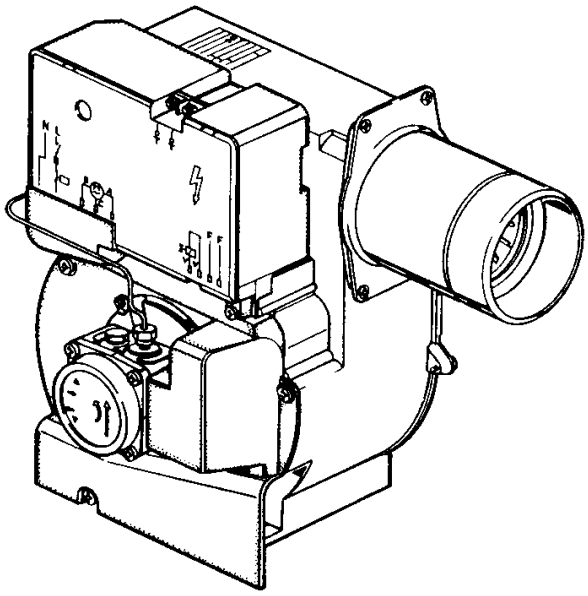
RIELLO BURNERS



OIL BURNER
R35 SERIES
INSTALLATION MANUAL

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 in this manual.

TABLE OF CONTENTS

CARTON CONTENTS

Your RIELLO 35 burner carton includes the following parts. Please check to make sure all parts are present before beginning the installation.

1 – Burner
1 – Mounting Flange
1 – Mounting Gasket
1 – By-pass Plug (attached to burner)

SERVICE TOOLS REQUIRED

1 – No 1 Philips Screwdriver
1 - No. 2 Philips Screwdriver
1 – No. 2 Slotted Screwdriver
1 – 1 inch Adjustable Wrench
4 – Allen Keys: 2.5 mm – Pump By-pass Plug
1/8 inch – Pump Pressure Regulator
5/32 inch – Pump – Cover & Mounting Bolts, Blower Fan
7/32 inch – Adjustable Flange Bolt

BURNER MODEL IDENTIFICATION

HOW TO READ BURNER MODEL IDENTIFICATION

EXAMPLE

R35 . 3 . 03 . R . 0

Remote Sensing
R = Standard on 535SE Control Box
0 = Not available on 536SE Control Box

24 volt Thermostat Terminals
R = Standard on 536SE Control Box
0 = Not Available on 535SE Control Box

Useable Air Tube Length
See TABLE A on page 3.

Firing Rate Range
3 = 0.60 – 1.10 GPH
5 = 0.75 – 1.60 GPH

R35.3			
MODEL	**CODE**	**MODEL**	**CODE**
R35.3.03.R.0	C8511205	R35.3.03.0.R	C8511200
R35.3.04.R.0	C8511206	R35.3.04.0.R	C8511201
R35.3.05.R.0	C8511207	R35.3.05.0.R	C8511202
R35.3.07.R.0	C8511208	R35.3.07.0.R	C8511203
R35.3.10.R.0	C8511209	R35.3.10.0.R	C8511204

R35.5			
MODEL	**CODE**	**MODEL**	**CODE**
R35.5.03.R.0	C8512205	R35.5.03.0.R	C8512200
R35.5.04.R.0	C8512206	R35.5.04.0.R	C8512201
R35.5.05.R.0	C8512207	R35.5.05.0.R	C8512202
R35.5.07.R.0	C8512208	R35.5.07.0.R	C8512203
R35.5.10.R.0	C8512209	R35.5.10.0.R	C8512204

TECHNICAL DATA

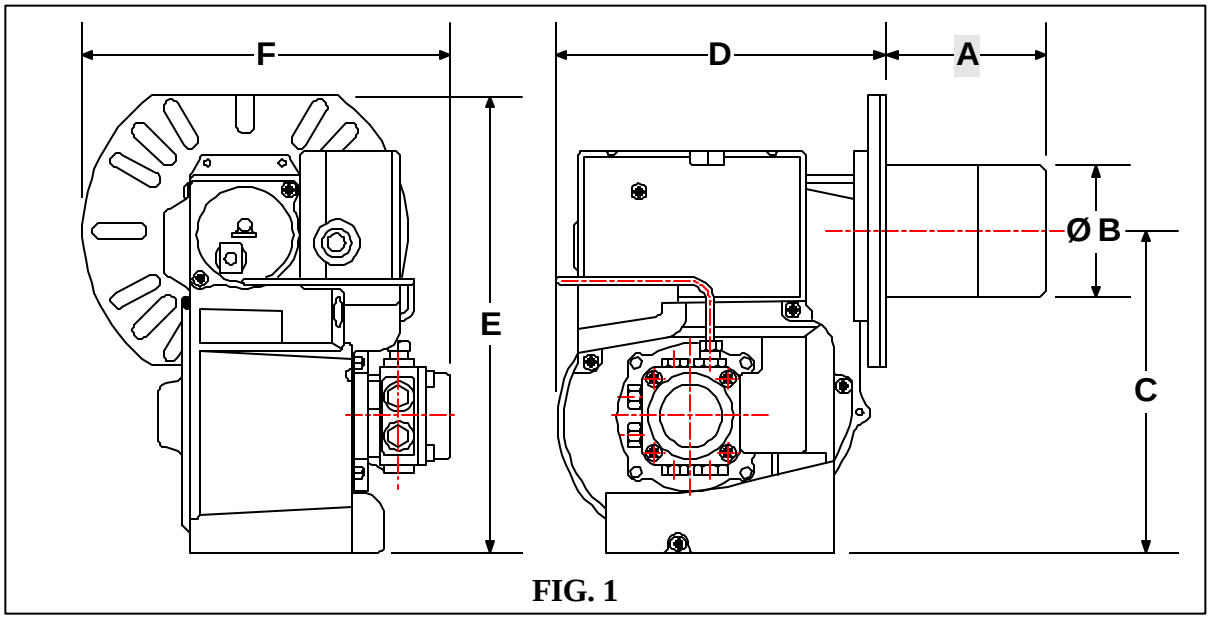


FIG. 1

DIMENSIONS – FIG.1						
	A	**B**	**C**	**D**	**E**	**F**
Inches	See	3 1/2	8 5/16	8 5/16	11 7/8	9 3/8
mm	Tab. A	89	211	211	301	237

DIMENSIONS – FIG.2						
	A	**B**	**C**	**D**	**E**	**F**
Inches	3 5/8	5 1/2	7 1/2	8 7/16	7 1/16	7/16
mm	92	140	190	215	180	11.2

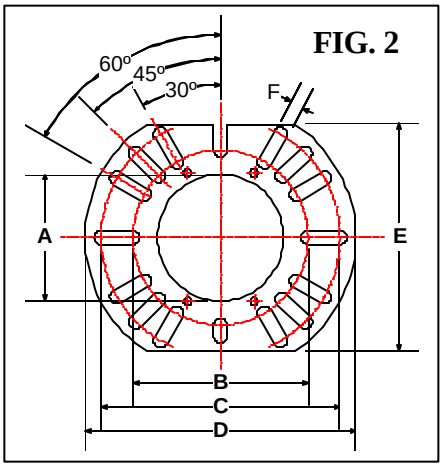


FIG. 2

TABLE A	USEABLE AIR TUBE LENGTH				
BURNER MODEL	**R35.3**			**R35.5**	
	Inches	mm		Inches	mm
.03	3 ¼	82		3 1/8	80
.04	4 7/16	112		4 5/16	110
* .05	5 11/16	145		5 5/8	143
* .07	7 ¾	196		7 5/8	194
* .10	10 1/8	257		10	255

* length can be increased approximately 1" by using available fixed flange.

