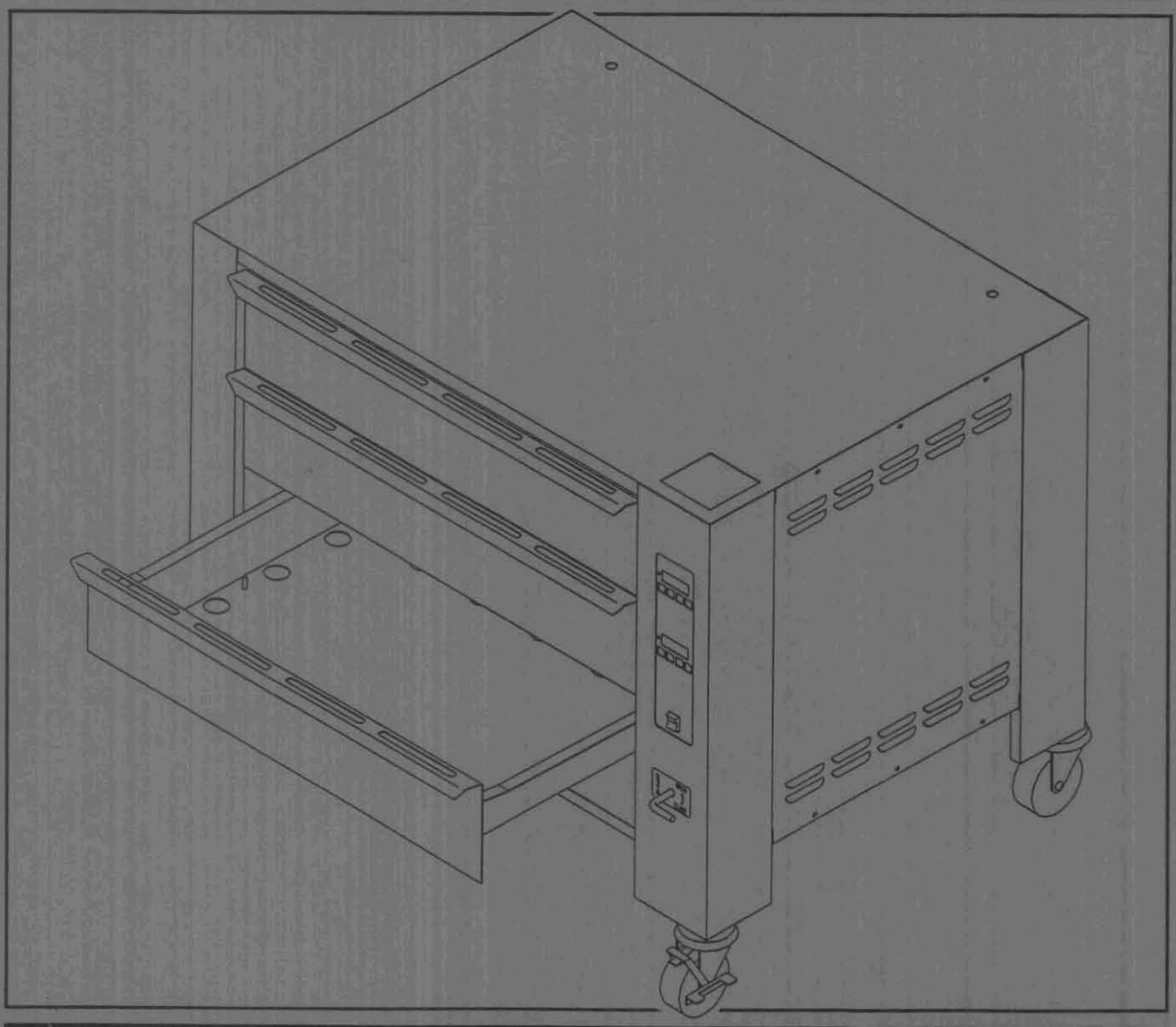
Service Manual

Technical Reference and Troubleshooting Guide

BMW334 Warming Cabinet



December 1996, rev. 0.9

1333 East 179th St.
Cleveland, Ohio 44110
Phone (216) 481-4900
Facsimile (216) 481-3782

Cleveland
Steam Cooking Specialists
A WELBILT Company

Cleveland WARRANTY AND LIMITED EXTENDED WARRANTY COVERAGE

LIMITED WARRANTY

Cleveland Range products are warranted to the original purchaser to be free from defects in material and workmanship under normal use and service for the standard warranty period.

Cleveland Range agrees to repair or replace, at its option, f.o.b. factory, any part which proves to be defective due to defects in material or workmanship during the warranty, providing the equipment has been unaltered and has been PROPERLY INSTALLED, MAINTAINED, AND OPERATED IN ACCORDANCE WITH THE CLEVELAND RANGE OWNER'S MANUAL.

CLEVELAND RANGE agrees to pay any FACTORY AUTHORIZED EQUIPMENT SERVICE AGENCY (within the continental United States, Hawaii, and Canada) for reasonable labor required to repair or replace, at our option, f.o.b. factory, any part which proves to be defective due to defects in material or workmanship, during the labor warranty period. This warranty includes travel time not to exceed two hours and mileage not to exceed 50 miles (100 miles round-trip), but does not include post start-up, tightening loose fittings, minor adjustments, maintenance, cleaning or descaling.

