This Base Manual covers all
Commercial Microwave Ovens.
Refer to individual Technical Sheet
for information on specific models.

MSO22
MSO35
MSO35OS
MSO5211
MSO5351
MSO5353
AMSO22
AMSO35
AMSO5353

Service

Commercial Microwave Oven
AMSO & MSO Models

Service Manual

This manual is to be used by qualified service technicians only. ACP, Inc. does not assume any responsibility for property damage or personal injury for improper service procedures done by an unqualified person.

ACP INC.
Accelerated Cooking Products

16400029
Revision 1
December 2015

ComServ Support Center

- **Customer Service Line**
- **Toll Free**
- **Answered 24/7**
- **Prompt diagnosis and repair**
- **96% parts fulfillment rate**
- **End to end solution**
- **Maximum customer satisfaction**

866-426-2621

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ACP INC. Accelerated Cooking Products

Service Connection

PRODUCT WARRANTY
PARTS PRICING
PARTS SUBSTITUTIONS
PARTS LOOK-UP
TECHNICAL BULLETINS
SERVICE MANUALS

IMPORTANT SAFETY INSTRUCTIONS

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Important Safety Information. Read before using this oven.

Keep these instructions for future reference.

For additional product documentation or more detailed operating instructions visit:
www.acpsolutions.com

CONTACT INFORMATION

Any questions or to locate an authorized ACP servicer, call ACP ComServ Service Support.

–**Inside** the U.S.A. or Canada, call toll-free 866-426-2621.
–**Outside** the U.S.A. and Canada, call 319-368-8120.
–**Email:** Commercialservice@acpsolutions.com.

Warranty service must be performed by an authorized ACP servicer. ACP also recommends contacting an authorized ACP servicer, or ACP ComServ Service Support if service is required after warranty expires.

PRECAUTIONS TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

A. **DO NOT** attempt to operate this oven with the door open since open door operation can result in harmful exposure to microwave energy. It is important not to defeat or tamper with the safety interlocks.
B. **DO NOT** place any object between the oven front face and the door or allow soil or cleaner residue to accumulate on sealing surfaces.
C. **DO NOT** operate the oven if it is damaged. It is particularly important that the oven door close properly and that there is no damage to the:
   1. door (bent)
   2. hinges and latches (broken or loosened)
   3. door seals and sealing surfaces.
D. The oven should not be adjusted or repaired by anyone except properly qualified service personnel.

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⚠ WARNING To reduce the risk of burns, electrical shock, fire, or personal injury when using electrical equipment, basic safety precautions should be followed.

1. **READ AND FOLLOW** the specific **"PRECAUTIONS TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY"** on page 1.
2. This equipment **MUST BE GROUNDED**. Connect only to properly **GROUNDED** outlet. See **"GROUNDING/EARTHING INSTRUCTIONS"** on page 4.
3. Install or locate this equipment **ONLY** in accordance with the installation instructions in this manual.
4. Some products such as whole eggs and sealed containers—for example, closed glass jars—are able to explode and **SHOULD NOT** be **HEATED** in this oven.
5. Use this equipment **ONLY** for its intended use as described in this manual. Do not use corrosive chemicals or vapors in this equipment. This type of oven is specifically designed to heat, cook, or dry food. It is not designed for industrial or laboratory use.
6. As with any equipment, **CLOSE SUPERVISION** is necessary when used by **CHILDREN**.
7. **DO NOT** operate this equipment if it has a damaged cord or plug, if it is not working properly, or if it has been damaged or dropped.
8. This equipment, including power cord, must be serviced **ONLY** by qualified service personnel. Special tools are required to service equipment. Contact nearest authorized service facility for examination, repair, or adjustment.
9. **DO NOT** cover or block filter (if applicable) or other openings on equipment.
10. **DO NOT** store this equipment outdoors. **DO NOT** use this product near water – for example, near a kitchen sink, in a wet basement, a swimming pool, or a similar location.
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. See door cleaning instructions on page 4. Cleaning and user maintenance shall not be made by children without supervision.
15. To avoid risk of fire in the oven cavity:

a. **DO NOT** overcook food. Carefully attend oven when 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 ignite, keep oven door

d. **CLOSED**, turn oven off and disconnect the power cord, or shut off power at the fuse or circuit breaker panel.

e. **DO NOT** use the cavity for storage. **DO NOT** leave paper products, cooking utensils, or food in the cavity when not in use.

17. For commercial use only.
18. It is hazardous for anyone other than a competent person to carry out any service or repair operation that involves the removal of any cover which gives protection against exposure to microwave energy.
19. If the door or door seals are damaged, the oven must not be operated until it has been repaired by a competent person.
20. Appliance is not to be used by children 8 years and below or persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction.
21. Children being supervised not to play with appliance.
22. Only use utensils that are suitable for use in microwave oven.
23. When heating food in plastic or paper containers, keep an eye on the oven due to the possibility of ignition.
24. If smoke is observed, switch off or unplug the appliance and keep the door closed in order to stifle any flames.
25. Failure to maintain the oven in a clean condition could lead to deterioration of the surface that could adversely affect the life of the appliance and possibly result in a hazardous situation.
26. The appliance should not be cleaned with a water jet (for appliances intended to stand on the floor and which are not at least IPX5).
27. Liquids or other foods must not be heated in sealed containers since they are liable to explode.
28. Microwave heating of beverages can result in delayed eruptive boiling, therefore care must be taken when handling the container.

Combination Ovens Only:

29. **DO NOT** insert oversized foods or oversized utensils in a microwave/convection oven as they may create a fire, an electrical arc, or risk of electrical shock.
30. **DO NOT** clean with metal scouring pads. Pieces can break off the pad and touch electrical parts involving risk of electrical shock.
31. **DO NOT** use paper products not intended for high temperature cooking when equipment is operated in convection or combination mode.
32. **DO NOT** store any materials, other than manufacturer's recommended accessories, in this equipment when not in use.
33. **DO NOT** cover any part of the oven with metal foil. Airflow restriction will cause overheating of the oven.
34. **DO NOT** spray oven cleaning solutions toward the rear inner cavity surface. This will contaminate and damage the convection heating assembly.

⚠ CAUTION To avoid risk of personal injury or property damage, observe the following safety instructions:

General Use:

1. **Do not** use regular cooking thermometers in oven. Most cooking thermometers contain mercury and may cause an electrical arc, malfunction, or damage to oven.
2. Never use paper, plastic, or other combustible materials that are not intended for cooking.
3. When cooking with paper, plastic, or other combustible materials, follow manufacturer's recommendations on product use.
4. **Do not** use paper towels which contain nylon or other synthetic fibers. Heated synthetics could melt and cause paper to ignite.
5. To avoid surface deterioration, keep the oven in a clean condition. Infrequent cleaning could adversely affect the life of the appliance and possible result in a hazardous situation.
6. Clean oven regularly and remove any food deposits.

Heating Foods and Liquids:

7. Liquids such as water, coffee, or tea are able to be overheated beyond the boiling point without appearing to be boiling due to surface tension of the liquid. Visible bubbling or boiling when the container is removed from the microwave oven is not always present. THIS COULD RESULT IN VERY HOT LIQUIDS SUDDENLY BOILING OVER WHEN A SPOON OR OTHER UTENSIL IS INSERTED INTO THE LIQUID. To reduce the risk of injury to persons:
   a. Do not overheat the liquid.
   b. Stir the liquid both before and halfway through heating it.
   c. Do not use straight-sided containers with narrow necks.
   d. After heating, allow the container to stand in the microwave for a short time before removing it.
   e. Use extreme care when inserting a spoon or other utensil into the container.
8. **Do not** deep fat fry in oven. Fat could overheat and be hazardous to handle.
9. **Do not** cook or reheat eggs in shell or with an unbroken yolk using microwave energy. Pressure may build up and erupt. Pierce yolk with fork or knife before cooking.
10. Pierce skin of potatoes, tomatoes, and similar foods before cooking with microwave energy. When skin is pierced, steam escapes evenly.
11. **Do not** heat sealed containers or plastic bags in oven. Food or liquid could expand quickly and cause container or bag to break. Pierce or open container or bag before heating.
12. **Do not** heat baby bottles in oven.
13. Baby food jars shall be open when heated and contents stirred or shaken before consumption, in order to avoid burns.
14. Never use oven to heat alcohol or food containing alcohol as it can more easily catch fire if overheated.

Additional Microwave Oven Safety Instructions:

15. **Do not** operate equipment without load or food in oven cavity.
16. Use only popcorn in packages designed and labeled for microwave use. **Popping time varies depending on oven wattage.** Do not continue to heat after popping has stopped. Popcorn will scorch or burn. Do not leave oven unattended.
17. **Do not** use metal utensils in oven.
18. An authorized servicer MUST inspect equipment annually. Record all inspections and repairs for future use.

Additional Combination Oven Safety Instructions:

19. **Do not** pop popcorn in this oven.
20. **Do not** use metal utensils in oven except when recommended by microwave food manufacturers or recipe requires metal utensils in convection or combination mode. Heat food in containers made of glass or china if possible.
21. Oven temperature is at least 450°F in convection mode. Verify plastic, paper or other combustible materials are recommended by the manufacturer to withstand the maximum oven temperature.
22. Racks, utensils, rack guides, and oven surfaces may become hot during or after use. Use utensils or protective clothing, like pan grips or dry oven mitts, when necessary to avoid burns.
23. **Do not** unplug oven immediately after use. Internal fan must cool oven to avoid damage of electrical components.
24. Caution: To avoid burns, do not use containers loaded with liquid or kitchen products that become liquid by heating at levels above those that can be easily observed.

SPECIFICATIONS

CAUTION

All safety information must be followed

WARNING

To avoid risk of electrical shock, personal injury, or death, disconnect power to oven and discharge capacitor before servicing, unless testing requires power.

