



GAS TUNNEL STONE CONVEYOR

MODELS: TSB AND TSC



OPERATION AND MAINTENANCE MANUAL





# Contents

<b>Attention!</b> .....	<b>1</b>
Additional Instructions .....	2
<b>Introduction</b> .....	<b>1</b>
General Warnings .....	2
Technical Data Plate .....	5
Support Stand .....	6
Stand and Oven Secured by Bolts.....	6
Stacking Stand and Oven Secured by Bolts .....	7
Restrained Oven on the Wall .....	8
<b>Installation Instructions</b> .....	<b>9</b>
Restraint Requirement – Gas Oven(s) On Casters – U.S.....	10
Typical Installation.....	11
Gas Connection .....	11
Electrical Connection .....	12
<b>Commissioning</b> .....	<b>13</b>
Checking the Gas Supply Pressure .....	13
Conversion to Other Types of Gas.....	14
Attention! .....	16
Commissioning .....	17
Initial Start-up .....	17
Turn off the Oven .....	18
Safety Devices .....	18
Flame Control.....	19
Residual Risks.....	19
<b>Cleaning and Maintenance</b> .....	<b>20</b>
Maintenance .....	20
Operator Maintenance .....	20
Cleaning Instructions.....	20

Maintenance Schedule .....	21
Daily Maintenance.....	21
Required Periodic Maintenance.....	21
Maintenance Schedule Sticker .....	22
Instructions for Replacing Components.....	23
Troubleshooting.....	25
<b>Diagrams.....</b>	<b>28</b>
Wiring Diagram .....	28
Burner Assembly Configuration Diagram .....	30
<b>Appendix A - The Specs Plates for Each Model.....</b>	<b>31</b>
TSB Models.....	31
TSC Models .....	32
<b>Appendix B – Technical Specifications.....</b>	<b>33</b>
TSB Models.....	33
TSC Models .....	34
<b>Appendix C - Views and Overall Dimensions .....</b>	<b>36</b>
TSB Models.....	36
TSC Models .....	37
<b>Appendix D – Adjusting the Minimum and Maximum Gas Pressure .....</b>	<b>38</b>
Adjusting the High Pressure Top Burner.....	38
Adjusting Minimum Pressure Setting.....	39
<b>Appendix E - Gas Pressure Settings.....</b>	<b>41</b>
TSB Models.....	41
TSC Models .....	41
<b>Appendix F- Burner Mixture Air Bushing Clearances.....</b>	<b>42</b>
TSB Models.....	42
TSC Models .....	43
<b>Technical Supplement- Chain Maintenance .....</b>	<b>44</b>
Directions to Apply Italforni USA Approved Oven Chain Lubricant.....	44

<b>FOR SERVICE .....</b>	<b>45</b>
IN NORTH AMERICA.....	45
OUTSIDE NORTH AMERICA.....	45

# Attention!

**THIS MANUAL PROVIDES IMPORTANT SAFETY INSTRUCTIONS AS WELL AS INSTALLATION AND OPERATION GUIDELINES. ALL OPERATORS MUST READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT.**

## **DANGER**

- ***DO NOT*** work around the conveyor belt with long hair, loose clothing, or dangling jewelry. Getting caught in the belt can result in serious injuries.
- ***DO NOT*** store or use gasoline or other flammable substances in the vicinity of equipment or any other associated appliance.
- ***DO NOT*** spray aerosols in the vicinity of this equipment while it is in operation.
- ***DO NOT*** attempt to operate the unit if the power supply cord appears to be damaged. Contact a service agent or electrician for repair of the system.
- ***DO NOT*** use parchment paper when placing food products on the belt! Use of such materials can cause fire outbreak.



## WARNINGS

- *Improper installation, adjustment, alteration, service, or maintenance can cause equipment damage, injury, or even death. Read the installation, operating, and maintenance instructions thoroughly before proceeding.*
- *This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use the appliance safely. Your children should be supervised to ensure that they do not play with or around the appliance.*



## NOTES

- *Operate this Oven only on an approved oven support.*
- *Surrounding temperature of this equipment must not exceed 95°F/35° C.*
- *Do not disconnect the power supply as the fans may remain in operation even when the equipment is not functioning.*



## Additional Instructions

- Obtain necessary instructions about handling gas leakage, from the Gas Providers and display the same in appropriate areas.
- Install the equipment in a place where adequate ventilation and air current is available. Follow the instructions provided by the ventilation hood manufacturer and inspect/clean the hood periodically.
- Keep the equipment at a safe distance from walls and inflammable materials. Adequate clearances are a minimum of 5 ½ inches around the oven. For more information, see [Typical Installation](#) section.
- Adequate clearance for air openings to the combustion control chamber on the right side of the Oven is required. - Do not obstruct the ventilation holes in the right side of the oven.
- Use the gas/electricity that matches with the specifications plate on the equipment to operate the Oven.
- Electrical power is required to operate the power burner and to flow gas through the burner.
- ***Keep this manual handy and safe for future use.***
- ***If you find the equipment to be malfunctioning, contact the nearest authorized service center or the manufacturer immediately.***
- ***The Manufacturer's Warranty for your oven begins from the day that the oven is installed or on the 30<sup>th</sup> day after it has been shipped, whichever date is earlier, and will continue for twelve (12) months. You can find more information on extended coverage and what actions can void your warranty at [www.italforniusa.com/warranty-italforni-ovens](http://www.italforniusa.com/warranty-italforni-ovens).***



# Introduction

The Tunnel Ovens are part of the conveyor belt oven series and are specifically designed for automatic baking of pizza, bread, biscuits, and related products. Baking can be performed either directly on the refractory stones or using suitable baking trays or molds. These Tunnel Ovens can also be included in any automatic production lines.

---

**Caution:** *Improper use of the oven and any attempt to dismantle or modify the equipment can lead to accidents and loss of warranty coverage or denial of warranty claims! ITALFORNI USA and ITALFORNI Pesaro s.r.l. shall not be responsible for any such damages to persons or property that may have caused by such tampering, including but not limited to the following:*

---

- Improper use of the Oven by untrained staff.
- Improper or sub-standard installation.
- Not complying with the laws, in the country of use.
- Not performing or incorrect routine maintenance.
- Usage of duplicate or unapproved spare parts.
- Not following the safety instructions completely.
- Not registering the equipment.

---

**Note:** *You can register the equipment by following [www.italforniusa.com/register-your-product](http://www.italforniusa.com/register-your-product).*

---

Our TSB and TSC model conveyor ovens carry the ETL symbol issued by an authorized agency, entrusted with and responsible for assessing compliance with the essential requirements set out by the gas Directive **ANSI Z83.11/ CSA 1.8** and **NSF 4-2009**. The oven or the quality of the production system is subject to periodic monitoring through inspection checks in order to ensure their adherence with the type of certificate as stated in the aforementioned Directives.

The appliance must be installed in accordance with the local guidance codes, in charge of governing the installation of gas/electric appliances for collective use with the accessories. The installation must also follow the adaptations mandated by the county of use as described in the respective usage and maintenance manuals.

More precisely, the oven must be installed on an approved stand or surface which is perfectly horizontal in a room with sufficient ventilation and must be used by trained staff only. The oven must be placed under a suitable extractor hood in order to exhaust the cooking vapors and combustion fumes outdoors.

The oven is equipped with two atmospheric burners. The cooking temperature can be programmed by two digital displays on the control panel. Once the preset temperature is reached, two modulating valves will control the burner flame (up or down) to maintain that temperature.

If the burner does not ignite, a warning light will turn on. You can restart the burner by pressing the Red Ignition Button after 30 seconds. In case of excessive or irregular heating in the cooking chamber, a thermostat with automatic re-enabling is triggered and the excess temperature warning light on the control panel is turned on to indicate the irregularity.

## General Warnings

Read this booklet carefully as it provides the required directions for safely operating and maintaining the oven. The purpose of this manual is to alert the operators about the instructions and basic principles for ensuring their safety and for improving the equipment life.



---

**Note:** *Ensure that you read this manual completely, before allowing the authorized personnel to service/perform maintenance activities on the equipment.*

---

You also need to ensure that this booklet is made available with the oven for future reference. In case the oven is sold or transferred, make sure that the booklet is also handed over, so that the new user can be informed of its operation and the safety measures. This manual should be kept in a safe place which is dry and can be quickly accessed for reference, as required.

If this manual is not in a usable condition, you can request a replacement by writing to ITALFORNI USA ([support@italforniusa.com](mailto:support@italforniusa.com)).

This product is carefully packed in a durable wooden/carton crate and is bubble wrapped to protect it from knocks, humidity, and damage during transportation.

However, we advise you to check the packaging upon delivery for any signs of damage. In case you find the package in damaged condition, immediately bring it to the attention of the delivery person and notate the damage clearly and concisely on the delivery receipt. While unpacking the appliance, check if any of the components are damaged. In such cases DO NOT use the appliance. Contact ITALFORNI USA ([support@italforniusa.com](mailto:support@italforniusa.com)) for further assistance.



---

**Note:** Perform periodical service of the equipment in accordance with the governing local codes.

---



This oven is intended only for automatic baking of pizza, bread, biscuits, and related products. Any other material must not be placed in the oven unless it is placed in a suitable oven friendly container. Any other use of the equipment is considered improper. The appliance is intended for collective and professional use and must be operated by trained staff.

Service, conversion to alternate energy source, installation, and functioning inspection must only be performed by qualified professionals.

Every time the equipment parts are replaced or mechanisms are adjusted, ensure that service and safety panels are reinstalled to protect the equipment from exposure, tampering, or damage.



Ensure that you contact an authorized service center and always insist on genuine Italforni spare parts.




The following symbol indicates “hot surface”. Avoid direct contact with such surfaces.



When the appliance reaches its end of life (EOL), all the parts and components must be disposed of separately - and properly. Ensure that you divide different types of materials that are used to create the appliance. These include stainless steel parts, thermal insulation in ceramic fiber, refractory tiles, cables, and other electric devices. Disposal of such materials is regulated by law and may be subject to penalties if these parts are not disposed as regulated as that may pollute the environment and may be hazardous.

