

Single stage operation oil burners



RETROFIT APPLICATIONS ONLY

If this burner is being installed in a packaged unit (ie. burner comes with a boiler or furnace), follow the installation and set-up instructions supplied with the heating unit, as settings may differ from those shown in this manual.

- *The following pages contain information, descriptions and diagrams for the proper installation and wiring of the burner. Please read carefully before attempting final installation.*
- *This manual is to remain with the final installation designation. It is the installer's responsibility to ensure that the burner installation and operation instructions mentioned in this manual are followed and operated within local code authority limits.*



*This burner is not equipped for 2 line operation.
For 2 line operation order: part # C7001025 for BF3, C7001026 for BF5.*



RIELLO 40 BF

CODE	MODEL	TYPE
C8512352	800060000-Brn-PO Rie BF5	1.00GPH Vnt-D
C8512353	800061000-Brn-PO Rie BF5	1.20GPH Vnt-D
C8512354	800062000-Brn-PO Rie BF5	1.40GPH Vnt-D

C6501073(0)



INSTALLATION PRECAUTIONS

AIR FOR COMBUSTION

Do not install burner in room with insufficient air for combustion. Be sure there is an adequate air supply for combustion if the boiler room is enclosed. It may be necessary to create a window to permit sufficient air to enter the boiler room. The installer must follow local ordinances in this regard.

CANADA It is suggested that the installer follow CSA standard B139.

USA It is suggested that the installer follow NFPA manual #31.

CHIMNEY

Be sure chimney is sufficient to handle the exhaust gases. It is recommended that only the burner be connected to the chimney. Be sure that it is clean and clear of obstructions.

OIL FILTER

An external oil filter is REQUIRED, even though there is an internal strainer in the pump. The filter should be replaced at least once a year, and the filter container should be thoroughly cleaned prior to installing a new filter cartridge.

DRAFT

Follow the instructions furnished with the heating appliance. The pressure in the combustion area should be kept as close to zero as possible. The burner will operate with a slight draft or pressure in the chamber.

ELECTRICAL CONNECTIONS

CANADA All electrical connections should be done in accordance with the C.E.C. Part 1, and all local codes. The system should be grounded.

USA All electrical connections should be done in accordance with the National Electrical Code, and all local ordinances. The system should be grounded.

CONTROL BURNER OPERATION

Check out the burner and explain its operation to the homeowner. Be sure to leave the Owner's Instruction sheet with the homeowner.

FIRE EXTINGUISHER

If required by local codes, install an approved fire extinguisher.

ELECTRICAL CONNECTIONS

In most localities, a number 14 wire should be used inside a metal conduit. The system should be grounded. A service switch should be placed close to the burner on a fireproof wall in an easily accessible location.

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PACKAGE CONTENTS LIST

Your Riello 40 BF burner should include the following parts. Please check to make sure all parts are present before beginning the installation.

Quantity	Description	Code
1	Burner with combustion head mounted	
1	Mounting gasket	C6880016
1	Parts bag	C7001060 - C7001038
1	Installation manual	C6501073

Parts bag C7001060 - C7001038

Quantity	Description
1	NPT - NPTF pipe adapter
1	3/8" straight connector
2	Anti-shorts bushings
3	Wire nuts

SERIAL NUMBER IDENTIFICATION

The Riello 15 character serial number, example,

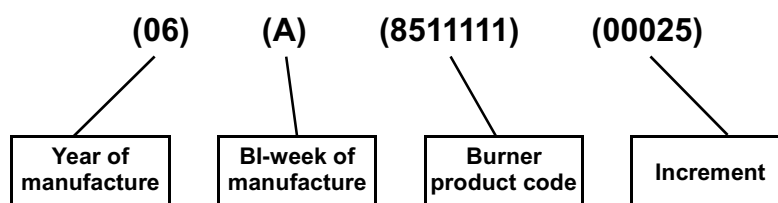
06 A 8511111 00025, is identified as follows:

06 = Last two digits of the year of manufacture;

A = BI-week of manufacture;

8511111 = Burner product code;

00025 = Increment of 1 for each burner produced – specific to product code – reset to zero each January 1st.



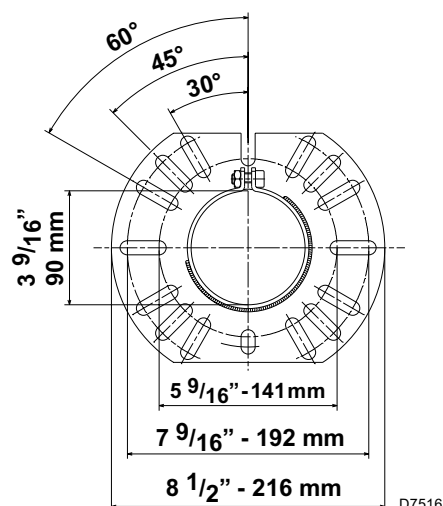
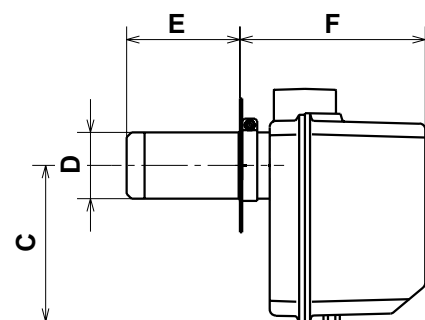
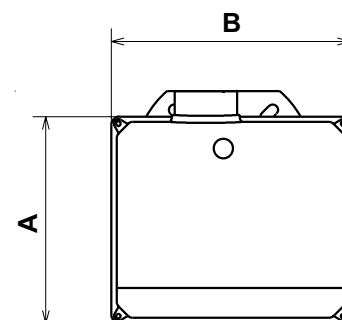
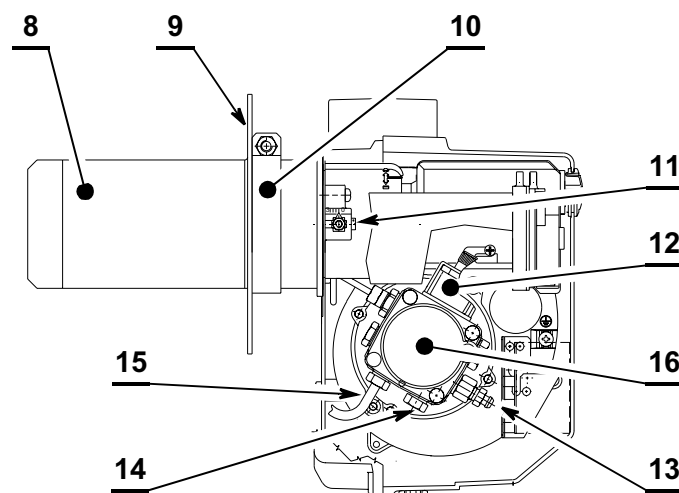
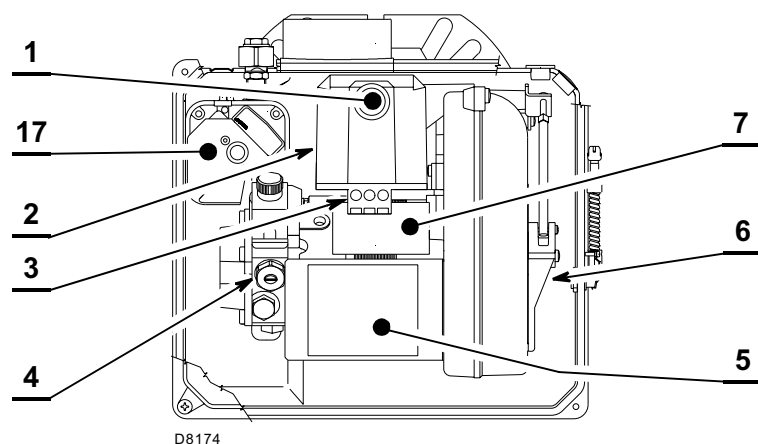
TECHNICAL DATA SPECIFICATIONS

