

**McDonalds
MDHSO
HIGH SPEED OVEN**



Service Manual

Intended for Authorized Service Agent use only



Carter-Hoffmann

**A Division of Carrier Commercial Refrigeration
1551 McCormick Ave.
Mundelein, Illinois, 60060 U.S.A.**

Phone: 847-362-5500

Toll Free (USA and Canada): 800-323-9793

Fax :847-367-8981

E-mail: service@carterhoffmann.com

Sales and Marketing: sales@carterhoffmann.com

Website: www.carter-hoffmann.com

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INTRODUCTION

This manual is designed for use by professional technicians, and provides the information necessary to successfully and safely troubleshoot and service the Carter-Hoffmann High Speed Oven.

SPECIFICATIONS

DIMENSIONS:

30.125" wide x 20.5" high x 34.343" deep
Door swing is 21" radius
2" clearance required on right side, left side and back

ELECTRICAL:

Voltage:	208 vac 3 ϕ
Wattage:	Appliance Maximum: 5500 Watts
	Convection Heaters: 2 @ 1500 Watts each
	Magnetrons: 2@ 1020 Watts each
Amperage:	22 Amps/leg maximum
Power Cord:	6' cord with NEMA 15-30P plug

SAFETY PRECAUTIONS



DANGER: EXTREMELY HIGH VOLTAGES

Voltages in the high voltage section of this oven can exceed 2,000 volts. Contact with extremely high voltages can cause severe injuries or death. Always wait at least 2 minutes after disconnecting oven from electrical power before servicing. Always check components of the high voltage section with a high voltage probe to verify voltages have bled down to safe levels before servicing.



WARNING: MICROWAVE RADIATION HAZARD

High energy microwave radiation is generated during operation of the microwave section of this oven. Microwave radiation can cause severe injury. Do not attempt to operate the oven with the door open. Do not attempt to defeat any safety interlock or safety system.



CAUTION: MICROWAVE RADIATION HAZARD

Damage to the door can result in microwave radiation leakage. Do not operate the oven if the door is damaged.



CAUTION: ELECTRIC SHOCK HAZARD

Disconnect this appliance from electrical power and wait 2 minutes before performing any maintenance or servicing.



CAUTION: MICROWAVE RADIATION LEAKAGE HAZARD

Any procedure that disturbs any component within the microwave section of the oven may cause microwave radiation leakage. Always perform a microwave radiation leakage test after servicing the microwave section of the oven. Microwave radiation leakage must not exceed $4\text{mw}/\text{cm}^2$.



CAUTION: MICROWAVE RADIATION LEAKAGE HAZARD:

Do not place or allow any material between the door sealing surfaces. Do not use an external thermocouple in the oven cavity. Do not allow soil or cleaning residue to accumulate on the door sealing surfaces.



CAUTION: FIRE HAZARD

Do not overcook foods. In case of a fire in the oven cavity, do not open the door. Disconnect the oven from electrical power and allow the fire to self-extinguish in the closed cavity. Opening the door may allow the fire to spread.



CAUTION: BURN HAZARD

During operation, interior door surfaces may become very hot and can cause serious burns on contact.

IMPORTANT SAFETY INSTRUCTIONS

When using electrical appliances basic safety precautions should be followed, including the following:



WARNING – To reduce the risk of burns, electrical shock, fire, injury to persons, or exposure to excessive microwave energy:

- 1) Read all instructions before using the appliance.
- 2) Read and follow the specific “PRECAUTIONS TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY” found on page 5.
- 3) This appliance must be grounded. Connect only to properly grounded outlet. See “Grounding Instructions” found on page 5.
- 4) Install or locate this appliance only in accordance with the provided installation instructions.
- 5) Some products such as whole eggs and sealed containers – for example, closed glass jars – may explode and should not be heated in this oven.
- 6) Use this appliance only for its intended use as described in the manual. Do not use corrosive chemicals or vapors in this appliance. This type of oven is specifically designed to heat, cook, or dry food. It is not designed for industrial or laboratory use.
- 7) Do not operate this appliance if it has a damaged cord or plug, if it is not working properly, or if it has been damaged or dropped.
- 8) Only qualified service personnel should service this appliance. Contact nearest authorized service facility for examination, repair, or adjustment.
- 9) Do not cover or block any openings on the appliance.
- 10) Do not store this appliance outdoors. Do not use this product near water – for example, near a kitchen sink, in a wet basement, or near a swimming pool, and the like.
- 11) Do not immerse cord or plug in water.
- 12) Keep cord away from heated surfaces.
- 13) Do not let cord hang over edge of table or counter.
- 14) When cleaning surfaces of door and oven that comes together on closing the door, use only mild, nonabrasive soaps, or detergents applied with a sponge or soft cloth.
- 15) To reduce the risk of fire in the oven cavity:
 - a. Do not overcook food. Carefully attend appliance if paper, plastic, or other combustible materials are placed inside the oven to facilitate cooking.
 - b. Remove wire twist-ties from paper or plastic bags before placing bag in oven.
 - c. If materials inside the oven should ignite, keep oven door closed, turn oven off, and disconnect power cord, or shut off power at the fuse or circuit breaker panel.
 - d. Do not use the cavity for storage purposes. Do not leave paper products, cooking utensils, or food in the cavity when not in use.

SAVE THESE INSTRUCTIONS

PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

A- Do not operate or allow the oven to be operated with the door open.

B- Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary: (1) interlock operation, (2) proper door closing, (3) seal and sealing surfaces (arcing, wear, and other damage), (4) damage to or loosening of hinges and latches, (5) evidence of dropping or abuse.

C- Before turning on microwave power for any service test or inspection within the microwave generating compartments check the magnetron, wave guide or transmission line and cavity for proper alignment, integrity and connections.

D- Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced or adjusted by procedures described in this manual before the oven is released to the owner.

E- A Microwave leakage check to verify compliance with the Federal performance standard should be performed on each oven prior to release to the owner.

GROUNDING INSTRUCTIONS

This appliance must be grounded. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current. This appliance is equipped with a cord having a grounding wire with a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded.

WARNING—Improper use of the grounding can result in a risk of electric shock.

Consult a qualified electrician or serviceman if the grounding instructions are not completely understood, or if doubt exists as to whether the appliance is properly grounded.

GENERAL SAFETY PRECAUTIONS

This oven is intended for use in commercial establishments only.

This oven is intended to prepare food for human consumption. No other use is recommended or authorized by the manufacturer or its agents.

Allow 2" clearance between the cabinet and adjacent equipment or structure in order to provide adequate cooling. The right side of the oven should not be placed next to high-heat equipment such as fryers, grilles or broilers.

Operators of this appliance must be familiar with the appliance use, limitations and associated restrictions. Operating instructions must be read and understood by all persons using or installing this oven.

Cleanliness of this oven is essential to good sanitation. Read and follow all included cleaning instructions and schedules to ensure the safety of the food product.

Do not splash or pour water on, in or over any louvers, controls, control panel or wiring.

Do not operate the oven when empty. Inadequate energy absorbing material, such as food or water, may cause the magnetron to overheat.

Do not put any of the following in the oven cavity:

- regular cooking thermometer or external thermocouple
- newspaper, or paper towels containing synthetic fibers
- sealed containers or plastic bags
- sharp or pointed items, such as knives, forks, twist ties, foil, etc.

Do not cook unapproved products, fat, or eggs with unbroken shells and/or yolks in this oven.

Do not use the oven cavity for storage. Never leave anything in the oven cavity when the oven is not in use.

Any procedure which requires the use of tools must be performed by a qualified technician.

Installation Guide

1. Check for proper voltage and circuit breaker size. Requires 208 Volt, 3 Phase, 30 Amp Circuit
2. Ensure receptacle is correctly installed and operating safely. Requires L15 – 30R NEMA wall mounted receptacle.
3. Position oven on table or counter top. Maintain 2" of clearance on each side and back of oven to allow for adequate cooling. The right side of the oven should not be placed next to high-heat equipment such as fryers, grilles or broilers. This side of the oven contains the component cavity and access may be needed to this area for service.
4. Fasten oven to table or counter-top from underneath with bolts (provided). Oven must be securely fastened to prevent movement.
5. Seal around bottom edge of oven with NSF approved material.

