Cleveland

Service Manual

BMR-32 ROTISSERIE CONVECTION OVEN

BMR-32
REV. 1/3/01

Contents

Section 1 - Service Assembly Drawings

Section 2 - Overview of Systems and Functions

Section 3 - Computer, Keypad, and Progamming

Section 4 - Troubleshooting Procedures

Section 1

Assembly Drawings

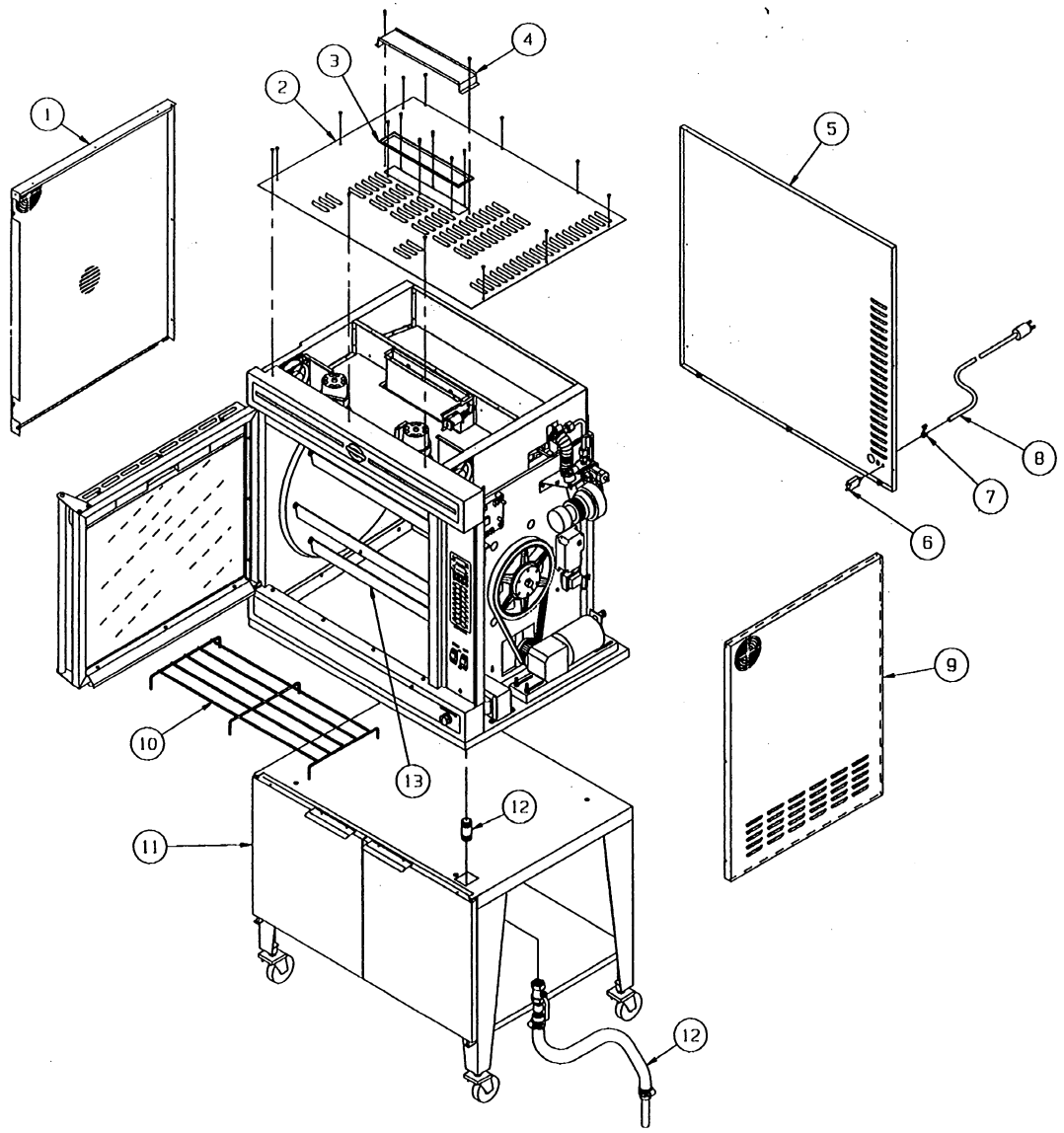
This drawing shows, in addition to the outer sheet metal, the various external and accessory components that make up a complete rotisserie installation

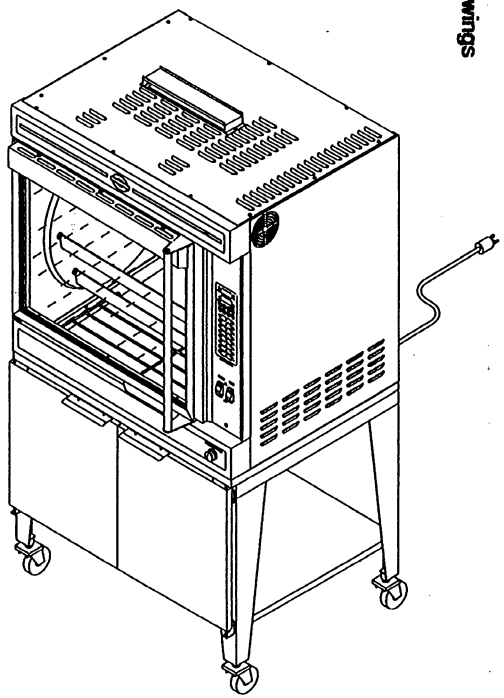
Not shown is the stainless steel Left / Right Side Panel (an appearance item), which can be attached to either side of the stand. It is available as a kit, with screws and nuts, part number 107514.

Also not shown, but available, are Turkey Baskets, Turkey Basket Wrenches, Skewer Cart, Skewer Handling Tools, Skewer Adapter Holder for Countertop, set of Four Light Bulbs and Five Fuses, and a set of 8 Planetary Bearings.

Stand and Outer Sheeting

ASY001





ITEM	QTY.	PART NO.	DESCRIPTION
13	8	WR01075	SKEWER ASSEMBLY, WELDMENT
12	1	107442	KIT ASSEMBLY, DRAIN - ROTISSERIE STAND
11	1	WR00919	STAND ASEMBLY (CBS32)
10	1	WR00022	RACK, ANTI-SPLASH
9	1	WR010931	PANEL ASSEMBLY, RIGHT SIDE, PAINTED
8	1	106461	CORD ASSEMBLY, 3-WIRE, ELEC.
7	1	106579	BUSHING, STRAIN RELIEF (HEYCO 1200)
6	1	WR50263	CIRCUIT BREAKER, 1.8 AMP
5	1	WR01092	PANEL ASSEMBLY, BACK BODY
4	1	WR50243	COVER, VENT, TOP
3	1	WR50251	VENT SEAL
2	1	WR51084	PANEL, TOP BODY
1	1	WR510851	PANEL, LEFT SIDE, PAINTED

CLEVELAND RANGE INC. 1333 East 179th St. Cleveland, Ohio 44110-2574	BOSTON MARKET ROTISSERIE	STAND AND OUTER SHEETING	ASY001

Interior Frame Assembly

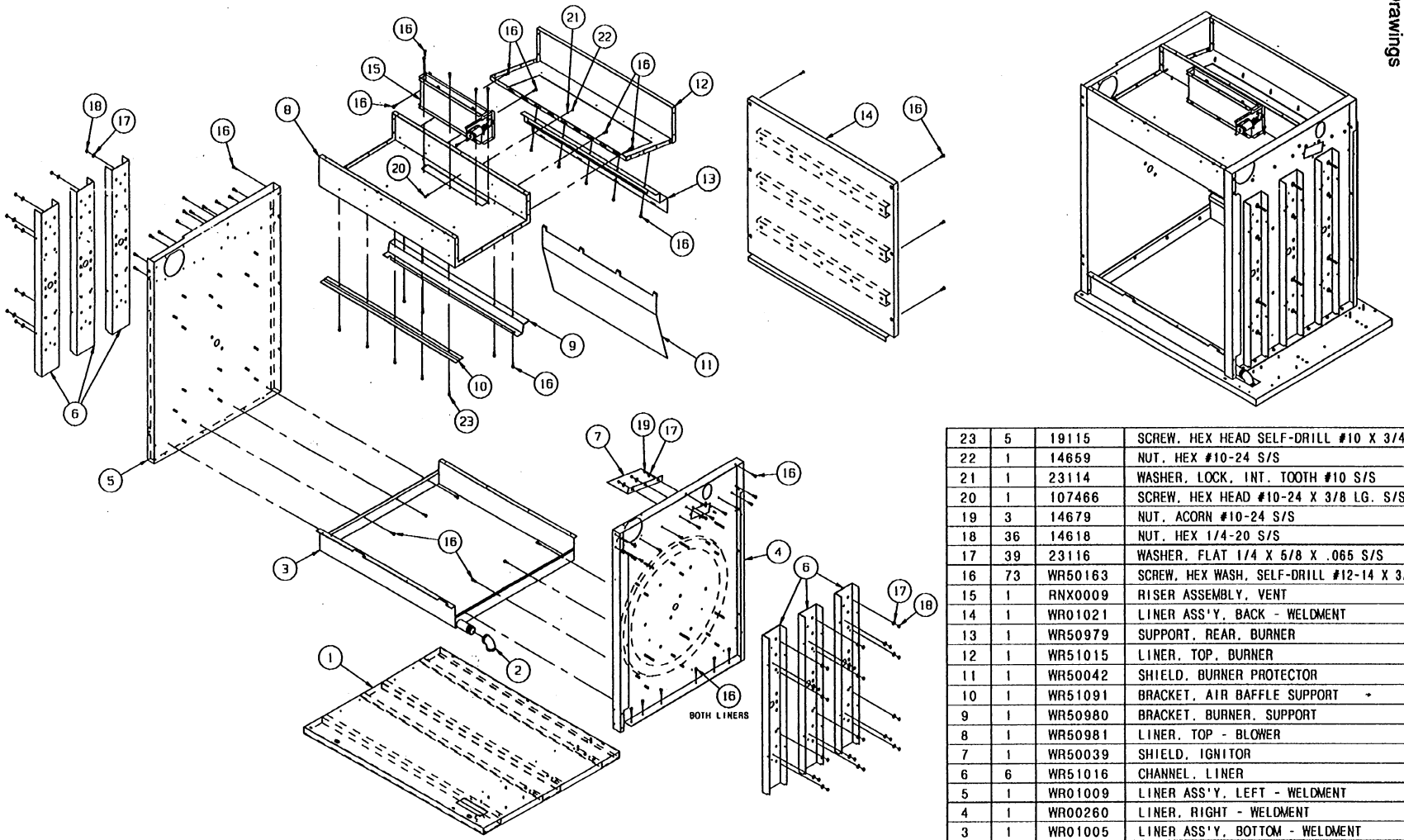
ASY002

This drawing shows the sheet metal weldments and assemblies that make up the interior of the oven.

Of importance to service personnel are:
the Burner Protector Shield (#11)
two Support pieces (#9 and #13)

The Burner Protector Shield, during normal operation, hangs out-of-the-way at the rear of the oven. During daily oven maintenance, the shield is manually swung forward and upward to cover the surface of the ceramic burner. The shield is held in place while the oven interior is cleaned and a fresh application of Kote is applied to oven surfaces. If the shield is not used during the Kote application, the burner surfaces will eventually become clogged, seriously affecting the oven's performance.

The two support pieces (#9 and #13), in addition to being structural elements, are vital positioning members for the sheet metal "jet plate." The jet plate (#19 on dwg ASY002) must be properly positioned. Both the front and rear edges of the jet plate must be engaged in these two support pieces for proper oven convection (and the resultant proper appearance and doneness of the product).



ITEM	QTY.	PART NO.	DESCRIPTION
23	5	19115	SCREW, HEX HEAD SELF-DRILL #10 X 3/4 LG.
22	1	14659	NUT, HEX #10-24 S/S
21	1	23114	WASHER, LOCK, INT. TOOTH #10 S/S
20	1	107466	SCREW, HEX HEAD #10-24 X 3/8 LG. S/S
19	3	14679	NUT, ACORN #10-24 S/S
18	36	14618	NUT, HEX 1/4-20 S/S
17	39	23116	WASHER, FLAT 1/4 X 5/8 X .065 S/S
16	73	WR50163	SCREW, HEX WASH, SELF-DRILL #12-14 X 3/4 S/S
15	1	RNX0009	RISER ASSEMBLY, VENT
14	1	WR01021	LINER ASS'Y, BACK - WELDMENT
13	1	WR50979	SUPPORT, REAR, BURNER
12	1	WR51015	LINER, TOP, BURNER
11	1	WR50042	SHIELD, BURNER PROTECTOR
10	1	WR51091	BRACKET, AIR BAFFLE SUPPORT
9	1	WR50980	BRACKET, BURNER, SUPPORT
8	1	WR50981	LINER, TOP - BLOWER
7	1	WR50039	SHIELD, IGNITOR
6	6	WR51016	CHANNEL, LINER
5	1	WR01009	LINER ASS'Y, LEFT - WELDMENT
4	1	WR00260	LINER, RIGHT - WELDMENT
3	1	WR01005	LINER ASS'Y, BOTTOM - WELDMENT
2	1	05265	ELBOW, 1" NPT X 90°, BLACK
1	1	WR00054	BASE ASSEMBLY - WELDMENT

CLEVELAND RANGE INC.
1333 East 179th St. Cleveland, Ohio 44110-2574

BOSTON MARKET ROTISSERIE

INTERIOR FRAME ASSEMBLY

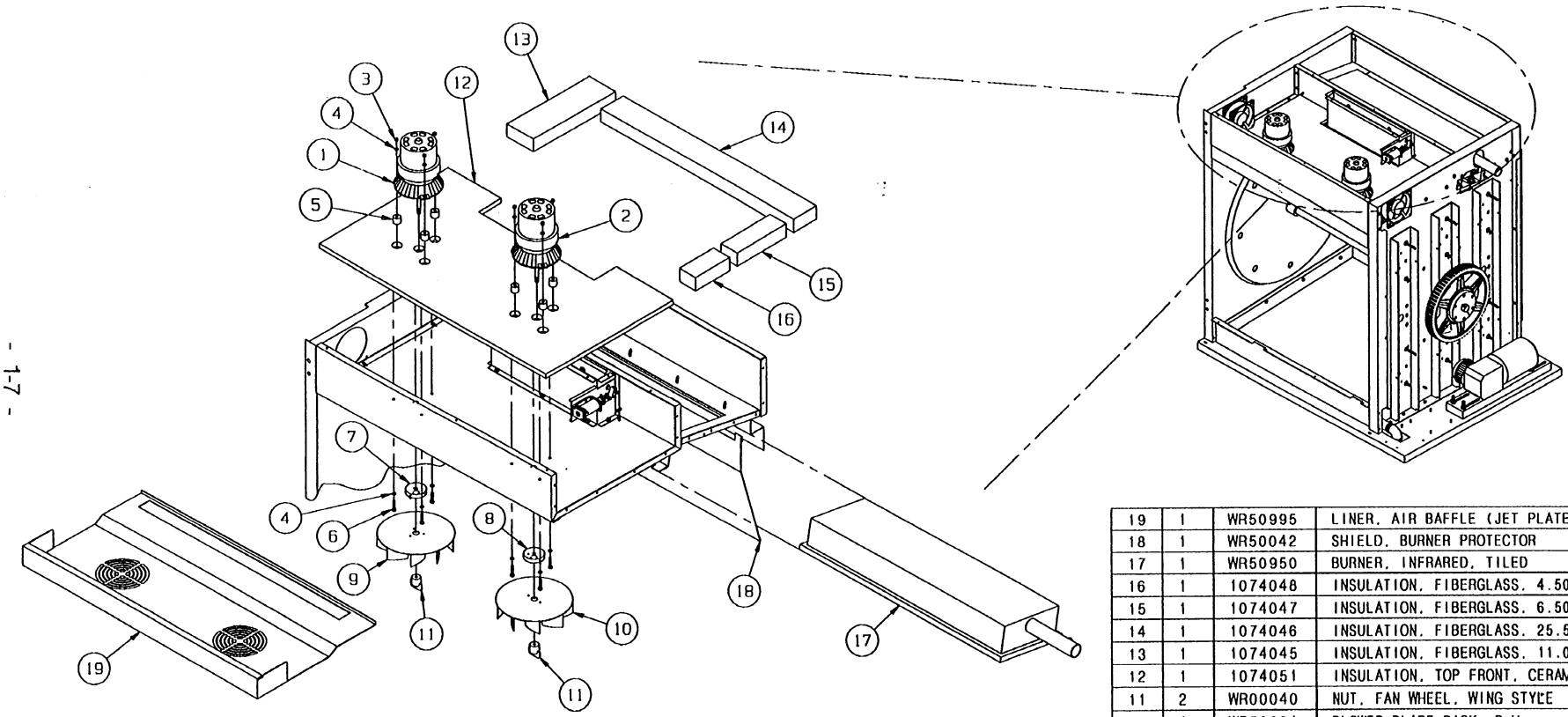
ASY002

This drawing shows assembly details of additional components in the upper part of the oven, including the two counter-rotating convection fans (# 1 and #2). Proper installation of these fans and motors is vital for proper convection air flow. The motor on the left (#1) rotates clockwise, viewed from the shaft end; the motor on the right (#2) rotates counter-clockwise.

Also note that the fan disks (#9 and #10) are different on each side, with the blades oriented in reverse directions. Further note that the disks are attached to unique motor shaft hubs (#8 and #9) that are guide-pinned to prevent improper installation. There are 3 guide pins on the left hub and 2 guide pins on the right hub.

Insulation (items 13 through 16 on this drawing, and numerous items on subsequent drawings) must be properly re-installed after servicing. All insulation supplied at the factory must be replaced, and edges that were taped at the factory must be re-taped to retain compliance with food equipment codes.

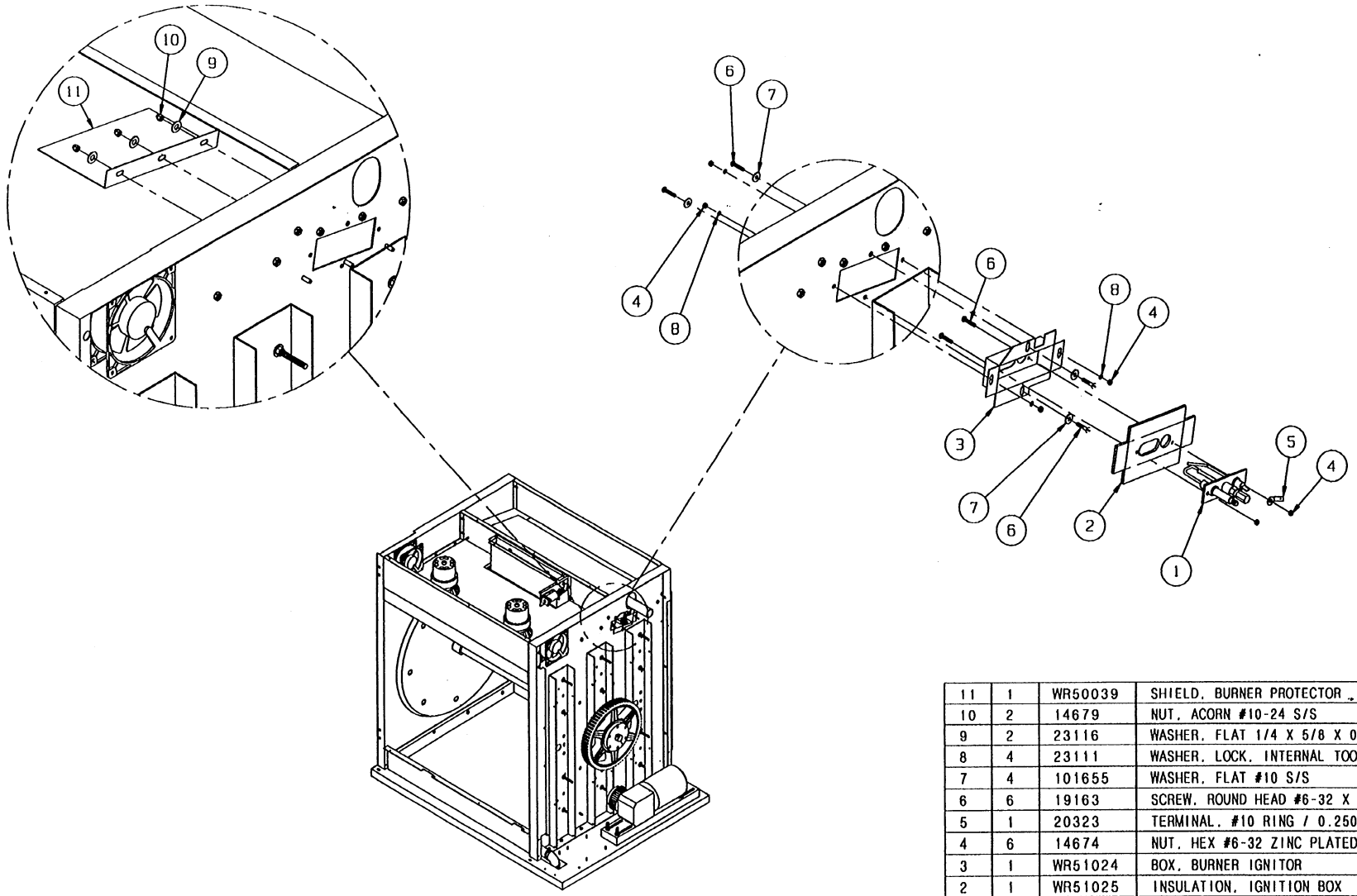
Burner/Convection Fan Assembly
ASY003



ITEM	QTY.	PART NO.	DESCRIPTION
19	1	WR50995	LINER, AIR BAFFLE (JET PLATE)
18	1	WR50042	SHIELD, BURNER PROTECTOR
17	1	WR50950	BURNER, INFRARED, TILED
16	1	1074048	INSULATION, FIBERGLASS, 4.500 X 2.125
15	1	1074047	INSULATION, FIBERGLASS, 6.500 X 2.125
14	1	1074046	INSULATION, FIBERGLASS, 25.500 X 3.000
13	1	1074045	INSULATION, FIBERGLASS, 11.000 X 3.500
12	1	1074051	INSULATION, TOP FRONT, CERAMIC BOARD
11	2	WR00040	NUT, FAN WHEEL, WING STYLE
10	1	WR50061	BLOWER BLADE DISK, R.H.
9	1	WR50062	BLOWER BLADE DISK, L.H.
8	1	WR00036	HUB ASSEMBLY, FAN - R.H.
7	1	WR00037	HUB ASSEMBLY, FAN - L.H.
6	6	106125	SCREW, TORX HEAD #10-32 X 1.750" LG.
5	6	195553	SPACER, 0.625" LG.
4	12	23114	WASHER, LOCK, INTERNAL TOOTH #10 S/S
3	6	14645	NUT, HEX #10-32 ZINC PLATED
2	1	WR50101	MOTOR, CONVECTION FAN, C.C.W. ROTATION R.H
1	1	WR50102	MOTOR, CONVECTION FAN, C.W. ROTATION L.H.