## Technical Data Plate

The Technical Data Plate (depicted in the following figure) is located on the body of the oven and contains the voltage rating as well as all other important information necessary for installation.

		ITALFORNI Pesaro s.r.l. VIA DELL'INDUSTRIA, 130 LOC.CHIUSA DI GINESTRETO, 61122 PESARO (PU), ITALY																								
		Mod : TSB GAS																								
S/N: <b>123456</b>		Date: <b>00/00/2050</b>																								
Input Rating (Natural gas): <b>xxxxxx</b> btu/hr		Input Rating (Propane gas): <b>xxxxxx</b> btu/hr																								
Electrical Rating:		injector gas pressure ( inWC )																								
Volt ac	<b>110</b>	Phase	<b>1</b>	<table border="1"> <thead> <tr> <th rowspan="2">orifice size</th> <th colspan="2">TOP</th> <th colspan="2">BOTTOM</th> </tr> <tr> <th>min.</th> <th>max.</th> <th>min.</th> <th>max.</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Natural gas (G20)</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Propane gas (G31)</td> </tr> </tbody> </table>		orifice size	TOP		BOTTOM		min.	max.	min.	max.						Natural gas (G20)						Propane gas (G31)
orifice size	TOP		BOTTOM																							
	min.	max.	min.	max.																						
					Natural gas (G20)																					
					Propane gas (G31)																					
Hz	<b>60</b>	Amp.	<b>XX</b>																							
		Watt	<b>XXXX</b>																							
CAS connection pressure: NG (G20) / PG (G31)																										
POUR VOTRE SECURITE CONSULTER LES INSTRUCTIONS D'INSTALLATION POUR LA PROCEDURE DE CONVERSION PREVUE POUR AUTRE CHOSE QUE USAGE DOMESTIQUE ANSI Z83.11 -CSA 1.8- (2016)																										
FOR YOUR SAFETY REFER TO INSTALLATION INSTRUCTIONS FOR CONVERSION PROCEDURE INTENDED FOR OTHER THAN HOUSEHOLD USE ANSI Z83.11 -CSA 1.8- (2016)																										

This is a sample Technical Data Plate. Refer to [Appendix A](#) for further information.

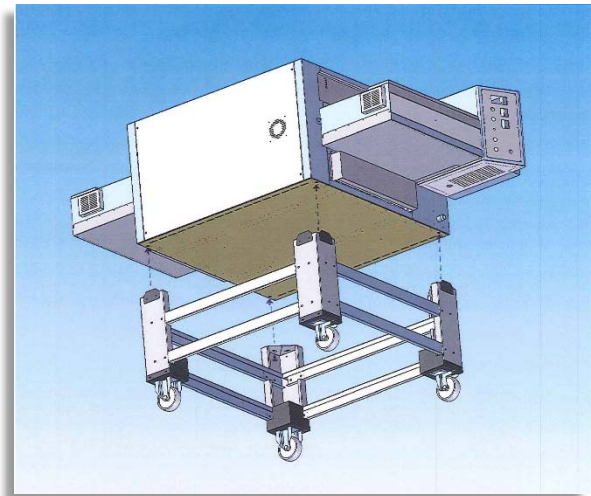
## Support Stand

This figure depicts the support stand in which the Oven can be mounted:



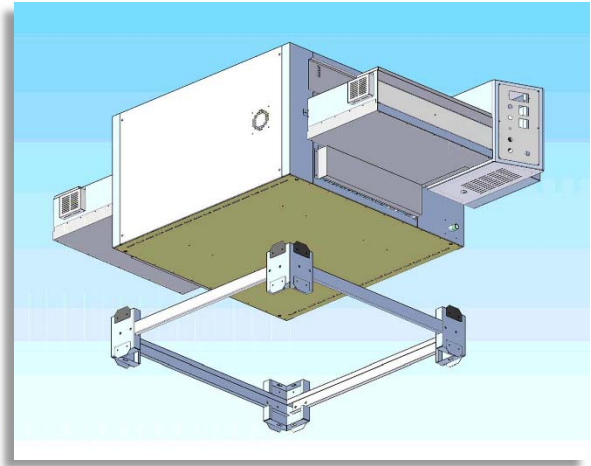
## Stand and Oven Secured by Bolts

This figure depicts the method in which the Support Stand and Oven are attached using the supplied bolts each other.



## Stacking Stand and Oven Secured by Bolts

This figure depicts the method in which the Stacking Stand and Oven and the TOP oven are mounted and secured using supplied bolts each other.



## Restrained Oven on the Wall

The following figure depicts the way in which Oven is restrained on the wall:





# Installation Instructions

*After you receive the equipment and before proceeding with the installation, cross check to ensure that the product along with other accessories is delivered in good condition and no damage has occurred during transit. If you find any sort of damage and/or missing parts, immediately inform the driver of the shipping company and note in the delivery log, and immediately inform the shipper. Note that the shipper cannot process any claims for damage if none was reported during delivery (see [General Warnings](#) section).*

The installation engineer must ensure that commissioning of the equipment is carried out in accordance with the rules in force in the country and state where the oven is used. The installation engineer must be a professional who is qualified to perform the installation activities. Also, the engineer must follow all the safety rules without fail. All extraordinary maintenance (for example: conversion to other types of gas or parts replacement) must be carried out by authorized personnel who are approved by the product manufacturer.

The oven must be installed in a well-ventilated room with permanent ventilation openings to guarantee sufficient flow of combustion air and a healthy workplace.




---

**Caution:** *All gas appliances create some Co2 and therefore the combusted fumes must be discharged outside with the aid of a suitable motorized extractor hood.*

---

Be sure to clean and inspect the ventilation hood as per the ventilation hood manufacturer's instructions. The oven should be positioned horizontal on the stand supplied or on a sufficiently solid and horizontal structure. This must be placed on four base feet, at a distance of not less than 6 inches (150mm) from the rear wall and 40 inches (1000 mm) from the loading and unloading sides. The oven must not be located near flammable walls. For additional instructions and directions on installation and the minimum ventilation diameters, refer to the national laws and directions.




---

**Warning:** *The amount of air needed for combustion must not be obstructed by any objects placed under or around the appliance, especially the side holes and slits.*

---

## Restraint Requirement – Gas Oven(s) On Casters – U.S.

1. The installation shall be made with a gas connector that complies with the Standard for Connectors for Movable Gas Appliances, ANSI Z21.69 latest version, and a quick disconnect device that complies with the Standard for Quick Disconnect Devices for Use with Gas Fuel, ANSI Z21.41 latest version.

**In Canada:** The installation shall be made with gas connectors that comply with Canadian Code CSA 6.16 latest version and quick disconnects complying with Canadian Code CSA 6.9 latest version.

*In the absence of local codes, with the national Fuel Gas Code, ANSI Z223.1/NFPA 54 or the Natural Gas and Propane Installation Code, CSA B149.1, as applicable.*

2. The installation of the restraint must limit the movement of the oven(s) without depending on the connector, then quick disconnect device or its associated piping to limit the oven movement.
3. If the restraint must be disconnected during maintenance or cleaning, it must be reconnected after the oven has been returned to its originally installed position.



---

**Note:** Installation point is the same for single and double stack oven(s).

---



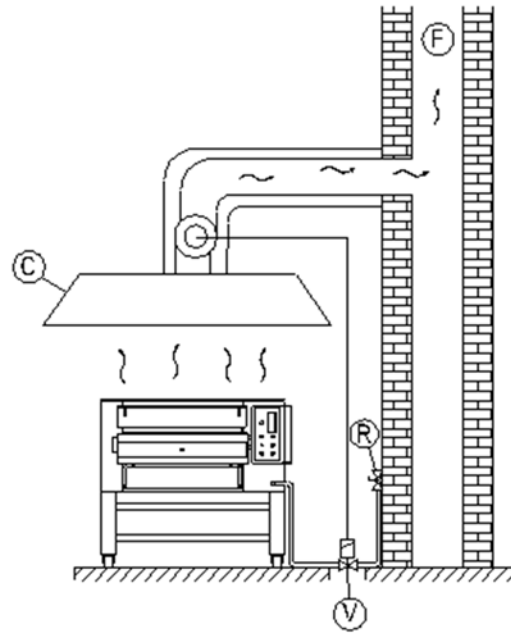
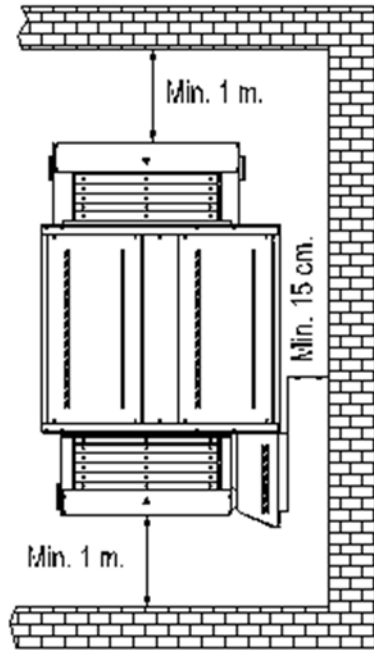
---

**Caution:** When moving this appliance, make sure to disconnect all plugins/outlets, then reconnect upon placement in new location.

---

## Typical Installation

The following figure depicts the typical installation of this device. It clearly displays the distance the equipment should have from the walls:



Key	Description
C	Extractor hood
F	Chimney
R	Gas Valve On/ Off
V	Interlocked hood cut off valve (optional)

## Gas Connection

Before installation, make sure that the oven is set up for the available type of gas. For expert advice, you may contact the manufacturer's technical service department. Also, see the section [Conversion to Other Types of Gas](#), for further details.

The connection to the gas supply must be performed by adhering to the installation mandates. The connection should be done using an approved rigid/flexible pipe, with diameter in proportion to the

appliance power rating and to the length of travel. Ensure that the pipe does not pass through hot areas and is not twisted or stretched. Fit an approved shutoff valve between the gas supply and the oven, in such a way that it is readily accessible. Once the appliance is installed, perform a leak test on the whole gas circuit, using a leak searching spray or other non-corrosive foaming substances (do not use naked flames for this operation). The Appliance must be isolated from the gas supply piping system by closing all other manual shutoff valves during any testing of the gas supply avoid pressure fluctuation caused by other appliances attached to the same supply line.