Fuel	No. 2 Fuel Oil
BF3 Firing rate - Effective Output	0.50 to 0.95 US GPH - 70,000 to 133,000 BTU/h
BF5 Firing rate - Effective Output	0.75 to 1.65 US GPH - 105,000 to 231,000 BTU/h
Voltage (single phase)	120V 60Hz (+ 10% - 15%)
BF3 Absorbed electrical power	192 Watts
BF5 Absorbed electrical power	204 Watts
Motor (rated)	3250 rpm Run Current 2.2 AMP
Capacitor	12.5 Microfarads 260V
Pump pressure	100 to 200 PSI
Primary control	RIELLO 530 SE/C
Ignition transformer	8kV 16mA

BURNER AND MOUNTING FLANGE DIMENSIONS

Model		A	B	C	D	E	F
BF3	Inches	9 13/16	11 1/4	7 1/2	3 1/2	4 5/8	8 21/32
	mm	249	286	193	89	117	220
BF5	Inches	9 13/16	11 1/2	7 1/2	3 1/2	6 5/16	6 13/16
	mm	249	292	193	89	160	173

BURNER COMPONENTS IDENTIFICATION



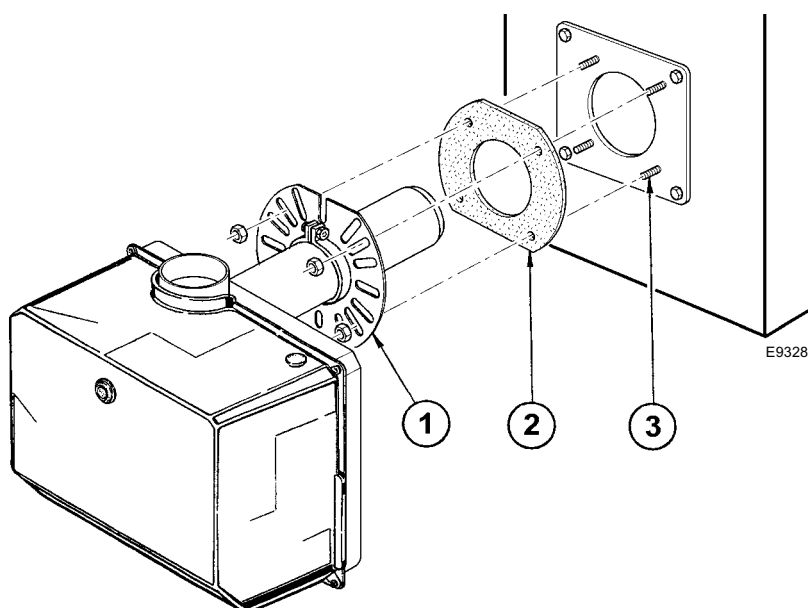
BURNER COMPONENTS

- 1 Lockout indicator lamp and reset button
- 2 Primary control
- 3 Primary control sub-base
- 4 Pump pressure regulator
- 5 Post purge timer
- 6 Air adjustment
- 7 Capacitor
- 8 Combustion head
- 9 Mounting gasket
- 10 Universal mounting flange
- 11 Turbolator adjustment screw
- 12 Coil
- 13 Bleeder and pressure gauge port
- 14 Return fuel line port
- 15 Inlet fuel line port
- 16 Pump
- 17 Air pressure switch

MOUNTING THE BURNER TO THE BOILER

- Position the MOUNTING GASKET (2) between the flat surface of the UNIVERSAL MOUNTING FLANGE (1) installed on the burner and the appliance.
- Line up the holes in the UNIVERSAL MOUNTING FLANGE with the STUDS (3) on the appliance mounting plate and securely bolt the UNIVERSAL MOUNTING FLANGE to the plate.

To remove the burner from the boiler, reverse the procedure.




ELECTRICAL CONNECTIONS

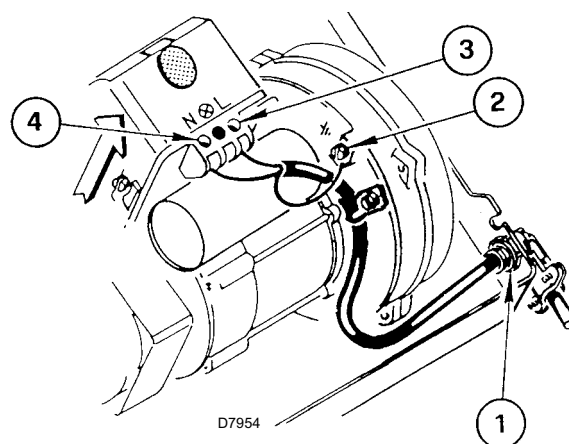
It is advisable to leave the control box off the sub-base while completing the electrical connection to the burner.

- 1) Wire access hole (Use BX electrical connector)
- 2) Earth ground conductor terminal (Green wire)
- 3) Hot conductor terminal (Black wire)
- 4) Neutral conductor terminal (White wire)

WARNING:

The hot (black) wire must be connected to the L terminal and the neutral (white) wire must be connected to the N terminal or the primary safety control will be damaged.

Do not connect wither wire to the terminal marked .



Using the appropriate diagram below, make electrical connections to burner.

All wiring must be done in accordance with existing electrical codes, both national and local.

When all electrical connections have been made, the control box may be put back in place on the sub-base.

WARNING: DO NOT activate burner until proper oil line connections have been made, or failure of the pump shaft seal may occur.