The standard labor warranty allows factory payment of reasonable labor required to repair or replace such defective parts. Cleveland Range will not reimburse the expense of labor required for the repair or replacement of parts after the standard warranty period, unless an Extended Warranty Contract has been purchased to cover the equipment for the balance of the warranty period from the data of equipment installation, start-up, or demonstration.

PROPER INSTALLATION IS THE RESPONSIBILITY OF THE DEALER, THE OWNER-USER, OR INSTALLING CONTRACTOR, AND IS NOT COVERED BY THIS WARRANTY. Many local codes exist, and it is the responsibility of the owner and installer to comply with these codes. Cleveland Range equipment is built to comply with applicable standards for manufacturers, including UL, A.G.A., NSF, ASME/Ntl. Bd., CSA, CGA, ETL, and others.

BOILER (SteamGenerator) MAINTENANCE IS THE RESPONSIBILITY OF THE OWNER-USER, AND IS NOT COVERED BY THIS WARRANTY. The use of good quality feed water is the responsibility of the Owner-User (see Water Quality Requirements below). THE USE OF POOR QUALITY FEED WATER WILL VOID EQUIPMENT WARRANTIES.

Boiler maintenance supplies, including boiler hand gaskets, are not warranted beyond the first 90 days after the date the equipment is placed into service if no preventive maintenance records are available showing descaling every 90-120 days.

WATER QUALITY REQUIREMENTS

Total Dissolved Solids	less than	60 parts per million
Total Alkalinity	less than	20 parts per million
Silica	less than	13 parts per million
Free Chlorine	less than	0.5 parts per million
Chlorides	less than	25 parts per million
pH factor (acidity)	neutral, ± 1.0 pH	

The foregoing shall constitute the sole and exclusive remedy of original purchaser and the full liability of Cleveland Range for any breach of warranty.THE FOREGOING IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR IMPLIED, INCLUDING ANY WARRANTY OF PERFORMANCE, MERCHANTABILITY, OR FITNESS FOR PURPOSE, AND SUPERSEDES AND EXCLUDES ANY ORAL WARRANTIES OR REPRESENTATIONS, OR WRITTEN WARRANTIES OR REPRESENTATIONS, NOT EXPRESSLY DESIGNATED IN WRITING AS A "WARRANTY" OR "GUARANTEE" OF CLEVELAND RANGE MADE OR IMPLIED IN ANY MANUAL, LITERATURE, ADVERTISING BROCHURE OR OTHER MATERIALS.

Cleveland Range's liability on any claim of any kind, including negligence, with respect to the goods or services covered hereunder, shall in no case exceed the price of the goods or services, or part thereof, which gives rise to the claim. IN NO EVENT SHALL CLEVELAND RANGE BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES IN THE NATURE OF PENALTIES.

LIMITED EXTENDED WARRANTY COVERAGE

The purchase of a Limited Extended Warranty Contract extends the standard warranty coverage to the purchased period of time (one to four years) from the date of installation, start-up, or demonstration, whichever is sooner.

October 1995

Contents

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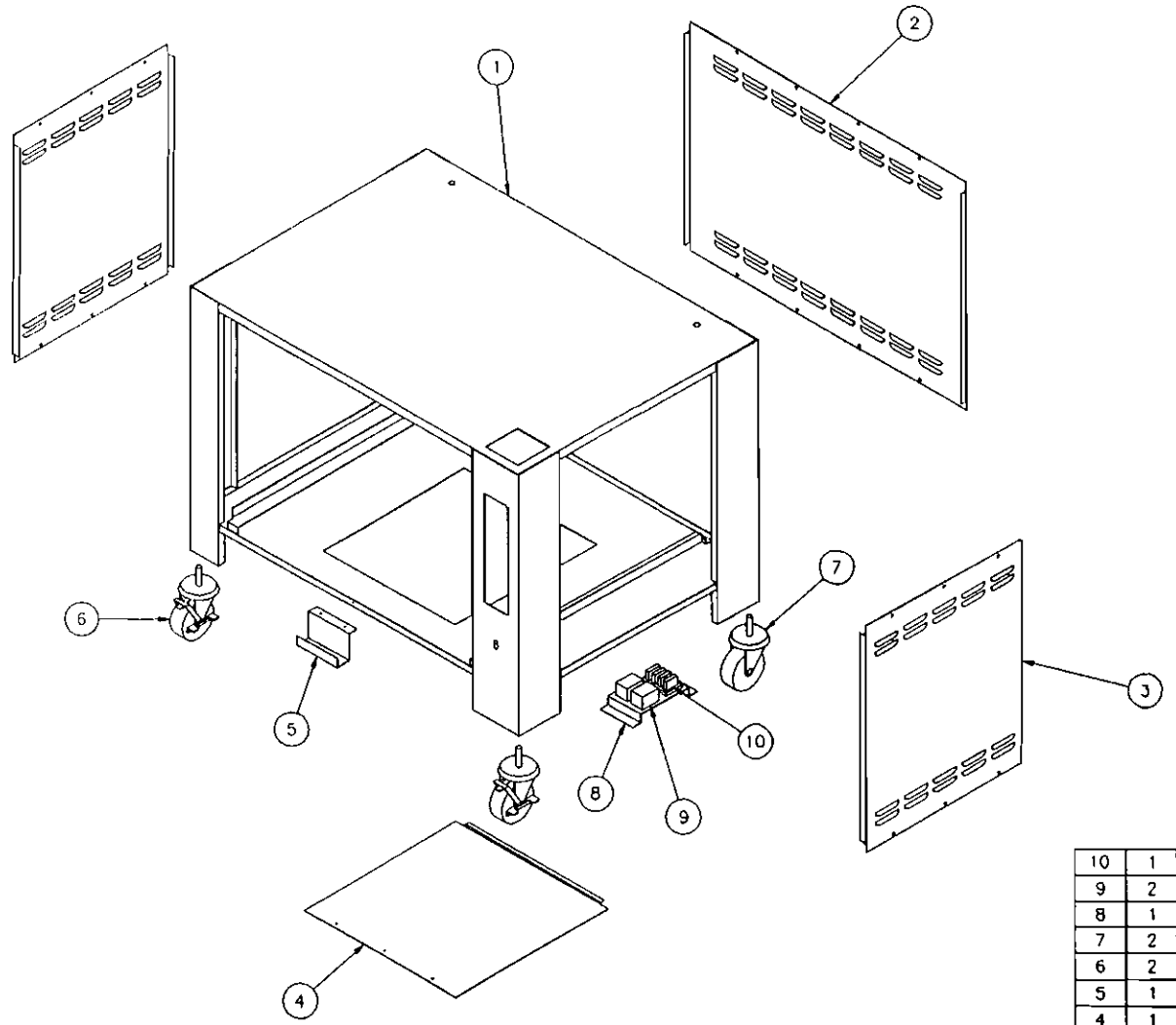

