



# **GAS RANGES**

## ***SERVICE MANUAL***

Models covered in this manual are:

280 Series, 380 Series, G280 Series, H280 Series,  
P280 Series, GV280 Series, 40 Series Ranges  
Gas Stock Pot Ranges and the Café Range

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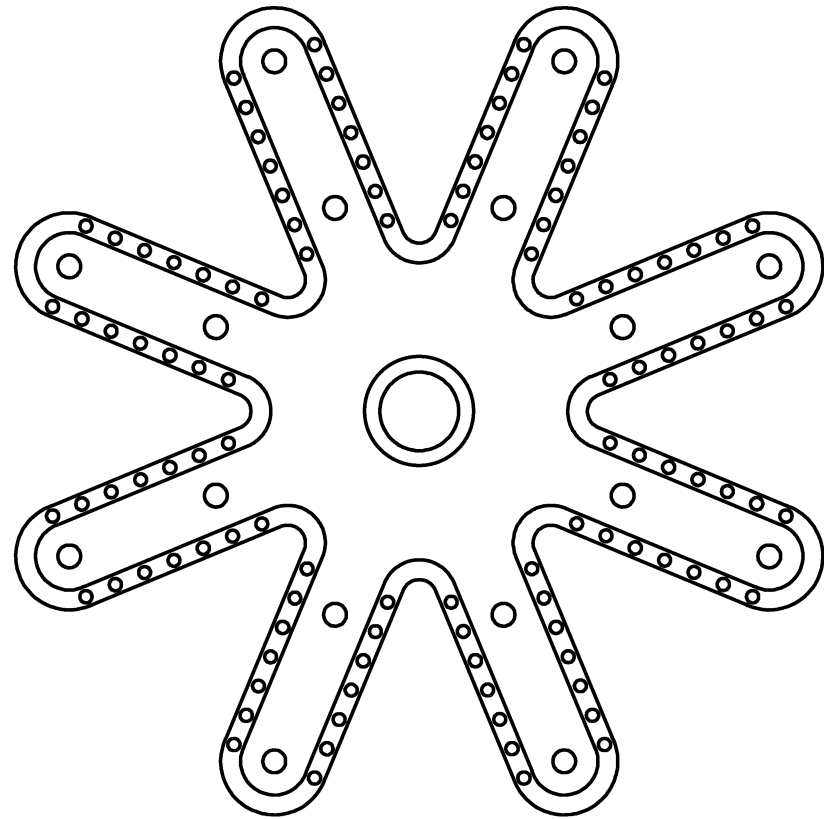
**GARLAND / US Range**  
**DIRECT SERVICE 1-800-427-6668**  
**DIRECT FAX 1-800-361-7745**

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**This service manual is designed to answer questions related to model Operational Requirements, and Troubleshooting Procedures. It contains Model Identification, Unit Dating, Thermostat Calibration, Safety Pilot Trouble-Shooting. It also includes BTU Ratings, Orifice Sizing and Gas Pressure and Technical Data for each series.**

This book is broken down into sections. Each section will list the applicable models. Use the Table of Contents on the next page to locate the model and function that you are attempting to trouble-shoot.

For example; if you need to know information concerning oven thermostat, refer to SECTION 6: CALIBRATION OF THERMOSTAT found on page 19.



RC Base Ovens • 15  
Recalibrate, BJWA • 21  
Recalibrate, UN • 22  
Recalibration of FDO • 20  
Restaurant Series  
How to Identify • 4

## S

Single Pilot Valve  
How to Identify • 17  
Standard Oven Operation • 15  
Star Burner  
Air Shutter Adjustment • 18  
Surface Type Thermocouple • 22  
Swing of Temperature • 19

## T

Thermocouple, Oven • 24  
Thermometer • 19

Thermostatically Controlled Griddles • 14  
Tolerance of Thermostats • 23  
Tolerance +/-20° • 20  
Trouble Shooting Guide • 25

## U

UN Griddle Thermostat • 22

## V

Valve Controlled Griddles • 14

## W

Warranty Numbers • 13  
Weighting , How to • 19  
Weighting of Thermocouple • 19

**INDEX**

**A**

- Accessories
  - How to Identify, 280 Series • 5
- Adapter, Robertshaw • 24
- Adjustable Orifice Hood • 8
- Adjustments • 17
- Age of Equipment
  - Date Codes • 13
- Air Shutter Adjustments • 18

**B**

- BJWA Griddle Thermostat • 21
- Burner Flames • 25
- By-Pass, BJWA • 21
- By-Pass, FDO • 20
- By-Pass, UN • 22

**C**

- Calibration of Thermostats • 19
- Closed Circuit Test • 24
- Cool Down, How to
  - RC Base Ovens • 15

**D**

- Differential • 19
- Disc-type Thermocouple
  - Griddle Calibration • 21
- Door Closure Problem • 25
- Doors, not level • 25
- Double Pilot Valve
  - How to identify • 17

**E**

- Electric Thermostat
  - RC Base Ovens • 23
- Explanation of Optional Accessories
  - How to Identify 280 Series • 5
- Extinction Pop • 25

**F**

- FDO Thermostat • 20

**G**

- GAS SPECIFICATION**
  - Section 2, the BTU Ratings • 8
- Gas Stock Pot Range • 5**
- Griddle Burner
  - Air Shutter Adjustment • 18
- Griddle Pilot Valve
  - How to Identify • 17
- Griddles - Manual Valve Control
  - How to Identify • 5
- Griddles - Thermostat Control
  - How to Identify • 5

**H**

- Heavy Duty Series
  - Identification • 6
- Hot Top
  - How to Identify • 5
- Hot Tops • 14

**I**

- Instrumentation for Calibration • 19

**K**

- Knuckle Burners
  - Air Shutter Adjustments • 18

**L**

- Lifting Flames • 25

**M**

- Magnet, Safety Valve • 24
- MC / FO1 • 13
- Millivolt, Out-Put • 24
- Millivolt, output low • 25

**N**

- Natural Gas Pressure
  - 280 Series • 8
  - Heavy Duty Series • 12

**O**

- Open Circuit Test • 24
- Open Top Burners • 14
- Operation of Controls
  - Section 4 • 14
- Oven Burner
  - Air Shutter Adjustment • 18
- Oven Dimensions
  - Restaurant Series • 5
- Oven Pilot
  - How to Adjust • 17
- Oven Pilot Adjustments • 17
- Oven Safety Pilot • 24
- Oven to hot • 25

**P**

- Pilot Outage • 25
- Potentiometer
  - FDO • 20
- Propane Gas Pressure
  - 280 Series • 8
  - Heavy Duty Series • 12

**R**

- Raised Broiler/Griddle • 14
- RC Base Oven Thermostat • 23

**TABLE OF CONTENTS**

**SECTION 1: MODEL IDENTIFICATION ----- 4**

- Restaurant Series ----- 4
- Explanation of Optional Accessories----- 5
- Stock Pot Range----- 5
- Heavy Duty Series----- 6

**SECTION 2: GAS SPECIFICATIONS----- 8**

- 280 Series Built 1961 - 1971----- 8
- G-30, G-30A, 280 Series, 380 Series G280 Series Built from 1974 to April 1987 ----- 8
- G-30, G-30A, 280 Series, G280 Series Built After to April 1987 ----- 8
- G280 Series Built After May 16, 1989 ----- **Error! Bookmark not defined.**
- Gas Heavy Duty Ranges Built from November 1, 1968 through March 31, 1971 ----- 9
- Gas Heavy Duty Ranges Built from March 31, 1971 through January 1975 ----- 9
- Gas Heavy Duty Ranges Built from January 1975 through March 1987 ----- 10
- Six Burner Heavy Duty Ranges Built from March 1987 ----- 10
- Four Burner Heavy Duty Ranges Built from March 1987 ----- 11
- Even Heat Hot Top Heavy Duty Ranges Built from March 1987 ----- 11
- Fry Top Valve Controlled Heavy Duty Ranges Built from March 1987----- 12
- Fry Top Thermostatically Controlled Heavy Duty Ranges Built from March 1987 ----- 12

**SECTION 3: HOW TO DETERMINE THE AGE OF EQUIPMENT ----- 13**

**SECTION 4: OPERATION OF CONTROLS----- 14**

- Open Burners----- 14
- Hot Tops----- 14
- Thermostatically Controlled Griddles ----- 14
- Valve Controlled Griddles----- 14
- Raised Griddle/Broiler ----- 14
- Standard Ovens----- 15
- Range Base Convection Ovens RC----- 15

**SECTION 5: ADJUSTMENTS----- 17**

**SECTION 6: CALIBRATION AND OPERATION OF THERMOSTATS----- 19**

- Instrumentation----- 19
- Weighting of Thermocouple----- 19
- FDO Thermostat----- 20
- BJWA Thermostat----- 21
- UN Type Thermostat ----- 22
- Electric Thermostat for RC Base ----- 23

