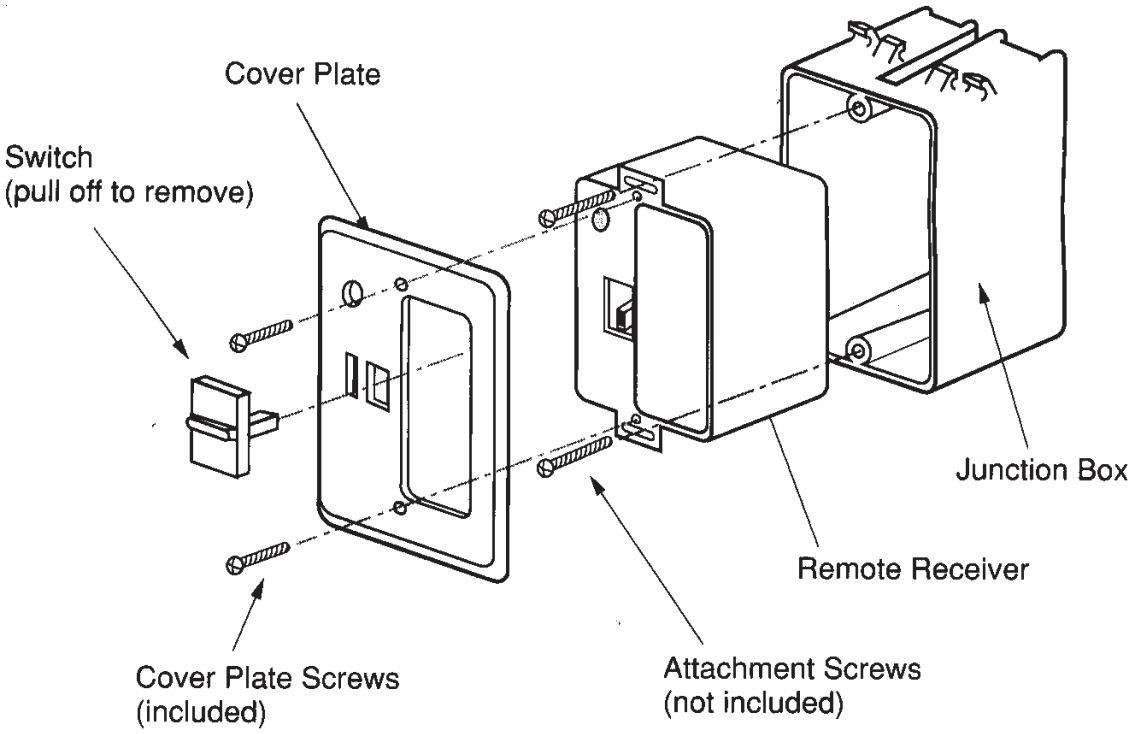
- Child Proof Code (UD DUD)

- Requires
  3 AAA Batteries
  4 AA Batteries

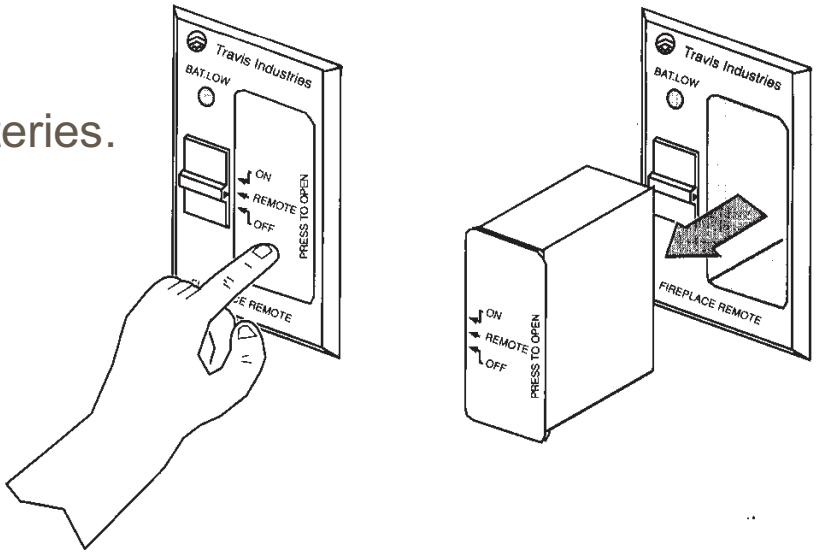




Fireplace Remote Controls



Requires
4 AA batteries.



SETTING OF AIR SHUTTERS & RESTRICTORS

TRAVIS INDUSTRIES
HOUSE OF FIRE

Restrictor Purpose

Restrictor Configuration

Air Shutter Configuration

Self-Balancing Flue

Setting Restrictors

Adjusting Air Shutters

TRAVIS INDUSTRIES
HOUSE OF FIRE

Restrictors

- In order to balance the air flow through the gas appliance, restrictors are commonly used throughout the industry.

- Other manufacturers may have you add restricting rings to the intake of the vent pipe in an effort to balance the air flow.

- While this does the job, you must climb to the top of the vent and add the rings immediately below the chimney cap.

- Travis Industries has built the restrictor system into the gas appliance. This makes for simple and easy restrictor adjustment.

- Restrictor setting is an important element of the appliance set-up and must be done by a PROFESSIONAL! Improper restrictor setting may cause poor flame appearance, frequent pilot outages or create dangerous delayed ignitions. Restrictor setting will be discussed in full detail later in this section.

TRAVIS INDUSTRIES
HOUSE OF FIRE

Restrictors Purpose

- **Direct Vent Gas Applications** - Depend upon a very balanced relationship between incoming combustion air and exhausting of the burnt flue gases.

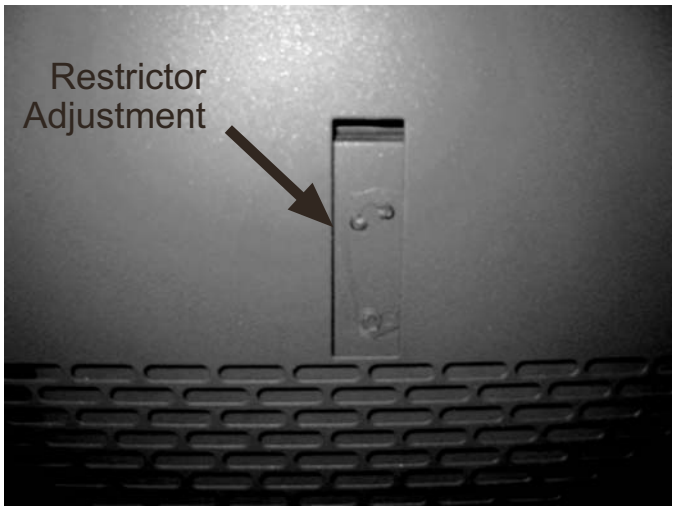
- Incoming combustion air must be in combustion process, but not so strong as to disrupt the pilot or burner flame.

- The exhaust gases must exit the system at a set rate in order to draw in the

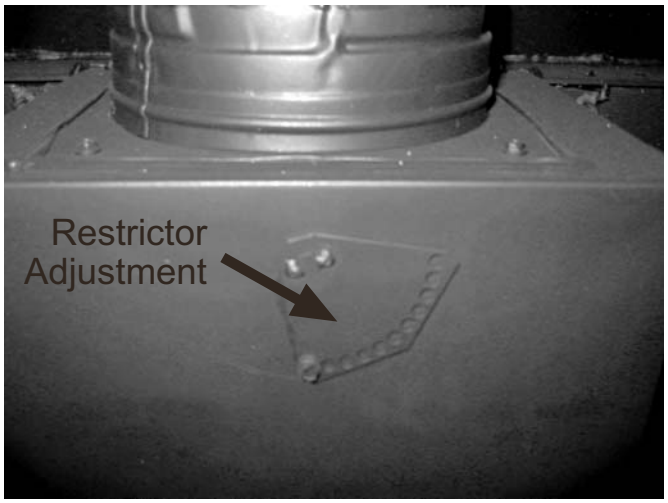
Restrictors Configuration

- Exhaust only restrictors were used on older Travis gas appliances.

