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Instruction Manual for the Rolling Thin Film Oven

Notice

Users of this equipment must comply with operating procedures and training of operation personnel as required by the Occupational Safety and Health Act (OSHA) of 1970, Section 6 and relevant safety standards, as well as other safety rules and regulations of state and local governments. Refer to the relevant safety standards in OSHA and National Fire Protection Association (NFPA), section 86 of 1990.

Caution

Setup and maintenance of the equipment should be performed by qualified personnel who are experienced in handling all facets of this type of system. Improper setup and operation of this equipment could cause an explosion that may result in equipment damage, personal injury or possible death.

Dear Customer,

Thank you for choosing Despatch Industries. We appreciate the opportunity to work with you and to meet your heat processing needs. We believe that you have selected the finest equipment available in the heat processing industry.

At Despatch, our service does not end after the purchase and delivery of our equipment. For this reason we have created the Service Products Division within Despatch. The Service Products Division features our Response Center for customer service. The Response Center will direct and track your service call to ensure satisfaction.

Whenever you need service or replacement parts, contact the Response Center at 1-800-473-7373: FAX 612-781-5353.

Thank you for choosing Despatch.

Sincerely,

Despatch Industries

Table of Contents

PREFACE	i
Table of Contents	ii
List of Illustrations	iv
List of Tables	iv
INTRODUCTION	1
Special Features	1
Specifications	2
Dimensions	2
Power	2
Temperature	3
Capacities	3
THEORY OF OPERATION	5
TEMPERATURE Instrument	6
HI-LIMIT Instrument	7
INSTRUCTIONS	9
Unpacking and Inspection	9
Rejoining Fluid in the Thermometer	11
Set-up	13
Oven HI-LIMIT Instrument	13
Resetting the HI-LIMIT Instrument	14
Operating	14
Loading the Oven	14
Pre-Startup Checklist	15
Startup/Operation	16
Shut-down	17
Maintenance	18
Checklist	18
Tests	19
Gearmotor	19
Moisture Indicator	19
Replacement	20
Parts	20
TEMPERATURE Instrument	20
HI-LIMIT Instrument	22
Fan Motor	23
Heater Unit	24
Gearmotor	25
APPENDIX	27
Special Instructions	27
Parameter Programming	28
Parameter Program Mode Outline	29

Table of Contents (Cont.)

Calibration	30
TEMPERATURE Instrument	30
HI-LIMIT Instrument	31
Temperature Scale Conversion (°C/°F)	32
Troubleshooting	33
Warranty	35
Despatch Classic™ Service Warranty Program	35
Immediate Service Response	35
Field Service Network	35
Best Service Protection in the Industry!	36
Classic™ Series Warranty	37
Parts and Material	37
Labor and Expenses	37
Exclusions/Limitations of Liability	37
Emergency Service	38
Non-Compliance	38
Despatch Customer Service	39
Procedures and Customer Responsibilities	39
Attachment A - Sustained Service Support	40

PREFACE

This manual is your guide to the Despatch oven. It is organized to give you the information you need quickly and easily.

The INTRODUCTION section provides an overview of the Despatch oven.

The THEORY OF OPERATION section details the function and operation of assemblies and subassemblies on the Despatch oven.

The INSTRUCTIONS section provides directions on un-packing, installing, operating and maintaining the Despatch oven.

The APPENDIX section contains Special Instructions for operating the control instrument, a Troubleshooting Table, a list of Accessories and a Warranty.

An efficient way to learn about the oven would be to read the manual while working with the corresponding oven control system. This will give you practical hands-on experience with information in the manual and the oven.

While reading this manual, if a term or section of information is not fully understood, look up that item in the appropriate section to familiarize yourself with that item. Then go back and reread that section again. Information skipped, not understood or misunderstood could create the possibility of operating the equipment in an unsafe manner. This can cause damage to the oven or personnel or reduce the efficiency of the equipment.