Note: Useable length includes 4mm standard gasket
- Models .03 & .04 fixed flange standard
- Models .05, .07 & .10 adjustable flange standard

SPECIFICATIONS		R35.3	R35.5
FUEL		No. 2 Fuel Oil	
FIRING RATE	Gph	0.60 – 1.10	0.75 – 1.60
	Kg/h	1.89 – 3.5	2.4 – 5.0
EFECTIVE OUTPUT	Btu/h	81,200 – 154,000	105,200 – 224,000
	kW	23.8 - 45	30.8 – 65.5
VOLTAGE		Single Phase 120V 60Hz (+10% - 15%)	
POWER CONSUMPTION		130 W	140 W
MOTOR (Rated)		3250 rpm	
MOTOR CURRENT (Rated)		2.2 A	2.2 A
CAPACITOR		10 µF – 260 V	
PUMP PRESSURE (max.)		200 PSI	
PRIMARY CONTROL		536 SE – 535 SE	
IGNITION TRANSFORMER		8 kV 16 mA	

COMPONENT IDENTIFICATION

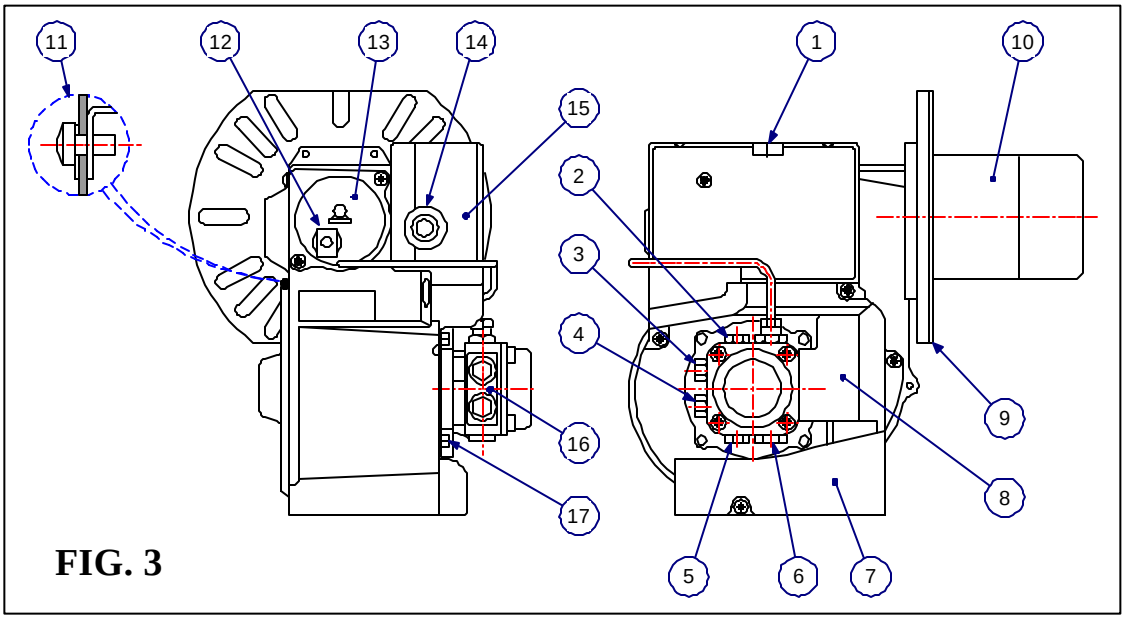


FIG. 3

1. Thermostat connection terminals (536 only)
2. Vacuum gauge connection port
3. Inlet fuel line port
4. Return fuel line port
5. Bleeder / Pressure gauge connection port
6. Pump pressure regulator adj. Screw
7. Electrical enclosure
8. Capacitor (hidden)
9. Mounting flange & gasket
10. Air tube
11. Air damper adjustment screw
12. Photocell
13. Drawer assembly
14. Lockout lamp (535 only) & Reset button
15. Primary safety control
16. Fuel pump
17. Motor

MOUNTING THE BURNER

There are three possible methods to mount the burner, depending on the individual application. These are:

1.) Fixed UNIVERSAL FLANGE bolted to the boiler/furnace unit.
2.) ADJUSTABLE FLANGE bolted to the boiler / furnace unit.
3.) ADJUSTABLE FLANGE or fixed UNIVERSAL FLANGE mounted directly to optional Pedestal kit (C7001022) must be ordered separately.

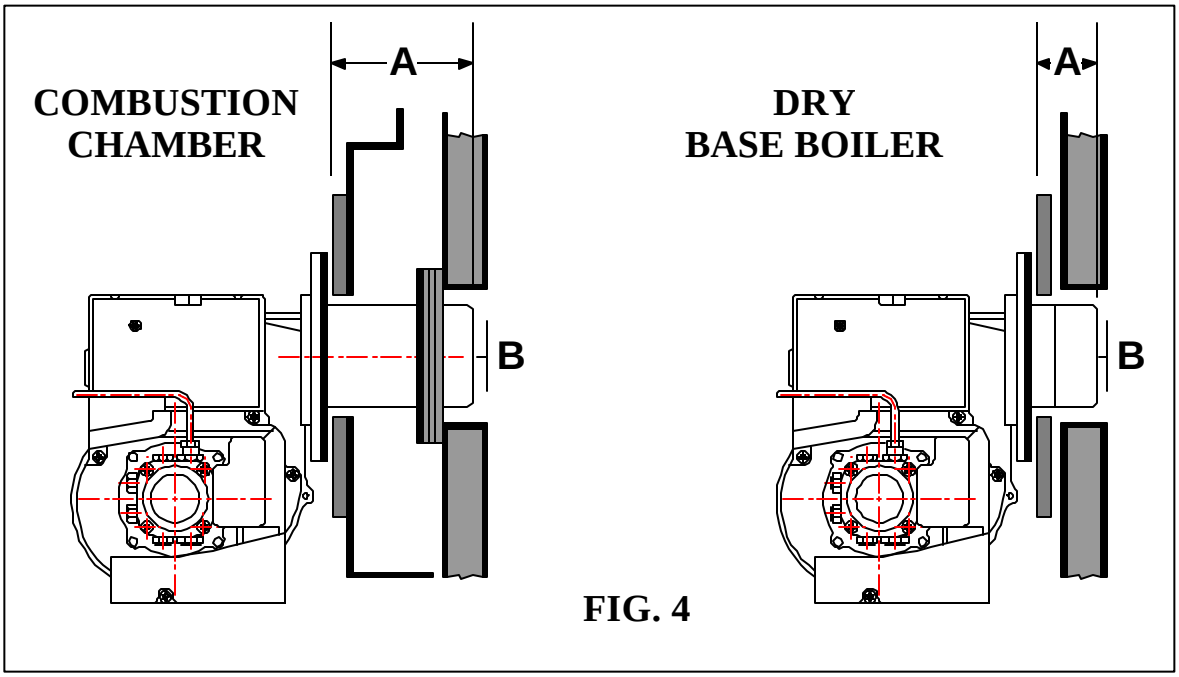


FIG. 4

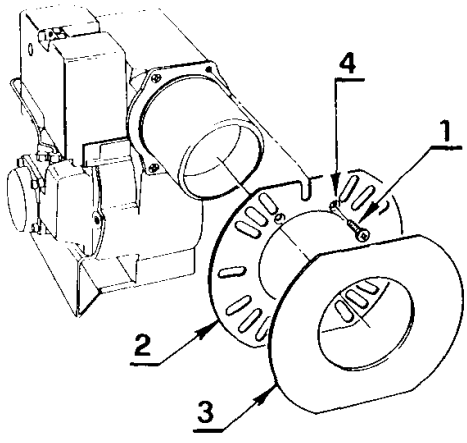


FIG. 5

METHOD 1. (ref. FIG. 5)

A.) Remove the 4 screws (1) from the burner chassis. Position the UNIVERSAL MOUNTING FLANGE (2) with countersunk mounting holes (4) facing away from burner. Insert the 4 screws (1) through the countersunk mounting holes and secure in place.