Models	AMSO22 MSO22	AMSO35 MSO35 MSO35OS	MSO5211	MSO5351	AMSO5353 MSO5353
Power Source					
Voltage AC	240/208 VAC	240/208 VAC	230 VAC	230 VAC	400 VAC
Amperage (single unit)	20A	30 A	16A	30A	16A
Frequency	60 Hz	60 Hz	50 Hz	50 Hz	50 Hz
Single phase, 3 wire grounded	X	X	X	X	3 Ph 5 wire
Plug	NEMA 6-20	NEMA 6-30	Schuko CEE 7/7	IEC 309	IEC 309
Power Output					
Nominal microwave energy (IEC705)	2200 Watts	3500 Watts	2100 Watts	3500 Watts	3500 Watts
Minimum temperature rise (∆T)	22ºF/11.2ºC	35ºF/19.5ºC	21ºF/11.7ºC	35ºF/19.5ºC	35ºF/19.5ºC
Operating frequency	2450 MHz	2450 MHz	2450 MHz	2450 MHz	2450 MHz
Power Consumption					
Cook condition microwave	3500 Watts	5100 Watts	3300 Watts	5400 Watts	5200 Watts
Dimensions					
Cabinet					
Width	25 5/8in 650mm	25 5/8in 650mm	25 5/8in 650mm	25 5/8in 650mm	25 5/8in 650mm
Height	18 5/8in 472mm	18 5/8in 472mm	18 5/8in 472mm	18 5/8in 472mm	18 5/8in 472mm
Depth	23 1/2in 597mm	23 1/2in 597mm	23 1/2in 597mm	23 1/2in 597mm	23 1/2in 597mm
Oven Interior					
Width	21in 535mm	21in 535mm	21in 535mm	21in 535mm	21in 535mm
Height	9 7/8in 251 mm	9 7/8in 251 mm	9 7/8in 251 mm	9 7/8in 251 mm	9 7/8in 251 mm
Depth	13in 330 mm	13in 330 mm	13in 330 mm	13in 330 mm	13in 330 mm
Weight					
Crated	161lb 73kg	161lb 73kg	161lb 73kg	161lb 73kg	161lb 73kg
Uncrated	146lb 66kg	146lb 66kg	146lb 66kg	146lb 66kg	146lb 66kg

INSTALLATION & CLEANING

Unpacking Oven

- Inspect oven for damage such as dents in door or inside oven cavity.
- Report any dents or breakage to source of purchase immediately. **Do not attempt to use oven if damaged.**
- Remove all packing materials from oven interior.
- If oven has been stored in extremely cold area, wait a few hours before connecting power.
- A protective film is used to prevent scratching of the outer case during transportation. Peel off the film from the exterior of the oven before installation.
- The warning label provided with the oven must be placed in a conspicuous location near the oven.

Radio Interference

Microwave operation may cause interference to WiFi network, radio, television, or a similar oven. Reduce or eliminate interference by doing the following:

- Clean door and sealing surfaces of oven according to provided instructions.
- Place WiFi network, radio, television, etc. as far as possible from oven.
- Use a properly installed antenna on radio, television, etc. to obtain stronger signal reception.

Oven Placement

- Do not install oven next to or above source of heat, such as pizza oven or deep fat fryer. This could cause microwave oven to operate improperly and could shorten life of electrical parts.
- Do not block or obstruct oven filter. Allow access for cleaning.
- Install oven on level countertop surface.
- Outlet should be located so that plug is accessible when oven is in place.

⚠ CAUTION

To avoid risk of electrical shock, severe personal injury or death, unplug power cord or open circuit breaker to oven before cleaning.

Cleaning Interior, Exterior, and Door

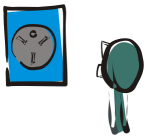
Clean microwave oven daily with mild detergent in warm water using soft sponge or cloth. Wring sponge or cloth to remove excess water before wiping equipment. If desired, boil a cup of water in microwave oven to loosen soil before cleaning. **DO NOT allow cooking residues such as grease or fat to remain in oven interior for any length of time.**

- Do NOT allow cooking residues to remain in oven cavity.
- Do NOT use abrasive cleansers or cleaners containing ammonia. These could damage finish.
- Do NOT use caustic cleaning products or those containing ammonia, phosphates or chlorine in oven. These could damage oven. Use non-caustic cleaner.
- NEVER pour water into microwave oven bottom.
- Do NOT use water pressure type cleaning systems.
- For more detailed cleaning instructions, see the Owner's Manual on-line at www.acpsolutions.com.

⚠ WARNING

To avoid risk of electrical shock or death, this oven must be grounded and plug must not be altered.

Grounding/EarthingInstructions



Oven MUST be grounded. Grounding reduces risk of electric shock by providing an escape wire for the electric current, if an electrical short occurs. This oven is equipped with a cord having a ground wire with a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded.

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

Do not use an extension cord. If the product power cord is too short, have a qualified electrician install a three-slot receptacle. This oven should be plugged into a separate circuit with the electrical rating as provided in product specifications (available on ACP's website at www.acpsolutions.com). When a microwave oven is on a circuit with other equipment, an increase in cooking times may be required and fuses can be blown.

External Equipotential Earthing Terminal *(export only)* Equipment has secondary earthing terminal. Terminal provides external earthing connection used in addition to earthing prong on plug. Located on outside of oven back, terminal is marked with symbol shown below.

QUICK START REFERENCE GUIDE

Quantity
Automatically adjusts preprogrammed cook cycle for cooking two of the same food item.

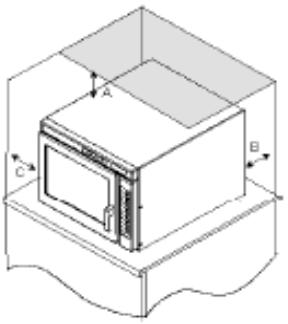
A/B Pad
Toggles selection between two sets of preprogrammed menu settings.

Time Entry
Cooking time can be changed for either manual entry or programming.

Power Level
Changes microwave power level for different stages of a cook cycle.

Stage
User can program up to four different stages per keypad to combine power levels and time changes.

Program Save
Programs or settings can be changed and saved based on a user's preference.



Oven Clearances
A—For North American (UL/CSA) models, allow at least 2" (5.1 cm) of clearance around top of oven. For International (50 Hz) models, allow at least 7" (17.8 cm) of clearance around top of oven. Proper air flow around oven cools electrical components. With restricted air flow, oven may not operate properly and life of electrical parts is reduced.
B—Allow at least 2 9/16" (6.5 cm) between air discharge on back of oven and back wall.
C—Allow at least 2" (5.1 cm) around sides of oven.

Manual Operation
To cook food using a specific entered time and power level.

1. Open oven door and place food in oven. Close door.
2. Press TIME ENTRY pad and enter cooking time.
3. Press POWER LEVEL pad to change power level if desired.
   - For a lower microwave power, press pads 1 (for 10%) through 9 (for 90%)
   - Press same number keypad again to change power level to 100%
4. If stage cooking is desired, press STAGE pad and repeat steps 2 through 4.
5. Press START pad.
6. At end of cooking cycle oven beeps and shuts off. **DONE** displays.

USB Compatibility
A standard USB flash drive is compatible with the microwave oven, allowing the user to save preprogrammed settings to the flash drive rather than the oven.

1. Oven must be in READY mode. If not, open and close the door.
2. Open the oven door completely.
3. Insert USB flash drive.
4. Press and hold the 5 keypad until "USB" appears on the display.
5. To transfer **FROM** the USB flash drive **TO** the oven, press the 1 pad.
   - Or to transfer programs **TO** the USB flash drive **FROM** the oven, press the 2 pad.
6. Push the START pad to begin transfer.
   - Display will read, "Contacting USB card."
   - Display will then read, "Transferring data from USB to oven," or vice versa
7. Once programming has been successfully transfered, display will read, "Done - Loaded __ Programs."
   - Shut the door to clear the display and begin a cooking cycle.

Preprogrammed Pads
To cook food using preprogrammed cooking sequences.

1. Open oven door and place food in oven. Close door.
   - To add an additional serving press QUANTITY pad.
   - Display will read, "DOUBLE."
2. Press desired pad.
3. Oven begins to cook.
4. At end of cooking cycle oven beeps and shuts off. **DONE** displays.

CLEAN FILTER
This oven displays CLEAN FILTER at user defined intervals. When the message displays, ACP recommends cleaning the air filter thoroughly. **Cleaning the air filter will not shut off the message.** The message will stop displaying automatically after 24 hours. Depending on microwave use and environmental conditions, the filter may need to be cleaned more frequently.

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Changing User Options

Options such as single or double pad programming and beep volume can be changed to suit individual preferences.

To change options:

1. Press firmly on hidden pad located to the right of the STOP keypad.
   - Pad is unmarked
   - The display remains blank when hidden pad is pressed.
2. Press PROGRAM SAVE pad
   - The first user option will display. Oven is now in options mode
3. Press desired number pad to control changes in options.
   - See table on next page for options.
   - Current option will display
4. Press the same number pad again to disable or enable the setting.
   - Each time pad is pressed, option will change
   - Changes take effect immediately
   - To change additional options, repeat steps 3 and 4
5. Press PROGRAM SAVE to return to READY mode, or open and close oven door.

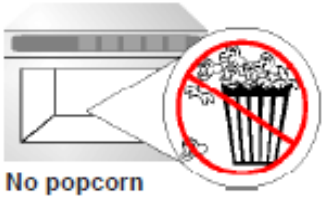
Programming Pads

1. **READY** must be in the display. If not, open and close the door.
2. Press PROGRAM SAVE pad.
   - Programming mode begins
   - "Enter Program to Add/Review" is displayed
3. Press desired number pad to be programmed.
   - Display will show all settings for the pad
   - The pad number that is being programmed displays beside the word **ITEM**
4. Press TIME ENTRY to program amount of cooking time.
   - Enter desired cooking time by using numeric key pads
   - Maximum cooking time is 60 minutes
5. Press POWER LEVEL to program level of microwave power.
   - For a lower microwave power, press pads 1 (for 10%) through 9 (for 90%)
   - Press numeric key pad for desired level. Press same keypad again to set power level to 100%
6. When cooking two of the same food item, press the QUANTITY pad before a preprogrammed cook cycle. The oven will automatically adjust the program.
   - Display will read, "DOUBLE."
   - To clear, open and close the door or press the STOP pad
7. Press PROGRAM SAVE to save the program changes.
8. To discard changes, press STOP/RESET.

