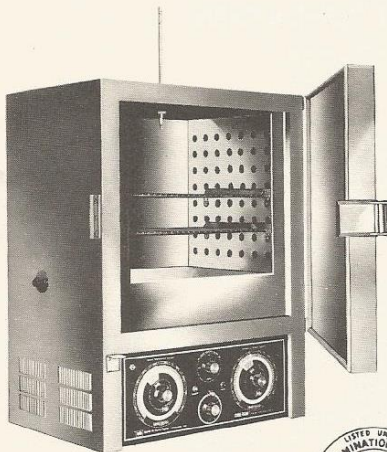


OPERATION and MAINTENANCE MANUAL



BLUE M
STABIL-THERM®

Mechanical Convection
Horizontal Air-Flow

ELECTRIC UTILITY OVENS

MODELS OV-472A-1, OV-475A-1
OV-490A-1, OV-500C-1
OV-510A-1, OV-520C-1



BLUE M *Electric Company*

CORPORATE HEADQUARTERS: BLUE ISLAND, ILLINOIS 60406

OPERATION AND MAINTENANCE

BLUE M

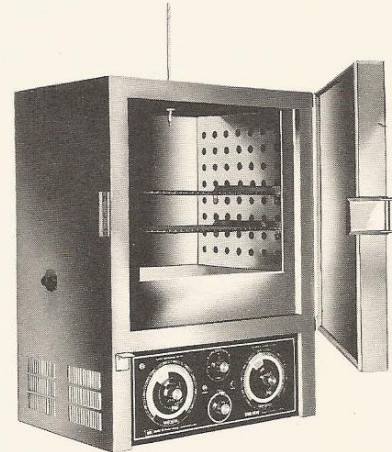
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I. INSTALLATION:

All standard Blue M Electric Company controlled temperature units are shipped electrically complete. Positioning unit and connecting proper electrical service is the only requirement to place in operation.

When installing unit, allow sufficient air space between unit walls and/or flammable materials. Consideration must also be given to existing overhead wiring or adjacent wiring. A large high temperature unit will raise the ambient temperature surrounding it.

Do not locate in an area subject to wide temperature fluctuations. Unit will function best if ambient temperature is maintained $\pm 7^{\circ}\text{F}$.

DO NOT CONNECT UNIT TO OVER-LOADED LINES. EXCESSIVE VOLTAGE DROP WILL ADVERSELY AFFECT OPERATION OF UNIT!

A. Ground unit as per local electrical code. **CAUTION:** Do not connect neutral side of 120 V. line to unit for grounding purposes.

Blue M units supplied with a line cord have a three wire cord. Unit is automatically grounded when plugged in.

B. UNITS WITH LINE CORD AND PLUG.

Plug unit into power source. (Voltage and frequency specified on data plate.) Line cord plug and receptacle are considered sufficient disconnect means if plug and receptacle are readily accessible to operator.

UNITS WITH OUTLET BOX.

Connect to power source of voltage and frequency specified on data plate. Branch circuit breaker is sufficient disconnect means if it is in sight of or readily accessible to operator. If above condition is not met, a fused disconnect switch must be installed in such a location as to meet the above requirements.

FUSE PROTECTION SHOULD NOT EXCEED 125% of unit rating.

C. INSTALLING NON-STANDARD UNITS.

All units not shipped complete, or utilizing non-cataloged accessories, are classified as non-standard. In these cases, connections will be indicated on wiring diagram and covered by special instructions.

II. GENERAL OPERATION:

A. MODELS: OV-472A-1 OV-475A-1

1. Turn on main switch.
2. Set temperature control to desired operating temperature. (See Section III E for calibration.)

B. MODELS: OV-490A-1 OV-500C-1 OV-510A-1 OV-520C-1

1. Set power selector switch to either LOW, MEDIUM or HIGH position. (See Section III D for proper setting.)
2. Set temperature control to desired operating temperature. (See Section III E for calibration.)