ITEM	QTY.	PART NO.	DESCRIPTION
10	1	108088	BLOCK TERMINAL 7-POLE
9	2	108067	RELAY, 30 AMP, 120V
8	1	108134	WELDMENT, ELECTRICAL MOUNT
7	2	80020	CASTER, 4"
6	2	80019	CASTER, 4", LOCKING
5	1	108114	BRACKET, DRAIN TUBE
4	1	108119	COVER, BASE PAN
3	2	108074	PANEL, SIDE
2	1	108075	PANEL, REAR
1	1		

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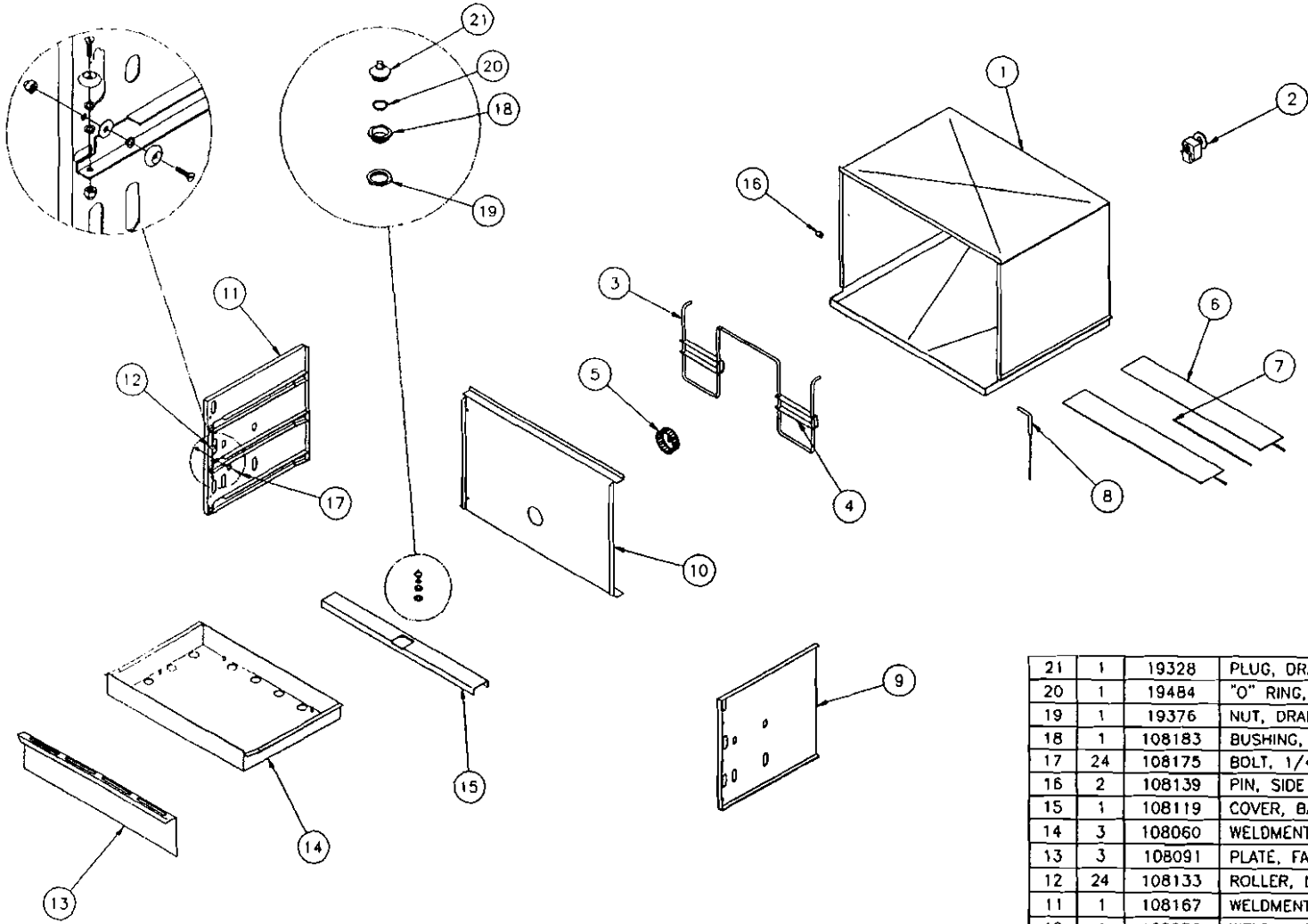
BOSTON MARKET WARMING OVEN