LOPI SPIRIT



With Back Access Panel In Place



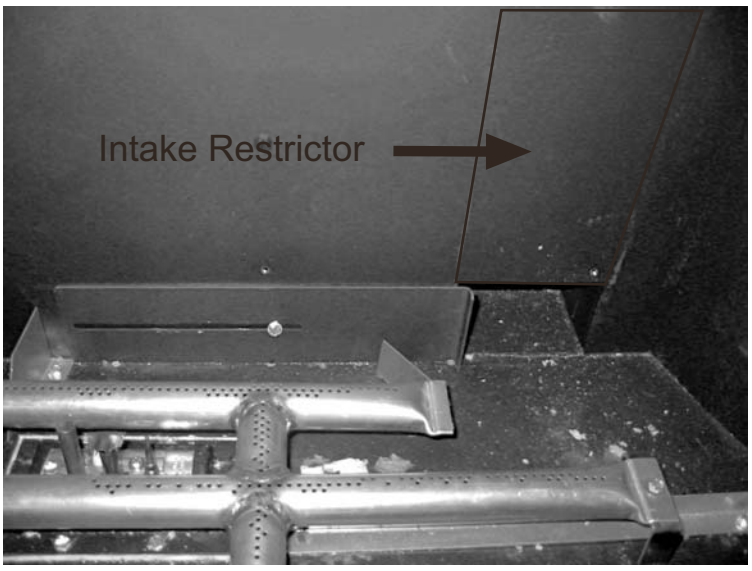
With Back Access Panel Removed

Restrictors Configuration

- Many older units used only intake restrictors

FPX Model 44 DV - XXL

DVS/ DVL (Tube Burner)

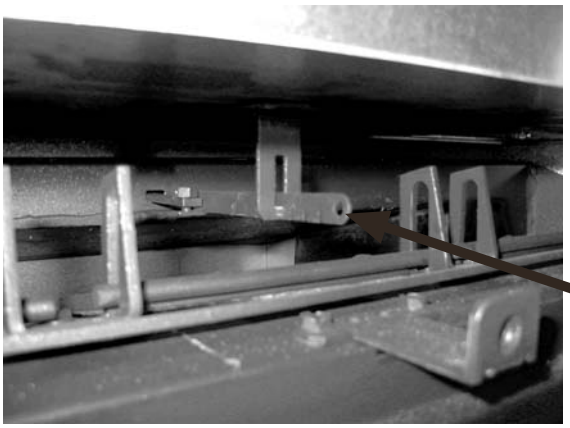


TRAVIS INDUSTRIES
HOUSE OF FIRE

Restrictors Configuration

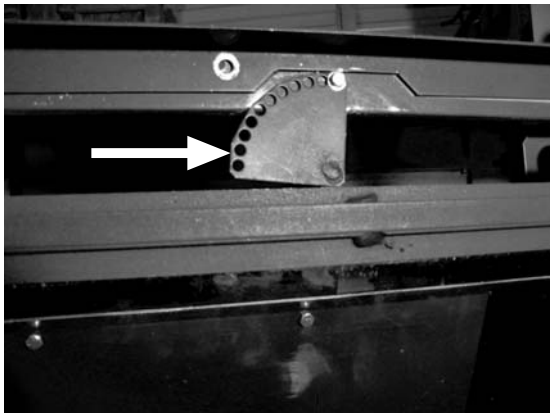
- Most of our newer units use a combination restrictor or syncronized intake and exhaust restrictor.