C. Blower motor is energized when power selector switch is turned on. It is equipped with built-in overload protection with an automatic reset. If temperature exceeds motor rating, overload protection automatically stops the motor.

NOTE: The motors used in these units are lubricated by the manufacturer. This lubrication is sufficient for 10 years normal operation.

D. VENTS

There are two vents on the oven. The intake vent is located on the left side and the exhaust on the right. Vents provide a means of exhausting heated air from oven and drawing fresh room air in thru intake port at left side of oven. This allows positive exhaust of volatile fumes and minimizes build up of an explosive mixture. The best position of the vents can only be determined by the "trial and error" method. This is due to varying workloads and ambient temperature variations.

NOTE: When operating near 40°C . the vents should be open.

III. FEATURES OF BLUE M CONTROL PANEL:

A. AUTOMATIC TRIGGER CONTROL.

This is a direct acting thermostat which acts on the principle of thermal sensitivity of certain fluids. The complete control consists of a sensing bulb, capillary tube, diaphragm, and a set of electrical contacts. As the temperature of the sensing bulb is raised, fluid in the system expands, forcing diaphragm outward. Motion of diaphragm is utilized to open or close a set of electrical contacts. Power supplied to heating element is controlled by these contacts.

B. MAIN PILOT LIGHT.

Red light indicates power is being supplied to control circuit.

C. HEATER PILOT LIGHT.

Amber light indicates heating elements are energized.

D. POWER SELECTOR SWITCH.

NOTE: On Models OV-472A-1 and OV-475A-1, the power selector switch is replaced by a main switch.

The power selector switch is used in conjunction with the main control to monitor power to heating elements. Using this switch, it is possible to supply maximum power to unit for initial run-up, and then reduce power when operating temperature is reached. Settings are LOW, MEDIUM and HIGH. LOW setting may be used for temperatures up to approximately 120°C. MEDIUM setting from 120°C. to 180°C. HIGH setting above 180°C.

NOTE: The above settings may be used as a guide, but they are only approximate as they depend on load condition and position of vents.

E. MEMORY RING DIAL AND DIAL LOCK.

Supplied on these ovens is Blue M's patented "Memory" Ring Dial system. This dial assembly allows a calibration at all temperatures within its range with pin-point accuracy and extreme ease. The inherent ability of this control system to relocate an exact pre-set temperature justifies the few minutes spent for calibration.

All dials are preset at the factory to a mid-range temperature at which point the "Memory" Ring is "zeroed". This calibration should suffice for at least 6 months to a year of normal use. When the control needs to be calibrated, proceed as follows:

STEP I — Using a separate means of indication (thermometer, recorder, etc.) operate the unit at a mid-scale temperature. Stabilize the unit at this temperature (approximately one-half hour). In this case we will use 150°C.

STEP II — If dial does not indicate 150°C. on its graduated scale, the knob must be slipped on its shaft. This can easily be done by loosening the Allen-head set screws found on the knob. Then, being careful not to turn the shaft, slip the dial and knob so it now reads 150°C. Tighten the Allen-head set screws and calibration is now complete.

There are graduated reference numbers on the pointer, extending in both directions from the zero mark, which are correction factors to compensate for non-linear controls. If the temperature indicator shows that a temperature less than the desired op-

erating temperature is reached, rotate the dial clockwise until desired temperature is reached and write the correction factor (1 to 5) on the white ring on the dial.

If the temperature indicator shows the temperature to be above desired operating temperature, rotate the dial counter-clockwise until desired temperature is reached and again write the correction factor (6 to 10) on the white ring on the dial.

Doing this for several different temperatures allows the operator to reproduce any temperature within the dial's range with extreme accuracy.

Dial pointer lock secures setting and prevents inadvertent changing by accidental bumping or unauthorized personnel.

F. OVERTEMPERATURE PROTECTION (Optional)

Provides protection for workload and prevents damage caused by excessively high temperatures. If, for any reason, the temperature should increase a few degrees above set point, the entire unit will shut down before any damage occurs.