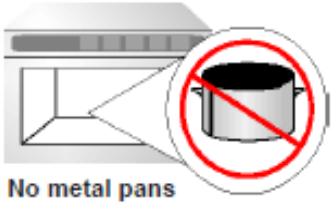
Programming Multiple Stages

Stage cooking allows consecutive cooking cycles without interruption. Up to four different cooking cycles can be programmed into a memory pad.

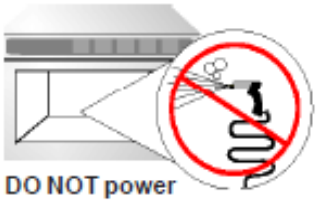
1. Follow steps 1-5 in the *Programming Pads* portion above.
2. Press the STAGE keypad.
   - This will begin programming for the next cooking stage
   - Display indicates stage to be programmed
   - Enter cook time and power level as in steps 4 and 5
   - To enter another cooking stage for that pad, press STAGE again
   - Total cooking time limit is 60 minutes
3. When cooking two of the same food item, press the QUANTITY pad before a preprogrammed cook cycle. The oven will automatically adjust the program.
   - Display will read, "DOUBLE."
   - To clear, open and close the door or press the STOP pad
4. Press PROGRAM SAVE to save programming and changes.
5. To discard changes, press STOP/RESET before pressing PROGRAM SAVE.



No popcorn



No metal pans



DO NOT power spray

Top or Bottom Only Cooking

1. Push the POWER LEVEL pad.
   - Select and program the preferred microwave power.
2. If POWER LEVEL pad is pushed a second time, "Top Only" heating option will be selected and displayed.
3. If the POWER LEVEL pad is pushed a third time, "Bottom Only" heating is selected and displayed.
4. If the POWER LEVEL button is pushed a fourth time, the oven resets and both top and bottom will heat.

USER OPTIONS

Numbered Pads	Displays	Options
1 Double Digit Entry	**Disabled** Enabled	**Allows 10 (0-9) preprogrammed pads** Allows 100 (00-99) preprogrammed pads
2 Manual Programming	Disabled **Enabled**	Manual time entry/cooking not allowed **Manual time entry/cooking allowed**
3 Reset on Door Open	**Disabled** Enabled	**Opening oven door does not reset oven back to READY mode** Opening oven door resets the oven back to READY mode
4 Key Beep	OFF **ON**	Keys do not beep when pressed **Keys beep when pressed**
5 Speaker Volume	OFF LOW MEDIUM **HIGH**	Key beep volume OFF Key beep volume LOW Key beep volume MEDIUM **Key beep volume HIGH**
6 End of Cook Signal	**Solid Beep** 3 Second Beep 4 Beeps Once 4 Beeps Repeating	**Done signal is a continuous beep until reset by user** Done signal is a three second beep Done signal is four beeps continously Done signal is four beeps, four times
7 Keyboard Active	15 Seconds 30 Seconds **60 Seconds** 120 Seconds Always	Keypad time entry window is 15 seconds Keypad time entry window is 30 seconds **Keypad time entry window is one minute** Keypad time entry window is two minutes Keypad time entry window is always active
8 On-The-Fly Knob	**Disabled** Enabled	**Disables turning the knob to enter manual mode** Allows turning the knob to enter manual time entry mode, allows pressing knob to start oven and allows turning the knob to add time before starting a cook cycle
9 Manual Knob	Disabled **Enabled**	Disables knob completely **Enables knob according to Option 8**
0 Top or Bottom Cooking	**Disabled** Enabled	**Disables the use of top or bottom only cooking** Enables the use of top or bottom only cooking
Time Entry Pad On-The-Fly Cook	**Disabled** Enabled	**Disables pushing any additional keypads during a cook cycle** Allows pushing additional keypads to add or change time in the middle of a cook cycle without stopping
X2 Pad X2 Prompt	Disabled **Enabled**	Disables X2 prompt **Enables X2 prompt**
A/B Pad A/B Menus	**Disabled** Enabled	**Disables A/B Menus** Enables A/B Menus
Power Level Pad Return to Menu	**A** B Last Selected	**Return to Menu A** Return to Menu B Return to last selected menu
Stage Pad Clean Filter Message (Frequency)	Disabled **Weekly** Monthly Quarterly	Oven will not display CLEAN FILTER **Oven will display CLEAN FILTER every seven days** Oven will display CLEAN FILTER every 30 days Oven will display CLEAN FILTER every 90 days

COOKING INSTRUCTIONS

Steaming Tips:

1. Cooking Vessels
   a) Always heat or cook food items in covered containers to accomplish:
      - Retention of steam for efficient cooking and to keep foods moist
      - Even cooking results and temperatures
      - A cleaner oven interior and prevention of food splatters
   b) Ceramic, paper, china, styrofoam, glass and plastic are suitable materials for use in microwave ovens. A high temperature resistant amber pan is recommended for ALL items, especially those high in fat or sugar content, as these ingredients get hot very quickly.

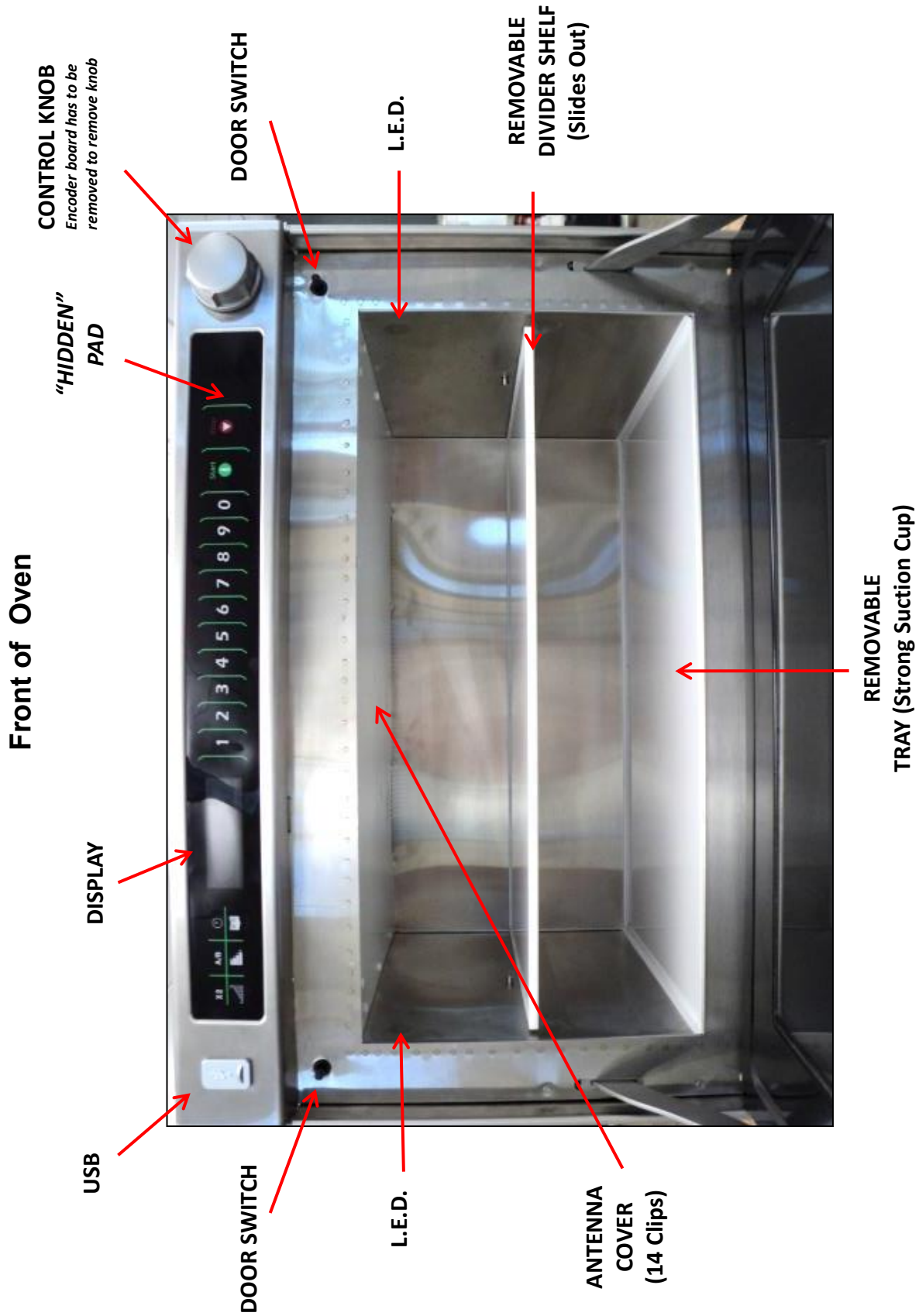
2. Food Temperature
   a) To reach a mandatory serving temperature, frozen foods require a longer cook time than refrigerated items.
   b) Refrigerated items:
      - Items stored at 40°F *(4°C)* in the refrigerator should be covered while heated; except breads, pastries or any products with a breaded coating, which should be heated uncovered to avoid softening.
   c) Room temperature items:
      - Foods held at room temperature, such as canned items or vegetables, will require less time to heat than refrigerated items.
   d) Conventionally prepared foods should be slightly undercooked to prevent overcooking when rethermed by microwave steaming.
   e) After a steaming cycle has been completed, internal food temperatures continue to slightly rise due to the presence of steam.

3. Structure of Food
   a) Food items that are high in fat, sugar, salt and moisture attract and quickly absorb microwave energy, allowing for a shorter cook time.
   b) Items high in protein or fiber require a longer cook time, due to a slower absorption of microwave energy.

4. Quantity
   a) As the mass of food increases, so will the necessary cook time.

Refer to and comply with all USDA/FDA Food Code guidelines when cooking or heating food items.