Ignitor Assembly

ASY004

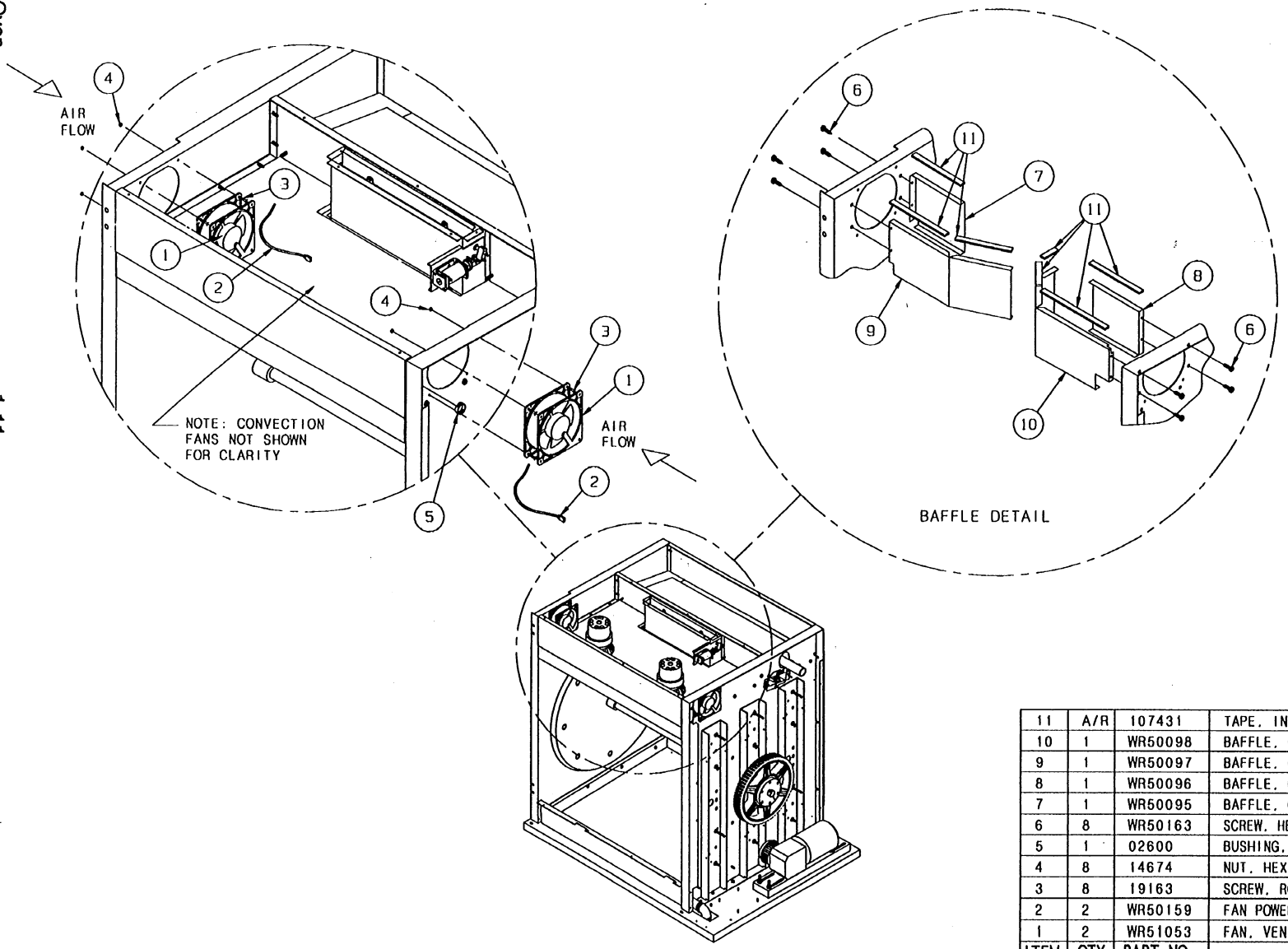


ITEM	QTY.	PART NO.	DESCRIPTION
11	1	WR50039	SHIELD, BURNER PROTECTOR
10	2	14679	NUT, ACORN #10-24 S/S
9	2	23116	WASHER, FLAT 1/4 X 5/8 X 0.065 S/S
8	4	23111	WASHER, LOCK, INTERNAL TOOTH #6 ZINC PLT.
7	4	101655	WASHER, FLAT #10 S/S
6	6	19163	SCREW, ROUND HEAD #6-32 X 3/4" LG.
5	1	20323	TERMINAL, #10 RING / 0.250 MALE TAB
4	6	14674	NUT, HEX #6-32 ZINC PLATED
3	1	WR51024	BOX, BURNER IGNITOR
2	1	WR51025	INSULATION, IGNITION BOX
1	1	WR51026	IGNITOR, 8100459 (NATURAL GAS ONLY)
		WR510261	IGNITOR, 8100609 (LP GAS ONLY)

CLEVELAND RANGE INC. 1333 East 179th St. Cleveland, Ohio 44110-2574	BOSTON MARKET ROTISSERIE	IGNITOR ASSEMBLY	ASY004

This drawing shows assembly details of the ventilating ("boxer") fans (#1), vital in keeping the convection fan motors cool. Note: both these cooling fans are installed so that air flows inwards into the convection motor cavity, through the baffled paths.

Air Performance Fan Assembly
ASY005



ITEM	QTY.	PART NO.	DESCRIPTION
11	A/R	107431	TAPE, INSULATION, SELF-ADHESIVE
10	1	WR50098	BAFFLE, COOLING, RIGHT FRONT
9	1	WR50097	BAFFLE, COOLING, LEFT FRONT
8	1	WR50096	BAFFLE, COOLING, RIGHT REAR
7	1	WR50095	BAFFLE, COOLING, LEFT REAR
6	8	WR50163	SCREW, HEX WASH SELF-DRILL #12-14 X 3/4 LG
5	1	02600	BUSHING, INSULATOR, HEYCO SB-875-11
4	8	14674	NUT, HEX #6-32 ZINC PLATED
3	8	19163	SCREW, ROUND HEAD #6-32 X 3/4 LG.
2	2	WR50159	FAN POWER CORDSET, 24" LG. PLUG STYLE
1	2	WR51053	FAN, VENTILATING, AIR PERFORMANCE

CLEVELAND RANGE INC.
1333 East 179th St. Cleveland, Ohio 44110-2574

BOSTON MARKET ROTISSERIE

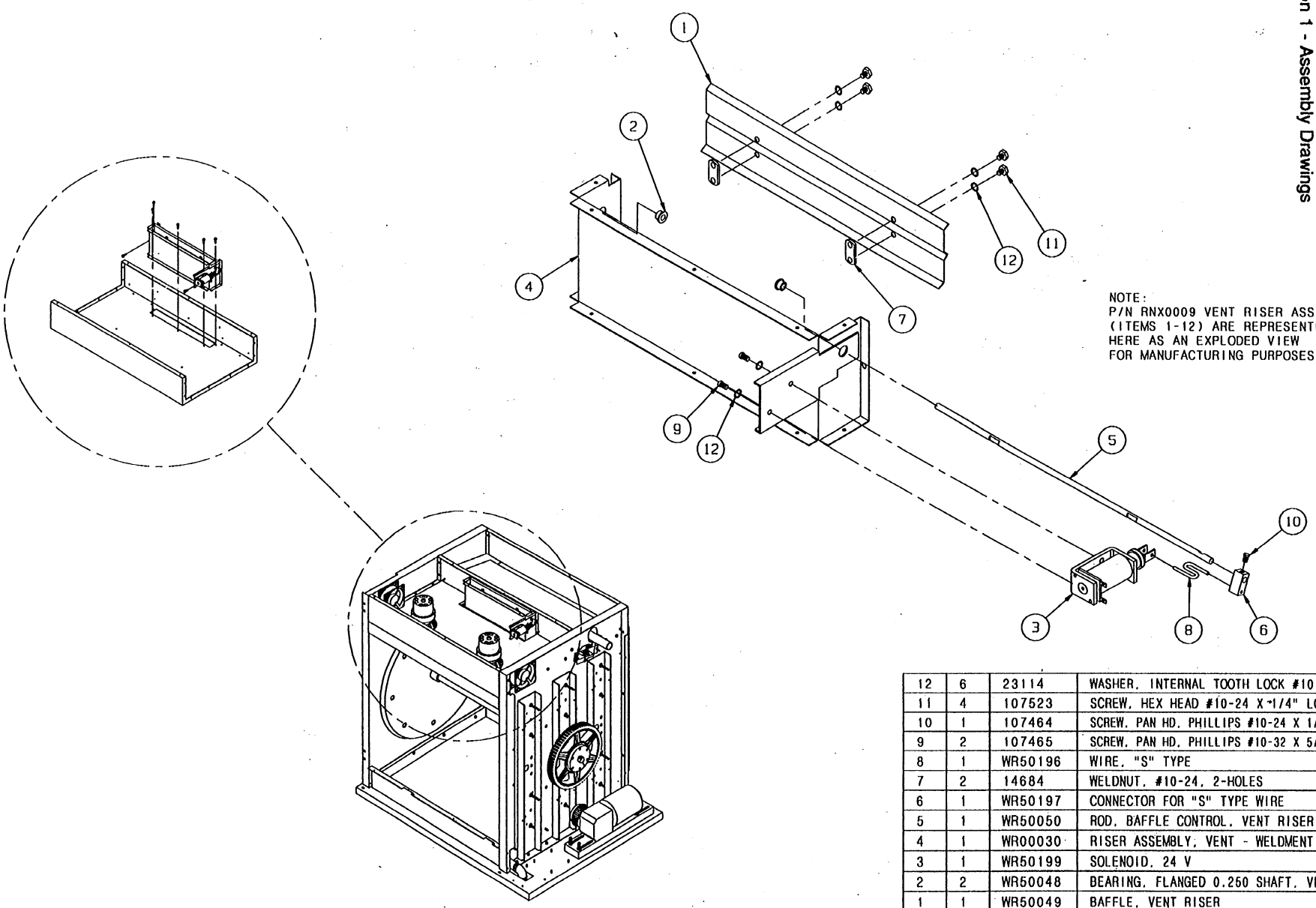
AIR PERFORMANCE FAN ASSEMBLY

ASY005

This is a detail of the exhaust vent assembly, which is used to control temperature during cooking. The 24 volt DC solenoid (#3) is energized to open the vent baffle (#1) - an integral spring returns the vent to the closed position when the solenoid is de-energized. When troubleshooting, make sure that the baffle and solenoid armature travel freely without any hang-ups. The baffle bearings (#2) do not need lubrication.

Vent Riser Assembly

ASY006



NOTE:
P/N RNX0009 VENT RISER ASSY.
(ITEMS 1-12) ARE REPRESENTED
HERE AS AN EXPLODED VIEW
FOR MANUFACTURING PURPOSES

ITEM	QTY.	PART NO.	DESCRIPTION
12	6	23114	WASHER, INTERNAL TOOTH LOCK #10 S/S
11	4	107523	SCREW, HEX HEAD #10-24 X 1/4" LG S/S
10	1	107464	SCREW, PAN HD, PHILLIPS #10-24 X 1/4" LG S/S
9	2	107465	SCREW, PAN HD, PHILLIPS #10-32 X 5/16" LG S/S
8	1	WR50196	WIRE, "S" TYPE
7	2	14684	WELDNUT, #10-24, 2-HOLES
6	1	WR50197	CONNECTOR FOR "S" TYPE WIRE
5	1	WR50050	ROD, BAFFLE CONTROL, VENT RISER
4	1	WR00030	RISER ASSEMBLY, VENT - WELDMENT
3	1	WR50199	SOLENOID, 24 V
2	2	WR50048	BEARING, FLANGED 0.250 SHAFT, VENT RISER
1	1	WR50049	BAFFLE, VENT RISER

CLEVELAND RANGE INC. 1333 East 179th St. Cleveland, Ohio 44110-2574	BOSTON MARKET ROTISSERIE	VENT RISER ASSEMBLY	ASY006

Gear Drive Assembly

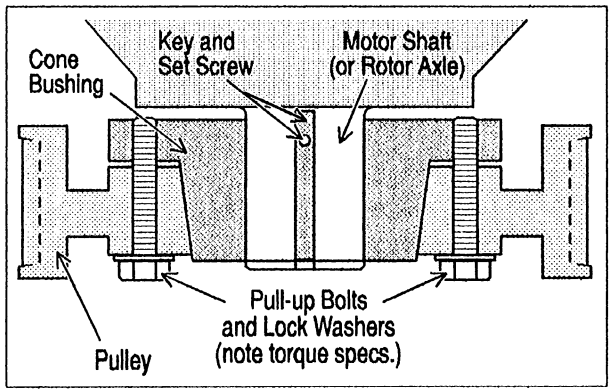
ASY007

This drawing shows exploded views of the rotisserie drive system, along with various assembly details of the axle and drums, the sun and planetary gears, and the motor drive system.

The axle (#4) turns in two bearings (#31) mounted to each side wall; note the gaskets (#33) used to seal the bearings. The idler and drive end drums (#2 and #8) are axially aligned with the axle by means of hub slots that engage with spring pins (#3) pressed through the axle. The drums are then secured to the axle by cap screws (#1) that engage a flat machined into the axle (see also details A and B). These cap screws are specially machined and plated for this purpose -DO NOT SUBSTITUTE.

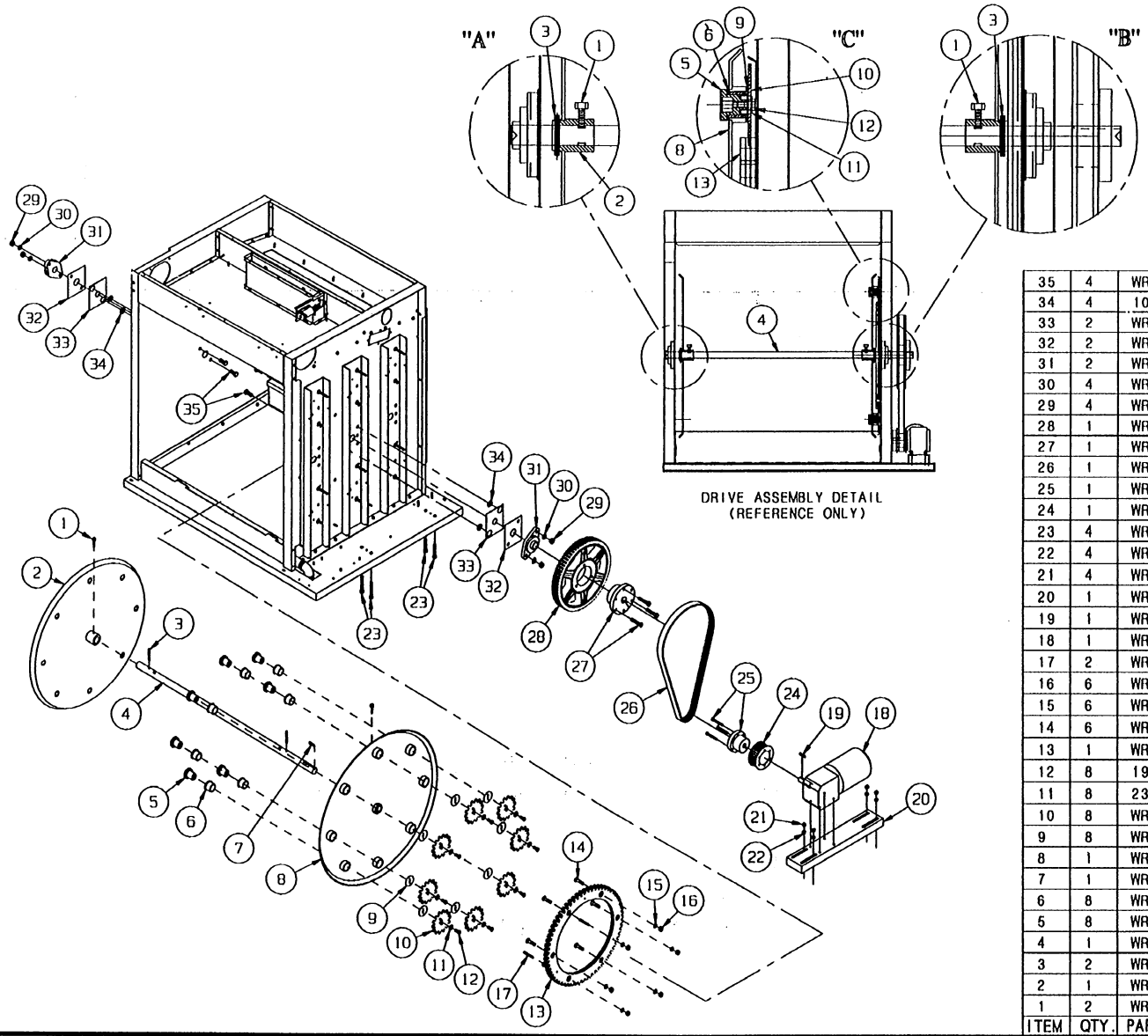
The drums occasionally may need to be moved inwards on the axle when cleaning the oven. When returning the drums to proper position, make sure the cap screws line up with the flats on the axle, and the slots in the hubs engage the spring pins before tightening the cap screws. Also, when returning the drive end drum assembly to position, rotationally jog the drum so the planetary gears (#10) mesh with the sun gear (#13; see detail C), then engage the hub with the right-hand spring pin. No lubrication is required for the sun and planetary gears.

Special tapered-cone bushings (#25, 0.750-inch shaft, and #27, 1.000-inch shaft) are used to secure the drive pulleys (#24 and #28) to the gearmotor shaft (#18) and the rotisserie axle (#4). The bushing is assembled to the shaft using a keyed/slot and set screw (screw "hand tight" only). The pulleys are then slid over the tapered bushing cones (all cone surfaces must be clean and dry). When assembling, align the through-drilled bolt holes in the pulley with the drilled-and-tapped holes in the bushing. Pull-up bolts (with lock washers) are then inserted through the pulley's drilled holes, threaded into the bushing's tapped holes, and tightened alternately and evenly to the following torques: a) the smaller, 0.750 shaft: 108 in-lbs.; b) the larger, 1.000-inch shaft:



360 in-lbs. (To remove the pulleys, the pull-up bolts must be removed and threaded into the pulley's tapped holes and brought to bear on the bushing's flange. The cone grip is then broken by alternately tightening the bolts.)

Adjust the tension of the drive belt (#26) so that you can twist the belt, by hand, no more than half a twist. Tension is adjusted by sliding the motor support bracket in its slots and tightening the hex nuts (#21).



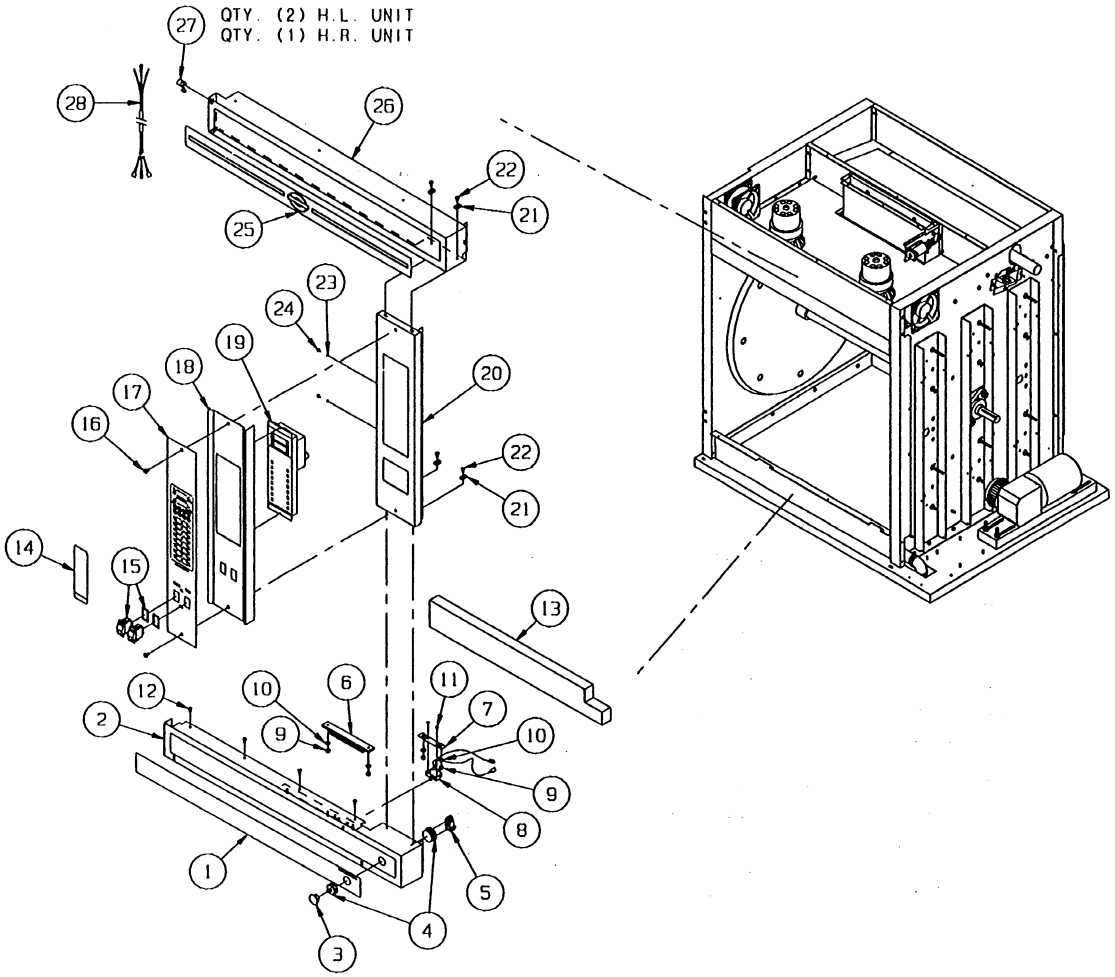
ITEM	QTY.	PART NO.	DESCRIPTION
35	4	WR50166	BOLT, HEX HEAD 7/16-14 X 1-1/2 18-8 S/S
34	4	101768	WASHER, FLAT 0.515 X 0.875 X 0.063
33	2	WR50072	GASKET, SHAFT, SILICONE RUBBER
32	2	WR50073	PLATE, GASKET RETAINER, SHAFT
31	2	WR50074	BEARING, FLANGE 1.00" DIA. MAIN SHAFT
30	4	WR50169	WASHER, LOCK 7/16 18-8 S/S
29	4	WR50168	NUT, FULL HEX 7/16-14 18-8 S/S
28	1	WR50081	PULLEY, DRIVE-TIMING BELT
27	1	WR50079	BUSHING, SPLIT 1.00" DIA. SHAFT
26	1	WR50078	BELT, TIMING 51.00" LG. X 1.00" W.
25	1	WR50080	BUSHING, SPLIT 0.750" DIA. SHAFT
24	1	WR50082	PULLEY, MOTOR-TIMING BELT
23	4	WR50160	BOLT, CARRIAGE 5/16-18 X 2-1/2 ZINC PLT.
22	4	WR50162	WASHER, LOCK 5/16 ZINC PLATED
21	4	WR50161	NUT, HEX 5/16-18 ZINC PLATED
20	1	WR00035	BRACKET ASS'Y, MOTOR SUPPORT - WELDMENT
19	1	WR50134	KEY, 1/4 SQUARE X 2.00 LG.
18	1	WR51071	DC MOTOR, DRIVE, 1/4 HP 130 VOLTS
17	2	WR50132	PIN, SPRING 1/4 DIA. X 2.00 LG. S/S
16	6	WR50165	NUT, FULL HEX 3/8-16 18-8 S/S
15	6	WR50167	WASHER, LOCK 3/8 18-8 S/S
14	6	WR50164	SCREW, FLAT SOCKET CAP 3/8-16 X 1-1/2 S/S
13	1	WR00925	GEAR ASSEMBLY, DRIVE
12	8	192281	SCREW, HEX HEAD THD.LOC. 5/16-18 X 3/4
11	8	23120	WASHER, FLAT 3/8 X 7/8 X 1/16 ZINC PLTD.
10	8	WR00910	GEAR ASSEMBLY, SKEWER DRUM
9	8	WR50908	WASHER, THRUST DRUM
8	1	WR00928	DRUM ASSEMBLY, DRIVE END
7	1	WR50133	KEY, 3/16 SQUARE X 1.625 LG.
6	8	WR50906	BEARING, DRUM
5	8	WR50907	SOCKET, SKEWER, DRUM
4	1	WR50947	AXLE, DRUM
3	2	WR50132	SPRING PIN, 1/4 DIA. X 2.00 LG. S/S
2	1	WR00931	DRUM ASSEMBLY, IDLER END
1	2	WR509331	SCREW, HEX HEAD CAP, 3/8-16 UNC X 5/8 LG.