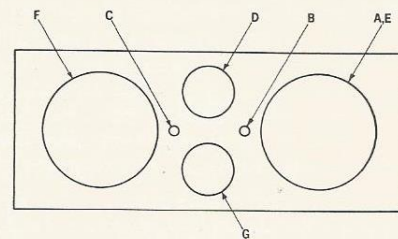
G. SPRING WOUND TIMERS (Optional)

Shuts unit down after a predetermined time. See page 4 for operation.

H. PROGRAM TIMERS (See Wiring Diagram)

Allows programming of "on time" and "off time" of unit. See instructions enclosed with timer for operation.

NOTE: Timer motor switch must be turned on in order to operate timer.



CONTROL PANEL FRONT VIEW

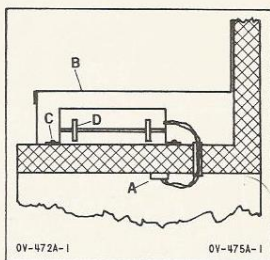
IV. MAINTENANCE AND SERVICING:

If the measured temperature is known to be in error or a set temperature cannot be maintained, check the following:

- A. Check line fuses.
- B. Check line voltage. Excessive voltage drop will adversely affect oven operation.
- C. Check all electrical connections for loose or broken wires.
- D. Inspect control sensing bulb for damage or deterioration. Capillary system may develop a pin hole leak which may not allow proper control action.
- E. Inspect door seal for leaks; door gasket should be replaced periodically. i.e., after 2 to 3 year's service.
- F. Inspect heating elements for continuity and deterioration. Remove inner chamber insert and inspect visually. If element needs replacing, refer to replacement parts list for part number.

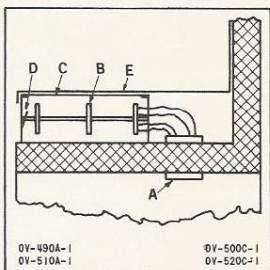
TO REPLACE ELEMENTS, PROCEED AS FOLLOWS:

MODELS: OV-472A-1
OV-475A-1



1. Disconnect element leads from terminal strip (A) inside control compartment. Access to control compartment can be had by removing bottom cover of unit.
2. Remove inner chamber (B) in order to expose element compartment.
3. Remove four screws (C) holding metal element cover in place.
4. Carefully lift element (D) out of unit.
5. Reverse procedure for installation of element.

MODELS: OV-490A-1
OV-500C-1
OV-510A-1
OV-520C-1



1. Disconnect element leads on bottom terminal and remove ceramic plate (A).
2. Remove inner chamber (E) to expose element chamber (C). Remove chamber cover to expose element (B).
3. Depress element support clip (D) and simultaneously lift element and pull leads through ceramic discs at rear of chamber.
4. Reverse procedure for installation of element.

V. CARE AND CLEANING OF STAINLESS STEEL EXTERIORS:

If unit exterior is stainless steel, keep its shining appearance by periodically cleaning as recommended. If this is done, the unit will keep its appearance for many years.

On outside surface only, use a damp cloth wrung out in a hot mild soapy solution. Take a clean cloth and dip in clear hot water. Wring out practically dry and wipe off soapy solution. Dry with a clean cloth.

Once a month, where practical, scour outside surfaces only. Use a high quality scouring compound that will not mar the surface. Tartaric acid may also be used as a cleanser. For stubborn dirt, spots or blemishes, use a stainless steel wool. **DO NOT USE ORDINARY STEEL WOOL** as it will scratch the surface.

Grease or oils can be removed by cleaning with vapor degreaser or other solvents such as benzene, etc.

VI. THERMOMETERS:

Mercury column may become separated during shipment or use. To re-unite, please proceed as follows:

1. Gently heat the thermometer bulb until all particles of mercury reach expansion chamber.
2. Tap gently until all mercury is united. Cool in a vertical position.