COMPONENT LOCATIONS



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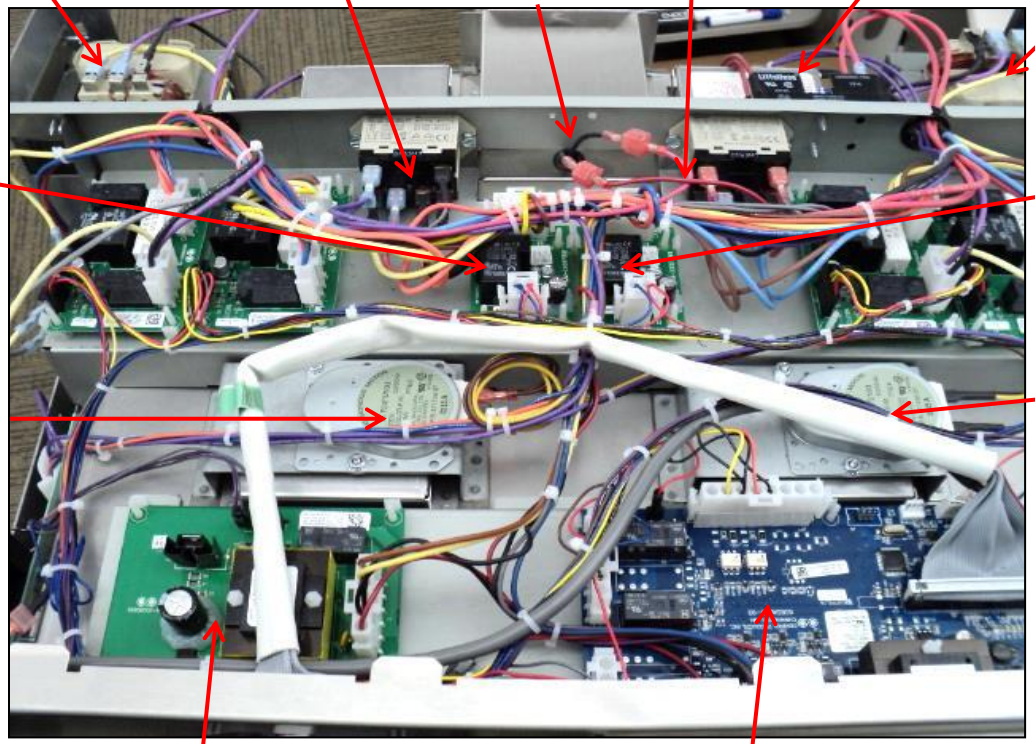
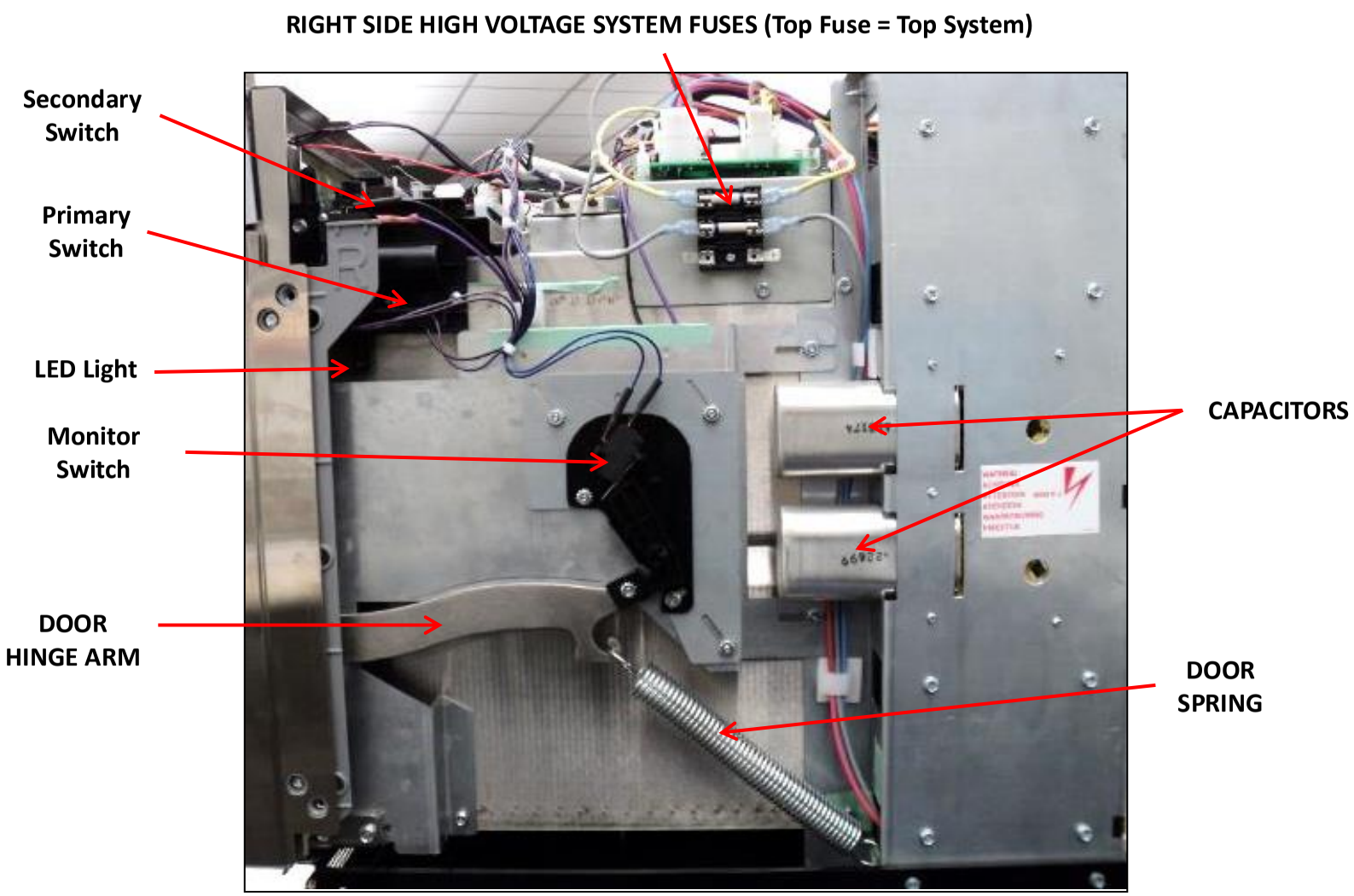
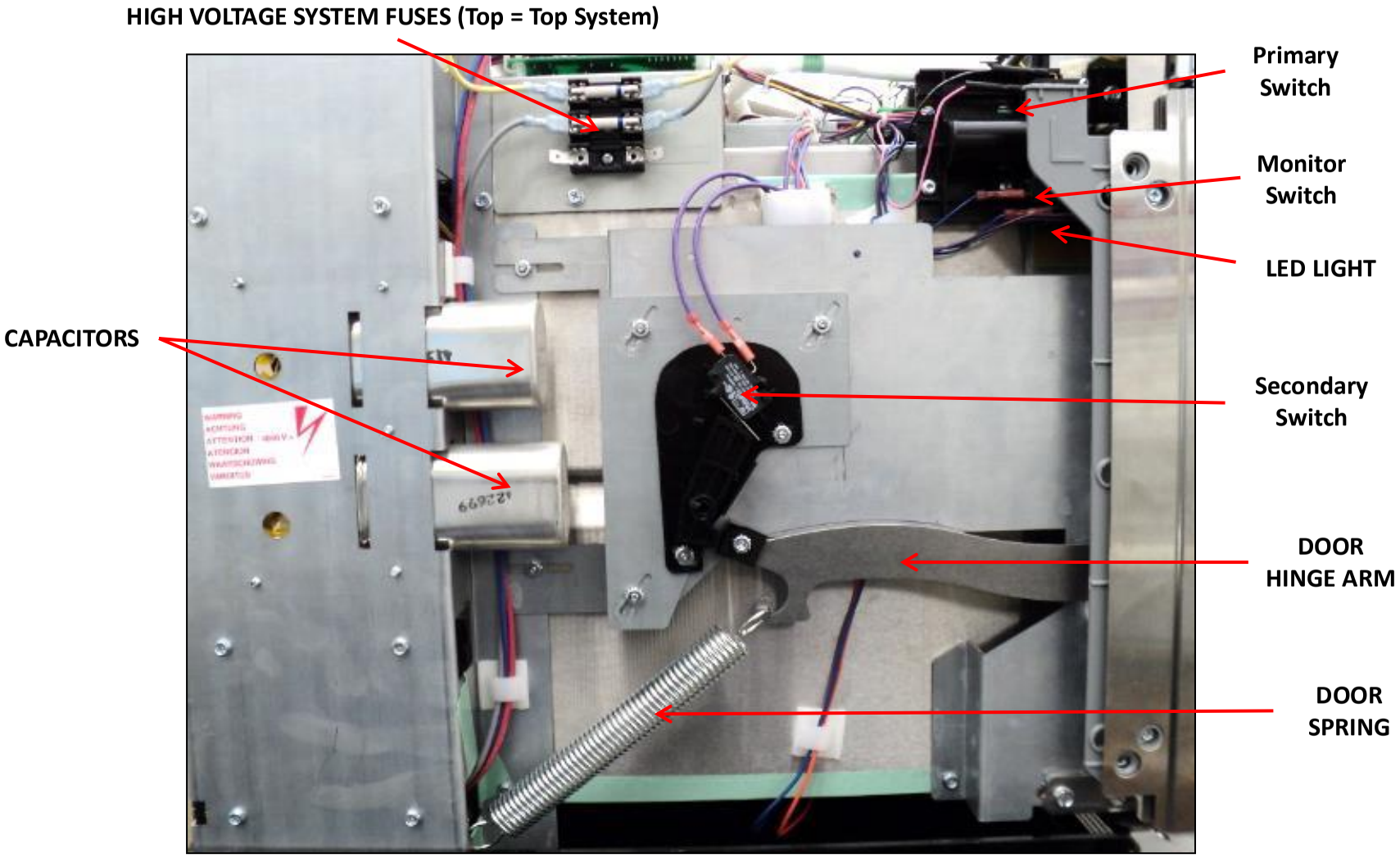
Top of Oven


TRANSFORMER
POWER RELAY
OVEN THERMAL CUTOUT (under cover)
POWER RELAY
MAIN FUSES
TRANSFORMER
MONITOR RELAY BOARD
MONITOR RELAY BOARD
ANTENNA MOTOR
ANTENNA MOTOR
DISPLAY BOARD
CONTROL BOARD

