

GB Forced draught natural gas/propane burner

Two stage operation



RIELLO 40

CODE	MODEL	TYPE
3757325	G900	573T

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INSTALLATION INSTRUCTIONS AND OWNER'S HANDBOOK



All gas burners **MUST** be installed by trained and licensed technicians.



Installation of this burner must conform with local codes requirements or, in the absence of local codes, with the Standard: National Fuel Gas code ANSI Z223.1-1984, and CAN/CGA B149.1 & 2 AND UL 795. If an external electrical source is utilized, the conversion burner, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the national Electrical Code, ANSI/NFPA No. 70-1990 and CSA Electrical Code C22.2 No.0 M1982 & C22.2 No 3. 1988.

Authorities having jurisdiction should be consulted before installations are made. The owner is required to retain this manual for future reference.

TECHNICAL SPECIFICATIONS				
FIRING RATES:				
HIGH 360,000 TO 900,000 Btu/hr				
LOW 250,000 TO 490,000 Btu/hr				
	NATURAL GAS		PROPANE	
	HIGH FIRE	LOW FIRE	HIGH FIRE	LOW FIRE
GAS SUPPLY PRESSURES	MIN. 7" wc MAX. 14" wc	MIN. 7" wc MAX. 14" wc	MIN. 8" wc MAX. 13" wc	MIN. 8" wc MAX. 13" wc
MANIFOLD PRESSURES	MIN. 2.3" wc MAX. 3.3" wc	MIN. 0.55" wc MAX. 1.1" wc	MIN. 2.6" wc MAX. 6.0" wc	MIN. 1.7" wc MAX. 3.4" wc
POWER MOTOR CONTROL MODULE	120 Volts 60 Hz 1 phase 233T 4.3 Amps 3250 rpm 325 rad/s. RMG 88.62			



WARNING:

If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

Do not store or use gasoline or any other flammable vapours or liquid in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS:

- 1) Do not try to light any appliance.
- 2) Do not touch electrical switches; do not use any phone in your building.
- 3) Immediately call your gas supplier from a neighbour's phone.
Follow the gas supplier's instructions.
- 4) If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

GENERAL INFORMATION

Your Riello gas burner comes to you completely assembled and factory wired, ready for installation. Models equipped with the short combustion head have a fixed flange, which bolts directly to the front of the appliance. When equipped with the long combustion head, the burner comes with a universal flange, which when bolted to the appliance, allows the burner to be adjusted for exact positioning in the combustion zone.

STEP-BY-STEP PROCEDURE

- 1) Remove the burner from the carton, taking care not to lose any of the supplied accessories. Check for signs of physical damage.
- 2) Bolt the combustion head and burner to the appliance. Be sure to install the supplied mounting gasket. Ensure that the burner is level (we suggest using a spirit level) and that the combustion head is centred in the appliance port. Refer to page 7 for positioning of combustion head relative to the chamber.
- 3) Check that all gas train connections are tight and make your connections to the incoming gas supply.
 - a) A sediment trap must be provided.
 - b) If not already installed, a manual shutoff valve must be supplied. This valve must be upstream of the burner gas train supply connection.
 - c) A $\frac{1}{8}$ " NPT plugged tapping must be installed immediately upstream of the burner gas train supply connection and must be accessible for a test gauge.
 - d) If required by local codes, provide gas vent lines at the gas regulators and valve (Riello gas trains are equipped with vent limiting diaphragms).
 - e) Perform required gas pressure test on incoming gas supply lines.

NOTE: Details of sediment trap, manual gas valve and test point can be found in installation of sediment trap and burner supply section.

- 4) Remove the red protective cover by removing the three screws. Make your adjustment of stop gate, (refer to firing rate specifications and settings charts for details). Replace and secure the air cover plate.
- 5) Electrical hookup: 120Volt 60 Hz incoming power lines should be connected to Terminals 1 and 2 on burner terminal block. A manual disconnect switch must be installed in the incoming power lines. Incoming power lines must be rigid conduit or flexible approved cable.



The hot wire must be connected to the black lead of the relay: neutral to the white lead.

Do not reverse the polarity.

The burner will not operate with the Phase/Neutral reversed, and the control box may be damaged.

Proper earth ground should be connected to the terminal block mounting plate which should be a solid green wire to Earth Ground.

- 6) Start and check the burner functions as follows:
 - a) Make a final check on both the gas and electrical connections.
 - b) Check that all adjustments have been completed.
 - c) Loosen the screw in the manifold gas test point and install a manometer.
 - d) Switch on power.
 - e) Set the thermostat at its highest setting and press the burner reset button. Allow the burner to run through a complete cycle to check control functions.
 - f) Turn on the manual gas valve and reset the safety. At this stage, the burner will open the air shutter and once it is open, the burner will prepurge for approx. 25 seconds.
Allow about 66 seconds for the control module to check all the operating circuits.

It may be necessary to repeat the starting cycle several times to free the gas train of entrapped air. If the burner goes to lockout, reset the safety button.

- 7) With the burner running and flame established, check the manifold gas pressure. Adjust manifold pressure to the correct value for the selected firing rate specified in the FIRING RATE SPECIFICATIONS AND SETTINGS chart. After completing the setting, remove the manometer and tighten the screws.

NOTE: Do not assume the burner is operating at optimum performance.

- 8) Make your final combustion efficiency test and fine tune the fan air damper as necessary. Replace the red protective cover and secure with three screws.
- 9) If the burner is installed on a central warm air furnace, affix the supplied warning labels to the furnace fan cover door (inside and outside).

- 10) Always do a final set up by checking the gas flow rate by clocking the meter.
 Do a complete combustion check with proper test equipment to obtain the best and safe CO², O², and CO results. This test must be done by a qualified technician. The maximum CO² level for Natural Gas is 10%.
 The maximum CO² level for Propane Gas is 12%. The recommended flue gas temperature is from 350 degrees Fahrenheit to 550 degrees Fahrenheit.
 Fill out the installation data on the label described below and explain the burner's essential functions (starting and stopping) to the owner.
 Do not forget to give the dealer or service company's name and address.

ADJUSTMENT DATA TAG ANSI Z21-17b-1994	
INPUT C.F.H.	
MANIFOLD PRES.	
AIR DAMPER	
AIR/GAS RATIO No.	
FLUE GAS TEMP.	
O2 LEVEL %	
CO2 LEVEL %	
CO LEVEL P.P.M	
DATE :	
COMPLETED BY	
INSTALLATION CONTRACTOR	

INSTALLATION DATA

Note: This label is supplied in the package with the burner and should be filled out and affixed to the appliance when the conversion burner is installed.

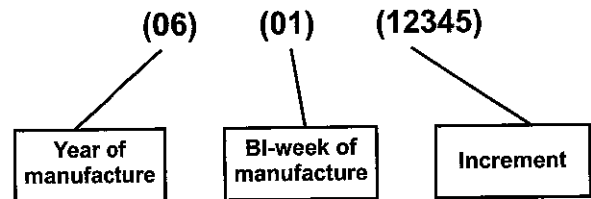
SERIAL NUMBER IDENTIFICATION

Your Riello burner may have been manufactured in more than one location and therefore there are two possible serial number identification.

The Riello 9 character serial number, example,

06 01 12345, is identified as follows:

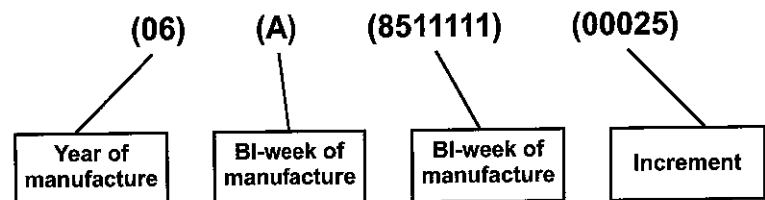
- 06** = Last two digits of the year of manufacture;
- 01** = Week of manufacture;
- 12345** = Increment of 1 for each burner produced – specific to product code – reset to zero each January 1st.