B.) Position MOUNTING GASKET (3) between the MOUNTING FLANGE and the appliance plate. Line up the holes in the MOUNTING FLANGE with the studs on the appliance mounting plate and securely bolt in place.

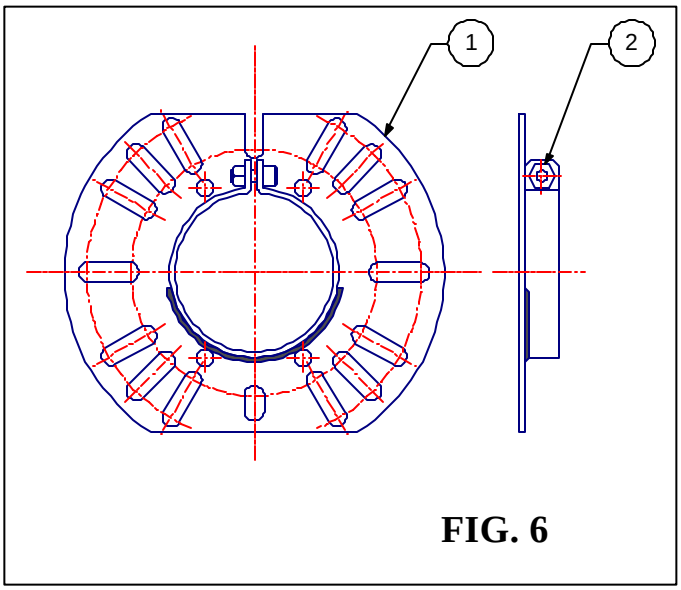


FIG. 6

METHOD 2. (ref. FIG. 6)

A.) Secure the ADJUSTABLE FLANGE (1) to the burner AIR TUBE by tightening the bolt (2). Be sure that the ADJUSTABLE COLLAR is properly positioned so the outside edge of the END CONE will be at least ¼ inch (6.5 mm) back from the inside wall of the refractory of the combustion chamber (see dimension B in FIG. 4 above). The measured length (A), is to the face of the MOUNTING GASKET.

B.) Secure the burner to the appliance as per METHOD 1-B.

METHOD 3. PEDESTAL MOUNT

Secure the MOUNTING FLANGE to MOUNTING PEDESTAL using the hardware provided with the pedestal. Secure burner to MOUNTING FLANGE as in METHOD 1 and 2.

WARNING: WHEN THE COMBUSTION CHAMBER IS LINED WITH A REFRACTORY MATERIAL, IT IS IMPERATIVE THAT THE END CONE NOT PROTRUDE INTO THE CHAMBER AREA, AS EXCESSIVE HEAT COULD DAMAGE THE END CONE.

SERIAL NUMBER IDENTIFICATION

The Riello 15 character serial number, example, 97 A 8511111 00025, is identified as follows: 97 = 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.

(97) (A) (851111) (00025)

Year of Manufacture	BI-week of manufacture	Burner product code	Sequence

ELECTRICAL CONNECTIONS

To gain access to the line voltage terminals on the primary safety control follow items A and B below.

A.) Remove drawer assembly from the burner.
B.) Remove the electrical enclosure by removing the three screws. FIG. 3 (7).
C.) Make electrical connections to burner as shown in FIG. 7.
D.) Replace the electrical enclosure over the terminals on the control box and secure using three screws.

1. Wire Access Hole (Use BX connector)
2. Ground Terminal (Green/Copper Wire)
3. Line (Phase) Terminal (Black Wire)
4. Neutral Terminal (White Wire)
5. Remote Lockout Terminal (535 SE Only)
6. Control Box Mounting Screw
7. 24 V Thermostat Terminals (536 SE Only)
8. Power Supply

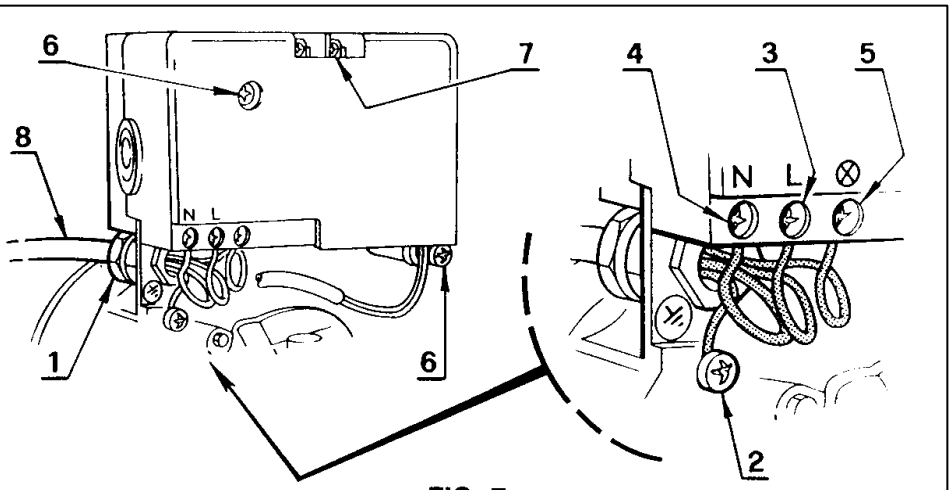


FIG. 7

FIELD WIRING

Burner operation is controlled by using a low voltage control (24 Vac) with the standard 536SE CONTROL BOX. On some OEM applications, burner operation may be controlled by using a line voltage (120 Vac) control with the 535SE CONTROL BOX.

The 536SE CONTROL BOX can also be used in a line voltage circuit, by using a WIRE JUMPER between the 24 V thermostat terminals on the 536SE CONTROL BOX.

Using the appropriate drawing below and on the next page, complete the required field application wiring to control the burner. All wiring must be done in accordance with local codes or, in the absence of local codes, with the National Electrical Code ANSI/NFPA 70-1990 and the CSA Electrical Code.