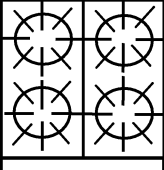
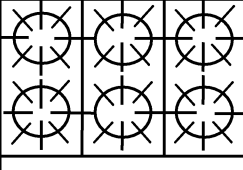
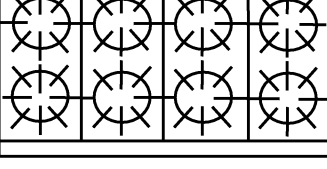
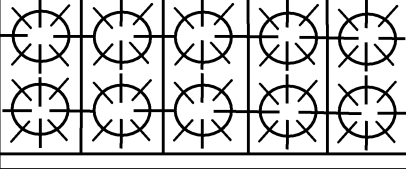
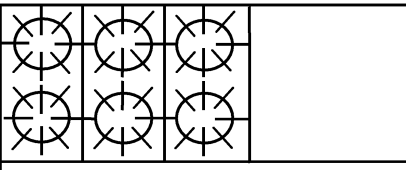
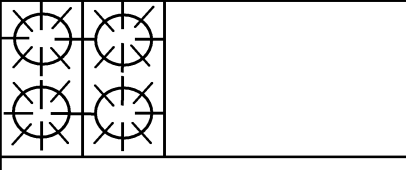
**SECTION 7: TROUBLESHOOTING THE OVEN PILOT SAFETY SYSTEM ----- 24**

- Troubleshooting the Standing Pilot----- 24
- Automatic Pilot Valve ----- 24
- Thermocouple Replacement----- 24
- To Test Magnet Assembly and Thermocouple Operation ----- 24
- Closed Circuit Test----- 24
- Open Circuit Test----- 24

**SECTION 8: GAS EQUIPMENT FIELD SERVICE TROUBLESHOOTING GUIDE ----- 25**

## SECTION 1: MODEL NUMBER IDENTIFICATION

### Restaurant Series

	4 Burner 24" Wide	(1) Space Saver Oven	G28, H28, P28
		(1) Storage Base	G28S, H28S, P28S
	6 Burner 36" Wide	(1) Standard Oven	286, 386, G286, GV286, H286, P286
		(1) Range Base Convection Oven	G286RC, H286RC, P286RC
		(1) Storage Base	G286S, H286S, P286S
	8 Burner = 48" Wide	(2) Space Saver Ovens	G288, H288, P288
		(1) Std. Oven & Storage Base	G288S, H288S, P288S
		(1) Range Base Convection Oven	G288RC, H288RC, P288RC
		(1) Storage Base	
	10 Burner = 60" Wide	(2) Std. Ovens	284, 384, G284, GV284, H284, P284
		(1) Std. Oven & Storage Base	287, 387, G287, H287, P287
		(1) Std. Oven & Range Base Convection Oven	G284RC, H284RC, P284RC
		(2) Range Base Convection Oven	G284RC2, H284RC2, P284RC2
		(1) Storage Base	
	60" Wide = 6 Burner w/ 24" Raised Griddle/Broiler	(2) Std. Ovens	283, 383, G283, GV283, H283, P283
		(1) Std. Oven & Storage Base	282, 382, G282, H282, P282
		(1) Std. Oven & Range Base Convection Oven	G283RC, H283RC, P283RC
		(2) Range Base Convection Ovens	G283RC2, H283RC2, P283RC2
		(1) Storage Base	
	60" Wide = 4 Burner w/ 36" Raised Griddle/Broiler	(2) Std. Ovens	285, 385, G285, H285, P285
		(1) Std. Oven & Storage Base	281, 381, G281, H2821, P281
		(1) Std. Oven & Range Base Convection Oven	G285RC, H285RC, P285RC
		(2) Range Base Convection Ovens	G285RC2, H285RC2, P285RC2
		(1) Storage Base	

## SECTION 8: GAS EQUIPMENT FIELD SERVICE TROUBLESHOOTING GUIDE

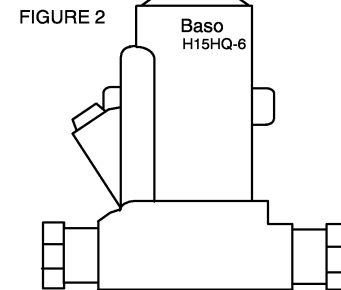
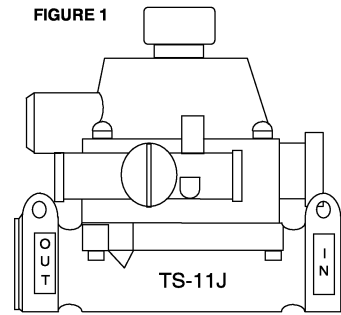
Service should be performed by a professional as listed in your Maintenance and Repair Center guide.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Burner flame soft-lazy tip yellow	Not enough air mixing with gas.	Open air shutter
Flame lifts off burner ports. Flashes back in burner. Pops excessively when turned off.	Too much air mixing with gas.	Close air shutter.
Delayed ignition.	Unit over gassed or orificed incorrect.	Check gas pressure and orifice size.
Pilot burner will not ignite.	Burner adjusted improperly. Burner ports plugged. Pilot flame too small. Draft in kitchen.	Adjust gas and air mixture. Clean burner ports. Adjust pilot valve. Determine cause.
Flame lifts off pilot orifice.	Pilot over gassed.	Adjust pilot valve.
Oven pilot keeps going out.	Faulty thermocouple or safety valve. Pilot flame too small. Loose connection on safety valve. Main burner blowing out pilot.	Check safety system.  Adjust pilot valve. Tighten connection.  Adjust gas and air mixture.
Millivolt output low on open circuit test.	Pilot flame too small. Flame yellow - pilot dirty. Thermocouple faulty.	Adjust pilot valve. Clean and adjust pilot. Replace.
Millivolt output high on open circuit test but low on closed circuit test.	Short in magnet.	Replace safety valve.
Millivolt output high on closed circuit test but safety valve will not open.	High millivolt reading on drop out test.	Replace safety valve.
Oven too hot or not enough.	Control out of calibration or bypass improperly set.	Check calibration and set bypass.
Burner flame shuts off when oven gets up to temperature.	By-Pass set too low. By-Pass set too high causing control to go into snap action.	Adjust by-pass.
Door will not stay closed.	Not enough tension on springs. Springs broken, hinge link broken.	Adjust tension nut clock wise. Replace faulty parts.
Door will not stay open.	Too much tension on springs.	Adjust tension nut counter-clockwise.
Door not closing on one side.	Door warped.	Re-stress door.
Doors not level or low in center of unit.	Trunion support loose.  Trunion support worn.	Level and tighten support. Replace.

## SECTION 7: TROUBLE SHOOTING THE OVEN PILOT SAFETY SYSTEM

**AUTOMATIC PILOT VALVE** - The automatic pilot valve is a protective device that allows gas to flow to the oven burner only when the pilot burner is burning. (This is used on GARLAND ovens and ranges to have safe lighting provisions provided by the flow interrupter that will not allow gas to flow to the oven burner while the red button is depressed.)

GARLAND has used two different types of pilot safety valves. On the 280 Series the valve used up to July 1988 was the Robertshaw TS-11J. From July 1988 to present the Johnson BASO H15HQ-6 valve is being used. The Heavy Duty Series used the Robertshaw TS-11J up to October 1990, from then on the Johnson BASO H15HQ-6 valve is being used. Figure 1 showing the TS-11J and Figure 2 showing the Johnson BASO H15HQ-6.



**THERMOCOUPLE REPLACEMENT** - A thermocouple nut should be started and turned all the way in by hand. An additional quarter turn with a small wrench will then be sufficient to seat the lock washer and maintain adequate contact. A too loose or too tight connection of the thermocouple nut to the automatic pilot valve can prevent the thermocouple from activating the valve. A visual examination of the thermocouple lead should be made to make sure that there are not cracks or ruptures. Every effort has been made to insure trouble-free performance of this system with a minimum of service.

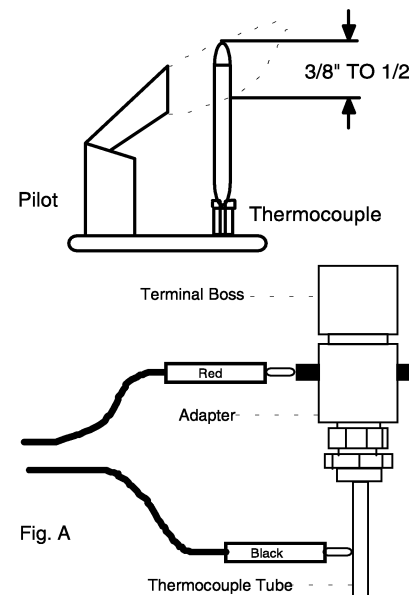
### TO TEST MAGNET ASSEMBLY AND THERMOCOUPLE OPERATION

Heating the thermocouple tip by the pilot flame produces an electrical potential that is used to energize the magnet that, in turn, holds open the main and pilot valves. When the pilot is "OUT" or improperly adjusted, insufficient heat is applied to the thermocouple tip to produce adequate electrical generation that results in the control shutting itself off.

