OPERATING INSTRUCTIONS MANUAL

(Please retain for future reference)

For

FVNP-200RC INDIRECT FIRED SPACE HEATERS

CERTIFIED FOR USE IN CANADA AND U.S.A.
As per Standard ANSI Z83.7/CSA 2.14 2000 Gas Fired Construction Heaters / Unattended Type.

Issue date: August 1, 2017

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FLAGRO INDUSTRIES LIMITED
ST. CATHARINES, ONTARIO
CANADA

GENERAL HAZARD WARNING:

FAILURE TO COMPLY WITH THE PRECAUTIONS AND INSTRUCTIONS PROVIDED WITH THIS HEATER, CAN RESULT IN DEATH, SERIOUS BODILY INJURY AND PROPERTY LOSS OR DAMAGE FROM HAZARDS OF FIRE, EXPLOSION, BURN, ASPHYXIATION, CARBON MONOXIDE POISONING, AND/OR ELECTRICAL SHOCK.

ONLY PERSONS WHO CAN UNDERSTAND AND FOLLOW THE INSTRUCTIONS SHOULD USE OR SERVICE THIS HEATER.

IF YOU NEED ASSISTANCE OR HEATER INFORMATION SUCH AS AN INSTRUCTIONS MANUAL, LABELS, ETC. CONTACT THE MANUFACTURER.

WARNING:

FIRE, BURN, INHALATION, AND EXPLOSION HAZARD. KEEP SOLID COMBUSTIBLES, SUCH AS BUILDING MATERIALS, PAPER OR CARDBOARD, A SAFE DISTANCE AWAY FROM THE HEATER AS RECOMMENDED BY THE INSTRUCTIONS. NEVER USE THE HEATER IN SPACES WHICH DO OR MAY CONTAIN VOLATILE OR AIRBORNE COMBUSTIBLES, OR PRODUCTS SUCH AS GASOLINE, SOLVENTS, PAINT THINNER, DUST PARTICLES OR UNKNOWN CHEMICALS.

WARNING:

NOT FOR HOME OR RECREATIONAL VEHICLE USE.

WARNING:

INTENDED USE IS PRIMARILY THE TEMPORARY HEATING OF BUILDINGS UNDER CONSTRUCTION, ALTERATION, REPAIR OR EMERGENCIES ONLY.

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This heater is designed and approved for use as a construction heater under Standard ANSI Z83.7/ CGA 2.14. 2000.

We cannot anticipate every use which may be made of our heaters. CHECK WITH YOU LOCAL FIRE SAFETY AUTHORITY IF YOU HAVE QUESTIONS ABOUT APPLICATIONS.

Other standards govern the use of fuel gases and heat producing products in specific applications. Your local authority can advise you about these.

SPECIFICATIONS

Model …….….	FVNP-200RC
Input Range……... ……..	200,000 btuh
Fuel …….	Propane Natural Gas
Manifold Pressure …….	1.45” W.C. Propane 3.44” W.C. NG
Maximum Inlet Pressure ……	13” W.C. Propane 10” W.C. NG
Electrical ……	115V 15 AMP (6 AMP Draw)
Ignition ……	Direct Spark Ignition
……..….	Thermostat Control
Air Circulation …….	2600 cfm
Fuel Consumption …….....	9.25 lbs/hr Propane 190 cfh NG
Approved …….....	cETLus listed

INSTALLATION:

The installation of this heater for use with natural gas shall conform with local codes or, in the absence of codes, with the National Fuel Gas Code ANSI Z223.1/NFPA 54 and the Natural Gas and Propane Installation Code, CSA B149.1-00. This heater must be installed by a qualified gas technician, following local codes published by the authority having jurisdiction. All installations performed in the state of Massachusetts must be completed by a qualified plumber and gas fitter of the State of Massachusetts.

The installation of this heater for use with propane tank or cylinder shall conform with Local codes or, in the absence of local codes, with the Standard for the Storage and Handling of Liquefied Petroleum Gases, ANSI/NFPA 58 and the Natural Gas and Propane Installation Code, CSA B149.

This heater must be located at least 10ft (3m) from any propane gas cylinder. This heater shall not be directed toward any propane gas container within 20ft (6m).

CLEARANCE TO COMBUSTIBLES:

TOP	FRONT	SIDES	REAR	FLUE PIPE
3 ft	10 ft	1 ft	2 ft	3 ft

ELECTRICAL: **WARNING**

Electrical Grounding Instructions

This appliance is equipped with a three-prong (grounding) plug for your protection against shock hazard and should be plugged directly into a properly grounded three-prong receptacle.

115v supply must be available. Please note that the heater requires 15 amps for proper operation. Ensure appropriate gauge extension cord is used.

