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**Loss on Heating Oven
BM200**

Impact Test Equipment Ltd

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User Guide
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OPERATING INSTRUCTIONS

LOSS -ON-HEATING / THIN FILM OVEN

This dual purpose oven is designed to determine the loss in weight of bitumen and flux oils (loss on heating test) and the effect of heat and air on asphaltic materials (thin film test). The unit is heavily insulated and has a double glass door for viewing the test chamber thermometer and samples. Temperature is controlled at $163^{\circ}\text{C} \pm 1^{\circ}\text{C}$ by means of a variable temperature controller and thermostat. Two rotating platforms are supplied with each oven: one accepts nine standard penetration cups for the loss on heating test, the other accepts two 140mm diameter test pans for the thin film test. The platforms are rotated at 5 to 6 rpm by an external motor.

1 MAINS SUPPLY

Check the voltage shown on the serial plate adjacent to the cable entry. Connect the BROWN wire of the mains lead to the 'L' live pin, the BLUE wire to the 'N' neutral pin and the GREEN-YELLOW wire to the 'E' earth pin.

- 1.1 **240 volt units.** Each unit comes supplied with a mains connection lead already fitted with a correctly rated fuse. The fuse rating and other details for each unit are shown on the voltage plate riveted to the back of the unit. It is important that, if the fuse needs to be replaced, it must **ONLY** be replaced with one of the correct rating.
- 1.2 **110 volt units** are supplied with a cable but without a plug or fuse. These units should be wired in by a suitably qualified electrician to the following:-

BROWN	'L' Live pin	Refer to voltage plate
BLUE	'N' Neutral pin	for fuse requirement
GREEN/YELLOW	'E' Earth pin	

WARNING

DO NOT CONNECT THE OVEN TO A D.C. MAINS SUPPLY OR SERIOUS DAMAGE WILL OCCUR

THE FOLLOWING PRECAUTIONS SHOULD BE OBSERVED

- 1.3 Mop up any spilled liquid from the chamber floor or damage to the element may result.
- 1.4 Position away from direct sunlight or radiant heat sources.
- 1.5 Sample trays should not be placed on the floor of the unit.

2. OPERATION

- 2.1 Position the required table to the motor shaft inside the chamber and secure using the 3/16" Allen key provided.
- 2.2 Attach the correct thermometer (see ASTM specification for loss on heat test) to the clip on the table shaft, so that the bulb is 0.25" above the shelf.
- 2.3 Switch on the mains switch situated on the control panel.
- 2.4 Switch on the motor via the switch on the control panel.
- 2.5 The oven is pre-set to 163°C. The overheat thermostat has been set 5°C above the main digital controller set point.
- 2.6 DIGITAL CONTROLLER CAL 3200. The operational parameters of the controller have been factory set to control the heating performance requirements as per ASTM 1754. To check and to change the set point press the * button to display the current set point. Press and hold in the * button and use the up / down buttons to change the value to the required set point.

3. PREVENTATIVE MAINTENANCE

Ensure that the unit is maintained in a clean, dry condition and when not in use stored in a normal warm atmosphere.

Minimum recommendation, every six months:-

- 3.1 Check operation of the overheat protection by:

Allow the temperature to stabilise. Once the desired temperature has been reached and stabilised with the CONTROL thermostat, adjust the OVERHEAT dial (RED CENTRE CAP).

Turn ANTICLOCKWISE UNTIL THE RED LAMP JUST COMES ON. Now slowly turn the spindle clockwise until the red lamp just extinguishes. Increase the digital control set point to a temperature 5-10 degrees higher than the overheat setting. Within a few minutes the red overheat lamp will come on indicating that the system is working correctly. After this check, reset the digital control to 163°C.

- 3.2 Carry out an electrical safety check (Portable Appliances) using an appropriate appliance tester operated by a competent person.
- 3.3 Check that the control temperature is maintained within limits.
- 3.4 Check the condition of the mains lead and the fuse rating is correct. Refer to serial plate on the back of the oven.

The manufacturer can offer the above service on request.

4. MAINTENANCE

- 4.1 BEFORE STARTING WORK, DISCONNECT THE UNIT FROM THE MAINS SUPPLY.
- 4.2 To check or replace any electrical components remove the end panel from the left hand side of the unit.

Refer to Service Instructions to replace any parts.

SERVICE & MAINTENANCE INSTRUCTIONS

LOSS ON HEAT/THIN FILM OVEN

SERVICE/MAINTENANCE INSTRUCTIONS

LOSS-ON-HEATING / THIN FILM OVEN

1. REPLACING THE DIGITAL CONTROL UNIT

- 1.1 DISCONNECT FROM THE MAINS SUPPLY BEFORE STARTING WORK.
- 1.2 Remove the side panel at the left hand side of the unit.
- 1.3 Carefully remove the terminal block on the controller, taking note of the positioning of the wires. This is done by pulling back the small green locking tab and lifting the terminal block off its pins.
- 1.4 Remove the plastic clip holding the controller in position.
- 1.5 Withdraw the controller.
- 1.6 Fit the new controller and re-assemble in the reverse order.
- 1.7 Check all wiring before refitting the side panel.