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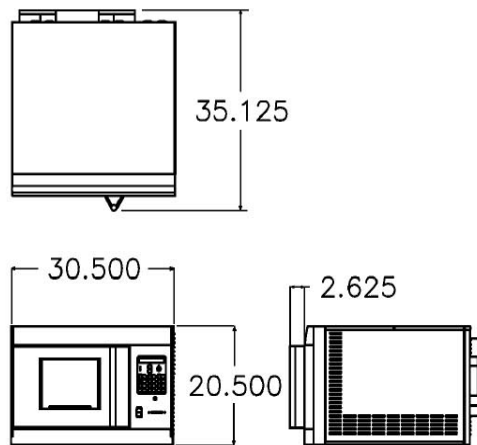


HIGH SPEED OVEN MODEL MDHSO1

The Carter-Hoffmann Model MDHSO1 High Speed Oven is designed to bake approved menu items with the flexibility of future products. Microwave and convection heating technology is combined to reduce baking time and produce fresh baked product.

PRODUCT FEATURES

- Multi-level programmable controller for up to thirty settings for breakfast, lunch, dinner and late menus.
- "Fast Cool" setting for quick cooling.
- "Clean Cycle" for quick and easy cleaning.
- Accepts 1/2 size standard aluminum baking pans.
- Preheat to 400°F in 8 minutes or less.
- Cooking temperature range from 150°F to 450°F.
- Digital temperature display (°F or °C).
- 300 series stainless steel construction.
- Oven designed for counter-top installation.
- Long life spring action door latching mechanism.
- Welded tubular door handle.
- Durable 1/2" stainless steel door hinge pin with bronze bushing.
- Smart Card Reader for quick menu changes.



ELECTRICAL INFORMATION:

Voltage: 208 volt, 22 Amps maximum per line, three phase, 60 Hz., 3000 watts convection, and two 1020 watt each magnetron tubes. Cabinet is provided with a six-foot cord and NEMA L15-30P plug. 2" space required for ventilation.

Optional alternate electric and plug configurations available.

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BY

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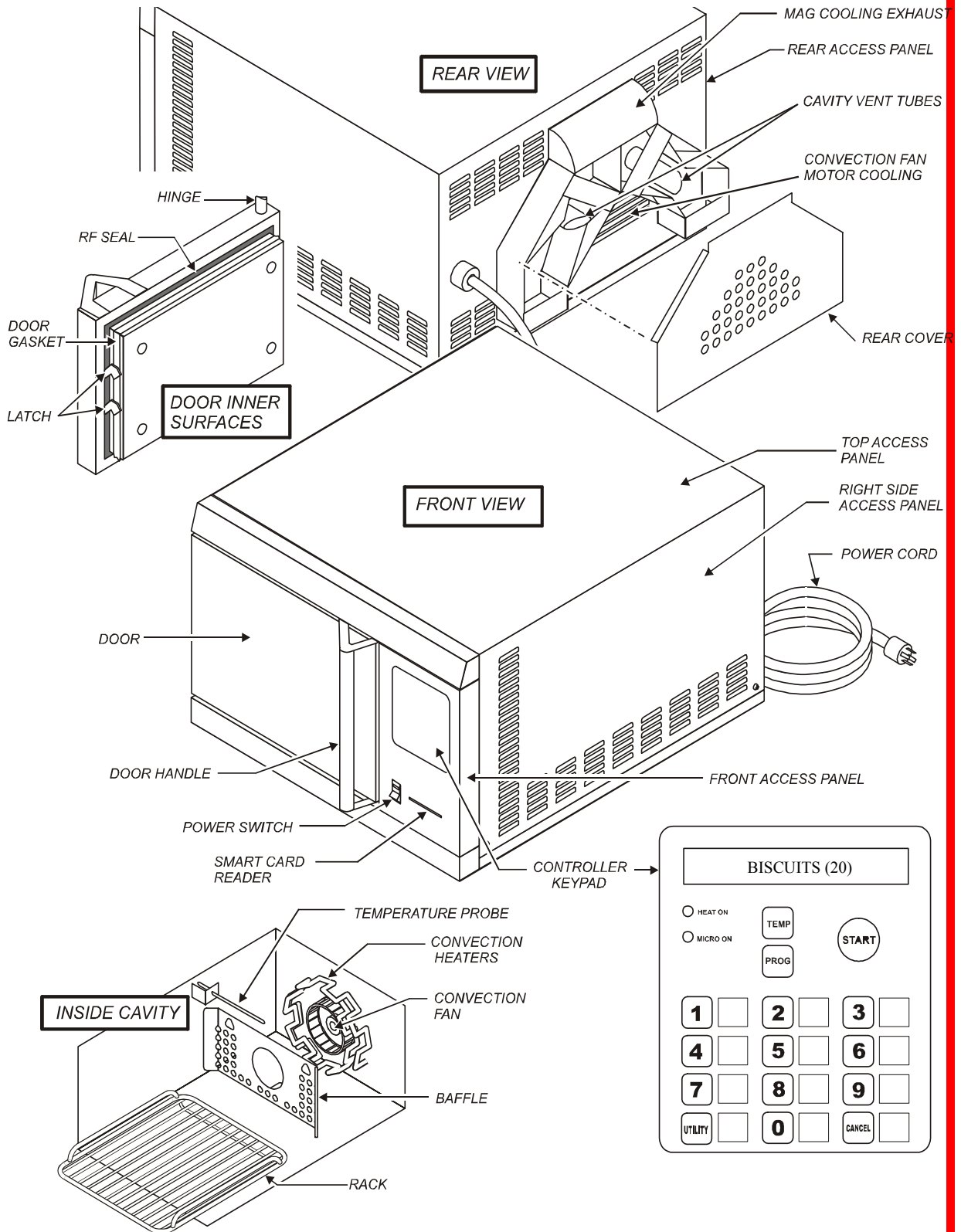
1551 MCCORMICK AVE.
MUNDELEIN, IL 60060 U.S.A.
PHONE 1 (847) 362-5500
TOLL FREE: 1 (800) 323-9793
FAX: 1 (847) 367-8981

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FEATURES & OPERATING CONTROLS



FEATURES & OPERATING CONTROLS (CONT)

CONTROLLER:

- A. All oven functions are controlled by the controller
- B. Controller is programmed by:
 - 1. Smart Card; or,
 - 2. Keypad
- C. Controller functions are displayed on the digital readout.

CONVECTION OVEN:

- A. Normal heating is provided by 2 heating elements.
- B. Heated air is circulated by a cage-type fan and a removable baffle.
- C. The oven cavity is vented by two tubes, the ends of which are situated in venturi sections of the magnetron cooling exhaust duct.

MICROWAVE OVEN:

- A. The microwave oven is fed by two magnetrons via dual wave guides.
- B. The wave guides are sealed from the oven by a Teflon window.
- C. The inner surface of the door is equipped with an RF seal (RF choke) to minimize microwave radiation leakage.

SAFETY FEATURES:

- A. The door must be closed and latched for either the microwave or convection section to operate. Any attempt to defeat the door latch safety will cause the line fuses to blow (crowbar circuit).
- B. Reset-able hi-limit thermostats protect the oven cavity, solid-state relays and magnetrons from excessive temperature.
- C. An auxiliary thermostat will energize the magnetron cooling fan any time the temperature at the magnetron mounting exceeds 120°F, regardless of the position of the power switch.
- D. The oven is protected from over-current by two line fuses.
- E. The magnetrons are protected from over-current by individual fuses.

CABINET:

- A. Fuses, interlock switches, power contactors, solid state relays, magnetron cooling fan, high-voltage component and heat-sink hi-limit HL1 may be accessed by removing the right side panel.
- B. Magnetrons, magnetron cooling ducts and magnetron high-limit HL4 may be accessed by removing the top panel.
- C. Convection fan motor, heating element connections and oven cavity hi-limit HL5 may be accessed by removing the rear panel.
- D. Temperature probe may be accessed by removing the left side panel.
- E. Controller may be accessed by removing the front panel.
- F. In the oven cavity, both the rack and convection fan baffle are easily removable for cleaning.