536SE CONTROL BOX

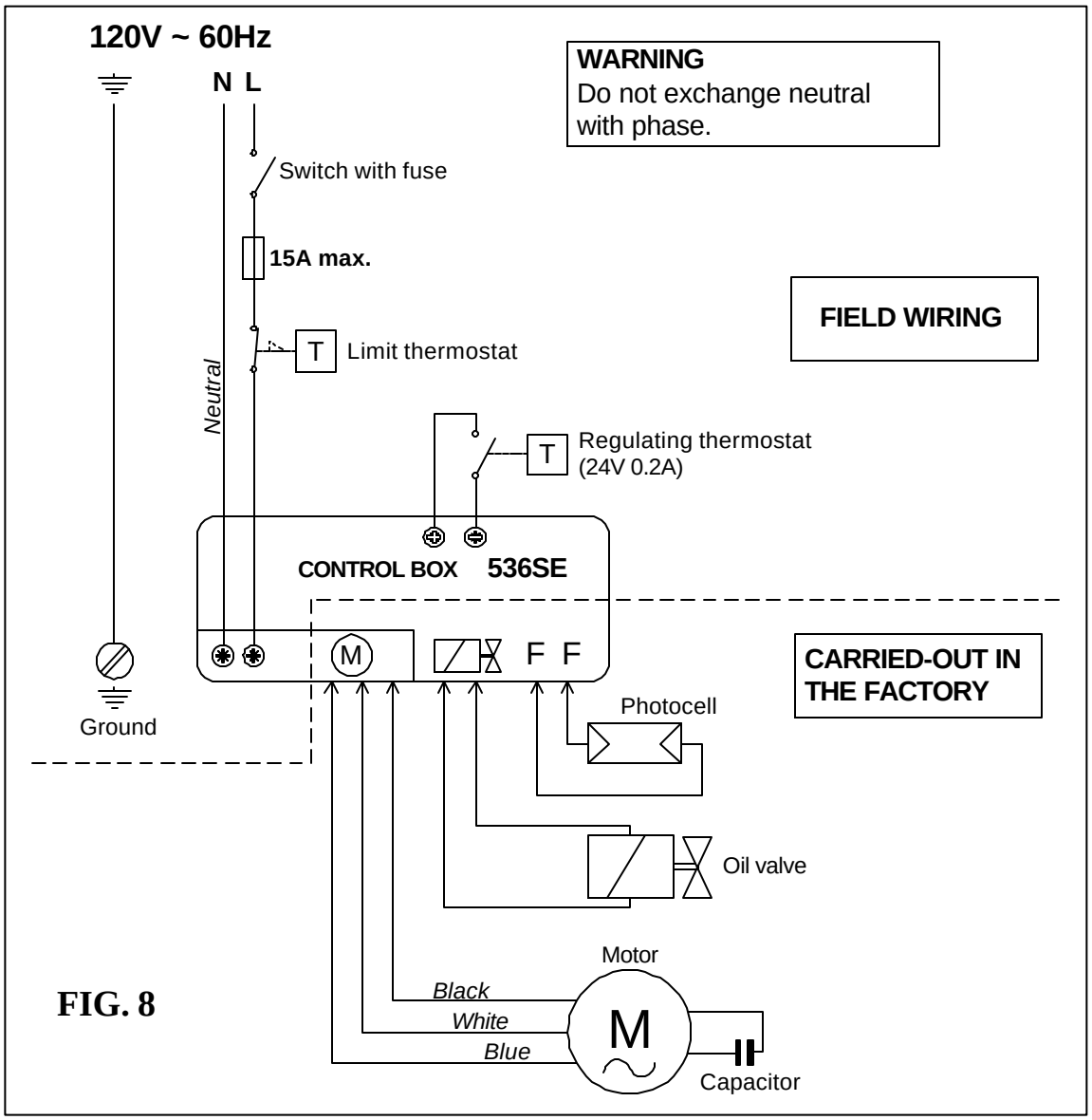


FIG. 8

535SE CONTROL BOX

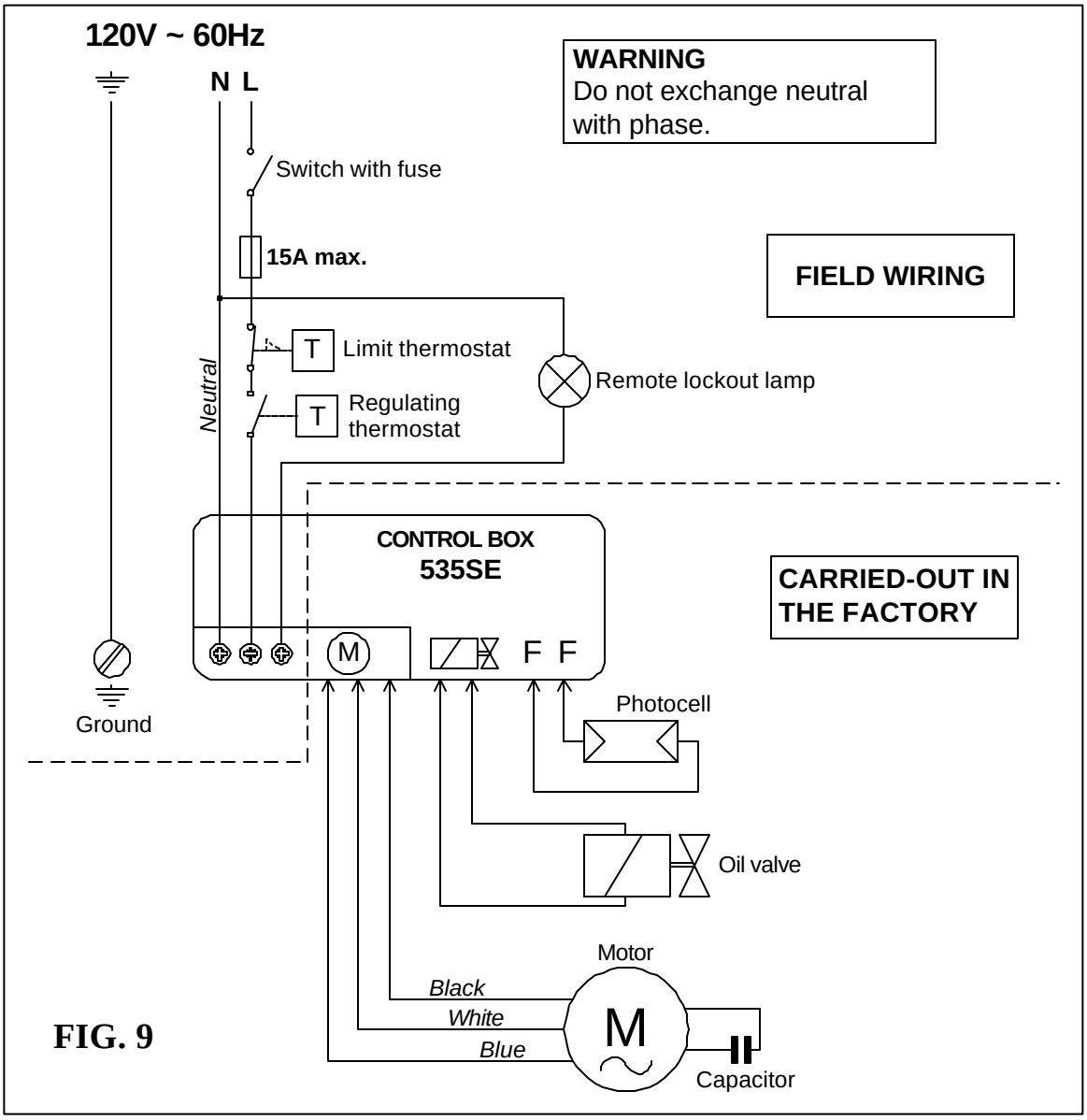


FIG. 9

REMOTE SENSING OF SAFETY LOCKOUT SWITCH 535SE CONTROL BOX

The SAFETY SWITCH on the 535SE CONTROL BOX is equipped with a contact allowing remote sensing of burner lockout. The electrical connection is located on the CONTROL BOX terminal ? FIG. 7 (5) as indicated. Should burner lockout occur, the 535SE CONTROL BOX will supply a power source of 120 Vac to the connection terminal.
NOTE: The maximum allowable current draw on this terminal (5) is 1 A.