FPX Model 36 DV - XL

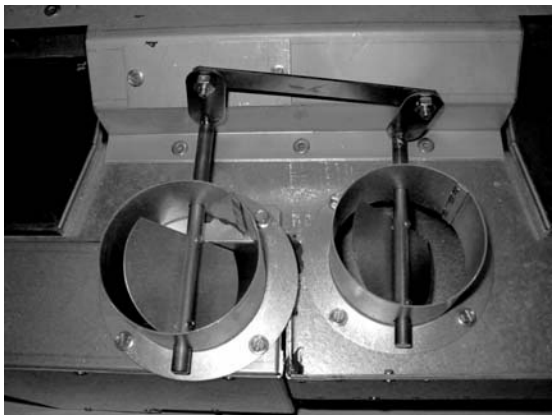


Freestanding Stoves

New DVS/ DVL Inserts



Restrictor Adjustment



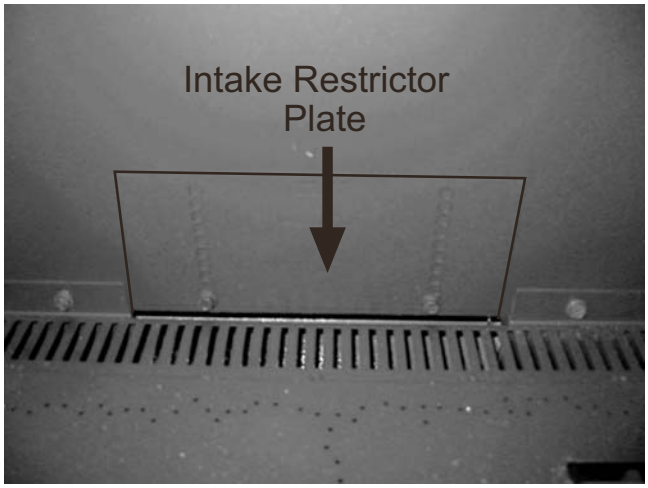
Restrictor Plates

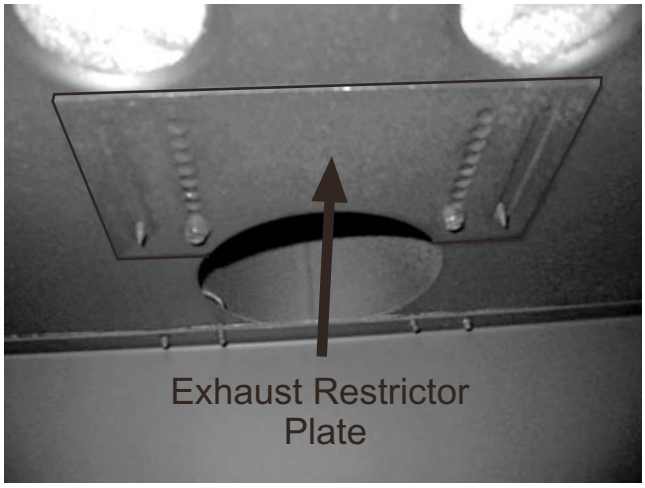
SETTING OF AIR SHUTTERS & RESTRICTORS

TRAVIS INDUSTRIES
HOUSE OF FIRE

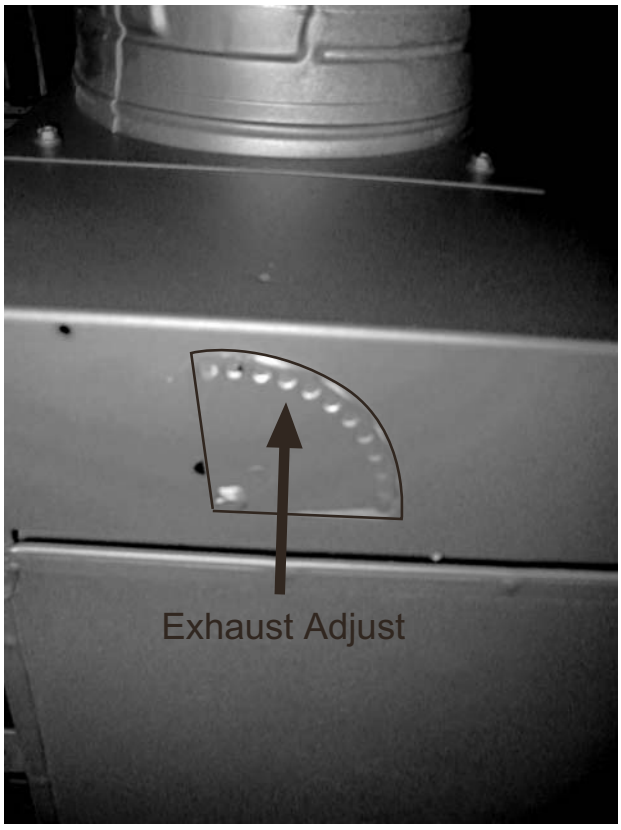
Restrictors Configuration

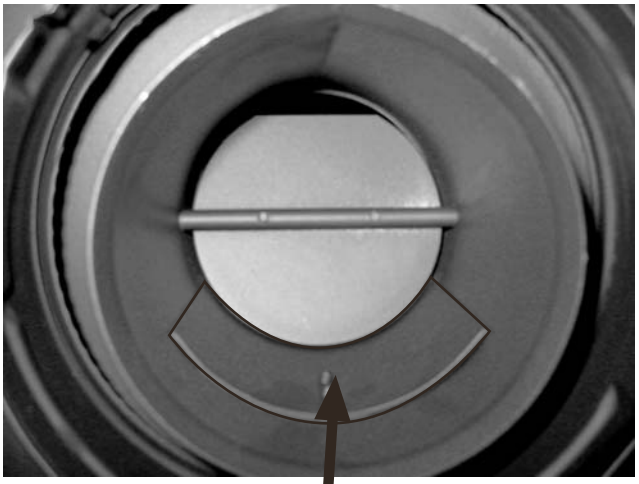
FPX Model 35 CB





LOPI Sturbridge

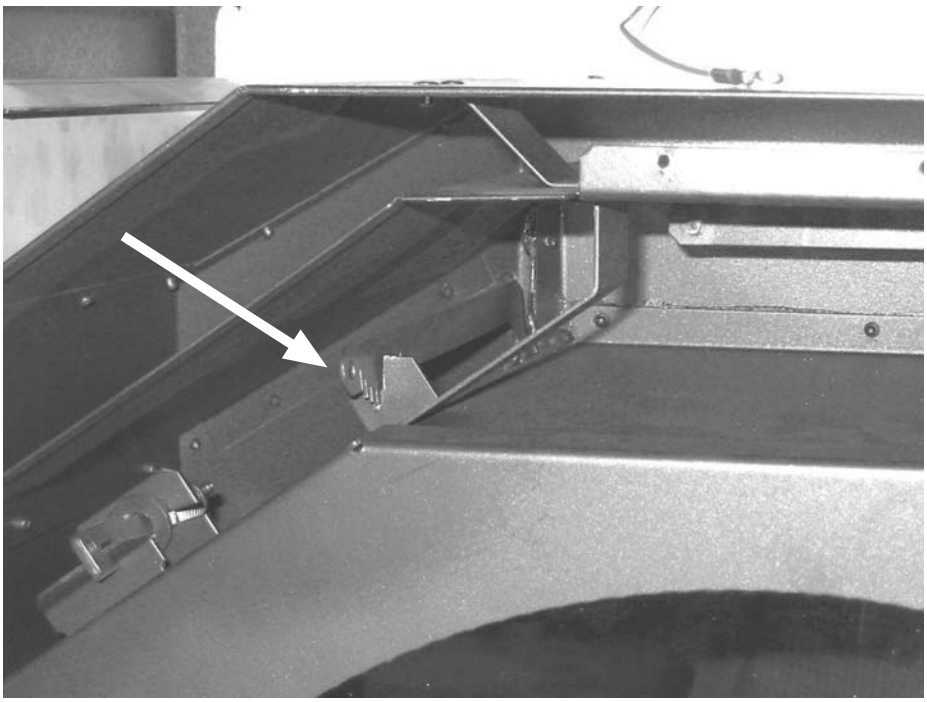




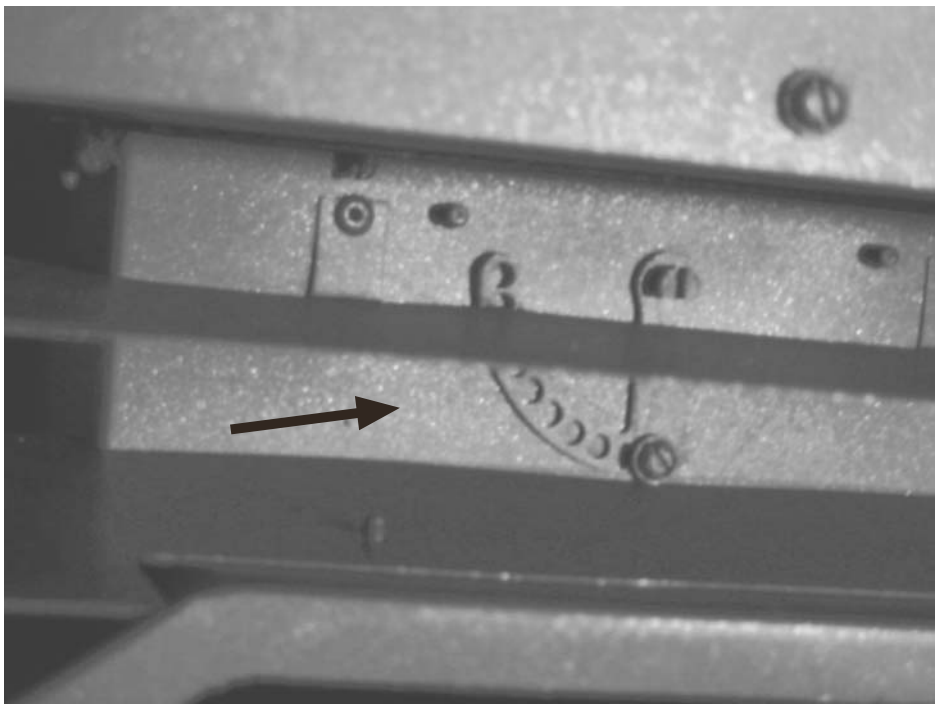
Flue Balance Plate -
Must Be Removed for Vertical
Installation

Restrictors Configuration

LOPI Sweet Dreams



21 DV FP

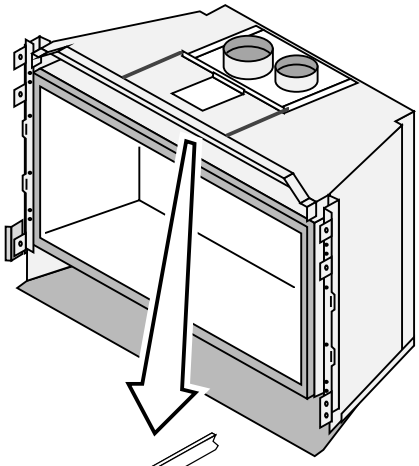


SETTING OF AIR SHUTTERS & RESTRICTORS

TRAVIS INDUSTRIES
HOUSE OF FIRE

Restrictors Configuration

New DVS Insert



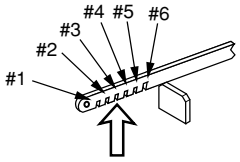
To Access the Restrictor:

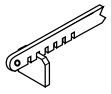
Remove the face.

WARNING: Use a glove to protect your hand from burns.

To Adjust the Restrictor:

1. Determine a restrictor position. Start low (move the restrictor a maximum two positions at a time) and thoroughly test the heater before adjusting further.
2. Lift up the adjustment plate and move it so the correct notch falls into the slot on the adjustment bracket.



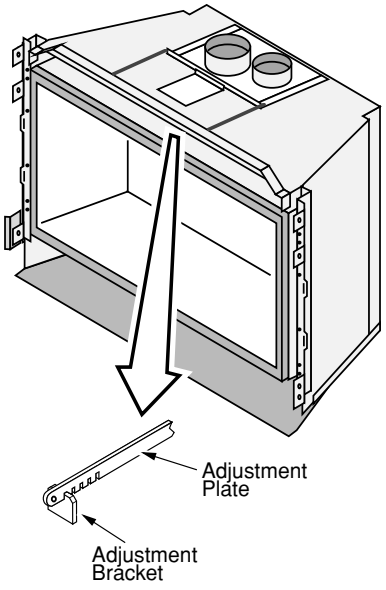


This restrictor is in position 1 (factory setting).

To adjust, lift up on the adjustment plate and push it back (use pliers if necessary).

This restrictor is in position 2.

New DVL Insert



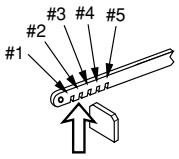
To Access the Restrictor:

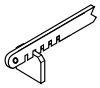
Remove the face.