- 12/3 AWG at 50 Feet
- 10/3 AWG at 100 Feet

CONNECTING THE CYLINDER:

If cylinders are being use, no cylinders smaller than 100lb capacity shall be used. These cylinders must supply a **vapour withdrawal** only.

1. All cylinder connections must be made using a wrench to tighten the POL fitting.

2. Be sure that the cylinder valve is in the closed position when connection or disconnecting the cylinder.

3. A soap and water solution must be applied to all connections in order to leak check the system.

The gas must be turned off at the propane supply cylinder(s) when the heater is not in use. When the heater is to be stored indoors, the connection between the propane supply cylinder(s) and the heater must be disconnected and the cylinders removed from the heater and stored in accordance with Standard for the Storage and Handling or Liquefied Petroleum Gases, ANSI/NFPA 58 and CSA B149.1, Natural Gas and Propane Installation Code.

PIPING: This heater must be installed by a qualified gas technician following local codes published by the authority having jurisdiction. Sizing of supply piping must be determined using the length of pipe run as well as total btuh rating of the appliance(s). Appropriate piping tables must be used to determine size of supply piping dependant on the length of run from source.

PRESSURES:

MAXIMUM INLET PRESSURES:	LP:	13.0 IN. WC.
	NG:	10.0 IN. WC.
MINIMUM INLET PRESSURES:	LP:	8.0 IN. WC.
	NG:	7.0 IN. WC.

This heater must be supplied by pressures indicated on the approval label. Over pressure may cause controls to fail.
DO NOT supply this unit with more than ½ psig (14.0 in. W.C.)

Note: A second stage regulator must be installed if the supply pressure exceeds ½ psig.

FUEL: This heater is a dual fuel unit and operates on propane & natural gas. The manifold pressures are listed on the approval label.
You do not need to change any of the burner components; you however need to make sure the fuel selector valve on the manifold is in the proper fuel position.

HOSES: All hoses used to connect this heater of fuel supply must be Type 1 approved propane / natural gas hose assemblies

POWER SUPPLY INDICATOR LIGHT:

The power supply indicator light will help detect any faulty power supplied to the heater such as; grounding issues, reverse polarity or missing/poor connections.

Warning Light Indications

Green Light …… Meets Power Requirements

Solid Red Light…….. Reverse Polarity

Solid Red & Green Light… Ground Issue

ATTENTION: IF SOLID RED & GREEN IS INDICATED, MAKE CORRECTIONS TO POWER SUPPLY BEFORE TURNING HEATER ON. FAILURE TO DO SO WILL VOID ANY WARRANTY.

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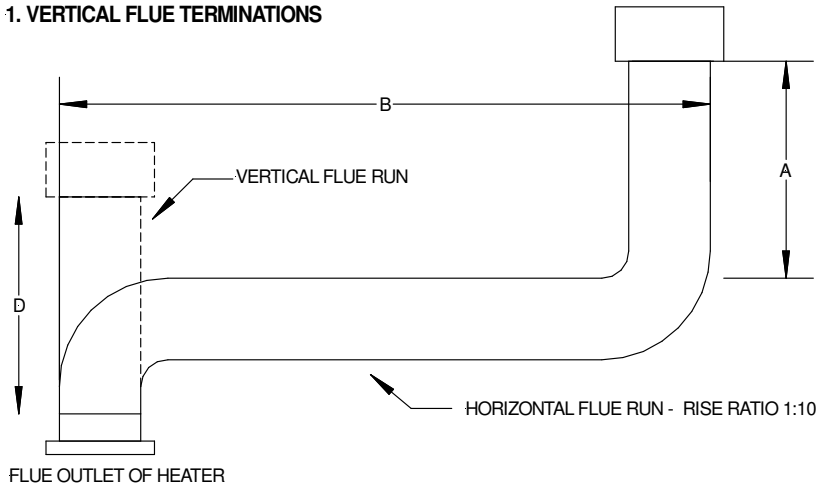
FLUE PIPE: For outdoor applications the flue pipe connection must terminate with a vertical run at least 2 ft long with a rain cap.

For indoor installations the venting must consist of a minimum 2 ft vertical run to a maximum of 20 ft total vent length. See diagram below for horizontal vent installation.