WARNING: The terminal ? FIG. 7 (5) is to be used only for the connection of a remote sensing device. If a neutral or ground lead is connected to this terminal, the CONTROL BOX on the burner will be damaged should lockout occur.

REMOVAL OF DRAWER ASSEMBLY

Refer to FIG. 10

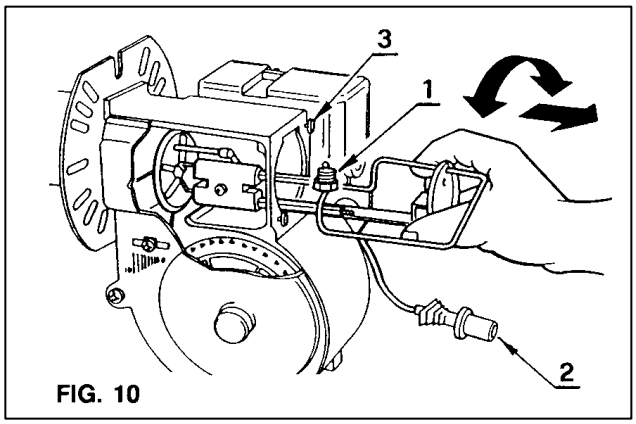


FIG. 10

A.) Disconnect the nozzle line (1) from pump.
B.) Take out the retainer screws (3) of the cover.
C.) Loosen the retainer screws (3) of the cover.
D.) Turn the drawer assembly cover counter clockwise, and then pull out the drawer assembly while keeping the electrodes on the lift side.

INSTALLING THE NOZZLE

Refer to FIG. 11

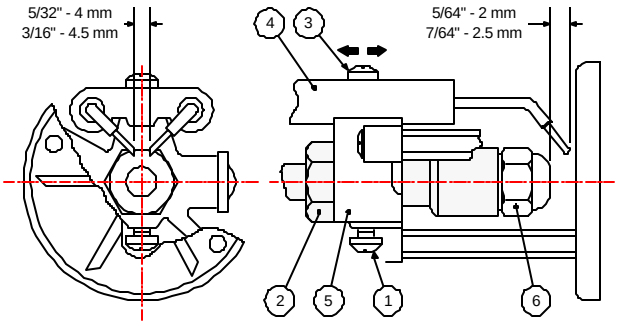


FIG. 11

A.) Determine the proper firing rate for the boiler or furnace unit, considering the specific application, then uses the BURNER SET-UP chart to select the proper nozzle and pump pressure to obtain the required input from the burner.
B.) Remove the NOZZLE ADAPTER (2) from the DRAWER ASSEMBLY by loosening the SCREW (1).
C.) Insert the proper NOZZLE into the NOZZLE ADAPTER and tighten securely. (Do not over tighten).
D.) To replace adapter, insert completely, with nozzle installed, into drawer assembly and secure with screw (1).

ELECTRODE ADJUSTMENT

If adjustment is required, loosen the screw (FIG. 11) (3), move the electrode assembly (4) as required and lock the screw (3) securely.

NOTE: These settings should be verified when installing the burner.

OIL LINE CONNECTIONS

NOTE: The oil line connections to the pump should be made only after all electrical connections are complete and the electrical enclosure has been replaced.

The burner is shipped from the factory with the pump set for a single line system. To operate on a two-line system, the BY-PASS PLUG must be installed.

Refer to FIG. 12

1) Inlet Port (1/4" NPTF)
2) Return Port Plug (1/4" NPTF)
3) Bleeder Valve & Pressure Gauge Port (1/8 parallel thread)
4) Pressure Adjustment Screw
5) Vacuum Gauge Port (1/8 parallel thread)
6) By-pass Plug
7) Nozzle Outlet Port

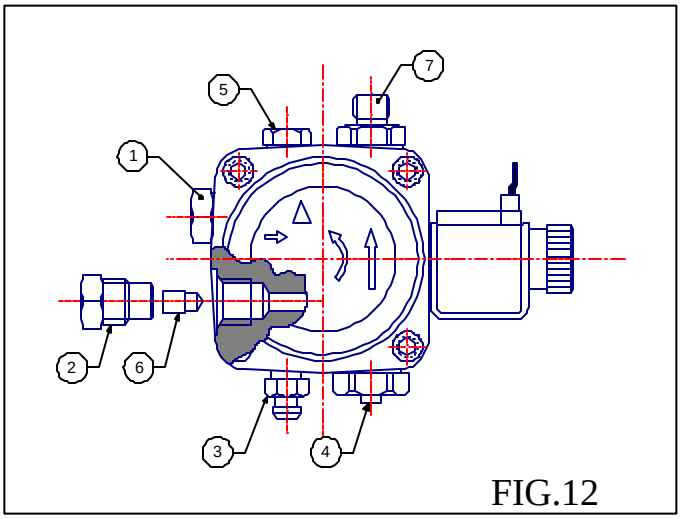


FIG.12

BY-PASS PLUG INSTALLATION

A) Remove return port plug (2).
B) Insert by-pass plug and tighten in place using (3/32") Allen key.
C) The return line can now be connected to the pump using a ¼" NPTF fitting.

SINGLE LINE (GRAVITY FEED) SYSTEM

Oil line connection to the inlet port (1) of the pump, can be made using a ¼" NPTF fitting. Be sure that the return port plug (2) is tightened securely. Do not exceed the pipe lengths indicated in the table in FIG. 13.

SINGLE LINE SYSTEM PIPE LENGTHS					
H		3/8" OD		½" OD	
Feet	Meters	Feet	Meters	Feet	Meters
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

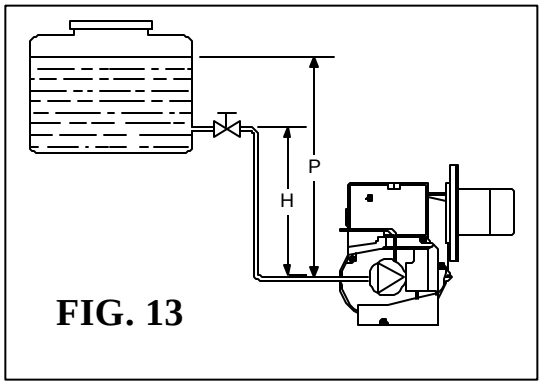


FIG. 13

NOTE: Do not exceed pipe lengths indicated in chart.

WARNING: Height "P" should not exceed 13 Feet (4 m)

TWO LINE (LIFT) SYSTEM

A) Install BY-PASS PLUG. (See FIG. 12)
B) Suction and return lines should be the same diameter and both should extend to the same depth inside the fuel tank. Do not exceed the pipe lengths indicated below in FIG 14.
C) The suction and return line connections to the pump can be made using ¼" NPTF fitting. Ensure that the connections are tight with no air leaks.

WARNING: When the pump operates on a Two-line system, before starting the burner, make sure the RETURN LINE is not restricted in any way. Any excessive back pressure will cause damage to the pump shaft seal.