OPERATING INSTRUCTIONS FOR OVERTEMPERATURE PROTECTION UNITS

Models: OTP-1031 (120V)
OTP-1041 (240V)

1. Turn safety control (24) completely to the right (clockwise). This closes contacts of safety control and completes circuit from L₁ to relay coil C₁. (REFER TO WIRING DIAGRAMS.)
2. Press reset switch (25) to close circuit from L₂ to C₁. Relay (26) will close and remain closed when reset switch is released. Circuit to oven is now complete and oven may be operated in the normal manner.
3. After oven has stabilized at the desired set temperature, turn OTP dial counter-clockwise until safety relay trips and oven shuts off. Safety control is now set at the exact same temperature at the main control.
4. Turn safety control dial clockwise a few degrees.
5. Press reset switch. Circuit to oven is now complete and oven may be operated in the normal manner.

If the temperature of the oven ever exceeds the set point, relay (26) will open and shut off unit.

Main power line failure will also cause the relay to open. If this happens it is necessary to manually reset the OTP by pressing the reset switch.

Test safety control periodically by deliberately raising main control setting and noting if safety circuit trips at required temperature.

OPERATION OF SPRING WOUND SHUT-OFF TIMER

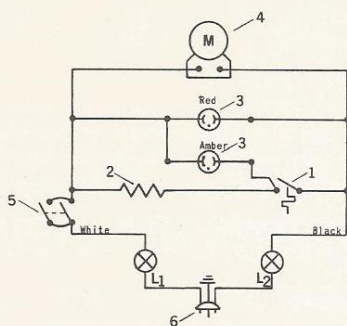
I. ELECTRICAL CONNECTION

Timer is connected in series with the black power line. (See wiring diagram.)

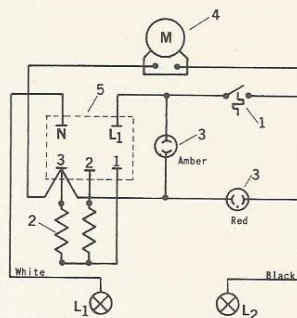
II. OPERATION

- A. To place unit into operation, turn on unit in normal manner and set temperature control to desired temperature. Turn timer knob past the 1 hour graduation. Then set timer to desired timing period. At end of timing cycle, the unit will automatically shut down.
- B. If continuous operation is desired, turn timer knob to any position past #1 graduation. Lock pointer in place by tightening the dial lock against the timer dial. This prevents timer from rotating and will allow continuous operation of the unit.

WIRING DIAGRAMS



MODELS: OV-472A-1, OV-475A-1



MODELS: OV-490A-1, OV-500C-1
OV-510A-1, OV-520C-1

CATALOG SPECIFICATIONS

MODEL NUMBER	INSIDE DIMENSIONS (INCHES)			MAXIMUM WATTS	VOLTAGE 50/60 CYCLE SINGLE PHASE	TEMPERATURE RANGE
	W	D	H			
OV-472A-1 OV-475A-1	13	12	12	1000	120 V.	+38°C. to +260°C.
OV-490A-1 OV-500C-1 OV-510A-1 OV-520C-1	19	15	18	1600	120 V. 240 V. 120 V. 240 V.	(+100°F. to +500°F.)