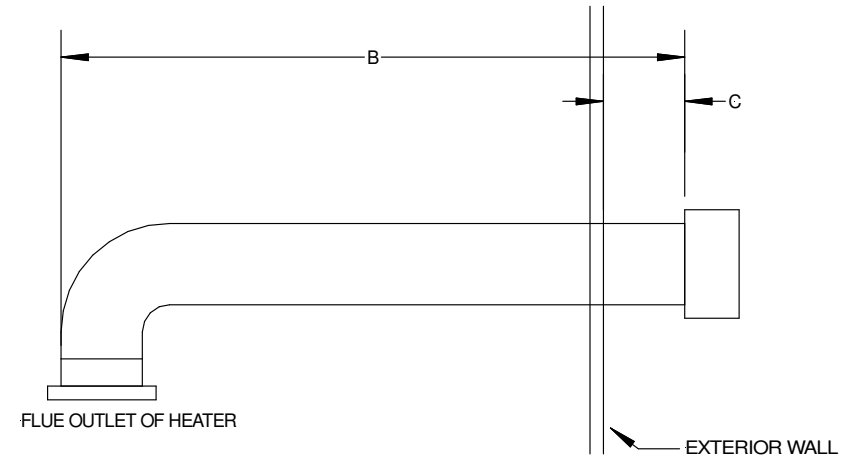
The vent outlet on the heater is 6” diameter. Certified venting must be used at all times. Vent cap should be installed in situations where downdrafts occur. All venting must correspond with CSA B149 standard or in its absence, local codes.

FV SERIES CONSTRUCTION HEATER – VENTING REQUIREMENTS

1. VERTICAL FLUE TERMINATIONS



2. HORIZONTAL FLUE TERMINATIONS



A - VENT TERMINATION MUST BE A MINIMUM OF 2FT HIGHER THAN ANY POINT WITHIN 10FT.

B - MAXIMUM HORIZONTAL RUN IS 30FT.
NOTE: 90deg ELBOW = 10ft HORIZONTAL VENT ALLOWANCE
45deg ELBOW = 5ft HORIZONTAL VENT ALLOWANCE

C - VENT TERMINATION IN HORIZONTAL POSITION MUST BE MINIMUM 4ft FROM ANY COMBUSTABLE SURFACE

D - EXTERIOR VERTICAL VENT TERMINATION MUST BE A MINIMUM OF 2ft.

NOTE: ALL VENT TERMINATIONS MUST HAVE A RAIN CAP INSTALLED AS PER LOCAL CODE REQUIREMENTS.

OUTLET DUCTING:

Hitex heater duct with a minimum temperature handling of 300 deg F including wire reinforcement to prevent collapsing. Heater is designed for use with 1 x 12" (FV-HD12) or 1 x 16" (FV-HDG16) diameter ducting equipped with pin lock or cuff & buckle provided on collar of ducting. Ducting should be inspected periodically for tearing and/or wear marks. Ducting should be stored in a dry area when not in use.

INLET DUCTING:

Ducting must be used on the return air inlet of heater. The heater is designed for 12" inlet diameter ducting (FV-HD12) and is designed for pin lock or cuff and buckle system

MAINTENANCE:

1. **Every construction heater should be inspected before each use, and at least annually by a qualified service person. Incorrect maintenance my result in improper operation of the heater and serious injury could occur.**

2. The hose assemblies shall be visually inspected prior to each use of the heater. If it is evident there is excessive abrasion or wear, or the hose is cut, it must be replaced prior to the heater being put into operation. The replacement hose assembly shall be that specified by the manufacturer.
3. The appliance must be kept clear and free from combustible materials, gasoline and other flammable vapors and liquids.

4. The flow of combustion and ventilation air must not be obstructed. Be sure to check the fan assembly and ensure that the motor and blade are operating properly.

5. Compressed air should be used to keep components free of dust and dirt build up.

   Note: Do not use the compressed air inside any piping or regulator components.

6. Fan Limit Switch (Part# FV-407A) should be replaced if the fan motor does not shut off after the heat exchanger has cooled down.

7. High Limit Switches (Part# FV-406 & FV-437) should be checked each season. These limit switches will ensure the burner shuts down if the temperature exceeds 250°F at the outlet.

8. Heat Exchanger should be cleaned if smokey conditions continue even after the air adjustments on the burner are made.

START UP INSTRUCTIONS:

1. Position heater properly on a level surface.

2. Be sure the toggle switch is in the 'OFF" position.

3. Connect the fuel supplier to heater (leak test all connections) Refer to chart #1 for hose sizing.

4. Ensure the fuel selector valve is in the proper position. (LP or NG)

5. Ensure burner "air gate" is properly set at 3.5

6. Ensure electrical cord is grounded & plugged into a 120V 15 amp outlet. Verify cord size (12/3AWG at 50 ft & 10/3AWG at 100ft).

7. The power indicator light on the control box will engage, if green light illuminates, you have proper power supply. If not, refer to sticker on heater to verify warning problem. Correct power supply problem before operating heater.

8. Move toggle switch to "MANUAL" position for manual control.

9. Move toggle switch to "THERMOSTAT" position for thermostat control. Plug in thermostat.

10. Once the burner has started, you will need to verify and set manifold pressure. See rating plate for manifold pressure

11. Use a manometer to verify manifold pressure is being achieved. If needed, adjust manifold pressure by adjusting the set screw on the RV52 regulator. (small grey appliance regulator on the manifold, rated at ½ PSI)

Please Note:

1. If using Thermostat on unit, unit must be started in Thermostat position.

2. When changing between manual and thermostat operation, the heater must be left in the "OFF" position for 30 seconds to prevent the burner from locking out.