The Riello 15 character serial number, example,

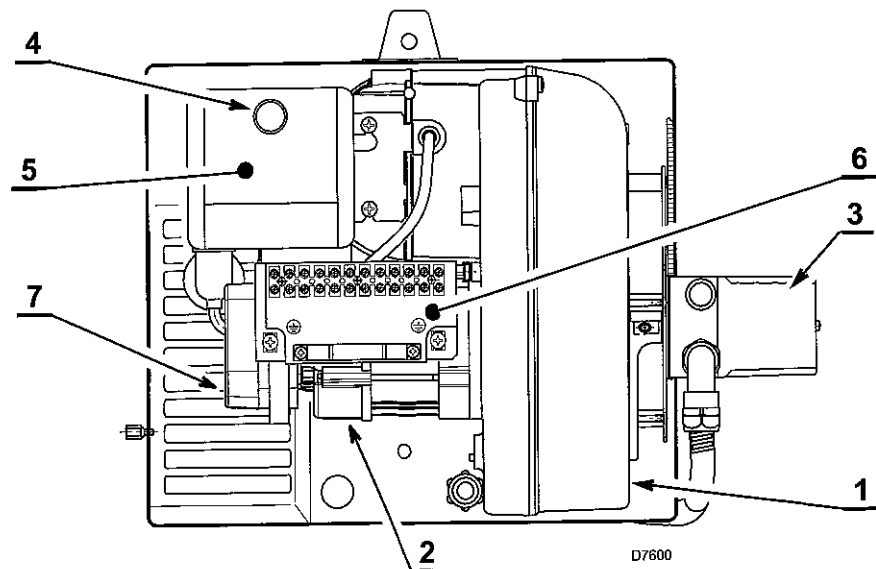
06 A 8511111 00025, is identified as follows:

- 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.

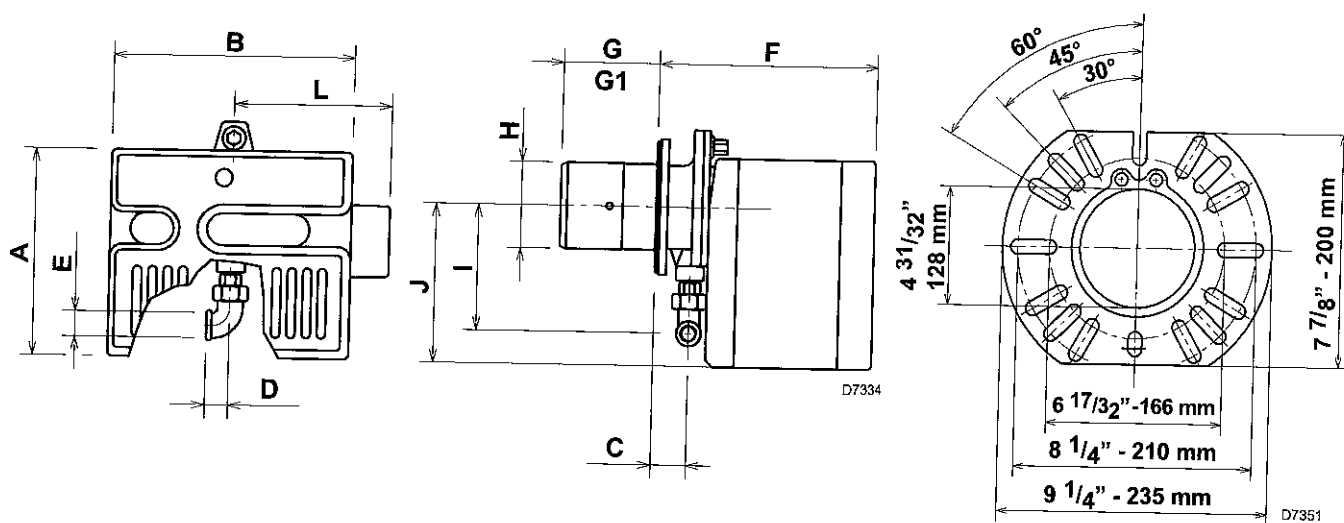


BURNER COMPONENTS IDENTIFICATION

- 1 Air damper
- 2 Motor
- 2 Servomotor
- 4 Reset button with lock-out lamp
- 5 Control box RMG 88.62
- 6 Wiring terminal block
- 7 Air pressure switch



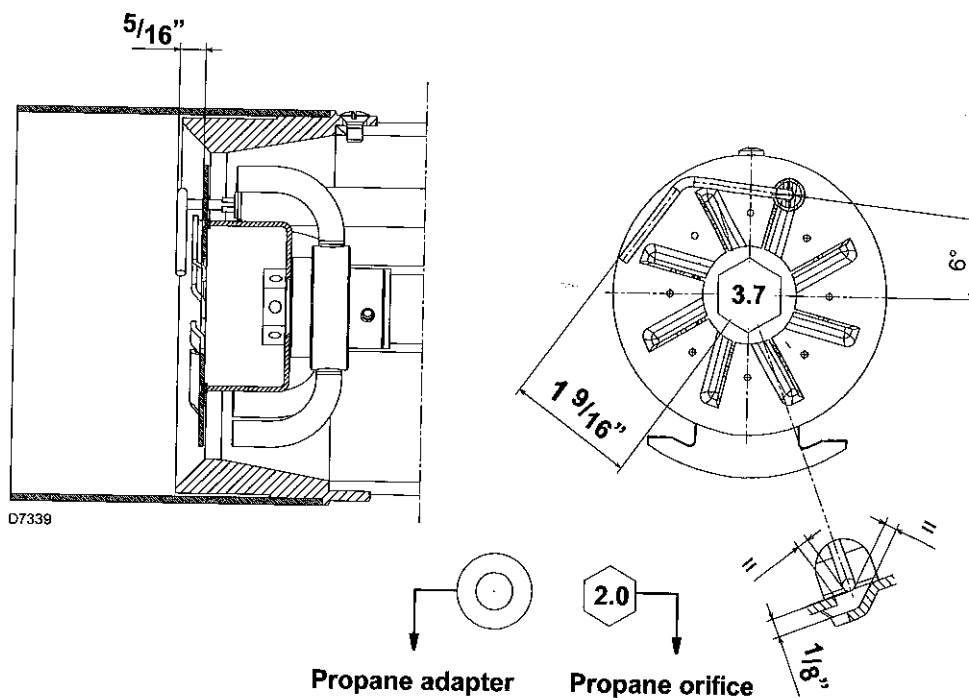
BURNER DIMENSIONS



Model 900	A	B	C	D	E	F	G	G1	H	I	J	L
inches	11 ⁴⁷ / ₆₄	13 ²⁵ / ₃₂	2 ⁴¹ / ₆₄	1 ¹⁹ / ₆₄	³ / ₄	15 ²³ / ₆₄	4 ²³ / ₃₂	10 ⁵ / ₈	4 ⁵⁹ / ₆₄	5 ⁶³ / ₆₄	9 ¹ / ₁₆	3 ⁴⁷ / ₆₄
mm	298	350	67	33	19	389	120	270	125	152	230	95

NOTE: Actual available insertion length must be measured from tip of end cone to face of mounting gasket.