REPLACEMENT PARTS LIST

ITEM NUMBER	DESCRIPTION	PART NUMBER	NUMBER REQUIRED	PRICE EACH
1	Automatic Trigger Control	CB-1001	1	\$17.95
2	Heating Element Complete			
	OV-472A-1, OV-475A-1 (120 V.)	A-121-559	1	25.00
	OV-490A-1, OV-510A-1 (120 V.)	A8E27A	1	28.75
	OV-500C-1, OV-520C-1 (240 V.)	A8E28A	1	30.00
3	Pilot Light (Specify Color)	P-4028	2	2.25
4	Blower Motor 120 V.	M-5204	1	29.50
	240 V.	M-5205	1	29.50
5	Main Switch OV-472A-1, OV-475A-1	S-3016	1	4.50
	Power Selector Switch OV-490A-1, OV-510A-1	S-3013	1	5.75
	OV-500C-1, OV-520C-1	LC-108	1	3.50
6	Line Cord (OV-472A-1, OV-475A-1 Only)	LC-108	1	3.50
*7	Blower Wheel OV-472A-1, OV-475A-1	BW-124	1	5.00
	OV-490A-1, OV-510A-1			
	OV-500C-1, OV-520C-1			
*8	Blower Shaft OV-472A-1, OV-475A-1	BW-133	1	8.50
	OV-490A-1, OV-510A-1	BS-149	1	10.50
	OV-500C-1, OV-520C-1			
*9	Shelves			
	OV-472A-1, OV-475A-1 Steel Rod, Nickel-Plated	SH-1075	As Req'd	10.50
	OV-490A-1, OV-510A-1, OV-500C-1, OV-520C-1	SH-1075S	As Req'd	13.00
	Steel Rod, Nickel Plated			
	OV-490A-1, OV-510A-1, OV-500C-1, OV-520C-1	SH-1001	As Req'd	13.00
	Stainless Steel Rod	SH-1001S	As Req'd	21.00
*10	Thermometer 0°C. to +260°C.	T-512	1	5.50
*11	Door Gasket OV-472A-1, OV-475A-1	G-1080	1	4.55
	OV-490A-1, OV-510A-1			
	OV-500C-1, OV-520C-1			
*12	Exhaust and Intake Covers	G-1108	1	5.85
*13	Door Latch (Enameled)	ES-104	2	3.00
	(Chrome-Plated)	L-125	1	12.50
		L-125CH	1	15.00

*Parts Not Shown

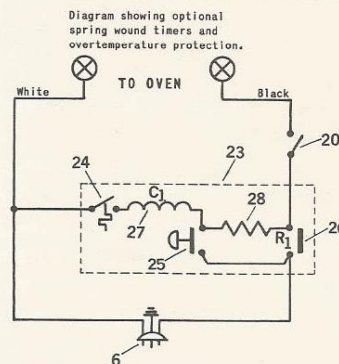
OPTIONAL ACCESSORIES

20	6 Hr. Spring Wound Timer	SB-3023	1	\$12.00
	12 Hr. Spring Wound Timer	SB-3029	1	12.00
21	24 Hr. Program Timer (120 V.)	S-3052	1	13.95
	24 Hr. Program Timer (240 V.)	S-3049	1	14.95
	7 Day Program Timer (120 V.)	S-3118	1	33.50
	7 Day Program Timer (240 V.)	S-3119	1	34.50
22	Timer Motor Switch	S1-3016	1	4.50
23	Overtemperature Protection (120 V.)	OTF-1031	1	59.00
	Overtemperature Protection (240 V.)	OTF-1041	1	59.00
24	Safety Switch	CB-1001	1	17.95
25	Reset Switch	S-3259	1	3.00
26	Relay	RA-2000	1	8.50
27	Relay Coil	Supplied With Relay		
28	Dropping Resistor (120 V.)	R10-100	1	2.00
	Dropping Resistor (240 V.)	R10-5000	1	2.00
29	Line Cord OV-490A-1, OV-510A-1	LC-109	1	7.50
	OV-500C-1, OV-520C-1			

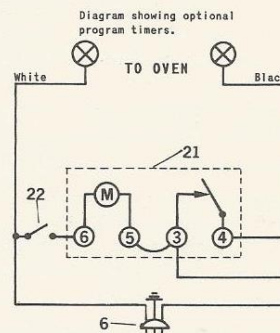
NOTE: Items 24 thru 28 are replacement parts for item No. 23.

All Prices Shown Are For Replacement Only.

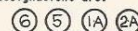
PRICES SUBJECT TO CHANGE WITHOUT NOTICE. PARTS SHIPPED F.O.B. BLUE ISLAND, ILL. WHEN ORDERING PARTS GIVE MODEL No., SERIAL No., VOLTAGE AND PART No.