CLEVELAND RANGE INC. 1333 East 179th St. Cleveland, Ohio 44110-2574	BOSTON MARKET ROTISSERIE	GEAR DRIVE ASSEMBLY	ASY007

This drawing, in addition to showing the control panel assembly, also shows the door magnet and door switch, various top and bottom panels, and the lamp cord. Note that right-hand and left-hand door hinging is available, so some of the components have different part numbers for the two styles.

Front Panel Assembly

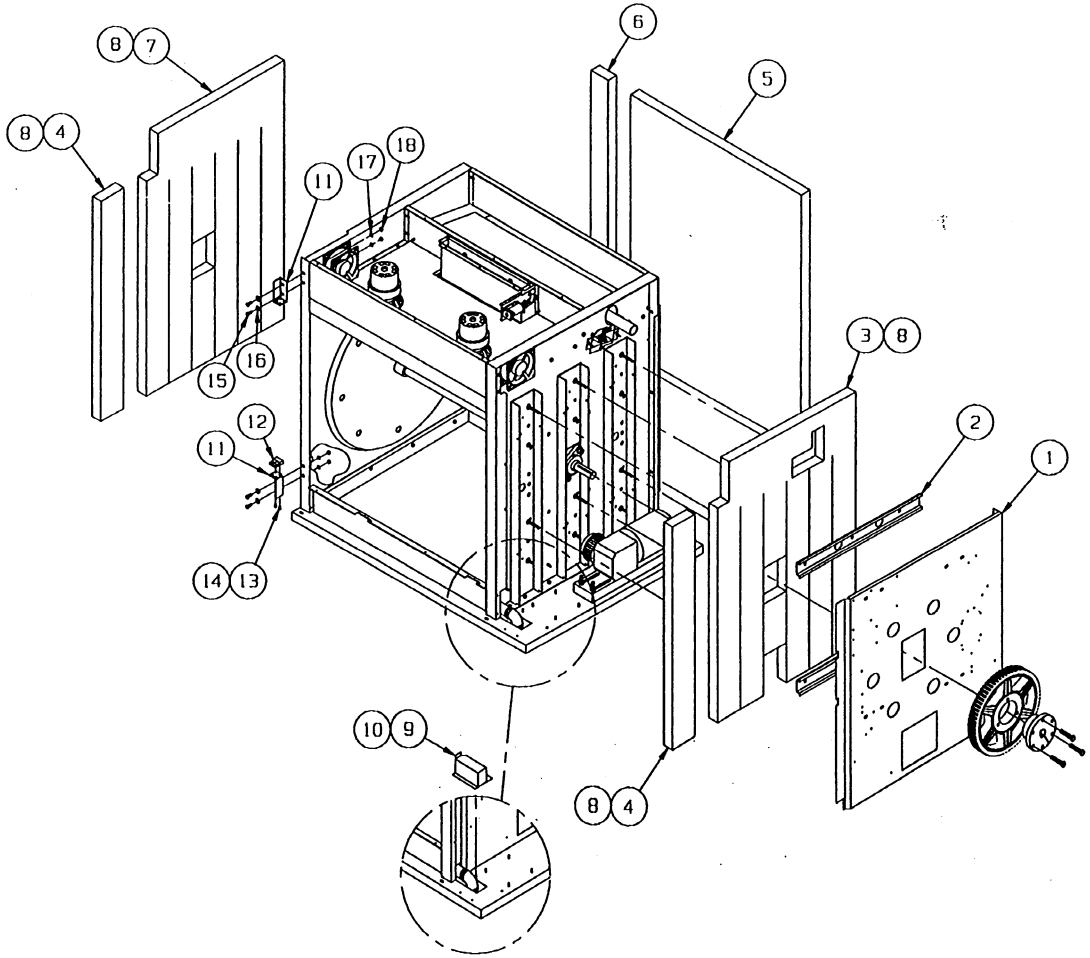
ASY008



ITEM	QTY.	PART NO.	DESCRIPTION
28	1	WR50267	CORD, LAMP, LIGHTING, H.R.
		WR50266	CORD, LAMP, LIGHTING, H.L.
27	-	WR50262	BUSHING, STRAIN RELIEF, RIGHT ANGLE
26	1	WR50261	BODY, TOP FRONT H.R.
		WR50260	BODY, TOP FRONT H.L.
25	1	WR50054	LABEL, TOP PANEL
24	2	14659	NUT, HEX #10-24 S/S
23	2	23114	WASHER, LOCK, INTERNAL TOOTH #10 S/S
22	4	101231	SCREW, TRUSS HEAD #10-24
21	4	106699	NUT, SLIP-ON #10-24
20	1	WR00237	SUPPORT ASSEMBLY, CONTROL PANEL
19	1	WR50092	COMPUTER, VERTICAL MODULAR
18	1	WR00255	PANEL ASSEMBLY, CONTROL - WELDMENT
17	1	WR50053	LABEL, CONTROL PANEL
16	2	191761	SCREW, TRUSS HEAD 1/4-20 X 1/2 S/S BLACK
15	2	106871	SWITCH, ROCKER, DPDT, ON/OFF, RED
14	1	WR50088	LABEL, MENU INSERT
13	1	1074802	INSULATION, BOTTOM FRONT 4 X 30 X 1.500
12	4	101231	SCREW, TRUSS HEAD #10-32 X 1/2 LG. S/S
11	2	105449	SCREW, TRUSS HEAD #6-32 X 0.312 LG. S/S
10	8	23116	WASHER, FLAT 1/4 X 5/8 X-.065 THK. S/S
9	4	14672	NUT, HEX LOCK ELASTIC #10-32
8	1	WR51051	SWITCH, MICRO, DOOR
7	1	WR50021	BRACKET, MICRO SWITCH MOUNTING
6	1	WR50976	MAGNET, DOOR
5	1	102533	BLOCK, CONTACT
4	1	WR51058	SWITCH, PUSHBUTTON OPERATOR
3	1	WR50179	BUTTON, PUSH 1-3/8" MUSHROOM HEAD
2	1	WR00259	BODY ASSY, FRONT LOWER, WELDMENT, H.R.
		WR00258	BODY ASSY, FRONT LOWER, WELDMENT, H.L.
1	1	WR50052	LABEL, BOTTOM PANEL, ROTISSERIE

Door hinge components come in left-hand and right-hand configurations, so be aware of the different part numbers. The bottom pad hinge (#12) has a brass door helper, which eases door closing and also holds the door open during product loading and unloading. Note the various sealants and adhesives called out in this drawing (#8, #10, and #14). Be sure to use insulation tape as installed at the factory to maintain compliance with food equipment codes.

Insulation and Door Hinge Assembly
ASY009



ITEM	QTY.	PART NO.	DESCRIPTION
18	4	14618	NUT, HEX 1/4-20 S/S
17	4	23105	WASHER, LOCK 1/4" KATLINK STYLE S/S
16	4	23116	WASHER, FLAT 1/4 X 5/8 X 0.065 THK S/S
15	4	19170	SCREW, HEX HEAD 1/4-20 X 0.625 LG S/S
14	A/R	104146	ADHESIVE, LOCKTITE THREAD LOCK #222
13	2	107524	SCREW, RD HD SLTD #10-32 X 0.375 LG S/S
12	1	WR50239	HINGE, BOTTOM PAD, DOOR H.R.
		WR51097	HINGE, BOTTOM PAD, DOOR H.L.
11	2	WR50240	BRACKET ASSY, HINGE TOP & BTM., DOOR H.R.
		WR50070	BRACKET ASSY, HINGE TOP & BTM., DOOR H.L.
10	A/R	00932	SEALANT, RTV, DOW CORNING 732, ALUMINUM
9	1	WR50250	COVER, DRAIN
8	A/R	107431	TAPE, INSULATION, SELF-ADHESIVE
7	1	1074042	INSULATION, LEFT, FIBERGLASS 1-1/2" DP.
6	1	1074804	INSULATION, BACK 3 X 39 X 1.500
5	1	1074803	INSULATION, BACK 30 X 39 X 1.500
4	2	1074043	INSULATION, FIBERGLASS 33.000 X 4.000
3	1	1074041	INSULATION, RIGHT, FIBERGLASS 1-1/2" DP.
2	2	WR50035	CHANNEL SUPPORT, INSULATION RETAINER
1	1	WR50264	PANEL, INSUL. RETAINER/COMPONENT MOUNT

CLEVELAND RANGE INC.
1333 East 179th St. Cleveland, Ohio 44110-2574

BOSTON MARKET ROTISSERIE

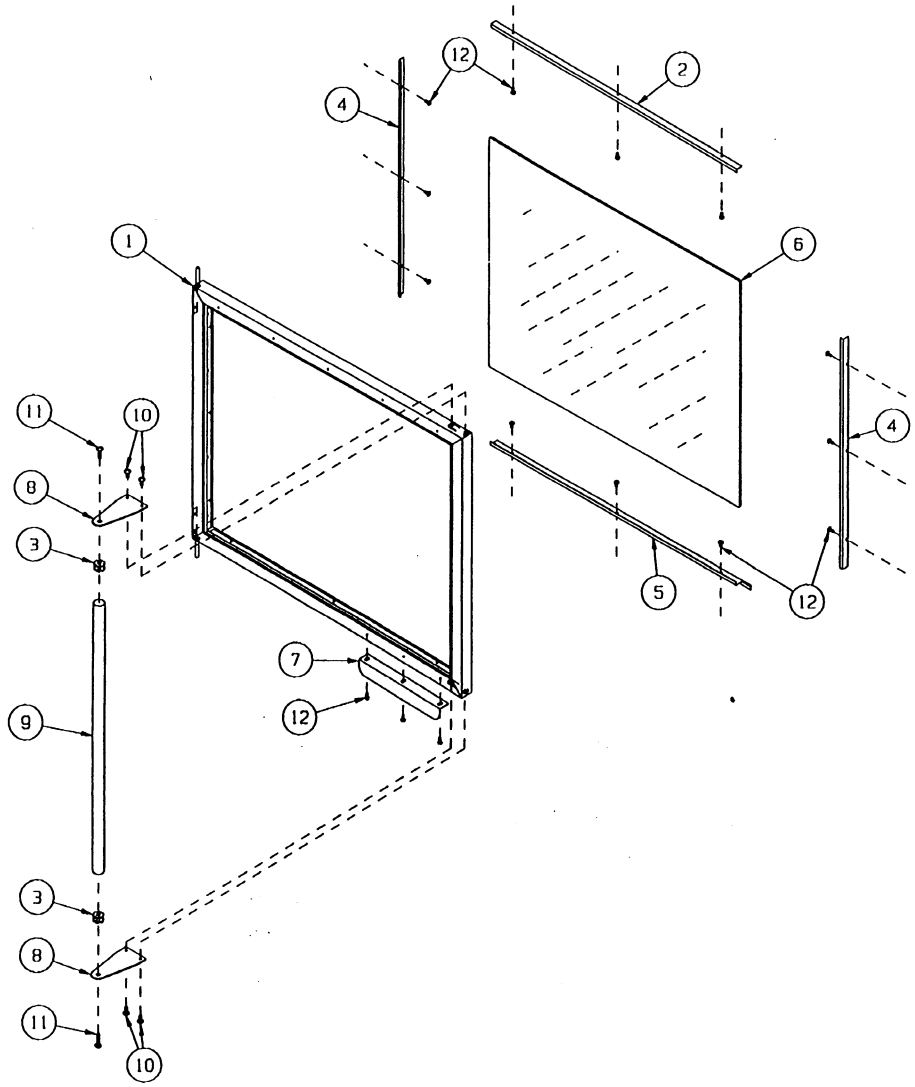
INSULATION AND DOOR HINGE ASSEMBLY

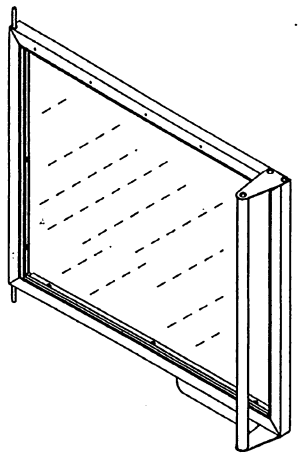
ASY009

The left-hand hinged door is shown; right-hand is available. The door assembly is available for replacement as a unit, but if desired, various components can be ordered as needed.

Door Assembly

ASY010





NOTE:
P/N WR00960 H.L. / WR00062 H.R.
DOOR ASSEMBLY (ITEMS 1-12) ARE REPRESENTED HERE AS AN EXPLODED VIEW FOR MANUFACTURING ASSEMBLY PURPOSES.

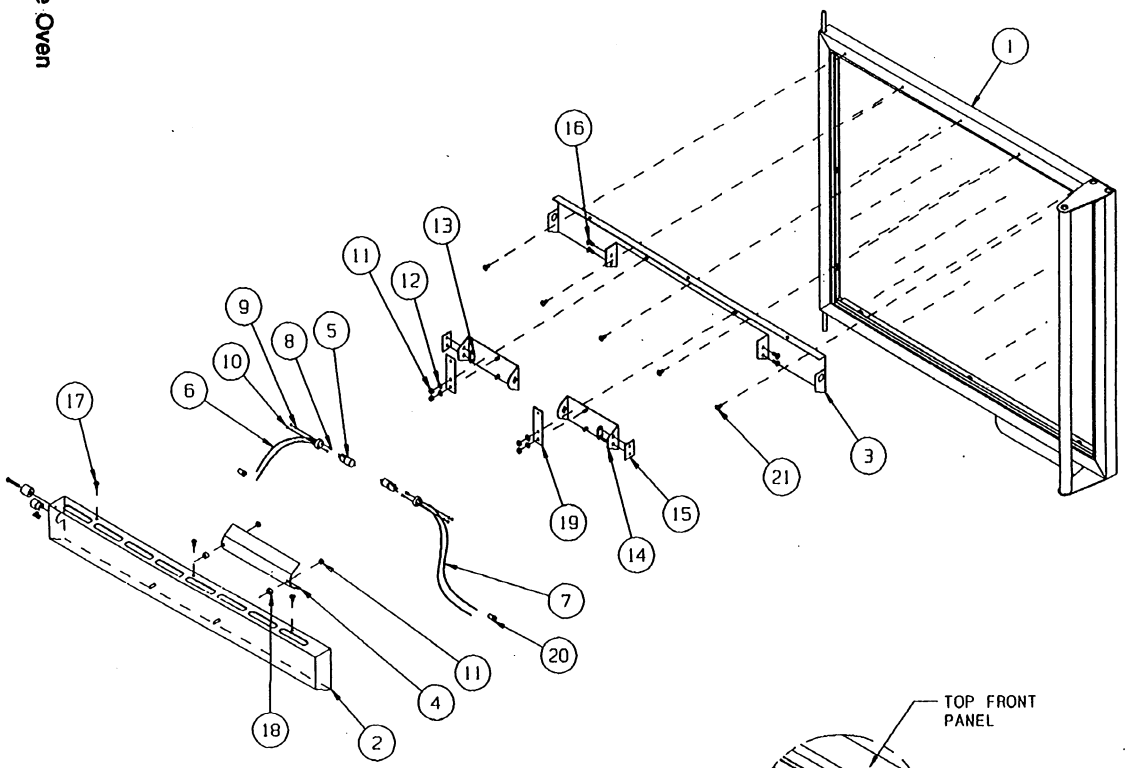
ITEM	QTY.	PART NO.	DESCRIPTION
12	15	19098	SCREW, PHILLIPS HEAD #10-32 X 1/2, S/S
11	2	104719	BOLT, CARRIAGE, 1/4-20 X 1"
10	4	19176	SCREW, TRUSS HD SLTD, 1/4-20 X 1/2, S/S
9	1	WR50974	HANDLE, DOOR
8	2	WR50973	BRACKET, DOOR HANDLE
7	1	WR51088	STRIKER, DOOR MAGNET/SWITCH
6	1	WR50970	GLASS, DOOR
5	1	WR50232	PAN, DOOR DRIP
4	2	WR50965	RETAINER, GLASS, VERTICAL, INSIDE
3	2	WR50972	CONNECTOR, DOOR HANDLE
2	1	WR50966	RETAINER, GLASS, HORIZ, TOP, INSIDE
1	1	WR00060	FRAME, DOOR WELDMENT, H.R.
		WR00023	FRAME, DOOR WELDMENT, H.L.

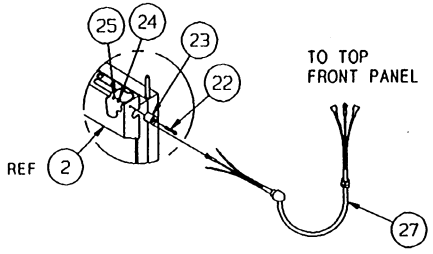
CLEVELAND RANGE INC. 1333 East 179th St. Cleveland, Ohio 44110-2574	BOSTON MARKET ROTISSERIE	DOOR ASSEMBLY	ASY010

The halogen lamps (#5) that illuminate the interior of the oven are mounted as part of an assembly on the top of the door. The lamp filaments are sensitive to vibration, so shock mounting is part of design consideration. (The oven's control system also delays applying power to the filaments, so they can stabilize after the door is closed.)

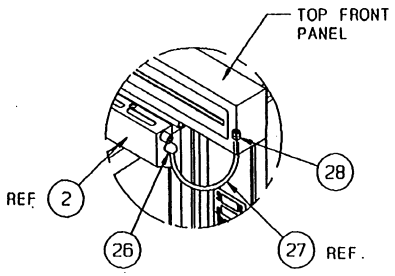
Door Lighting Assembly

ASY011





H.R. UNIT DETAIL



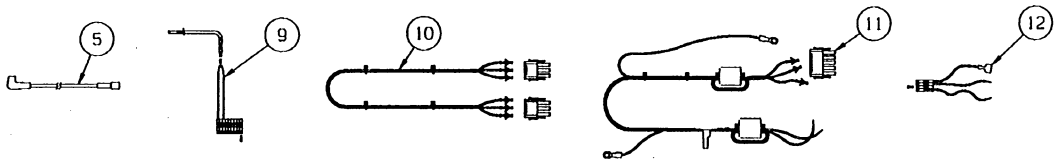
H.R. UNIT DETAIL

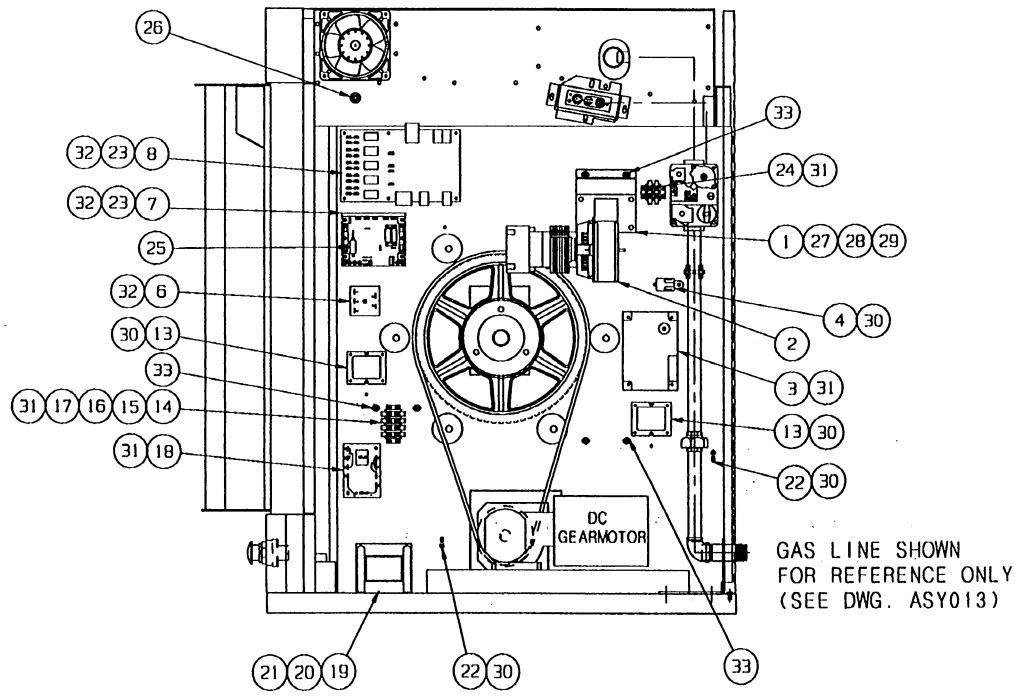
ITEM	QTY.	PART NO.	DESCRIPTION
28	-	106579	BUSHING, STRAIN RELIEF, HEYCO
27	1	WR50267	CORD, LAMP, LIGHTING, H.R.
		WR50266	CORD, LAMP, LIGHTING, H.L.
26	-	WR50262	BUSHING, STRAIN RELIEF, RIGHT ANGLE
25	1	14598	NUT, HEX #8-32
24	1	102641	WASHER, SPLIT LOCK #8
23	1	107313	BUMPER, RUBBER
22	1	19150	SCREW, ROUND HEAD #8-32 X 1.250 LG.
21	5	19098	SCREW, TRUSS HEAD #10-32 X 1/2 LG.
20	2	107459	CONNECTOR, WIRE NUT (2) #22 OR (3) #16
19	2	WR502261	MOUNT, VIBRATION, LIGHTING 1 X 3
18	2	195554	SPACER, 1/4 X 1/2 X 0.243 LG. ALUMINUM
17	3	101231	SCREW, TRUSS HD. PHILLIPS #10-24 X 1/2"
16	4	19168	SCREW, PAN HEAD #10-24 X 1/2
15	2	WR50226	MOUNT, VIBRATION, LIGHTING 1 X 1-1/2
14	2	WR00227	MOUNT, ELASTIC, LAMP WELDMENT
13	2	14684	NUT, WELD #10-24 W/ 2 HOLES
12	4	101655	WASHER, FLAT #10 S/S
11	6	104616	NUT, ELASTIC LOCK #10-24
10	4	WR50153	NUT, HEX #4-40, ZINC PLATED
9	4	WR50154	WASHER, INTERNOAL TOOTH #4
8	4	WR50152	SCREW, TRUSS HD. #4-40 X 3/4 LG.
7	1	WR501211	SOCKET, 2 PIN 250V 12A 28" LEADS
6	1	WR50121	SOCKET, 2 PIN 250V 12A 12" LEADS
5	2	WR50117	LAMP, HALOGEN BULB, BI-PIN, 100W, 24V
4	1	WR50120	REFLECTOR, LAMP
3	1	WR00254	BRACKET, WELDMENT, LAMP MOUNT
2	1	WR002571	SHIELD, HEAT, WELDMENT, PAINTED H.R
		WR002561	SHIELD, HEAT, WELDMENT, PAINTED H.L
1	1	WR00062	DOOR ASSEMBLY, H.R.
		WR00960	DOOR ASSEMBLY, H.L.

This drawing shows all electrical and control components not identified on earlier drawings. The circuit breaker and electrical power cord are shown on drawing ASY013. Additional electrical harnesses are identified on the page after drawing ASY013.