WARNING: Use a glove to protect your hand from burns.

To Adjust the Restrictor:

1. Determine a restrictor position. Start low (move the restrictor a maximum two positions at a time) and thoroughly test the heater before adjusting further.
2. Lift up the adjustment plate and move it so the correct notch falls into the slot on the adjustment bracket.





This restrictor is in position 1 (factory setting).

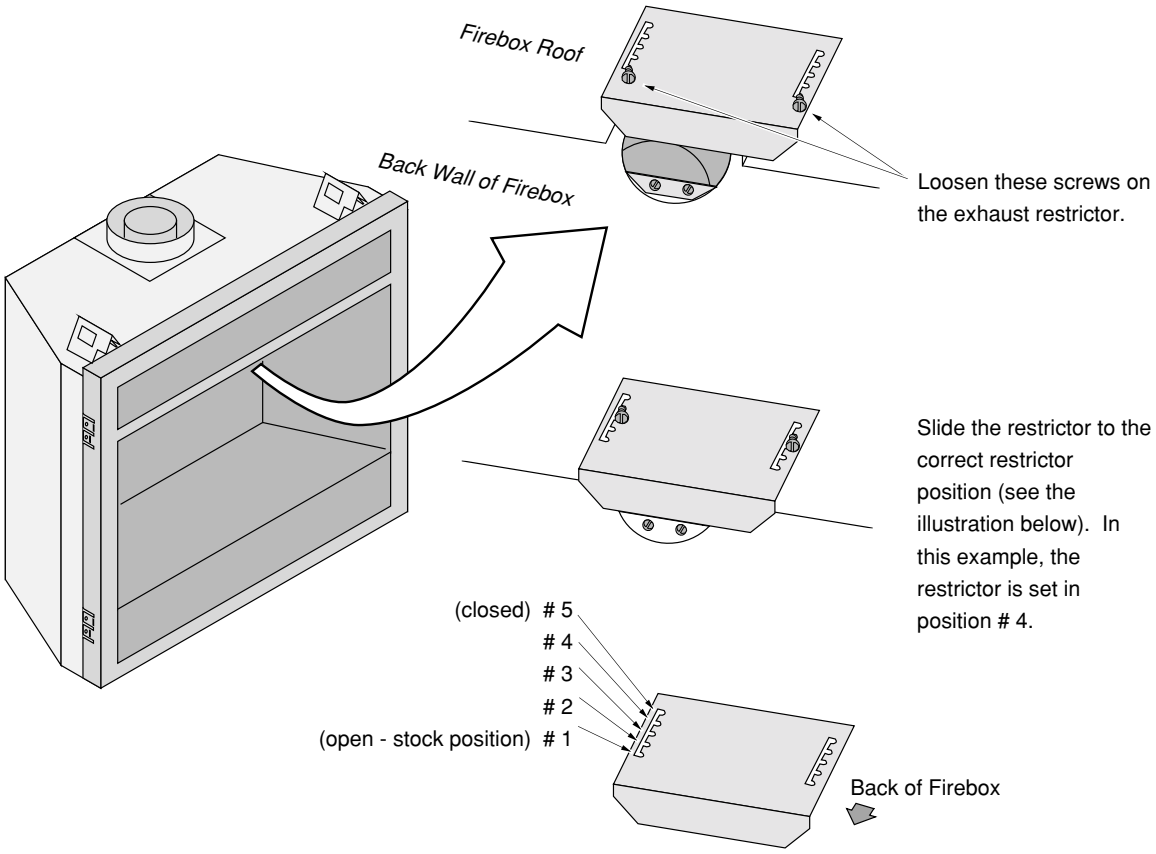
To adjust, lift up on the adjustment plate and push it back (use pliers if necessary).

This restrictor is in position 2.