Basic and template programming may be accomplished by the use of a pre-programmed Smart Card.

The operation of the magnetron cooling system causes a slight negative pressure in the oven cavity. Air drawn into the oven around the door gasket helps keep the door cool during operation.

The wave guide is designed to minimize microwave "blind" spots without the use of a stirrer.

Magnetron cooling is completely separate from the oven to minimize grease contamination of the magnetrons or wave guides.

Fuses and hi-limit thermostats may be accessed by removing the appropriate access panel.

The "fast cool" function (key in lower left corner of keypad) allows the fan to run with the door open.

NOTE: Technical content of this manual, including any wiring diagrams, schematics, parts breakdown illustrations or adjustment procedures, is intended for use by qualified technical personnel only.

OPERATION



CAUTION: Burn Hazard

Inner surfaces of the door will be very hot during and after operation. Avoid touching the door when loading or removing product.

Operation may be cancelled at any time during the cooking cycle by pressing the **CANCEL** key.

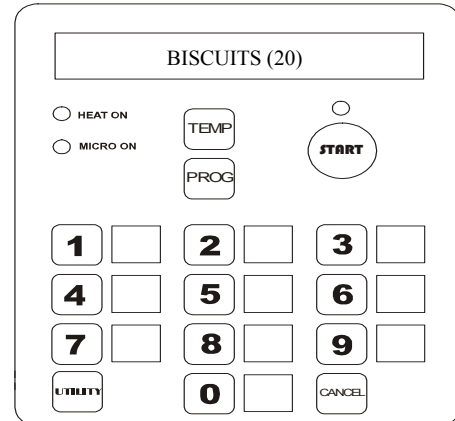
Leaving the door open for more than 10 seconds will cause an alarm to sound.

The oven can be cooled down quickly for shut-down or daily cleaning by the **FAST COOL** function.

NORMAL OPERATION

OPEN

1. Verify the oven is plugged in proper outlet. Turn power switch to **ON**. Controller defaults to menu item 1. The display will read **BISCUITS** and the oven will begin to heat. The convection oven will turn on and the **HEAT ON** LED will glow.
2. Wait for oven to preheat. Normal pre-heat time is approximately 8 - 9 minutes.
3. If the default menu item is not desired, select the proper menu item (see chart on page 10). If the oven is not at the proper temperature, the display will read **TOO COOL**. When the proper operating temperature for the selected item is reached, the message will disappear.
4. Load product into oven and press **START** key to begin a cooking cycle.
5. When cooking cycle is complete, the display will read **REMOVE** and an audible signal will sound. Remove product from oven.



CLOSE

1. Open door
2. Press the lower left key (**UTILITY**) on the keypad to initiate the "fast cool" function. Display reads "FAST COOL". Door must be open during this operation.
3. Press **START** key. Allow fan to run for approximately 10 minutes, or until the oven has cooled to less than 100°F. To cancel fast cool function, press and hold the **CANCEL** key, or close the door.
4. Turn power switch to oven in **OFF** position.

CHECKING THE OVEN TEMPERATURE AND SET POINTS

1. The current oven temperature may be checked by pressing the **TEMP** key once.
2. The temperature set point for the current menu item may be checked by pressing the **TEMP** key twice.

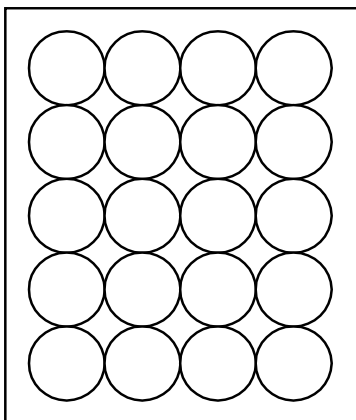
PRODUCT SETTINGS & CONFIGURATION

Default Cook Settings from Factory

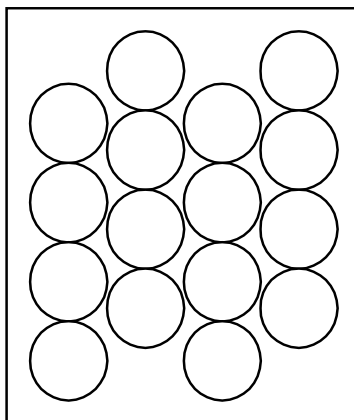
Button #	Product	Enable	Cancel	Cooling	Cook	Temp (F)	Rest Time	Micro Start	Micro Stop	Micro Power
1	Biscuits (20)	Y	M	N	5:30	400	0:30	0:00	3:45	45%
1	Biscuits (10)	Y	M	N	4:30	400	0:30	0:00	2:30	45%
1	Lg. Biscuits (16)	N	M	N	5:30	400	0:30	0:00	3:45	55%
1	Lg. Biscuits (8)	N	M	N	4:30	400	0:30	0:00	2:30	55%
2	Bagels (6)	Y	M	N	2:45	430	0:00	0:00	0:15	15%
3	Pies (10-12)	Y	M	Y	8:30	410	0:00	0:00	3:30	25%
3	Pies (4-6-8)	Y	M	Y	6:30	410	0:00	0:00	3:00	25%
4	Cookies (12)	Y	M	N	6:00	390	0:00	0:00	0:40	15%
5	New Menu Item	N	M							
6	New Menu Item	N	M							
7	New Menu Item	N	M							
8	New Menu Item	N	M							
9	New Menu Item	N	M							
0	New Menu Item	N	M							
UTILITY	Fast Cool	Y	A	N	0:00	90	0:00	0:00	0:00	0%
UTILITY	Delivered Power	Y	M	N	1:03	90	1:03	0:00	1:03	100%

McDONALD'S BISCUIT CONFIGURATION

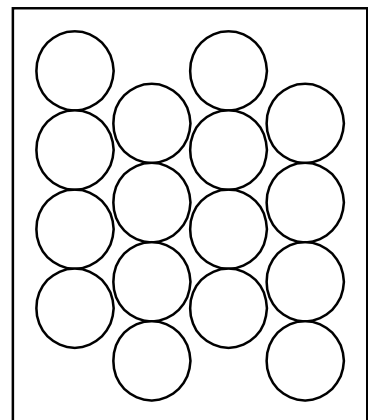
**20 COUNT
ROUND
BUTTERMILK BISCUIT**



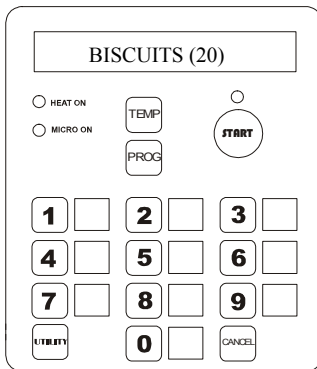
**16 COUNT
LARGE ROUND
BUTTERMILK BISCUIT "A"**



**16 COUNT
LARGE ROUND
BUTTERMILK BISCUIT "B"**



CONTROLLER PROGRAMMING INSTRUCTIONS



NOTE: You cannot go into edit or view program mode when cooling time for pies is activated.

SELECT MENUS BKFS indicates this is the end of this programming cycle for current menu selection. If no other menu items are to be programmed, press **START** button. Display will read:

UPDATING MENUS

Controller will return to original menu option prior to entering into the programming mode.

If other menu items are to be programmed, press **PROG** key. Display will read: **SEL->** Continue with item 7.

Note: Menu names cannot be programmed at this time, just setpoints.

By completing the following steps, certain settings can be changed in the program. For example; enabling or disabling a menu item, manual or automatic cancellation of alarm at end of bake cycle, box cooling time, convection cook time, temperature of cavity, rest time or turning all heat and air flow off, along with microwave power on, off and %. Programming will not interrupt the temperature cycling of menu selected item.