FRAME AND SHEETING

WARM2



ITEM	QTY.	PART NO.	DESCRIPTION
21	1	19328	PLUG, DRAIN
20	1	19484	"O" RING, DRAIN PLUG
19	1	19376	NUT, DRAIN BUSHING
18	1	108183	BUSHING, DRAIN
17	24	108175	BOLT, 1/4-20 X 1.00 C/S S/S
16	2	108139	PIN, SIDE LINER RETAINER
15	1	108119	COVER, BASE PAN
14	3	108060	WELDMENT, DRAWER
13	3	108091	PLATE, FACE, DRAWER
12	24	108133	ROLLER, LINER/ DRAWER
11	1	108167	WELDMENT, LINER, LEFT SIDE
10	1	108056	WELDMENT, LINER REAR
9	1	108168	WELDMENT, LINER, RIGHT SIDE
8	1	108068	THERMOCOUPLE, 1/8" DIA., "K" TYPE
7	1	108121	THERMOCOUPLE, #10 RING, "K" TYPE
6	2	108063	HEATER, SILICONE
5	1	108171	WHEEL, BLOWER
4	2	108062	BRACKET, ELEMENT
3	1	108059	ELEMENT, 1250W, 120V
2	1	108077	MOTOR, BLOWER, 120V
1	1	108057	WELDMENT, CAVITY

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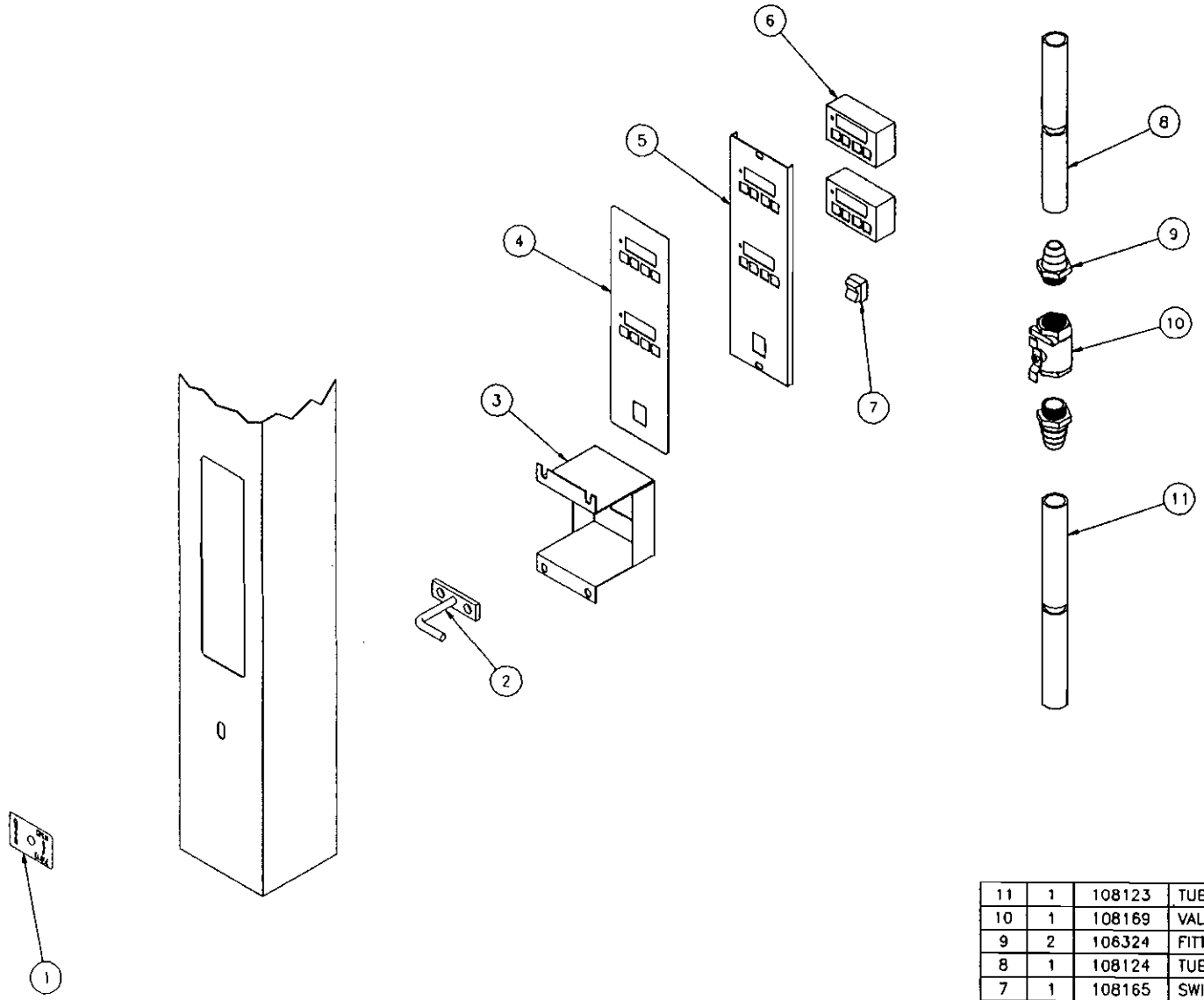
BOSTON MARKET WARMING OVEN