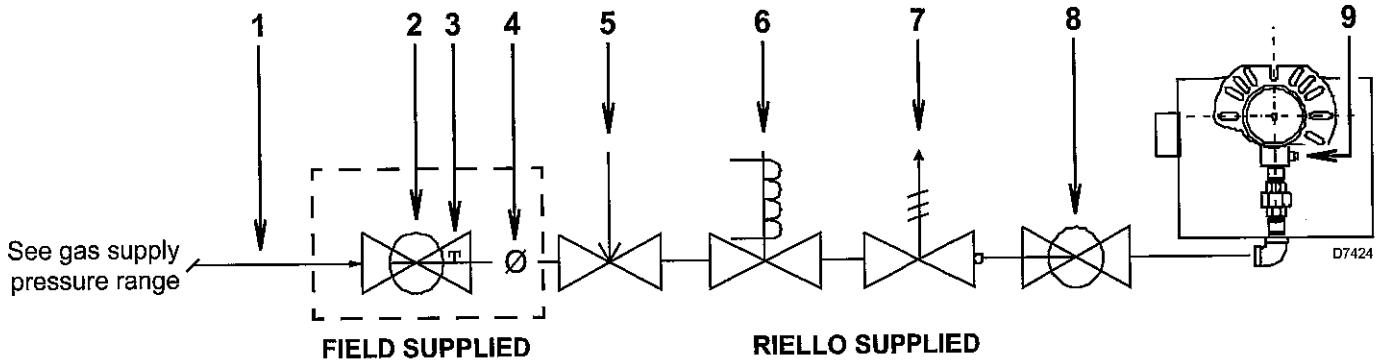
ELECTRODE AND FLAME PROBE ADJUSTMENTS



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

This gas train scope of supply meets the minimum controls requirements according to CGA and AGA regulations. Any additional requirements needed to meet local codes are the responsibility of others.



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

Key to layout

- 1 Gas supply & flow direction of gas
- 2 Gas supply main shutoff manual valve (field supplied)
- 3 Gas supply pressure test point (field supplied)
- 4 Gas train pipe diameter size(s): burner G900 1" NPT (reduced at combustion head to 3/4")
- 5 Gas appliance pressure regulator
- 6 Safety shutoff gas valve (VS) 120V operated
- 7 Main gas valve 120V operated:
burner G900 = single stage V1 only
- 8 Firing valve manual shutoff
- 9 Gas burner manifold test point

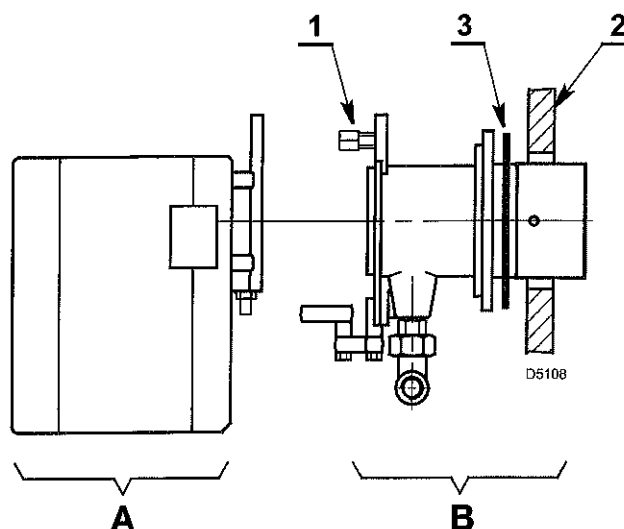
Gas supply pressure ranges	min.	max.
Natural gas	7" wc	14" wc
Lp propane gas	8" wc	13" wc

INSTALLING THE BURNER

- A) Burner Chassis
 B) Combustion Head Assembly
 1) Locking Nut
 2) Mounting Plate surface
 3) Insulation Gasket

Separate the combustion head of the burner from the chassis (A) by removing the locknut (1). Install the combustion head into the boiler.

Typical insertion depth, the front edge of the combustion head is flush with the inside surface of the appliance mounting surface (2).



Use this checklist prior to installation:

- 1) Check the input/output requirements of the boiler/furnace.
- 2) Check the physical size of the combustion chamber against the thermal requirements of the application and relate this to the sizing charts.
- 3) Check that there is sufficient air for proper combustion and adequate ventilation. Local codes should be followed.
- 4) Check that you have adequate space for servicing the equipment as per local code. This is required for servicing and periodic maintenance of burner/appliance.
- 5) Prior to burner installation, the chimney must be inspected and must meet local code requirements.
- 6) Barometric draft regulators, when used, should be of the double acting type, and must be installed in accordance with the draft regulator Manufacturer's instructions. Single acting barometric dampers are not permitted.
- 7) The operating instructions tag supplied with the unit must be left in place.

TO START THE BURNER:

Switch on power, open manual gas cocks, set the thermostat above ambient temperature. If the burner does not start, press the illuminated re-set button on the burner safety control.

TO SHUT DOWN BURNER:

Switch off power supply. If burner is switched off for extended periods, close manual gas cocks.



A vent shutoff system shall be applied to a barometric damper installed in the venting system at the time of conversion of the appliance.

This will electrically disconnect the burner should there be a blockage in the vent (chimney).

The installer must identify the main electrical power switch and manual gas shut off valve, for emergency conditions. The burner cover must be in place and secured before the burner is placed in operation.

INSTALLATION OF SEDIMENT TRAP AND BURNER SUPPLY

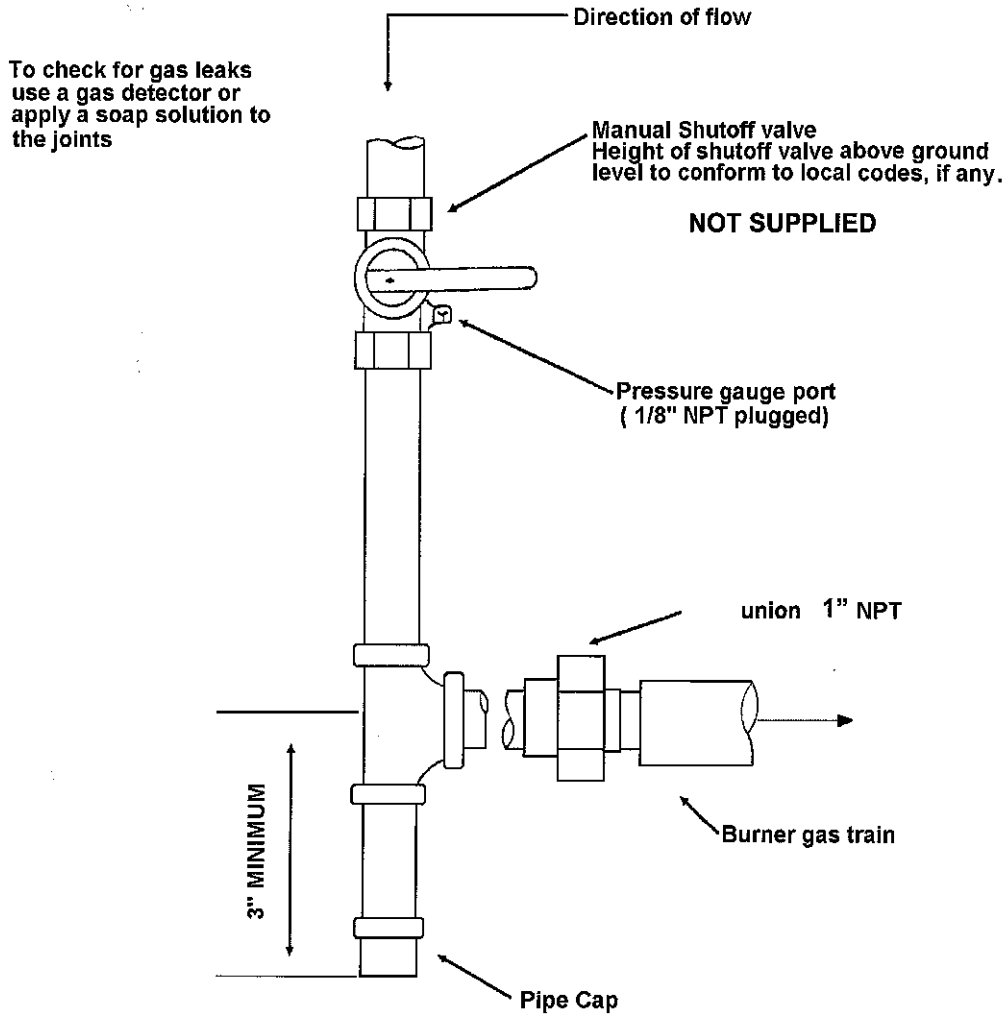
Gas piping to the burner must be $\frac{1}{2}$ -inch minimum. Install only a full-ported shutoff valve. The valve must be located outside the appliance jacket, and the pressure gauge port must be accessible.