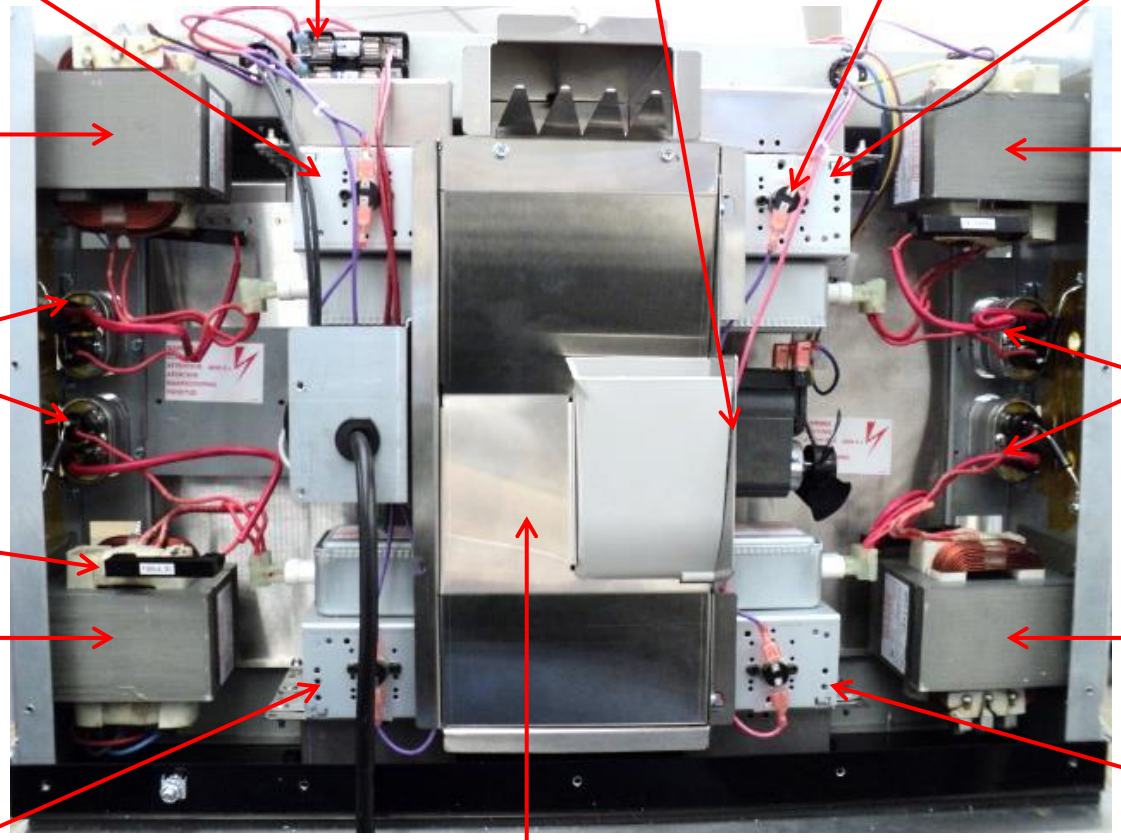
Right Side of Oven



Left Side of Oven



Back of Oven - Removed



Back of Oven

DOOR & DOOR SWITCH ADJUSTMENT

1. Remove the outer case.

2. Using a pencil or pen, mark the position of both door hinge arms as shown in Figure 1.

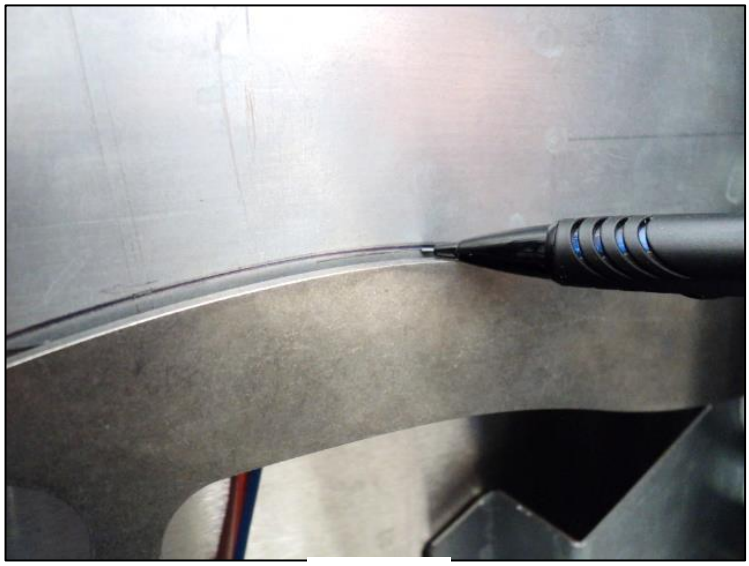


Figure 1

3. While holding the door closed, carefully remove both door springs and open the door the full position.

4. While providing support to the open door remove the Hole Plugs and Shoulder Bolts using the 2mm Hex Key Wrench as shown in Figure 2 and remove the Hinge Arms.

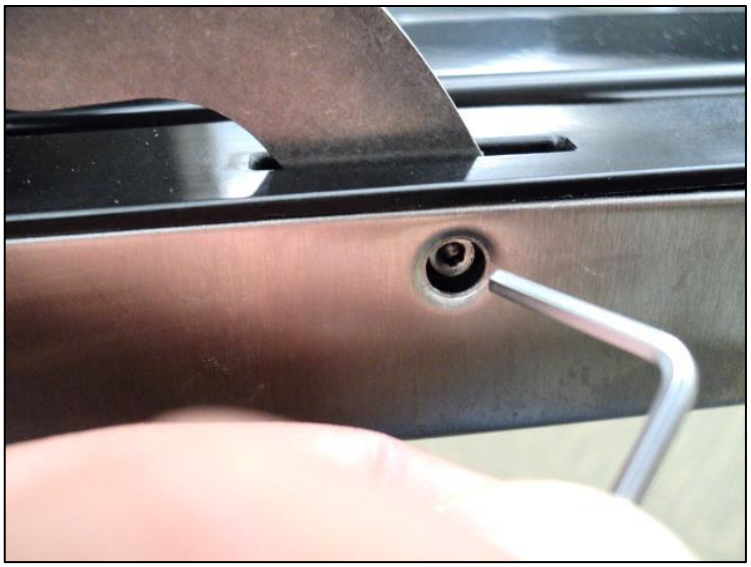


Figure 2

5. Remove the Door Hinge Screws (2 on each side) and remove the old door.

6. Place the new door into position and install the new TC/Hex Screws finger tight.

7. Place a small drop of the provided Blue Threadlock to the threads of the new Shoulder Bolts and reattach Door Arms, Hole Plugs, and Door Springs. Door Arms will be out of adjustment from the marks made in Step 2. See Figure 3.

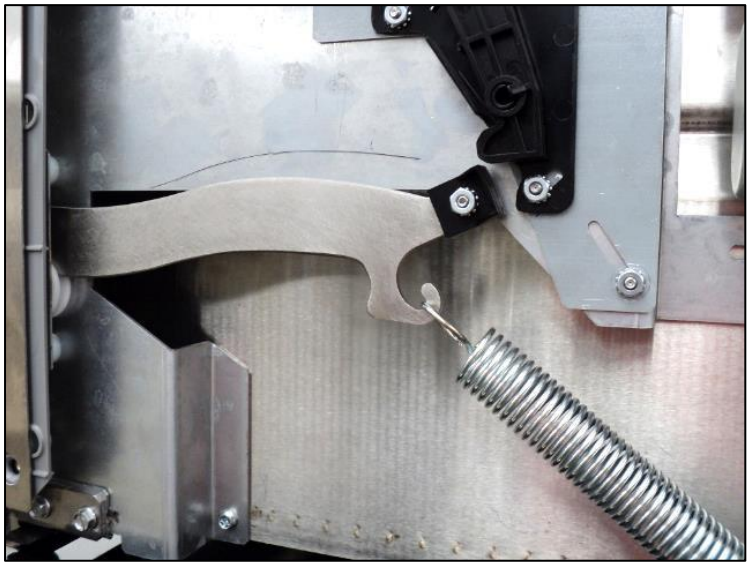


Figure 3

8. Using the 2mm Hex Key Wrench as a spacer between the top of the Door and the Control Panel, pull down on the Door Handle and observe the hinge arm. When the Hinge Arm aligns with the mark made in Step 2, tighten the Door Hinge TC/Hex Screws **securely** and repeat on the other side. See Figure 4

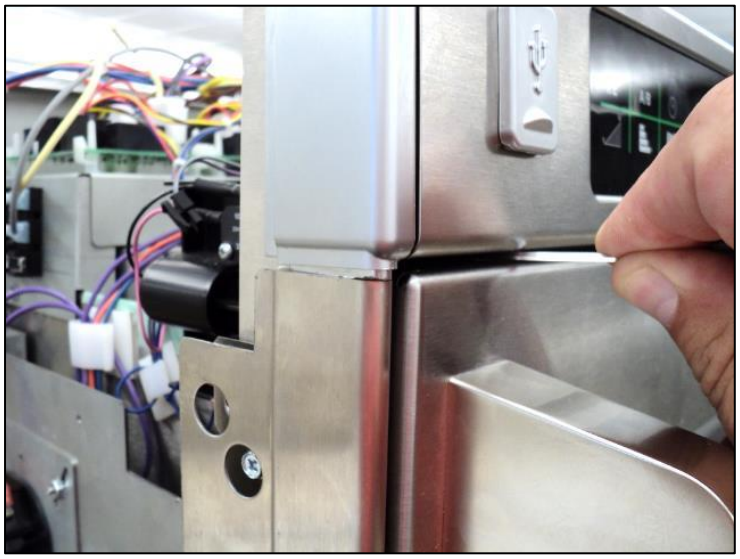


Figure 4

9. Inspect door operation and alignment with cabinet and make any necessary adjustments.
10. Test oven operation and perform microwave leak test.

SERVICE TEST MODE

MSO Units have an easily accessed Service Mode that allows a technician to operate components, clear service alarms, check door cycles, and check magnetron hours. To enter the Service Mode, perform the following:

PRESS and RELEASE the Hidden Pad
PRESS and RELEASE In Order: 1, 3, 5, 7, 9. Display will now show "SERVICE MODE", the applied voltage, and Hz.