TRAVIS INDUSTRIES
HOUSE OF FIRE

Restrictors Configuration

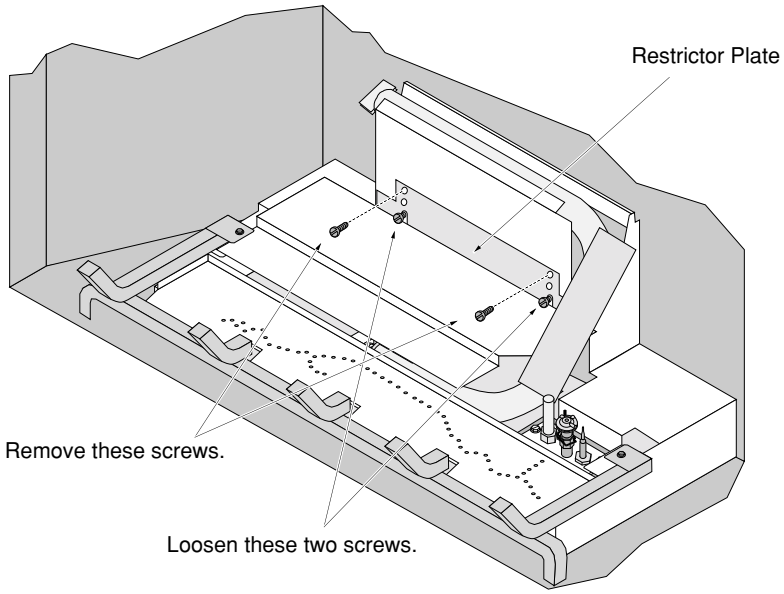
864TRV

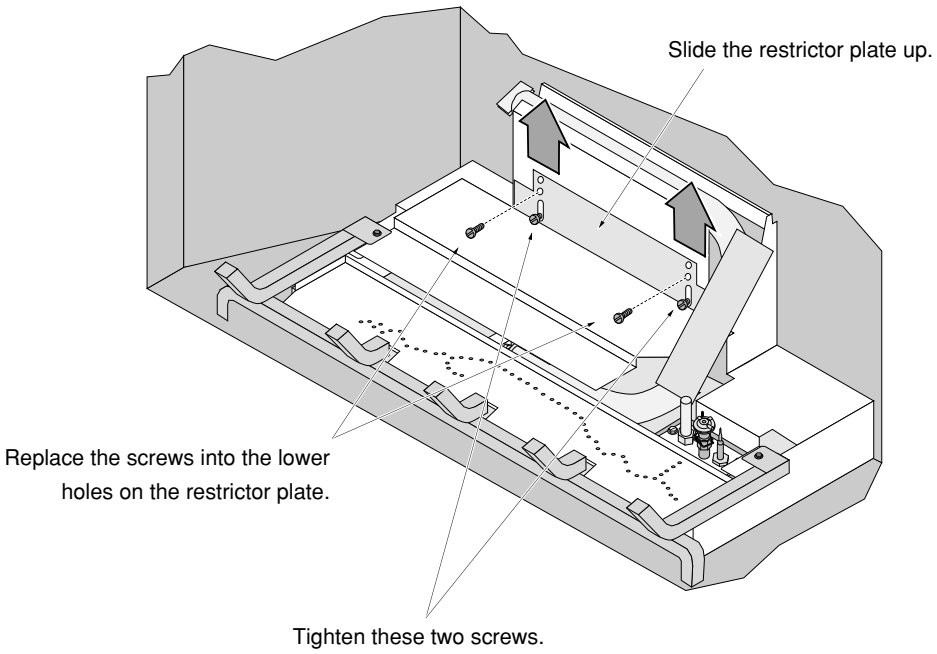


TRAVIS INDUSTRIES
HOUSE OF FIRE

Restrictors Configuration

864TRV

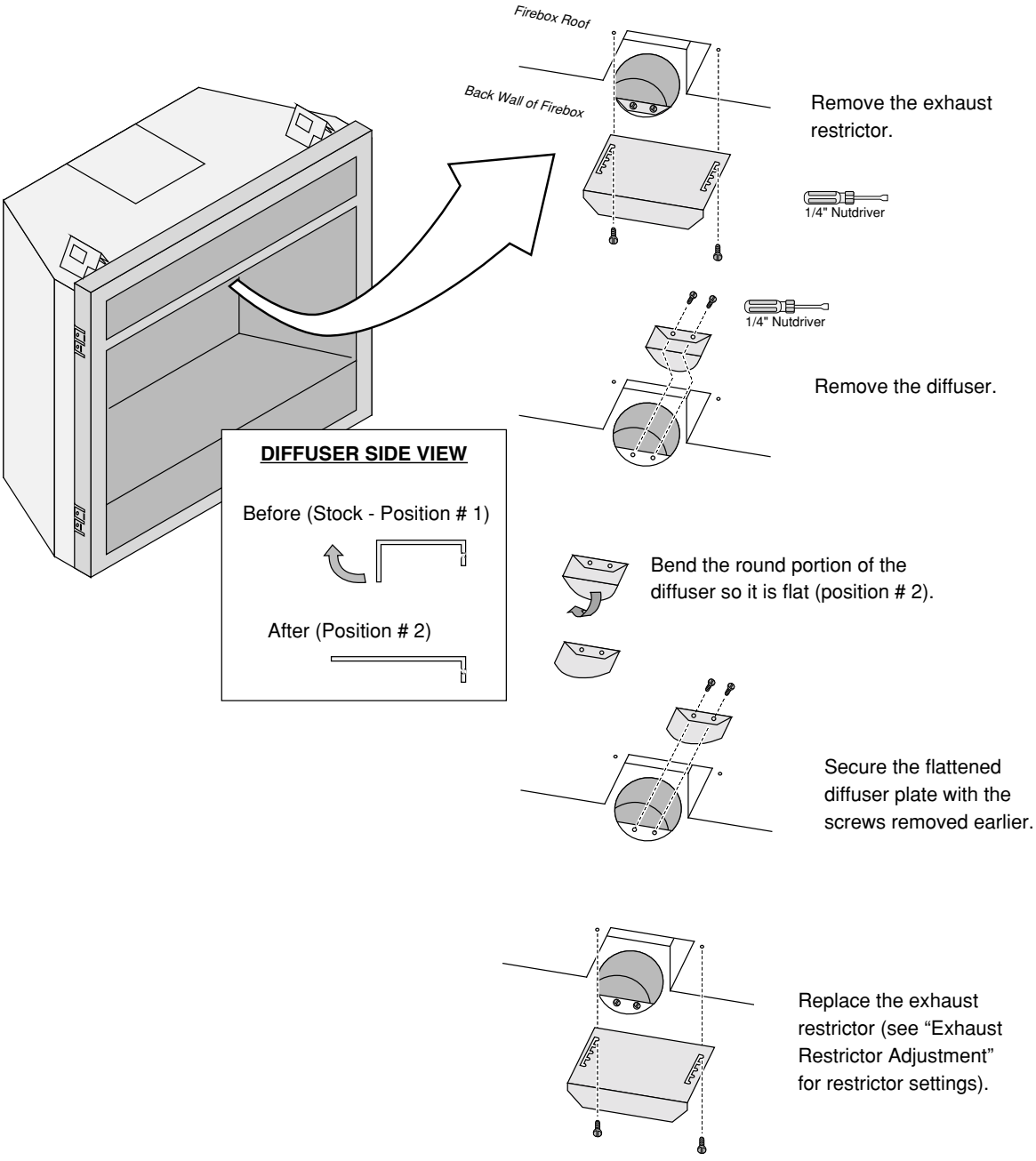




TRAVIS INDUSTRIES
HOUSE OF FIRE

Restrictors Configuration

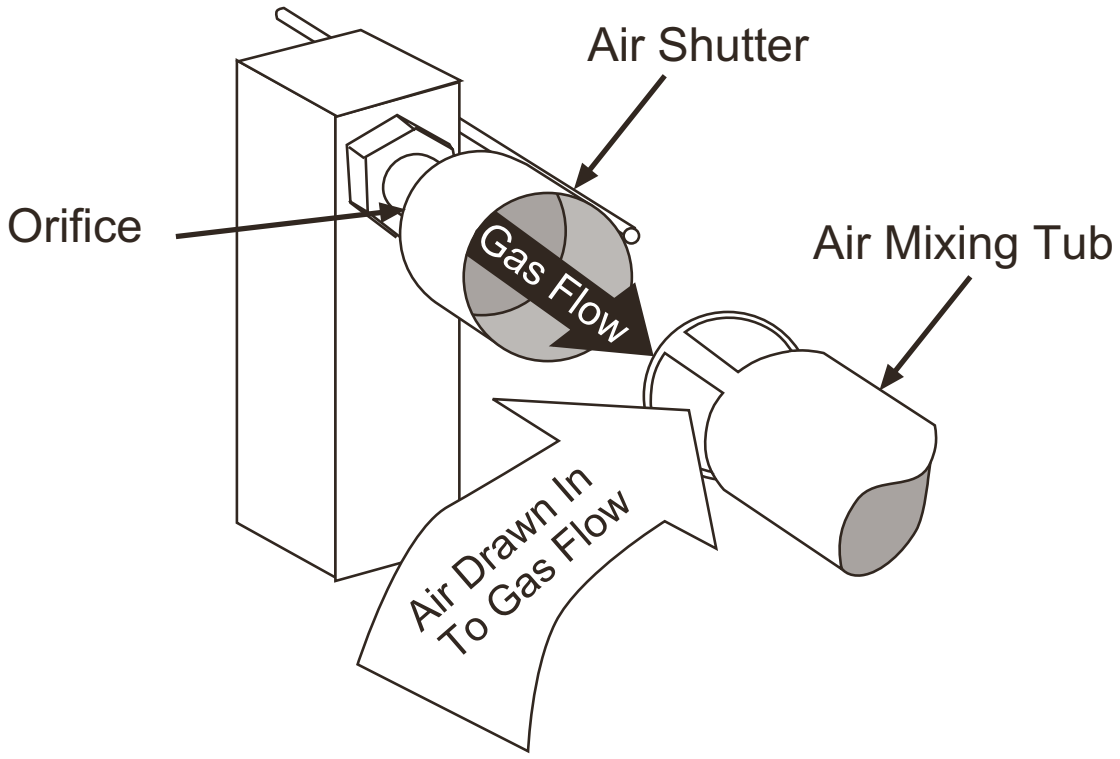
864TRV



TRAVIS INDUSTRIES
HOUSE OF FIRE

Air Shutter Purpose

- Once the combustion air has entered the appliance the air shutter controls the amount of the primary air that will mix with the fuel gas.



Tube Burner Air Shutter Shown

Air Shutters

Blue Flame vs. Yellow Flame

- Our gas appliances achieve a realistic looking fire by using a yellow flame
- This is achieved by depriving primary air (point where air and gas are mixed) and using secondary air (fire area) to complete the combustion process
- The primary air is regulated by the air shutter:
  - More open - blue flame
  - More closed - yellow flame

  Note: Closing the air shutter beyond the designated minimum will create incomplete combustion and possibly dangerous carbon monoxide
- While a yellow flame appliance is not as clean-burning as a blue flame appliance, it is within ANSI Standards (American National Standards Institute)
- Many gas Companies or HVAC people are not familiar with today's yellow flame technology. Therefore, they adjust the appliance to burn blue as they have been trained to do on traditional appliances.