DISPLAY WILL READ

- | | | |
|--|-----------------------|---------------|
| 1. To enter programming mode, press and hold PROG button for 3 seconds, | DAY PART | BRKFST |
| 2. Push PROG button 2 times. | EDIT MENU ITEM | NO |
| 3. Press #2 button. | EDIT MENU ITEM | YES |
| 4. Press PROG button.
Enter the following password: 9793 | PASSWORD | 0000 |
| 5. Press PROG button. | SELECT MENU | BRKFST |
| 6. Press PROG button. | SEL-> | |
| 7. Select desired menu button to program.
Display will read menu item selected. | | |

VERY IMPORTANT:

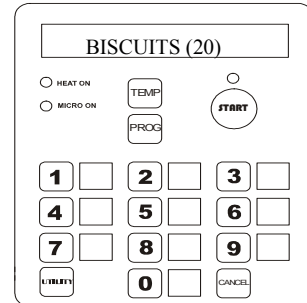
Note: the controller is multi leveled, and has the capability to provide several menu items per button. For example: it is pre-programmed to provide the following; pressing button #1 one time will show Biscuits (20), pressing it twice will display Biscuits (10), and pressing it three times will show Biscuits (16). Pressing button #1 four times will show Biscuits (8). Button #2 is for bagels and is single level. Pressing button # 3 one time will show Pies (10-12), pressing it twice will display the setting Pies (4-6-8). Button # 4 is for cookies, which is also single level. All other menu items are currently single level access only.

DISPLAY WILL READ

- | | | |
|--|--------------------------|------------------|
| 8. Press PROG button.
Press button # 2 to toggle to Yes or No | ENABLE | YES or NO |
| 9. Press PROG button.
(Leaving this item in the manual mode allow the alarm to continue until the door is opened). | CANCEL A/M MANUAL | |
| 10. Press PROG button.
(Should always be NO except for pies) | COOLING TIMER | NO |
| 11. Press PROG button.
(Enter desired time in minutes and seconds using the format mm:ss) | COOK TIME | 00:00 |
| 12. Press PROG button.
(Enter desired temperature) | COOK TEMP | 000 |
| 13. Press PROG button.
(Enter time in minutes and seconds using the format mm:ss to turn fan and heaters off at end of bake cycle) | REST TIME | 00:00 |

CONTROLLER PROGRAMMING INSTRUCTIONS (con't):

14. Press **PROG** button. **MICRO START 00:00**
 (Enter time in minutes and seconds using
 the format mm:ss to turn microwave on.
 00:00 indicates it starts at beginning of bake cycle)



DISPLAY WILL READ

15. Press **PROG** button. **MICRO STOP 00:00**
 (Enter time in minutes and seconds using
 the format mm:ss to turn microwave on.
 Time entered is how long microwave is
 on during the bake cycle.)
16. Press **PROG** button. **MICRO POWER %**
 (Enter desired % by pressing the #2 button
 (up) or #8 button (down))
17. Press **PROG** button. **UPDATING MENU ITEM**
18. A short audible alarm will sound **SELECT MENU BRKFST**
 (Indicates this is the end of the programming
 cycle for current menu selection.)
19. Pressing **START** button once returns to step 2 **EDIT MENU ITEM NO**
 of programming cycle

If other menu items are to be programmed, perform steps # 3 through step # 19. If not, press **START** button again and display will return to original menu item selected

CONTROLLER PROGRAMMING INSTRUCTIONS

TRANSFERRING MENU INFORMATION FROM THE CONTROLLER TO MENU CARD

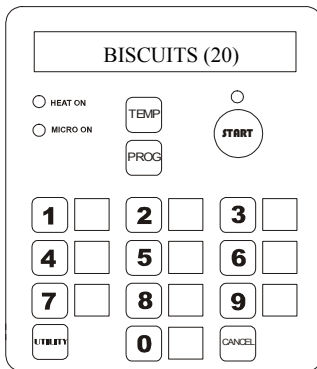
Complete the following steps to read menus from the smart card to the controller or to write menus from the controller to the smart card. This function can not be performed during a cooking cycle.

When oven is turned on, the controller automatically defaults to item # 1 in button # 1.

DISPLAY WILL READ

NOTE: Cannot go into edit or view program mode when cooling time for pies is activated.

- | | | |
|---|------------------------|-------------|
| 1. Insert card into slot. After test of card | PASSWORD | 0000 |
| 2. Enter password. Press PROG. | READ MENU CARD | NO |
| 3. Press PROG . | WRITE MENU CARD | NO |
| 4. Press button # 2. | WRITE MENU CARD | YES |
| 5. Press PROG button. | WRITING CARD | |
| 6. Display will default to read | TRANSFER MENU | NO |
| 7. Remove card, press START . Display will return to original menu option at the start of this function. | | |



TRANSFERRING MENU INFORMATION FROM THE MENU CARD TO THE CONTROLLER

Complete the following steps to provide new settings to the controller with the use of a card to the Smart Card Reader.

DISPLAY WILL READ

- | | | |
|--|-----------------------|-------------|
| 1. Insert card into slot. After test of card, | PASSWORD | 0000 |
| 2. Enter password. Press PROG | READ MENU CARD | NO |
| 3. Press # 2 button once. | READ MENU CARD | YES |
| 4. Press PROG button. | READ CARD | |
| 5. Display will default to read | TRANSFER MENU | NO |
| 6. Remove card. | | |
| 7. Press START button. Display will return to original menu option. | | |

MICROWAVE POWER TEST

Complete the Microwave Power Test to determine the wattage delivered by the microwave into the cavity.

Oven must be cool to complete this test.

Carefully measure and record the temperature of the water at the start of the test.

At the conclusion of the test, stir the water, then again carefully measure and record its temperature.

Determine the temperature rise by:

$$T_{\text{rise}} = T_{\text{end}} - T_{\text{start}}$$

Approximate delivered power, in watts, is determined by:

$$P = T_{\text{rise}} \times 75.6$$

DELIVERED POWER TEST McDonald's HIGH-SPEED OVEN

Tools- 2-liter or larger plastic microwavable container
Measuring container
Digital thermometer

Oven must be cool to perform test.