The oven is equipped with a  $\frac{3}{4}$  inch gas connector.

## Electrical Connection

It is essential for the appliance to be properly grounded in accordance with local codes. In the absence of local codes it should follow the National Electrical Code - ANSI/NFPA 70 or the Canadian Electrical Code - CSAC22.2, as applicable.

### **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. Do not cut or remove the grounding prong from this plug.*

### **AVERTISSEMENT**

#### *Mise à la terre*

*Cet appareil est pourvu d'une fiche à trois broches dont une mise à la terre assurant une protection contre les chocs électriques. La prise dans laquelle elle est branchée doit être correctement mise à la terre. Ne pas couper ni enlever la broche de mise à la terre de la fiche.*

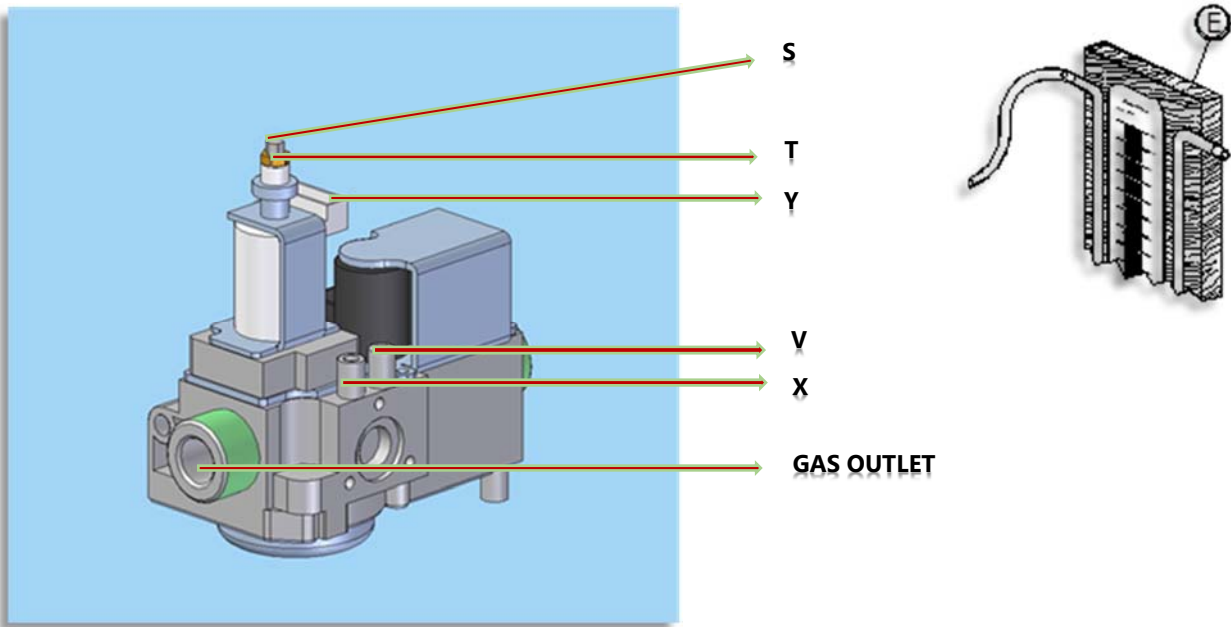
# Commissioning

## Checking the Gas Supply Pressure

Ensure that the type of gas available matches the Technical Data Plate. If any deviation is found, see the section [Conversion to Other Types of Gas](#), for further information/actions.

During its operation, the gas supply pressure is measured using a pressure gauge for liquids (for example a “U” type pressure gauge or a digital Manometer). To carry out this check, perform the following procedure:

1. Access the gas valve by removing the large side panel to the right of the control panel from the oven.
2. Connect the pressure gauge using your pressure measuring device, “E” to the INLET pressure “V” of the gas valve after removing the relative screws.



Key	Description
E	Pressure gauge - Manometer
S	Minimum pressure regulator screw
T	Maximum pressure regulator screw

<b>V</b>	Inlet gas pressure plug
<b>X</b>	Outlet gas pressure plug
<b>Y</b>	AMP terminals

3. Measure the inlet pressure.

If this is not within the range of values as in the following table, the oven **MUST NOT** be operated. Inform the gas supply agency immediately.

Type of Gas	Inlet Gas Pressure (mbar)			Inlet Gas Pressure (inch H <sub>2</sub> O column)		
	Normal	Minimum	Maximum	Normal	Minimum	Maximum
Natural Gas G20	20	17	25	8.02	6.82	10.3
Liquid Gas G30/G31	30/37	20/25	35/45	12.04/14.85	8.02/10.03	14.05/18.06

The outlet pressure “X” must be checked and adjusted using the screw “S” and “T” underneath the cap to adjust to the values for your specific model oven. For more information refer to [Appendix D](#) and [Appendix E](#).

The maximum pressure setting must be initially adjusted to ensure that burner will safely light up, then the minimum pressure setting can be adjusted.

Any adjustment of maximum pressure influences the minimum pressure setting. Therefore, a minimum pressure setting should always be readjusted after.

## Conversion to Other Types of Gas

All the required gas spare parts are supplied with the oven. If any additional spare parts are required, contact the manufacturer’s technical service department. Conversion must be carried out by a qualified engineer. To replace the two main injectors and the primary air adjustment on the two brass bushings, refer to the technical data in the following table.

Adjust the outlet pressure from the valve by following the procedure described in the [Checking the Gas Supply Pressure](#) section.



**Note:** When converting to LPG, set the air shutters as indicated in the following table.



**Warning:** Carry out this operation only after closing the gas shutoff valve, located upstream of the oven and disconnecting the oven electrical power supply. Check that the diameter of the injector is stamped on it in 1/100 of a mm.

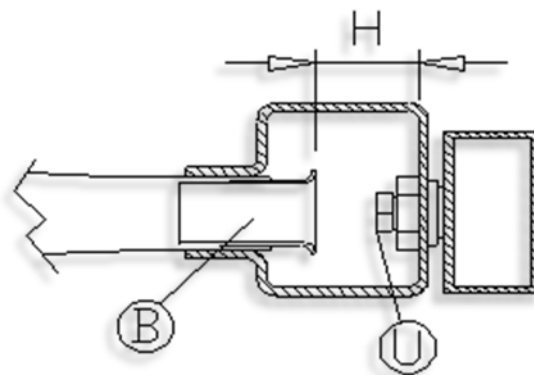
Perform the following operations in series:

- To access the devices to make any adjustment or replacement, remove the side oven panel (on the control panel side) after removing the four screws and disconnecting the electrical connections to the cooling fan.
- Remove the valve protection box by removing the screws.
- With a suitable tool, loosen and replace the two injectors “U” with the correct ones for the gas supply.
- Loosen the screws and regulate the air bushings “B” to the correct distance H, according to the settings in [Appendix F](#). Then tighten the screw and seal it with paint.
- Fix the front oven panel by following this procedure in reverse order.

**Key:**

**B** = Primary air bushing

**U** = Injector



Refer to [Burner Assembly Configuration Diagram](#) for the location of each burner.

**Warning** - After each conversion to new gas, perform the following:

- Apply a permanent sticker bearing the data of the new installation, on the plate.
- Perform the appropriate gas circuit leakage tests.
  - Check operation by controlling the following:
  - Regular ignition of the burner branches, the stability and appearance of the flames.
  - That the flame remains stable.

## **Attention!**

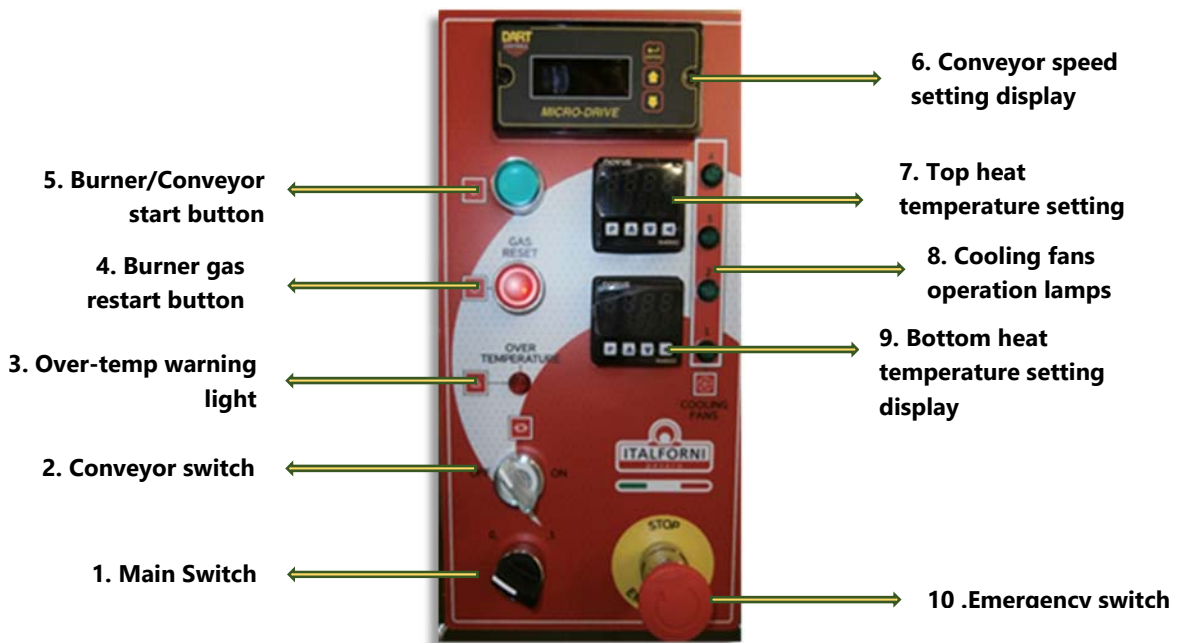
- This gas oven is intended for commercial use. It must only be used by trained personnel.
- The customer is responsible for its correct use and regular cleaning.
- All installation, commissioning, and maintenance operations must be carried out by the manufacturer's authorized installers, in compliance with current national codes and regulations.
- We recommend having the oven checked periodically by a specialized technician to keep it in perfect working order.