TRAVIS INDUSTRIES
HOUSE OF FIRE

Air Shutters

AIR SHUTTER

- OPEN
  - Short Blue Flame
  - Hottest Flame
  - Produces Heavy Ember Glow On Logs & Burner

AIR SHUTTER

- CLOSED
  - Taller, More Yellow Flame
  - Cooler Flame
  - Lower Ember Glow On Logs & Burner

Air Shutter Configurations

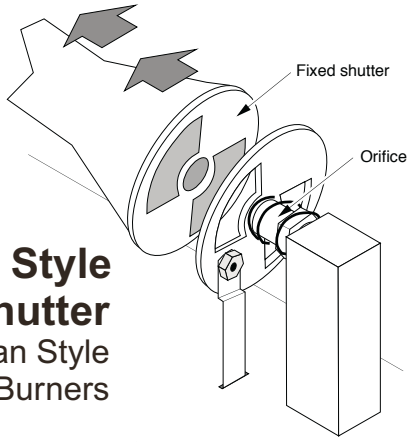
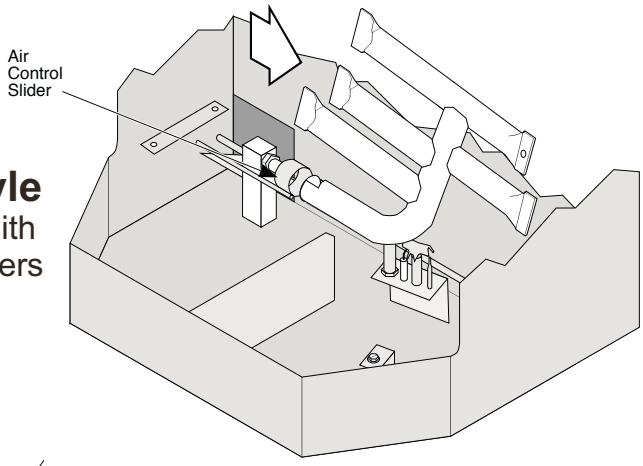
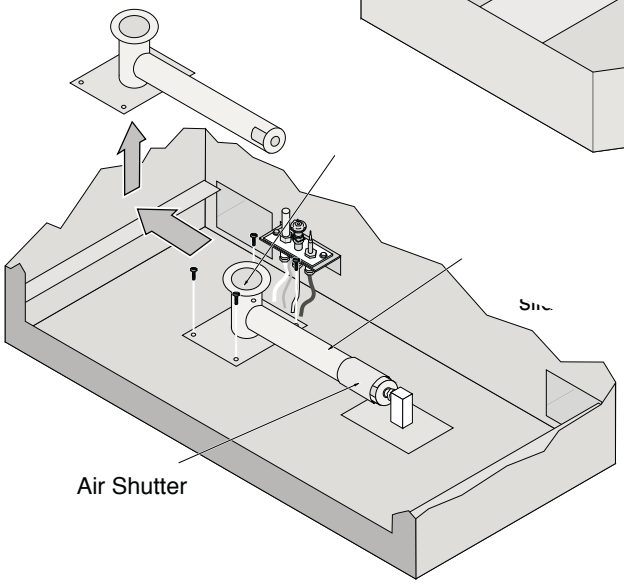


Plate Style Shutter
Used with Pan Style Burners



Tube Style
Used with Tube Burners

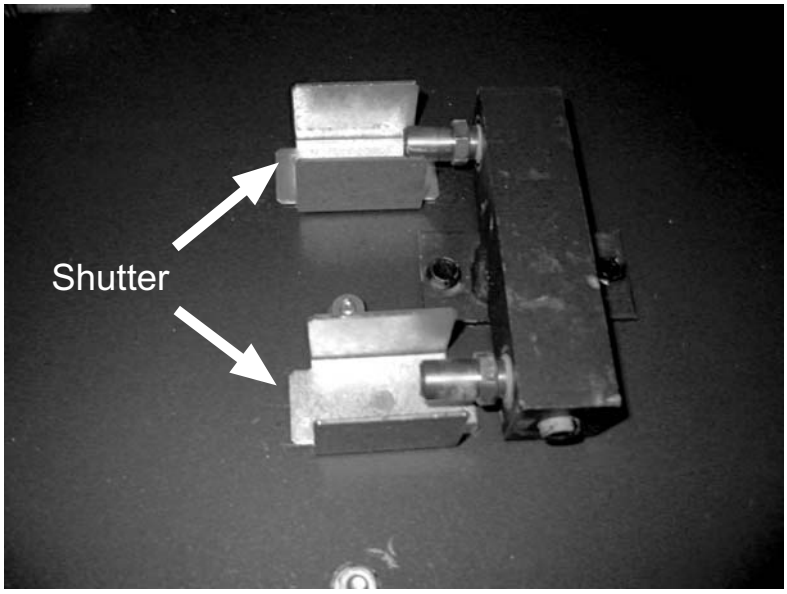


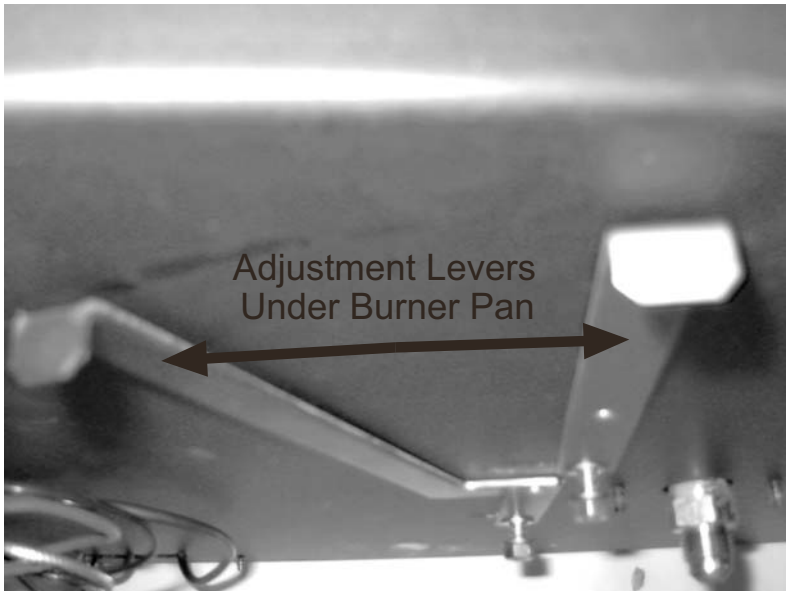
Tube Style Shutter
Used with original Ember-Fyre Burners

Air Shutter Configurations

U-Style Shutter

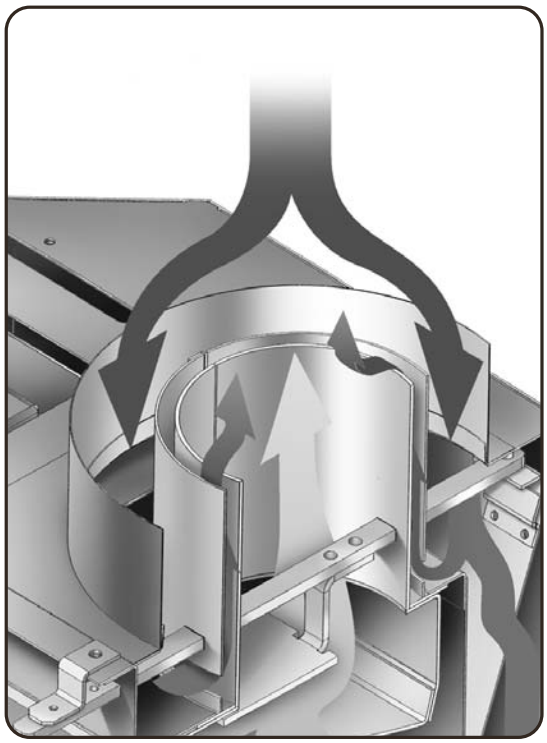
Used with newest
Ember-Fyre Burners





TRAVIS INDUSTRIES
HOUSE OF FIRE

Self-Balancing Flue System



- Occasionally atmospheric conditions at the vent termination will result in the flue gas being drawn out of the appliance too quickly. The increased flue gas exiting will cause the combustion air to be drawn in at faster rate, creating flame disruption.