INTERIOR CAVITY AND COMPONENTS | WARM3



ITEM	QTY.	PART NO.	DESCRIPTION
11	1	108123	TUBE, DRAIN, LOWER
10	1	108169	VALVE, 1" BALL, FULL PORT
9	2	106324	FITTING, BRASS 1" PIPE – 1" HOSE
8	1	108124	TUBE, DRAIN, UPPER
7	1	108165	SWITCH, ROCKER, 20A SPAT
6	2	108066	CONTROL, TEMPERATURE
5	1	108150	PANEL, CONTROL, WELDMENT
4	1	108155	LABEL, CONTROL PANEL
3	1	108145	BRACKET, VALVE MOUNT
2	1	108157	HANDLE, VALVE, WELDMENT
1	1	108156	LABEL, VALVE HANDLE

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BOSTON MARKET WARMING OVEN

CONTROL PANEL AND COMPONENTS

WARM4

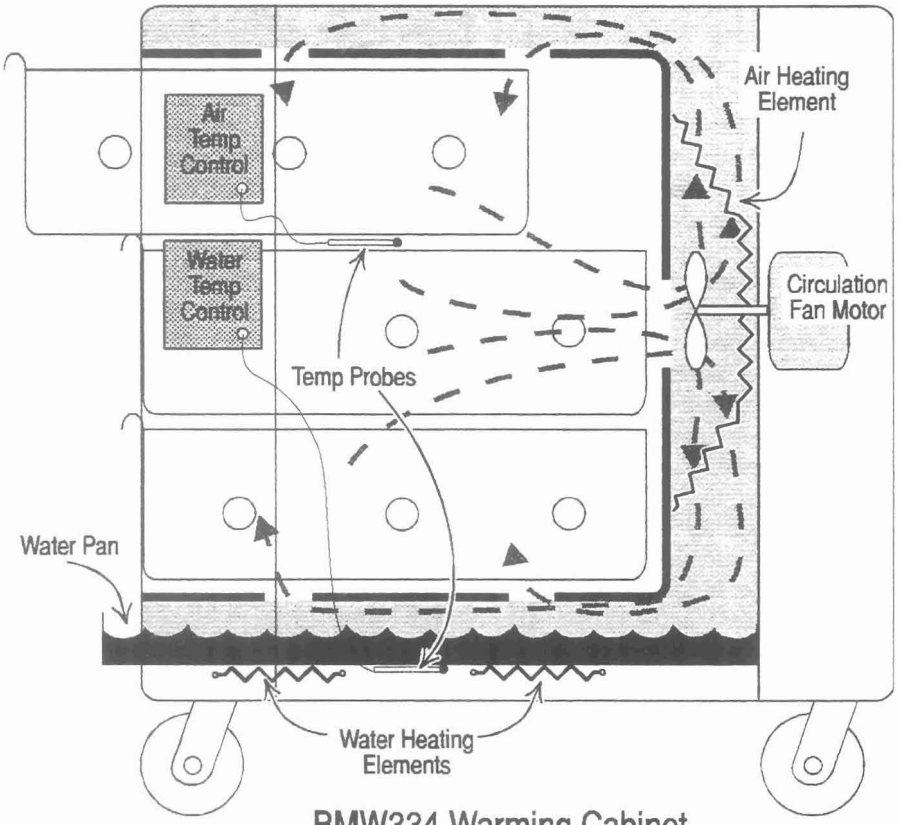
BMW334 Warming Cabinet
General Overview

The basic purpose of the BMW334 warming cabinet is to hold cooked meats in a temperature and humidity controlled environment until they are ready to be served. It is designed for use with the BMR32 rotisserie oven, which is installed on top of the warming cabinet.

Operating Procedure - The warming cabinet is operated simply by turning the power on at the front panel. The cabinet temperature is automatically maintained by two controllers. The water level must be monitored by the operator, and refilled when necessary. (NOTE: The drain valve near the bottom of the control panel has nothing to do with the warming cabinet. It is a feed-through drain connection to the BMR32 rotisserie oven.)

Basic Functions - The cabinet consists of three storage drawers, with large perforations, that are enveloped by a double-walled, insulated cavity. Moistened air is drawn through the drawers to the back of the warming cavity, where it is warmed and recirculated through the drawers.

Operating Elements - Beneath the drawers is a water heating pan. The water is heated by two 500 watt surface-contact heaters adhered to the bottom surface of the pan. Behind the drawers, in a sub-cavity, is an air warming and circulating system consisting of a small blower and a 1250 watt electric heating element.