APPLICATION FIELD WIRING

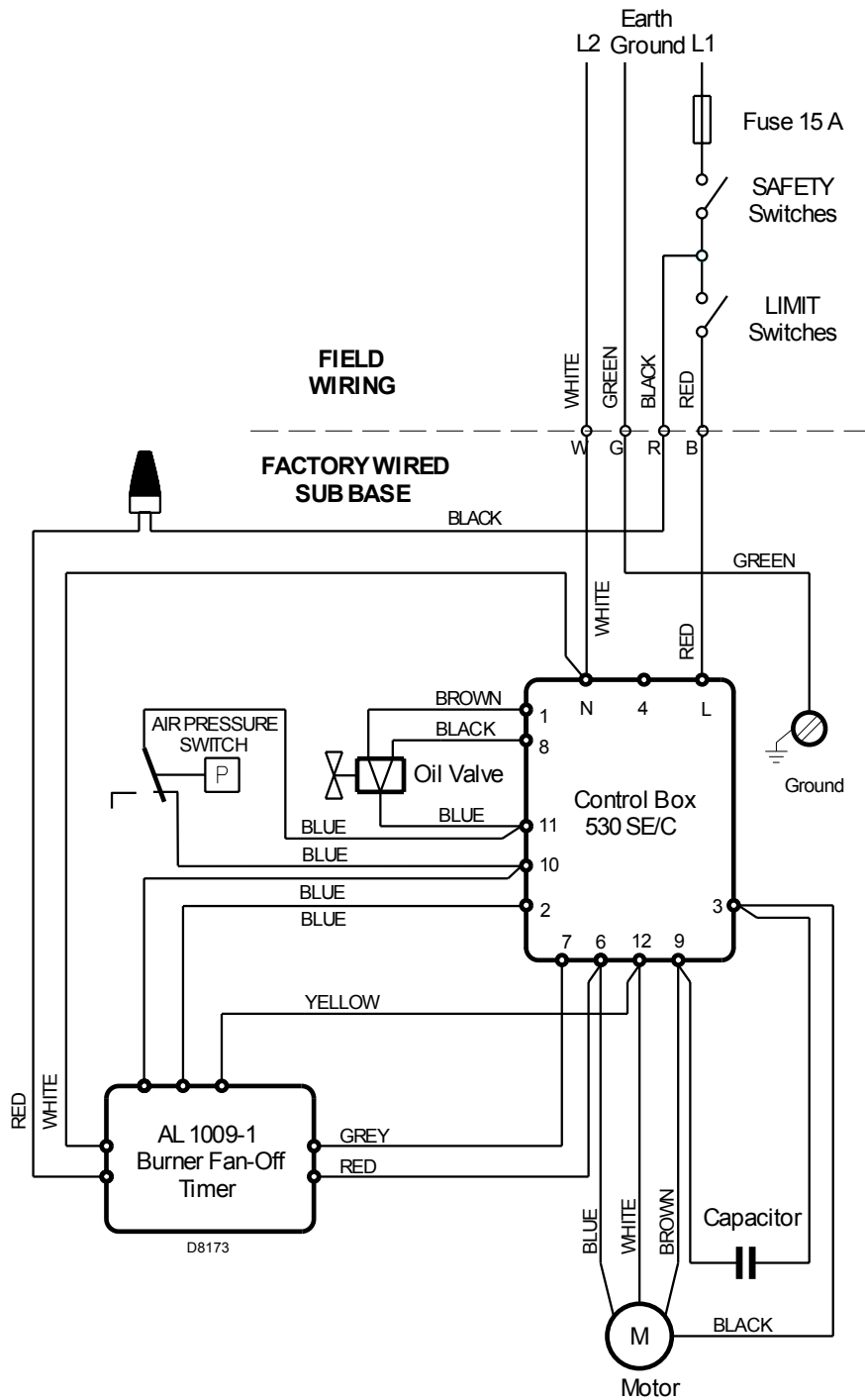
REMOTE SENSING OF SAFETY LOCKOUT

The SAFETY SWITCH in the 530SE CONTROL BOX is equipped with a contact allowing remote sensing of burner lockout. The electrical connection is made at terminal 4 (●) on the SUB-BASE.

Should lockout occur the 530SE CONTROL BOX will supply a power source of 120Vac to the connection terminal. The maximum allowable current draw on this terminal (4) is 1 Amp.

WARNING:

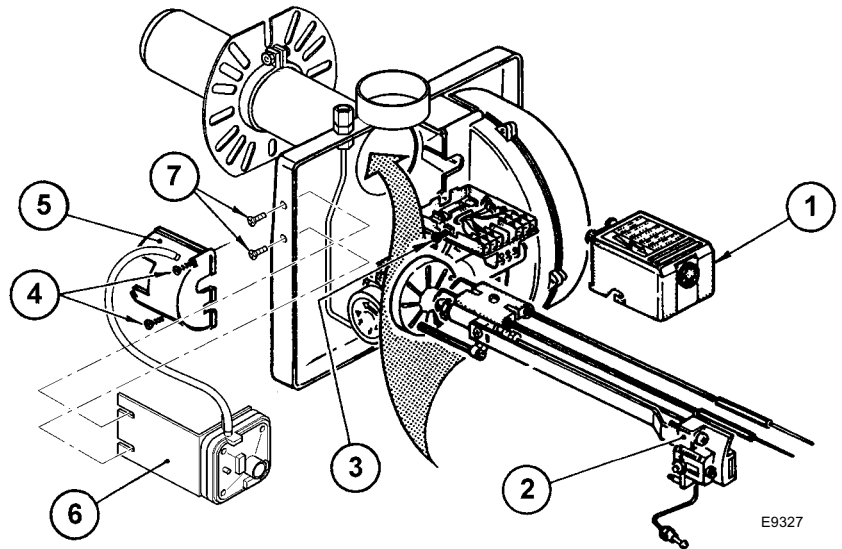
If a neutral or ground lead is attached to this terminal, the CONTROL BOX on the burner will be damaged should lockout occur.



INSTALLATION/REMOVAL OF DRAWER ASSEMBLY

Removal:

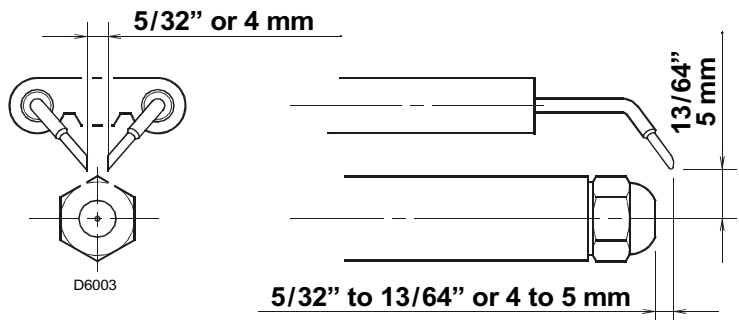
- A) Remove the air pressure switch support (6) from the front shield by the two retaining screws (7)
- B) Loosen off oil delivery tube nut from pump.
- C) Loosen SCREW (3), and then unplug CONTROL BOX (1) by carefully pulling it back and then up.
- D) Remove the AIR TUBE COVER PLATE (5) by loosening the retaining SCREW (4) (Two SCREWS – Model BF5).
- E) Loosen SCREW (2), and then slide the complete drawer assembly out of the combustion head as shown.
- F) To insert drawer assembly, reverse the procedure in items A to E above.



ELECTRODE SETTING

IMPORTANT:

These dimensions must be observed and verified.

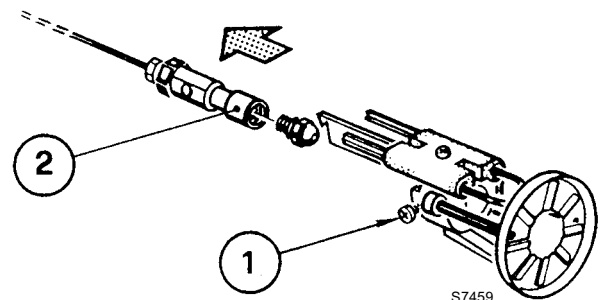


NOZZLE PLACEMENT

- Remove the NOZZLE ADAPTER (2) from the DRAWER ASSEMBLY by loosening the SCREW (1).
- Insert the proper NOZZLE into the NOZZLE ADAPTER and tighten securely (Do not over tighten).
- Replace adapter, with nozzle installed, into drawer assembly and secure with screw (1).