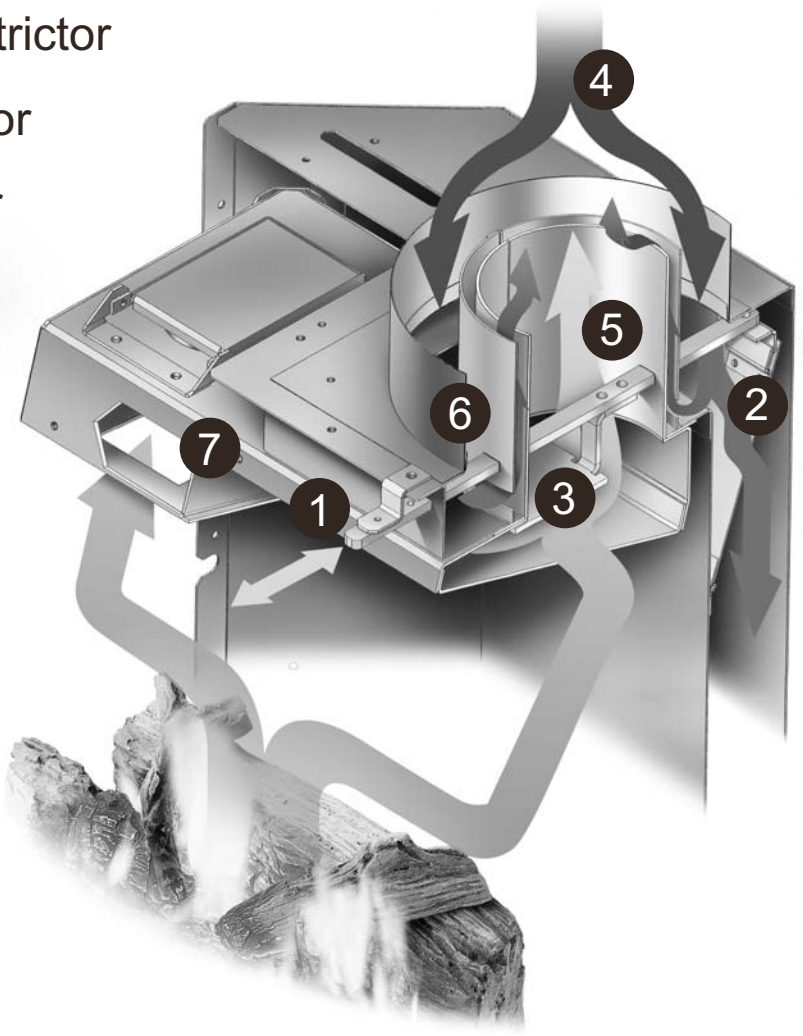
- The self-balancing flue system works much like a barometric damper and prevents over-drafting.

- When overdrafting occurs, fast rising flue gases pull combustion air through the slots at the base of the collar and up into the vent. This decreases the incoming speed and volume of the combustion air keeping the system balanced.

TRAVIS INDUSTRIES
HOUSE OF FIRE

Self-Balancing Flue System

1. Synchronized Restrictor
2. Air Intake Restrictor
3. Exhaust Restrictor
4. Combustion Air
5. Exhaust Gases
6. Self-Balancing Flue System
7. Heat Exchanger



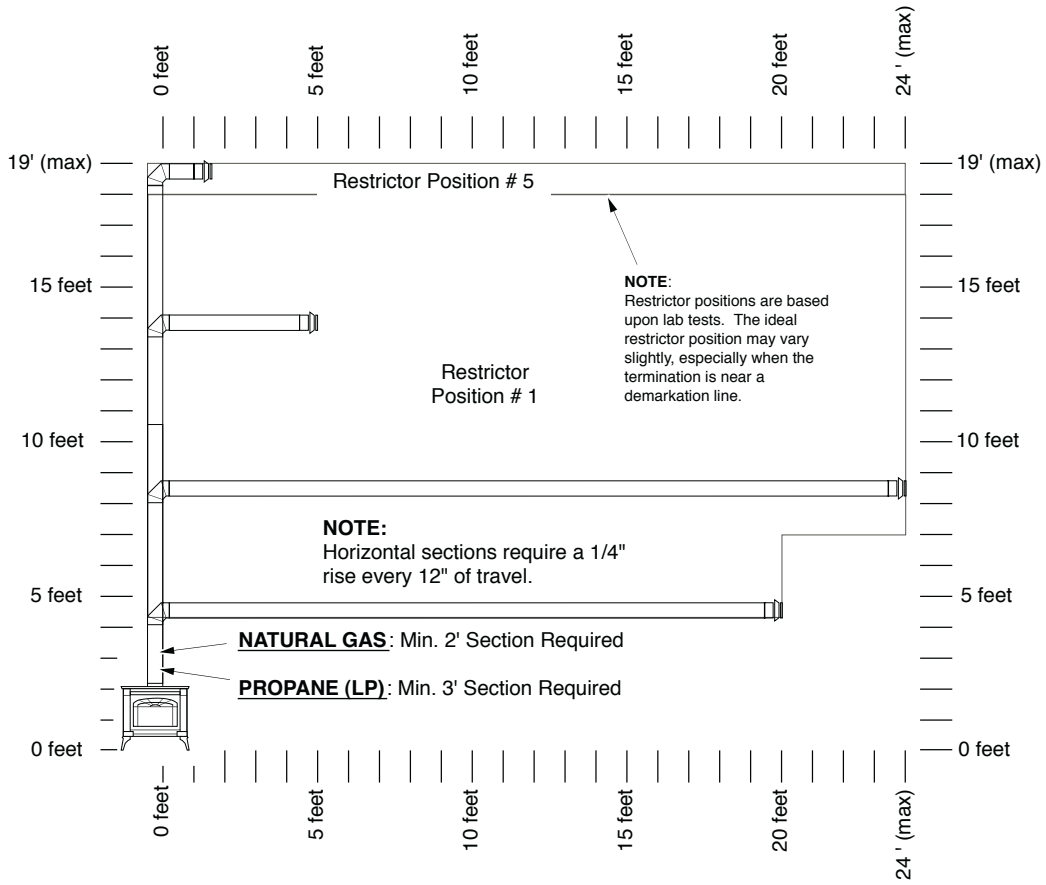
TRAVIS INDUSTRIES
HOUSE OF FIRE

Restrictor Setting

- Setting of the gas appliance restrictor is a very critical part of the appliance set-up.
- All Travis Industries gas appliances are shipped in the wide open position.
- Failure to set the restrictor may result in poor flame appearance or frequent pilot/burner outages.
- Only professionals should make restrictor adjustments.
- Improper setting may lead to sooting, carbon build-up and/or dangerous delayed ignition.

Restrictor Adjustment

1. Set restrictor in accordance with installation recommendations



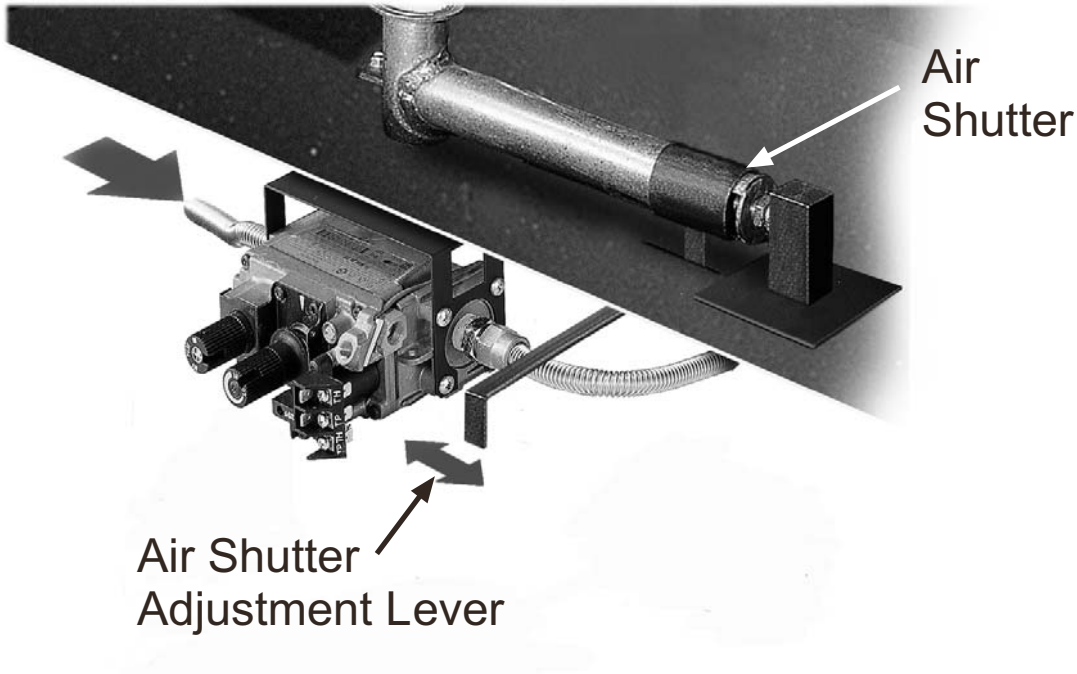
2. Adjust Air Shutter to Wide Open Position
3. Burn Appliance for 15-20 Minutes (Bring Everything Up to Heat)
4. After 15-20 Minutes of Burn Time Move Air Restrictor Until You Achive the Best Looking Flame
5. Secure Air Restrictor

Air Restrictor Adjustment

1. Adjust to Desired Ember-Fyre Look

2. The More Closed the<u>More</u> Ember-Fyre Look

3. The More Open the<u>Less</u> Ember-Fyre Look



Pre-Ember-Fyre Technology - Shutters should be adjusted by a professional - <u>NOT the consumer!</u>

Ember-Fyre Technology - Allows for the consumer to adjust flame to match their mood at any given time.