## Commissioning

- Before commissioning the oven, clean it thoroughly to remove manufacturing grease.
- Smoke during first operation and after each lubing process is normal.
- Check to ensure that the air flow to the burner is not obstructed and that the space is properly ventilated. Make sure that the extractor hood and chimney pipe work properly.
- Monitor the oven while it is working. Pay attention to hot parts and moving parts.
- Do not obstruct any of the oven loading or unloading bulkheads. A minimum height of the bulkheads from the tiles has been established to make sure that combustion fumes are exhausted correctly while the burner is running.

## Initial Start-up



- Open the gas cutoff valve and connect power.
- Turn the main switch “1” to the on position (1).
- Turn the belt switch “2” to the on position.

- Set the cooking temperature on the digital displays “7-8” by pressing + or -. Temperature can be set as high as 850 °F (454°C)\*.
- Press the green start button “5” which starts the belt moving and switches the burner on.
- Set the belt speed display “6” at the desired speed in (**min:seconds**).
- If the burner fails to ignite, the ignition controller will go into lock mode and the red warning light on the button “4” switches on. Wait for 30 seconds and press the button to restart the ignition procedure. If the retrieval fails, try to swap the polarity of the electric plug. If the problem persists, contact the manufacturer's technical service ([ItalforniUSA.com](http://ItalforniUSA.com)).
- If the over-temp warning light “3” switches on, it means that the cooking chamber is too hot and there may be a components failure. In this case, the safety thermostat shuts down ignition for safety and in order to avoid damage to other components. If the problem continues, consult the factory technical service department ([ItalforniUSA.com](http://ItalforniUSA.com))
- Where applicable, if one of the cooling fans operation lamps “8” switch off, it means that the relative numbered fan has stopped working. Check the wiring connection and if the problem persists, contact the manufacturer's technical service for a replacement ([ItalforniUSA.com](http://ItalforniUSA.com)).

*\*Optimum temperature range for the TS gas ovens are above 600°F (315°C). Furthermore, as in any oven, the temperature difference between the top and the bottom settings should not exceed 100°F (38°C) as the heat from one burner will affect the opposing side.*

## Turn off the Oven

- At the end of the work day, turn the main switch “1” to the off position. The cooling fans may continue to run to cool down internal components.
- Close the gas shutoff valve upstream of the oven.

## Safety Devices

- The oven is equipped with an automatic reset safety thermostat which is triggered if the cooking chamber is too hot. Then the warning light “OVER TEMPERATURE” on the control panel turns on. In this case, contact technical service to resolve the problem.

- The control panel has a red emergency switch “10” which is easy to reach in case of an emergency. Press it to abruptly stop the oven. To unlock the emergency button and allow the oven ignition, turn the red head button to disengage state.
- In case of overcurrent or short circuits, the electric system is protected by series of 6 A and 2 A fuses.

## Flame Control

The two burners have each a flame detection electrode connected to two independent control units. Gas flow is interrupted if the flame goes out on one of the two electrodes.

## Residual Risks

Some parts of the oven, including the two crumb trays and the frame around the stone conveyor reach high temperatures, including the parts marked with the following symbol:



Do not touch these surfaces. If they need to be cleaned, do it after the appliance has cooled down.

The oven has some moving parts such as the conveyor belt and relative gears. Do not bring your hands or work tools close to the tiles in the area where they change direction (especially on the food loading and unloading sides). Avoid wearing long jewelry or articles of clothing that may get caught in the conveyor mechanism.



---

***Alert! IF GAS ODORS ARE DETECTED, IMMEDIATELY TURN OFF THE MAIN GAS SUPPLY AND CONTACT ITALFORNI USA TECHNICAL DEPARTMENT OR YOUR LOCAL GAS COMPANY.***

---

# Cleaning and Maintenance

## Maintenance

Although this oven has been designed to be as trouble-free as possible, periodic maintenance is essential to maintain optimal performance. It is necessary to keep the motors, fans, and electronic controls free of dirt, dust, and other debris to ensure proper cooling. Overheating is detrimental to the life of all components mentioned.

The intervals for periodic cleaning may vary depending on the environment in which the oven is operating. You must discuss the need for periodic maintenance with your staff and Authorized Service Agency to establish a proper program. If there are any questions that the service agency cannot answer, contact Italforni Technical Service Department at **(424) 364-0075** / or email: [support@italforniusa.com](mailto:support@italforniusa.com)

## Operator Maintenance

**The conveyor chain must be lubed regularly (see Maintenance Schedule for further details).**

To maintain maximum efficiency of the oven, it is necessary to keep it clean. All ventilation louvers on the oven must be cleaned regularly. Oven usage and type of product will determine the frequency of cleaning. The conveyor drive and its bearings, should be checked during the cleaning cycle to see if it has become dry. Stiffness in the conveyor system operation, lack of lubrication, and improper seating of stones will DAMAGE the conveyor drive motor and may result in damage to the chain and stones.

If the oven fails to operate, check the circuit breaker to ensure that it is turned on. Also, check the fuses on the control panel ensure that they are good, before you call the Authorized Service Agency.

The appliance must be checked periodically. We recommend a semi-annual inspection to ensure proper and efficient operation. Maintenance and repair operations must be carried out by authorized and qualified personnel only.

## Cleaning Instructions

When using cleaning solutions, ensure that they meet local and national health standards.

# Maintenance Schedule

## Daily Maintenance

### Stone Cleaning

Clean the conveyor/stones using a stiff-bristle natural brush to remove loose debris and food particles, with a movement in the same direction of the stones from left to right. This operation must be performed frequently throughout the day and at the end of the work day with the oven is turned on, as it is much easier to clean the stones when they are hot. Repeat this throughout the day.

### Oven Cabinet Cleaning

Turn off the oven. Allow the oven to completely cool down. Turn off the electrical supply to the oven or unplug the power cord from the holder. Clean the exterior of the oven using a mild detergent solution and a soft cloth. Always clean in the direction of the steel grain to avoid visible scratches.

### Crumb Drawers Cleaning

Remove, empty, and clean the two crumb drawers daily.

## Required Periodic Maintenance

### Fan Filter Cleaning

At least once a month (more frequent if necessary), remove and clean the fan cover filters using forced air or a vacuum cleaner. You can also use a soft brush or wash the filters under a tap. Dry completely before reinstallation.

### Chain Lubrication

AT LEAST ONCE A WEEK or EVERY 40 Hours of use (whichever occurs first) of operation of the oven, lubricate the conveyor belt chain with the approved food grade lubricants. This operation must be carried out when the oven is cold and is switched on. **USE FACTORY RECOMMENDED ITALFORNI LUBRICANT ONLY.**



---

**Warning:** The oven can be used even if some stones are cracked, as long as no stone parts or rivets are missing. If stone parts or rivets are missing, replace those immediately before using the oven. Using the oven with missing stone parts or rivets affects proper functionality.

---

***Failure to Comply with the Aforementioned Procedures May Void Any and All Warranty Claims.***

## Maintenance Schedule Sticker

On the side of the oven, a sticker is affixed with the required Maintenance Schedule, which has to be performed on regular basis. Ensure that the schedule is carefully followed as it is crucial to the proper operation of the oven.

**Stone Conveyor Oven – MAINTENANCE SCHEDULE**

**CAUTION**

- Never use a water hose, pressure washer, or steam cleaner on ovens.
- Never use metal scrapers, razor blades, steel wool, scouring pads, or any other ferrous abrasives when cleaning ovens.

**Daily Maintenance**

**Stone Cleaning**

- Clean the conveyor/stones using a stiff-bristle natural brush to remove loose debris and food particles, with a movement in the same direction of the stones from left to right. This operation must be repeated throughout the day and at the end of the work day with the oven still on.

**Oven exterior**

- Turn off the oven. Allow the oven to completely cool down. Turn off the electrical supply to the oven or unplug the power cord from the receptacle. Clean the exterior of the oven using a mild detergent solution and a soft cloth. Always clean in the direction of the steel grain to avoid visible scratches.

**Crumb drawer cleaning**

- Remove, empty and clean the two crumb drawers daily.

**Periodic Maintenance**

**Fan filter cleaning**

- At least once a month (more if necessary), remove and clean the fan cover filters using vacuum or forced air. You can also use a soft brush, or a vacuum cleaner or wash the filters under running water. Dry completely before reinstallation.

**Chain lubrication**

Every 40 hours of operation of the oven, lube the conveyor belt chain using approved ITALFORNI Lubricant. This operation must be carried out when the oven is cold and has just been switched on **USING APPROVED ITALFORNI LUBRICANT ONLY**. Please refer to the owner's manual for full instructions.

---

**The oven can be used even if some stones are cracked, providing that no stone parts or rivets are missing. If stone parts or rivets are missing, replace immediately before using the oven. Using the oven with missing stone parts or rivets prevents proper functionality.**

---

**FAILURE TO COMPLY WITH ALL OF THE PROCEDURES DETAILED ABOVE MAY VOID ANY AND ALL WARRANTY CLAIMS.**

ITALFORNI PESARO

## Instructions for Replacing Components



**Warning** – Perform this operation only after closing the gas shutoff valve located upstream of the oven and disconnecting the oven electrical power supply. Replacements must be carried out by an authorized and professionally trained installer.

### A. Gas Solenoid Valve:

- Remove the side panel on the control panel side by removing the four screws.
- Disconnect the electrical connections on the gas solenoid valve and on the electrical control unit.
- Disconnect the inlet and outlet connections on the gas valve and remove the inlet and outlet gas pipes.
- Disconnect the electrical control unit from the valve contacts and set aside.
- Refit the various parts by following this procedure in reverse order.