2 LINE (LIFT) SYSTEM PIPE LENGTHS					
H		**3/8" OD**		**½" OD**	
Feet	Meters	Feet	Meters	Feet	Meters
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

NOTE: Do not exceed pipe lengths indicated in chart.

WARNING: Height "P" should not exceed 13 Feet (4 m)

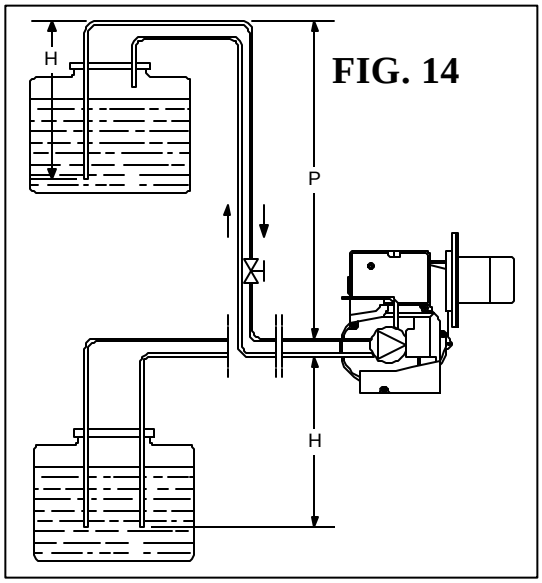


FIG. 14

WARNING: The height "P" in PIPE LENGTH for the tables in FIG. 13 and FIG. 14 should not exceed 13 feet (4 m)

WARNING: 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

SINGLE LINE (Gravity Feed) SYSTEM – FIG. 13

A) Loosen the bleeder valve (3, FIG. 12) until oil flows out. Tighten the bleeder valve securely and start burner.
B) To bleed the pump by pressure:
    1) Loosen the bleeder valve (3, FIG. 12).
    2) Start the burner.
    3) When the valve is engaged, approximately 10 seconds after starting, remove the photo cell (2, FIG. 10) allowing it to see false flame (light).
    4) Run the burner until the fuel pump has been purged of air, and then immediately shut down the burner.
    5) Tighten the bleeder valve (3, FIG. 12) securely and re-install the photocell (2, FIG. 10).
    6) The burner can now be started normally.

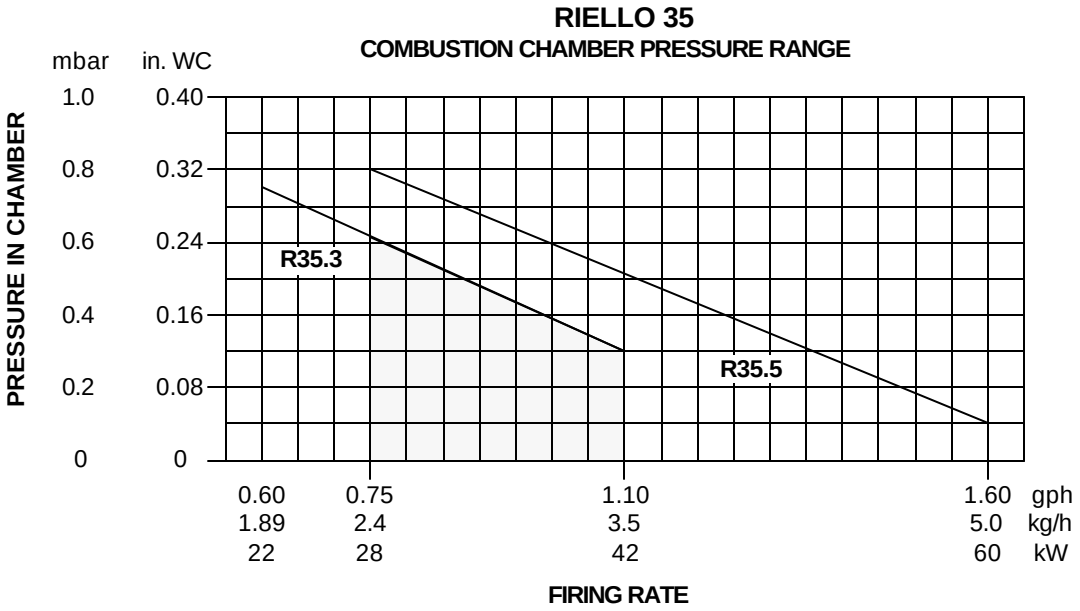
TWO LINE (LIFT) SYSTEM – FIG. 14

1) Remove the photocell (2, FIG. 10) allowing it to see false flame (light).
2) Start the burner (the burner will remain in pre-purge).
3) Follow procedures 4 through 6 (as per B) above for pressure bleeding a single line system.

NOTE: To protect the pump gears, it is advisable to lubricate the pump prior to purging a lift system. Apply oil through the VACUUM GAUGE PORT (5, FIG. 12).

NOTE: Pump pressure is factory set at 145 psi unless otherwise specified by the equipment manufacturer. The pressure should be verified at time of burner installation. Pressure and vacuum ports are **not** NPT threads. Riello pressure, vacuum gauges and adapters (C7001070) for North American style gauges are available for purchase from Riello.

WORKING FIELD



BURNER SET-UP AND ADJUSTMENT

COMBUSTION HEAD (TURBULATOR) SETTING – (FIG. 16)

The TURBULATOR setting varies according to the burner output required.

A) Refer to the burner set-up charts to determine the correct set point for the application.
B) Setting is made by rotating the adjustment screw (1) clockwise or counter clockwise until the set point marked on the regulating rod (2) is aligned with the drawer assembly cover (3).

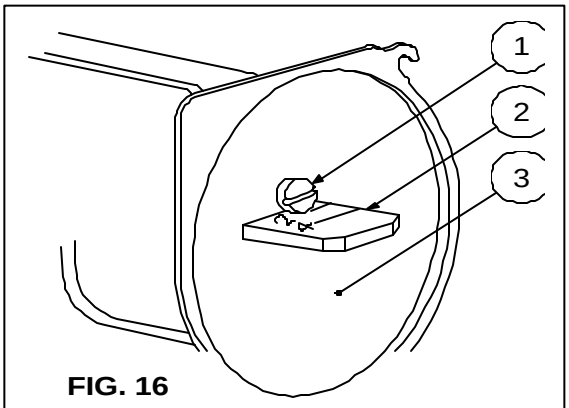


FIG. 16

AIR DAMPER SETTING – (FIG. 17)

The AIR DAMPER setting varies according to the burner output required.

A) As per **A** in **Combustion Head Setting**.
B) Loosen the LOCKING SCREW (1).
C) Move the indicator to the required set point.
D) Retighten the LOCKING SCREW (1).
E) The final position of the AIR DAMPER setting will vary on each installation. Use instruments to establish the proper settings for maximum CO_2 and a smoke reading of zero.

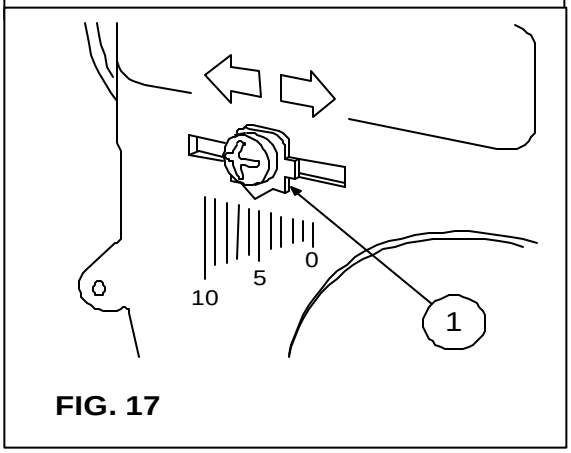


FIG. 17

BURNER SET-UP CHART

To obtain the specific input requirement for the appliance, install the proper nozzle and adjust the pump pressure, then set the combustion head and air damper as indicated in the charts below.