IMPORTANT:

The nozzle and the pump pressure must be in accordance with the burner setup chart at page 9.

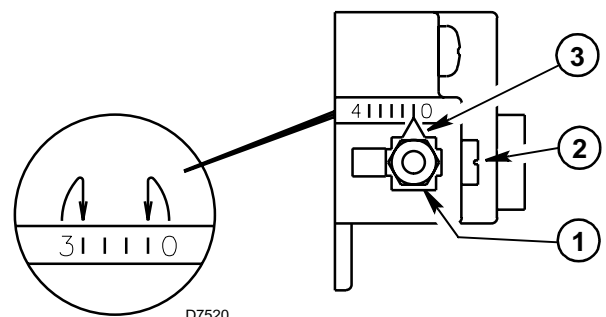


TURBULATOR SETTING

- A) Loosen NUT (1), and then turn SCREW (2) until the INDEX MARKER (3) is aligned with the correct index number as per the burner setup chart at page 9.
- B) Retighten the RETAINING NUT (1).

MODEL BF3: Zero and three are scale indicators only. From left to right the first line is 3 and the last line 0.

MODEL BF5: Same as above, except scale indicators are 0 and 4.



OIL LINE CONNECTIONS

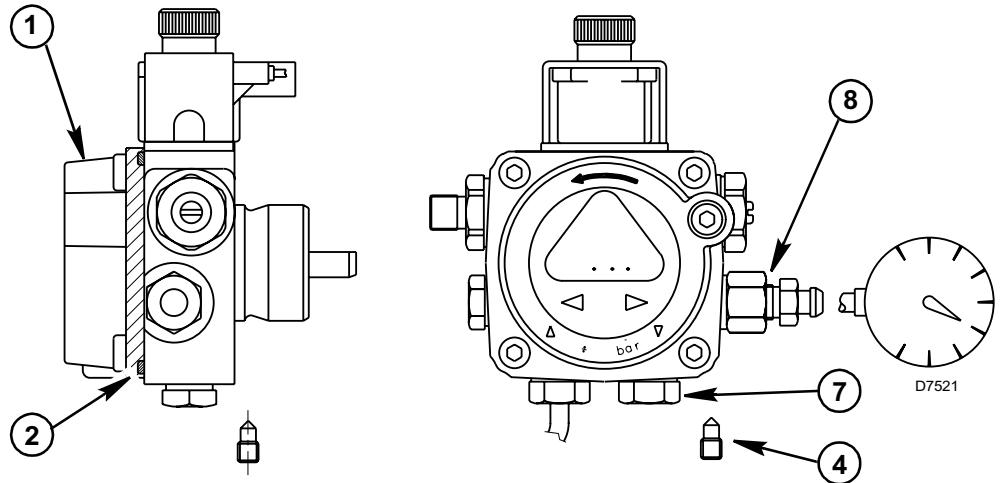
This burner is shipped with the oil pump set to operate on a **single** line system.
To operate on a **two-line** system the by-pass plug must be installed.

WARNING

Do not operate a **single** line system with the by-pass plug installed.
Operating a **single** line system with the by-pass plug installed will result in damage to the pump shaft seal.

NOTE:

Pump pressure must be set at time of burner start-up.
A pressure gauge is attached to the **PRESSURE PORT** (8) for pressure readings.
All pump port threads are **British Parallel Thread** design.
Direct connection of NPT threads to the pump **will damage** the pump body.
Riello manometers and vacuum gauges **do not** require any adapters, and can be safely connected to the pump ports.
An NPT (metric) adapter **must** be used when connecting other gauge models.



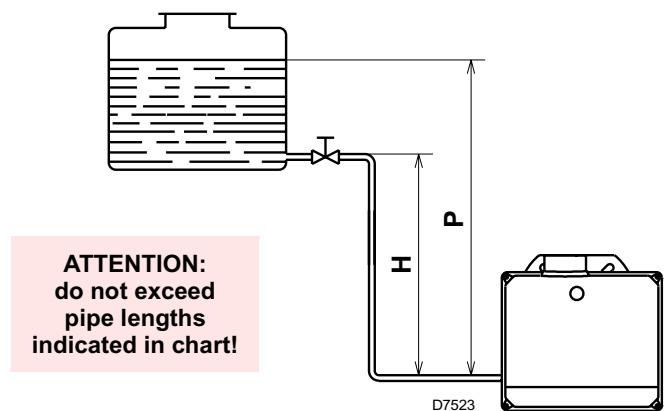
SINGLE LINE (GRAVITY FEED SYSTEM)

The burner is shipped configured for use in single line applications.
No changes to the oil pump are required for use in single line applications.

NOTE:

If the **pump cover** (1) is removed for any reason, be sure the O-ring (2), is properly seated in the pump cover (1) before re-attaching the pump cover to the pump housing.
Install the required fitting NPTF to NPT adapter into the pump's **SUCTION LINE CONNECTION FITTING** on left side of burner on top.
Attach the required tubing to this fitting. Be sure that the plug in the **RETURN LINE CONNECTION FITTING** is tightened securely.

SINGLE LINE SYSTEM-PIPE LENGTHS					
H		3/8" OD		1/2" OD	
FT	M	FT	M	FT	M
1.5	0.5	33	10	65	20
3.0	1.0	65	20	130	40
5.0	1.5	130	40	260	80
6.5	2.0	195	60	325	100

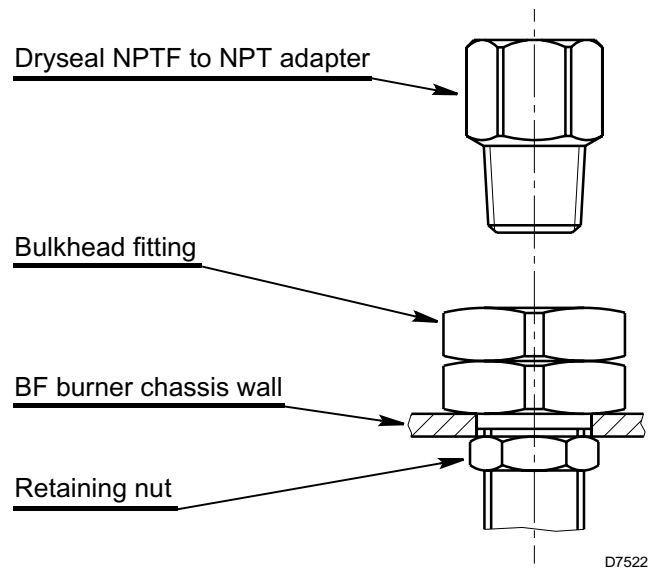


NPTF - NPT pipe adapter

The BF burner you have purchased is shipped with an NPTF to NPT fitting. This fitting is the connection point for the oil line from the oil tank or the in-line oil filter. In some locations, fittings with the NPTF male thread are difficult to obtain. In these areas, a more common NPT thread male fitting or pipe may be used. To accommodate this NPT thread, the BF NPT-NPTF adapter is supplied. This brass adapter is installed as shown below.