### B. Electric Components of the Control Panel:

- Unscrew the four screws to remove the outside panel of the board.
- Disconnect the respective wiring and then rewire them in the same order to replace each component.



**Caution:** To replace the safety thermostat and its probe, pay attention to the location so it is placed on the specific bracket inside the cooking chamber.

### C. Burner - Ignition and Detection Plugs:

- Remove the four screws to remove the side panel on the control panel side.
- Unscrew the wiring of the ignition plug through the ignition cooling box.
- Remove the ignition cooling box by removing the screws.
- Remove the inside panel by removing the screws to gain access to the burner compartment.
- Unscrew the fittings which engage the pipes near the burner.

- Disconnect the electrical connections on the gas solenoid valve and on the electrical control unit.
- Disconnect the gas pipe from the front of the oven and remove it.
- Unscrew the burner from its seat by removing the middle screw.
- Carefully extract the burner from the compartment it is inserted in.
- Disconnect the wiring of the electrodes on both sides of the burner.



**Caution:** One of the two pairs of plugs consists of an ignition plug and a flame detection plug; DO NOT swap their wiring. Be careful not to confuse the detection and the detection cables. Mark as necessary before disconnecting.

- Replace faulty components.
- Refit the various parts by following this procedure in reverse order.



**Note:** Pay attention when replacing the gas pipes or pipe fittings: conical head mechanical couplings or appropriate gas sealant guarantee the tightness of the circuit; refer to the gas circuit diagram at the end of this manual.

#### D. Refractory Tiles:

Broken or damaged Refractory Tiles can be removed and replaced by taking out the four rivets (two on each side) and applying new ones.





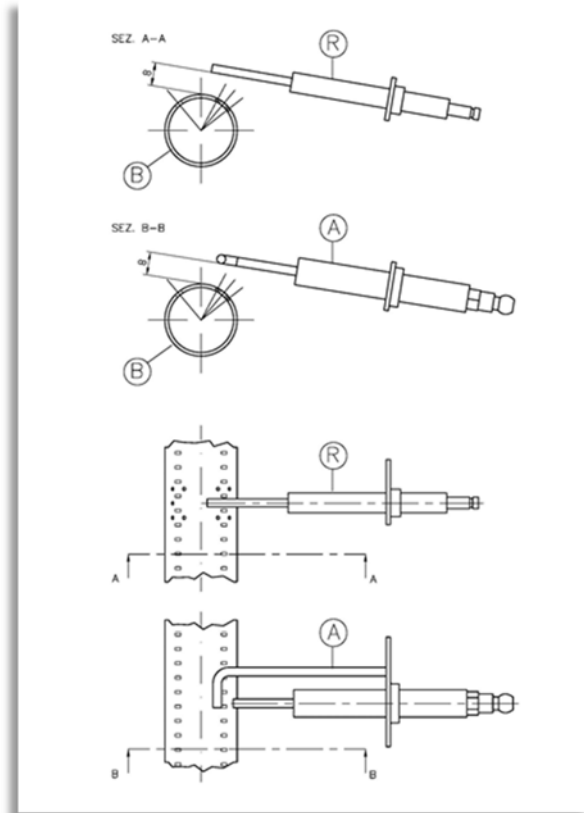
## Troubleshooting

- The control panel does not switch on. Possible causes:
  - Check Power
  - Check if the Emergency Switch is engaged.
- The burner does not switch on or does not stay on. Possible causes:
  - The ignition plug is not secured properly, is in the wrong position, or the wire is damaged.
  - Power cable polarity is swapped. Swap neutral and phase by turning the plug around.
  - The gas valve is faulty.
  - Insufficient gas pressure or air pockets in the line.
  - The gas pressure regulator on the valve is not set properly.
  - The gas injectors are clogged.
  - The burner flame outlets are clogged.
  - The Thermocouple is faulty.
  - Wires are detached.
- Incorrect temperature adjustment. Possible causes:
  - The Thermocouple is faulty or the probe is out of place.
  - The electronic temperature programming control unit is faulty.

**Ignition and flame sensing electrodes**

**Key:**

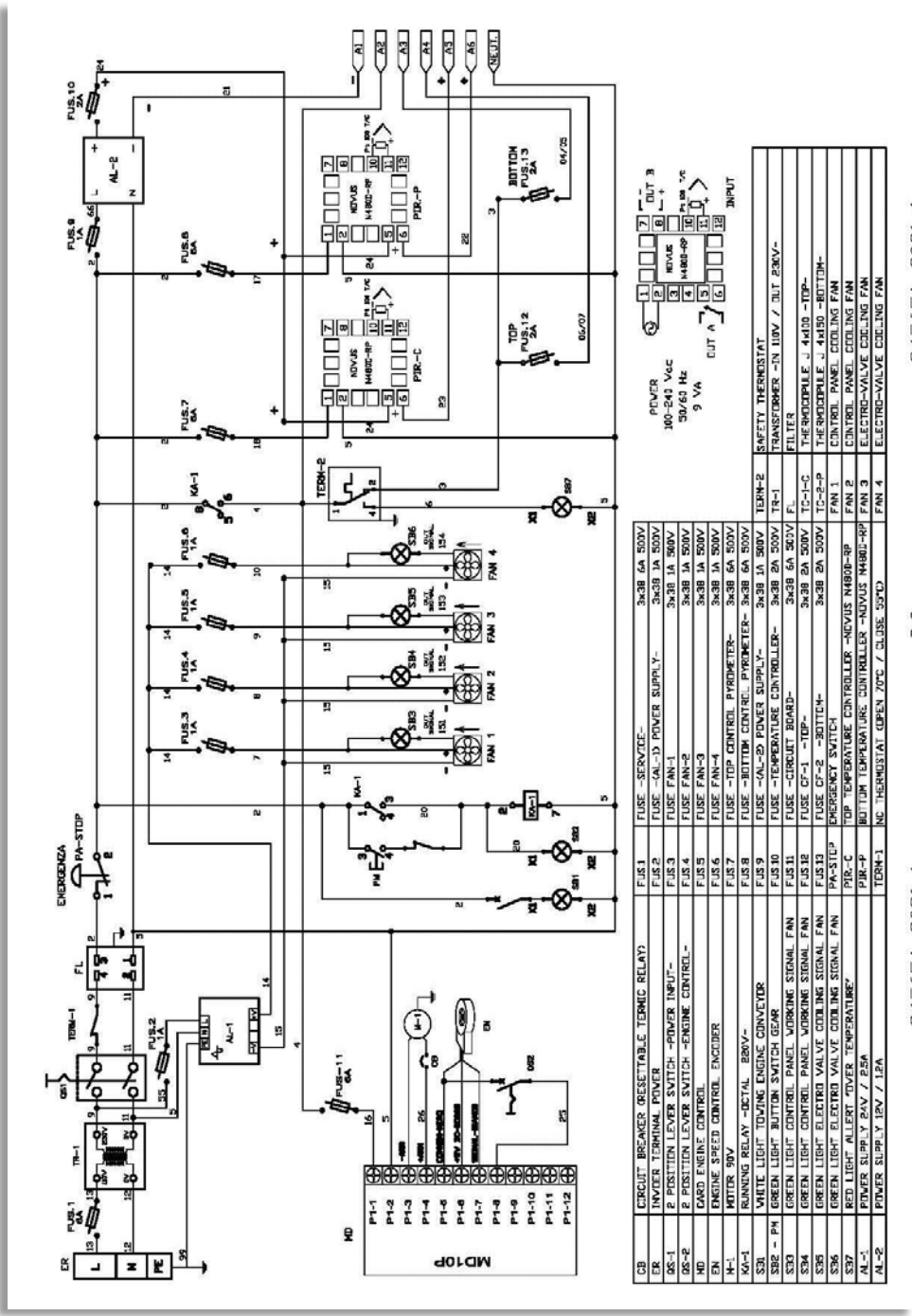
- A - Ignition electrode
- B - Burner
- R - Flame sensing electrode