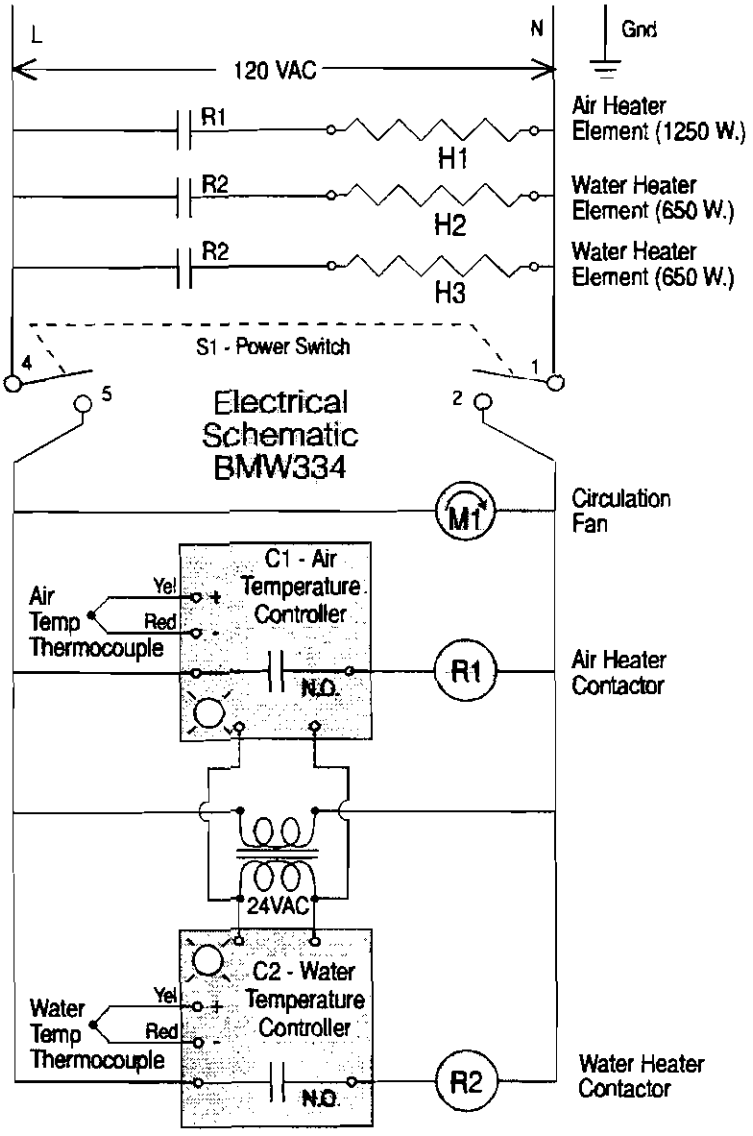


BMW334 Warming Cabinet

Temperature Controllers - The cabinet's environment is accurately controlled by two digital temperature controllers -- one controls air temperature, and the other controls water temperature. Two thermocouple probes sense the air and water temperatures.

The controllers are programmed at the factory to the desired air and water temperatures for the typical chicken product. Once these controllers have been programmed, no operator intervention is required. The controllers display the actual temperatures of the air and water. The setpoint temperatures can be displayed by pressing the TEMP buttons (see procedure on page 3).

Electrical Circuit Overview



The electrical circuitry of the BMW334 is very straightforward. Electrical power is input at 120 VAC. The unit draws 20 to 30 amps at full load.

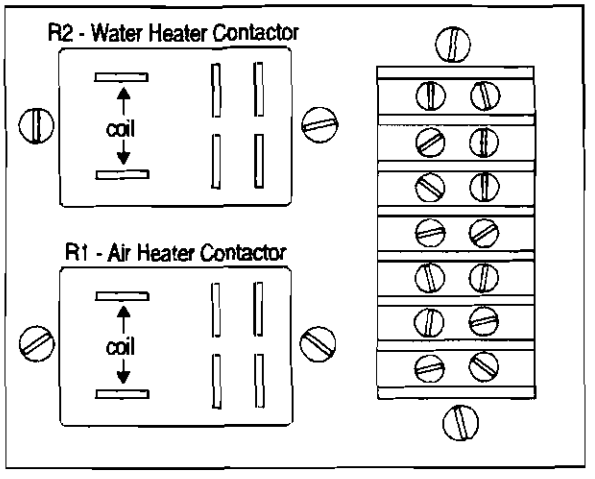
When the unit is plugged in, power appears across the contactor/heating elements (R1, R2, H1, H2, and H3), but the heaters don't come on until the temperature controllers energize the contactor coils.

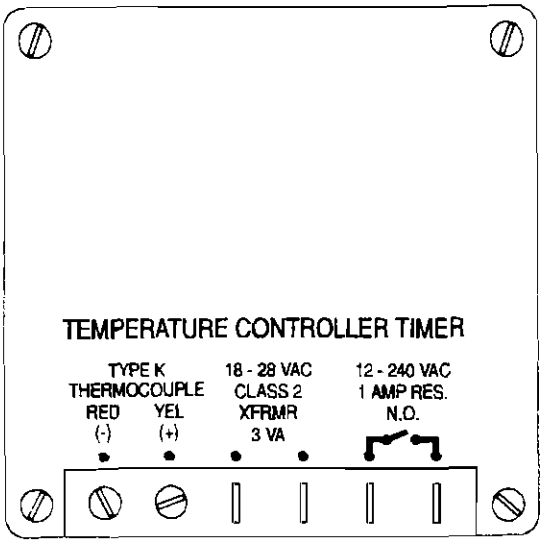
The main power switch is double-pole, switching both legs of the power input. When the switch is turned on, the circulation fan (M1) comes on and stays on. Through a 24VAC step-down transformer, power is also applied to both temperature controllers (C1 and C2), which first perform a start-up test, then begin controlling.