Installation of NPT-NPTF pipe adapter

- 1 The brass adapter may be threaded directly into the steel female fitting already installed in the BF burner chassis. No pipe sealant is required since this thread is self-sealing.
- 2 Ensure that the brass adapter is tightly fitting into the steel adapter.
- 3 Fit the pipe or fitting used to connect the oil supply system into the brass adapter. Use pipe sealant to ensure a leak-free joint.



TWO LINE (LIFT SYSTEM) (Accessory package required)

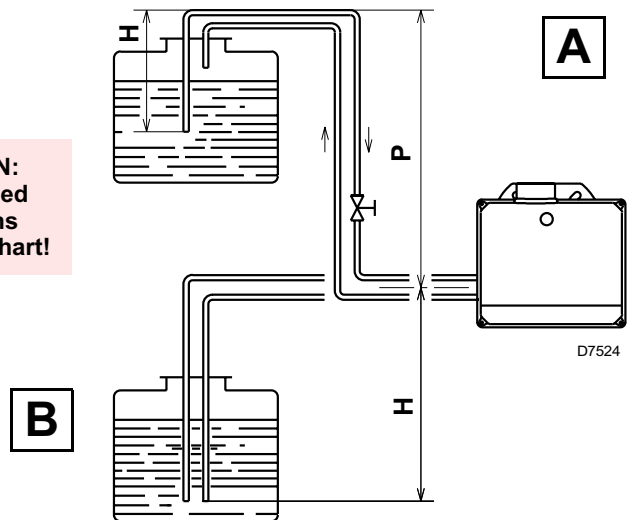
If a two-line system is required, install the By-pass plug. The by-pass plug is installed in the return port of the pump. A 2.5-mm hexagonal key is to be used to install the plug.

DO NOT use an inch size hexagonal key; damage to the by-pass plug may result.

- A) Suction and return lines should be sized in accordance with local codes. The suction line should extend down near the bottom of the oil tank. The return line should terminate near the top of the oil tank.
- B) Suction and return lines should be sized in accordance with local codes and both **should extend to the same depth inside the fuel tank**. Be sure there are no air leaks or blockages in the piping system. Any obstructions in the return line will cause failure of the pump shaft seal. Do not exceed the pipe lengths indicated in the table. Install the required fittings (NPT THREAD) in the SUCTION LINE and RETURN LINE CONNECTION FITTINGS. Attach the required tubing to these fittings.

2 LINE (LIFT) SYSTEM-PIPE LENGTHS					
H		3/8" OD		1/2" OD	
FT	M	FT	M	FT	M
0.0	0.0	115	35	330	100
1.5	0.5	100	30	330	100
3.0	1.0	80	25	330	100
5.0	1.5	65	20	295	90
6.5	2.0	50	15	230	70
9.5	3.0	25	8	100	30
11	3.5	20	6	65	20

ATTENTION:
do not exceed pipe lengths indicated in chart!



To install the by-pass plug:

- 1) Remove the return plug (7).
- 2) Install the by-pass plug (4) using the 2.5 mm hexagonal key.
- 3) Connect the return line connection pipe to the return port (7) of the pump and tighten securely.

WARNING:

- Pipe dope or Teflon tapes are NOT to be used on any direct oil connection to the fuel pump.
- The height 'P' in Pipe Length Charts should not exceed 13 feet (4 m).
- The vacuum should not exceed 11.44 inches of mercury.

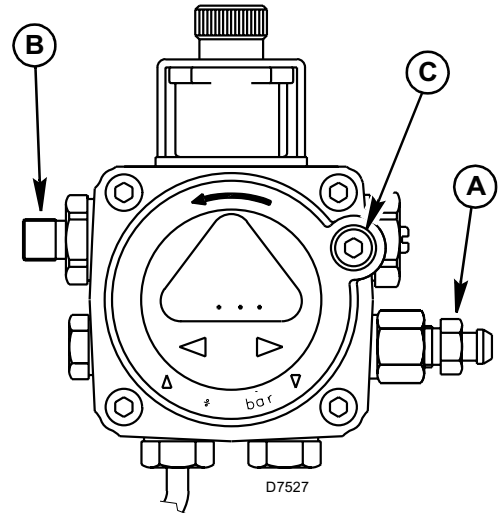
IMPORTANT: An external, appropriately listed and certified oil filter must be placed in the fuel line between the fuel tank and the burner pump.

PUMP PURGE

NOTE: To protect the pump gears, it is advisable to lubricate the pump prior to purging a lift system.
Apply oil through the VACUUM PORT (C).

A) SINGLE LINE (GRAVITY FEED SYSTEM)

- I. Loosen the bleeder valve (A) until oil flows out.
Tighten the bleeder valve securely and start burner.
- II. When bleeding the pump by pressure:
 - 1) Loosen the bleeder valve (A).
 - 2) Disconnect nozzle oil supply line at the pump nozzleport (B).
 - 3) Attach a flexible plastic tube to the pump nozzle, port directing the oil flow into a bucket.
 - 4) Loosen the screw(s) securing the air tube cover, allowing it to be removed freely.
 - 5) Holding the air tube cover in its proper location start the burner.
 - 6) When the solenoid valve is engaged approximately 10 seconds after starting, remove the air tube cover and shine a light source on the photocell, allowing it to see false light.
 - 7) Run the burner until the fuel pump has been purged of air, then tighten the bleeder valve and immediately shut down the burner.
 - 8) Reinstall the air tube cover and nozzle line.
 - 9) The burner can now be started normally.



WARNING: Omitting steps 2 and 3 will result in a collection of unburned oil in the combustion chamber creating a hazardous situation upon burner startup.

B) TWO LINE (LIFT SYSTEM)

Turn off the main power source to the burner and remove the air tube cover. Shines a light source on the photocell (now visible where the air tube cover was removed), return power to the burner and activate the burner. With the light source in place, the burner will operate in prepurge only. Once the burner is purged, turn off the power source and replace the air tube cover. Return power to the burner. The burner is now ready to operate.

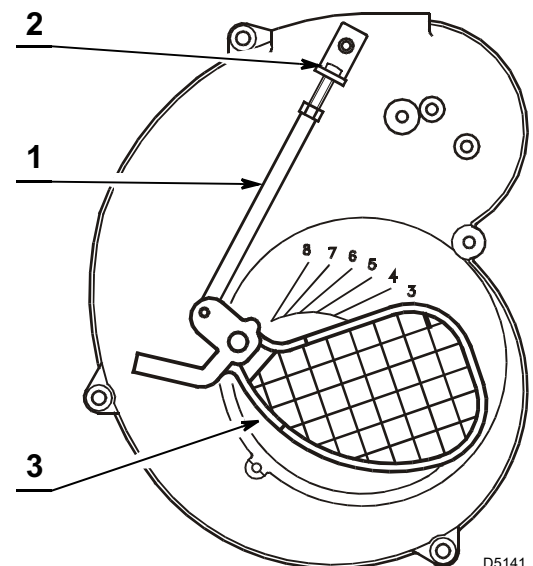
ATTENTION: It is important that the fuel line be completely sealed and free from air leaks or any internal blockages.
WARNING! WHEN THE BYPASS PLUG IS INSTALLED, A TWO-PIPE SYSTEM MUST BE USED OR FAILURE OF THE PUMP SHAFT WILL OCCUR.