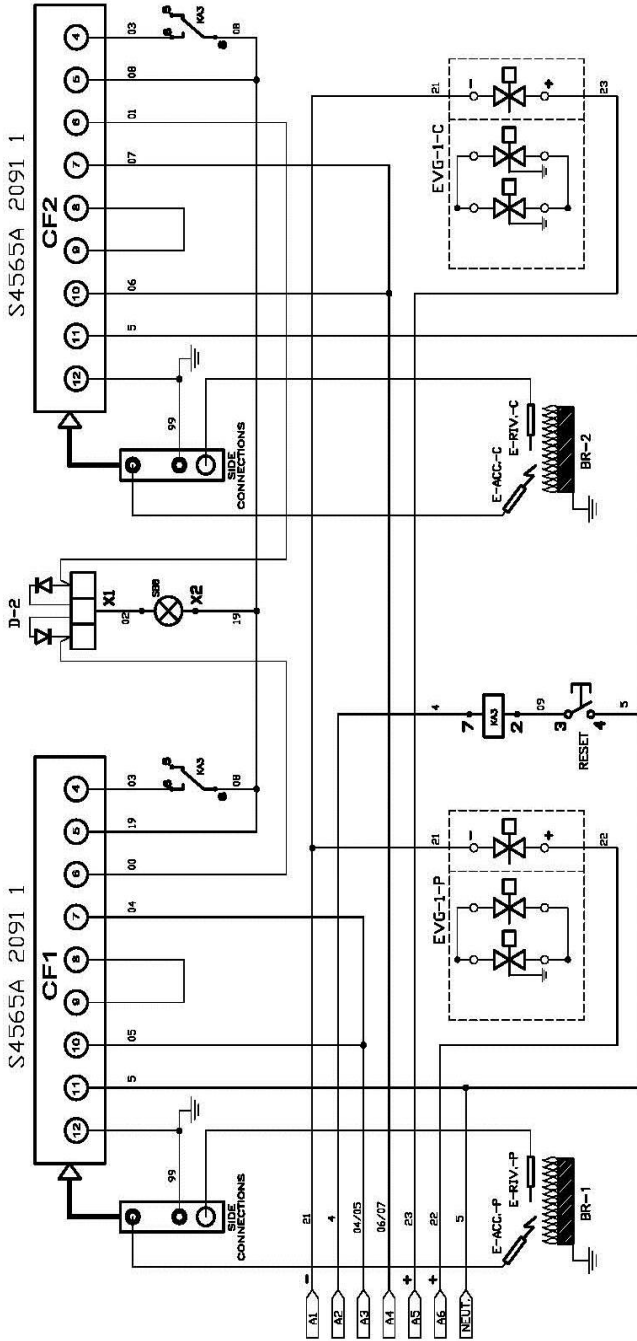


## **Notes**

# Diagrams

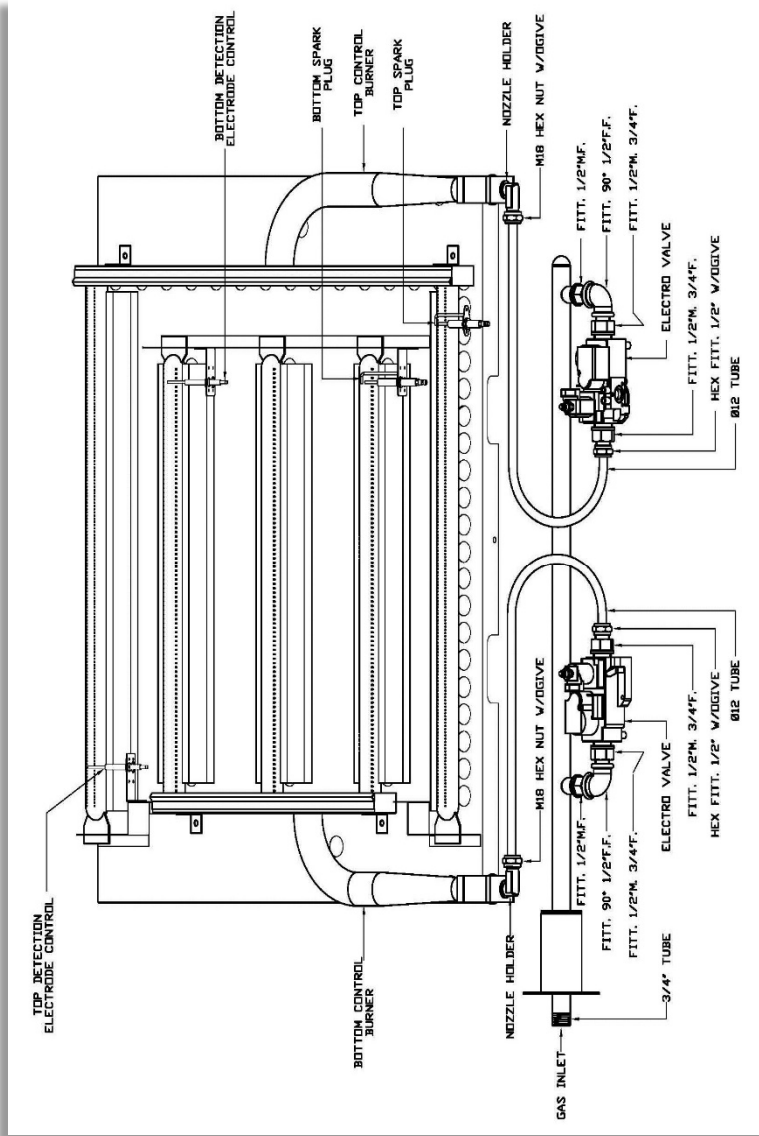
## Wiring Diagram





KA-3	BURNER RESET RELAY -DIGITAL- 2EDV-
SBB	RED LIGHT ALLERT BLOCK BURNER
EVG-1-P	BOTTOM GAS VALVE CONTROL
EVG-1-C	TOP GAS VALVE CONTROL
BR-1	BOTTOM CONTROL BURNER
BR-2	TOP CONTROL BURNER
RESET	RED LIGHT BURNER BURNERS RESET
CF-1	BOTTOM BURNER IGNITION CONTROL
CF-2	TOP BURNER IGNITION CONTROL
D-2	DIPSES POWER BURNER BLOCK INDICATOR
E-RV-P	BOTTOM FLAME DETECTOR ELECTRODE
E-RV-C	TOP FLAME DETECTOR ELECTRODE
E-ACC-P	BOTTOM BURNER IGNITION ELECTRODE
E-ACC-C	TOP BURNER IGNITION ELECTRODE

# Burner Assembly Configuration Diagram





**Note:** Threaded couplings are secured with sealant



# Appendix A - The Specs Plates for Each Model

The following diagrams provides you the technical specifications of various models of this Oven:

## TSB Models

		ITALFORNI Pesaro s.r.l. VIA DELL'INDUSTRIA, 130 LOC.CHIUSA DI GINESTRETO, 61122 PESARO (PU), ITALY								
Mod : TSB GAS										
S/N: <input type="text"/>		Date: <input type="text"/>								
Input Rating (Natural gas): 120,000 btu/hr Input Rating (Propane gas): 120,000 btu/hr										
Electrical Rating:		orifice size	injector gas pressure ( inWC )							
Volt ac	<input type="text" value="110"/>		Phase	<input type="text" value="1"/>	TOP					
Hz	<input type="text" value="60"/>	Amp.	<input type="text" value="2.2"/>	min.	max.	min.		max.		
Watt		<input type="text" value="120"/>	330		3.21	6.0		2.0	5.6	Natural gas (G20)
			230		2.4	10.3		2.4	10.3	Propane gas (G31)
GAS connection pressure: NG (G20) 7.0inWC / PG (G31) 11.0inWC										
POUR VOTRE SECURITE CONSULTER LES INSTRUCTIONS D'INSTALLATION POUR LA PROCEDURE DE CONVERSION PREVUE POUR AUTRE CHOSE QUE USAGE DOMESTIQUE ANSI Z83.11 -CSA 1.8- (2016)										
FOR YOUR SAFETY REFER TO INSTALLATION INSTRUCTIONS FOR CONVERSION PROCEDURE INTENDED FOR OTHER THAN HOUSEHOLD USE ANSI Z83.11 -CSA 1.8- (2016)										

## TSC Models

		ITALFORNI Pesaro s.r.l. VIA DELL'INDUSTRIA, 130 LOC.CHIUSA DI GINESTRETO, 61122 PESARO (PU), ITALY							
S/N: <input type="text"/>		Mod : TSC GAS Date: <input type="text"/>							
Input Rating (Natural gas): 130,000 btu/hr Input Rating (Propane gas): 155,000 btu/hr									
Electrical Rating:		orifice size		injector gas pressure ( inWC )					
Volt ac	<input type="text" value="110"/>	Phase	<input type="text" value="1"/>	TOP		BOTTOM			
Hz	<input type="text" value="60"/>	Amp.	<input type="text" value="2.2"/>	min.	max.	min.	max.		
		Watt	<input type="text" value="120"/>	355 / 355	3.21	6.0	2.0		5.6
				260 / 250	5.2	10.3	5.2		10.3
				GAS connection pressure: NG (G20) 7.0inWC / PG (G31) 11.0inWC					
POUR VOTRE SECURITE CONSULTER LES INSTRUCTIONS D'INSTALLATION POUR LA PROCEDURE DE CONVERSION PREVUE POUR AUTRE CHOSE QUE USAGE DOMESTIQUE ANSI Z83.11 -CSA 1.8- (2016)									
FOR YOUR SAFETY REFER TO INSTALLATION INSTRUCTIONS FOR CONVERSION PROCEDURE INTENDED FOR OTHER THAN HOUSEHOLD USE ANSI Z83.11 -CSA 1.8- (2016)									

\* Refer to [Appendix B](#) for the location of each burner.

**Notice:** In order to be able to service this appliance, it must be installed with the caters supplied, a connector complying with ANSI Z 21.69 • CSA 6.16 and a quick-disconnect device complying with ANSI Z21.41 • CSA 6.9. It must also be installed with restraining means to guard against transmission of strain to the connector as specified in the appliance manufacturer's instructions.

**Avis:** Pouvoir être entretenu, cet appareil doit être équipé des roulettes fournies, d'un connecteur conforme à la norme ANSI Z21.69 • CGA 6.16 et d'un connecteur à branchement rapide conforme à la norme ANSI Z21.41 • CGA 6.9. Il doit aussi comporter un dispositif empêchant que la traction soit transmise au connector, comme il est spécifié dans les instructions du fabricant.



# Appendix B – Technical Specifications

The following tables provide you the technical specifications of various models of this Oven:

## TSB Models

External dimensions L x D x H	(46.5 x 83.1 x 26 in.) 1170 x 2110 x 661 mm
Stand dimensions L x D x H	(45.3 x 44.5 x 24.5 in.) 1150 x 1130 x 622 mm
Total nominal thermal capacity	(120.000 BTU) G20 / G31 : 35.0 kW
Electrical power rating	300 W
Gas connection	ISO 7-1, 3/4 "
Appliance category	II2H3+
Type of gas installation	B <sub>21</sub>
Electric security class	I
Voltage supply	110 V ~ 50/60Hz
Power lead	H07RN-F 3x1.5 mm <sup>2</sup> / 18 AWG
Gas connection nominal pressure	<b>Propane Gas G31:</b> (11 inWC) 27.4 mbar <b>Natural Gas G20:</b> (7 inWC) 17.4 mbar
Gas pressure at injector	<b>Propane Gas G31:</b> (2.4 inWc) Min.6 mbar (10.3 inWC) Max.25.7 mbar <b>Natural Gas G20:</b> <b>For Top</b> (3.21 in Wc) Min.8 mbar (6.02 inWC) Max.15 mbar <b>For Bottom</b> (2.0 in Wc) Min.5 mbar (5.62 inWC) Max.14 mbar
Gas Consumption calculated with calorific inferior value Hi at 15° and 1013 mbar (59°F & 406 inWC)	<b>G31:</b> (5.54 lbs/hr) 2,514 kg/h <b>G20:</b> (7.39 lbs/hr) 3,353 m <sup>3</sup> /h
Main injector diameter	<b>G31:</b> (0.09 in.) 2 x 230 1/100 mm