If, while following the proper lighting procedures, the magnet cannot be made to "HOLD", inspect the pilot flame for proper size and adjustment (see pilot burner adjustment.). If the magnet will still not hold, make the following checks:

### CLOSED CIRCUIT TEST (TO TEST MAGNET & THERMOCOUPLE AS COMPLETE UNIT)

To make the closed circuit test, remove the thermocouple lead from the magnet contact. Place an adapter (Robertshaw Part #75036) in the magnet contact and turn the thermocouple into the adapter, finger tight. Connect millivolt meter leads to adapter and thermocouple lead as shown in Figure "A".



Re-light pilot. Read meter after pilot has been burning three minutes. If pilot will not continue burning, depress and hold red button to check thermocouple output for this closed circuit check. If insufficient (normal output is 20 to 28 millivolts) millivolt output is noted, (less than 17 millivolts), replace thermocouple.

After checking the thermocouple in closed circuit, blow out the pilot flame, watching the millivolt meter. The magnet should continue to hold for a drop of at least five millivolts. If the magnet doesn't hold for a drop of five millivolts, you would have a false safety condition and frequent pilot outages. After this closed circuit check is made with the main burner off, the main burner should then be operated with the millivolt meter in position to check the effect of the main burner on the millivolt output.

### OPEN CIRCUIT TEST

1. Disconnect thermocouple from safety valve.
2. Attach thermocouple to millivolt test instrument.
3. Heat sensor end of thermocouple with flame, monitoring millivolt meter.
4. If millivolt reading is below 17 millivolts, replace thermocouple.

	(2) Std. Ovens	G289, H289, P289
	(1) Std. Oven & Storage Base	G289S, H289S, P289S
	(1) Std. Oven & Range Base	G289RC, H289RC, P289RC
	(1) Convection Oven	
	(2) Range Base Convection Oven	G289RC2, H289RC2, P289RC2
	(1) Standard Oven	G-30, G-30A

### Explanation of Optional Accessories

(1) Hot Top, Replaces 2 Open Burners. At time of order the customer specifies where the hot top is to be located. Indicate amount of Hot Tops by adding suffix -1,-2,-3,-4,-5,-6 at the end of each model number.

Griddles - Manual Valve Control - Each 12" Section Replace 2 Open Burners

12", Add Suffix -12G	48", Add Suffix -48G
24", Add Suffix -24G	60", Add Suffix -60G
36", Add Suffix -36G	72", Add Suffix -72G

Griddles - Thermostat Control - Each 12" Section Replaces 2 Open Burners, **1 Thermostat per 12" Section.**

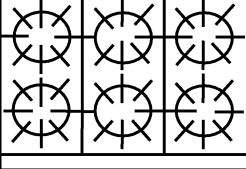
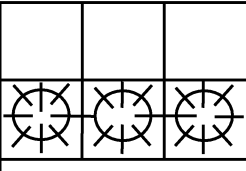
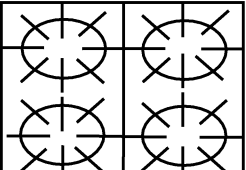
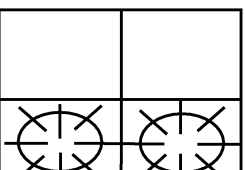
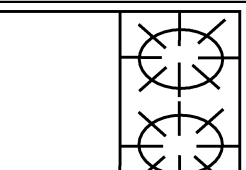
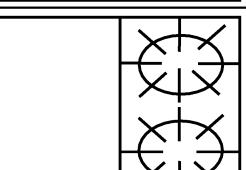
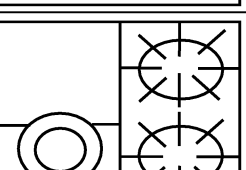
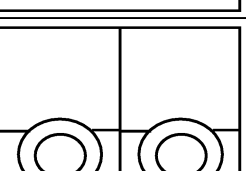
12", Add Suffix -12TH	48", Add Suffix -48TH
24", Add Suffix -24TH	60", Add Suffix -60TH
36", Add Suffix -36TH	72", Add Suffix -72TH

**NOTE: G-30 & G-30A have no option for griddles or hot top. Sold as a 4 Burner Café Range only.** Range Oven Dimensions 26¼" Wide X 22" Deep X 13½" High - Standard Oven or Range Base Convection Oven.

### Gas Stock Pot Range:

		<p>Model # G20-SP, G20-SPH* (* with Safety Pilot) 4 Burners Rated at a Total of 60,000 B.T.U.'s</p> <p>Range is 20" Wide X 20" Deep And Stands 24" High</p>
Top View	Front View	

**Heavy Duty Series:**

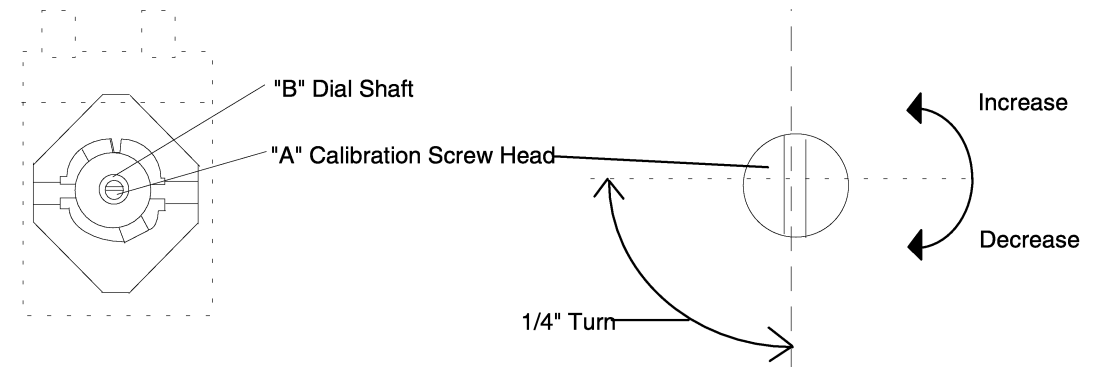
	6 Burner 34" Wide	(1) Standard Oven	43-40R
		(1) Range Base Convection Oven	43-40RC
		(1) Storage Base	43-40S
		(1) Modular Top Section	43-40T
	3 Burners Front	(1) Standard Oven	43-40FTR
		(1) Range Base Convection Oven	43-40FTRC
	3 Hot Tops Rear	(1) Storage Base	43-40FTRS
	34" Wide	(1) Modular Top Section	43-40FTT
	4 Burner 34" Wide	(1) Standard Oven	44-40R
		(1) Range Base Convection Oven	44-40RC
		(1) Storage Base	44-40S
		(1) Modular Top Section	44-40T
	2 Burner Front	(1) Standard Oven	44-40FTR
		(1) Range Base Convection Oven	44-40FTRC
	2 Hot Top Rear	(1) Storage Base	44-40FTRS
	34" Wide	(1) Modular Top Section	44-40FTT
	17" Valve Controlled Griddle on Left	(1) Standard Oven	42-40R
		(1) Range Base Convection Oven	42-40RC
	2 Burners	(1) Storage Base	42-40S
	34" Wide	(1) Modular Top Section	42-40T
	17" Equi- therm Hot Top	(1) Standard Oven	42-40R-6
		(1) Range Base Convection Oven	42-40RC-6
	2 Burners	(1) Storage Base	42-40S-6
	34" Wide	(1) Modular Top Section	42-40T-6
	17" Spectro -Heat Hot Top	(1) Standard Oven	42-40R-5
		(1) Range Base Convection Oven	42-40RC-5
	2 Burners	(1) Storage Base	42-40S-5
	34" Wide	(1) Modular Top Section	42-40T-5
	Spectro -Heat Hot Top 34" Wide	(1) Standard Oven	45-40R
		(1) Range Base Convection Oven	45-40RC
		(1) Storage Base	45-40S
		(1) Modular Top Section	45-40T

**INSTRUCTIONS FOR ELECTRIC THERMOSTAT OPERATION PART #1032400**

**Thermostat Operation**

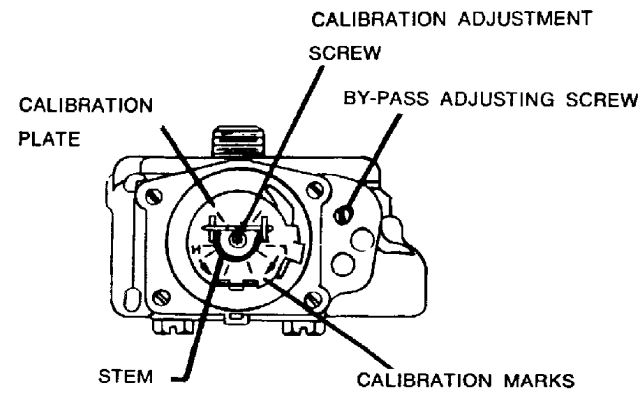
It is normal for a hydraulic thermostat cycling with a temperature swing of 45° to 50°. When checking calibration first; allow the thermostat to cycle a minimum of four (4) times, second; place your temperature sensor in the geometric center of the empty oven. Once the oven has been allowed to preheat record the temperature at which the burners cycle "ON and OFF". Average the two readings, that average should be +/-20° of the set point temperature.