A) Determine the actual firing rate of the burner required matching the appliance input.
B) From the charts below, install the proper NOZZLE to obtain the actual firing rate.
C) Adjust the pump pressure, combustion head and the air damper according to the charts below.

NOTE: These settings are starting points only. Use instruments to establish the proper settings for maximum CO_2 and a smoke reading of zero.

NON-RETROFIT APPLICATION: If this burner is being installed in a packaged unit (i.e. Burner comes with a boiler or furnace), follow the instructions supplied with the heating unit as settings may differ from those shown in this manual.

R35.3

1 ACTUAL FIRING RATE ± 5%		2 NOZZLE SIZE	3 PUMP PRESSURE		4 TURBULATOR SETTING	5 AIR DAMPER SETTING
gph	Kg/h	GPH	PSI	bar		
0.60	1.89	0.50 x 80º	145	10	0.0	1.1
0.72	2.26	0.60 x 80º	145	10	0.0	2.2
0.78	2.47	0.65 x 60º/80º	145	10	0.5	2.5
0.90	2.84	0.75 x 60º/80º	145	10	1.0	3.5
1.00	3.15	0.85 x 60º/80º	145	10	1.5	4.0
1.10	3.46	0.85 x 60º/80º	174	12	2.0	4.5

R35.5

1 ACTUAL FIRING RATE ± 5%		2 NOZZLE SIZE	3 PUMP PRESSURE		4 TURBULATOR SETTING	5 AIR DAMPER SETTING
gph	Kg/h	GPH	PSI	bar		
0.75	2.36	0.60 x 80º	155	10.7	0.0	2.0
0.85	2.68	0.65 x 60º/80º	170	11.7	0.5	2.5
1.00	3.15	0.85 x 60º/80º	145	10	1.0	4.5
1.20	3.78	1.00 x 60º/80º	145	10	1.5	5.5
1.30	4.16	1.10 x 60º/80º	145	10	2.0	7.0
1.50	4.72	1.25 x 60º/80º	145	10	2.5	7.5
1.60	5.04	1.25 x 60º/80º	170	11.7	3.0	8.0

RECOMMENDED NOZZLES

MANUFACTURER	TYPE		MANUFACTURER	TYPE
DANFOSS	S – B		MONARCH	R
DELAVAN	W – B		STEINEN	S – Q
HAGO	S – SS			

AMULET INSTALLATION INSTRUCTIONS FOR 40 SERIES F3, F5, & R35

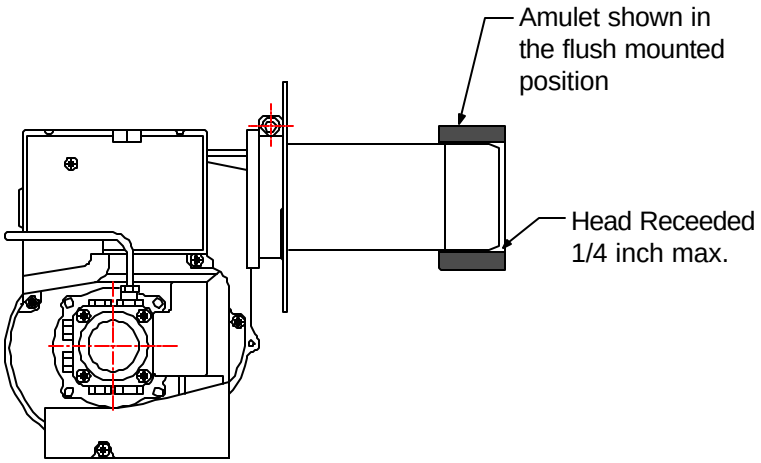
The amulets provided have been selected by Riello to protect the combustion tube from hot exhaust gases and flame. This protection may be needed in applications where the combustion tube opening in the combustion chamber refractory is larger than the tube outside diameter.

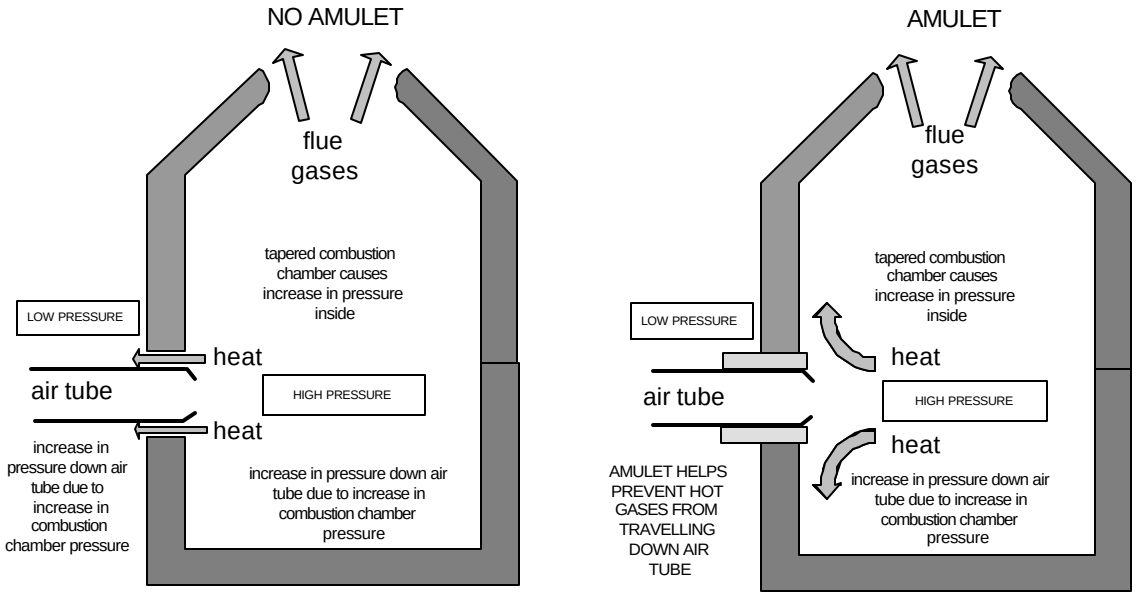
The amulet has been sized to fit Riello Model 40 sizes F3 and F5 plus the Riello Model R35.

When installing this amulet, handle it carefully. Do not exert undue pressure when pushing the amulet over the combustion tube. Excessive force can result in a broken amulet!