3. When using a generator for electrical supply, make sure the generator is properly grounded and generator is at a 60Hz frequency.

4. In the event that a generator is being used and the generator runs out of fuel, make sure the heater switch is in the "OFF" position before restarting generator, failure to do so may damage heater.

TO SHUT DOWN:

1. Close main gas supply valve while heater is operating.

2. Move toggle switch to “OFF” position. The main fan will run until the heater exchanger cools down. Do not disconnect power supply until the heat exchanger cools down.

3. Disconnect fuel supply from heater.

NOTE: Fan will continue to operate after the burner shuts down. Once the unit cools down, the fan will stop.

IF HEATER FAILS TO START:

1. Press manual reset button at rear of burner.

2. Check gas pressure supply. Supply and manifold pressure must follow those on rating plate.

3. Ensure proper power supply and extension cord is being used.

4. If heater fails to ignite after 3 attempts, call your supplier for service.

SAFE OPERATION PRECAUTIONS:

1. For use with propane or natural gas only. See approval label.

2. Use toggle switch to shut down the heater. Do not try to shut down the heater by unplugging the electrical cord.

3. Do not plug anything other that the thermostat into the “Thermostat” plug.

4. Follow electrical requirements shown on rating plate and/or Electrical requirements section of this manual.

5. Before removing any guards or performing any maintenance, be sure that the main power supply is disconnected.

COMBUSTION AIR ADJUSTMENTS:

NOTE: Proper combustion air adjustment must be achieved using a certified combustion analyzer to ensure complete combustion.

The air adjustment should be made to achieve 10% CO_2 on natural gas and 12% CO_2 on propane.

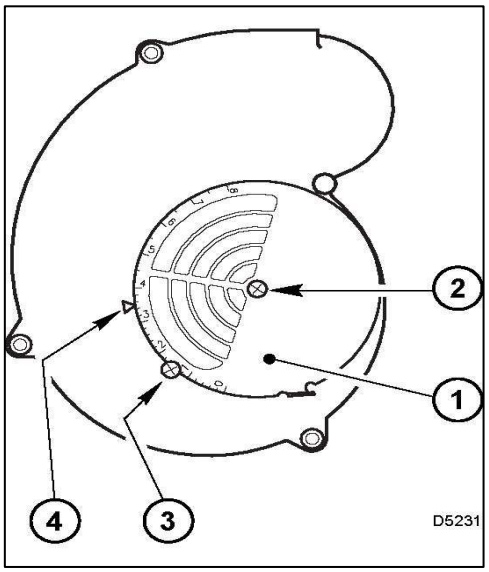
SETTING THE AIR ADJUSTMENT PLATE

A) Regulation of the combustion air flow is made by adjustment of the manual AIR ADJUSTMENT PLATE (1) after loosening the FIXING SCREWS (2 and 3). The initial setting of the air adjustment plate should be made according to Column 5 in the Burner Set-up Chart.

B) The proper number on the manual AIR ADJUSTMENT PLATE (1) should line up with the SETTING INDICATOR (4) on the fan housing cover. Once set, the air adjustment plate should be secured in place by tightening SCREWS 2 and 3.

C) The final position of the air adjustment plate will vary on each installation. Use instruments to establish the proper settings for maximum CO_2.

NOTE: Variations in flue gas, CO_2 and temperature readings may be experienced when the burner cover is put in place. Therefore, the burner cover **must** be in place when making the final combustion instrument readings, to ensure proper test results.



BURNER SET-UP CHART

1	2	3	4
FIRING RATE (BTUH)	**ORIFICE-**	**HEAD SETTING**	**AIR DAMPER SETTING**
200,000 NG 200,000 LP	PART # FVN-226	5	3.5 NG 3.0 LP

TEMPERATURE FEELER GAUGE ADJUSTMENT
(ATTACHED TO FAN SWITCH)

The temperature feeler gauge is required to be always touching the heater exchanger.

The temperature feeler gauge controls the air flow over the fan switch, which eliminates any unnecessary fan cycling. The temperature feeler gauge can be adjusted for different outside temperatures, by rotating the location of the temperature feeler gauge holes. This will provide maximum performance of the unit in different applications.