Example: Thermostat set point at 300°, first cycle Off at 325°. Cycle back ON at 291°. The average of 325° and 291° is 308°. This thermostat is within the +/-20° tolerance. If the thermostat is cycling beyond the 20° tolerance and the appliance is under warranty **recalibrate the thermostat** or if not under warranty consult owner for proper action. If the thermostat is out of calibration more than fifty 50° it will not likely hold an attempt of recalibration we suggest that the thermostat be replaced.



**NOTES**

**INSTRUCTIONS FOR UN GRIDDLE CONTROL #1092196, 1092197, 1902198, 1092199**



The Robertshaw UN throttle-type griddle control requires a by-pass adjustment. To adjust, proceed as follows:

1. Be sure pilot flames are lit and adjusted.
2. Turn dial to 200°F (93°C) mark, and allow griddle to heat of approximately 5 minutes.
3. Turn dial clockwise to "LOW" position. Control will cut down to BY-PASS flame.
4. Carefully remove dial, making sure setting is not disturbed.
5. With a screw-driver, turn the by-pass adjustment screw and adjust to the "LOWEST POSSIBLE STABLE FLAME COVERING THE ENTIRE BURNER". Turn screw clockwise to decrease or counter-clockwise to increase size by-pass flame.
6. Replace dial.
7. Turn dial to "OFF" position.

**DO NOT RECALIBRATE UNTIL THE FOLLOWING HAS BEEN CHECKED:**

1. BY-PASS FLAME for proper adjustment (see above).
2. Check that the control bulb is full inserted in the bulb tube.

To check calibration, proceed as follows:

Use a Robertshaw test instrument with special disc type thermocouple or reliable "SURFACE" type thermometer. (Note: A drop of cooking oil on the face of disc will provide better contact with the griddle plate.

1. Turn all griddle temperature control dials to 350°F (177°C). In order to allow temperature to stabilize, the controls must be allowed to cycle three times before taking a test reading.
2. Check temperature reading when control cuts down to by-pass by placing sensor firmly on griddle surfaces directly above sensing bulb of control. Reading of the test instrument should be between 335°F (168°C) and 365°F (185°C).
3. If dial setting does not agree with the test instrument reading within the above limits, recalibrate as follows:
4. Remove dial making sure setting is not disturbed.
5. Each division mark on calibration plated equals 15°F. With a screwdriver, turn calibration crew clock-wise (toward LOW) to reduce temperature, or counter-clockwise (toward HIGH) to increase temperature.

Example - Dial setting 350°F mark. Test instrument reading 380°F. Turn calibration screw clock-wise (toward LOW) two division.

6. Replace dial, turning dial to "OFF" position.
7. Repeat steps 1 through 3 to make sure correct adjustment has been made.

	Equi-therm Hot Top	(1)	Standard Oven	46-40R
		(1)	Range Base Convection Oven	46-40RC
	34" Wide	(1)	Storage Base	46-40S
		(1)	Modular Top Section	46-40T
	Valve Controlled Griddle	(1)	Standard Oven	47-40R
		(1)	Range Base Convection Oven	47-40RC
	34" Wide	(1)	Storage Base	47-40S
		(1)	Modular Top Section	47-40T
	Thermostat Controlled Griddle	(1)	Standard Oven	48-40R
		(1)	Range Base Convection Oven	48-40RC
	34" Wide	(1)	Storage Base	48-40S
		(1)	Modular Top Section	48-40T
	2 Burners Spreader	(1)	Standard Spreader w/Storage Base	40-4S
	17" Wide	(1)	Modular Top Section	40-4T
	Spectro-Heat Hot Top Spreader	(1)	Standard Spreader w/Storage Base	40-5S
	17" Wide	(1)	Modular Top Section	40-5T
	Equi-therm Hot Top Spreader	(1)	Standard Spreader w/ Storage Base	40-6S
	17" Wide	(1)	Modular Top Section	40-6T
	Valve Controlled Griddle Spreader	(1)	Standard Spreader w/Storage Base	40-7S
	17" Wide	(1)	Modular Top Section	40-7S
	Thermostat Controlled Griddle Spreader	(1)	Standard Spreader w/Storage Base	40-8S
	17" Wide	(1)	Modular Top Section	40-8S

**SECTION 2: GAS SPECIFICATION**

**280 Series Built 1961 through 1971**

BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
Open	14,000	#47A	#57F
Hot Top	18,000	#47A	#55F
Griddle	9,000	#48A	#63F
Griddle Pilot	**	.018"	.010"
Raised Griddle	14,500	#47A	#57F
Oven - Cast Iron Burner	25,000	#36A	#53F

**G-30, G-30A, 280 Series, 380 Series G280 Series Built from 1974 to April 1987**  
 G-30, G-30A, 280 Series, 380 Series G280 Series Built from 1974 to April 1987

BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
Open	14,000	#47A	#57F
G-30 Open	12,500	#47A	#51F
Hot Top	18,000	#47A	#55F
Griddle	18,000	#48A	#55F
Griddle Pilot	**	.018"	.010"
Raised Griddle	14,500	#47A	#57F
Oven	35,000	#36A	#51F

**G-30, G-30A, 280 Series, G280 Series Built After to April 1987**  
 G-30, G-30A, 280 Series, G280 Series Built After to April 1987

In April of 1987 A.G.A. stopped the use of ADJUSTABLE Orifices.

BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
Open	14,000	#50	#57
G-30, G-30A Open	12,500	#51	#57
Hot Top	18,000	#46	#55
Griddle	18,000	#48	#55
Griddle Pilot	**	.018"	.010"
Raised Griddle	14,500	#47	#57
Oven	35,000	#36	#51

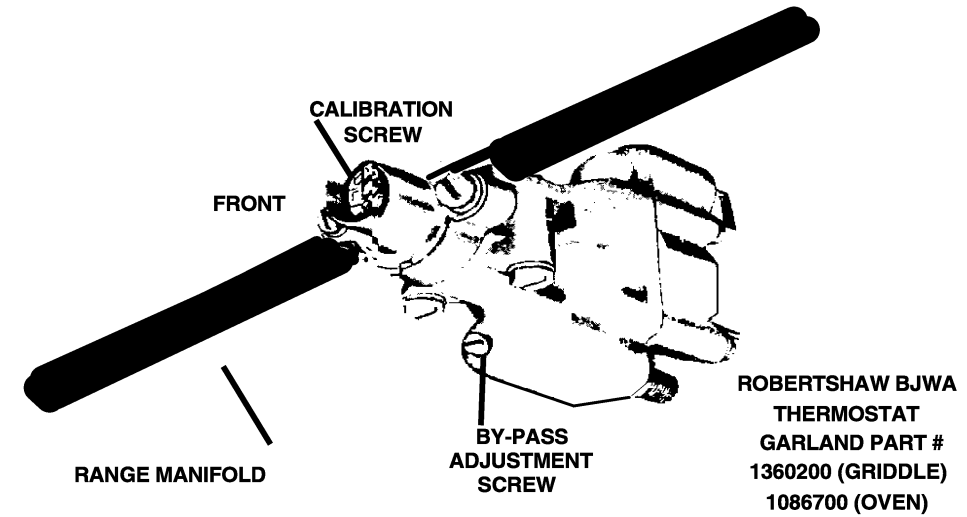
**G280 Series Built After May 16, 1989**

BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
Open	20,000	#50	#55
Hot Top	18,000	#47	#55
Griddle	18,000	#48	#55
Griddle Pilot	**	.018"	.010"
Raised Griddle	14,500	#47	#57
Oven	35,000	#36	#51
Space Saver Oven	25,000	#42	#55

NOTE: A = Indicates Adjustable Orifice Hood with Pin  
 F = Indicates Fixed Orifice No Pin  
 Natural Gas Pressure Measured at Manifold Tap = 4.5" W/C  
 Propane Gas Pressure Measured at Manifold Tap = 10.0" W/C

**thermostat** or if not under warranty consult owner for proper action. If the thermostat is out of calibration more than fifty 50° it will not likely hold an attempt of recalibration we suggest that the thermostat be replaced.