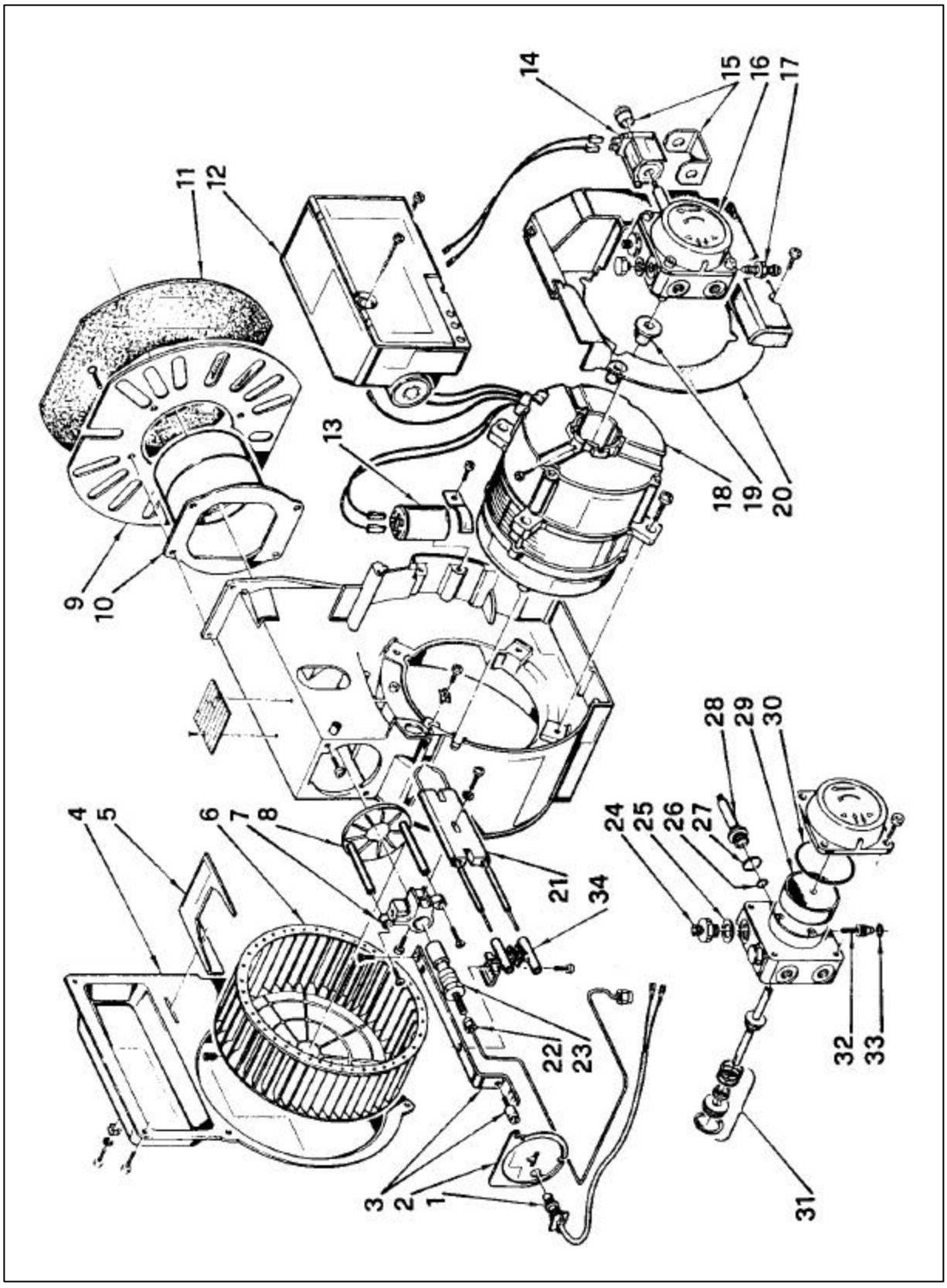
If the amulet will not fit easily onto the tube, remove a small amount of the inner diameter with a sharp knife to provide the necessary clearance.

The diagram below shows the proper position of the amulet after installation.





SPARE PARTS EXPLODED VIEW



SPARE PARTS LIST

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No.	CODE	DESCRIPTION	.3	.5
1	3007541	Photo Cell	?	?
2	3007542	Cover Plate	?	?
3	3007543	Regulator Assembly – for .03 tube length	?	?
3	3007544	Regulator Assembly – for .04 tube length	?	?
3	3007545	Regulator Assembly – for .05 tube length	?	?
3	3007546	Regulator Assembly – for .07 tube length	?	?
3	3007547	Regulator Assembly – for .10 tube length	?	?
4	3007548	Fan Cover	?	?
5	3007549	Manual Air Shutter	?	?
6	3007476	Fan	?	?
7	3007550	Electrode Support	?	?
8	3007551	Turbulator Disc	?	
8	3007552	Turbulator Disc		?
9	3007553	Universal Mounting Flange	?	?
9	3000932	Adjustable Mounting Flange	?	?
10	3007554	Air Tube – for .03 tube length	?	
10	3007555	Air Tube – for .04 tube length	?	
10	3007556	Air Tube – for .05 tube length	?	
10	3007557	Air Tube – for .07 tube length	?	
10	3007558	Air Tube – for .10 tube length	?	
10	3007559	Air Tube – for .03 tube length		?
10	3007560	Air Tube – for .04 tube length		?
10	3007561	Air Tube – for .05 tube length		?
10	3007562	Air Tube – for .07 tube length		?
10	3007563	Air Tube – for .10 tube length		?
11	3005856	Mounting Gasket	?	?
12	3001170	Primary Control – 535SE	?	?
12	3001171	Primary Control – 536SE	?	?
13	3007564	Capacitor – 10 µF	?	?
14	3007565	Coil	?	?

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No.	CODE	DESCRIPTION	.3	.5
15	3007566	Coil U-bracket and Retainer nut	?	?
16	3007567	Pump	?	?
17	3007568	Bleeder Fitting	?	?
18	3007569	Motor	?	?
19	3000443	Pump Drive Key	?	?
20	3007570	Electrical Enclosure	?	?
21	3007571	Electrode Assembly – for .03 tube length	?	?
21	3007572	Electrode Assembly – for .04 tube length	?	?
21	3007573	Electrode Assembly – for .05 tube length	?	?
21	3007574	Electrode Assembly – for .07 tube length	?	?
21	3007575	Electrode Assembly – for .10 tube length	?	?
22	3007576	Nozzle Oil Tube – for .03 tube length	?	?
22	3007577	Nozzle Oil Tube – for .04 tube length	?	?
22	3007578	Nozzle Oil Tube – for .05 tube length	?	?
22	3007579	Nozzle Oil Tube – for .07 tube length	?	?
22	3007580	Nozzle Oil Tube – for .10 tube length	?	?
23	3007496	Nozzle Adapter	?	?
24	3007581	Nozzle Outlet Fitting	?	?
25	3007087	Crushable Metal Washer	?	?
26	3007156	O-Ring – Lower Small – Valve	?	?
27	3007173	O-Ring – Upper Large – Valve	?	?
28	3007582	Valve Stem	?	?
29	3005719	Pump Screen	?	?
30	3007162	O-Ring – Pump Cover	?	?
31	3000439	Pump Shaft Seal	?	?
32	3007583	Pump Pressure Regulator	?	?
33	3007028	O-Ring – Pump Pressure Regulator	?	?
34	3007584	Buss Bar Sup – for .05, .07, .10 tube length	?	?

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/furnace room is enclosed. It may be necessary to create a window to permit sufficient air to enter the boiler/furnace room. The installer must follow local ordinances and applicable codes in your area.

CHIMNEY

Be sure chimney is sufficient to handle the exhaust gases. Be sure the chimney is clear of obstructions. Follow all applicable codes in your area.

OIL FILTER

An external 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 should be done in accordance with the National Electrical Code, and all local codes. 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.

BURNER OPERATION

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

FIRE EXTINGUISHER

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

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