Drive Control Assembly

ASY012





GAS LINE SHOWN
FOR REFERENCE ONLY
(SEE DWG. ASY013)

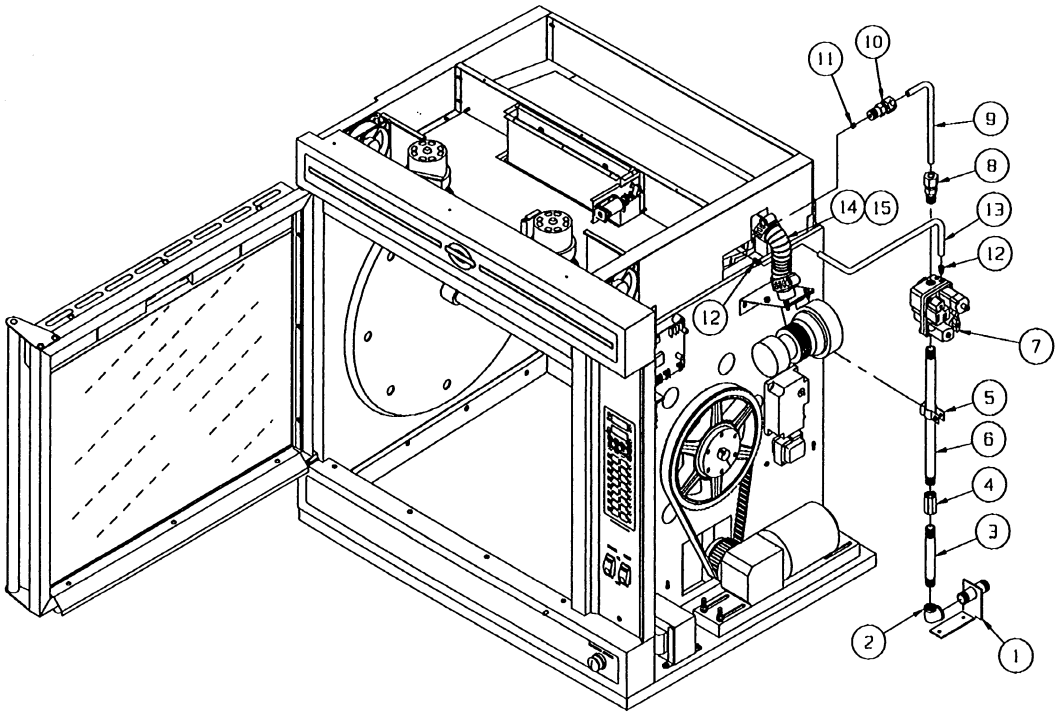
ITEM	QTY.	PART NO.	DESCRIPTION
33	8	WR50163	SCREW, HEX WASH. SELF-DRILL #12-14 X 3/4
32	9	106125	SCREW, TORX SLOT PAN HEAD #10-32 X 3/4
31	10	106128	SCREW, TORX SLOT PAN HEAD, #6-32 X 1
30	7	106123	SCREW, TORX SLOT PAN HEAD, #10-32 X 1/2
29	4	19170	SCREW, HEX HEAD 1/4-20 X 5/8 S/S
28	4	14618	NUT, HEX 1/4-20 S/S
27	4	23105	WASHER, LOCK 1/4" KATLINK STYLE, S/S
26	1	WR50201	FITTING, 3/16T X 1/4NPT STR. (3/16 PROBE)
25	1	WR50189	FUSE, 12 AMP (ABC12)
24	1	44168	TERMINAL BLOCK ASSY, 2-POLE
23	8	107313	BUMPER, RUBBER 3/4 DIA. X 0.781 LG.
22	2	20333	TERMINAL, RING, #8, 16-14 AWG
21	4	14659	NUT, HEX #10-24 S/S
20	4	23114	WASHER, LOCK INTERNAL TOOTH #10 S/S
19	1	WR50099	TRANSFORMER, LIGHTS 120V TO 22V @ 200W
18	1	WR50191	TIMER, 1.5 SECOND DELAY, 120 VAC
17	5	20326	TERMINAL CONNECTOR .032 X .250, MALE 45°
16	6	20325	TERMINAL CONN, MALE STR, .032 X .250
15	1	20327	TERMINAL CONNECTOR .032 X .250, MALE 90°
14	1	02192	RELAY, TERMINAL BLOCK, 4 TERMINAL
13	2	20528	TRANSFORMER, SPARK IGNITION SUPPLY, HONEYWELL
12	1	WR50111	CABLE, MOTOR CONTROL, ADAPTER
11	1	WR50110	HARNESS, POWER SUPPLY
10	1	WR50109	HARNESS, COMMUNICATION
9	1	WR50091	PROBE, THERMISTOR (W/LEADS & CONNECTOR)
8	1	WR50090	BOARD ASSEMBLY, R.I.B.
7	1	WR50037	PC BOARD ASSEMBLY, DC DRIVE
6	1	WR50106	TIMER, 30 MIN. FIXED DELAY
5	1	WR50100	IGNITION CABLE ASSEMBLY
4	1	WR51047	BUZZER, MIMI - 24V CLASS B
3	1	107494	MODULE, CONTROL IGNITION, CHANNEL PRODUCTS
2	1	1074951	BLOWER ASSY, COMBUSTION FAN
1	1	WR01027	BRACKET ASSEMBLY, BLOWER AIR HOSE

CLEVELAND RANGE INC. 1333 East 179th St. Cleveland, Ohio 44110-2574	BOSTON MARKET ROTISSERIE	DRIVE CONTROL ASSEMBLY	ASY012

This drawing shows all gas plumbing components, and also the hose and pipe clamps (#14 and #15) for the combustion air blower. Note that the gas valve assembly (#7) and the orifice (#11) are different for the two types of gas that may be supplied, natural and L.P.

Gas Plumbing Assembly

ASY013

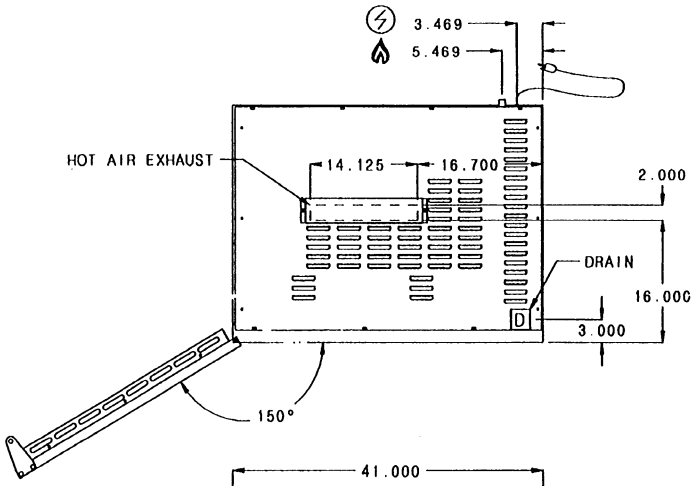


ITEM	QTY.	PART NO.	DESCRIPTION
15	2	102018	CLAMP, HOSE, WORM DRIVE
14	1	WR51029	HOSE, HIGH TEMP, REINFORCED
13	1	WR50178	TUBE, 1/4" GAS LINE (VALVE TO IGNITOR)
12	2	06245	FITTING, COMP, 1/4T X 1/8 NPT, BREAK AWAY FERRULE
11	1	WR50176	ORIFICE, GAS #26 DRILL HOLE
10	1	WR50175	FITTING, COMP, 1/4 NPT X 1/2 T, TAP 11/32 NS
9	1	WR50177	TUBE, 1/2" DIA. X 90° - GAS LINE
8	1	06206	FITTING, COMPRESSION 3/4" NPT X 1/2 TUBE
7	-	1057821	VALVE, GAS, LP GAS
	-	105782	VALVE, GAS, NATURAL GAS
6	1	14292	NIPPLE, 1/2" NPT X 14" LG. BLACK
5	1	WR50188	CLAMP, 3/4" PIPE
4	1	21302	UNION COUPLING, 1/2" NPT BLACK
3	1	14339	NIPPLE, 1/2" NPT X 6" LG. BLACK
2	1	05271	ELBOW, 1/2" X 3/4" BLACK
1	1	WR00042	BRACKET ASSEMBLY, 3/4" GAS PIPE, WELDMENT

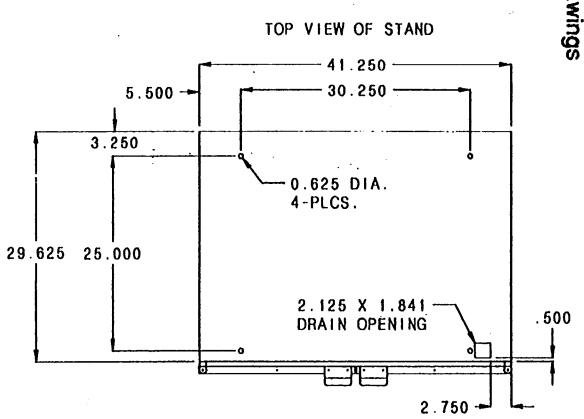
CLEVELAND RANGE INC. 1333 East 179th St. Cleveland, Ohio 44110-2574	BOSTON MARKET ROTISSERIE	GAS PLUMBING ASSEMBLY	ASY013

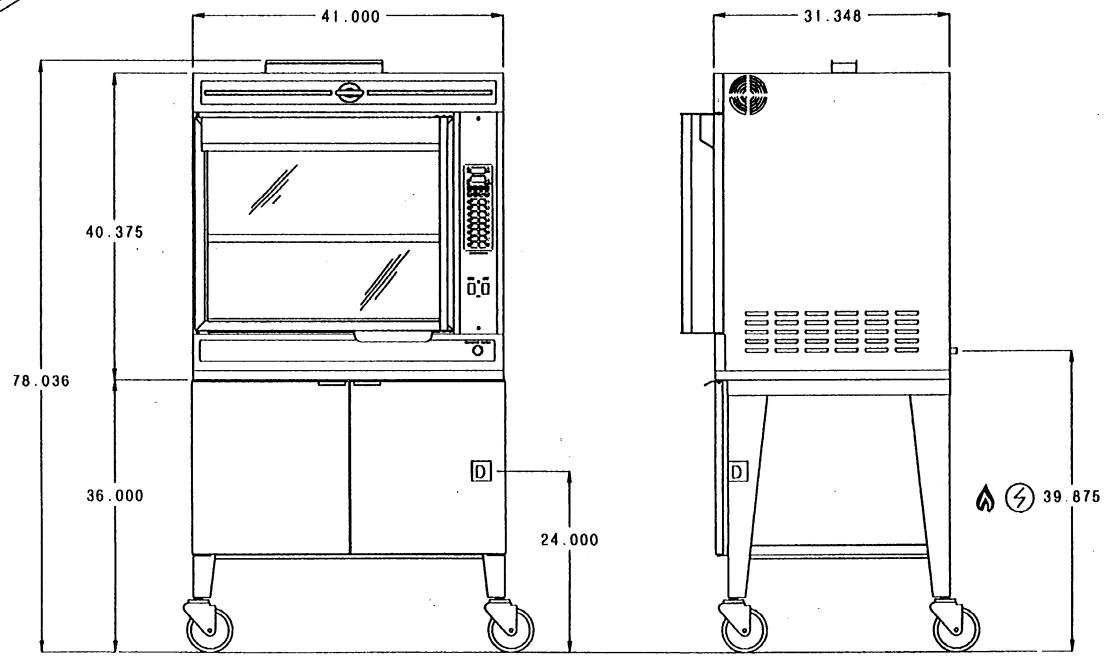
Specifications

ASY014



NOTE:
THE UNIT MUST HAVE 7" OF NATURAL GAS PRESSURE WITH THE FACILITY IN FULL OPERATION.





MODEL	CAPACITY	INPUT CHART	SERVICE CONNECTIONS
BMR-32	8 SKEWERS OR 8 TURKEY BASKETS	NATURAL GAS 65,000 B.T.U. PER HOUR	ELECTRICAL CONNECTION - SUPPLIED WITH 6 FT. CORD - 1 PHASE GROUNDED OUTLET - 9 AMPHERE MAX. GAS CONNECTION - 3/4" N.P.T.

INSTALLATION NOTES

SUITABLE FOR INSTALLATION ON COMBUSTIBLE FLOORS

MIN. CLEARANCE TO COMBUSTIBLE OR NON-COMBUSTIBLE WALLS:

SIDES:	BACK:
3"	6"

GAS PRESSURE REQUIRED:

NATURAL:	PROPANE:
5"-14" WC	12"-14" WC

NORMAL SUPPLY PRESSURES

GAS INPUT RATINGS -

RATINGS SHOWN ARE FOR NATURAL AND LP GAS INSTALLATIONS. RATING WILL BE MAINTAINED AT HIGH ALTITUDES. SPECIFY ALTITUDE OF PROJECT IF OVER 2000 FEET (610 METERS). FOR OTHER GASES SPECIFY TYPE. CALORIFIC VALUE, SPECIFY GRAVITY AND PRESSURE AT APPLIANCE.

NOTE: WHEN ORDERING SPECIFY TYPE OF GAS TO BE USED.

CLEVELAND RANGE INC. 1333 East 179th St. Cleveland, Ohio 44110-2574	BOSTON MARKET ROTISSERIE	SPECIFICATIONS	ASY014

Harness #1 P/N 10752211 14 wires

Green	23"	Yel/Blk	21"
Blk. Hi-Temp	30"	Yellow	6"
Red	19"	Yel/Wht	16"
Brown	16"	Wht/Yel	20"
Lt Blue	27"	Pink	15"
Dk Blue	27"	Blue	3"
Yel/Blk	6"	Green Hi-Temp	9"

Harness #2 P/N 1075212 7 wires

Pink	22"	Wht/Blu	36"
Blue	22"	Yel/Blk	14.5"
Dk Blue	22"	Yellow	14.5"
Blu/Red	45"		

Harness #3 P/N 1075213 6 wires

Dk Blue	3"	Dk Blu/Red	5"
Dk Blue	3"	Lt Blue	3"
Dk Blue	4"	Pink	3"

Harness #4 P/N 1075214 4 wires

Wht/Pur	3"	Tan	3"
Purple	3"	Tan/Brn	3"

Harness #5 P/N 1075215 10 wires

Black	3"	Purple	3"
Black	3"	Purple	3"
Black	3"	Tan	3"
Gray	3"	Purple	20"
Purple	3"	Wht/Pur	20"

Harness #6 P/N 1075216 20 wires

Gray	18"	Wht/Brn	16"
Wht/Pur	18"	Wht/Blu	15"
Wht/Pur	18"	Dk Blue	15"
Wht/Pur	18"	Org/Wht	13"
Purple	18"	Wht/Org	13"
Tan	18"	White	5.5"
Tan/Brn	18"	White	5.5"
Tan	13"	Black	6"
Purple	13"	Red	6"
Purple	13"	Yellow	6"

Harness #7 P/N 1075217 4 wires

Brown	19"	Purple	6"
Brown	16"	Wht/Pur	6"

Harness #8 P/N 1075218 5 wires

Gray	6"	wht/Brn	6"
Brown	6"	White	6"
Wht/Gray	6"		

Harness #9 P/N 1075219 8 wires

Gray	43"	Black	27"
Wht/Gray	43"	White	27"
Brown	25"	Black	24"
Wht/Brn	25"	Blk/Wht	24"

Harness #10 P/N 10752110 23 wires

Org/Wht	21"	Wht/Blk	5"
Wht/Org	21"	Gray	5"
Gray	21"	Wht/Pur	6"
Black	21"	Wht/Pur	6"
Wht/Blk	23"	Wht/Brn	6"
Gray	23"	Blue	12"
White	23"	Wht/Blu	12"
Black	23"	Purple	6"
White	23"	Wht/Pur	6"
Pink	14"	Tan	8"
Wht/Blk	5"	Tan	8"
Wht/Blk	5"		

Wiring Harness

Assemblies

Section 2

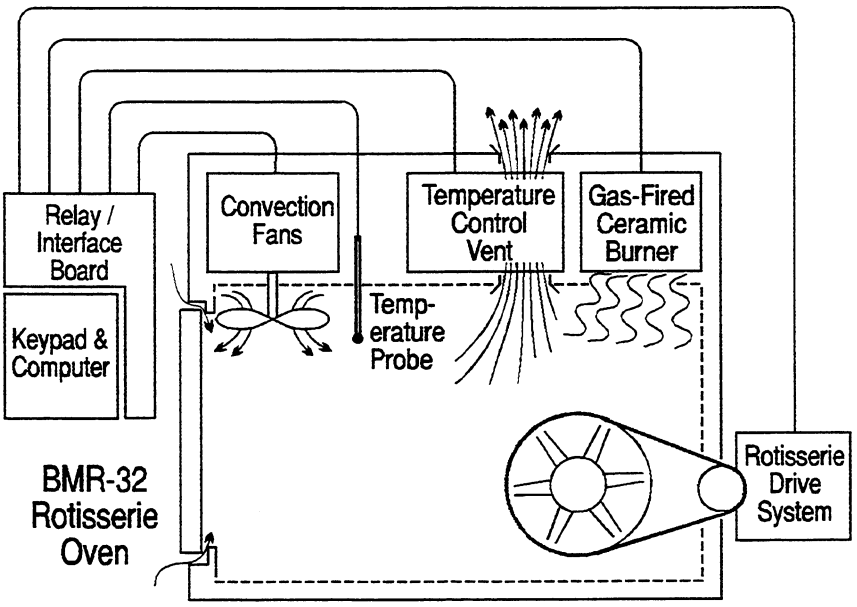
Overview of Systems and Functions

General System Overview
BMR-32 Rotisserie Convection Oven

The basic purpose of the BMR-32 rotisserie convection oven is to automatically cook meats in a controlled environment, so that the cooked product meets specifications as to doneness and appearance. When the product is done, a hold cycle automatically keeps the product at serving temperature for up to two hours.

Keypad & Computer - The oven's environment is precisely controlled by a programmable computer. The computer stores cooking programs for various quantities and types of meat. The programs have been tested and optimized so that the resulting product meets the restaurant's specifications.

The desired cooking program is selected by pressing one of up to16 product buttons on the front-panel keypad. The keypad has various indicator lights and a digital readout to show the time and temperature status of cooking program. The operator can use the keypad to inquire about current conditions and to override some automatic functions.



Relay / Interface Board - This module, refered to as the R.I.B., serves as the "translator" of signals between the computer and the oven's components

The major oven components controlled through the R.I.B. include the motor/drive system, the convection fans, the gas burner, and the temperature control vent.

Rotisserie Drive System - The rotor is powered by a cogged-belt and pulley system, driven by a 1/4-horsepower DC gearmotor. The motor's speed is controlled to produce three rotisserie speeds (1, 2, and 3 rpm) through a speed control module; the speed signal is returned by the R.I.B.

Temperature Control Vent - Temperature in the oven is controlled primarily by opening and closing an exhaust vent at the top of the oven, allowing cooler air in through gaps at the top and bottom of the door.

Gas-Fired Ceramic Burner - The gas burner in the oven is a high-performance ceramic type, and is fed by a two-stage gas valve, capable of outputting 45,000 and 60,000 BTUs.

Convection Fans - Two special design, counter-rotating fans continuously circulate air in the oven.

The RIB - The RIB contains 5 control relays that operate the major functions of the oven: convection, low burner, high burner, rotor power, and oven temperature control. It also provides the speed signal for the DC Motor Controller, and senses the oven temperature with a thermistor probe.

Door Closed Relay - The oven door is held closed by a magnetic latch. When the door is shut, it closes the

Power Up

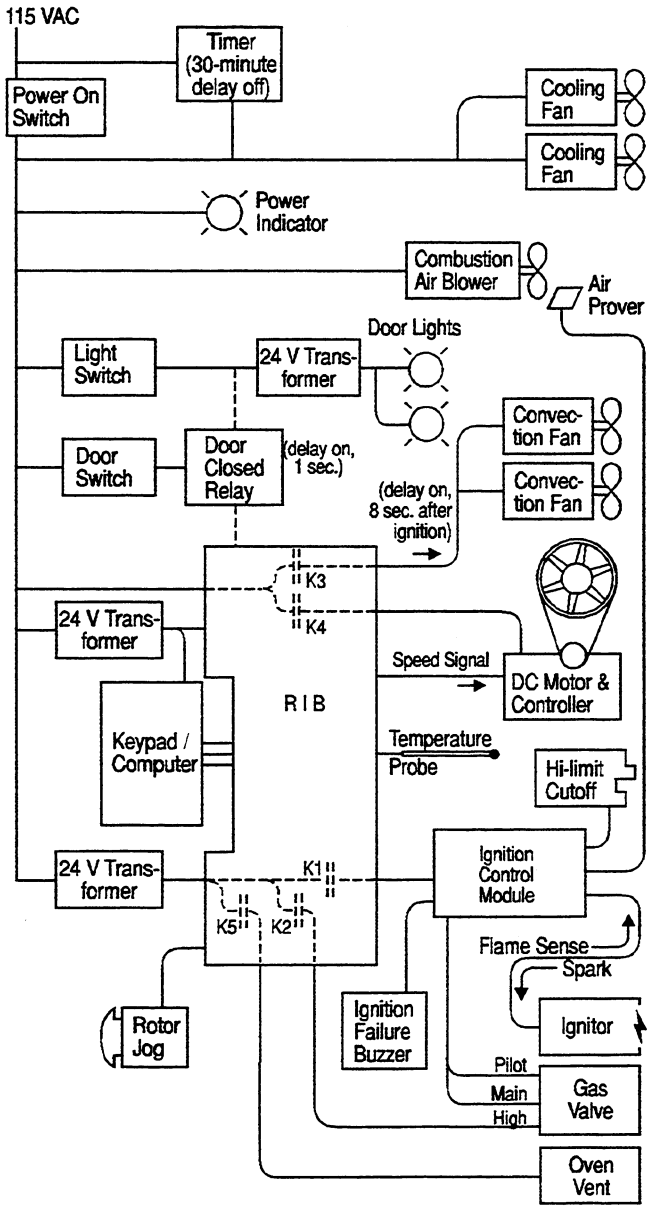
When power is turned on at the front panel, 115 VAC power appears at a number of elements in the control system, powering them up:

1. The front panel ***power indicator*** turns on.

2. Both ***cooling fans*** turn on and run continuously, cooling the convection fan motors. NOTE: The 30-minute ***off-delay timer*** comes into play when power is turned off. It runs the cooling fans for 30 minutes, exhausting air from the top of the oven as it cools down.

3. The ***combustion air blower*** runs, providing forced air to the ceramic burner. The air will be mixed with gas for combustion. Once combustion air flow is established, the ***air prover*** switch closes, which will be used to enable the ***ignition control module***.

4. The ***24 VAC transformers*** that power the keypad/computer, the ignition control module, and the oven vent are energized. The keypad/computer begins running its programs, but the ignition control module and the oven vent cannot operate without the RIB supplying an enabling signal.



door switch, which energizes the door closed relay. This relay enables the door lights; it is also a signal to the RIB to enable and control various functions.

When the Door is Opened - If the door is open, the RIB inhibits various functions for operator safety and convenience:

- the door lights are disabled
- the convection fans stop
- the motor stops
- the burner is turned off

Preheat and Setback - Upon power-up, the computer automatically begins pre-heating the oven, in preparation for the first cooking cycle. Once the oven is preheated, it is held at cooking temperature, waiting for the operator to load the product and select a cooking program; if no program is selected within 20 minutes, the temperature is reduced to an energy-saving setback temperature.

Door-Mounted Interior Lights - These low-voltage halogen lights are turned on at the front panel. They are disabled when the door is open. The door closed relay provides a one second delay for the filaments to stop vibrating before power is reapplied.

The Rotor Jog Switch - Normally inactive, the jog switch is activated when the door is open, so the rotisserie can be advanced during product loading.

Convection Fans - These fans are vital to the proper cooking and appearance of the product. To properly circulate air, they are counter-rotating (CCW on the right and CW on the left).

Cooling Fans - The convection fans must be continuously cooled while the oven is operating. If these cooling fans fail to operate, the convection fans will quickly fail.