**INSTRUCTIONS FOR BJWA GRIDDLE CONTROL #1360200**



**THERMOSTAT VIEWED FROM BELOW WITH VALVE PANEL REMOVED**

When the appliance reaches the temperature at which the dial is set, the control cuts down the flow of gas to the amount required to keep the appliance at that temperature. Always, however, the control must bypass enough gas to keep the entire burner lighted. To maintain this minimum flame, the bypass must be set carefully and accurately as follows:

1. Light the burner, then turn dial "Full On".
2. After 5 minutes, turn dial clockwise to point slightly beyond first mark on dial.
3. Remove dial.
4. With a screw driver, turn bypass adjuster counter-clockwise to increase the flame, clockwise to decrease the flame, until there is a minimum flame over the entire burner.

To check calibration, proceed as follows:

1. Use a Robertshaw Test Instrument with a special disc type thermocouple or reliable "Surface" type thermometer. (NOTE: A drop of oil on the face of the disc will provide better contact.)
2. Turn all griddle temperature controls dials to 400°F. (240°C). In order to allow temperature to stabilize, the control must be allowed to cycle at least three times before taking a reading.
3. Check temperature reading when control cuts down to bypass by placing sensor firmly on griddle surface, directly above the sensing bulb of control. Reading of test instrument should be between 350°F(196°C) and 410°F (213°C).

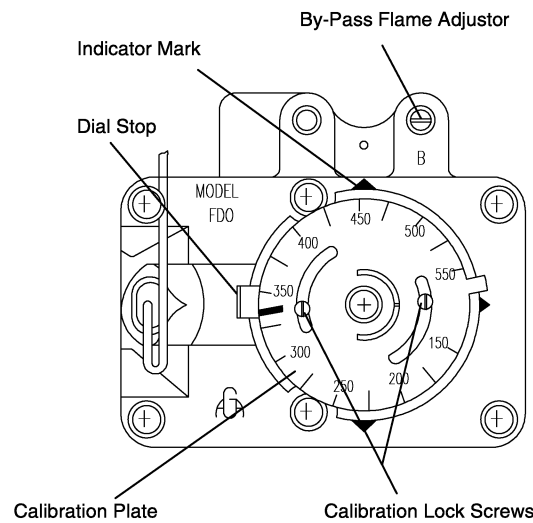
If the dial setting does not agree with the test instrument reading within the above limits, recalibrate as follows:

4. Remove the dial and push out the metal insert.
5. Replace the dial.
6. Hold dial firmly, insert screwdriver through center of dial, and push calibration stem inward. **DO NOT TURN THIS CALIBRATION STEM!**
7. While holding calibration stem in firm with screw driver, turn the **DIAL** until it is set at the actual temperature as shown by your instrument or thermometer. Release pressure on calibration stem.
8. Replace the dial insert and dial.
9. Set dial to 450°F (232°C) mark. Check temperature again, if the thermostat is cycling beyond the 20° tolerance and the appliance is under warranty **recalibrate the thermostat** or if not under warranty consult owner for proper action. If the thermostat is out of calibration more than fifty 50° it will not likely hold an attempt of recalibration we suggest that the thermostat be replaced.



five times doubling the thickness with each fold. After the fifth fold, place the thermocouple tip in the center of the aluminum piece and fold once more. Finally, fold in the sides so that the foil clings to the thermocouple tip. A mercury thermometer can be weighted in much the same way by wrapping several layers of aluminum foil around the bulb end thus creating the necessary mass. This procedure is a *must* if you open an oven door to check temperature.

**INSTRUCTIONS FOR MODEL FDO HEAVY DUTY CONTROL #1017502**



This model FDO is a precision made instrument, carefully set at the factory to accurately control oven temperatures, from 500°F. (260°C.) to 150°F. (66°C.). All adjustments are accessible from front of appliance after removing dial. To remove dial, grasp knob portion and pull straight out.

1. With oven cold, turn dial counter-clockwise slowly from "Low Stop", until bypass seat just snaps on.
2. Remove dial.
3. With a screw driver, turn bypass flame adjuster screw counter-clockwise to increase the bypass flame or clockwise to decrease the entire burner flame to a minimum stable flame.
4. Replace dial. CAUTION: While making this adjustment, if the oven should become heated while the dial is set at a low rang below 350°F. (177°C.), the bypass flame will shut off completely. If this occurs, turn dial counter-clockwise slowly until bypass gas snaps on. Then check bypass adjustment as stated.

**RECALIBRATION**

Field recalibration is seldom necessary, and should not be resorted to unless poor cooking results, definitely proves that the control is not maintaining the temperature to which the dial is set. To check oven temperature when recalibrating use an indicating potentiometer or a reliable mercury oven thermometer.

1. Place the thermocouple of test instrument or thermometer in the geometric center of the oven.
2. Light the main burner. Observe which indicator mark aligns with the low stop position of the dial. Use this indicator mark for all settings.
3. Turn dial so 400°F. (240°C.) lines up with the "Low Stop" indicator mark.
4. Allow the oven, or appliance, to heat and thermostat to cycle three times. After sufficient time, check temperature if the temperature does not read within +/-20° of the dial setting recalibrate as follows:
5. Pull dial straight off without turning thermostat shaft.
6. Hold calibration plate and loosen the two calibration screws until the plate can be moved independently of the control.
7. Turn calibration plate so that the instrument of thermometer reading is in line with the indicator mark. Hold plate and tighten screws firmly.
8. Replace dial.
9. NOTE: If the above adjustment is prevented by the two loosened calibration lock screws being in contact with the ends of the screw clearance plate to the proper location, reassemble screws in the other tapped holes designed for them.

If the thermostat is cycling beyond the 20° tolerance and the appliance is under warranty **recalibrate the**

**GAS HEAVY DUTY RANGES**

**Ranges Built from November 1, 1968 through March 31, 1971**

Model Numbers	BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
40 & 50 Series	Range Oven	40,000	#30A	#51F
2-40, 2-50	Roasting Oven	40,000	#30A	#51F
42-40, 50	Open	15,000	#46A	#57F
92-40,50	Griddle	30,000	#36A	#52F
43-40, 50	Open	14,000	#46A	#57F
93-40, 50	Hot Top (-1, -2)	11,000	#52	#63F
44-40, 50	Open	15,000	#46A	#57F
94-40, 50	Open	15,000	#46A	#57F
40-4, 50-4	Open	15,000	#46A	#57F
45-40, 50	Spectro Heat	10,500	#52A	#63F
95-40, 50	Hot Top	10,500	#52A	#63F
40-5, 50-5	Lighter	2,000	#52A	#77F
46-40, 50	Even Heat	30,000	#36A	#52F
96-50, 50	Hot Top	30,000	#36A	#52F
40-6, 50-6	Lighter	10,000	#52A	#63F
47-40, 50	Valve Griddle	30,000	#36A	#52F
97-40, 50	Valve Griddle	30,000	#36A	#52F
40-7, 50-7	Lighter	10,000	#52A	#63F
48-40, 50	Thermostat	30,000	#33A	#54F
98-40, 50	Griddle	30,000	#33A	#54F

NOTE: A = Indicates Adjustable Orifice Hood with Pin  
F = Indicates Fixed Orifice No Pin

**GAS HEAVY DUTY RANGES**

**Ranges Built from March 31, 1971 through January 1975**

Model Numbers	BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
40 & 50 Series	Range Oven	40,000	#30A	#51F
2-40, 2-50	Roasting Oven	40,000	#30A	#51F
42-40, 50	Open	15,000	#46A	#57F
	Griddle	30,000	#36A	#52F
43-40, 50	Open	14,000	#46A	#57F
	Hot Top (-1, -2)	11,000	#52A	#63F
44-40, 50	Open	15,000	#46A	#57F
40-4, 50-4	Open	15,000	#46A	#57F
45-40, 50	Spectro Heat	10,500	#52A	#63F
40-5, 50-5	Hot Top	10,500	#52A	#63F
	Lighter	2,000	#52A	#77F
46-40, 50	Even Heat	30,000	#36A	#52F
40-6, 50-6	Hot Top	30,000	#36A	#52F
	Lighter	10,000	#52A	#63F
47-40, 50	Valve Griddle	30,000	#36A	#52F
40-7, 50-7	Lighter	10,000	#52A	#63F
48-40, 50	Thermostat Griddle	30,000	#33A	#54F

NOTE: A = Indicates Adjustable Orifice Hood with Pin  
F = Indicates Fixed Orifice No Pin

## GAS HEAVY DUTY RANGES

Ranges Built from January 1975 through March 1987

Model Numbers	BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
40 & 50 Series	Range Oven & "RC" Oven	40,000	#30A	*35,000 BTU #51F
2-40, 2-50	Roasting Oven	40,000	#30A	#51F
42-40, 50	Open Griddle	15,000 30,000	#46A #36A	#57F #52F
43-40, 50	Open Hot Top (-1, -2)	14,000 11,000	#46A #52A	#57F #63F
44-40, 50 40-4, 50-4	Open	15,000	#46A	#57F
45-40, 50 40-5, 50-5	Spectro Heat Hot Top	11,000	#52A	#63F
46-40, 50 40-6, 50-6	Even Heat Hot Top	30,000	#36A	#52F
47-40, 50, S, T 40-7, 50-7, S, T	Valve Griddle	30,000	#33A	#52F
48-40, 50	Thermostat Griddle	30,000	#33A	#54F

NOTE: A = Indicates Adjustable Orifice Hood with Pin  
F = Indicates Fixed Orifice No Pin

## GAS HEAVY DUTY RANGES

In April of 1987 A.G.A. disallowed the use of ADJUSTABLE Orifices.