SETTING THE AIR ADJUSTMENT PLATE

- A) The initial air damper setting is made by turning screw (2) until the top edge of the air damper (3) is aligned with the number according to the burner setup chart.
- B) Further adjustments can be made with the burner cover in place by removing plastic plug on the top right hand side of the cover. Turn the screw counter clockwise (+ indicator) to increase combustion air, turn the screw clockwise (- indicator) to decrease combustion air.
- C) The final position of the air damper will vary on each installation. Use instruments to establish the proper settings for maximum CO₂ and a smoke reading of zero.

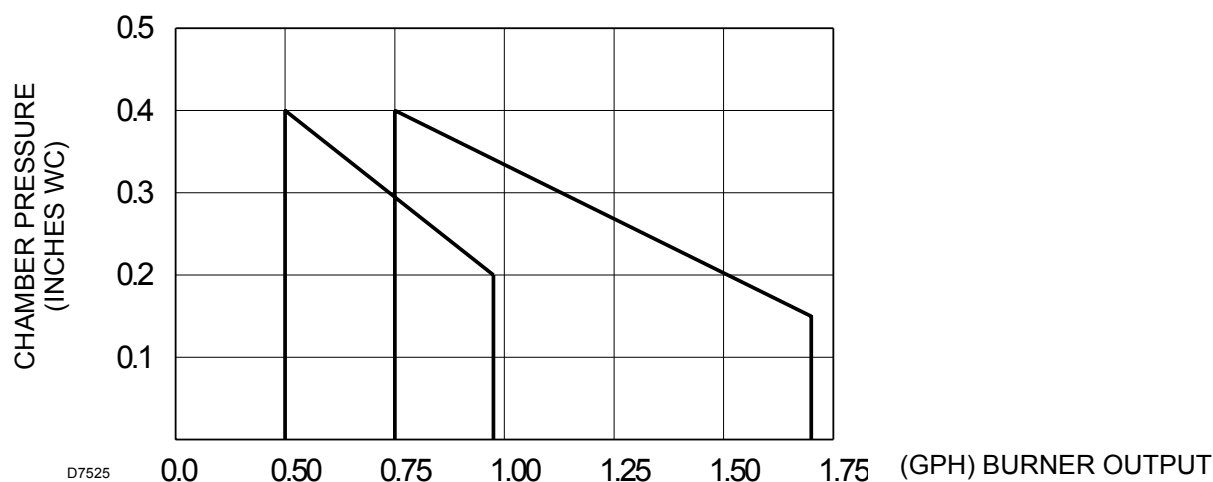
NOTE:

Variations in flue gas, smoke, CO₂, 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.



COMBUSTION CHAMBER PRESSURE CHART

BURNER OUTPUT VS CHAMBER PRESSURE CHART

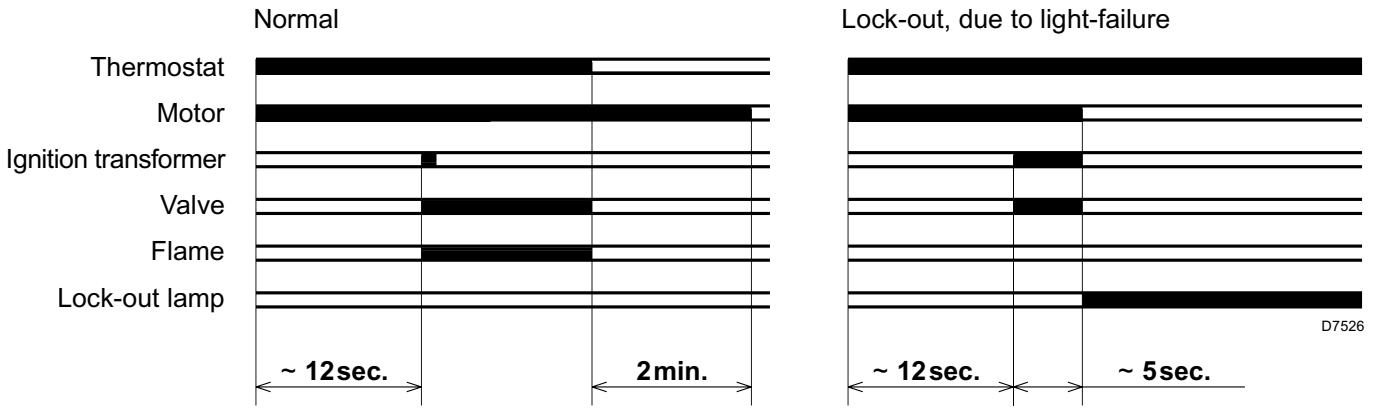


RIELLO BURNER SET UP SHEET

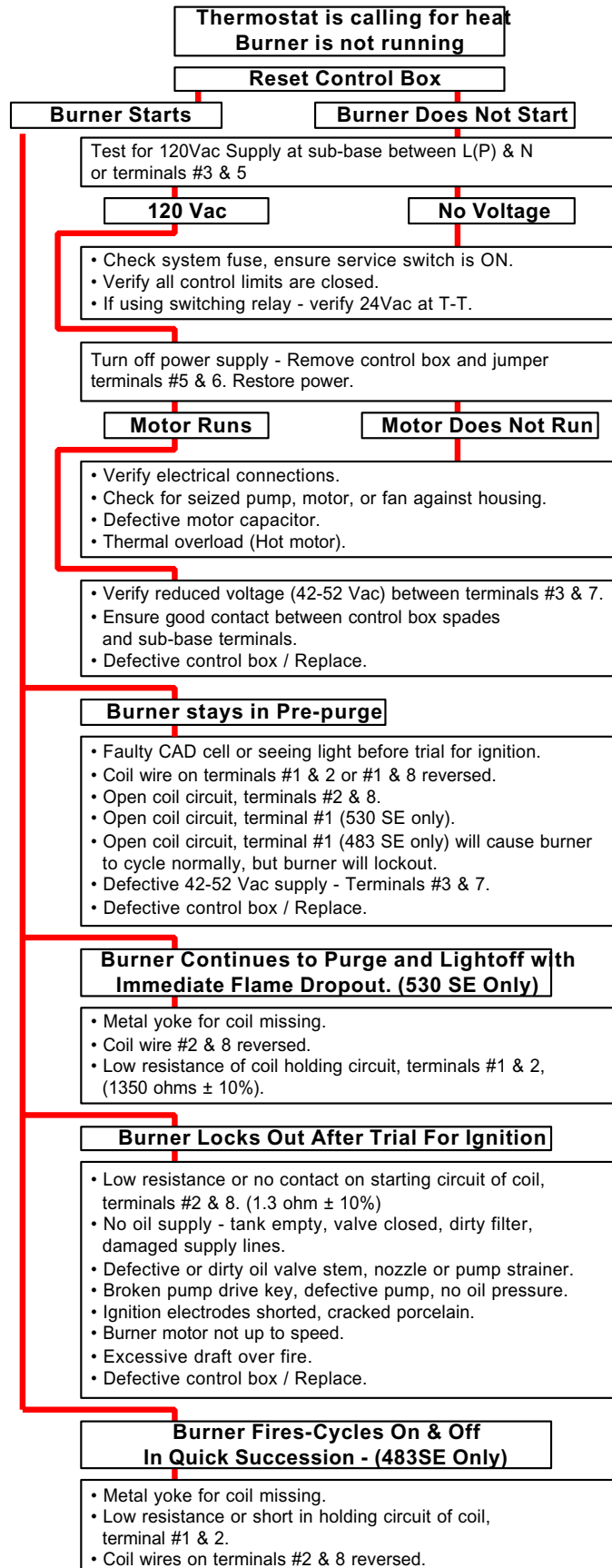
Weil McLain Part No.		8000-60000		8000-61000	8000-62000
Riello Part No.		C8512352		C8512353	C8512354
Burner Model	Riello 40 Series	BF5	BF5 Factory preset *1	BF5 Factory preset *1	BF5 Factory preset *1
	Boiler	UO3	UO3	UO4	UO5
Input	GPH	0,8	1,0	1,2	1,4
Nozzle	Delavan	.65 X 70°B	.85 X 60°B	1.00 X 70°B	1.10 X 70°B
Pump Pressure	PSI	150	145	145	160
Turbolator Setting		0	1	3	4
Air Gate Setting		3.5	4.25	5.0	5.5
Air tube length	inches	8	8	8	8
Air tube insertion	inches	4 1/4"	4 1/4"	4 1/4"	4 1/4"