Each controller closes its Normally Open contact as long as the programmed temperature set point has not been reached. The small indicating light next to each front-panel display is lighted whenever the controller's heating contact is closed.

The controller's N.O. contacts energize contactors R1 and R2, which provide the heavier current-carrying capabilities needed by the resistive heating elements.

The Thermocouple probes that sense the air and water temperatures are type K. They must be connected in the proper polarity.





Temperature Controller

The BMW344 uses two identical digital temperature controllers to regulate air and water temperatures. Temperature is controlled by turning the heating elements on and off. There is an adjustable upper and lower deadband (hysteresis). The regulation ("setpoint") temperature can be set in one degree increments. Temperature display can be in either Fahrenheit or Centigrade, configurable from the front panel. The "Heat On" indicator will light whenever the Heater Output relay is energized.

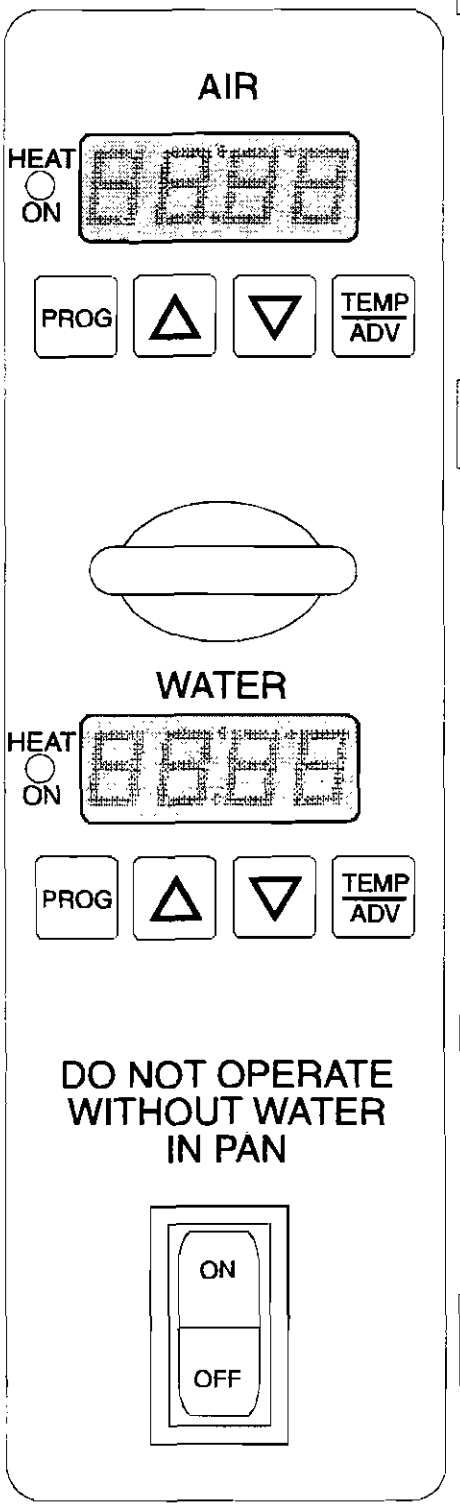
TEMPERATURE DISPLAY

During operation, the displays show the actual air and water temperatures. To view the setpoint temperature (the temperature being controlled to), press and hold the TEMP button. Release the TEMP button when done.

THE PROGRAM MODE

To make any changes to the controller's program, press and hold the PROG button for 2 seconds. This will cause the controller to leave the "run" mode and enter the "program" mode.

NOTE: When a controller is in the program mode, the heater output is forced open, and heating is inactive. When in the program mode, if the controller senses no operator activity after 2 seconds, the display will begin flashing. This is an indication that no heating is taking place and the operator must press the PROG button to resume normal operation.



CHANGING TEMPERATURE SCALES

Press and hold ***both*** the UP and DOWN buttons for more than 1/2 second to toggle between the F and C temperature scales. (The temperature scale can be changed in either the program mode or the run mode. All parameters will be converted automatically.)

CHANGING THE SETPOINT TEMPERATURE

The first display in the program mode shows alternately "SET" "PNT", followed by the setpoint temperature, in F or C. To change the setpoint, press the UP or DOWN arrow button – holding the arrow button down will cause an automatic repeat after one second. When done viewing or changing the setpoint, press the PROG button again to resume normal operation. The new setpoint temperature is stored in the controller, and it will begin to regulate to the new temperature.

To view or set other functions while in the program mode, press "TEMP/ADV" to scroll to another function. (On some controllers, the button is labelled only "TEMP").

SETTING THE DEADBAND (HYSTERESIS)

The temperature at which the Heater Output will turn on or off can be offset from the setpoint by up to plus or minus 20 deg. F (11 C). (Refer to the settings table on the next page.) This hysteresis is set at

the factory. Do not change this setting. If for some reason this setting has been changed, use the following procedure to return it to the factory setting:

- Press and hold the PROG button.
- Press the TEMP/ADV button until the words "dead" "band" "ON" appear, followed by a number. This is the number of degrees that the controller will ***add*** to the setpoint value before it turns on the heater output. (A minus number indicates that the heater will be turned on that many degrees ***below*** the setpoint.)
- Press the UP or DOWN button to change the ON hysteresis value.
- Next, press the TEMP/ADV button until "OFF" and another number appears. This is the turn-off hysteresis value.
- Again, use the UP or DOWN arrow button to change the value.
- Press the PROG button to return to the run mode of operation.