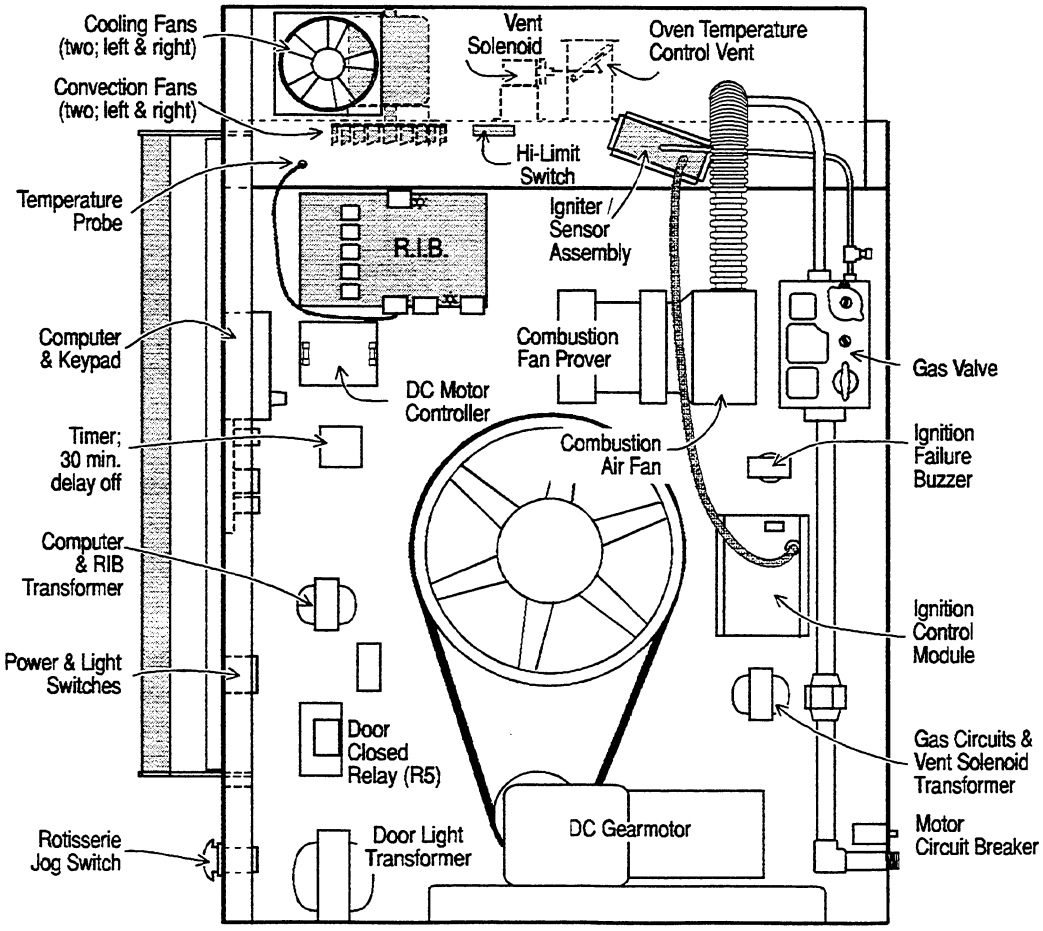
Combustion Air Prover and High Limit Switch - These two safety devices interrupt power to the ignition module if they open for any reason.

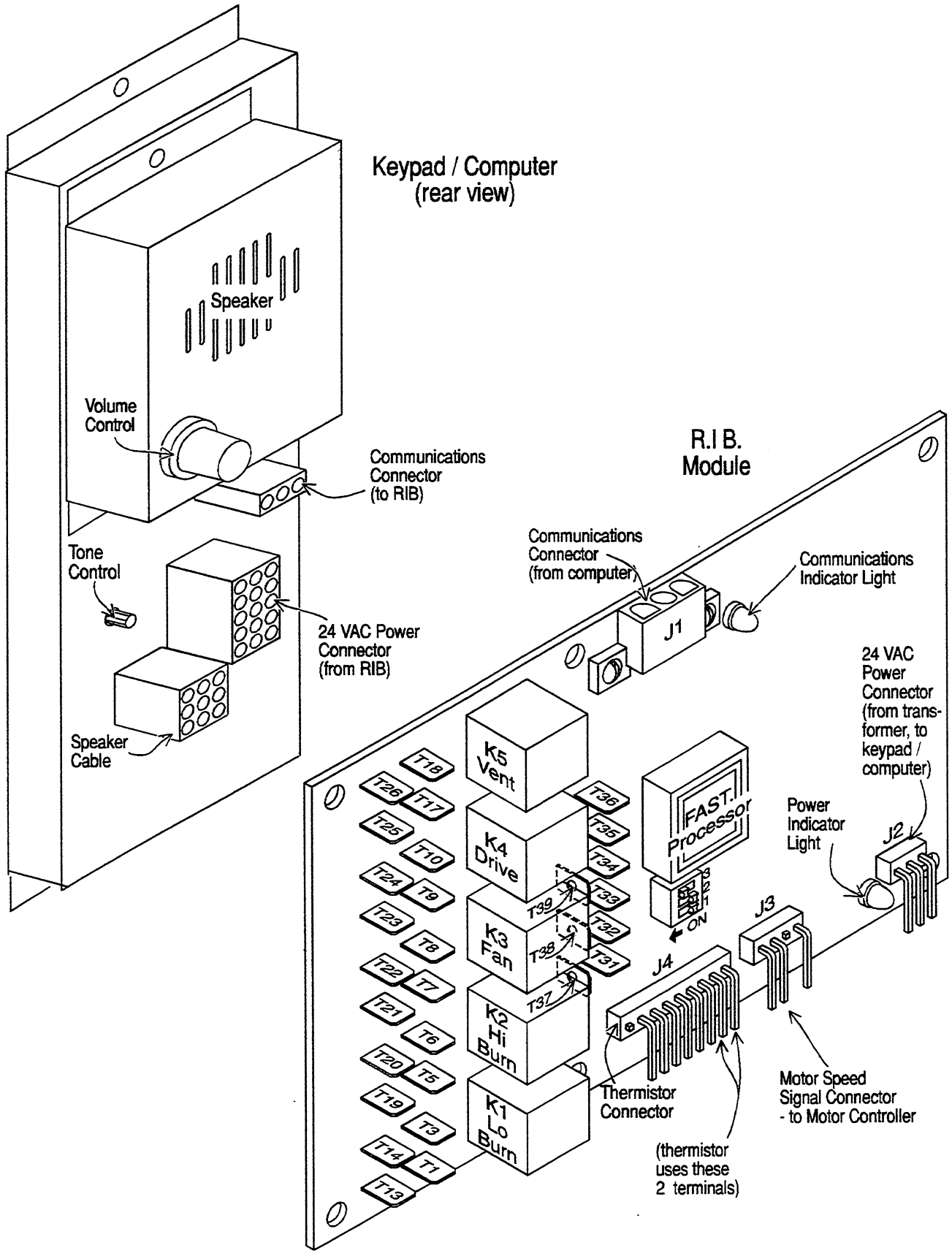
Ignition Control System - If the combustion air prover and the high limit switch allow it, the ignition control module generates a high voltage ignition spark about 5 seconds after power is turned on.

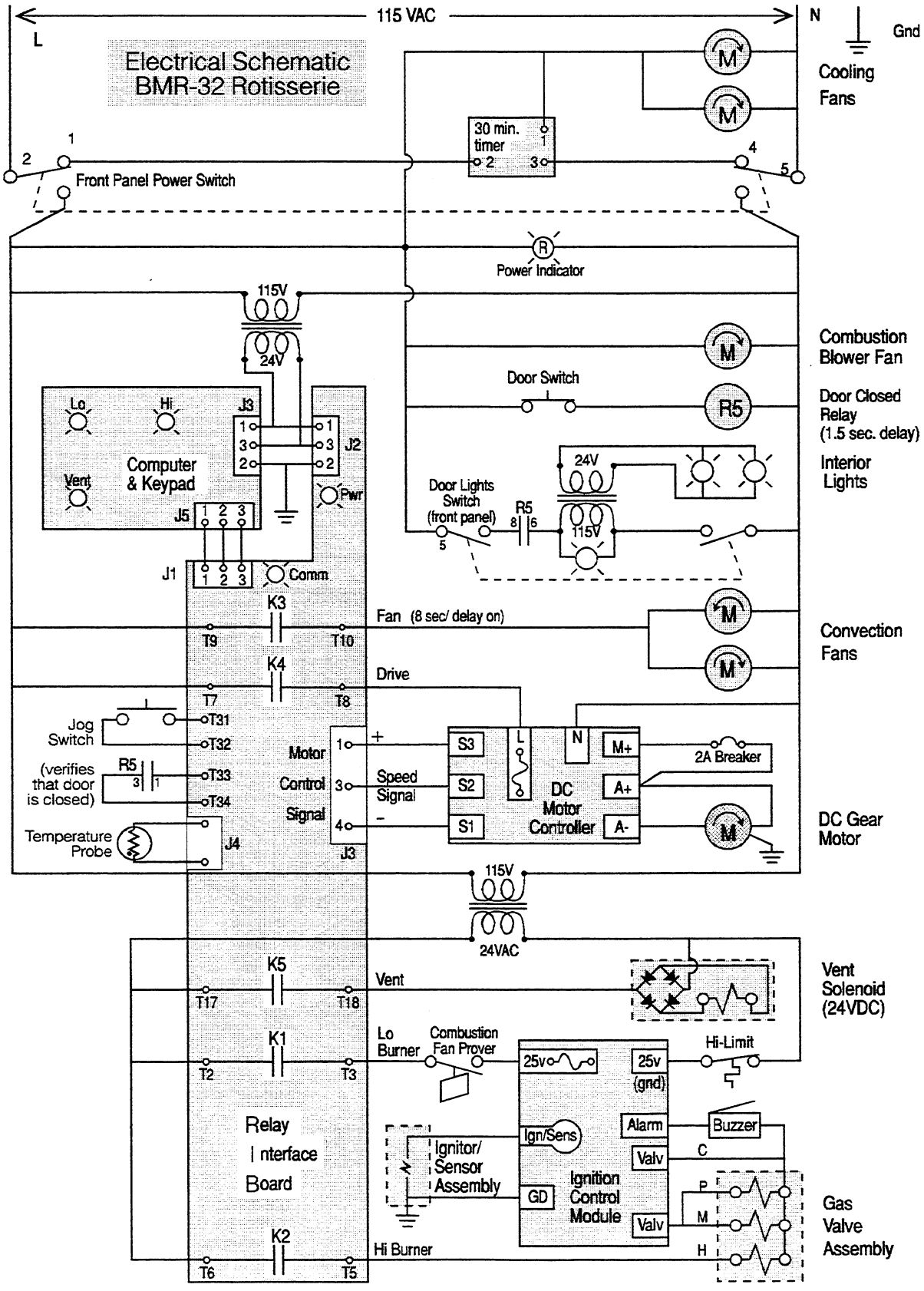
Spark and Flame Sense - High voltage for the spark is delivered to the ignitor assembly at the burner. Failure to ignite after 2 tries will sound the alarm buzzer and disable ignition. The ignition module is reset by opening and closing the door - the ignition module will again attempt ignition.

Oven Temperature Control Vent - This vent is the main temperature controlling element. It is opened to allow hot air to exit the top of the oven and closed to retain the air. The vent is operated by a 24 volt D.C. solenoid.

Door Gaps Required for Make-up Air - The door does not use a seal. It is designed with an air gap all around it. This supplies make-up air during the exhaust cycle, and secondary combustion air for the burner. The door is held closed by a magnetic door latch.



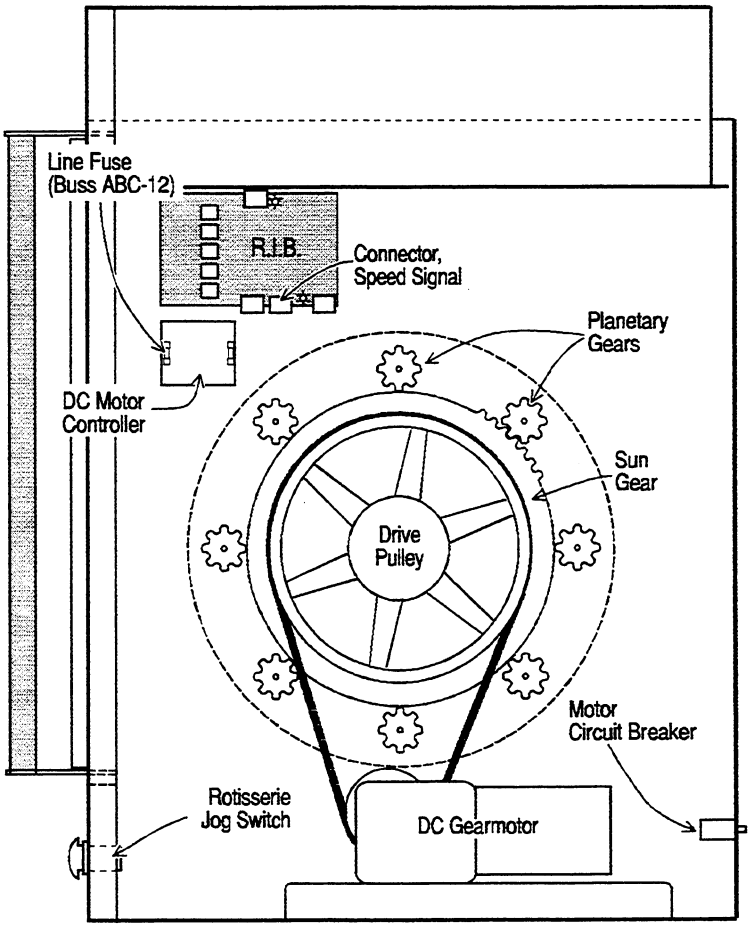

Keypad / Computer
(rear view)
Speaker
Volume
Control
Communications
Connector
(to RIB)
Tone
Control
24 VAC Power
Connector
(from RIB)
Speaker
Cable
R.I B.
Module
Communications
Connector
(from computer)
Communications
Indicator Light
J1
24 VAC
Power
Connector
(from trans-
former, to
keypad /
computer)
J2
Power
Indicator
Light
FAST
Processor
ON
J3
J4
K5
Vent
K4
Drive
K3
Fan
K2
Hi
Burn
K1
Lo
Burn
T18
T26
T17
T25
T10
T24
T9
T23
T8
T22
T7
T21
T6
T20
T5
T19
T3
T14
T1
T13
T36
T35
T34
T33
T32
T31
T39
T38
T37
Thermistor
Connector
(thermistor
uses these
2 terminals)
Motor Speed
Signal Connector
- to Motor Controller


115 VAC
L
N
Gnd
Electrical Schematic
BMR-32 Rotisserie
Cooling Fans
30 min. timer
Front Panel Power Switch
Power Indicator
115V
24V
Combustion Blower Fan
Door Switch
Door Closed Relay (1.5 sec. delay)
Interior Lights
Door Lights Switch (front panel)
Lo
Hi
Vent
Computer & Keypad
Pwr
Comm
J1
J2
J3
J4
J5
Fan (8 sec/ delay on)
Convection Fans
Drive
Jog Switch
(verifies that door is closed)
Temperature Probe
Motor Control Signal
Speed Signal
DC Motor Controller
2A Breaker
DC Gear Motor
24VAC
Vent
Vent Solenoid (24VDC)
Lo Burner
Combustion Fan Prover
Hi-Limit
Relay Interface Board
Ignitor/ Sensor Assembly
Ign/Sens
Ignition Control Module
Alarm
Buzzer
Valv
Gas Valve Assembly
Hi Burner

The Rotisserie Drive Control System

The rotisserie drive control system consists of the components and assemblies shown in the figure at right:

1. The rotisserie mechanism (consisting of spits, axle, gears, pulleys, and drive belt)
2. The Direct Current gear motor
3. The Bodine Electric Co. UDC-800 motor control module and circuit breaker
4. The Jog Switch
5. The R.I.B. module (controls speed signal)



Basic Operation

Under normal operating conditions, the rotor is always turning at some programmed speed as long as the door is closed; if the door is opened, the rotor stops. While the door is open, the Jog Switch is active, so the rotor can be advanced during product loading.

The rotor speeds are fixed at 1 rpm, 2 rpm, and 3 rpm. The speed is controlled by a DC (voltage) speed signal from the RIB to the DC motor controller.

The speed signal is determined by the oven ontrol computer, and is based on the speed demanded by active cooking program (or on the operating mode the oven has defaulted to).

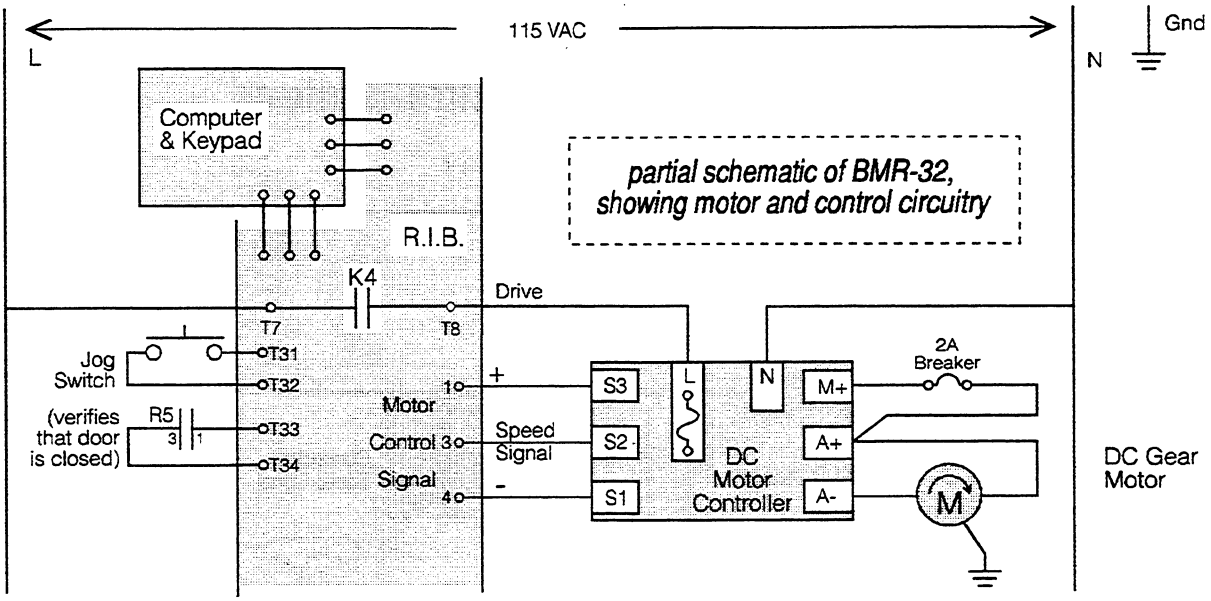
Programmed Rotor Speeds	
Program Status	Rotor Speed
Preheat	3 RPM
Cook	3 or 2 RPM
Hold	1 RPM
Setback	1 RPM
Cooldown	1 RPM

Motor Control Circuit Description

The motor control system consists of the DC gearmotor (1/4 horsepower, 90 volt DC, permanent magnet field), a DC motor controller module, and the RIB, which provides the speed control signal.

If the RIB is operating properly, and the door is closed (confirmed by the closed R5 relay contact), contact K4 closes. This provides 115 VAC to the motor controller.

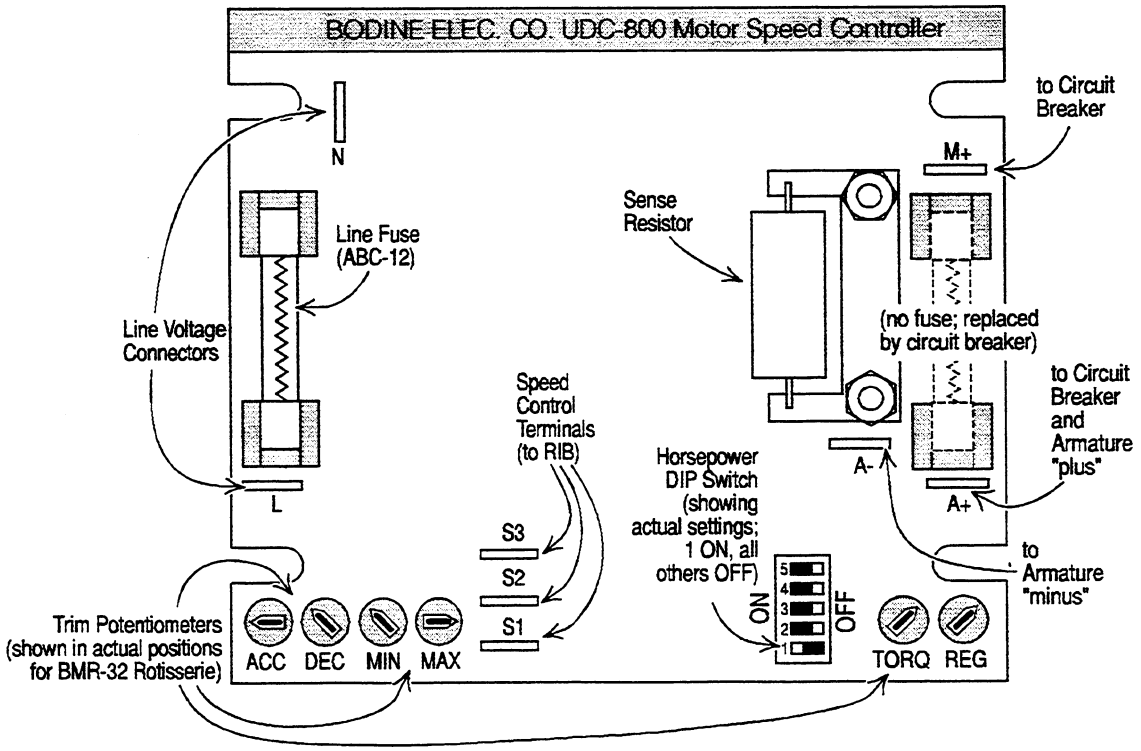
The Bodine controller provides a reference speed signal at the S1 and S3 terminals, which is sent to the RIB. The RIB returns the speed controlling signal to



S2 - this signal will correspond to the three programmed rotor speeds: 1, 2, and 3 rpm. (Note: In a typical application, the Bodine controller would have a 10K ohm speed control potentiometer wired across S1 and S3, with the pot's wiper connected to S2).

Based on the speed signal voltage returned from the RIB, the motor controller delivers the necessary high-current DC voltage to the gear-motor armature, at A+ and A-. (The approximate voltage readings on the signal and armature terminals are given in "Motor Troubleshooting," Section 4.)

The motor controller is fused on its Line voltage input. Cleveland Range leaves out the armature fuse, replacing it with a 2 amp circuit breaker. (The breaker is on the rear panel of the oven, near the gas inlet.)