The unit is now in the Service Mode and pressing individual pads will activate or open specific components/programs:

PAD	FUNCTION	DISPLAY
1	Magnetron 1 (top right from front of oven) Press pad once to start and again to stop.	Magnetron #1: ON 01:00 Amps 0.2 Do not use Amperage Reading as diagnostic. Use Power Test Output @ 9 degree F Rise
2	Magnetron 2 (top left from front of oven) Press pad once to start and again to stop	Magnetron #2: ON 01:00 Amps 0.2 Do not use Amperage Reading as diagnostic. Use Power Test Output @ 9 degree F Rise
3	Magnetron 3 (bottom right from front of oven) Press pad once to start and again to stop	Magnetron #3: ON 01:00 Amps 0.2 Do not use Amperage Reading as diagnostic. Use Power Test Output @ 9 degree F Rise
4	Magnetron 4 (bottom left from front of oven) Press pad once to start and again to stop	Magnetron #4: ON 01:00 Amps 0.2 Do not use Amperage Reading as diagnostic. Use Power Test Output @ 9 degree F Rise
5	Cycles on/off the LED lights along with Fan and Antenna Motors	Aux. Output: ON
7	Magnetron Tube Hours	Magnetron Hours 0
8	Door Cycle Count (1 equals door open and closed)	Door Cycles 3210
9	Clears Door Cycles and Magnetron Hours	Press START to Clear serv. info
0	Clears Call Service Alarm	CALL SERVICE Alarm Cleared
ALL OTHER PADS	May access engineering modes. Do not use or change settings.	Various engineering modes. Do not use
HIDDEN PAD	Press and Hold during power up	Software Revision Number and Date

To Exit the Service Mode press and release the STOP Pad.

MICROWAVE POWER TEST

Power Test
All ACP microwave oven power outputs are rated using the IEC705 standards. Using the IEC705 test method requires precision measurements and equipment that is not practical to be performed in the field. Using the test shown below will indicate if the oven performance is satisfactory.

Set Up for Power Test
There are two methods to run microwave only:

1) Use Service Test Mode #3, the oven can be set up to run microwave only. The oven must be at room temperature for best results
2) Microwave only mode (oven must be below 212F / 100C)
   Press Hidden Pad
   Press Program Save
   Press Power Level Pad and ensure "Enabled"
   Press Program Save to save

Test equipment required:
1000 ml test container and thermometer.

Procedure
Fill the test container to the 1000 ml line with cool tap water as close to 60° F / 16° C as possible.
Using the thermometer, stir water for ten seconds; measure, and record the temperature.
Place test container of water in the center of oven cavity and close door.
Heat the water for a 33-second full power cycle.
At end of the cycle, remove test container. Using the thermometer, stir water for ten seconds and record temperature.
Subtract the starting water temperature from the ending water temperature to obtain the temperature rise.
If the temperature rise meets or exceeds the nominal microwave energy rating found on the model/serial tag, the test is complete. If the temperature rise fails to meet the minimum temperature rise, test the line voltage to verify it is correct. Then repeat steps 1-6 making sure to change the water. If the temperature rise fails to meet the minimum temperature rise again the oven will require service.

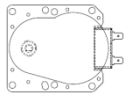
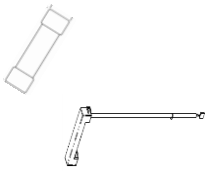
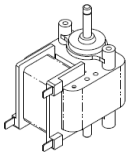
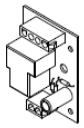
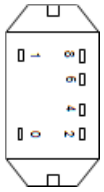
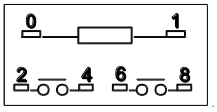
Minimum Temperature Rise at Thirty -Three (33) Seconds Run Time

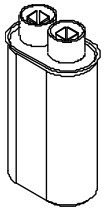
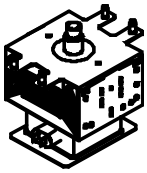
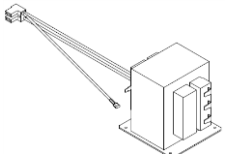
ΔT (°F)	Cooking Power Output	ΔT (°F)	Cooking Power Output	ΔT (°C)	Cooking Power Output	ΔT (°C)	Cooking Power Output
10	1000	20	2000	5	1000	11	2000
11	1100	21	2100	5.5	1100	11.5	2100
12	1200	22	2200	6.5	1200	12	2200
14	1400	24	2400	7.5	1400	13	2400
17	1700	25	2500	9.5	1700	13.5	2500
18	1800	27	2700	10	1800	15	2700
19	1900	30	3000	10.5	1900	16.5	3000

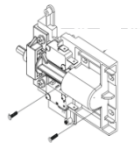
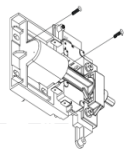
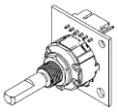
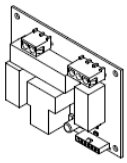
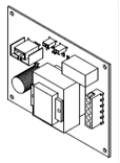
For Units with Greater than 3000 Watt nominal microwave energy rating refer to the Product Specifications Sheet

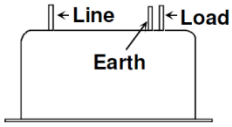
Important Notes:
Low line voltage will cause low temperature rise / power output. Ovens must be on a dedicated circuit, properly grounded, and polarized. Other equipment on the same circuit may cause a low temperature rise / power output. This test and results are not a true IEC705 test procedure and are only intended to provide servicers with an easy means of determining if the microwave oven cooking output is correct.

COMPONENT SPECIFICATIONS

Illustration	Component	Testing	Results
	Antenna Motor (4)	Disconnect all wires from motor Measure resistance across terminals….....	12.2K Ω
	Fuses	Remove fuse and check end-to-end 12 amp (qty 4)……. 30 amp (qty 2)……. HV Transformer Secondary 800ma (qty 4).. **IF MAIN FUSE IS OPEN, THE FUSE AND MONITOR RELAY BOARD MUST BE REPLACED**	 Continuity Continuity Continuity
	Blower Motor	Remove all wires from motor. Measure resistance COM to 208……. COM to 230…….	 Approximately 24 Ω Approximately 26 Ω
	Monitor Relay Board (2)	Unplug Connector J-2: Check resistance from J2-1 and J2-4 With 24vdc applied to J1-1 and J1-2 ……. No voltage at J1-1 and J1-2 ……..	 Open- Infinite Ω Continuity
	Power Relay (2)	Measure resistance from: Terminal 0 to Terminal 1 (coil) ..... 	Approximately 6 to 7 MΩ (Diode in circuit) **Note:** If using a digital meter it must contain a battery of 6 volts minimum. WITHOUT line voltage applied to Terminals 0 and 1: Contacts 2 -4 indicate Open – Infinite Ω Contacts 6 -8 indicate Open – Infinite Ω WITH line voltage applied to Terminals 0 and 1: Contacts 2 -4 indicate Continuity – 0Ω Contacts 6 -8 indicate Continuity – 0Ω

	Thermal Cutout (4) & Cavity Thermal Fuse (1)	Disconnect all wires from TCO. Measure resistance across terminals. Cavity Thermal Fuse (1) Magnetron (4)	Open at 220° F (104° C). Open at 300° F (149° C) and closed at 257° F (125° C)
	Diode Assembly (4)	**Discharge Capacitors !** Remove diode lead from capacitor and connect ohmmeter. Reverse leads for second test.	Infinite resistance should be measured in one direction and 50KΩ or more in the opposite direction. **NOTE:** Analog meter must contain a battery of 6 volts minimum.
	Capacitor (4)	**Discharge Capacitors !** MSO22 .55µ (bottom) .65µ (top) MSO35 .90µ Remove wires from capacitor terminals and connect ohmmeter, set on highest resistance scale to terminals. Also check between each terminal and capacitor case.	**Between Terminals:** Meter should momentarily deflect towards zero then return to over 5 MΩ. If no deflection occurs, or if continuous deflection occurs, replace capacitor. **Terminal to Case:** Infinite resistance.
	Magnetron	**Discharge Capacitors** Remove wires from magnetron and connect ohmmeter to terminals. Also check between each terminal and ground. Magnetron 1 = Top Right Magnetron 2 = Top Left Magnetron 3 = Bottom Right Magnetron 4 = Bottom Left	**Between Terminals:** Less than 1 Ω. Each terminal to ground measures Infinite resistance. **NOTE:** This test is not conclusive. If oven does not heat and all other components test good, replace the magnetron and retest.
	Transformer (4)	**Discharge Capacitor !** Remove all wires from terminals, and measure resistance from: 0v to 208v ..... 0v to 230v ..... Terminal 5 to 6..... Terminal 4 to Earth screw on transformer ..... Terminal 4 to any other terminal	 <1Ω. <1 Ω. <2 Ω. 71Ω. Infinite resistance. If not, replace transformer.