Must Have Diagnostic Tools

MUST HAVE

IMPORTANT TO HAVE

Multimeter

Gas Pressure Gauge

Digital Air Pressure Gauge

CO Analyzer

Thermocouple Adaptor

Use of the Multimeter

Use of the Multimeter

- Our gas appliances are controlled by electrical circuits.
  - Operational functions are controlled by millivolt circuits
  - Blowers are controlled by 110 volt circuits

- Troubleshooting gas operational problems. can be quickly diagnosed with a multimeter
  - Trust your multimeter

- Multimeter care
  - Delicate diagnostic instrument
    - Don’t drop or bang
    - Keep clean and dry
    - Think before you put the test leads into a circuit

- Personal Safety
  - When measuring 110 volts use caution to **not** come in contact with “HOT’ wires.

Use of the Multimeter

- In servicing gas hearth appliances 3 functions on the multimeter will be used - OHMS (or continuity) DC volts and AC volts

- OHMS - The measurement of the resistance to the flow of electricity

- The OHM function will be used to check for **continuity** in circuits and parts.

The OHMS SCALE or Ω

- Ω
- ((((- audible beep - indicating continuity

Testing For Continuity

- Place the black lead into the bottom socket marked “COM”.

- Place the RED LEAD into the bottom socket marked VΩ

- Set the pointer on the center selector knob to the audible beep symbol or on the Ω setting.
- Turn on power - ON/OFF button.
- Digital screen will light up and show a O.L off to the left side.
- This indicates there is no continuity between the leads, or an infinite amount of resistance.

When Testing For Continuity

- Touch the two leads together and hold tightly.
- The “O.L.” should disappear and the digital display should read zero or close to zero.
- If set on the audible beep it will also beep at this time.

- When testing a circuit or part for “goodness” or continuity:

A **GOOD** circuit or component	A **BAD** or defective circuit or component
• Will read zero or close to zero • Will beep if on audible	• Will remain with the O.L in the left hand side of the screen • Will not beep if set on audible

Testing For Continuity

CAUTION!

- Always turn off any power (voltage) before testing for continuity with your multimeter (failure to do so may damage your multimeter).

- Remember to disconnect one side of the circuit being tested to avoid “back door sneak”.

Millivolt Testing

- Using the DC volt scale
- Millivolt production of thermopiles and thermocouples will be read using the DCV function of the multimeter
- Millivolt is 1/1000 of a volt D.C. (direct current)

The DCV SCALE

DCV - Auto Range will read millivolts D.C.

Millivolt Testing

When Measuring Millivolts:

- Place the test leads in the same sockets as we measured OHMS.
- Turn your center selector knob so the pointer is on the D.C.V. scale auto range.
- When measuring D.C. millivolts the power must be on (pilot burning) and we must measure across both sides of the power source.
- If a **-** (minus sign) shows up on your screen simply reverse your black and red leads in the circuit you're testing (reverse polarity).

Alternating Current (AC Volt)

Using the A.C.* Volt Scale

- Accessory voltage for fans will be read using the ACV scale
- The accessory voltage will be household voltage or 110-120 volts A.C.*

* A.C. stands for alternating current

The ACV SCALE

- ACV Auto Range will read AC Voltage

Measuring A. C. Volts

- With your test leads plugged into the same sockets used for reading OHMS and D.C. volts turn the center selector knob to the ACV scale.

CAUTION!!

When testing a 110 volt circuit, be careful to not touch the ends of the test leads as you will receive an electrical shock.

Using the Pressure Gauge

- Measure incoming and outgoing gas pressure
- Never blow (with your mouth) into the tube as you may damage the meter
- Always check pressures with the main burner on high and burning to get an accurate reading
- To zero out the gauge: Press the ON/OFF button - hold until all 888's appear then O then release button
- Follow test procedures as outlined in the trouble-shooting manual

Using the Electronic Leak Detector

- You are responsible to make sure the gas appliance has no gas leaks
- Test incoming gas supply to gas control valve
- Turn on pilot and test pilot gas circuit
- Turn on burner and test burner circuit
- Test all field made connections
- Test all factory made connections
- Test after adjusting pilot
- Test after changing the regulator body
- Test after testing incoming or outgoing

LAB ACTIVITIES

LP Conversion

1. SIT Valve

a. Replace Pilot Orifice

b. Replace Burner Orifices

c. Replace Regulator

d. Adjust Air Shutter

e. Change Label on Valve

2. RobertShaw Valve

a. Replace Pilot Orifice

b. Replace Burner Orifices

c. Replace Regulator

d. Adjust Air Shutter

e. Change Label on Valve

Millivolt Testing

1. Thermocouple Voltage - Write Answer

A. SIT _____

B. RobertShaw _____

2. Thermopile Voltage - Write Answer

A. SIT _____

B. RobertShaw _____

Continuity Testing

Using the Multimeter, Test the following Components on the Component Testing Board.

a. SIT Valve Operation Head Coil

b. SIT EPU Coil

c. RoberShaw Valve Operation Head Coil

d. RoberShaw EPU Coil

e. Convection Fan

f. Rheostat

g. Snap Disc - NO (Normally Open)

h. Snap Disc - NC (Normally Closed)

i. Thermostat

Use of the Pressure Gauge - Write Answer

1. Incoming Pressure _____

2. Out Going Pressure

What is pressure on: High _____

What is pressure on: Low _____

BASIC GAS

Hands On Lab Sheet

Required Activity

1. Millivolt Testing SIT System
2. Millivolt Testing RobertShaw System
3. LP Conversion - RobertShaw Valve
4. LP Conversion - SIT Valve
5. Gas Pressure Testing - Input and Output
6. Thermostat Operation
7. Blower Circuit Operation
8. Setting Air Shutters
9. Setting Restrictors

Elective Activity

10. DVS & DVL Insert Accent Light Installation
11. DVS & DVL Insert Log Placement
12. DVS & DVL Insert Fireback Installation
13. DVS & DVL Insert Panel & Face Installation
14. 864TRV Flue Conversion
15. 864TRV Accent Light Installation
16. 864TRV Log Placement
17. 864TRV Fireback Installation

Name: _____

Store: _____

Course Title: _____

TRAINING WORKSHOP EVALUATION

Primary Position: ☐ Business Owner ☐ Manager ☐ Salesperson ☐ Installer ☐ Service Technician ☐ Other _____

What was most helpful to you? Why? _____

What was least helpful to you? Why? _____

General Comments About the Training Program _____

What other training topics should we offer? _____

Who Else In Your Organization Might Benefit From This Training

Name _____

Name _____

Name _____

Name _____

Please Circle the Appropriate Numbers

Pre-Study Training Materials
High - 5 4 3 2 1 - Low

Training Displays and Training Aids
High - 5 4 3 2 1 - Low

Hands-On Training Activities
High - 5 4 3 2 1 - Low

Class Met My Expectations
High - 5 4 3 2 1 - Low

Class Room Training Materials
High - 5 4 3 2 1 - Low

Overall Value of Training Course
High - 5 4 3 2 1 - Low

Instructor's Knowledge of Subject Matter
High - 5 4 3 2 1 - Low

Instructor's Delivery and Presentation Style
High - 5 4 3 2 1 - Low

Comments _____

Hotel Accommodations
High - 5 4 3 2 1 - Low

Food and Refreshments
High - 5 4 3 2 1 - Low

How does our training compare to others you have taken?

Much Better Better Same Worse
(Please circle best response)

List Other Manufacturer's Training Course's Taken: _____

You have my permission to reprint my comments. Signed _____