R = Range, RC = Range base Convection Oven, S = Storage Base, T = Top Section Only

Model 43-40R, 43-40RC, 43-40S, 43-40T

*Six Open Burner Range* (Primary Use: General Utensil Cooking, Oven - General Purposes)

BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
Range Oven & RC (1987 to July 1991)	NAT 40,000/PRO 35,000	#35F	#51F
Range Oven & RC (July 1991 to Present)	35,000	#35F	#51F
Open (April 1987 to Dec. 1993)	14,000	#52F	#57F
Open (December 1993 to Present)	24,000	#45F	#54F
Oven Pilot (1974 to July 1993)	708	.018"	.010"
Oven Pilot (July 1993 to Present)	892	.021"	.011"
Hot Top	22,000	#48F	#52F
Hot Top Pilot (1974 to July 1993)	708	.018"	.010"
Hot Top Pilot (July 1993 to Present)	892	.021"	.011"

## SECTION 6: CALIBRATION AND OPERATION OF THERMOSTATS

### →INSTRUMENTATION

A thermocouple type test instrument is preferred for measuring oven temperatures accurately. Mercury thermometers are acceptable providing they can be proven accurate.

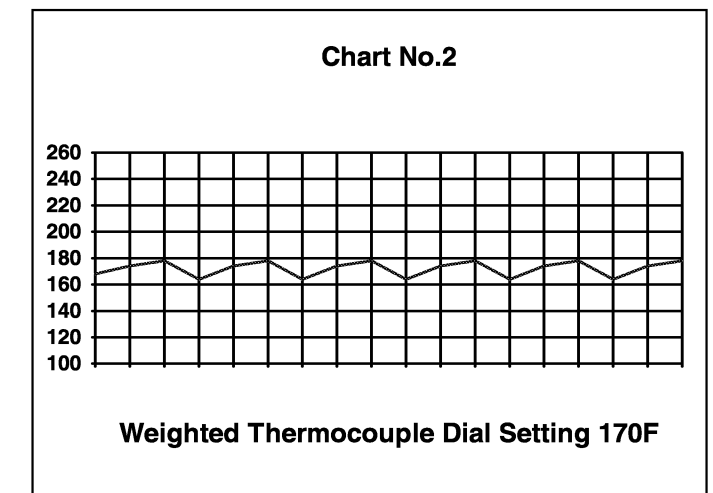
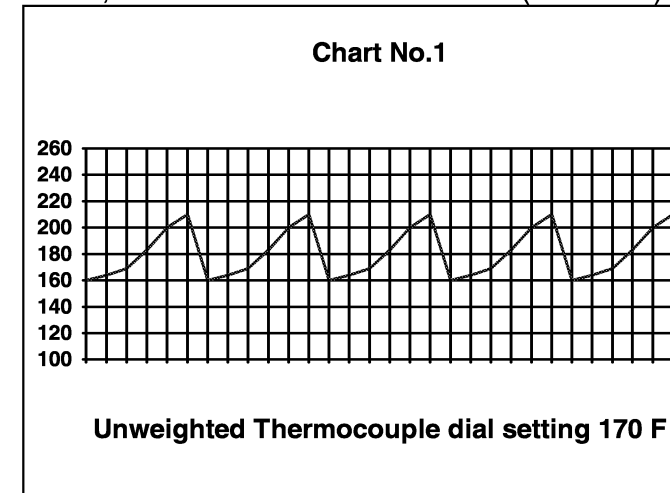
Regardless of the type instrument used, it is most desirable to double-check it just before making an oven temperature check. This can be done simply and quickly by placing the thermocouple tip (or immersing the **entire** mercury thermometer) in boiling water. **Note: Mercury oven thermometers should be the "total immersion type."** The resulting reading should be within several degrees of 212°, -depending on the altitude.

Generally, a mercury thermometer can drop in excess of 25° when the doors are opened to check oven temperature. This condition makes it extremely difficult to get a true temperature reading.

Almost all ranges today have oven burners which cycle "on and off." The high and low points of the resulting temperature "swing" (differential) in the oven must be measured-and averaged-to determine the true operating temperature. A thermocouple type test instrument is best suited to measure these temperature changes quickly and accurately, and without opening the oven door.

With an accurate, thermocouple test instrument or mercury thermometer, it is still difficult to measure these changing oven temperature and then, average them correctly. This is why we recommend that the thermocouple tip or the bulb of the thermometer be "weighted." Weighting (adding mass) to the test instrument compensates for oven temperature changes by making the test instrument less sensitive to these constant changes in temperature. **Note: How this weighting can be done is discussed later.**

Measuring these changing high and low temperatures points in an oven is possible with either type of test device without weighting but is subject to possible inaccuracies. This is most true at low temperature setting because, in this area, the function of "time" becomes a factor. The simple averaging of temperatures, then, may not produce the true operating temperature. "Weighting" provides the compensation for both time and temperature that is necessary. We produced (next page) test curves showing actual results in the low temperature area showing the difference in results when using an unweighted and a weighted thermocouple or thermometer. Tests were made with the same control, same oven and dial at 170° mark (not moved).



From the above, it can be seen that an error of 15° is possible. Chart #1, unweighted thermocouple indicates an erroneous average oven temperature of 185°. Chart #2, weighted thermocouple indicates the "average" or true temperature to be 170°.

### →WEIGHTING

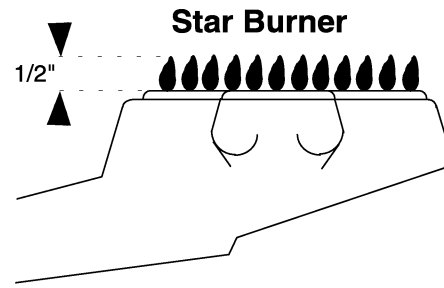
A thermocouple can be weighted by clamping the tip between two one-inch squares of 1/16" thick aluminum. The thermocouple can also be weighted (just as successfully) by using a letter-sized sheet of aluminum foil. Fold the foil

**2. Burner Gas/Air Adjustments**

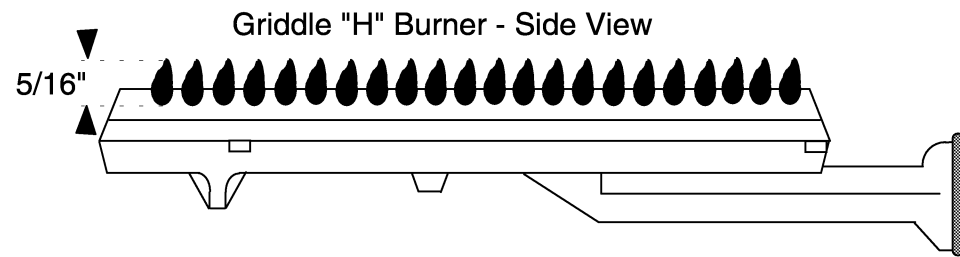
Variations in field conditions, rough handling of the equipment in transit may indicate the need for adjustment of primary air to the burners. Check operation and adjust as below to provide a sharp blue flame at full rate (open valve fully so that the thermostat is calling for maximum gas flow).

On the burner (star, "H" griddle, broiler, oven burners) locate the air shutter. Loosen the lock-nut so that the air shutter turns freely. Reinstall burner. Turn on gas flow and ignite burner. Rotate air shutter to obtain the following:

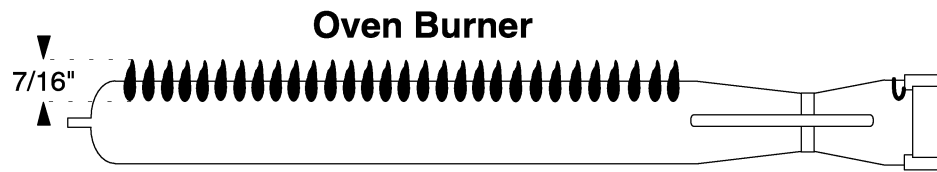
- a. Open (Star) Burner = 1/2" stable, sharp inner blue cones.