NOTE: In event oven is equipped with both program timer and overtemperature protection, the timer would be connected directly to the unit and the overtemperature protection to the incoming line.



NOTE: 7 Day Program Timer terminal designations are:



FACTORY WARRANTY/GUARANTEE

GRAVITY CONVECTION TYPE UNITS

DESCRIPTION OF COMPONENT	TYPE AND TIME OF WARRANTY/GUARANTEE (time from date of shipment)		
	60 Days	1 Year	Over 1 Year
	Heating element; MODELLA or ETERNA - - - - -	B	*C
Indicators; pyrometers, thermometers - - - - -	B	C	A
Thermocouple - - - - -	B	A	A
Timers - - - - -	B	C	A
Automatic Temperature Control - - - - -	B	C	A
Switches - - - - -	B	C	A
Transformers - - - - -	B	C	A
Relays/contactors - - - - -	B	A	A
Miscellaneous electrical wiring parts; pilot lights, resistors, terminal strips, etc. - - - - -	B	C	A
Blower motor - - - - -	D	D	A
Unit proper; cabinet, etc. - - - - -	C	C	A

*MODELLA or ETERNA heating elements have a 2 year time period instead of 1 year.

A—Part not Guaranteed or Guarantee has expired.

B—New replacement part shipped immediately. Customer will be invoiced for part. Full credit issued upon receipt and inspection of defective part. All parts subject to our inspection for abuse, etc. Warranty void should our inspection indicate abuse, misuse, over-heating, etc. Factory absorbs freight both ways with shipments made in regular manner. Air shipment charges will be made collect.

C—Defective part returned to our factory, transportation prepaid. If found defective, we will repair or replace at no charge. Repaired or replaced part(s) returned collect in accordance with customers instructions or method, which in our judgment, will be best. Warranty void should our inspection indicate abuse, misuse, over-heating, etc.

D—This item covered by separate manufacturer's warranty. Contact Blue M Electric Company for name and location of nearest service representative in your area.

Note 1. Guarantees do not apply to non-standard accessory items ordered with unit.

Note 2. Guarantees do not apply when our standard parts are substituted with parts from other suppliers with whom Blue M Electric does not have a working service agreement.

Note 3. Collect shipments are not accepted at factory without written or verbal permission from authorized personnel. If done so, we reserve the right to invoice for these collect charges.

Note 4. This warranty or guarantee is not transferable.

Note 5. To allow for installation of units all time limits are subject to a 30 day maximum extension period.

Note 6. Claims for damages or shortages must be made within 10 days after receipt of unit.

Note 7. Blue M Electric Company assumes no responsibility when alterations are made without consent.

For spare parts and service, contact your local Laboratory Equipment Distributor, or any of the following Blue M Sales and Service Centers:

ARIZONA — SCOTTSDALE
44 East Indian School Road 85251
(602) 947-7026

CALIFORNIA — SAN MATEO
327 N. San Mateo Drive 94010
(415) 342-3983

MASSACHUSETTS — NATICK
15 Strathmore Road 01760
(617) 235-8320

PENNSYLVANIA — ARDMORE
219 East Lancaster Avenue 19003
(215) MI 9-1448

CALIFORNIA — EL MONTE
9650 Telstar Avenue 91731
(213) 442-6672

ILLINOIS — BLUE ISLAND
138th and Chatham Street 60406
(312) 385-9000

NEW YORK — NEW ROCHELLE
271 North Avenue 10801
(914) NE 2-1465

WASHINGTON — SEATTLE
1836 Westlake Avenue North 98109
(206) AT 2-0606



BLUE M *Electric Company*

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Phones: (312) INterocan 8-7755 - 7756 FUlton 5-9000 TWX: 910-689-3398

MANUFACTURERS AND ORIGINAL DESIGNERS OF CONSTANT TEMPERATURE CONTROLLED EQUIPMENT.

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