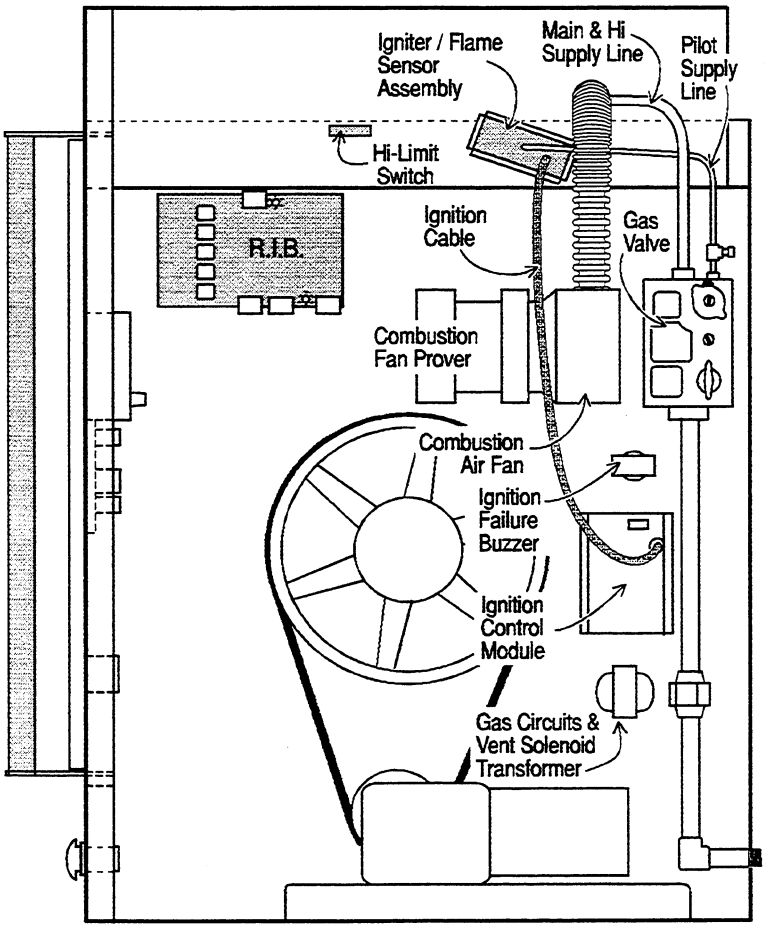


The Ignition Control Function

The oven combustion system consists of five major component areas and assemblies:

1. The gas delivery system, consisting of the 2-stage gas valve, pilot and main burner supply lines
2. The ceramic burner assembly, inside the oven
3. The ignition control module, the ignitor/ sensor assembly, and the ignition failure buzzer
4. The combustion air blower
5. And, two combustion safety devices, consisting of the hi-limit switch and the combustion air prover

Also involved in the combustion system are the front panel computer and keyboard, and the RIB module.



Basic Operation

The oven cavity is heated by a two-stage ceramic gas burner, capable of delivering 45,000 BTUs (Lo Fire) and 60,000 BTUs (Hi Fire). The burner is mounted in the top, near the back wall of the unit. It is tilted toward the center of the oven with its face perpendicular to the axle of the rotisserie.

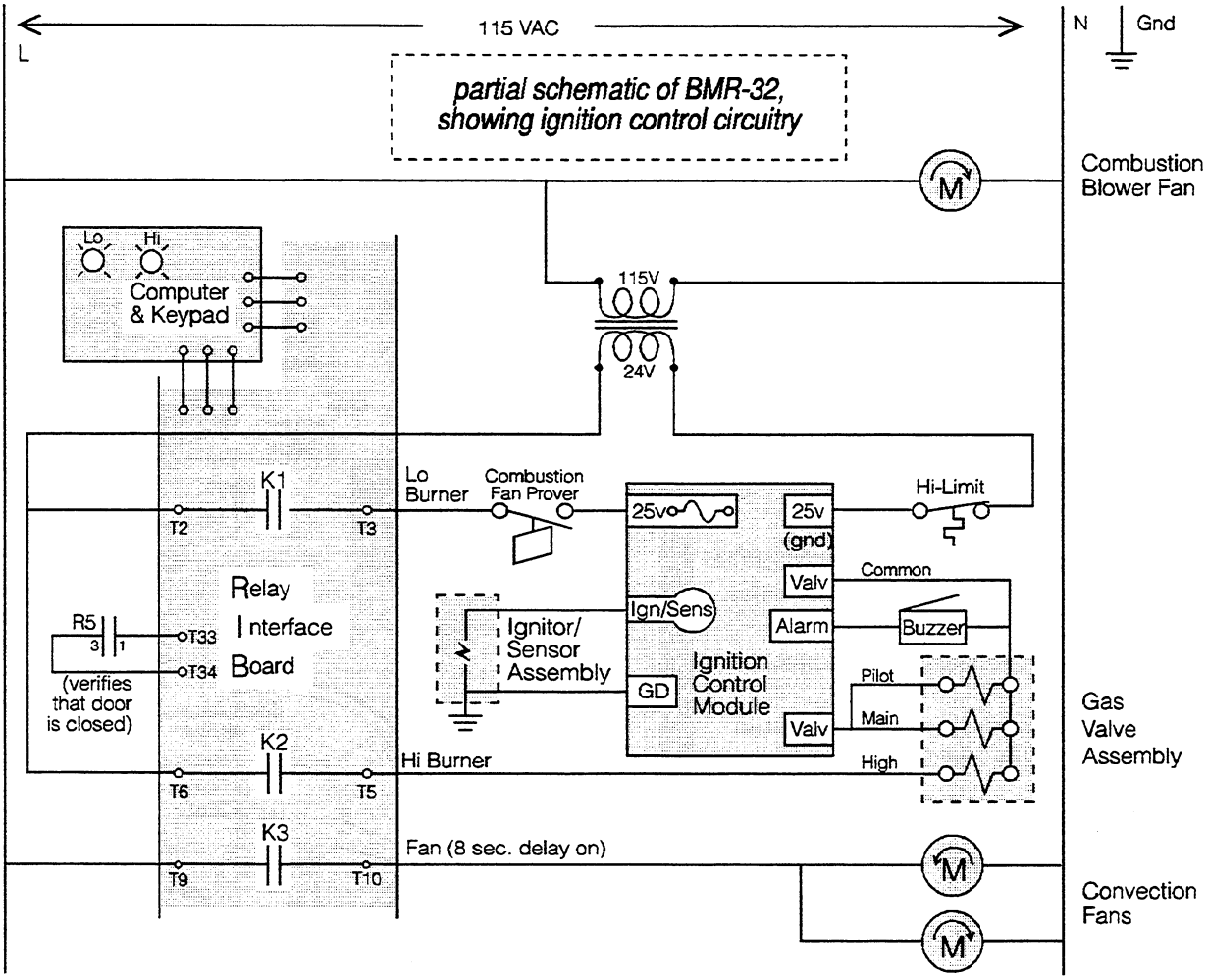
The combustion process is under the combined control of the ignition control module, the computer/keypad, and RIB module.

Combustion air (mixed with gas at the inlet of the burner assembly) is provided by a blower that runs continuously, as long as the oven is powered-up.

Oven temperature is sensed by the computer and controlled to a programmed set-point.

Fail-safe control of gas ignition is maintained by the ignition control module, which provides the ignition spark for lighting the pilot flame and continually senses the presence of the pilot.

The module also powers an alarm buzzer if ignition fails on power up, and shuts off gas should the pilot fail. Additional safety is provided by the hi-limit switch and the combustion air prover.



Combustion Control Circuit Description

When the BMR-32 is turned on, combustion circuitry receives power. The combustion air blower is powered up by 115 VAC, and the 24 VAC gas control circuit transformer provides power to the ignition module and its enabling circuitry.

The combustion blower delivers air through a flexible hose to the burner, ready to be mixed with gas at the burner orifice. The blower must activate the air prover switch, which is series-wired into the ignition control module's power input. In the event the combustion blower fails to run, the fan prover switch remains open, disabling the combustion process.

Also series-wired to the ignition control module is the hi-limit switch, mounted in the top of the oven. (Note that the hi-limit switch is not installed in early BMR-32 models). In the event the oven temperature exceeds the high limit, the combustion process is disabled.

IGNITION AND COMBUSTION - At power-up of the oven, the computer/keypad begins executing its program. As a result, the contacts K1 and K2 of the RIB close, enabling the Lo and Hi Burner signals - the Lo and Hi lights on the keypad come on.

When the Ignition Control Module receives power (fan prover and hi-limit both closed), it generates high voltage to the ignitor/spark assembly, attempting to light the pilot. At the same time, the ignition control module energizes both the pilot and main gas valves, opening the valves and sending gas to the pilot and the burner.

The ignition control module will generate sparks at the Ignitor assembly, attempting to ignite the pilot. If the pilot does not light after 2 tries, the alarm buzzer will sound, letting you know there is no flame present.

FLAME SENSING - If the pilot lights, a micoampere signal is returned to the ignition module. If this signal is not sensed by the module, the alarm buzzer is activated and the gas valve is shut down. The return signal can be as low as 0.5 microamps, so a good electrical connections from the spark/pilot assembly to the ignition module is a critical requirement.

If the burner fails to light after 2 tries, IT WILL NOT RETRY AUTOMATICALLY; the operator must manually reset the ignition module. The ignition module is reset by opening the door of the oven for 5 to 10 seconds and then closing it (the reset is sensed by the RIB from the R5 relay contact shown in the schematic.) The ignition spark will be reactivated.

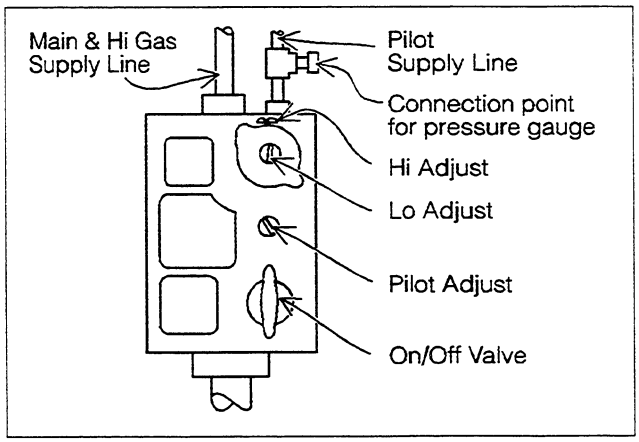
BURNER IGNITION - Since the pilot and the main gas valves are energized at the same time, successful pilot ignition also lights the ceramic burner.

If ignition is successful the oven's convection fans are permitted to come on. This is accomplished by the RIB's K3 contact. Note, however, that the closing of K3 is delayed 8 seconds so that the main burner flame can stabilize before the oven air is circulated across it.

At this point, the ignition and combustion sequence is ended, and oven temperature control begins. See the next section, "The Oven Temperature Control System" for a detailed circuit description.

Measuring and Adjusting Gas Pressure

You may need to measure and adjust gas output pressure at the gas valve assembly if you are having problems with ignition, combustion, or controlling oven temperature, and other troubleshooting has not solved the problem.



Adequate gas pressure and flow is very important to the operation of the oven. Although the valve can supply the required output with incoming pressure as low as 5" W.C., high demand periods and inadequate flow can reduce oven performance. Minimum pipe diameter to the oven must be 3/4-inch; larger is better.

Note that the combustion blower is equipped with an inlet restrictor. When troubleshooting, check that the restrictor is not clogged and is the right size (dwg. ASY013). This is very important because a proper balance between gas and air is critical for correct burner operation and temperature control.

Gas Valve Adjustment Chart		
	Natural	L.P.
Range of Input Pressures	5" to 14" W.C.	12" to 14" W.C.
Set Lo Burn Pressure *	2.2" W.C.	4.0" W.C.
Set Hi Burn Pressure	3.2" W.C.	10.0" W.C.
Pilot Flame	Adjust to produce 1" flame, 3/16" to 3/8" from burner	

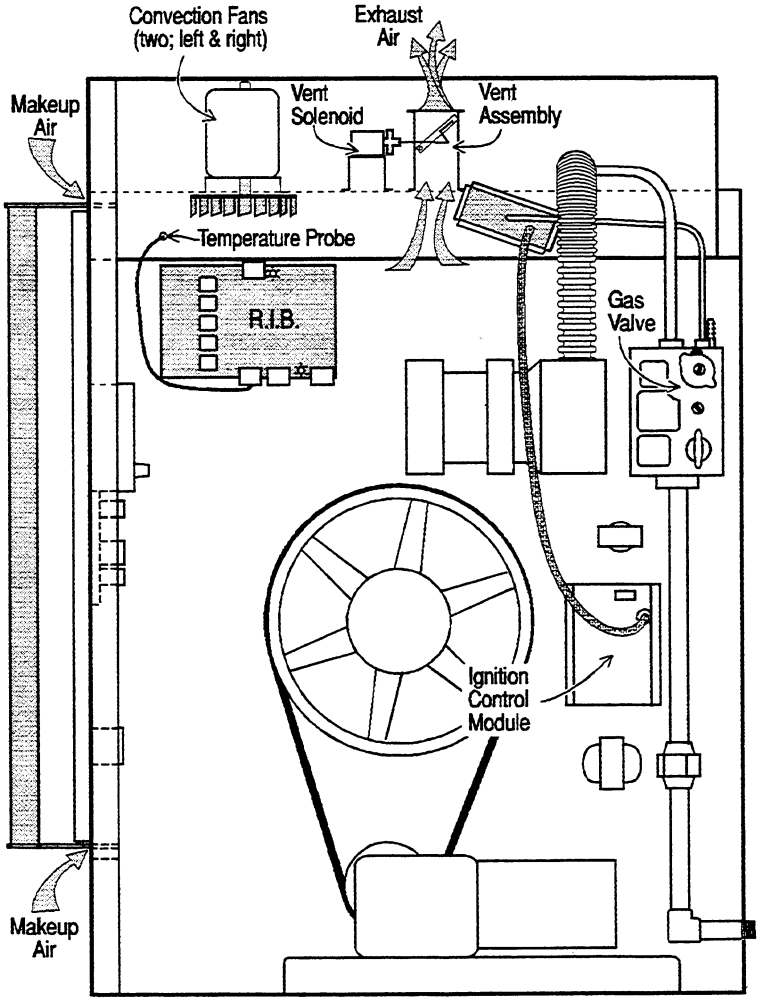
*remove pink wire form HI terminal of valve when setting LO pressure

DO NOT ADJUST OUTPUT PRESSURE WHEN UNIT IS COLD. Before measuring output pressure, run a Hi Burner cooking program for at least 15 minutes (Chicken Program 1 or 2, for example). This is necessary so that the Main and High gas solenoids and regulating mechanisms are energized long enough to reach a stable temperature. Also, pressure measurements and adjustments should be made with the unit operating, during times of peak gas demand, when facility pressure tends to be lowest.

The Oven Temperature Control Function

The oven temperature control system consists of all the components shown in the diagram at right. The components may be categorized into the following groups:

1. The IGNITION AND COMBUSTION SYSTEM (described previously).
2. The OVEN AIR CIRCULATION SYSTEM (the exhaust air venting mechanism, two convection blowers, and the air inlets behind the top and bottom of the door).
3. The TEMPERATURE SETPOINT CONTROL SYSTEM (computer/keypad, RIB module, and temperature probe).



Basic Operation

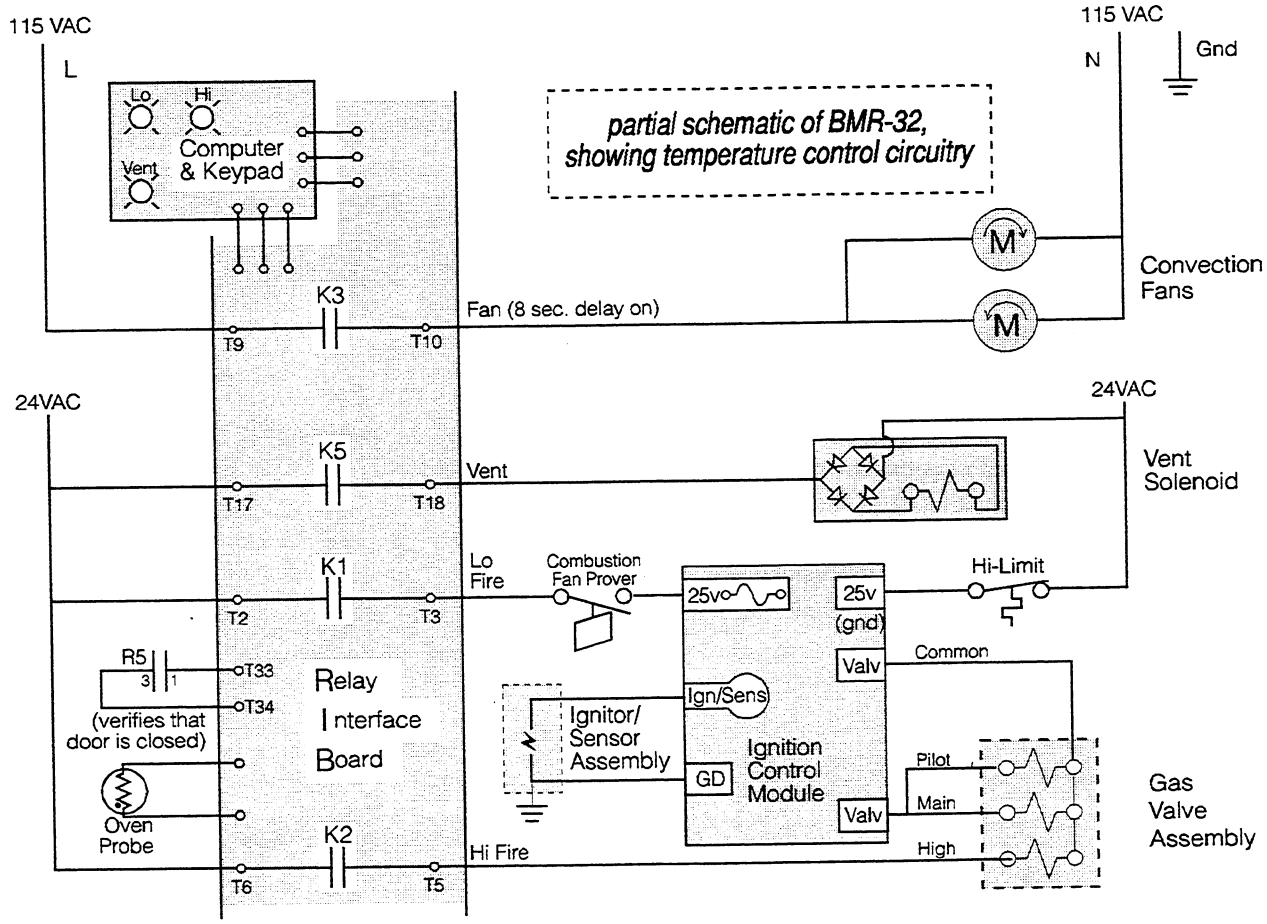
Once ignition is complete and the combustion process is under way, control of the oven cavity temperature begins. The two convection fans continuously circulate air in the cavity, while the temperature probe, at the top-front of the oven, senses the temperature.

Setpoint - Temperature is always brought to - and maintained at - a value known as the "setpoint." The setpoint is the desired oven temperature, as determined by the computer from the currently active operating mode or cooking program.

Start-Up - At start-up, the computer activates the Preheat mode, in which the oven is heated at Hi Fire to a temperature of 300 degrees Farenheit.

Temperature Control During Cooking - Once the oven has reached 300 degrees, cooking temperature is controlled to the setpoint. It is controlled not by cycling combustion off and on, but by opening and closing the air vent at the top of the oven. (However, if oven temperature exceeds setpoint by 25 deg. F, the burner will be turned off.)

Temperature Control During Hold - When cooking is done, the Hold mode is activated (oven temperature held for 2 hours at 175 deg.). Lo Fire is too much heat for the exhaust vent to keep the oven down to 175 degrees; therefore, oven temperature is controlled by cycling the convection fans and combustion off and on.



CIRCUIT DESCRIPTION

Once ignition and combustion is achieved the computer begins controlling oven temperature. Temperature inside the oven is controlled by the RIB, in conjunction with the computer, as sensed by the oven temperature probe.

The computer is programmed at the factory with up to 16 cooking programs. Refer to the Typical Cooking Program diagram on the next page. Each individual program varies by cooking time and temperature, depending on the product being cooked and the quantity that is loaded into the oven.

When the oven is started up cold (that is, somewhere between room temperature and the desired first stage cooking temperature) the computer initiates the Preheat mode.

The Preheat mode closes contacts K1 and K2 on the RIB, activating both Hi Fire and Lo Fire; the Lo and Hi lights on the keypad turn on. Eight seconds after combustion is established, K4 contact closes, starting the convection fans. The keypad readout continuously shows the actual temperature in the oven. (Setpoint temperature can be displayed by pressing the SET TEMP key.)

When Preheat temperature is reached, the keypad beeps to signal the operator, and the readout shows rEdY.

The product is loaded when the keypad display shows rEdY. When the door is opened to load product, the convection fans, the rotor, and combustion are all turned off. Closing the door re-enables the same functions. After loading, Hi and Lo Fire will probably both be activated to bring the oven back up to cooking temperature.

During the cooking stages, combustion is continuous. Temperature is controlled by opening and closing the vent at the top of the oven - makeup air enters through a gap above and below the door to replace hot air exhausted through the vent. The vent is opened by the

24 VDC solenoid, which is energized by the closing of the K5 contact of the RIB; the vent closes by spring return.

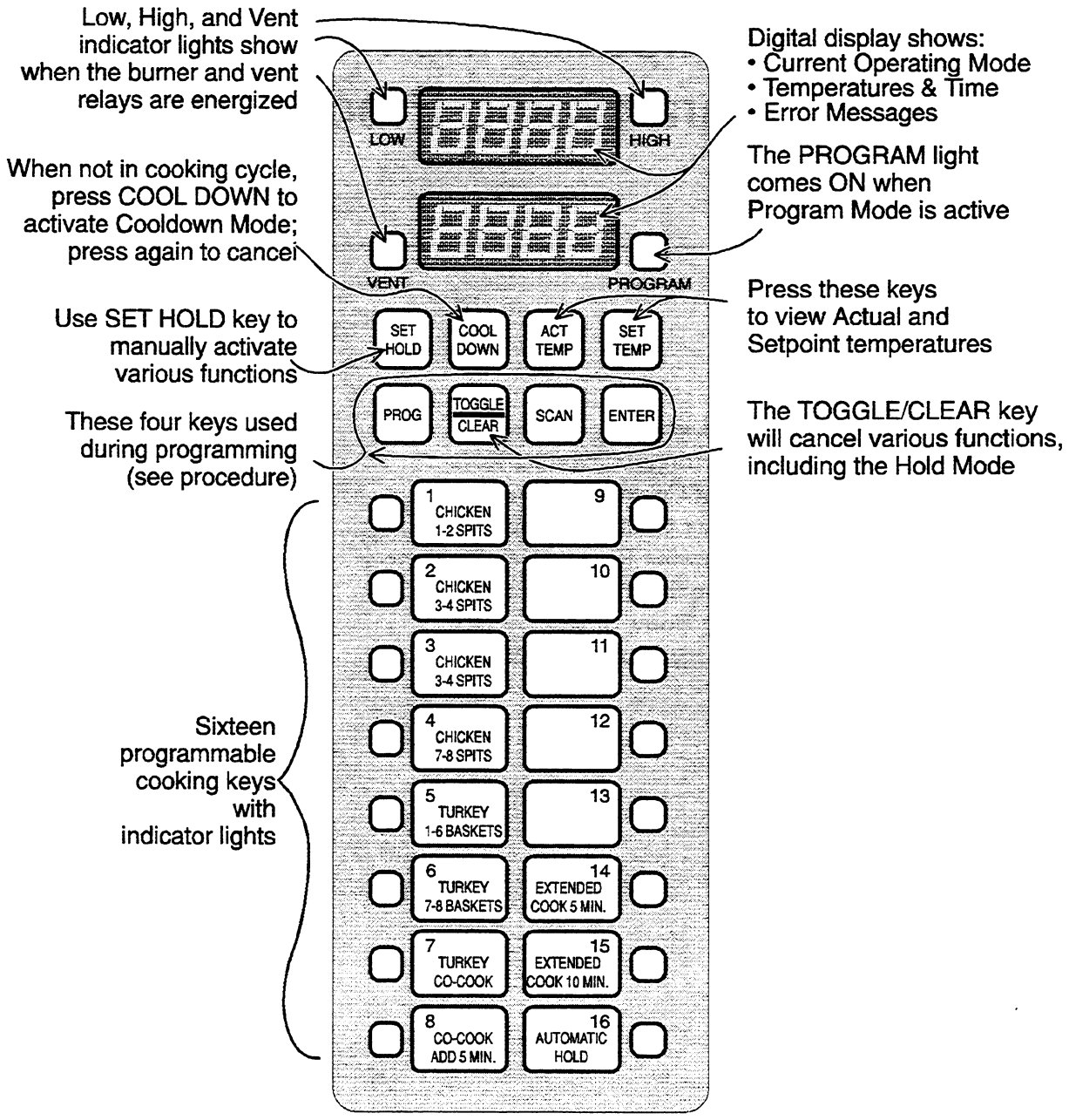
When the cooking cycle is done, the computer beeps, the readout shows donE. The oven goes into the Hold mode, keeping the product ready for use. Unlike the Cooking mode, temperature is controlled in the Hold mode (usually 175 degrees F.) by cycling the burner and convection fans off and on.