PRESSURE TEST-OVER $\frac{1}{2}$ PSIG.

The appliance and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of the system at a test pressure in excess of $\frac{1}{2}$ PSIG.

PRESSURE TEST- $\frac{1}{2}$ PSIG OR LESS

The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any testing of the gas supply piping system at test pressures equal to or less than $\frac{1}{2}$ PSIG.



WIRING DIAGRAM

CONTROL CIRCUITS

Burner firing stage may be controlled by either a 120V or 24V control system. The required controls must be connected to the burner as described on the following pages.

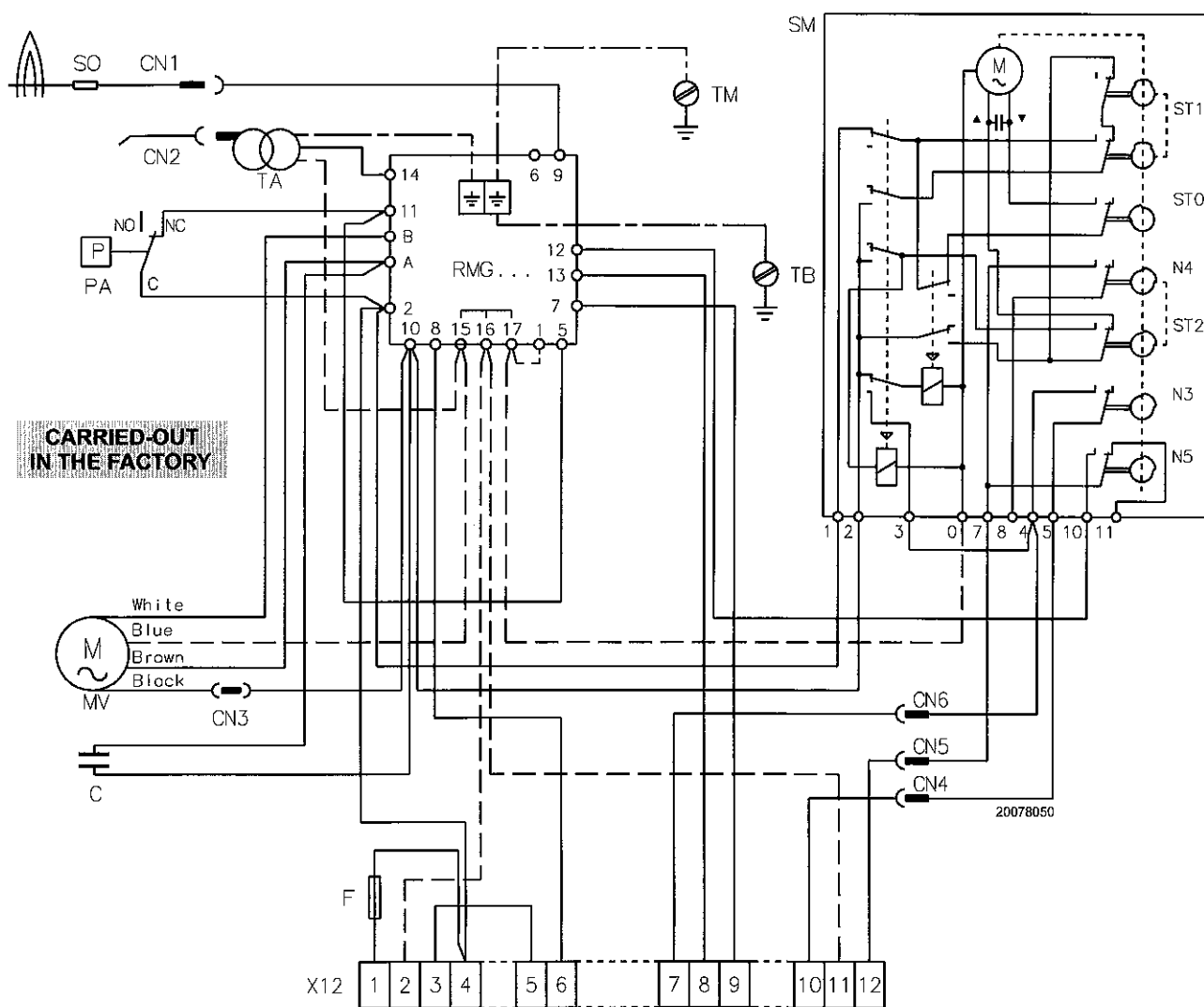
120V CONTROL SYSTEM

First stage firing is controlled by a 120V operating control wired between terminals 3 and 4 on the terminal block. To control second stage fire on demand only, a second 120V control must be wired between terminals 7 and 8 after removing the factory-installed jumper.

24V CONTROL SYSTEM

First Stage firing is controlled by a 24V operating control wired between terminals 3 and 4 on the terminal block. To control second stage fire on demand only, a second 24V control must be wired between terminals 7 and 8 after removing the factory installed jumper.

NOTE: if an external electrical source is utilized, the conversion burner, when installed, must be electrically grounded with a solid green wire to Earth Ground, 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.



Key to lay-out

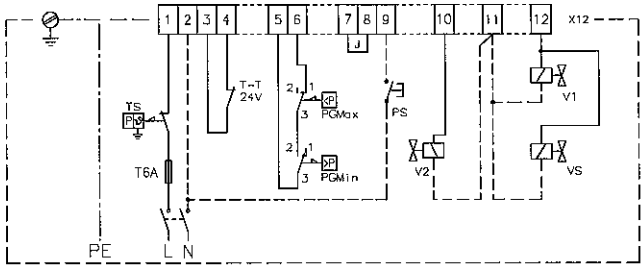
C Capacitor MV
 F Fuse 6.25A
 CN... Connectors
 MV Fan motor

PA Air pressure switch
 RMG... Control box
 SM Servomotor
 SO Ionization probe
 TA Ignition transformer

TB Burner earth
 TM Earth terminal board
 X12 Terminal board 12 pole

**TO BE DONE BY
THE INSTALLER**

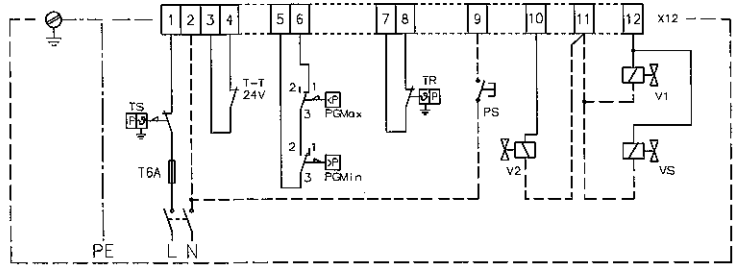
**24V SINGLE STAGE BURNER
LOW FIRE START**



24V 60 Hz

20078783

24V TWO STAGE BURNER FIRING

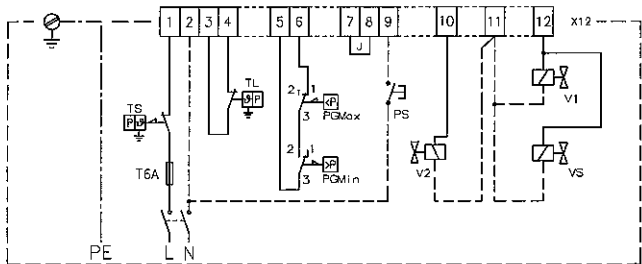


24V 60 Hz

20078786

**TO BE DONE BY
THE INSTALLER**

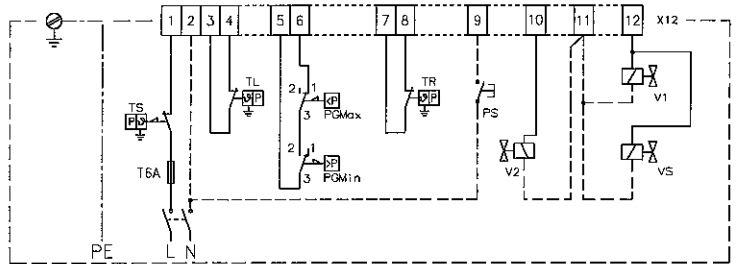
**120V SINGLE STAGE BURNER
LOW FIRE START**