Measure 2 liters water into a microwavable container
Water must be 58° - 60° F

Place the container IN THE CENTER OF THE OVEN CAVITY

DISPLAY WILL READ

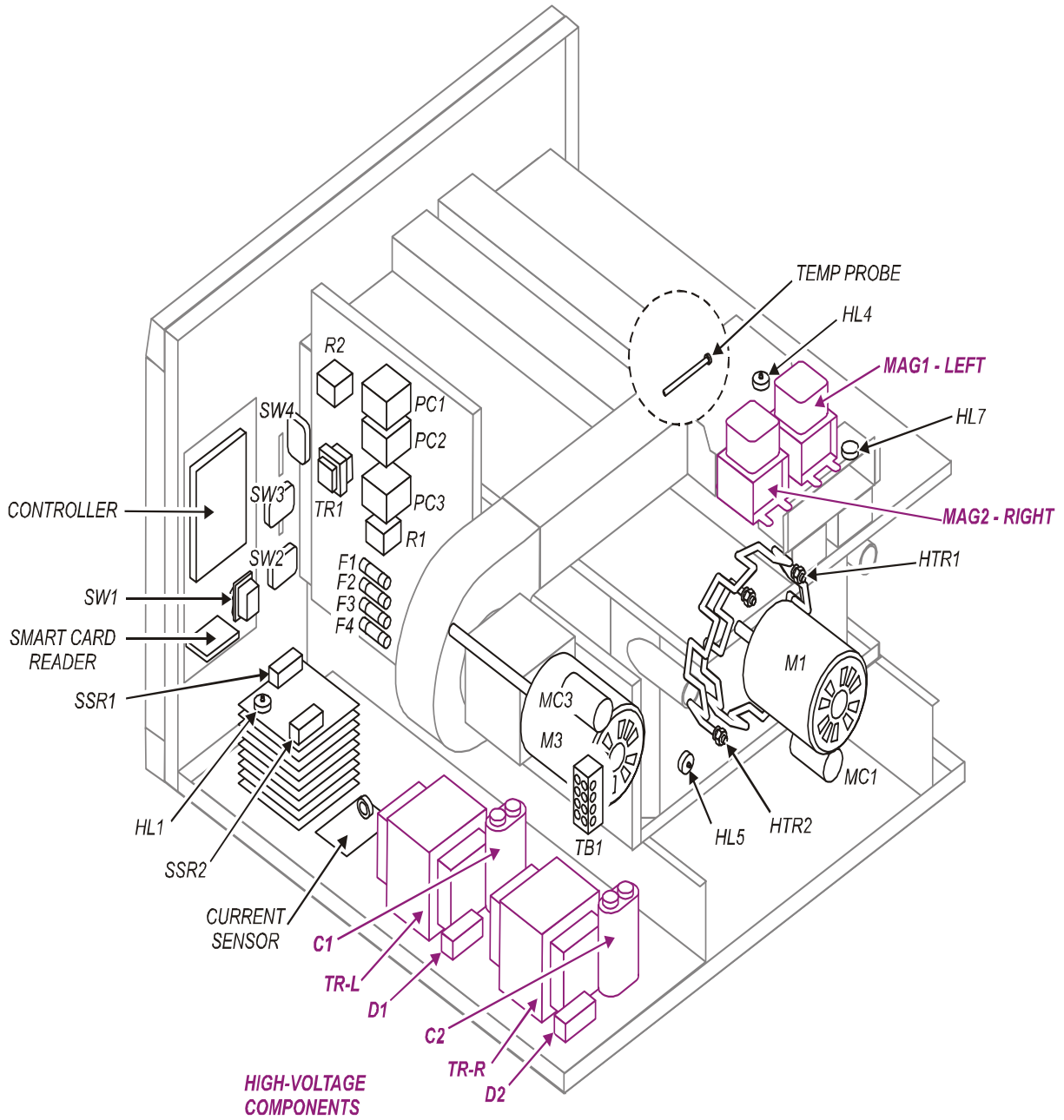
MICRO PWR TST

1. To perform the test, press **UTILITY** key two times.
2. Place container with water in cavity on shelf, close door.
3. Press the **START** button. Display will count down from 01:03 minutes.
4. At end of cycle, remove container.
5. Stir water with probe and take the temperature reading.
6. Temperature rise should be between 20-24 F°

TROUBLESHOOTING GUIDE

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
NO POWER	Power cord not plugged in	Plug in power cord to proper receptacle
	ON/OFF Switch OFF	Turn ON/OFF Switch ON
	Main circuit breaker tripped	Check and reset breaker
	Line fuse blown	Correct cause of fuse failure and replace fuse(s)
CABINET FAILS TO HEAT (Start/Stop button pressed. Oven will not heat. Blower fan runs)	Door not fully closed	Close door again. Retry.
	Incorrect cooking cycle	Retry cooking cycle
	Inoperable component	Identify and replace failed part(s)
CABINET FAILS TO HEAT (Heat indicator comes on. All other displays normal)	RF Interference	Verify RF leakage within limits
	Faulty controller	Replace controller
CABINET FAILS TO HEAT (Temperature lamp comes on. All other displays normal)	Hi-limit tripped	Reset hi-limit
	Faulty heater relay	Replace relay
	Faulty heat element(s)	Replace element(s)
OVEN NOT HEATING NORMALLY	Incorrect heating procedure	Check time setting
	Wattage output too low	Perform Power Test
	Magnetron fuse blown	Replace fuse
	Inoperative magnetron	Verify high voltage circuits replace transformer, capacitor, diode and/or magnetron as required Check high-voltage wiring and connections
CONTROLLER INOPERATIVE OR ERRATIC	RF Interference	Verify RF leakage within limits
	Faulty controller	Replace controller
	Faulty controller transformer	Replace transformer
AIR TEMP PROBE FAILURE (Air probe malfunctions)	Loose probe connection	Repair connections
	Faulty air thermocouple	Replace air probe