If the oven is turned on and no product key is pressed, the unit goes into the Setback mode after 20 minutes of inactivity. Setback temperature is 200 degrees F. and continues indefinitely, until the Cooldown key or a product key is pressed.

Section 3

The Computer, the Keypad, and Programming Procedures

Keypad Description
BMR - 32 Rotisserie Oven



Factory Settings - Product Keys

		1 CHICKEN 1-2 SPITS — Total Cook Time: 1h25m		2 CHICKEN 3-4 SPITS — Total Cook Time: 1h20m		3 CHICKEN 5-6 SPITS — Total Cook Time: 1h30m		
		1st Stage (P1:)	2nd Stage (P2:)	1st Stage (P1:)	2nd Stage (P2:)	1st Stage (P1:)	2nd Stage (P2:)	3rd Stage (P3:)
Turkey Co-Cook Key?	(Yes / No)	No		No		No		
Cook - Time		1m	1hr24m	25m	55m	1m	44m	45m
Cook - Temp	(degrees F.)	300	285	300	290	300	305	290
Cook - Burner Setting	(Hi / Lo)	Hi	Lo	Hi	Lo	Hi	Hi	Lo
Cook - Rotation Speed	(RPM)	3	2	3	2	3	3	2
Cook - Damper (Vent)	(clos / open)	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN
Cook - Time Control	(str / flex)	St		St		St		
Hold - Time		2:00hr		2:00hr		2:00hr		
Hold - Temp	(degrees F.)	175F		175F		175F		
Hold - Fan Setting	(pulse / on)	Puls		Puls		Puls		
Hold - Damper (Vent)	(clos / open)	Clos		Clos		Clos		

		4 CHICKEN 7-8 SPITS — Total Cook Time: 1h30m			5 TURKEY 1-6 BASKETS — Total Cook Time: 1h00m		6 TURKEY 7-8 BASKETS — Total Cook Time: 1h05m	
		1st Stage (P1:)	2nd Stage (P2:)	3rd Stage (P3:)	1st Stage (P1:)	2nd Stage (P2:)	1st Stage (P1:)	2nd Stage (P2:)
Turkey Co-Cook Key?	(Yes / No)	No			No		No	
Cook - Time		1m	46m	43m	1m	59m	1m	1h04m
Cook - Temp	(degrees F.)	300	310	295	300	280	300	280
Cook - Burner Setting	(Hi / Lo)	Hi	Hi	Lo	Hi	Lo	Hi	Lo
Cook - Rotation Speed	(RPM)	3	3	2	3	2	3	2
Cook - Damper (Vent)	(clos / open)	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN
Cook - Time Control	(str / flex)	St			St		St	
Hold - Time		2:00hr			2:00hr		2:00hr	
Hold - Temp	(degrees F.)	175F			175F		175F	
Hold - Fan Setting	(pulse / on)	Puls			Puls		Puls	
Hold - Damper (Vent)	(clos / open)	Clos			Clos		Clos	

		7 TURKEY CO-COOK	8 CO-COOK ADD 5 MIN.	9 *	14 EXTENDED COOK 5 MIN.	15 EXTENDED COOK 10 MIN.	16 AUTOMATIC HOLD
		1 hr Turkey Co-cook Timer	Extend Turkey Cooking 5 min	not 10 * programmed 11 12 13	Program Cannot Be Viewed or Changed	Program Cannot Be Viewed or Changed	Program Cannot Be Viewed or Changed
Turkey Co-Cook Key?	(Yes / No)	Yes	Yes		No	No	No
Cook - Time	(minutes)	1h00m	5min		5min	10min	1sec
Cook - Temp	(degrees F.)	-----	-----		300	300	300
Cook - Burner Setting	(Hi / Lo)	-----	-----		Lo	Lo	Lo
Cook - Rotation Speed	(RPM)	-----	-----		2	2	2
Cook - Damper (Vent)	(clos / open)	-----	-----		OPEN	OPEN	OPEN
Cook - Time Control	(str / flex)	St	St		St	St	St
Hold - Time		-----	-----		2:00 hr	2:00 hr	2:00 hr
Hold - Temp	(degrees F.)	-----	-----		175F	175F	175F
Hold - Fan Setting	(pulse / on)	-----	-----		Puls	Puls	Puls
Hold - Damper (Vent)	(clos / open)	-----	-----		Clos	Clos	Clos

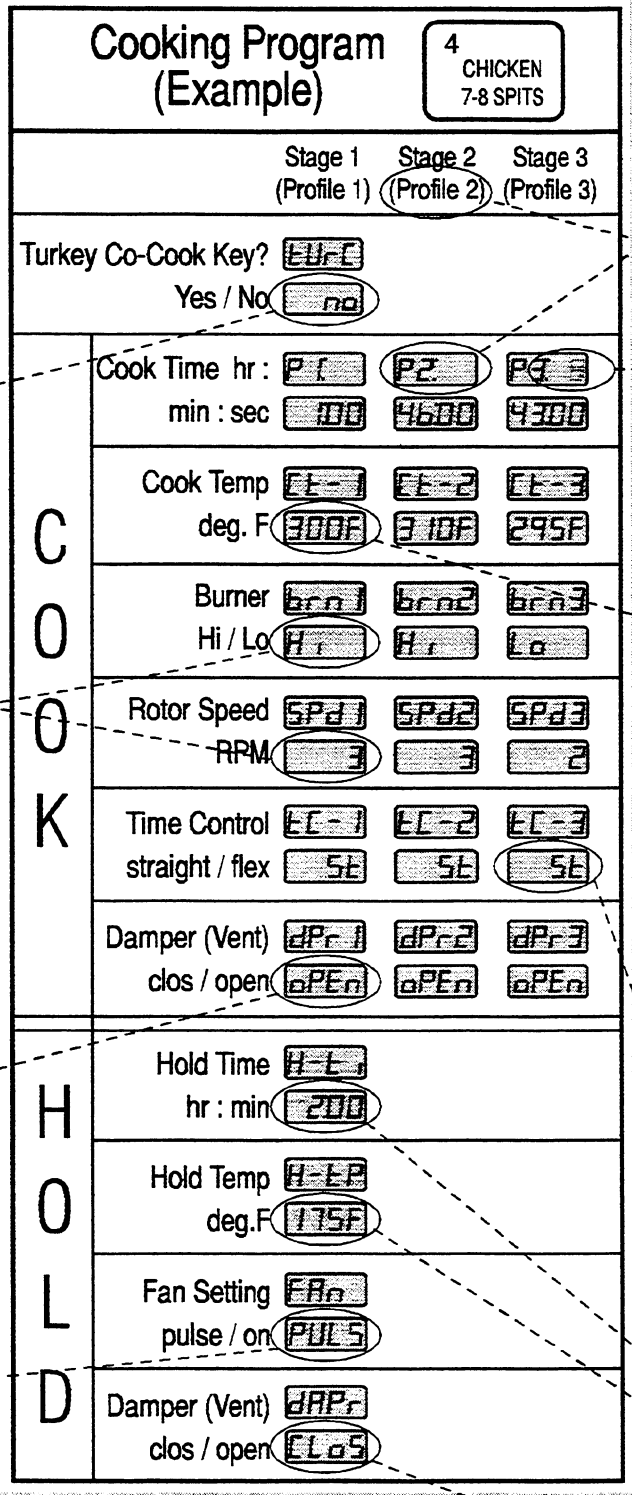
* may become Hi-Yield turkey keys

The "TURC" parameter of each key determines whether it is a primary key or a Turkey co-cook key. A co-cook key can only be used in conjunction with a primary key, and is used to cook turkey baskets at the same time a chicken program is being run. (Currently, only keys 7 and 8 are co-cook keys.)

Product appearance is affected by the burner setting (either Hi or Lo) and the Rotor Speed (3, 2, or 1 rpm. The combination of these two parameters, combined with themperatures and times, also affects the degree of doneness of the product.

During the Cook part of all but future Hi-Yield turkey programs, the Damper (vent) is programmed "OPEN." This controls temperature by opening and closing the vent.

The Fan parameter of all Hold programs is set to "PULS." The convection fans and the burner are "pulsed" (cycled off and on) to control oven temperature.



The Damper parameter of all Hold programs is set to "CLOS." With this setting, the exhaust vent remains closed, and the burner is cycled off and on to control oven temperature.

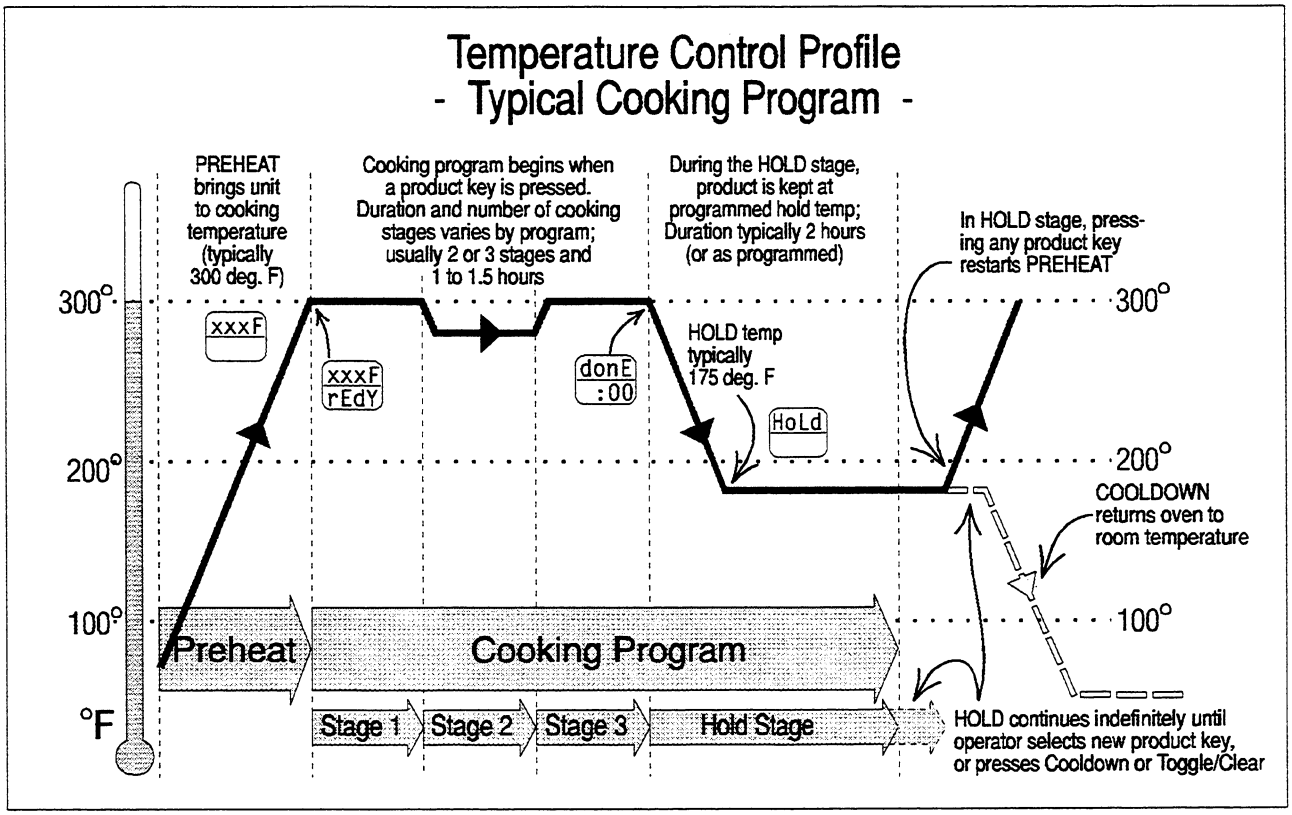
The number of cooking stages (or roasting "profiles") is determined by the number of cook times (creating a P4 time, for example, would create a new stage).

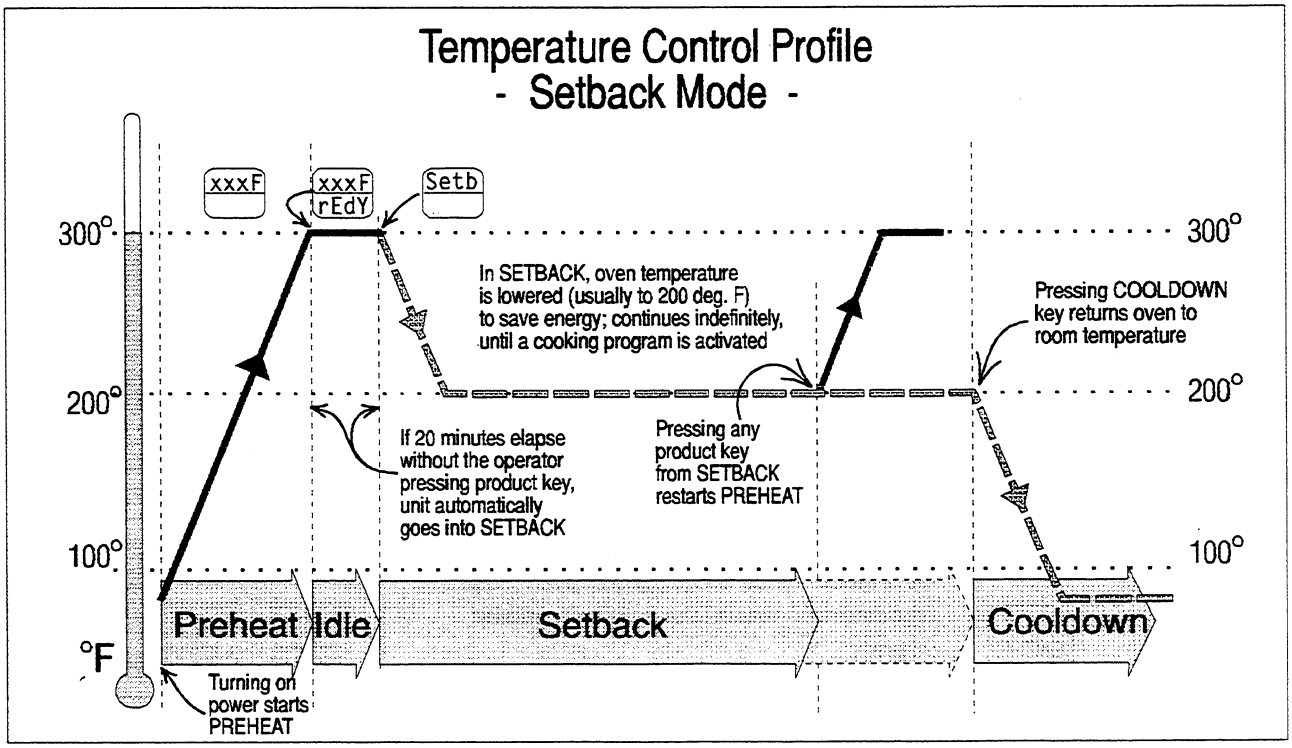
The cook time "hours" value (if one is programmed) is displayed in the far-right digit of the upper display

The first stage of all cooking keys is programmed for 300 degrees (even if only for 1 minute). This establishes the "preheat" temperature, which is always 300 degrees.

Time Control parameter of all cooking programs is Straight, in which cook time accumulates; in Flex, time is automatically modified to compensate for product load.

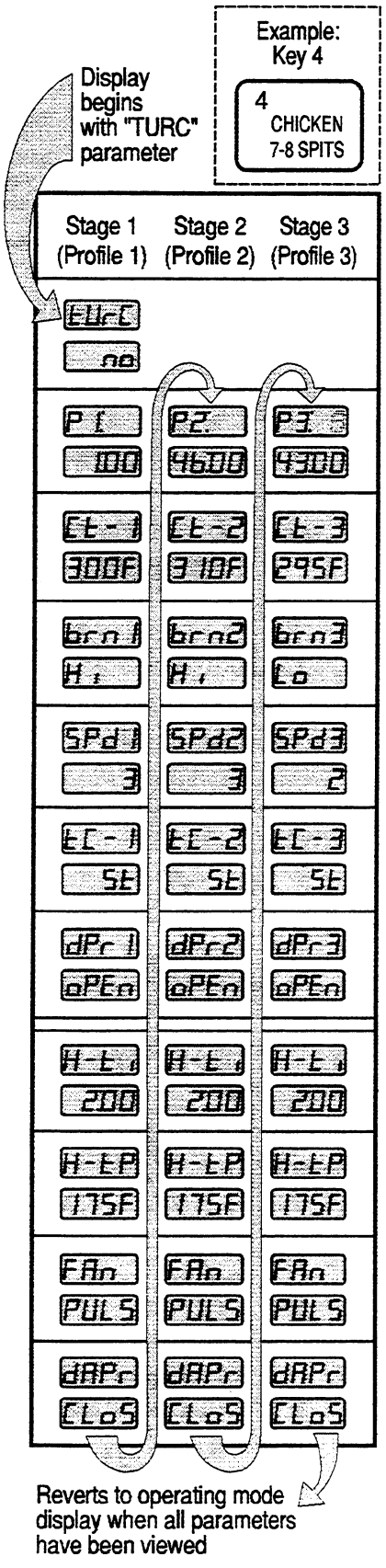
The Time and Temp parameters of all Hold programs are identical - 2 hours at 175 degrees. This is the maximum time, and minimum temperature, that the product can be safely held fresh.


Temperature Control Profile
- Typical Cooking Program -
PREHEAT brings unit to cooking temperature (typically 300 deg. F)
Cooking program begins when a product key is pressed. Duration and number of cooking stages varies by program; usually 2 or 3 stages and 1 to 1.5 hours
During the HOLD stage, product is kept at programmed hold temp; Duration typically 2 hours (or as programmed)
In HOLD stage, pressing any product key restarts PREHEAT
300°
200°
100°
°F
xxxF
xxxF rEdY
donE :00
HOLd
HOLD temp typically 175 deg. F
COOLDOWN returns oven to room temperature
Preheat
Cooking Program
Stage 1
Stage 2
Stage 3
Hold Stage
HOLD continues indefinitely until operator selects new product key, or presses Cooldown or Toggle/Clear


Temperature Control Profile
- Setback Mode -
xxxF
xxxF rEdY
Setb
300°
200°
100°
°F
In SETBACK, oven temperature is lowered (usually to 200 deg. F) to save energy; continues indefinitely, until a cooking program is activated
Pressing COOLDOWN key returns oven to room temperature
If 20 minutes elapse without the operator pressing product key, unit automatically goes into SETBACK
Pressing any product key from SETBACK restarts PREHEAT
Preheat
Idle
Setback
Cooldown
Turning on power starts PREHEAT

The "See" Function -
Viewing a Product Key's Parameters

The "SEE" function allows you see all the programmed settings of any product key. The settings are automatically scrolled one at a time onto the display, in the sequence shown in the figure at right. When done, the computer returns to the operating mode display. (Any programs running when you start the View mode will remain running in the background.)



Step 1 - Access View Mode by Entering Password

PROG

Press the PROG button to request access to the product key programming mode.

Prompt for Password

The upper display will show the "CODE" message; the lower display will show dashes. You must enter the correct password to enter the programming mode.

Password Entered but Hidden

In response to the CodE prompt, enter the password 2444 by pressing product keys 2, 4 4, and 4. As you enter the password, the dashes are replaced with "equal" signs.

ENTER

Press the ENTER key. (If the wrong code is entered, three short "beeps" are sounded, and the computer returns to the normal mode.)

Step 2 - Select the Product Key to be Viewed

Prompt for Product Key

If the code is entered correctly, the "SEE" prompt is shown, and product indicator lights 1 - 13 are lighted.

1 CHICKEN 1-2 SPITS ⇔ 13

The prompt is a signal to select a product key press the product key that you want to view.

Product Key 1 Selected

The number of the product key will appear in the lower display.

ENTER

Once you have selected the product key, press ENTER. This begins the automatic program view mode. When done, the computer will automatically resume the operating mode display.

Observe the values and settings as they are displayed. If any parameters are incorrectly programmed, refer to the next procedure for instructions on how to correct them.

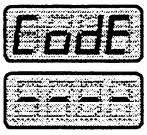
Programming Procedure for Product Keys

After using the View Procedure described previously to scan through a product key's parameters, if any parameter does not match the factory-programmed parameters, follow this procedure to correct it.

Step 1 - Access the Programming Mode by Entering the Password

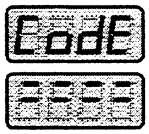
Press the PROG button to request access to the programming mode for product keys.

Prompt for Password



The upper display will show the "CODE" message; the lower display will show dashes. You must enter the correct password to enter the programming mode.

Password Entered but Hidden

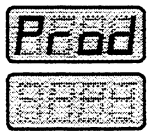


In response to the "CODE" prompt, enter the password 3124 by pressing the corresponding product keys. As you enter the password, the dashes are replaced with "equal" signs.

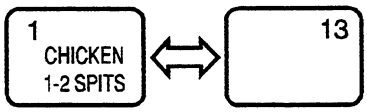
Press the ENTER key.

Step 2 - Select the Product Key to be Programmed

Prompt for Product Key

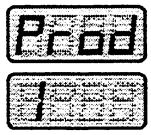


If the code is entered correctly, the "PROD" prompt is shown, and product indicator lights 1 - 13 are lighted. (If the wrong code is entered, three short "beeps" are sounded, and the computer returns to the normal mode.)



The prompt is a signal to select a product key; press the product key that you want to program.

Product Key 1 Selected



The number of the product key will appear in the lower display.

Once you have selected the product key, press ENTER. This begins a series of displays showing the various cooking parameters, including cooking time and temperature, burner state, hold parameters, etc.

Step 3 - Step Through Parameters & Stages to the One You Want to Change

Stage 1 (Profile 1) Cook Time

In the first display (a typical one is shown at left), the upper line shows that Profile (Stage) 1 is being programmed. The lower line shows the time programmed for the first cooking stage (in this case, 1 minute and 00 seconds).

(If this setting is incorrect, proceed to "Step 4a - Changing a Parameter Value (Number);" then return here.)

Press the Scan key and/or the Enter key until you reach the display that contains the incorrect setting, according to the table below.

Press Scan Key to Shift Display to Next Parameter

The Scan key shifts "downward" through all the parameters within the same cooking stage. Note that the Scan key does not reverse or recycle - if you scan past the desired parameter, you will have to go through all parameters and re-select the key to be programmed.

Press Enter Key to Shift Display to Next Stage

The Enter key shifts the display to the "right," showing the same parameter in the next cooking stage. Note that the Enter key steps through the same parameter of all stages, repeating, and does not shift "downward" to the next cooking parameter.

Product Key Parameter Labels			
	Stage 1	Stage 2	Stage 3
Turkey	tUrC	-------	-------
Cook Time	P1:	P2:	P3:
Cook Temp	Ct-1	Ct-2	Ct-3
Burner Setting	brn1	brn2	brn3
Rotation Speed	SPd1	SPd2	SPd3
Damper (Vent)	DPr1	DPr2	DPr3
Time Control	tC-1	tC-2	tC-3
Hold - Time	H-ti	-------	-------
Hold - Temp	H-tP	-------	-------
Hold - Conv Fan	FAn	-------	-------
Hold - Vent (damper)	dAPr	-------	-------

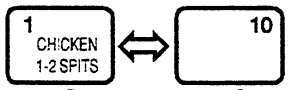
This table shows the parameter label, which is shown on the top line of the display. The second line of the display will contain the value or setting for the particular parameter. The specific values or settings will vary with the cooking program.