120V 60 Hz

20078051

120V TWO STAGE BURNER FIRING



120V 60 Hz

20078052

Key to lay-out

- J Bridge for 1st stage operating
- PGMax Max gas pressure switch
- PGMin Min gas pressure switch
- PS Remote reset push-button

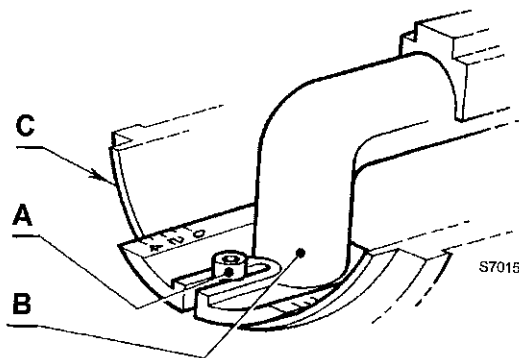
- TL Limit thermostat
- TR Adjustment thermostat
- TS Safety thermostat
- T-T 24V operating limit switch
- V1 1st stage gas valve

- V2 2nd stage gas valve
- VS Safety valve
- X12 Terminal board 12 pole

COMBUSTION HEAD SETTING

To set combustion head, loosen the Allen screw (A) and move the elbow (B) so that the rear edge of the air tube (C) coincides with the set point number.

Retighten the Allen screw (A).



Make sure you are using the correct table for either Natural gas or Propane gas.

BURNER SETUP CHART

SPECIFICATIONS 1" GAS TRAIN WITH 6" MINIMUM LINE SUPPLY PRESSURE											
	kBTU Input High Fire	kBTU Input Low Fire	Air Gate Setting	Head Setting	Servomotor set in degrees				Manifold Pressure (inches - wc)		Min Line Pressure (inches - wc)
					A	B	C	D	H	L	
					ST1	N5	ST2	N3			
NATURAL GAS	900		4.7	4.0			38	33	3.3		7
		490	2.4	4.0	20	15				1	7
	800		4.2	3.0			34	29	3		7
		410	2.1	3.0	19	14				0.55	7
	700		3.7	2.0			30	25	2.6		7
		370	2.0	2.0	18	13				0.78	7
	600		3.1	1.0			25	20	2.7		7
		320	1.8	1.0	15	10				0.86	7
	500		2.8	0.5			22	17	2.8		7
		300	1.8	0.5	15	10				1.1	7
	360	2.2	0.0			19	14	2.3		7	
	250	1.6	0.0	13	8				1	7	
SPECIFICATIONS 1" GAS TRAIN WITH 11" MINIMUM LINE SUPPLY PRESSURE											
PROPANE GAS	900		4.7	5.0			38	33	6		8
		490	3.2	5.0	26	21				3.4	8
	800		4.0	4.0			34	29	4.9		8
		410	2.9	4.0	24	19				2.8	8
	700		3.7	3.0			30	25	4.1		8
		370	2.7	3.0	22	17				2.3	8
	600		3.1	2.0			26	20	3.1		8
		320	2.4	2.0	20	15				1.8	8
	500		2.9	1.0			25	18	2.9		8
		300	2.1	1.0	18	13				1.7	8
	360	2.3	0.0			20	15	2.6		8	
	250	2.1	0.0	18	13				2	8	

NOTE:

The above settings are a starting point for adjustments ONLY; a qualified gas technician using proper test equipment must do the final adjustments.

Proper CO₂, O₂, and CO readings must be taken and be within regulating code requirements.

All the settings above are based on zero (0) over fire-draft.

If positive or negative chamber conditions exist some settings changes made be required.

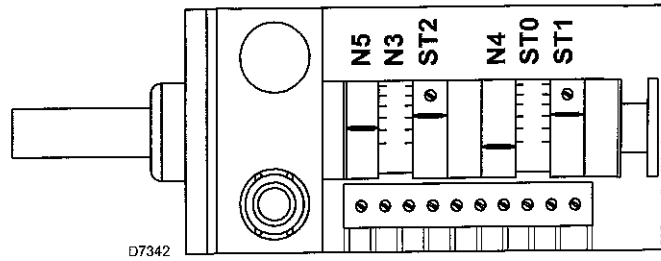
For any referral to valve setting, please check the attached manufacturer valve specification.

PRELIMINARY BURNER ADJUSTMENTS

**STANDBY WAITING FOR CALL FOR HEAT
DO NOT ADJUST THIS SETTING FOR ANY
REASON!!!**

The **ST0** lever is factory set at zero and corresponds to the closed air damper position during standby.

DO NOT ADJUST THIS SETTING FOR ANY REASON!



1st STAGE (LOW FIRE) AIR DAMPER SETTING

The **ST1** lever controls the first stage position of the air damper and must be set at a higher degree setting than the **ST0** Lever.

Lever **N5** controls when the first stage gas valve gets permission to open and must be set approximately 5° lower than **ST1**. (Example: if **ST1** is set at 20° then **N5** should be set at approximately 15°).

2nd STAGE (HI FIRE) AIR DAMPER SETTING

The **ST2** lever controls the 2nd stage (Hi fire) position of the air damper and must be set at a higher degree setting than the **ST1** Lever.

Lever **N3** controls when the 2nd stage (Hi fire) gas valve gets permission to open and it must be set approximately 5° lower than **ST2** (Example: if **ST2** is set at 30° then **N3** should be set at approximately 25°).

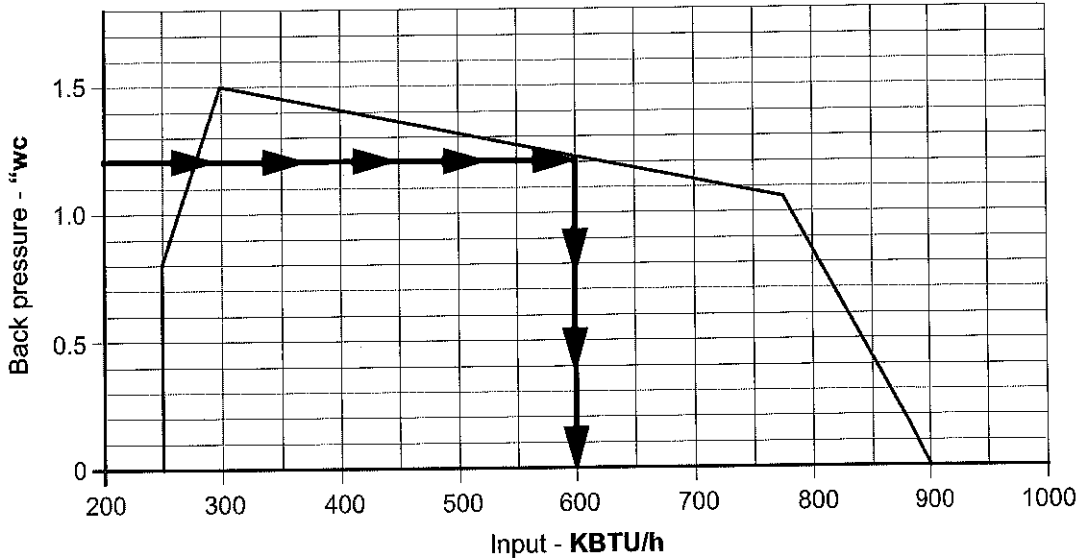
PRESSURE WORKING CHART

The chart below shows effects of pressure in the combustion zone on the minimum/maximum burner outputs.

In this example, with a maximum operating pressure of 1.2 inches water column in the combustion zone, you will be able to obtain a maximum of 600 KBtu/h burner output.