	Interlock Switch Assembly Upper - RIGHT	Disconnect wires to switch. With door open measure resistance from: Terminal to Terminal …… With door closed measure resistance from: Terminal to Terminal……..	 Open/Infinite Closed/Continuity
	Interlock Switch Assembly Upper - LEFT	Disconnect wires to switch. With door open measure resistance from: Terminal to Terminal …… With door closed measure resistance from: Terminal to Terminal……..	 Open/Infinite Closed/Continuity
	Interlock Switch Lower (2)	**Disconnect wires to switch.** With door open measure resistance Terminal to Terminal…….. With door closed measure resistance Terminal to Terminal……..	 Open/Infinite.. Closed/Continuity
	Encoder Board	**NOTE: KNOB DOES NOT PULL OFF FROM FRONT. ENCODER HAS TO BE REMOVED TO ACCESS TAB ON KNOB** Terminals 1 – 2……. Terminals 1 – 4…….	 Closed/Continuity w/ Knob pushed in Opens/Closes as Knob is Rotated
	Magnetron Relay Board (4)	**CAUTION ! – LIVE TEST. USE HANDS FREE TESTS. WHILE IN COOK MODE:** J1 – 1 to J1-2 …….. J2-1 or 2 to J2 – 6 or 7…….. Test for output voltage: J3 – 3 to either J3-2 or J3-1 ……..	 Incoming Line Voltage (208 or 230) Incoming 24vdc Line Voltage (208 or 230)
	Power Supply Board	**CAUTION ! – LIVE TEST. USE HANDS FREE TESTS:** J3 -1 or 2 to J3 – 6 or 7 …… J4-1 to J4 - 2……..... Test for output voltage: J4-4 …… or J4-5 …….. Note: LED Lamps J1 and J2…….	 24vdc Incoming Line Voltage (208 or 230) 230vac (if Line Voltage is 230) 208 (if Line Voltage is 208) 24vdc 100ma

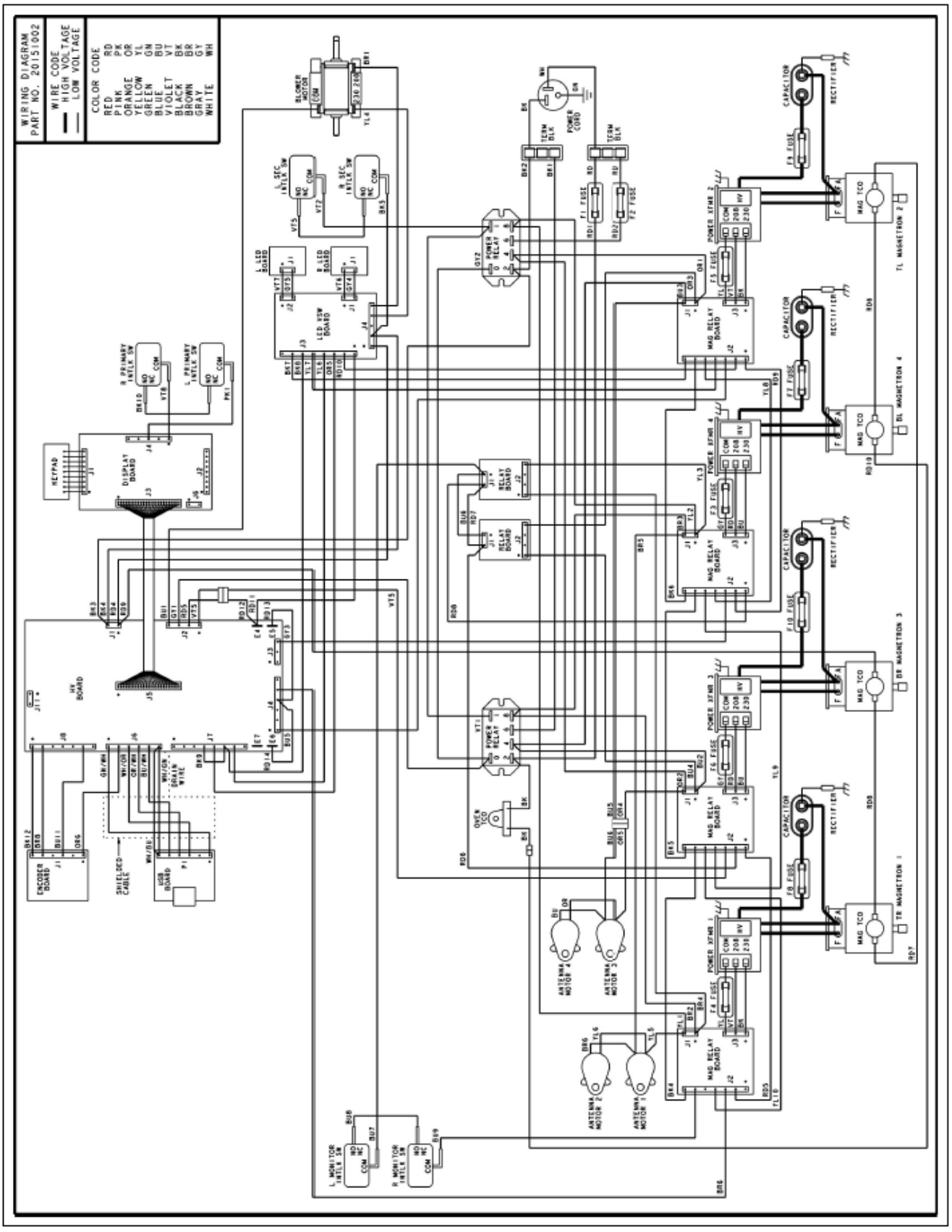
	Line Filter	Line to Line…… Load to Load…… Line to Load…….. Any Terminal to Earth……..	.8MΩ .8MΩ Closed/Continuity Open/Infinite

Error Code Table

The oven has built-in diagnostics. Below is a table of Errors and their causes:

Error Code	Corrective Action
1	Replace HV/LV Board
2	Replace HV/LV Board
3	Replace HV/LV Board
4	Replace Touch Panel
5	Keypad or Dial/Encoder Stuck