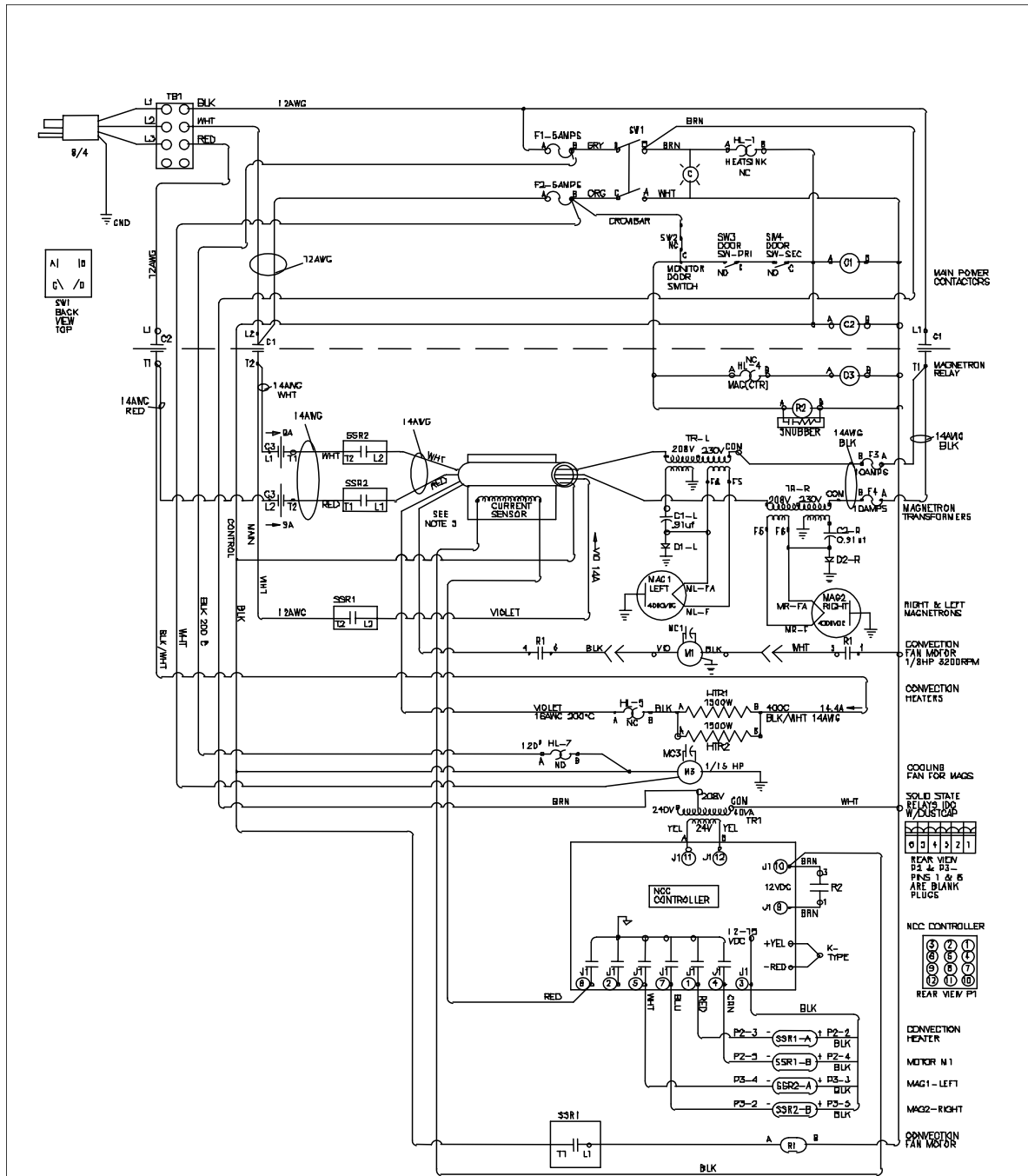
CARTER-HOFFMANN HSO HIGH-SPEED OVEN INTERNAL ARRANGEMENT



HIGH SPEED OVEN, PARTS LIST WITH PRICING

Part Number	Part Description	Usage	List Price	HSO- 0000A 208V, 30A,60hz	HSO- 0001A 400v, 20a,50hz
16000-9829	DOOR ASSY		\$900.00	X	X
16001-4085	WIRE SHELF		\$60.00	X	X
18050-0043	OVEN MOUNTING BOLTS (4 PER)		\$1.00	X	X
18120-0094	OVEN MOUNTING WASHERS (4 PER)		\$1.00	X	X
18304-0086	LATCH PLATE HSO		\$53.00	X	X
18304-0087	RAMP-UP BLOCK, DOOR SWITCHES		\$90.00	X	X
18400-2014	DOOR SPRING, GEO240-09-2000S		\$15.00	X	X
18600-0042	HI-LIMIT, SOLID STATE RELAY , #2E246	HL1	\$25.00	X	X
18600-0049	HI-LIMIT, MAGNETRON & COOLING FAN, 243 DEGREE	HL4, HL7	\$35.00	X	X
18600-0052	HI-LIMIT, OVEN CAVITY 550 DEGREE	HL5	\$40.00	X	X
18600-0064	CAPACITOR, 0.91mf, 2300v	C1, C2	\$30.00	X	
18600-0065	DIODE, RECTIFIER	D1, D2	\$40.00	X	X
18600-0073	CAPACITOR, 1.05Mf, 2500v	C1, C2	\$45.00		X
18602-0075	SWITCH, POWER ON/OFF W/INDICATOR	SW1	\$19.00	X	X
18602-0099	QUENCH ARC		\$21.00	X	X
18602-0115	HEATSINK, RELAY		\$175.00	X	X
18602-0117	INTERLOCK SWITCH, DOOR HSO HOT	SW3, SW4	\$28.00	X	X
18602-0124	RELAY, DOUBLE CONTACT	SSR1, SSR2	\$131.00	X	X
18602-0127	ROLLER SWITCH, MONITOR	SW2	\$46.00	X	X
18602-0228	RELAY, 1P 15A 208/240V	R1, R2	\$35.00	X	X
18602-0229	CONTACTOR, 2P 50A 208/240V	PC1, PC2, PC3	\$58.00	X	X
18602-0230	FUSE BLOCK, 4P 240V, #BC6032SQ		\$24.00	X	X
18602-0233	FUSE, LINE POWER 5AMP, #KTK-R-5	F1, F2	\$30.00	X	X
18602-0234	FUSE, 10AMP, #KLDL-10	F3, F4	\$22.00	X	X
18603-9049	WIRING HARNESS, MAIN		\$180.00	X	X
18603-9053	WIRING HARNESS, HI-VOLTAGE		\$80.00	X	X
18603-9054	WIRING HARNESS, LOW VOLTAGE		\$60.00	X	X
18605-0125	CORD, POWER 8/4 SOOW 600V	7 FEET	\$5.00 / FT	X	
18605-5041	CORD, POWER 12/5 600V	7 FEET	\$4.00 / FT		X
18606-0665	PLUG, POWER L15-30P 250V TWISTLOK, HBL #2721		\$75.00	X	
18607-0025	TERMINAL BLOCK, 4P, 85 AMP, MAIN POWER	TB1	\$16.00	X	X
18612-0321	ELEMENT HEATING, 208V / 1500W	HTR1, HTR2	\$120.00	X	
18612-0328	ELEMENT HEATING, 240V / 1500W	HTR1, HTR2	\$120.00		X
18614-0258	BLOWER WHEEL, HIGH CFM		\$122.00	X	X
18614-0304	INLET RING		\$11.00	X	X
18614-0343	WHEEL, 3" DIA		\$15.00	X	X
18614-0344	INLET RING, SMALL		\$10.00	X	X
18614-0345	WHEEL, BLOWER #12095-21		\$50.00	X	X
18614-0346	MOTOR, MAGNETRON COOLING, LG SHAFT, 208/240	M3	\$174.00	X	X
18614-0350	MOTOR, CONVECTION FAN, 208/240	M1	\$190.00	X	X
18616-0155	THERMOCOUPLE PROBE, TYPE K, DC31701	TEMP SENSOR	\$50.00	X	X
18616-0215	TRANSFORMER, 208/240V 40VA SEC	TR1	\$32.00	X	X
18616-0296	HIGH VOLTAGE TRANSFORMER, 50HZ		\$204.00		X
18616-0281	MAGNETRON, TOSHIBA, 1020W, 2M248J	MAG1, MAG2	\$190.00	X	X
18616-0283	NCC CONTROLLER	CONTROLLER	\$900.00	X	X
18616-0284	READER, MAGNETIC MEMORY CARD	SMART CARD READER	\$125.00	X	X
18616-0286	WIRING HARNESS, CONTROL		\$25.00	X	X
18616-0288	SMART CARD, 8K NCC CONTROL		\$33.00	X	X
18616-0289	TRANSFORMER, HI-VOLTAGE 208/230 PRI	TR-L, TR-R	\$274.00	X	
18616-0303	ASSEMBLY, CURRENT MONITOR, NCC 0C750	CURRENT SENSOR	\$100.00	X	X
18617-0017	CORD GRIP , .750-.875		\$18.00	X	X
18617-0028	DOOR BUSHING, BRONZE #6338K418		\$8.00	X	X
29034-0281	WAVEGUIDE HOLECOVER, 17 x 40		\$50.00	X	X
29034-0288	GASKET SILICONE, PRIMARY CHOKE	3 FEET	\$40.00	X	X
29034-0289	GASKET SILICONE, SECONDARY CHOKE	5 FEET	\$56.00	X	X
29037-9012	MENU PLEXIGLASS 8.5" x 11"		\$9.00	X	X
NO P/N	CAPACITOR, MOTOR RUN 370VAC 10mf	MC1, MC3	CALL FACTORY	X	

ELECTRICAL DRAWING—MODEL MDHSO, 208 volt, 30 amp, 60 hertz



NOTES:

- 1) "LEFT" AND "RIGHT" DESIGNATIONS ARE FROM THE FRONT OF THE DVEN
- 2) WIRES ARE 18AWG 1DC BODY UNLESS OTHERWISE SPECIFIED
- 3) ALL MAGNETRON WIRING IS 1600V @1600 MINIMUM
- 4) FUSES ARE CURRENT LIMITING, TIME-DELAY TYPE
- 5) CONNECTION FAN MOTOR WIRE LOOPS THROUGH CURRENT SENSOR 5 TIMES
- 6) ALL SWITCHES AND RELAY SHOWN WITH POWER OFF AND DOOR OPEN

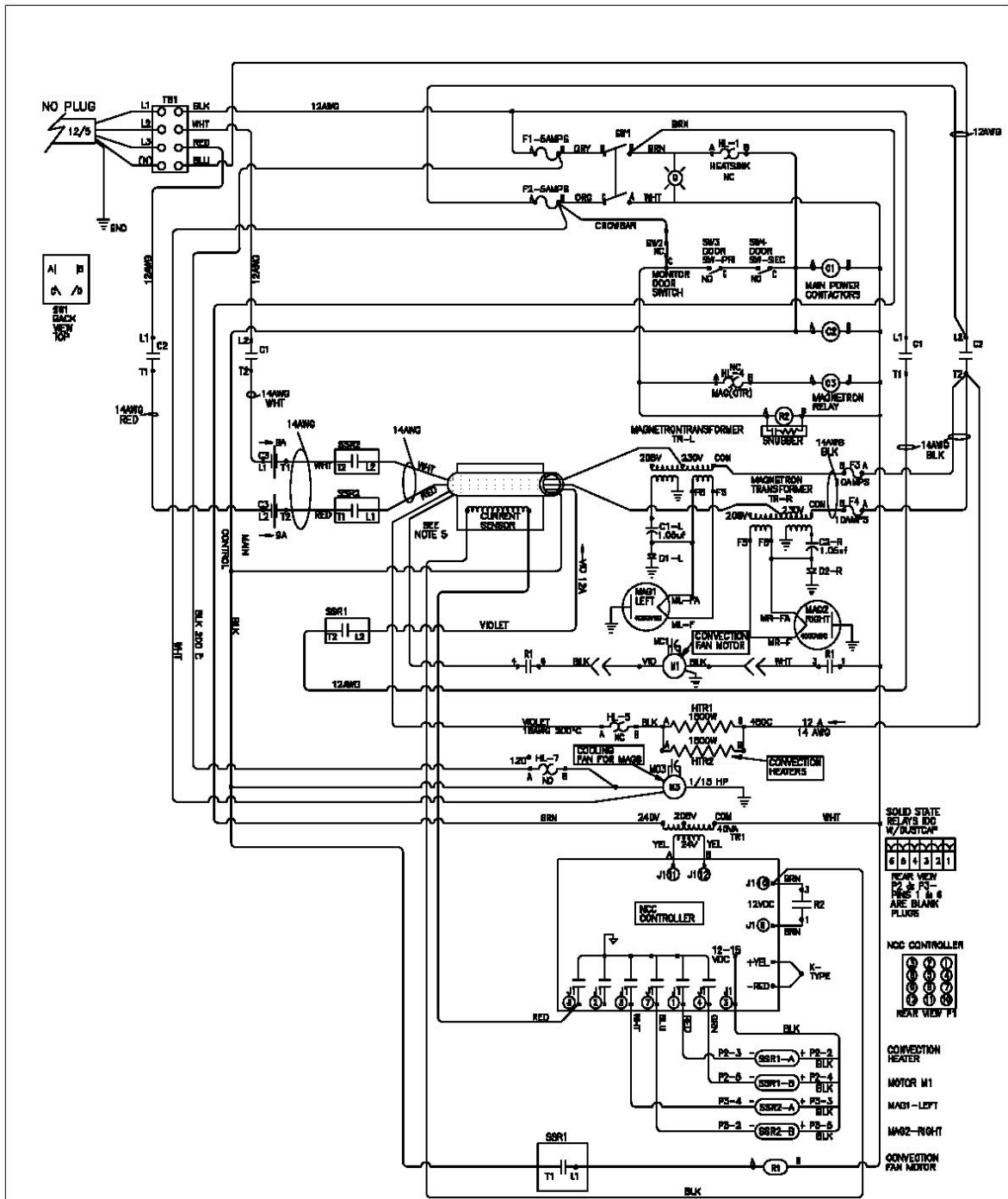
DO NOT SCALE DRAWING
 CARTER-HOFFMANN CORP.
 1221 WILSON AVENUE
 WILSON, NJ 07094