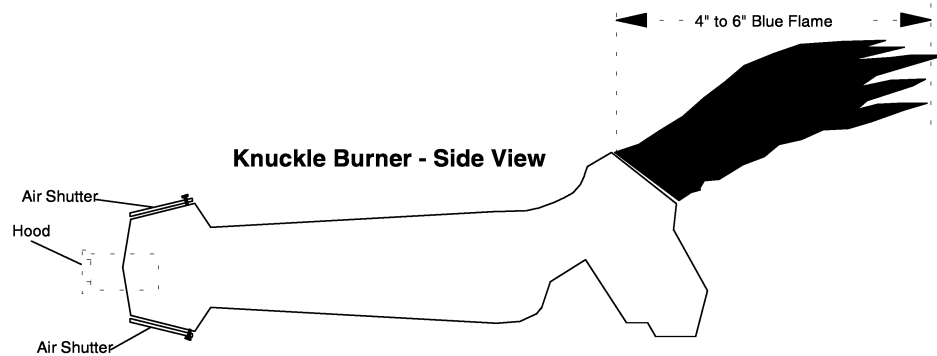
- b. Hot tops, griddles = 5/16" stable, sharp inner blue cones.



- c. Oven burners, if the burner flames are soft and unstable or show yellow tipping increase the amount of air by opening the air shutter.



- d. Knuckle burners = 4" to 6" stable, blue flame, slight yellow tips.



If the burner flames are sharp but lift off the burner ports, reduce the amount of primary air by closing the air shutter.

Model 44-40R,S,T, 44-40RC, 42-40R,S,T, 42-40RC, 40-4S, 40-4T  
 Four Open Burner Range (Primary Use: General Pan Cooking, Oven - General Purposes)

BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
Range Oven & RC (1987 to July 1991)	NAT 40,000/PRO 35,000	#35F	#51F
Range Oven & RC (July 1991 to Present)	35,000	#35F	#51F
Oven Pilot (1974 to July 1993)	708	.018"	.010"
Oven Pilot (July 1993 to Present)	892	.021"	.011"
Open (April 1987 to Dec. 1993)	20,000	#52F	#55F
*Open (October 1993 to Present)	30,000	#41	#52F
Hot Top (April 1987 to Present)	30,000	#48F	#52F

\*Open Top Burner was standard as 20,000 B.T.U. and Offered as an OPTION a 30,000 B.T.U. In October 20, 1994 the 30,000 B.T.U. Open Top Burner was a Standard Feature and the 20,000 B.T.U. Burner was Dropped from Production.

Model 45-40R,S,T, 45-40RC, 40-5S, 40-5T  
 Spectro-Heat Range (Primary Use: Top - Sauté, Oven - General Purposes)

BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
Range Oven & RC (1987 to July 1991)	NAT 40,000/PRO 35,000	#35F	#51F
Range Oven & RC (July 1991 to Present)	35,000	#35F	#51F
Spectro-Heat Burner	NAT 15,000/PRO 11,000	#51F	#63F
Pilot Burner Oven & Top (1975 to July 1993)	708	.018"	.010"
Pilot Burner Oven & Top (July 1993 to Present)	892	.021"	.011"

Model 46-40R,S,T, 46-40RC, 40-6S, 40-6T  
 Even-Heat Hot Top Range (Primary Use: Top - Stock Pots, Oven - General Purposes)

BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
Range Oven & RC (1987 to July 1991)	NAT 40,000/PRO 35,000	#35F	#51F
Range Oven & RC (July 1991 to Present)	35,000	#35F	#51F
Hot Top	30,000	#43F	#52F
Pilot Burner Oven & Top (1975 to July 1993)	708	.018"	.010"
Pilot Burner Oven & Top (July 1993 to Present)	892	.021"	.011"

Model 47-40R,S,T, 47-40RC, 40-7S, 40-7T

Fry Top - Valve Controlled Range (Primary Use: Top - Frying, Oven - General Purposes)

BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
Range Oven & RC (1987 to July 1991)	NAT 40,000/PRO 35,000	#35F	#51F
Range Oven & RC (July 1991 to Present)	35,000	#35F	#51F
Hot Top	30,000	#43F	#52F
Pilot Burner Oven & Top (1975 to July 1993)	708	.018"	.010"
Pilot Burner Oven & Top (July 1993 to Present)	892	.021"	.011"

Model 48-40R,S,T, 48-40RC

Fry Top - Thermostatically Controlled Range  
(Primary Use: Top - Frying, Oven - General Purposes)

BURNER TYPE	B.T.U.	NATURAL ORIFICE	PROPANE ORIFICE
Range Oven & RC (1987 to July 1991)	NAT 40,000/PRO 35,000	#35F	#51F
Range Oven & RC (July 1991 to Present)	35,000	#35F	#51F
Hot Top	30,000	#43F	#52F
Pilot Burner Oven & Top (1975 to July 1993)	708	.018"	.010"
Pilot Burner Oven & Top (July 1993 to Present)	892	.021"	.011"

Heavy Duty Series Gas Pressure:

Natural Gas Pressure Measured at Manifold Tap = 6.0" W/C  
Propane Gas Pressure Measured at Manifold Tap = 10.0" W/C

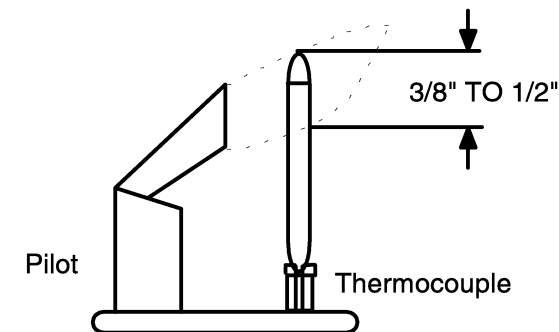
## SECTION 5: ADJUSTMENTS

The top and oven orifices are fixed and cannot be adjusted. Proper rate is attained if the gas supply pressure is adequate. Pressure may be checked by using the 1/8" N.P.T manifold pressure tap. A properly adjusted air shutter will provide for a distinct blue flame over the entire port area of the burners when at full rate.

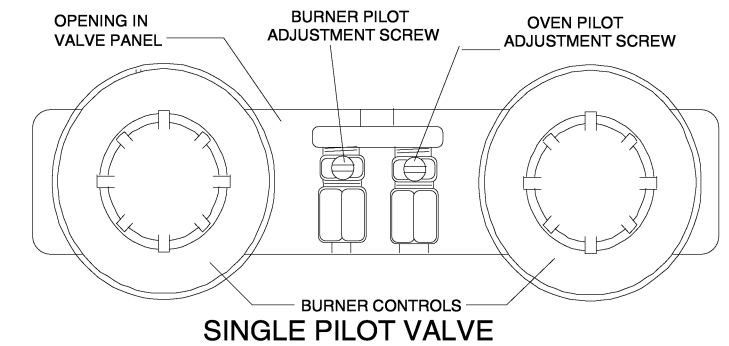
### 1. Pilot Adjustment

All pilot adjustment valves are mounted on the range top manifold as illustrated below.

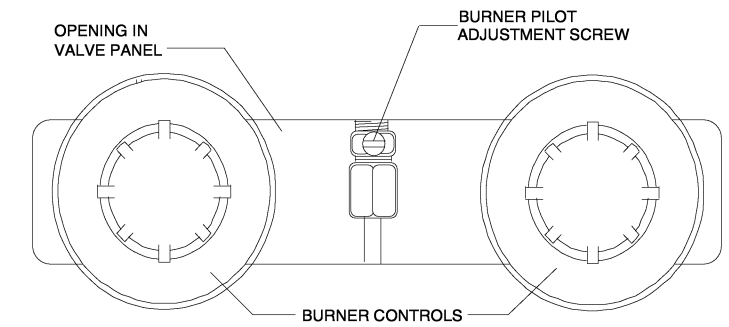
- If required the open burner pilot should be adjusted so that the tip of the pilot flame reached the middle of the flash tube opening. This flame may show a slight yellow tip.
- The pilot burner for the griddle or hot top burner should provide for rapid ignition of the burner but should not impinge on any part of the burner. When properly adjusted it should neither lift off the burner nor should it show a yellow tip.
- Oven pilot should reach and engulf the tip of the thermocouple as illustrated below. If the pilot flame fully engulfs the thermocouple premature failure will occur.



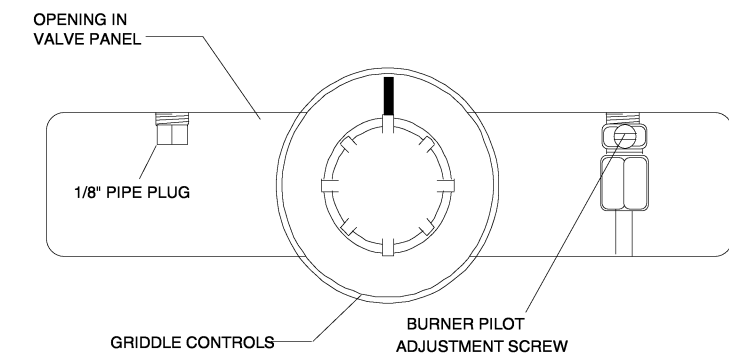
### DOUBLE PILOT VALVE



### SINGLE PILOT VALVE



### GRIDDLE PILOT VALVE



The motor on the range convection oven is maintenance free since it is constructed with self-lubricating sealed ball bearings. It is designed to provide durable service when treated with ordinary care. We have a few suggestions to follow on the care of your motor.