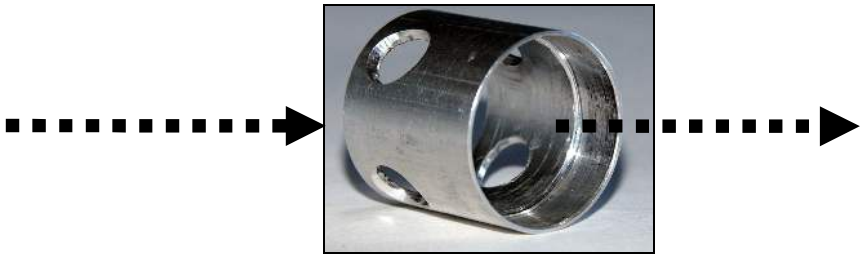
If supply air is warm (-5° C, indoor application):

Turn the temperature feeler gauge so that the holes are parallel with the heat exchanger. This will help the fan switch to remain cool and not overheat. See following:

If supply air is cold (under -5° C):

Turn the temperature feeler gauge so that the holes are closed off as the air goes over the heat exchanger. This will reduce fan cycling and the unit from shutting down.

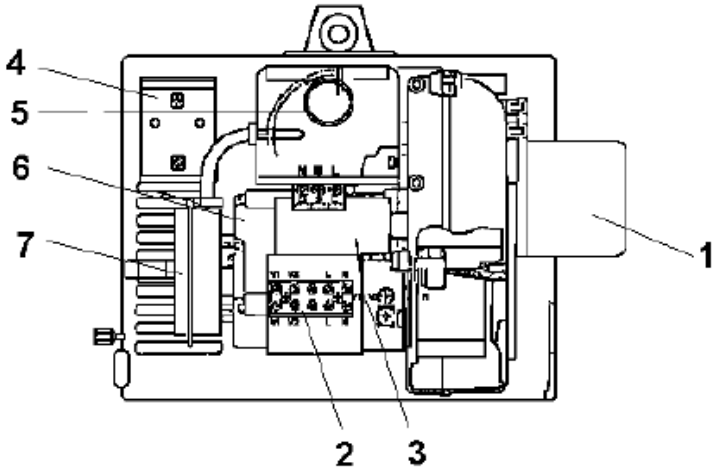
See following:



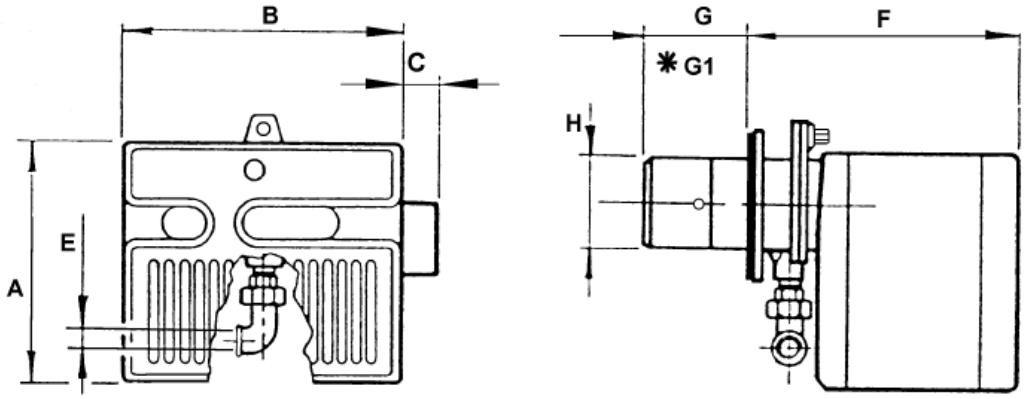
In extreme cold conditions, cover the holes on the temperature feeler gauge using foil tape. Ensure that the temperature feeler gauge is readjusted for warmer weather conditions. Failure to do so may result in burning out fan switches – not covered under warranty.

PRINCIPAL BURNER COMPONENTS

1. Electric air shutter assy. (Optional)
2. Field wiring terminal Block
3. Capacitor
4. Gas valve Transformer 120V/24 V (Optional)
5. Integrated primary/ Ignition control
6. PSC burner motor
7. Combustion air proving switch



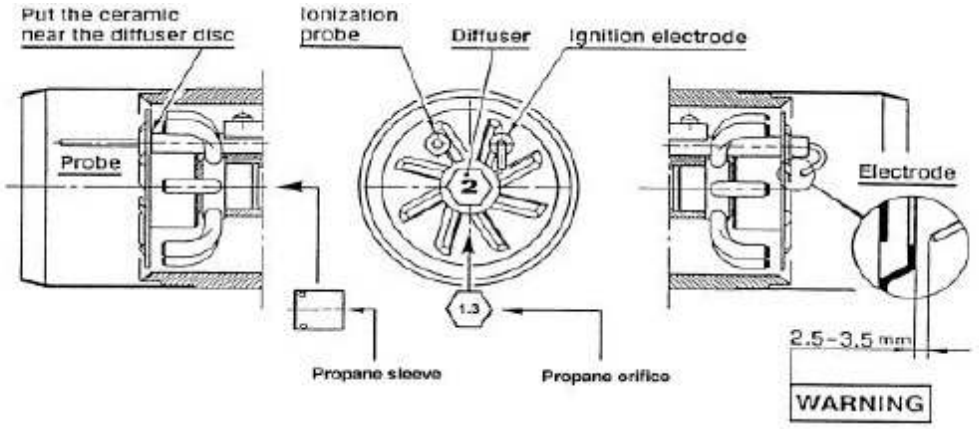
BURNER DIMENSIONS



Model 200	A	B	C	F	G	*G1	H
Inches	9 3/16	10 11/16	6 11/16	11 5/8	3 15/16	10	3 9/16
mm	233	272	35	295	85	255	91