DATE: WRS 9/13/2001
 SCALE: 3/8" = 1"

E	ADDED WIRE AWG'S	GR	5/2/2002
D	CORRECT/MOTDR SENSE	GR	12/18/2001
C	TEXT CHANGES	GR	11/20/2001
B	WAS "B+" UPDATE	WRS	8/13/2001
A	ISSUED	WRS	9/6/2001
DATE	WRS	BY	WRS
TITLE: ELECTRICAL SCHEMATIC 208V, 30A, 60HZ MDHSO		NO. 1000-1684	SCALE: E

NOTE: Technical content of this manual, including any wiring diagrams, schematics, parts breakdown illustrations or adjustment procedures, is intended for use by qualified technical personnel only.

Note: All switches & relays shown with power off and door open.



- NOTES:
- 1) "LEFT" AND "RIGHT" DESIGNATIONS ARE FROM THE FRONT OF THE OVEN
 - 2) WIRES ARE 18AWG 106C 600V UNLESS OTHERWISE SPECIFIED
 - 3) ALL MAGNETRON WIRING IS 16000V @1600 MINIMUM
 - 4) FUSES ARE CURRENT LIMITING, TIME-DELAY TYPE
 - 5) CONVECTION FAN MOTOR WIRE LOOPS THROUGH CURRENT SENSOR 6 TIMES
 - 6) ALL SWITCHES AND RELAY SHOWN WITH POWER OFF AND DOOR OPEN.

DO NOT SCALE DRAWING
 CONTROL-TECHNICAL CORP.
 1001 BROADWAY
 NEW YORK, N.Y. 10018

REV	DATE	BY	CHKD
A	ISSUED	GR	12-18-2001
B	11000-1685		

GR 12-18-2001
 ELECTRICAL SCHEMATIC
 380-415V, 20A, 50Hz
 MDHSO

SERVICE EXPECTATIONS

Service Philosophy

For over fifty years, Carter-Hoffmann has enjoyed a reputation for manufacturing rugged, dependable foodservice equipment that permits foodservice professionals serve more food products to more people, and thus, to grow their business.

Our goal is not only to provide the best food service equipment for the price, but also to back it up with after-sale service that is responsive fast, efficient and professional. We have prepared this brief document to ensure a clear understanding of our goals, expectations, and responsibilities.

Carter-Hoffmann products are innovative and efficient. They are easy to use, easy to clean and easy to maintain. Although the products are quite reliable, when necessary they are also easy to repair. We believe that a malfunction to a Carter-Hoffmann product should cause as little inconvenience to the customer as possible. Our aim is to provide "same day"/first time fix" repair service on all of our products, whether in warranty or not.. We are dedicated to making every aspect of our customer service the standard by which others are judged.

Service Capability

We expect the service provider to have ample trained staff, parts, communications, and support to meet our serving expectations.

- 1.** Calls before 1:00 PM are to be completed that same day. Calls received after 1:00 PM should be completed by the end of the next business day.
- 2.** Technicians shall carry necessary parts, tools, and service manuals to complete all repairs on the first call.
- 3.** Technicians must diagnose problems and make adjustments, repairs, or parts replacements in strict accordance with factory procedures.
- 4.** All repairs are to be made on-site at the customer's place of business. Inoperative products are not to be removed or replaced without prior approval.
- 5.** All repairs are to be made in a location and a time that provides the customer the least inconvenience.
- 6.** Only authentic OEM replacement parts shall be used to repair our products.
- 7.** Circuit boards, electronic controllers and other sealed components are not to be opened or repaired locally without our authorization.
- 8.** Technicians are expected to maintain a professional appearance and behavior, and customers are to be treated with respect and courtesy.

Sub-Agents

- 1.** The service provider is responsible to ensure that all sub-agents provide the same level of timely and professional service, and adhere to these same expectations.
- 2.** The service provider is responsible to provide all sub-agents with all the necessary training, replacement parts, tools, manuals, and supplies to carry out our service expectations.

Service Center Support

We expect the service provider to establish and maintain the proper support capabilities to receive; monitor, and document all service and repair activities to our products.

- 1.** Customers shall be provided a toll-free telephone number to call for service and repair.

SERVICE EXPECTATIONS (cont.)

Service Center Support (cont)

2. The service provider shall maintain 24/7 service coverage.
3. Full coverage shall be provided to the entire area serviced.
4. All incoming calls shall be fully documented (e.g., model, customer, nature of problem, date and time call received, dispatched, completed, etc.).
5. Troubleshooting assistance shall be provided over the phone.
6. Service call reports shall be maintained throughout each product's warranty period.
7. The service provider shall provide his technician's with, or access to any special tools needed to service our equipment, including note computers, e-mail, access to our web site, computer interface connections, electronic data exchange, etc.

Warranty Service

All products are sold with a limited warranty. The exact terms of each warranty are printed each product's Equipment Manual.

1. The service provider is **NOT** authorized to change or extend any of the terms or conditions of our warranty.
2. Within the warranty period, we agree to repair or replace (at our option only! -not the customer's or the service provider's) the product at our expense to correct a problem or defect.
3. Initial freight damage is NOT covered by the product warranty.

Reimbursement for Warranty Expenses

Carter-Hoffmann will reimburse the service provider for all covered/ authorized warranty expenses. To receive prompt payment for warranty service expenses, please comply with these guidelines:

1. Provide Carter-Hoffmann with your reimbursement terms prior to submitting claims.
2. Carter-Hoffmann will pay you for the freight, duties, taxes, etc., for any replacement part used for warranty repair.
3. All individual charges (e.g., basic labor, overtime, mileage, supplies, etc.) must be listed and converted to U.S. dollars on the International Warranty Service Report.
4. Labor charges will be reimbursed at the service provider's published rate, which must be on file with Carter-Hoffmann.
5. Mileage expenses will be reimbursed at the service providers published rate, which must be on file with Carter-Hoffmann.

Replacement Parts Inventory/Pricing

We expect the service provider to maintain a sufficient inventory of replacement parts in order to promptly repair Carter-Hoffmann products as well as to sell replacement parts to those customers who wish to buy parts only for after warranty repairs.

1. An initial parts inventory must be purchased before a new Carter-Hoffmann product is introduced to the service area.
2. The inventory of replacements parts must be at hand (in trucks, branch offices, sub agents, etc.) as to meet our service expectations.
3. The service provider shall inform Carter-Hoffmann of any special handling or importation requirements or procedures for importing replacement parts.
4. Carter-Hoffmann does NOT automatically replace parts used in warranty repair. The service provider must reorder ALL replacement parts used.