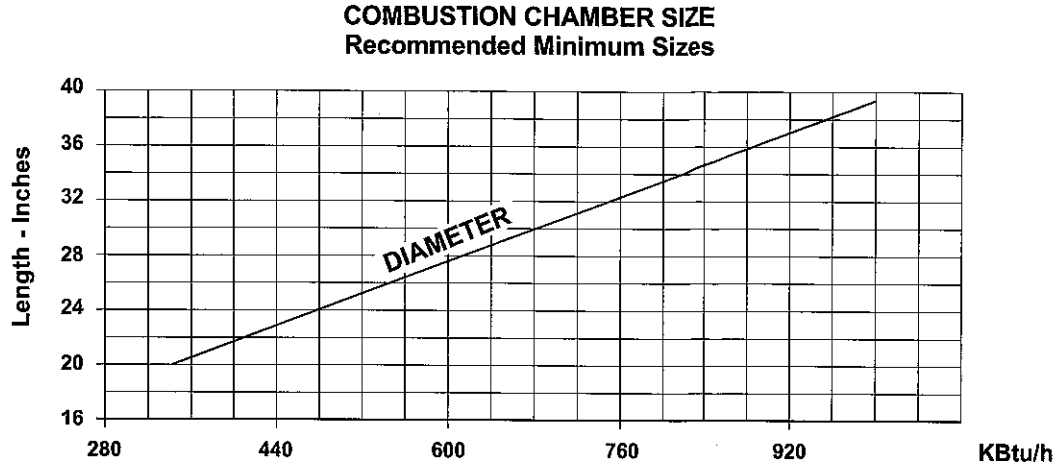
PRESSURE WORKING CHART
Natural and Propane Gas

S8978



Any change from zero (0) pressure in the combustion zone will affect the KBtu output of the burner. To supply the required input to the appliance, manifold pressure will have to be adjusted to compensate for this condition.

COMBUSTION CHAMBER SIZE



NOTES:

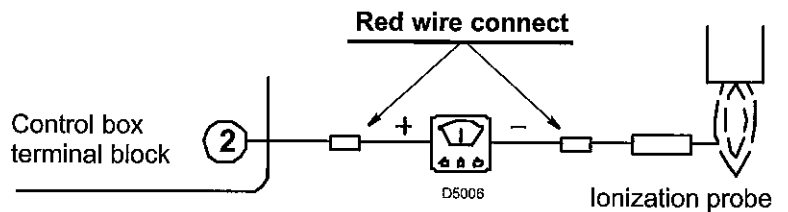
- 1) Sizes shown above are for cylindrical or wet base boilers, or air cooled heat exchangers.
- 2) To size the chamber in applications other than wet base boilers, you must calculate area in square inches of the combustion zone required to give you a grate area or floor area to match the BTU inputs according to local authority.
- 3) Please consult local code requirements for combustion chamber construction and sizing.

COMBUSTION CHECKS

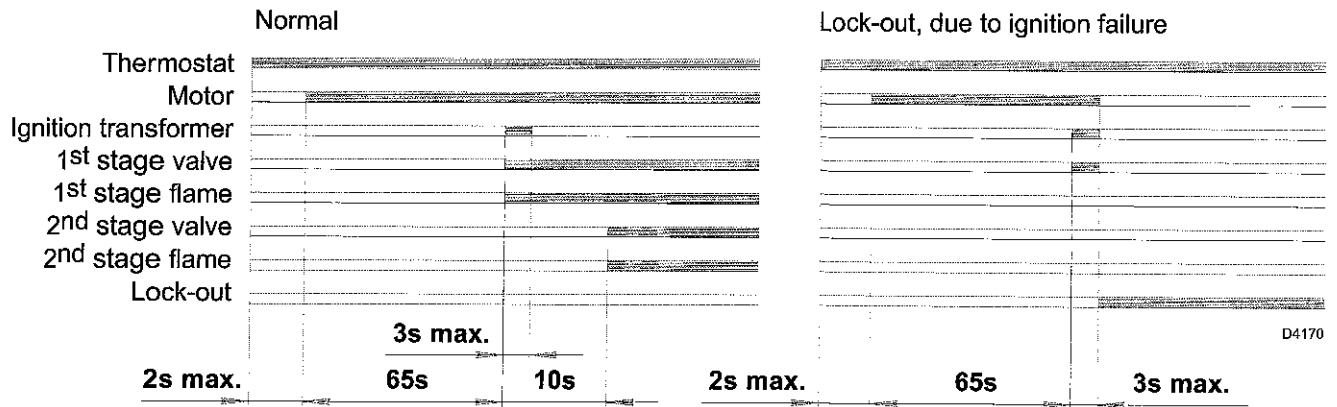
- CO₂** It is advisable not to exceed a measured reading of 10% CO₂ for Natural Gas or 12% CO₂ for Propane Gas taken with the burner cover in place, to avoid the risk of the formation of CO due to minor changes in wind/draft conditions which may occur.
- CO** For safety reasons, the value of .02% (200ppm) free air sample must not be exceeded.

IONIZATION CURRENT

The minimum amount of current necessary for the control box to operate properly is 5 micro Amps DC. To measure the ionization current, disconnect the red wire connector and insert a DC micrometer in series with control box terminal 2 and the ionization probe, which senses the flame.



BURNER START-UP CYCLE



When flame-failure occurs during working, shut down takes place within one second.

START-UP CYCLE DIAGNOSTICS

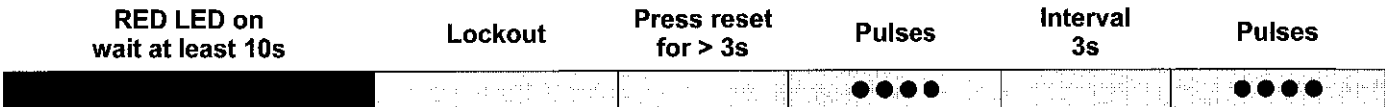
During start-up, indication is according to the following table:

COLOUR CODE TABLE	
Sequences	Colour code
Pre-purging	●●●●●●●●●●
Firing phase	●○●○●○●○●○
Operation, flame ok	□□□□□□□□
Operating with weak flame signal	□○□○□○□○□○
Electrical supply lower than ~ 170V	●▲●▲●▲●▲●▲
Lockout	▲▲▲▲▲▲▲▲▲▲
Extraneous light	▲□▲□▲□▲□▲□
Key to layout: ○ Off ● Yellow □ Green ▲ Red	

RESETTING THE CONTROL BOX AND USING DIAGNOSTICS

The control box features a diagnostics function through which any causes of malfunctioning are easily identified (indicator: **RED LED**). To use this function, you must wait at least 10 seconds once it has entered the safety condition (**lockout**), and then press the reset button.

The control box generates a sequence of pulses (1 second apart), which is repeated at constant 3-second intervals. Once you have seen how many times the light pulses and identified the possible cause, the system must be reset by holding the button down for between 1 and 3 seconds.



The methods that can be used to reset the control box and use diagnostics are given below.

RESETTING THE CONTROL BOX

To reset the control box, proceed as follows:

- Hold the button down for between 1 and 3 seconds.
The burner restarts after a 2-second pause once the button is released.
If the burner does not restart, you must make sure the limit thermostat is closed.

VISUAL DIAGNOSTICS

Indicates the type of burner malfunction causing lockout.

To view diagnostics, proceed as follows:

- Hold the button down for more than 3 seconds once the red LED (burner lockout) remains steadily lit.
A yellow light pulses to tell you the operation is done.
Release the button once the light pulses. The number of times it pulses tells you the cause of the malfunction, according to the coding system indicated in the table on page 10.

SOFTWARE DIAGNOSTICS

Reports burner life by means of an optical link with the PC, indicating hours of operation, number and type of lockouts, serial number of control box etc ...

To view diagnostics, proceed as follows:

- Hold the button down for more than 3 seconds once the red LED (burner lockout) remains steadily lit.
A yellow light pulses to tell you the operation is done.
Release the button for 1 second and then press again for over 3 seconds until the yellow light pulses again.
Once the button is released, the red LED will flash intermittently with a higher frequency: only now can the optical link be activated.

Once the operations are done, the control box's initial state must be restored using the resetting procedure described above.