NOTE: Setting the turn-off hysteresis value lower than or equal to the turn-on value is not permitted. The controller will limit the turn-on value to one-half degree lower than the turn-off value.

ERROR MESSAGES

"PROB" - If the controller's thermocouple probe is open, the controller displays "Prob" and all controller functions will be turned off until the probe is replaced or reconnected.

"FAIL" - When the cabinet is first turned on, the controllers perform a self-test. If the test determines that the controller's memory has failed to store the necessary settings, the display will flash "FAIL" continuously and all functions will be disabled. The controller will assume the following settings: regulation temperature set to minimum, the offset value set to zero, the turn-off hysteresis set to zero, and the turn-on hysteresis will be set to one degree below the turn-off hysteresis value. If the controller fails the memory test and displays the "FAIL" message, turn off power momentarily and turn it back on. If repowering the unit corrects the memory problem, reprogram per the parameters below and let the unit operate. If not, service will be necessary.

FACTORY SETTINGS - TEMPERATURE CONTROLLERS

Air Temperature Controller	
Setpoint:	180 degrees F.
Turn-On Hysteresis:	0 degree F.
Turn-Off Hysteresis:	1 degree F.
Probe Calibration Offset:	0 degree F.
Water Temperature Controller	
Setpoint:	150 degrees F.
Turn-On Hysteresis:	0 degree F.
Turn-Off Hysteresis:	1 degree F.
Probe Calibration Offset:	0 degree F.

TROUBLESHOOTING PROCEDURES

WARNING: Injury or Death Hazard

Death, severe electrical shock or equipment damage can result from touching any component inside the unit when the unit is plugged into a live outlet. *When possible, unplug the unit before removing the access panel prior to troubleshooting. If it is necessary to troubleshoot with power applied, use extreme caution during testing with the access cover removed.*

Symptom	Probable Cause	Corrective Action
UNIT APPEARS "DEAD" WHEN POWER SWITCH TURNED ON	Unit not plugged in	Plug power cord into live outlet
	Branch circuit breaker tripped or fuse blown	Determine and correct cause of tripped breaker or blown fuse; reset breaker or replace fuse
	Power switch defective	Check switch; replace if defective
NO HEATING AT ALL, AIR OR WATER - BOTH CONTROLLERS APPEAR DEAD	Main power switch defective; or, wiring between power switch and both controllers faulty	Check that power is being properly switched; replace switch if defective; wiring from switch to both controllers may be bad; check wiring, repair.
	Both controllers faulty	Remove controllers, test on bench; replace if necessary
AIR AND/OR WATER NOT HEATING BUT HEAT LIGHT IS ON	**Discussion:** If the controller is calling for heat, but the air or water is not being heated, the heating power circuit is faulty. First check that the required contacts are closing; if they are OK, turn off power and check the heating elements and the wiring.	
	The Heater Output contact (N.O.) on the controller C1 (or C2) is failed open	If you can measure 120VAC across the contacts, they are open when they should be closed; replace controller
	The contact(s) of the heater contactor R1 (or R2) are failed open	If you can measure 120VAC across the contacts, they are open; replace the contactor
	The wiring between the controller and the heater contactor R1 (or R2) is open	Turn off and unplug warmer; check wiring continuity; reconnect or repair
	The R1 (or R2) coil is open	Turn off and unplug warmer; check continuity of coil; replace if needed
	The air (or water) heating element has failed	Turn off and unplug warmer; check continuity of the suspected element; replace if needed

TROUBLESHOOTING PROCEDURE (cont.)

Symptom	Probable Cause	Corrective Action
	HEATING ELEMENT RESISTANCE CHECK	Air Heater Resistance: 12 ohms Water Heater Resistance: 29 ohms (each)
CIRCULATION FAN DOES NOT WORK	Power not being delivered to fan	Check cabling between power switch and fan; repair or replace
	Fan is defective	Check fan and replace if necessary
FOOD TOO COOL	Setpoint set too low	Check the Setpoint temperature: press PROG and hold for 2 seconds; the display will show alternately "SET" and "PNT" followed by the Setpoint value. If value is incorrect, press UP arrow button until value is correct (complete programming details on pages 3 & 4)
. . . FOOD TOO WARM	Setpoint set too high	Check setpoint as above; adjust as needed
	Thermocouple probe faulty, indicates to controller that temperature lower than actual	Test probe; replace with known good one if needed
CONTROLLER DISPLAY SHOWS TEMPERATURE LOWER OR HIGHER THAN ACTUAL	The thermocouple output is out of calibration with the controller's temperture conversion circuit	The controller's temperature display can be "offset" by up to plus/minus 20 degrees, to better match the characteristics of the thermocouple; (complete programming details on pages 3 & 4)
CONTROLLER DISPLAY SHOWS "Prob" MESSAGE	The thermocouple probe has failed open	Test probe and replace if needed
CONTROLLER DISPLAY SHOWS "FAIL" MESSAGE	The controller's memory has failed the power-up test	Turn off power to the cabinet, pause, and turn power back on; if message clears, let unit run; if message returns, controller is faulty and must be replaced