*G1 is for LBT version
Gasket thickness is 4 millimeters

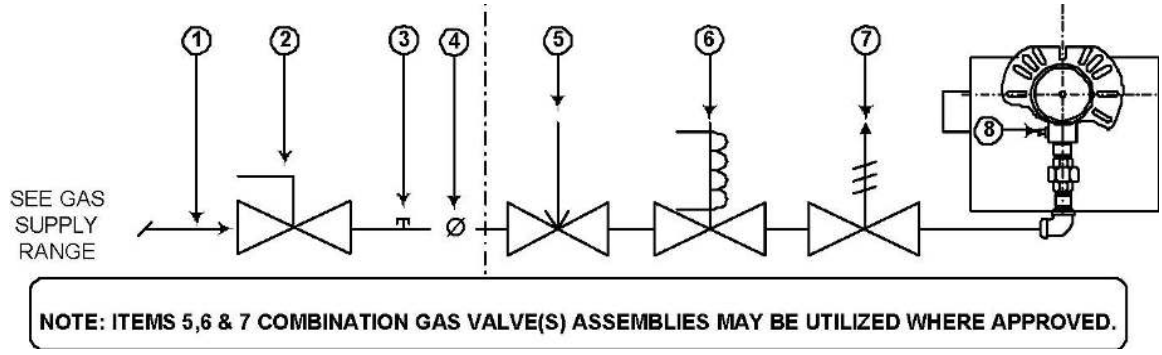
ELECTRODE AND FLAME PROBE ADJUSTMENTS



IMPORTANT: Do not turn the ignition electrode. Leave it as shown in the drawing. If the ignition electrode is put near the ionization probe, the amplifier of the control box may be damaged.

TYPICAL GAS TRAIN LAYOUT

FIELD SUPPLIED RIELLO SUPPLIED



NOTE: ITEMS 5,6 & 7 COMBINATION GAS VALVE(S) ASSEMBLIES MAY BE UTILIZED WHERE APPROVED.

GAS TRAIN LEGEND

❶ GAS SUPPLY & FLOW DIRECTION OF GAS

❷ AS SUPPLY MAIN SHUTOFF MANUAL VALVE (FIELD SUPPLIED

❸ GAS SUPPLY PRESSURE TEST POINT (FIELD SUPPLIED)