*1 Nozzle pre-installed at factory.

BURNER START-UP CYCLE



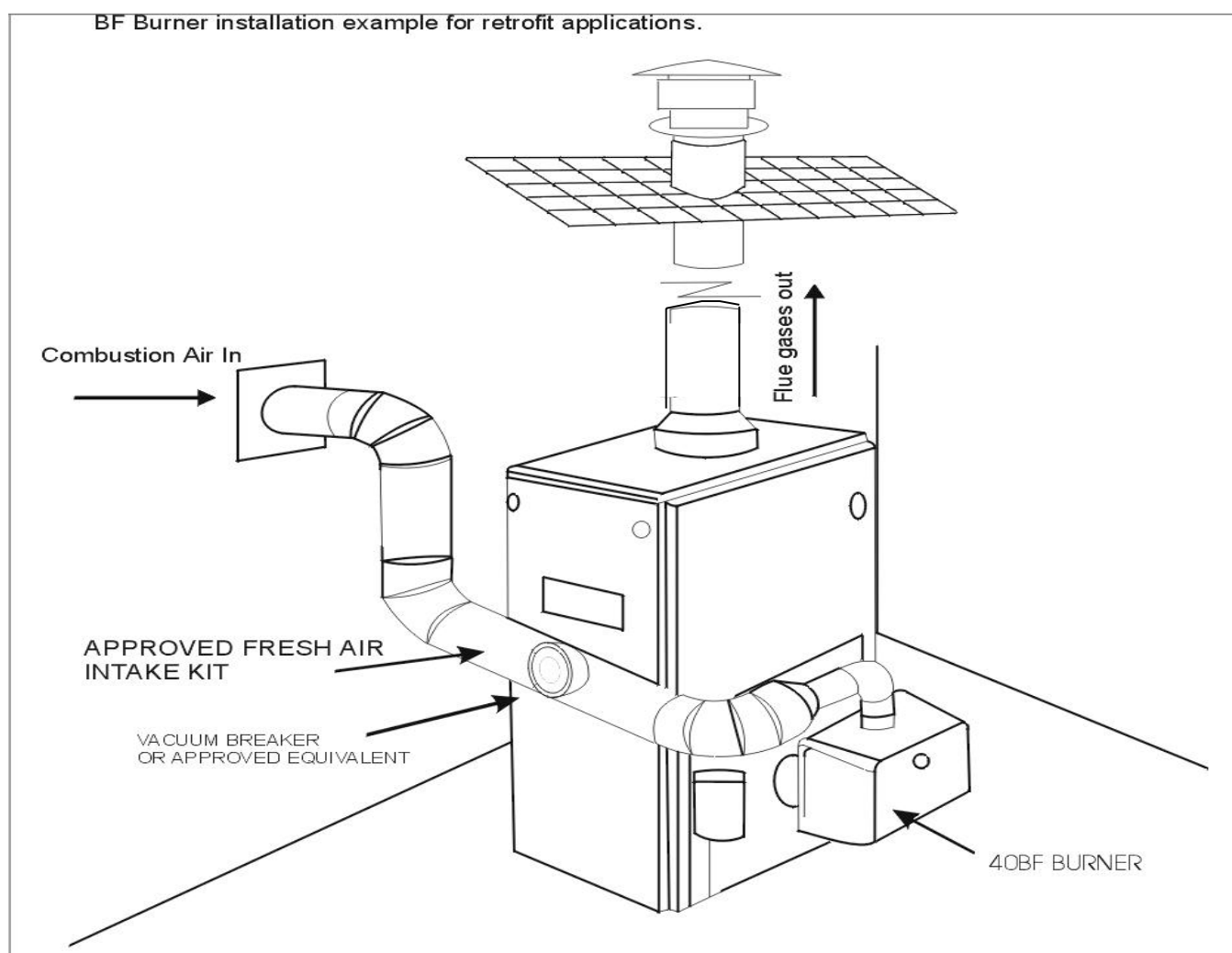
TROUBLE SHOOTING CHART



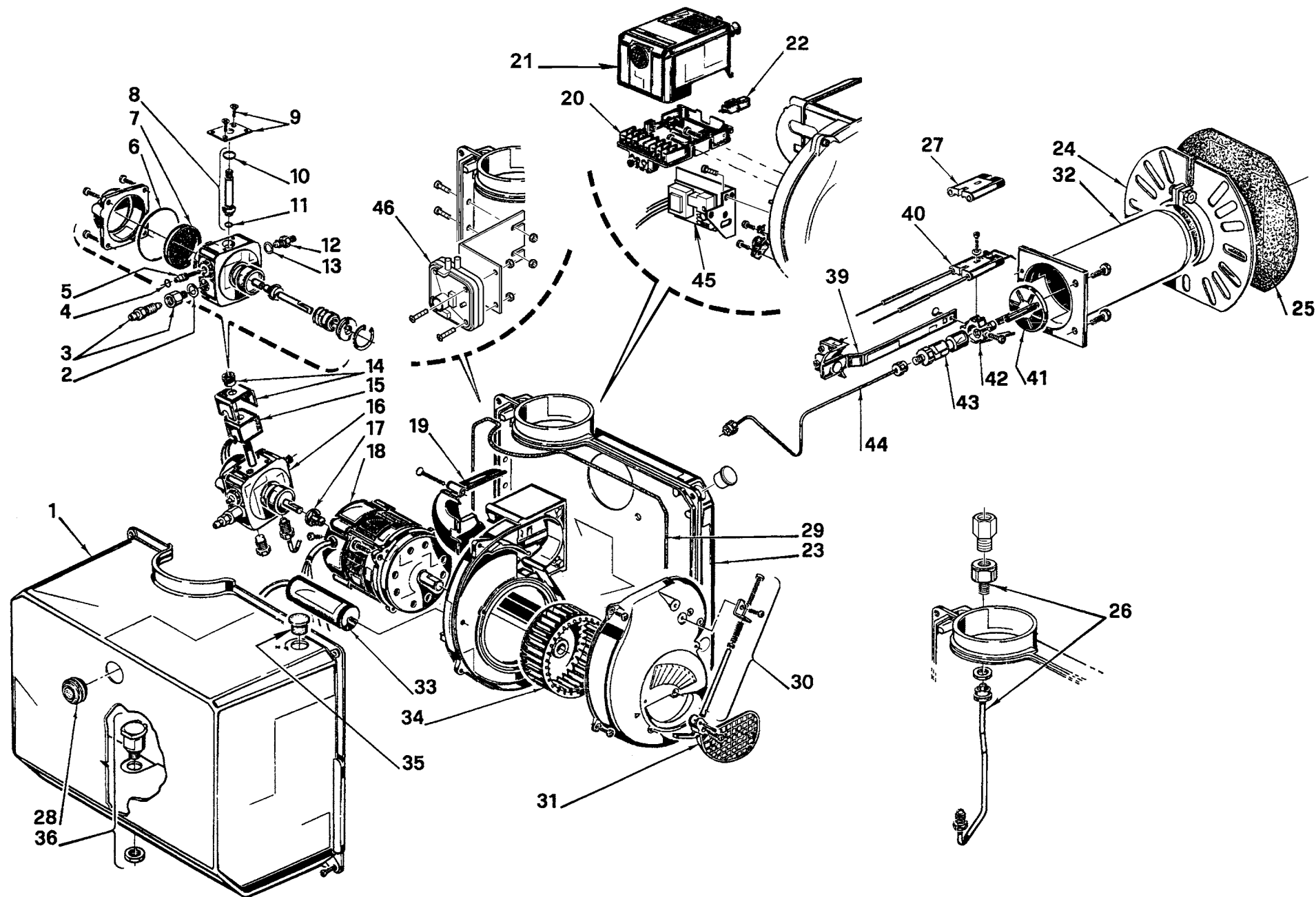
A TYPICAL LAYOUT FOR BF BURNER INTAKE AIR

- A) Use an approved air intake kit.
- B) Always keep intake air run to the minimum.
- C) Maximum intake air run of 4 (inch) diameter, flexible or rigid type of venting = 100'
- D) Reduce intake air length by 10' for every 90° elbow used. 5' for every 45° elbow used.
- E) It is suggested that air intake venting be insulated with R7 (min) foil lined insulation a minimum of 10' from air intake source. (Prevent condensation or corrosion of intake air venting)
- F) Used approved type of intake air vacuum breaker and to be installed in the same room and the burner, for the event of intake air source being blocked, this device should be tested to prove that in the event of intake air source is blocked that the vacuum breaker balancer is set correctly and can provide sufficient air for combustion for the burner. If the room that the burner is installed into cannot provide enough air or air quality is a concern, an additional air inlet source will have to be providing to this room.

THIS INTAKE AIR LAYOUT FOR CHIMNEY APPLICATIONS ONLY



EXPLODED SPARE PARTS LIST



SPARE PARTS LIST

No.	CODE	BF5	DESCRIPTION	No.	CODE	BF5	DESCRIPTION
1	C8111015	•	BURNER BACK COVER	39	3002361	•	REGULATOR ASSEMBLY
2	3007077	•	CRUSHABLE METAL WASHER 3/8" ID	40	3008891	•	ELECTRODE ASSEMBLY
3	3007568	•	BLEEDER	41	3006977	•	TURBULATOR DISC
4	3007028	•	O-RING - PUMP PRESSURE REGULATOR	42	3006966	•	ELECTRODE SUPPORT
5	3007202	•	REGULATOR SCREW	43	3006965	•	NOZZLE ADAPTER
6	3007162 C7010002	•	O-RING - PUMP COVER	44	3002363	•	NOZZLE OIL TUBE
7	3005719	•	PUMP SCREEN	45	C7001084	•	AL 1009 POST PURGE DEVICE KIT
8	3006925	•	VALVE STEM	46	C5332055	•	AIR PRESSURE SWITCH UO3 (0,6" wc)
9	3007203	•	PLATE - VALVE STEM RETAINER		C5332056	•	AIR PRESSURE SWITCH UO4-UO5 (0,7" wc)
10	3007029	•	O-RING - VALVE STEM UPPER	46			
11	3007156	•	O-RING - VALVE STEM LOWER	47	C5320037	•	WIRING HARNESS