SERVICE EXPECTATIONS (cont.)

Replacement Parts Inventory/Pricing (cont)

5. Should recommended parts not be used within one year of their purchase from Carter-Hoffmann, the parts may be returned for full credit, with no restocking charge.

Discounts and Sales Terms

All Carter-Hoffmann replacement parts are sold under the following terms and conditions.

1. Carter-Hoffmann will establish a "Suggested List Price" for all replacement parts. The service provider may set his own retail prices for replacement parts. The service provider shall provide Carter-Hoffmann a current price schedule for replacement parts.
2. All prices are quoted in U.S. dollars and are F.O.B., Mundelein, Illinois U.S.A. Freight, duties, tariffs, local taxes, or any other charges are in addition to our published prices.
3. Replacement parts are sold to authorized full-service providers at a fifty percent (50%) discount.
4. All orders are subject to the approval of our credit department. Open account terms are net 30 days (U.S. and Canada); 60 days (for international).
5. Carter-Hoffmann reserves the right to sell replacement parts directly to selected customers and end-users at full list price.

Returned Goods Procedure

Carter-Hoffmann will reimburse the service provider for the complete cost of any defective component (including freight, duties, taxes, etc.) from a product covered by our warranty. To ensure prompt and complete reimbursement for defective components parts:

1. Tag part completely (including customer, model, date of replacement, repair order number, etc.) and retain part until warranty reimbursement claim has been approved by Carter-Hoffmann.
2. Submit a completed warranty reimbursement claim to Carter-Hoffmann promptly, including all relevant information.
3. Only if specifically required, send the part (s) to Carter-Hoffmann by prepaid freight. You will be reimbursed for the shipping and handling costs.

Labor Rates

It is not Carter-Hoffmann's intention to dictate local repair and service labor rates and charges. However, we do have certain expectations about the proper and fair implementation of labor rates. These include:

1. Labor rates shall be the same for all other products repaired by the service provider.
2. The current published labor rates schedule shall be sent to Carter-Hoffmann at least once annually.
3. Premium labor rates or any other additional charges (such as mileage, after hours, "out of territory," etc.) shall be reasonable, consistently applied, and published.
4. Sub-agent rates shall not be higher than the service provider's published rate.

Factory Support

Carter-Hoffmann is committed to providing its service provider's with accurate, up to date technical information and training to enable skilled technicians to repair our products.

Reference Manuals

1. Carter-Hoffmann will provide without charge at least one master Service Manual to the service provider, and individual product Equipment Manuals, wiring schematics, replacement parts list, and servicing information to each qualified technician.

SERVICE EXPECTATIONS (cont.)

Reference Manuals (cont)

2. This manual must remain in the main repair facility and be kept up to date with factory-supplied update information.
3. Service bulletins, announcements, and other specific information will be provided by Carter-Hoffmann as required.
4. All service materials will be published in English.

Service Technician Training

1. Service technician training may take quite different forms, depending upon the specific product. In any event, only trained technicians are authorized to repair these products.
2. Whenever required by Carter-Hoffmann, and at a mutually agreeable place and time, the service provider shall make available for training all technicians authorized to service our products. Every effort will be made to provide training locally. However, if travel is required to attend a service clinic, all travel expenses shall be borne by the service provider.
3. Whenever required, the service provider shall arrange for capable English translations services (either written or verbal). Carter-Hoffmann will pay for the cost of such services.
4. Carter-Hoffmann will arrange for in-factory training of service technicians on an as needed basis.

Service Provider Communication

Our aim is to manufacture reliable products. The service provider's aim is to deliver prompt, efficient service and repair. Both of us want to provide quality service to our mutual customer. Occasionally, problems occur that are not easily remedied. In those instances, it is important that we communicate clearly and promptly so that together we can resolve the problem. To ensure this, Carter-Hoffmann requires that the service provider notify us:

1. Whenever you have difficulty repairing a Carter-Hoffmann product.
2. If you have not completed the repair of a product within 3 working days from the initial customer call for service.
3. Whenever one unit has had the same reported problem for 3 times.
4. Whenever 3 or more units are out of service for the same problem.
5. Whenever a customer complains formally about poor product reliability, excessive service calls, or poor service or follow-up.
6. Whenever you encounter significant, safety, or repeat problems with Carter-Hoffmann products. Please provide us with enough specific information to allow us to replicate the conditions and cause of the problem.
7. Not unilaterally disclose to the customer any chronic or repeated problem or offer opinions concerning the design or suitability of our products without first involving us.

End-User Responsibilities

While we all strive to serve our mutual customers as well as possible that does not mean that the end-user (including his employees) does not share some responsibilities. It is important that our local agents understand what Carter-Hoffmann defines as "customer responsibilities."

1. All shipping damage must be noted on the freight bill when the shipment is received. Any freight damages must be collected from the Freight Company, NOT Carter-Hoffmann.
2. The end-user should be advised beforehand to carefully unpack and inspect all products when they are received BEFORE SIGNING THE SHIPPER'S RECEIPT OF DELIVERY.
3. The end-user must provide a safe, dry, level surface for the equipment to be placed upon.

SERVICE EXPECTATIONS (cont.)

End User Responsibilities (cont)

4. The end-user must provide the proper electrical supply, in-wall electrical modifications are to be completed by a licensed electrician. All building modifications are the responsibility of the end user.
5. The end-user must operate, clean and maintain the equipment in accordance with the procedures described in the Equipment Manual.
6. Carter-Hoffmann is NOT responsible for any loss of the customer's income, loss of food product, extra labor charges, or any other incidental or consequential costs as a result of the malfunction of our product.
7. The end-user shall contact our authorized service provider only whenever service or repair to a Carter-Hoffmann product under warranty is required.
8. The end-user shall allow for on-premises repair of the equipment to be completed at a mutually convenient place and time.

Confidentially

1. The service provider and all his employees and sub-agents shall protect and keep confidential Carter-Hoffmann's proprietary designs, information, and knowledge.
2. All materials provided by Carter-Hoffmann is to be considered confidential; it remains Carter-Hoffmann's property; and is not to be reproduced without our prior approval.

Liability Exclusions

1. The service provider's relationship with Carter-Hoffmann is that of an independent contractor. The provider may not represent themselves as a part of, or employees of Carter-Hoffmann
2. Carter-Hoffmann assumes no responsibility for any charges or claims for repair or service on products that are no longer covered by the applicable warranty.
3. The service provider shall carry sufficient liability insurance.

Termination

If, and at Carter-Hoffmann's sole determination, the service provider is deemed unable or unwilling to follow the letter and intent of these expectations, we reserve the right to refuse to sell additional products, to and withhold additional support, and to unilaterally terminate our relationship with the service provider.

1. Carter-Hoffmann reserves the right to seek out and establish additional service providers in any market area to service its products.
2. In the event that termination of our relationship occurs, Carter-Hoffmann will provide the service provider with (30) days written notice. All matters relating to the termination will be explained at that time.

WARRANTY STATEMENT

One year parts and labor. Repair and /or replacement for covered items. Repair or replacement is at the discretion of **Carter-Hoffmann**. This warranty covers defects in material and workmanship to the first end user only.

This warranty does not cover: abuse or misuse, shipping damage, service agent travel expenses over 100 miles or two hours, holiday charges or overtime charges, or damage due to the loss of time, loss of use or other consequential items resulting from failure.

NOTE: A "Letter of Agreement Warranty" is on file with McDonald's Corporation if there are any concerns regarding the warranty statement in this equipment manual, the "Letter of Agreement Warranty" shall supercede and control.

Carter-Hoffmann

A Division of Carrier Commercial Refrigeration

1551 McCormick Ave.

Mundelein, Illinois, 60060 USA

Phone: 847-362-5500

Toll Free (USA and Canada): 800-323-9793

Fax: 847-367-8981

After Hours Emergency: 800-421-3744

Service E-mail: service@carterhoffmann.com

Sales and Marketing E-mail: sales@carterhoffmann.com

Company Website: www.carter-hoffmann.com