❹ GAS TRAIN PIPE DIAMETER SIZE(S): BURNER G200 1/2" NPT

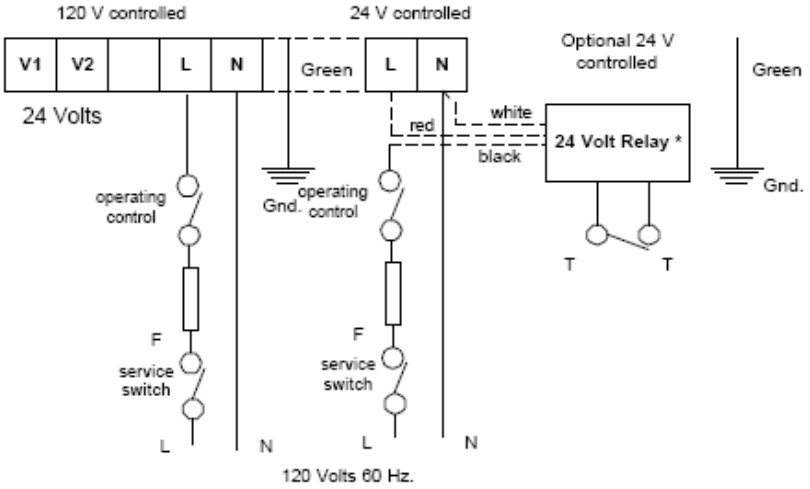
❺ GAS APPLIANCE PRESSURE REGULATOR

❻ SAFETY SHUTOFF GAS VALVE (VS) 24V OR 120V SUPPLIED) OPERATED

❼ MAIN GAS VALVE (V1) 24V OR 120V OPERATED SINGLE STAGE

❽ GAS BURNER MANIFOLD TEST POINT

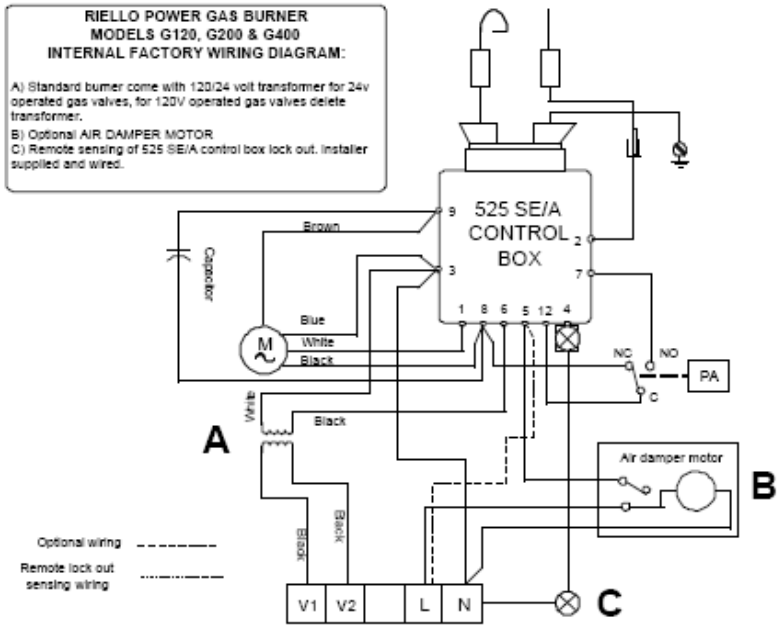
FIELD WIRING DIAGRAM



LEGEND

L = Line 1 (phase)	Gnd. = Ground
N = Line 2 (Neutral)	V1, V2 = Gas valve terminal
F = Fuse	TT = Thermostat
* 24 V switching relay as approved optional	