BUTTON PRESSED FOR	CONTROL BOX STATUS
Between 1 and 3 seconds	Control box reset without viewing visual diagnostics.
More than 3 seconds	Visual diagnostics of lockout condition: (LED pulses at 1-second intervals).
More than 3 seconds starting from the visual diagnostics condition	Software diagnostics by means of optical interface and PC (hours of operation, malfunctions etc. can be viewed)

The sequence of pulses issued by the control box identifies the possible types of malfunction, which are listed in the table below.

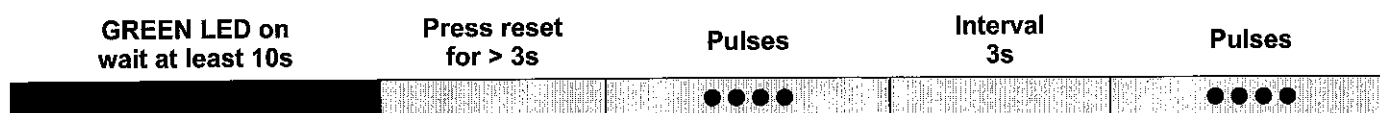
Signal	Problem	Possible cause	Recommended remedy
2 blinks ● ●	Once the pre-purging phase and safety time have passed, the burner goes into lockout without the appearance of the flame	The operation solenoid lets little gas through	Increase
		One of the two solenoid valves does not open.	Replace
		Gas pressure too low	Increase pressure at governor
		Ignition electrode incorrectly adjusted	Adjust
		Electrode grounded due to broken insulation	Replace
		High voltage cable defective	Replace
		High voltage cable deformed by high temperature	Replace and protect
		Ignition transformer defective	Replace
		Incorrect valve or transformer electrical wiring	Check
		Defective control box	Replace
		A closed valve upline the gas train	Open
		Air in pipework	Bleed air
		Gas valves unconnected or with interrupted coil	Check connections or replace coil
3 blinks ● ● ●	The burner does not switch on, and the lockout appears	Air pressure switch in operating position	Adjust or replace
	The burner switches on, but then stops in lockout	- Air pressure switch inoperative due to insufficient air pressure:	
		Air pressure switch incorrectly adjusted.	Adjust or replace
		Pressure switch pressure test point pipe blocked	Clean
		Poorly adjusted head	Adjust
		High pressure in the furnace	Connect air pressure switch to fan suction line
	Lockout during pre-purging phase	Defective motor control contactor (only three-phase version)	Replace
		Defective electrical motor	Replace
		Motor lockout (defective electrical motor)	Replace

Signal	Problem	Possible cause	Recommended remedy
4 blinks ● ● ● ●	The burner switches on, but then stops in lockout	Flame simulation	Replace the control box
	Lockout when burner stops	Permanent flame in the combustion head or flame simulation	Eliminate persistence of flame or replace control box
6 blinks ● ● ● ● ● ●	The burner switches on, but then stops in lockout	Defective or incorrectly adjusted servomotor	Adjust or replace
7 blinks ● ● ● ● ● ● ●	The burner goes into lockout immediately following the appearance of the flame	The operation solenoid lets little gas through	Increase
		Ionisation probe incorrectly adjusted	Adjust
		Insufficient ionisation (less than 5 A)	Check probe position
		Earth probe	Withdraw or replace cable
		Burner poorly grounded	Check grounding
		Phase and neutral connections inverted	Invert them
	Defective flame detection circuit	Replace the control box	
Burner lockout moving between 1st and 2nd stages, or between 2nd and 1st stages	Too much air or too little gas	Adjust air and gas	
	Burner goes into lockout during operation	Probe or ionisation cable grounded	Replace worn parts
10 blinks ● ● ● ● ● ● ● ● ● ●	The burner does not switch on, and the lockout appears	Incorrect electrical wiring	Check
	The burner goes into lockout	Defective control box	Replace
		Presence of electromagnetic disturbances in the thermostat lines Presence of electromagnetic disturbance	Filter or eliminate Use the radio disturbance protection kit
No blink	The burner does not start	No electrical power supply	Close all switches - Check connections
		A limiter or safety control device is open	Adjust or replace
		Line fuse blocked	Replace
		Defective control box	Replace
		No gas supply	Open the manual valves between contactor and train
		Mains gas pressure insufficient	Contact your GAS COMPANY
		Minimum gas pressure switch fails to close	Adjust or replace
Servomotor fails to move to min. ignition position	Replace		

Signal	Problem	Possible cause	Recommended remedy
No blink	The burner continues to repeat the start-up cycle, without lockout	The gas pressure in the gas mains lies very close to the value to which the minimum gas pressure switch has been set. The sudden drop in pressure after valve opening causes temporary opening of the pressure switch itself, the valve immediately closes and the burner comes to a halt. Pressure increases again, the pressure switch closes again and the ignition cycle is repeated. And so on	Reduce the minimum gas pressure switch intervention pressure. Replace the gas filter cartridge.
	Ignition with pulsations	Poorly adjusted head	Adjust
		Ignition electrode incorrectly adjusted	Adjust
		Incorrectly adjusted fan air damper: too much air	Adjust
		Output during ignition phase is too high	Reduce
	The burner does not move into the 2nd stage	Remote control device TR fails to close	Adjust or replace
		Defective control box	Replace
		Defective servomotor	Replace
	Burner stops with air damper open	Defective servomotor	Replace

NORMAL OPERATION / FLAME DETECTION TIME

The control box has a further function to guarantee the correct burner operation (signal: **GREEN LED** permanently on). To use this function, wait at least ten seconds from the burner ignition and then press the control box button for a minimum of 3 seconds. After releasing the button, the GREEN LED starts flashing as shown in the figure below.



The pulses of the LED constitute a signal spaced by approximately 3 seconds. The number of pulses will measure the probe DETECTION TIME since the opening of gas valves, according to the following table:

SIGNAL	FLAME DETECTION TIME
1 blink ●	0.4s
2 blinks ● ●	0.8s
6 blinks ● ● ● ● ● ●	2.8s

This is updated in every burner start-up. Once read, the burner repeats the start-up cycle by briefly pressing the control box button.

WARNING

If the result is > 2s, ignition will be retarded. Check the adjustment of the hydraulic brake of the gas valve, the air damper and the combustion head adjustment.

OWNER INFORMATION AND ROUTINE MAINTENANCE

SAFETY LOCKOUT

This burner is equipped with multiple interlocking safety devices. In the event of a failure in the flame, or any blockage of the combustion air supply, the burner will "lock out" in a safety condition. In such an event, an illuminated red button will show on the front of the red cover.

To restart the burner, press the button once only. Should the burner return to the lock out condition, call a qualified service technician or your gas company for assistance. In the case of loss of pressure in the gas supply line, the burner will go off on safety. If supplied with an optional gas pressure switch (or field installed), the burner will simply switch off on low gas pressure, and start up again when the gas pressure returns to normal.

NOTE: Keep the area around the burner free and clear of all combustible materials, gasoline and other flammable vapours and liquids. Do not allow any obstructions, which may prevent the free, flow of air to the burner.

MAINTENANCE

Like all precision equipment, your burner will require periodic maintenance. At an interval of 2 months, you should:

- 1) If your boiler/furnace has an observation port, visually check the flame.
- 2) Check and clean the air intake louver to remove any buildup of fluff, dust, pet hair, etc.

For any maintenance or repairs over and above those listed, contact your service technician or gas company. **THERE ARE NO OWNER SERVICEABLE PARTS INSIDE THE BURNER COVER.**

Once a year, you should have the burner checked as indicated below, by your local authorized Riello dealer.