2. REPLACING THE OVERHEAT THERMOSTAT

- 2.1 Follow 1.1 and 1.2. From inside the chamber, locate the thermostat bulb on the left hand side of the chamber and remove the retaining clip. Take note of the wires to the thermostat head and remove the wires.
- 2.2 Remove the dial knob by first prising out the centre cap which will reveal the locknut. Hold the knob tightly and slacken the locknut. Gently tap the knob and remove it from the spindle. Remove the two retaining screws on the front panel and withdraw the thermostat assembly. Fit the new unit in the reverse order. Position the knob so that the arrow is approximately at 30 degrees. Temporarily tighten the lock nut and follow recalibration instructions.

3. RECALIBRATION

- 3.1 Insert a suitable thermometer or thermocouple via the top vent or attached to the motor shaft.
- 3.2 Set the digital control to 163°C and ensure that the overheat dial is set to maximum.
- 3.3 Allow the temperature to stabilise.
- 3.4 Slowly turn the overheat dial down until the red light illuminates. Increase the dial setting upscale until the light just extinguishes. Ensure that pointer on the dial lines up with the set point (approximately 165°C). This can be achieved by firstly gripping the knob tightly and slackening the lock nut. Ensure that the knob is loose on the spindle (may require a gentle tap to free it). Align the pointer to 165°C and tighten the lock nut. Refit the centre cap.

4. REPLACING THE ELEMENTS

- 4.1 Follow procedures 1.1 and 1.2
- 4.2 Disconnect the element wires and earth straps.
- 4.3 Remove the internal guard from the base of the chamber.
- 4.4 Unscrew the clips holding the element(s) to the base of the liner
- 4.5 Replace the faulty element(s) with the new part.
- 4.6 Reassemble in the reverse order.

5. REPLACING THE MOTOR – DISCONNECT FROM THE MAINS SUPPLY BEFORE STARTING WORK

- 5.1 Remove the table and table-connecting shaft from the motor.
- 5.2 Remove the cowl from around the motor.
- 5.3 Disconnect the wires from the motor.
- 5.4 Remove the 4 retaining nuts holding the motor in place.
- 5.5 Fit the replacement motor, ensuring that the shaft is central in the top vent. Reconnect wires and refit the cowl.

6 FAULT FINDING

- 6.1 NO HEAT:
All indicator lamps off
Green lamp ON, amber & red OFF
Green lamp ON, red ON amber OFF
Check fuse. Check mains switch
Check element continuity
Check setting/operation of
overheat thermostat
- 6.2 HEAT ON CONTINUOUSLY:
Amber lamp ON or cycling
between amber and red
Check triac by measuring between red/grey
terminals with resistance meter. If shorted,
replace the triac.
- 6.3 OVEN WILL NOT MAINTAIN TEMPERATURE:
Temperature varies
Erratic display on controller.
Overheat thermostat incorrectly set. Refer to
service instructions.
Faulty sensor / controller.

To avoid the danger of an electrical shock, after completion of any maintenance work and before switching the unit back on, check carefully that any wiring which may have been disturbed either accidentally or deliberately is correctly connected.

7. PREVENTATIVE MAINTENANCE

Ensure that the unit is maintained in a clean, dry condition and when not in use, stored in a normal warm atmosphere.

Minimum recommendation every six months:-

7.1 Check operation of the overheat protection by:

Allow the temperature to stabilise.

Once the desired temperature has been reached and stabilised with the CONTROL thermostat, adjust the OVERHEAT dial (red centre cap).

Turn ANTICLOCKWISE until the RED lamp just comes ON.

Now slowly turn the spindle CLOCKWISE until red lamp just extinguishes. Turn control dial to a temperature higher than the overheat setting. Within a few minutes, the red overheat lamp will come on indicating that the system is working correctly.

7.2 Carry out electrical safety check (Portable Appliances) using an appropriate tester operated by a competent person.

7.3 Check that the control temperature is maintained within limits.

The manufacture can offer the above service on request.

8. GENERAL

Take normal precautions not to allow water to come into contact with electrical components. The outer surfaces can be cleaned with a warm, damp, soapy cloth or any proprietary cleaner suitable for a painted surface (do not use solvents or harsh abrasives). The work chamber may also be cleaned as above.

REPLACEMENT PARTS LIST

LOSS -ON-HEATING / THIN FILM OVEN

WHEN ORDERING REPLACEMENT PARTS, PLEASE QUOTE MODEL AND SERIAL NUMBER OF UNIT. REFER TO SERIAL PLATE NEXT TO MAINS LEAD.

TEMPERATURE CONTROL SYSTEM:

B4501Single thermocouple type 'K'
T5602Digital controller
T5603Transformer
T5604Solid state relay 25 amp
W2308Overheat thermostat
0165/OHOverheat thermostat knob & dial lock set

DOOR ASSEMBLY:

E2602Hinge
H3303Door handle
SealDoor seal

SUNDRY ITEMS

S2517240V Element (2 per unit)
S2517A110V Element (2 per unit)
D1009Triac
D1011Green indicator lamp
D1012Amber indicator lamp
D1013Red indicator lamp
M0201240V Fan motor
M0202110V Fan motor
R10114Hi-Lo switch
R10127Mains on-off switch

CONTROL PANEL