This table also shows 3 stages, or "profiles." Some programs will have 3 stages, some 2, and some only 1.

Step 4a - Change a Parameter Value (Number)

Press to Clear Current Value

Press Toggle / Clear if you want to change the numerical value of a parameter, Cook Time or Cook Temperature. The value will be cleared to zero.



number 1 **number 0**

Then, enter the correct value by pressing the numbered product keys in the lower part of the keypad that correspond to the value you want.

If you want to enter the number 5, for example, press Key 5 "Turkey 1-6 Baskets." Use Key 10 for the number "zero."

LIMITS - The computer is pre-programmed with value limits. It will not let you enter a value that exceeds those limits. You will not be allowed to move to the next parameter and you may hear a low-tone warning.

NOTE: The Cook Time parameter is entered in an HRS:MIN:SEC format, where the hours value appears in the last digit of the upper display. All other time values are in the HRS:MIN format.

When the value is correct, press ENTER.

Step 4b - Change a Parameter Setting or State

Press to Toggle Current Setting

Press Toggle / Cook if you want to change a state or setting parameter, such as the Hi or Lo burner setting, or the Closed or Open setting for the exhaust vent (damper).

For example, pressing Toggle / Clear repeatedly will switch back and forth between Closed and Open; or, it will switch between rotor speeds of 1, 2, and 3, and back again to 1.

When the state or setting is correct, press ENTER.

Step 5 - Leave the Programming Mode

After you have made all the necessary corrections to the cooking program, press the Scan key until the upper line of the display shows Prod, and all 16 product keys are lighted.

At this time another product key may be re-programmed, by pressing the desired product key.

If programming is complete, press the PROG key. The computer will return to the active mode, ready for cooking.

Rotor Speed Calibration Procedure

The rotational speed of the rotisserie can be fine tuned with the computer. Before running this procedure, be sure to set the trimpots on the Motor Controller circuit board to the positions shown in the drawing in Section 2.

Step 1 - Measure Rotation Speeds Before Calibrating

Rotor speed calibration is done by setting each of the three possible rotor speeds (1 RPM, 2 RPM, and 3 RPM) as a percentage of full speed. Note that the MAX speed trimpot on the motor controller board must be set high enough to produce at least 3 RPM when called for by a cooking program.

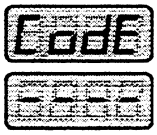
Use a stopwatch or clock with a second hand to time and record rotor speeds. Mark the rotor drum with a piece of tape. Start cooking program 1 and time one rotation in the first stage- it should take 20 seconds at 3 RPM. The second stage of program 1 is 2 RPM - it should take 30 seconds for one full rotation. In the Hold and Setback modes, rotor speed is 1 RPM - it should take 60 seconds for one full rotation. Record the times for each speed.

Next, calculate the deviation for each speed by subtracting the ideal time from the actual time and dividing the result by the ideal time. Thus, if at 3 RPM the rotor takes 18.5 seconds instead of 20 for one rotation, rotation is too fast by 1.5 seconds; dividing 1.5 by 20 indicates a 7.5% excess speed.

Step 2 - Access the Programming Mode by Entering the Password

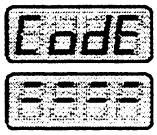
Press the PROG button to request access to the programming mode.

Prompt for Password



The upper display will show the "CODE" message; the lower display will show dashes. You must enter the correct password to enter the programming mode.

Password Entered but Hidden

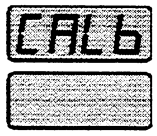


In response to the "CODE" prompt, enter the password 3111 by pressing the corresponding product keys. As you enter the password, the dashes are replaced with "equal" signs.

Press the ENTER key.

Step 3 - Select the Rotation Speed to be Calibrated

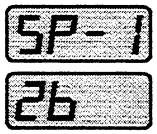
Initial Display - Calibration Sequence



If the code is entered correctly, the "CALB" prompt is shown. (If the wrong code is entered, three short "beeps" are sounded, and the computer returns to the normal mode.)

Press the SCAN key to bring up the first calibration display.

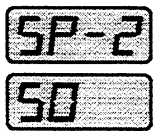
Speed 1 (1 RPM) Calibration Factor



The first display shows the calibration factor of SP-1 (in this example, a factor of 26%). If this value needs to be changed, proceed to Step 4.

If not, press the SCAN key to bring up the second display.

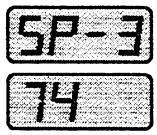
Speed 2 (2 RPM) Calibration Factor



The second display shows the calibration factor of SP-2 (in this example, a factor of 50%). If this value needs to be changed, proceed to Step 4.

If not, press the SCAN key to bring up the third display.

Speed 3 (3 RPM) Calibration Factor

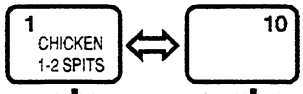


The third display shows the calibration factor of SP-3 (in this example, a factor of 74%). Proceed to Step 4.

Step 4 - Change the Calibration Factor

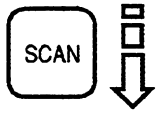
Press to Clear Current Value

To change the value of any speed calibration factor, press TOGGLE/CLEAR. The lower display will clear.



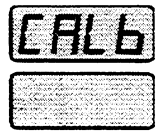
number 1 **number 0**

Enter the desired factor by pressing the corresponding product keys.



When done, press SCAN. The display will advance to the next calibration factor - after SP-3, it will return to the CALB display.

Initial Display - Calibration Sequence



From the CALB display, you can press SCAN to review the settings of all three factors, (and make changes if needed), or . . .

. . . you can press PROG to return to the normal operating mode.

Error Messages and Sounds

In addition to displaying information and sounding tones during normal operation, the computer also displays error messages and sounds when there is a problem with the oven's operation.

SOUND	DISPLAY	DESCRIPTION	REMEDY
Repeating beep, beep	door oPEn	The oven door is open. Cooking temperature may have been affected.	Close the door; monitor product to make sure it is properly cooked after DONE signal.
-- no tone --	hEAt Err	The oven has failed an efficiency test.	Call for technical assistance.
-- no tone --	---- Prob	Oven temperature probe has failed shorted.	Test probe; replace if necessary.
Steady high tone	---- Prob	Oven temperature probe has failed open.	Test probe; replace if necessary.
Steady high tone	---- Hi	Oven temperature has exceeded 520 degrees F.	Keep a close watch on the oven.
Steady high tone	---- HELP	DANGER: Oven temperature has exceeded 620 degrees F.	Turn oven off and call for technical assistance.

Section 4

Troubleshooting Procedures

BASIC TROUBLESHOOTING

Symptom	Probable Cause	Corrective Action
UNIT APPEARS "DEAD" WHEN POWER SWITCH TURNED ON	Unit not plugged in	Plug power cord into live outlet
	Disconnect switch OFF	Restore power to outlet circuit
	Branch circuit breaker tripped or fuse blown	Determine and correct cause of tripped breaker or blown fuse; reset breaker or replace fuse
	Power switch or power light defective	Check switch and light; replace if defective
POWER LIGHT IS ON, BUT SOME OR ALL BASIC FUNCTIONS DON'T WORK	DISCUSSION: When the front panel power switch is turned on, 115VAC power is supplied directly to some basic components, and these should operate immediately. They are: 1) the power indicator, 2) both cooling fans, 3) the combustion blower, and 4) the keypad / computer.	
COMBUSTION FAN - or - COOLING FANS DO NOT WORK	Power not being delivered to fans	Check cabling between power switch and fans; repair or replace
	One or more fans are defective	Check fans and replace if necessary
	Time delay relay defective	Test relay and replace if needed
KEYPAD / COMPUTER NOT WORKING; NO INDICATION OF POWER	Power wiring to keypad / computer transformer defective; transformer may be defective	Check "power" LED on RIB - it should be on steady; check for 115 VAC and 24 VAC on transformer input and output; check wiring; repair, replace as needed
	Power wiring from transformer, or cable between keypad and computer, defective or disconnected	Check power wiring; check power cable; reseat cable; repair or replace as needed
	Keypad / computer defective	Replace keypad / computer unit
BASIC FUNCTIONS WORKING, BUT OTHER(S) NOT WORKING	DISCUSSION: Some functions don't operate from main power, and depend on signals from control logic: 1) the door-mounted interior lights, 2) the convection fans, 3) the rotisserie drive motor, and 4) the ignition combustion control circuits.	
KEYPAD / COMPUTER FUNCTIONING, BUT NOTHING ELSE	No "door closed" signal because door is not closing completely, or door switch is defective.	Check operation of door and door switch. The door is held shut magnetically; the door striker must engage door switch, so it can energize relay R5.

BASIC TROUBLESHOOTING, cont.

Symptom	Probable Cause	Corrective Action
KEYPAD / COMPUTER FUNCTIONING, BUT NOTHING ELSE (continued . . .)	No "door closed" signal because door closed relay is defective; this deprives closed contacts at T33 and T34 of RIB, and/or in the circuit of door-mounted interior lights	Check operation of door closed relay (R5); check that relay is energized when door is closed; check that normally open contacts are closed when relay is energized; check that wiring is OK; reseat relay in socket; replace relay if needed
	No communications between computer and RIB	Check communications LED on RIB - it should be blinking slowly; if not, check that communications cable is properly seated; repair cable, or replace defective computer module or RIB module.
COMPUTER STUCK ON "DONE" DISPLAY	Computer program hung up; needs to be reset	Turn off power. Wait 5 seconds. Then, while holding down TOGGLE / CLEAR button, turn power back on. Computer resets, and starts up in preheat mode
DOOR LIGHTS NOT WORKING, BUT THE FRONT PANEL INDICATOR IS	If the indicator is working, then either the door light transformer is defective, or there is a wiring failure, or both lights are burned out	Check for 115 VAC at transformer input and 24 VAC at the output; check bulbs CAUTION: Don't touch halogen bulbs with bare fingers; contaminants deposited on surface can cause early failure.
DOOR LIGHTS NOT WORKING; NEITHER IS THE FRONT PANEL INDICATOR	If neither the lights nor the indicator are working, then the problem may be in the light switch, or in the door closed relay contact	Check the switch, the wiring; check the relay contact; reseat the relay; replace the switch or relay if necessary
BOTH CONVECTION FANS NOT WORKING	RIB contact K3 should close 8 seconds after combustion is achieved; problem could be: K3 relay or contact, wiring fault, or both fans bad	Check relay K3 across RIB terminals T9 and T10; check wiring; check fans; repair as needed; or replace fans or RIB

For help with other specific problems, refer to the separate troubleshooting sections that follow:

Troubleshooting the Motor Control Function

Troubleshooting the Ignition & Combustion Function

Troubleshooting Product Appearance problems

TROUBLESHOOTING the MOTOR CONTROL

Symptom	Probable Cause	Corrective Action
CONTROL BLOWS LINE FUSE	Control or motor connected to or shorted to ground	Check for shorts and repair as required
	Shorted armature leads, incorrect wiring	Check and correct wiring
	Damaged controller or components	Replace control module
DRIVE MOTOR WILL NOT START	Power not delivered to controller	Check for 115 VAC at L & N terminals of controller; if none, check RIB's K4 terminal (between T8 and neutral); repair as required
	Open line fuse or tripped circuit breaker	Determine cause and repair; replace fuse with correct size; reset breaker
	Motor overloaded; mechanical jam	Correct product load distribution; inspect rotisserie mechanicals
	TORQ trim pot is out of adjustment	Visually check setting of trim pot (see drawing in Section 3); adjust TORQ pot to factory setting
	Problem in computer program	Check motor speed programming in "SEE" and "CALB" procedures in Section 3; reprogram if possible, or replace computer
	Speed signal not being returned from RIB	Check integrity of signal cable between RIB and controller; measure signal across S1 and S3, and across S1 and S2
	Damaged motor	Repair or replace motor

Normal Voltage Readings at the DC Motor Speed Controller			
Programmed Rotor Speed	Supply Signal (S1 and S3)	Return Signal (S1 and S2)	Motor Armature (A+ and A-)
1 rpm	9.8 vdc	3.6 vdc	30.0 vdc
2 rpm	9.8 vdc	5.5 vdc	57.0 vdc
3 rpm	9.3 vdc	7.5 vdc	85.0 vdc

TROUBLESHOOTING the MOTOR CONTROL, cont.

Symptom	Probable Cause	Corrective Action
TROUBLE-SHOOTING TIP: Is the Problem in the Controller or the RIB?	1. Disconnect the speed signal cable between the motor controller's S1, S2, and S3 terminals and the RIB: the rotor should turn approximately 1 rpm. If you then place a shorting jumper between S2 and S3, the rotor should turn approximately 3 rpm. 2. If both of the above checks are positive, the motor controller is good, and your problem is in the RIB or the signal cable. 3. If one or both of the checks in step 1 fail, the motor controller is bad, and should be replaced.	
MOTOR WILL NOT COME UP TO SPEED	MAX trim pot set too low	Adjust trim pot
	Speed signal from RIB too low	Test for proper signal from RIB across S1 & S2; repair or replace
	Wrong horsepower setting	Confirm DIP switch setting (see figure in Section 3)
	Bad component on motor control board	Test and repair or replace board
	Motor overloaded	Correct product load distribution; inspect rotisserie mechanicals
	TORQ trim pot out of adjustment	Visually check setting; adjust TORQ pot
MOTOR WILL NOT MAINTAIN SPEED UNDER LOAD	Wrong horsepower setting	Check DIP switch setting on controller
	TORQ trim pot is out of adjustment	Visually check setting; adjust TORQ trim pot
	Spits improperly loaded; drive mechanicals out of adjustment; motor overloaded	Redistribute load; inspect rotisserie mechanicals
NO SPEED ADJUSTMENT	Open speed signal connection between RIB and Motor control	Check cable between RIB; check S1, S2, and S3 connections
	Defective speed signal from RIB	Repair/replace RIB
	Speed programmed incorrectly	Use "SEE" to review Product Key program settings for correct rotational speeds

TROUBLESHOOTING IGNITION and COMBUSTION

Symptom	Probable Cause	Corrective Action
BEFORE TROUBLE-SHOOTING . . .	Before troubleshooting the gas control circuitry, check that other basic control circuits are receiving power and are operational. When the front panel power switch is turned on, 115VAC power is supplied directly to some functions, and these should operate immediately. They are: 1) the power indicator, 2) the cooling fans, 3) the computer/keypad and RIB, and 4) the combustion air blower. Other functions, including the gas control circuits, require operating control logic before they will work.	
BASIC FUNCTIONS OK, COMPUTER/ KEYBOARD WORKING, BUT NO IGNITION SPARK	Door is not closing fully or door switch is faulty (door switch energizes R5, enabling control logic through RIB)	Check door alignment, door magnet, or switch; repair as needed; check relay R5, reseat or replace
	Fuse blown on Ignition Control Module	Determine and repair cause of blown fuse; replace fuse with correct size
	Power not being applied at 25V inputs of Ignition Control Module	Check the following: 1. Control transformer produces 24 VAC 2. Hi-Limit switch OK and closed 3. Combustion fan prover OK and closed 4. RIB functional and K5 contact closed If any of above is faulty, repair or replace
	Ignition/ground wires faulty or loose	Check wires; reconnect or replace
	Ignitor/sensor assembly faulty or shorted	Check assembly; repair or replace
	Ignition Control Module faulty	Replace module
IGNITION SPARKING, BUT PILOT WON'T LIGHT	Gas supply turned off	Make sure gas supply to oven is on; check all shutoff valves
	Pilot gas supply inadequate	Adjust flame per details in Section 2
	Incoming gas pressure too high	Adjust pressure per details in Section 2
	Gas valve assembly faulty	Replace gas valve assembly

TROUBLESHOOTING IGNITION and COMBUSTION, cont.

Symptom	Probable Cause	Corrective Action
PILOT WILL LIGHT, BUT WON'T STAY ON	Gas pressure too low, or pilot setting out of adjustment	Check gas pressure; adjust pilot flame to specs in Section 2
	Ignitor/sensor or ground wires, or connections, are defective or intermittent	Check wires and connections; clean and tighten connections; replace defective wires
	To read the flame sensing signal being returned from the Ignitor/Sensor assembly, set your meter to DC microamperes, and connect the meter in series in the ***ground*** circuit from the ignitor to the ignition module. (This Spark ignition module is used in other Cleveland Range products.)	
	Defective gas valve assembly	Replace gas valve assembly
PILOT WILL LIGHT, BUT MAIN BURNER WON'T LIGHT	Faulty wiring between Ignition Control Module and gas valve assembly	Check wiring; clean, tighten connections
	Gas pressure too low, or gas valve out of adjustment	Check gas pressure; adjust pressure to specs in Section 2
	Gas line to main burner obstructed; restrictor at main burner obstructed	Check gas flow from gas valve assembly; inspect and clean restrictor
	Combustion blower dirty	Check and clean air delivery system
	Fan prover air switch slow	Check and clean switch; replace if needed
	Ceramic main burner element clogged (possible cleaner overspray)	Check element for cleaner overspray; replace burner if necessary
	Defective gas valve assembly	Replace gas valve assembly

TROUBLESHOOTING PRODUCT, APPEARANCE

Symptom	Probable Cause	Corrective Action

BEFORE TROUBLE-SHOOTING . . .

This procedure addresses the problem of the product not being cooked as desired. The product may be undercooked, overcooked, or its appearance may not meet requirements.

The cause of the problem may be simple, like a failed component. Or it may be complex, perhaps a combination of problems thay may need some digging before the fix is found. Consider these possible groups of problems when troubleshooting a temperature control problem:

1) ***Faulty operating procedure*** (door open too long during loading, wrong product key pressed, etc.)
2) ***Faulty program*** (incorrectly programmed product key)
3) ***Faulty component*** (probe, RIB, computer/keypad, exhaust vent or solenoid, convection fan)
4) ***Faulty gas pressure*** (too low or too high)
5) ***Faulty installation or adjustment*** (vent blocked, door misaligned or out of adjustment)

"Prob" ERROR MESSAGE DISPLAYS

The computer/keypad displays the "Prob" error message when it detects a fault with the temperature probe or with communications between the computer and the RIB module. The "Prob" message is combined with a "beep" tone and with the "COMM" light to pinpoint the fault.

"Prob" ERROR MESSAGE - WITH BEEP

The computer has determined that the temperature probe is open

Probe Resistance at Selected Temperatures	
32 F (0 C)	1000 ohms
77 F (25 C)	1095 ohms
86 F (30 C)	1114 ohms
95 F (35 C)	1133 ohms
212 F (100 C)	1375 ohms
300 F (149 C)	1554 ohms

Check probe wiring and connections; disconnected probe from RIB and measure resistance - refer to resistance chart at left; replace faulty probe

"Prob" ERROR - WITHOUT BEEP *but* WITH FLASHING COMM LIGHT

The computer has determined that the temperature probe is shorted

Follow probe corrective action above

"Prob" ERROR - WITHOUT BEEP *and* WITHOUT FLASHING COMM LIGHT

Digital communications between the computer and the RIB have failed; cable may be bad; computer or RIB may be bad

Check proper seating of communication cable; check continuity of communication cable; replace cable if necessary; replace computer or RIB if necessary

TROUBLESHOOTING PRODUCT, APPEARANCE, cont.

Symptom	Probable Cause	Corrective Action
PRODUCT UNDERCOOKED (INTERNAL TEMPERATURE TOO LOW)	Door open too long during loading, causing oven to cool off too much, requiring more cooking time	Product should be completely readied prior to beginning loading; product should be loaded as quickly as possible
	Product loaded in setback mode, then product key pressed before oven showed "REDY"	Operator should not load product before "REDY" is displayed
	Wrong product key pressed, causing too short cooking time	Make sure operator knows which key to press for particular product and quantity
	Product key may have been accidently, or incorrectly, reprogrammed	Check program parameters using "SEE" procedure in Section 3; reprogram if needed
	Door not closing fully or is misaligned, allowing makeup airflow to cause temperature probe to read too high	Check that door is properly seated, and aligned with a 1/8- to 3/16-inch gap along all 4 sides
	Vent mechanism or vent solenoid misaligned or malfunctioning, causing temperature probe to read too high	Examine vent and solenoid, checking for free operation, and maximum travel when opening and closing
	Cool air blowing down exhaust vent	Check that external ventilation and/or exhaust system is working properly
	Convection fan(s) faulty, causing improper air circulation	Check that both fans are working, that they are rotating correctly (in opposite directions), and air flow is not blocked
	Gas pressure too low, reducing output of burner	Check incoming gas pressure and pressure settings of main and high supplies; use procedure in Section 2
	Faulty RIB or computer/keypad module	Temperature control program faulty; check modules and replace if necessary

TROUBLESHOOTING PRODUCT, APPEARANCE cont.

Symptom	Probable Cause	Corrective Action
PRODUCT OVERCOOKED (INTERNAL TEMPERATURE TOO HIGH)	Wrong product key pressed, causing too long cooking time	Make sure operator knows which key to press for particular product and quantity
	Product key may have been accidently, or incorrectly, reprogrammed	Check program parameters using "SEE" procedure in Section 3; reprogram if needed
	Door not closing fully or misaligned, allowing makeup airflow to cause temperature probe to read too low	Check that door is properly seated against strike plate, and aligned with a 1/8- to 3/16-inch gap along all 4 sides
	Vent mechanism or vent solenoid misaligned or malfunctioning, causing temperature probe to read too low	Examine vent and solenoid, checking for free operation, and maximum travel when opening and closing
	Vent blocked	Check that nothing is blocking the passage of air exiting the oven
	Convection fan(s) faulty, causing improper air circulation	Check that both fans are working, that they are rotating correctly (in opposite directions), and air flow is not blocked
	Gas pressure too high, elevating output of burner	Check incoming gas pressure and pressure settings of main and high supplies; use procedure in "Ignition" section
	Faulty RIB or computer/keypad	Temperature control program faulty; check modules and replace if necessary

TROUBLESHOOTING PRODUCT, APPEARANCE cont.

Symptom	Probable Cause	Corrective Action
IF THE PRODUCT APPEARANCE IS UNSATISFACTORY . . .	The surface appearance of the product depends on the correct combination of cooking time, oven temperature, and convection airflow. If the product is properly cooked (correct internal temperature), follow the suggestions below to improve its appearance.	
PRODUCT SURFACE TOO DARK OR CRISP	Excessive heat during part of the cooking cycle; possible program error	Check that one of the cooking stages in the program may be set with too high a temperature, or too long a time, causing the surface to dry out
	Excessive venting, which reduces the humidity inside the oven, causing too much surface drying	Check that the vent does not stick open partially when it should be closed (not enough to prevent complete cooking, but enough to cause continuous venting)
	Burner stuck in HI burn mode	Check for correct programming with "SEE" procedure; check that K2 on RIB is not stuck closed
	Rotor speed too low; possible program error, possible motor control problem	Check rotation speed parameter using "SEE" function; check speed calibration using "CALB"; check motor control module
	Convection fans malfunctioning or incorrectly rotating	Check that both fans are working, and rotating correctly (in opposite directions)
PRODUCT SURFACE TOO LIGHT OR MOIST	Insufficient heat during part of the cooking cycle; possible program error	Check that one of the cooking stages in the program may be set with too low a temperature, or too short a time, preventing proper surface crisping
	Insufficient venting, which increases the humidity inside the oven, causing too much surface moisture	Check that the vent does not stick open partially, when it should be closed (not enough to prevent complete cooking, but enough to cause continuous venting)
	Convection fans malfunctioning or incorrectly rotating	Check that both fans are working, and rotating correctly (in opposite directions)