FACTORY WIRING DIAGRAM



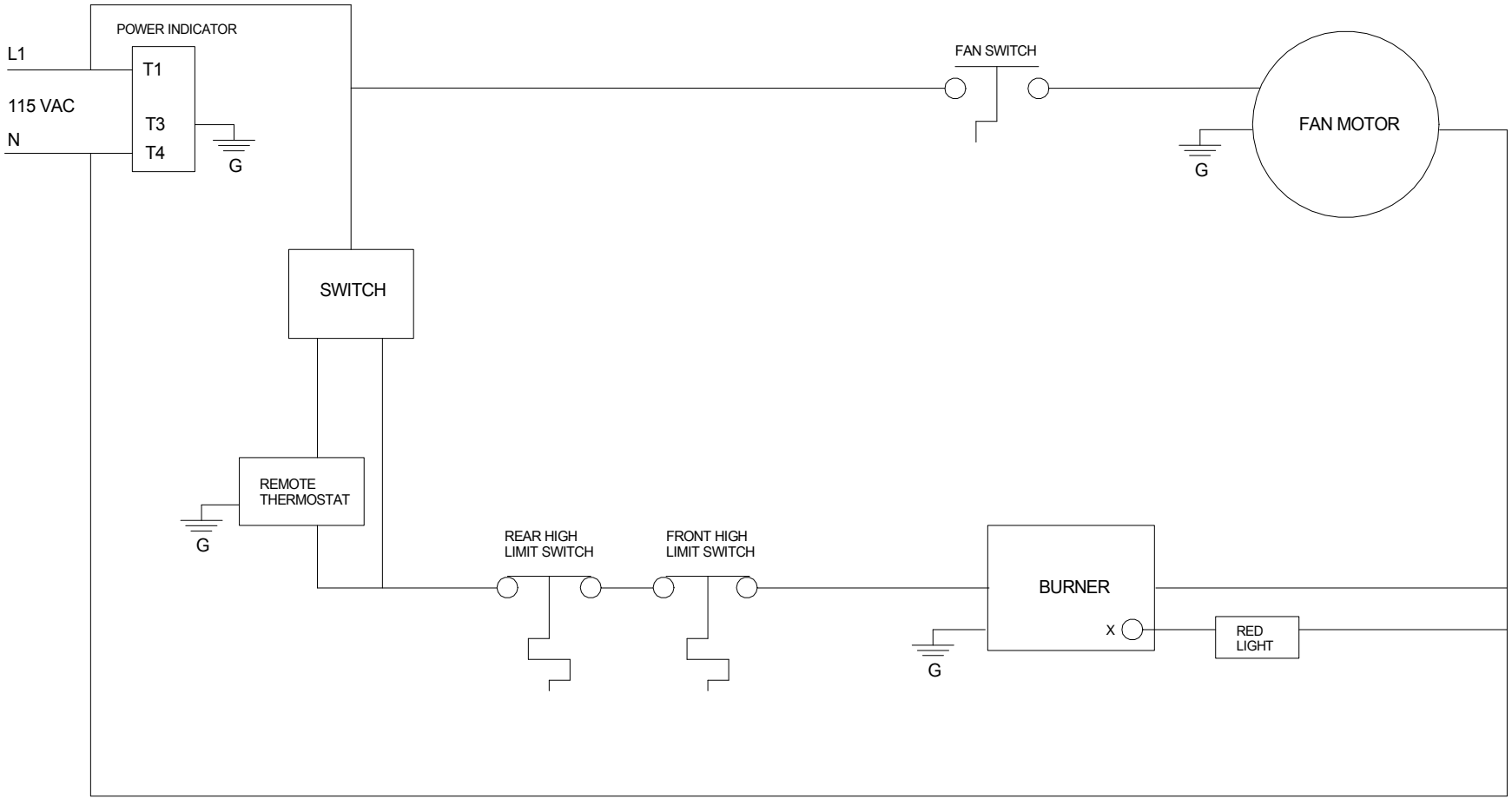
PARTS LIST FOR FVNP-200RC

Part Number	Part Description
FV-201	1/2 HP Fan Motor
FV-202RC	14" BC Impeller
FV-202RCA	Venturi For 14" BC Impeller
FV-203	12” Wheel
FV-204	12” Power Cord c/w Plug End
FV-205	SS Heat Exchanger
FV-2P01RC	Top Body Panel
FV-P04RC	Rear Burner Mount Panel
FV-P05RC	Motor Mount Bracket
FV-208RC	RC Hood
FV-208FP.com	Canopy Inner Faceplate
FV-208IR.com	Canopy Inlet Ring
FV-2P08RC	Control Box
FV-2P09RC	Control Box Lid
FVNP-2FRC	Frame
FV-406	High Limit Switch (Outlet) 250F
FV-407A	Fan Limit Switch (Adjustable)
FV-407G	Fan Limit Silicone Gasket
FV-207	6" Lockable Caster Wheel
FV-270	14" BC Impeller Fan Housing (Complete)
FV-271	Inlet Ducting Screen Ring Assembly
FV-409	Toggle Switch (on control box)
FV-411	Red Light (on control box)
FV-414B	Thermostat Plug (on control box)
FV-415B	Male Connector for FV-THB
FVNP-224	Riello G200 Burner (LP/NG)
FVNP-225	Fuel Selector Valve
FV-231	Burner Gasket
FV-433	Feeler Gauge
FV-433B	Feeler Gauge-Solid
FV-234	Front Face Plate (1 x 12”)
FV-234A	Front Face Plate (1 x 16")

FV-437	High Limit (Rear) 150F
FV-240	Wheel Axle FV-200 Series
FV-446	Sight Glass c/w Fiber Gasket
FV-447	Sight Glass Washer
FV-450SI	Power Indicator Light
FV-20136483	Burner Cover
FV-3005855	Universal Mounting Flange
FV-3007205	Manual Air Shutter
FVNP-3000870	Hinge Assembly
FVNP-300162	Ignition Module (LP/NG)
FVNP-3002307	G200 Burner Sub-Base
FVNP-3005447	Gas Pressure Test Point Adapter
FVNP-3005708	Fan
FVNP-3005834	Capacitor
FVNP-3005854	Semi Flange
FVNP-3006394	End Cone
FVNP-3006687	Chassis Mounting Collar
FVNP-3006695	Drawer Assembly Elbow
FVNP-3006899	Distributor Head & Mixing Plate
FVNP-3007265	Electrode & Ionization Clamp
FVNP-3007274	Electrode Assembly
FVNP-3007281	End Cone adapter
FVNP-3007284	Air Tube - Long
FVNP-3007288	Air Switch Tube and Connector
FVNP-3007289	Natural Gas Tube
FVNP-3007292	Air Tube Cover Plate
FVNP-3007298	Manifold
FVNP-3007303	Electrode Support
FVNP-3007310	Ionization Lead
FVNP-3007448	Ground Lead & Connector
FVNP-3020206	Flame Rod Assembly
FVNP-3020228	Drawer Assembly Diaphragm
FVNP-3020321	Air Pressure Switch
FVNP-3950272	Long Combustion Head
FVNP-C7020005	120/24 Volt Transformer
FVO-C7001034	Burner Motor

	ACCESSORIES
FV-HD12	12” X 12ft HiTex Vinyl Ducting (Used for inlet and outlet)
FV-HD12X25	12” X 25ft HiTex Vinyl Ducting
FV-HDG16	16" x 25ft HiTex Vinyl Ducting
FV-THB	Thermostat c/w 25 FT Cord – as of 2011
FV-VK	6” x 3FT C-Vent c/w Rain Cap

FV-200 SERIES - WIRING SCHEMATIC 2011



FLAGRO INDUSTRIES LIMITED	
TITLE: FV-200 - WIRING SCHEMATIC	**DWG. NO.** FV-200 WS 2011