- A. **NEVER** operate the oven without convection oven fan. Use of this oven without the convection fan you will cause premature motor failure!
- B. When the motor is operating, it cools itself internally by air entering the rear of the motor case, provided proper clearance has been allowed.
- C. Since the blower wheel is in the oven cavity it is at the same temperature as the oven. If the motor is stopped while the oven is hot, the heat from the blower wheel is conducted down the shaft and into the armature of the motor. This action could shorten motor life.
- D. We recommend, at the end of the bake or roasting period, when the oven will be idle for any period of time or before shutting down completely, that the doors be left open, and by use of the cool-down position on the fan switch, the fan continues to run for at least 20 minutes. The "FAN" should never be turned "OFF" when the oven is "HOT".

**- NOTES -**

**SECTION 3: HOW TO DETERMINE THE AGE OF EQUIPMENT**

Utilized since 1986 are MANUFACTURING DATE CODES. An alphabetical character indicates the year, ( G=1986, H=1987, etc.), and two digits indicate the month, (01=Jan., 02=Feb, etc.).

Example: G02=February, 1986

Prior to 1986, the manufacturing code was FO1, ( Factory #1), and had no chronological meaning.

**This information is for your in-house use only. I trust it is of benefit to you.**

As a guide, following are sequences of GARLAND Warranty Numbers and their related dates to help you date equipment and parts usage.

NOTE: GARLAND Warranty Numbers are 6 digits, (WN\_ \_ \_ \_ \_), include no letters, and are not a representation of any date.

NUMBER	DATE	NUMBER	DATE	NUMBER	DATE
033000	6/74	140000	3/84	310000	5/90
035000	10/74	150000	8/84	320000	9/90
040000	5/75	160000	4/85	330000	1/91
045000	1/76	170000	9/85	335000	4/91
050000	8/76	180000	3/86	340000	6/91
055000	3/77	190000	9/86	345000	10/91
060000	10/77	200000	11/86	350000	1/92
065000	4/78	210000	3/87	355000	5/92
070000	10/78	220000	7/87	360000	8/92
075000	5/79	230000	10/87	365000	10/92
080000	11/79	240000	3/88	370000	1/93
090000	10/80	250000	6/88	375000	5/93
100000	7/81	260000	10/88	380000	8/93
110000	3/82	270000	1/89	385000	11/93
120000	1/83	280000	5/89	390000	1/94
130000	8/83	290000	9/89	395000	5/94
		300000	1/90		

## SECTION 4: OPERATION OF CONTROLS

**CAUTION:** Gas will flow to top burners even with top pilots out. Gas will not be interrupted. It is the responsibility of the operator to check the ignition of the burners. ***SHOULD IGNITION FAIL AFTER 10 SECONDS, TURN BURNER VALVE OFF AND WAIT 5 MINUTES AND TRY AGAIN.***

**OPEN TOP BURNERS** - All Models Where Applicable, i.e. H286, 43-40R, 44-40RC

1. Remove top grates and ring grates.
2. Check flash tubes to see they are properly positioned on burner charge ports.
3. Light pilots.
4. Replace top grates and ring grates.
5. Turn valve completely on. Burner flame should be 1/2" stable blue flame and should impinge on the underside of pot placed on ring grate.

### **SHUT DOWN**

1. Turn all valves to the "OFF" position.
2. If the unit is to be shut down for an extended period of time, close the in line gas valve.

**HOT TOP SECTIONS** - All Models Where Applicable, i.e. H286-1, P284-3, 46-40S, 43-40-1R, 42-40RC

1. Raise or remove hot top sections. Every burner has one pilot located at the front right side of the burner.
2. Light pilots. The pilot burner should be adjusted to provide for rapid ignition on the burner.
3. Turn burner valve on. A sharp blue flame should be approximately 1/4" high.
4. Replace hot top sections.

### **THERMOSTATIC CONTROLLED GRIDDLES**

1. Raise griddle at front and block.
2. Light pilots located at the front right side of each burner.
3. Sensing bulbs must be fully inserted into their individual holders which are located on the underside of the griddle.
4. Set thermostat to maximum, one at a time. Burner should have a 5/16" stable blue flame.
5. Lower griddle carefully into position taking extreme caution not to leave any part of the capillary tube in the burner compartment.

### **VALVE CONTROLLED GRIDDLES**

1. Raise griddle at front and block.
2. Light pilots located at the front right side of each burner.
3. Turn burner valves on to full position. Burners should have 1/2" to a 5/8" stable blue flame.
4. Lower griddle into position.

### **BROILER GRIDDLE (H/P283,282,285,281)**

Before turning main gas supply on, make sure all valves are in the off position.

1. Light pilots located in broiler section. Left pilot is a tee, (double pilot) to control left and center burners. Right pilot controls right burner.
2. Turn valves completely on. Burner should have a 5/16" stable blue flame.

**ALL UNITS ARE TESTED AND ADJUSTED AT THE FACTORY. HOWEVER, BURNER AND PILOTS SHOULD BE CHECKED AT TIME OF INSTALLATION AND ADJUSTED IF NECESSARY.**

## **STANDARD OVEN**

### **A. LIGHTING**

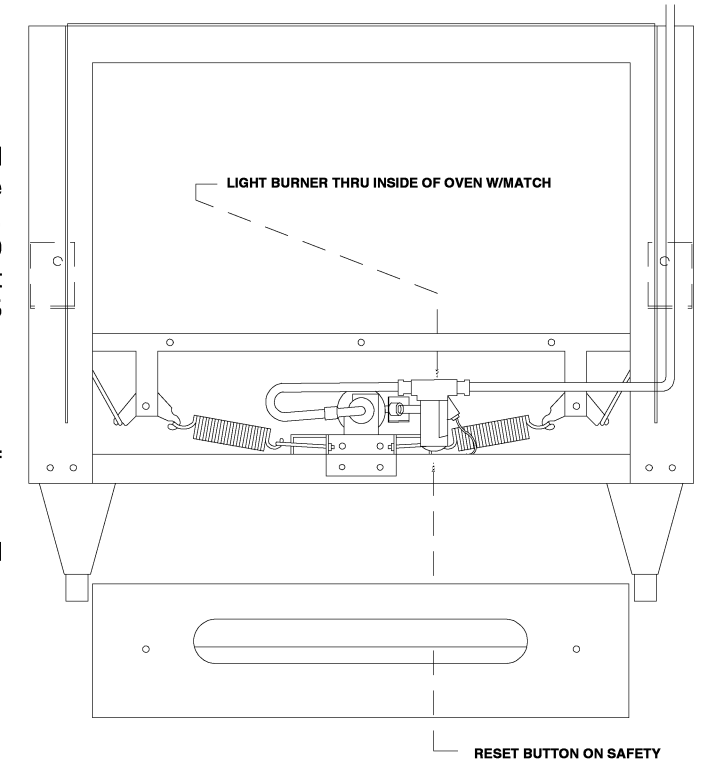
1. Remove oven bottoms.
2. Depress and hold reset button (red) located at the lower front of the oven (beneath the oven door) while lighting the oven pilot. Continue to depress the reset button for 60 seconds. Release button. If pilot does not stay lit, repeat this procedure after 5 minutes.

### **B. SHUT DOWN**

1. Turn all valves and thermostats to the off position.
2. If range is to be shut down for an extended period of time, close the in line gas valve.

### **C. RELIGHTING**

1. Shut all gas valves off.
2. Wait 5 minutes.
3. Repeat lighting instructions in section "A" above.



## **"RC" BASE OVENS (This section pertains to the forced air unit)**

For 115v usage, a cord and plug is provided but connection to the electrical service must comply with local codes; or in the absence of local codes, with the National Electrical Code, ANSI/NFPA No. 70-(current edition).

A wiring diagram is attached to the rear of this unit for your use.

### **A. Lighting Instructions**

1. Using the access through the louver panel hold the reset button (RED) located on the oven safety valve. (See prior)
2. Using the access hole located below the louver in the panel, push the RED IGNITOR BUTTON continuously until the oven pilot ignites. (See prior)
3. If the pilot does not stay lit after you release the reset button, wait 5 minutes and repeat Step 2 and hold the reset button approximately 60 seconds.

### **B. Start Up**

1. Activate the power switch to cook position.
2. Turn oven valve on. Turn thermostat to desired setting.

### **C. Cool Down**

1. Turn thermostat and oven valve off.
2. Open door.
3. Activate power to the cool down position.

### **D. Shut Down**

1. Turn thermostat off.
2. Return power switch to "OFF" position.
3. Turn oven valve off.