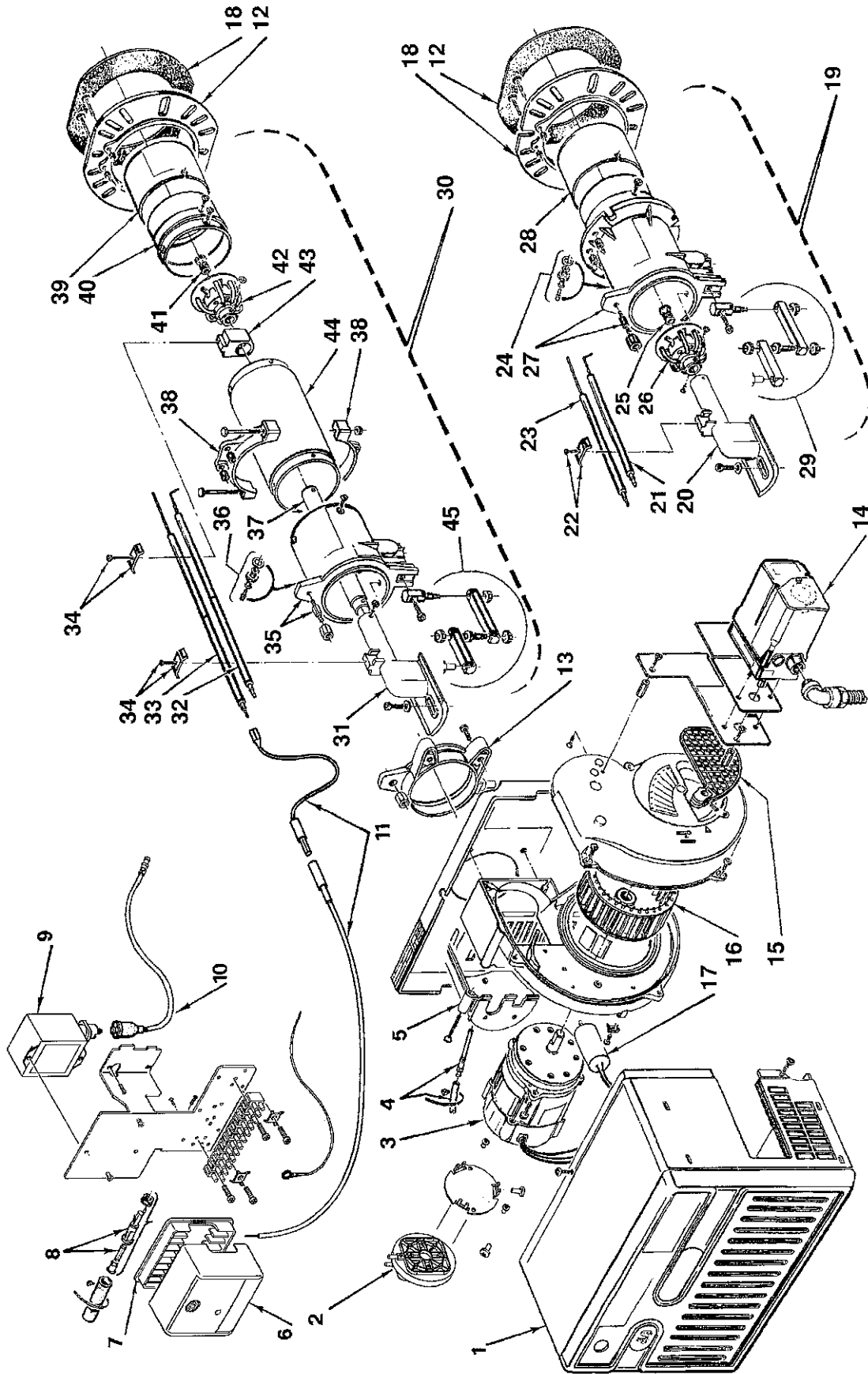
- 1) Check burner distributor head and mixing plates. Clean if necessary.
- 2) Check ignition electrode. Clean, adjust, or replace as necessary.
- 3) Check the flame sensor rod (ionization rod) for dirt or carbon build up. Clean, adjust, or replace as necessary.
- 4) Check manifold gas pressure.
- 5) Check all burner adjustments.
- 6) Generally clean all exposed parts and components.
- 7) Repeat combustion tests.

Your Riello 40 gas burner is only part of your heating system.

Once every year you should have your heating appliance serviced by a qualified service technician.

You should also have the chimney checked, and cleaned if necessary.

APPENDIX - SPARE PARTS



N.	CODE	DESCRIPTION
1	3007521	BURNER BACK COVER
2	3020314	AIR PRESSURE SWITCH
3	3005845	BURNER MOTOR
4	3007288	AIR SWITCH TUBE AND CONNECTOR
5	3007294	AIR PLATE COVER
6	3013072	PRIMARY CONTROL BOX
7	3003784	PRIMARY CONTROL SUB-BASE
8	3006804	FUSE 6.25A
9	3002462	TRANSFORMER - IGNITION
10	3002461	HIGH VOLTAGE LEAD
11	3007310	IONIZATION LEAD
12	3005851	UNIVERSAL MOUNTING FLANGE
13	3006689	CHASSIS MOUNTING COLLAR
14	3007523	SERVOMOTOR
15	3007421	AIR DAMPER PLATE
16	3005799	FAN
17	3007307	CAPACITOR 20 µF
18	3005852	MOUNTING GASKET
19	3950471	SHORT COMBUSTION HEAD (280T1)
20	3006697	DRAWER ASSEMBLY ELBOW
21	3006706	ELECTRODE ASSEMBLY
22	3003409	ELECTRODE & IONIZATION CLAMP
23	3020209	IONIZATION ASSEMBLY
24	3005447	GAS TEST POINT
25	3006703	NATURAL GAS DIAPHRAGM
26	3006700	DISTRIBUTOR HEAD AND MIXING PLATE
27	3007525	MANIFOLD
28	3006694	END CONE
29	3000870	HINGE ASSEMBLY
30	3950472	LONG COMBUSTION HEAD (280T2)
31	3006697	DRAWER ASSEMBLY ELBOW
32	3006962	ELECTRODE ASSEMBLY
33	3020210	IONIZATION ASSEMBLY
34	3003409	ELECTRODE & IONIZATION CLAMP
35	3007526	MANIFOLD
36	3005447	GAS TEST POINT
37	3007313	NATURAL GAS TUBE
38	3005849	SEMI FLANGE 2 REQUIRED
39	3006694	END CONE
40	3007283	COMBUSTION HEAD CONNECTOR
41	3006703	NATURAL GAS DIAPHRAGM
42	3006700	DISTRIBUTOR HEAD AND MIXING PLATE
43	3007314	ELECTRODE SUPPORT
44	3007286	AIR TUBE-LONG
45	3000870	HINGE ASSEMBLY

APPENDIX - BURNER START UP REPORT

Model number: _____	Serial number: _____
Project name: _____	Start-up date: _____
Installing contractor: _____	Phone number: _____

GAS OPERATION

Gas Supply Pressure: _____	CO ₂ : Low Fire _____	High Fire _____
Main Power Supply: _____	O ₂ : Low Fire _____	High Fire _____
Control Power Supply: _____	CO: Low Fire _____	High Fire _____
Burner Firing Rate: _____	NO _x : Low Fire _____	High Fire _____
Manifold Pressure: _____	Net Stack Temp - Low Fire: _____	High Fire _____
Pilot Flame Signal: _____	Comb. Efficiency - Low Fire: _____	High Fire _____
Low Fire Flame Signal: _____	Overfire Draft: _____	
High Fire Flame Signal: _____		

OIL OPERATION

Oil supply pressure: _____	CO ₂ : Low Fire _____	High Fire _____
Oil suction pressure: _____	O ₂ : Low Fire _____	High Fire _____
Control Power Supply: _____	CO: Low Fire _____	High Fire _____
Burner Firing Rate: _____	NO _x : Low Fire _____	High Fire _____
Low Fire Flame Signal: _____	Net Stack Temp - Low Fire: _____	High Fire _____
High Fire Flame Signal: _____	Comb. Efficiency - Low Fire: _____	High Fire _____
Low Fire Nozzle Size: _____	Overfire Draft: _____	
High Fire Nozzle Size: _____	Smoke number: _____	

CONTROL SETTINGS

Operating Setpoint: _____	Low Oil Pressure: _____
High Limit Setpoint: _____	High Oil Pressure: _____
Low Gas Pressure: _____	Flame Safeguard Model Number: _____
High Gas Pressure: _____	Modulating Signal Type: _____

NOTES

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