12	3007581	•	NOZZLE OUTLET FITTING	48	C7001330	•	BF5 SBT WELDED 4.25" COMPLETE
13	3007087	•	CRUSHABLE METAL WASHER 5/8" ID				
14	3006553	•	COIL U-BRACKET AND RETAINER NUT				
15	3002279	•	COIL				
16	3007802	•	PUMP				
17	3000443	•	PUMP DRIVE KEY				
18	3005843	•	MOTOR				
19	3007316	•	AIR TUBE COVER PLATE				
20	3002278	•	PRIMARY CONTROL SUB BASE				
21	3001157 C7001029	•	PRIMARY CONTROL 530SE/C				
22	3002280	•	PHOTOCELL				
23	3008079	•	BURNER FRONT PLATE				
24	3000932	•	MOVEABLE FLANGE				
25	3020248	•	MOUNTING GASKET				
26	3008024	•	OIL SUPPLY TUBE & ADAPTER FITTING				
27	3005869	•	ELECTRODE PORCELAIN				
28	3007627	•	PUMP-COVER OPENING-BURNER RESET				
29	3007630	•	GASKET - BURNER COVER				
30	3000681	•	MANUAL AIR DAMPER REGULATOR				
31	3008021	•	AIR DAMPER				
32	C7001337	•	BF5 SBT WELDED 4.25" TUBE ONLY				
33	3005844	•	CAPACITOR 12.5 µF				
34	3005708	•	FAN				
35	3007706	•	PLUG				
36	3008825	•	DRIP				
37							
38							

35 Pond Park Rd.
 Hingham, MA 02043
 Phone: 781-749-8292
 Toll Free: 800-992-7637
 Fax: 781-740-2069



2165 Meadowpine Blvd.
 Mississauga, On L5H 3R2
 Phone: 905-542-0303
 Toll Free: 800-387-3898
 Fax: 905-542-1525

BURNER START- UP FORM *

Burner S/N. or Model: _____	Appliance: _____
Installer name: _____	
Company: _____	Installation date: _____
Address: _____	
Phone: _____	Fax: _____
Owner Name: _____	
Address: _____	
Phone: _____	E-mail: _____

Burner Start-up Info (OIL)	
Nozzle info: _____	Pump pressure: _____
Air setting: _____	Turbolator setting: _____
Draft overfire: _____	Draft breech: _____
CO ₂ : _____ CO: _____ O ₂ : _____	Smoke density: _____ (Bacharach) _____
Single line: <input type="checkbox"/>	Two lines: <input type="checkbox"/>

* This form was designed and provided in the installation manual for reference and also for providing technical information which can be faxed or mailed to our technical hot-line coordinator when technical assistance is required. Please complete this form, fax it or mail it at the address/fax above, or send an e-mail with the information listed below to: techservices@riellocanada.com



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