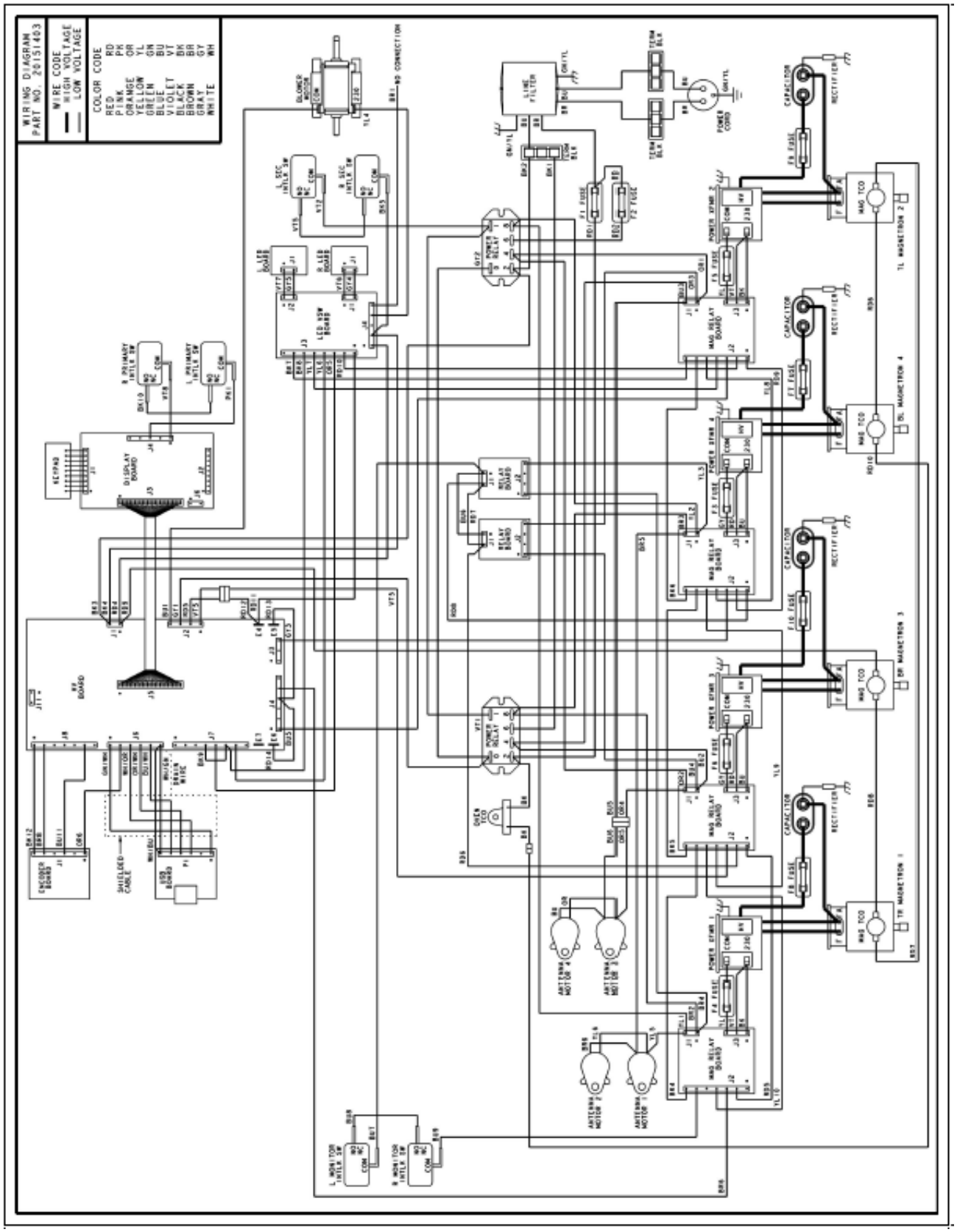
SCHEMATICS & DIAGRAMS



MSO22 **AMSO22**

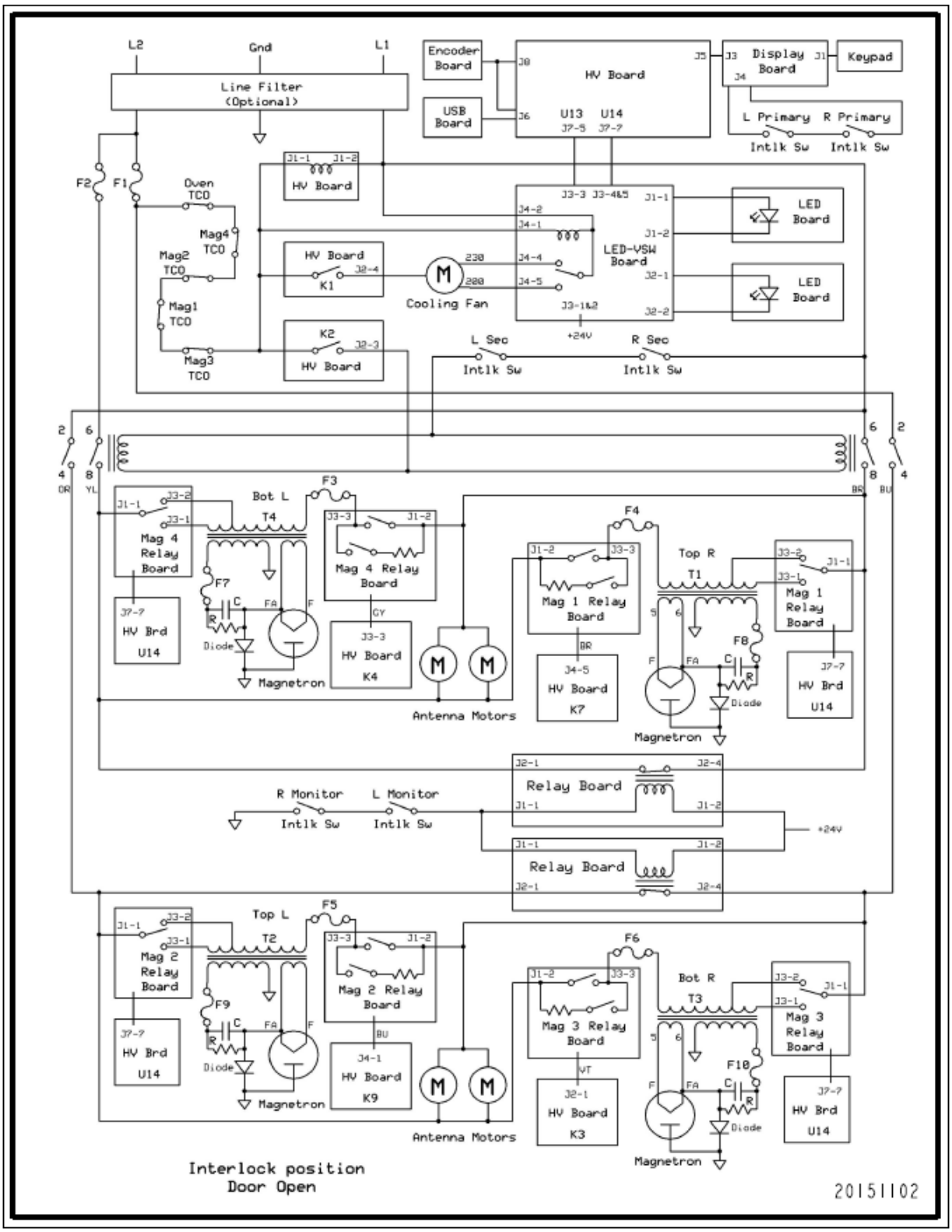
MSO35* **AMSO35**

SCHEMATICS & DIAGRAMS



MSO5211 **MSO5351**

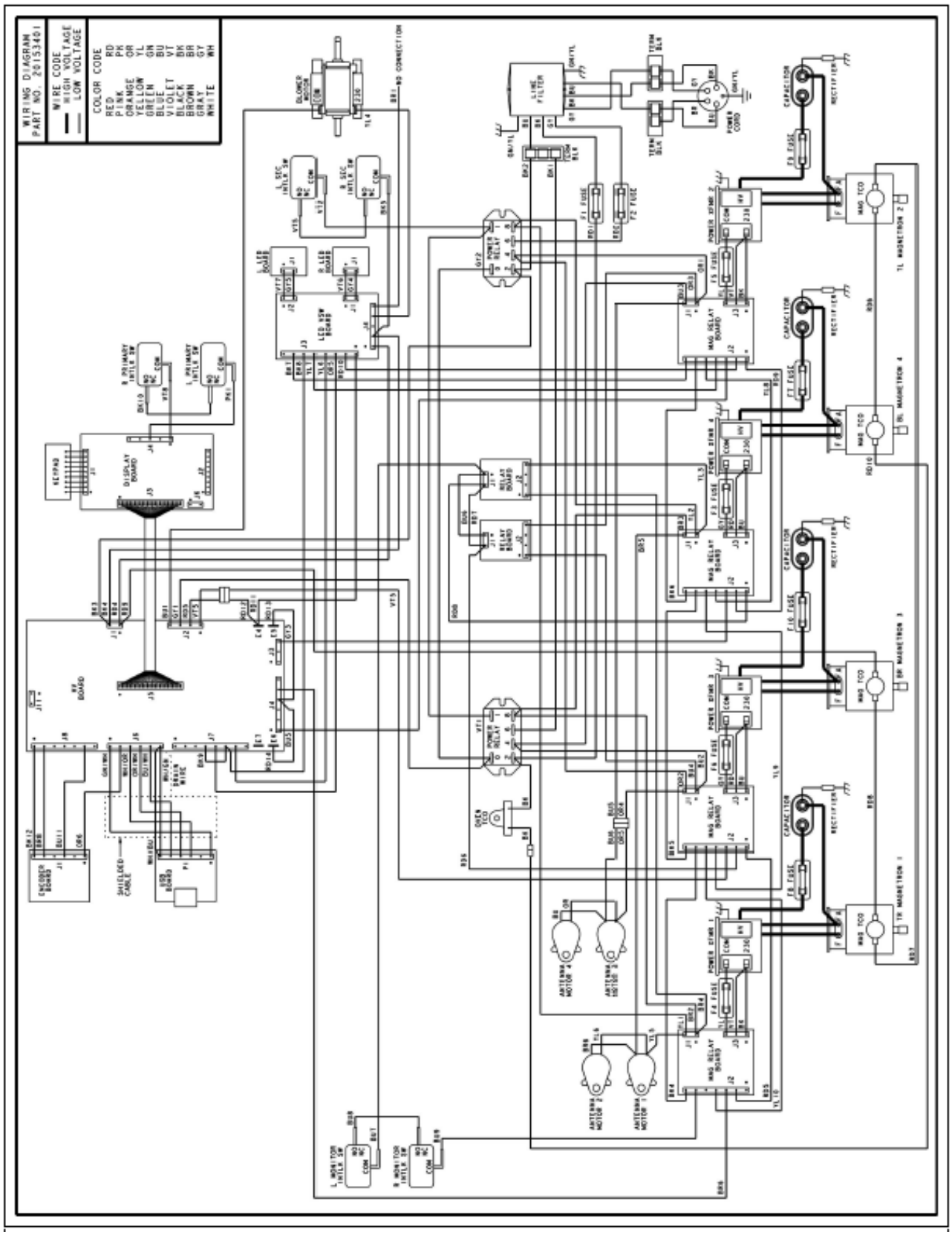
SCHEMATICS & DIAGRAMS



MSO22 **AMSO22** **MSO5211**

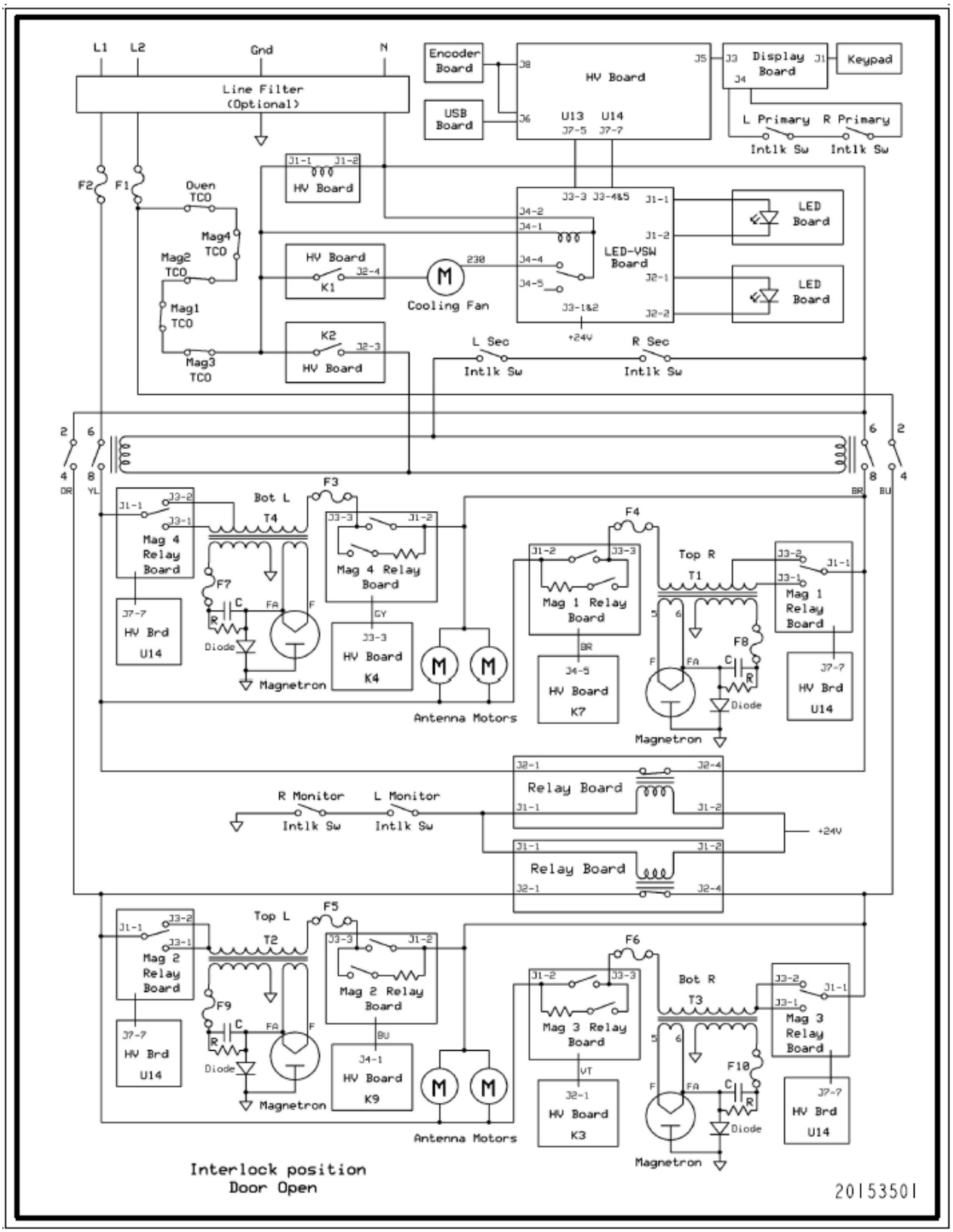
MSO35* **AMSO35** **MSO5351**

SCHEMATICS & DIAGRAMS



MSO5353 **AMSO5353**

SCHEMATICS & DIAGRAMS



MSO5353 **AMSO5353**