	<b>G20:</b> (0.129 in.) 2 x 330 1/100 mm
Primary air bushing setting	<b>G31:</b> (0.70 in.) 2 x 18 mm <b>G20:</b> (0.51 in.) for Top * 1 x 13 mm (0.63 in.) for Bottom * 1 x 16 mm

## TSC Models

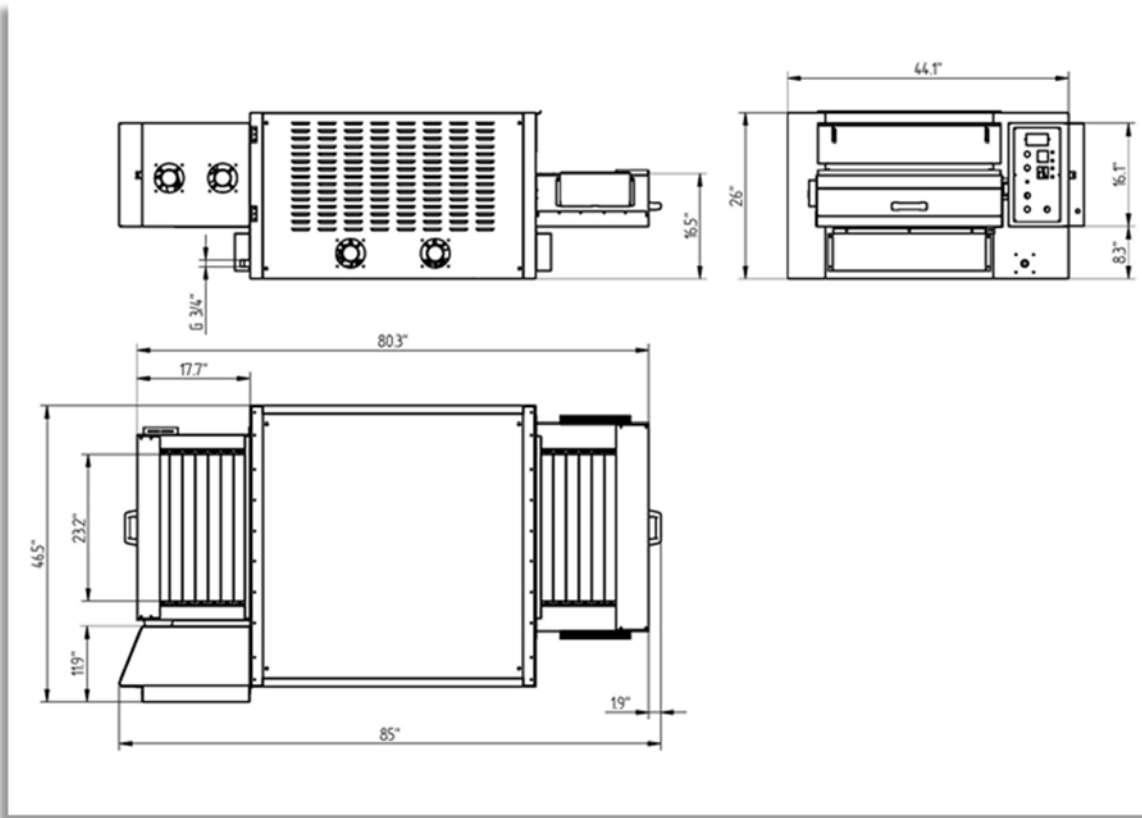
External dimensions L x D x H	(54.5 x 85 x 26 in.)1380 x 2160 x 661 mm
Stand dimensions L x D x H	(53 x 44.5 x 24.5 in.)1350 x 1130 x 622 mm
Total nominal thermal capacity	(130.000 BTU)Natural Gas [G20 : 38.0 kW] (155.000 BTU) Propane Gas [G31 : 45.4 kW]
Electrical power rating	300 W
Gas connection	ISO 7-1, 3/4"
Type of gas installation	B <sub>21</sub>
Electric security class	I
Voltage supply	110V ~ 50/60Hz
Power lead	H07RN-F 3x1.5 mm <sup>2</sup> / 18 AWG
Gas connection nominal pressure (inlet)	<b>Propane Gas G31:</b> (11 inWC) 27.4 mbar <b>Natural Gas G20:</b> (7 inWC) 17.4 mbar
Gas pressure at injector (outlet)	<b>Propane Gas G31:</b> (5.2 inWc) Min.13 mbar (10.3 inWC) Max.25.7 mbar <b>Natural Gas G20:</b> <b>For Top</b> (3.21 in Wc) Min.8 mbar (6.02 inWC) Max.15 mbar <b>For Bottom</b> (2.0 in Wc) Min.5 mbar (5.62 inWC) Max.14 mbar
Gas consumption calculated with calorific inferior value Hi at 15° and 1013 mbar (59°F & 406 inWC)	<b>G31:</b> (7.17 lbs/hr) 3.25 kg/h <b>G20:</b> (7.98 lbs/hr)3.62 m <sup>3</sup> /h

Main injector diameter	<p><b>G31:</b></p> <p style="padding-left: 40px;"><b>For Top</b> (0.102 in.) 1 x 260 1/100 mm</p> <p style="padding-left: 40px;"><b>For Bottom</b> (0.098 in.) 1 x 250 1/100 mm</p> <p><b>G20:</b> (0.14 in.) 2 x 350 1/100 mm</p>
Primary air bushing setting	<p><b>G31:</b> (0.70 in.) 2 x 18 mm</p> <p><b>G20:</b> (0.51 in.) for Top * 1 x 13 mm</p> <p style="padding-left: 40px;">(0.63 in.) for Bottom * 1 x 16 mm</p>

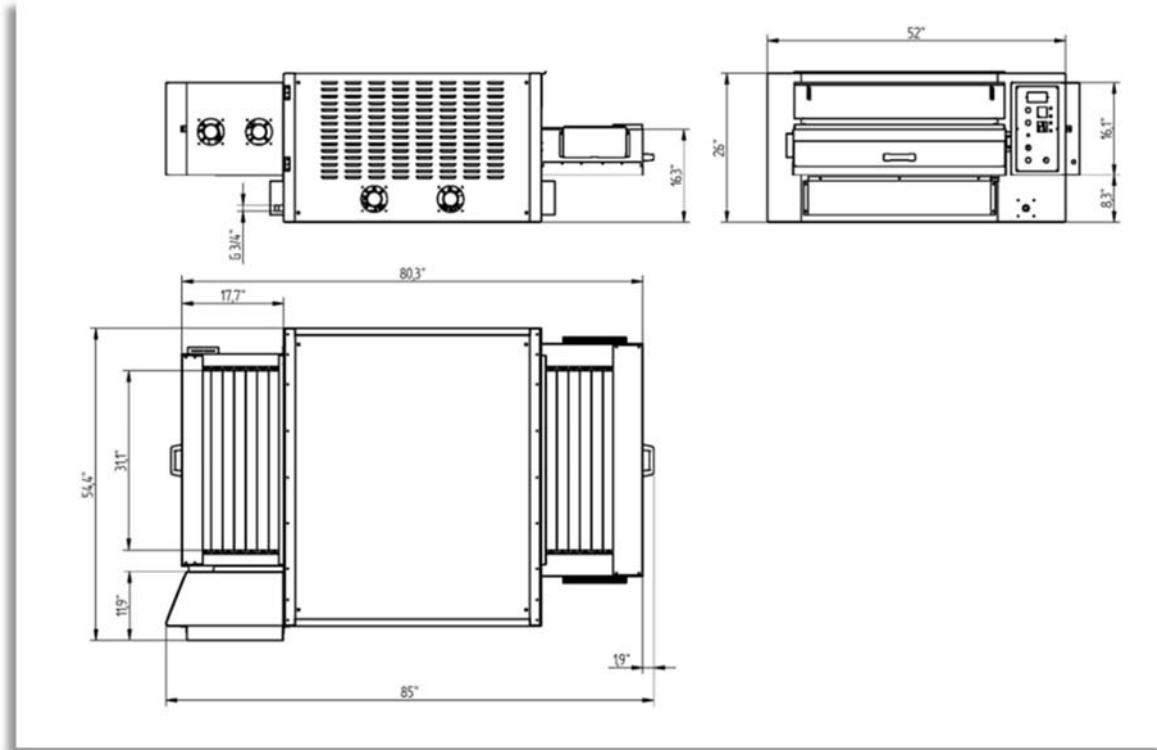
# Appendix C - Views and Overall Dimensions

Following figure depicts various views of the Oven subject to scaling:

## TSB Models

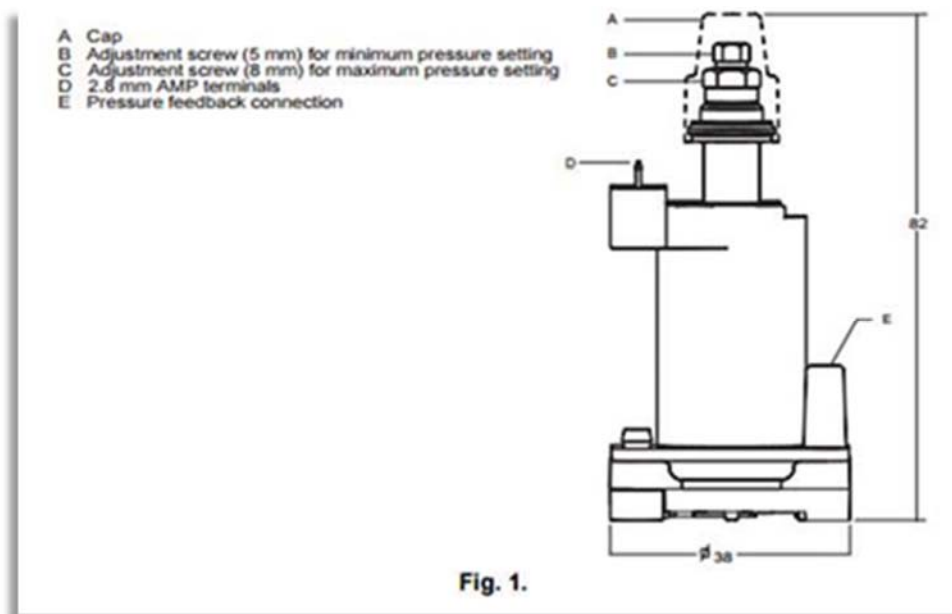


## TSC Models



## Appendix D – Adjusting the Minimum and Maximum Gas Pressure

The following procedure is to be carried out only by a qualified certified technician:



### Adjusting the High Pressure Top Burner

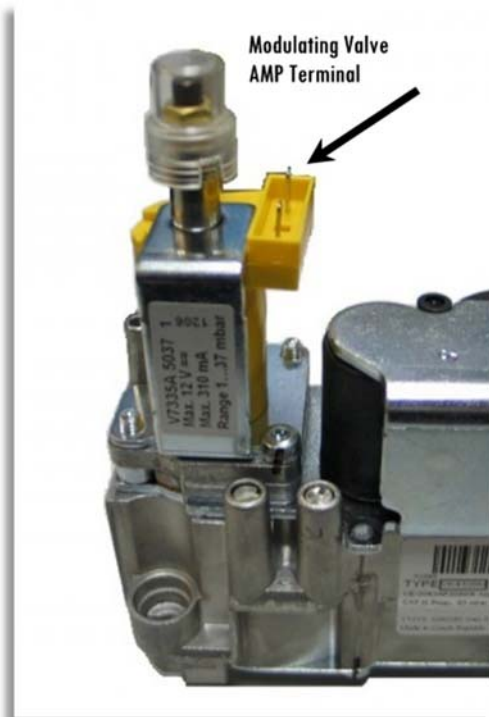
- Check inlet pressure to ensure you have sufficient pressure as outlined on page 17 of this manual.
- The maximum pressure setting must be initially adjusted to ensure that burner will safely light up, then the minimum pressure setting can be adjusted.
- Any adjustment of maximum pressure influences the minimum pressure setting. Therefore, a minimum pressure setting should always be readjusted after.
- Connect your Manometer to the outlet nipple E. Reset your Manometer and start the oven.
- Turn the TOP temp controller to 800°F and ensure the OUT light comes on:



Holding nut B in place, adjust nut C in figure 1 to get close to the required pressure as outlined in [Appendix E](#). If cannot get close to the required H<sub>2</sub>O pressure, it is possible you do not have enough incoming pressure and customer must be informed. The oven will not be able to reach normal operating temps. Gas Company is typically able to increase pressure from the meter regulator to increase pressure.

## Adjusting Minimum Pressure Setting

- Connect your Manometer to the outlet nipple E. Reset your Manometer and start the oven.
- Disconnect one of the low voltage electrical connections to the top of the modulating valve AMP terminals:



- Holding nut C in place, adjust nut B in figure 1 using a 5mm wrench to turn adjustment screw for minimum pressure setting. Rotate the screw clockwise to increase the pressure or counter clockwise to decrease the pressure, until the required minimum outlet pressure is obtained. Then release shaft.
- Check if the main burner remains on and strong at minimum pressure.
- Reconnect the AMP low voltage cable.

Repeat the above process for the second valve (bottom burner- left side) to reach the desired settings as outlined in [Appendix E](#).



# Appendix E - Gas Pressure Settings

## TSB Models

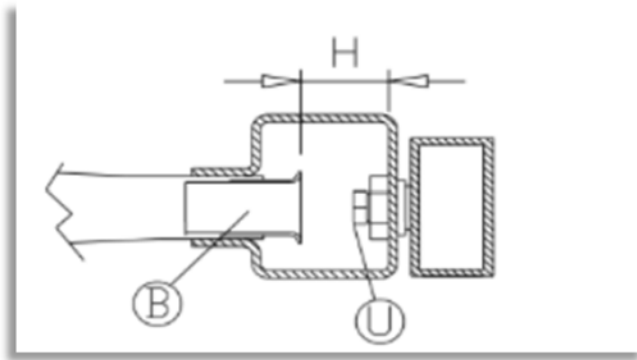
Type of Gas	Outlet Pressure (mbar)	Outlet Pressure (inch H <sub>2</sub> O column)	Procedure to be Followed
Natural Gas G20	Bottom max/min 14.0/5.0	Bottom max/min 5.62/2.0	Adjust the "S" and "T" screw until the value shown to the side is reached following the instruction below.
	Top max/min 15.0/8.0	Top max/min 6.02/3.21	
Liquid Gas G31	max/min 25.7/13	Max/min 10.3/5.2	Adjust the "S" and "T" screw until the value shown to the side is reached following the instruction below.

## TSC Models

Type of Gas	Outlet Pressure (mbar)	Outlet Pressure (inch H <sub>2</sub> O column)	Procedure to be Followed
Natural Gas G20	Bottom max/min 14.0/5.0	Bottom max/min 5.62/2.0	Adjust the "S" and "T" screw until the value shown to the side is reached following the instruction below.
	Top max/min 15.0/8.0	Top max/min 6.02/3.21	
Liquid Gas G31	max/min 25.7/13	Max/min 10.3/5.2	Adjust the "S" and "T" screw until the value shown to the side is reached following the instruction below.

# Appendix F- Burner Mixture Air Bushing Clearances

## TSB Models



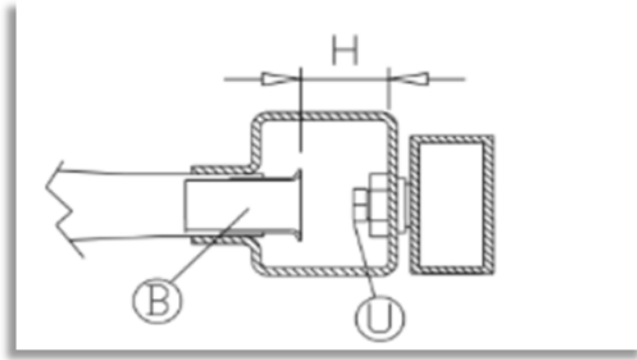
**Key**

B = Primary air brushing

U = Injector

Gas	Injector Diameter	Distance "H"
G31	2x230 1/100 mm (0.09 inch)	18 mm (0.71 inch)
G20	2x330 1/100 mm (0.129 inch)	13 mm (0.51 inch) for Top 16 mm (0.63 inch) for Bottom

## TSC Models



### Key

B = Primary air brushing

U = Injector

Gas	Injector Diameter	Distance "H"
G31	1x260 $\frac{1}{100}$ mm (0.102 inch) for Top 1x250 $\frac{1}{100}$ mm (0.098 inch) for Bottom	18 mm (0.71 inch)
G20	2x355 $\frac{1}{100}$ mm (0.139 inch)	18 mm (0.71 inch) for Top 16 mm (0.63 inch) for Bottom

# Technical Supplement- Chain Maintenance

## Directions to Apply Italforni USA Approved Oven Chain Lubricant

1. Ensure that the Chain temperature is 300°F or lower (so best to do this at the start of day).
2. Shake container well throughout the process to evenly distribute solid lubricant particles.
3. Apply and paint on chain using a small clean soft bristle brush.
4. Heat the oven to baking temperature as slowly as possible, to avoid smoking of oil.
5. Repeat this process once weekly or every 40 hours (whichever occurs first).



---

**Note:** *Once the oil has evaporated, the chain will appear dry and will leave behind white residue. This is the lubricant and this is the expected behavior. This is what your chains should look when properly lubricated and has been running for a few days.*

---



---

**WARNING:** *FAILURE TO LUBRICATE THE CHAIN ON REGULAR BASIS WILL RESULT IN DAMAGE AND IS NOT COVERED UNDER FACTORY WARRANTY.*

---

# FOR SERVICE

## IN NORTH AMERICA

*Tel: +1 (424) 364-0075*

[support@italforniusa.com](mailto:support@italforniusa.com)

Italforni USA, Inc.

24418 South Main St. Suite 408

Carson, CA 90475 USA

P +1 424.364.0075 - F +1 844.273.6873

<http://ItalforniUSA.com>

## OUTSIDE NORTH AMERICA

ITALFORNI Pesaro S.r.l.

Via Dell'Industria, 130 - Loc. Chiusa di Ginestreto

61100, Pesaro (PU) - ITALY

Tel: 0721 – 481515 - Fax: 0721 - 482453

<http://www.italforni.it> - email: [info@italforni.it](mailto:info@italforni.it)

# Index

---

## A

Additional Instructions · 2  
**Attention** · 1, 16

---

## C

**Canada** · 10  
**Caution** · 1, 9, 10, 23, 24  
 Cleaning · 20, 21  
 Co2 · 9  
 Commissioning · 13, 17  
 Connection · 11, 12  
 Conversion · 11, 13, 14

---

## D

Diagrams · 28

---

## E

Electrical · 2, 12, 33, 34

---

## F

Flame · 19, 26

---

## G

Gas · 2, 10, 11, 13, 14, 19, 23, 33,  
 34, 38, 39, 41, 42, 43  
 General Warnings · 2, 9

---

## I

Installation · 2, 9, 10, 11  
 Introduction · 1  
**Italforni** · 4, 20, 44, 45

---

## M

Maintenance · 20, 21, 22, 44

---

## N

**NORTH AMERICA** · 45  
**Note** · 1, 2, 3, 9, 10, 15, 24, 30, 44

---

## P

Pressure · 13, 14, 38, 39, 41

---

## R

Residual Risks · 19  
 Restrained · 8  
 Risks · 19

---

## S

**SERVICE** · 45  
 Stacking · 7  
 Start-up · 17  
**support** · 3, 6, 20, 45  
 Support Stand · 6

---

## T

Technical Data Plate · 5, 13  
 TSB · 1, 36, 41, 42  
 TSC · 1, 37, 41, 43  
 Turn Off · 18

---

## U

**USA** · 1, 3, 19, 44, 45

---

## W

Wall · 8