NOTE:

Read the entire INTRODUCTION and THEORY OF OPERATION before installing the oven.

WARNING:

Failure to heed warnings in this instruction manual and on the oven could result in personal injury, property damage or death.

List of Illustrations

Figure 1 illustrates the forced circulating airflow in the Despatch RTF oven.	5
Figure 2 illustrates the TEMPERATURE instrument.	6
Figure 3 illustrates the HI-LIMIT instrument on the Despatch RTF Oven.	7
Figure 4 illustrates a simple air bubble.	11
Figure 5 illustrates fluid in the upper end of the chamber and up into the capillary.	11
Figure 6 illustrates fluid in the lower end of the chamber and an air bubble below the chamber.	12
Figure 7 illustrates the control panel on the Despatch RTF Oven.	16
Figure 8 illustrates the connections to the TEMPERATURE instrument.	20
Figure 9 illustrates the connections to the HI-LIMIT instrument.	22
Figure 10 illustrates the TEMPERATURE instrument.	28
Figure 11 illustrates the Classic™ 4 Plus 1 Service Program	36

List of Tables

Table 1 Dimensions	2
Table 2 Power Requirements	2
Table 3 Temperature Specifications	3
Table 4 Capacities	3
Table 5 TEMPERATURE Instrument Features	6
Table 6 Open List	29
Table 7 Protected List	29
Table 8 Temperature Conversion	30
Table 9 Configuration Code Table	32
Table 10 Temperature Conversion Parameters	32

INTRODUCTION

This section provides an overview of the Despatch Rolling Thin Film Oven. This oven is specifically designed for the rolling thin film oven test in accordance with ASTM D2872-88.

Special Features

The sturdy construction of the Despatch Rolling Thin Film (RTF) Oven contributes to long term reliability and performance. Other special features include:

- Digital TEMPERATURE instrument to control chamber temperature fluctuations.
- HI-LIMIT instrument with manual reset to protect the workload as well as the oven itself.
- Welded double wall construction to reduce heat loss. Silicone rubber gaskets further minimize heat leakage.
- Rapid response heater with a five year warranty.
- Scratch-resistant Silver-Clay baked enamel exterior and stainless steel interior.
- One set of 8 glass containers.
- Leveling legs to assure the glass containers are level.
- Easily removed interior baffles and carriage wheel to make cleaning easier.
- Large observation window in the door for easy inspection.

Specifications

Dimensions

Table 1 Dimensions

Model	Chamber Size* in (cm)			Capacity	Overall Size* in (cm)		
	W	D	H		W	D	H
RTF Oven	16 (41)	17½ (44)	13½ (34)	8 bottles	38½ (98)	28 (71)	37 (94)

* Approximate

Power

Line voltages may vary in some geographical locations. If your line voltage is much lower than the oven voltage rating, warm-up time will be longer and motors may overload or run hot. If your line voltage is higher than name plate rating, the motor may run hot and draw excessive amps.

If the line voltage varies more than 10% from the oven voltage rating, some of the electrical components such as relays, temperature controls, etc. may operate erratically.

Table 2 Power Requirements

Model	Volts	Amps	Hertz	Phase	Heater (KW)	Connection
RTF Oven	208	14.7	60	1	2.0 KW	Plug connector
	240	13.2				

Ovens designed for 240 volts will operate satisfactorily on a minimum of 208 volts. Refer to the electrical schematic supplied with this manual for 208 volt line connection modifications. If your power characteristics are lower, contact Despatch Industries.

Temperature

Table 3 Temperature Specifications

Model	RTF Oven
Control Stability	$\pm 1^{\circ}\text{F}$ at 325°F
Recovery Time Door Open 2 Min.*	302°F <10 minutes
Operating Range	30°F over fresh air inlet temperature to 400°F

* approximate minutes to insert samples in a preheated oven

Capacities

Table 4 Capacities

Model	RTF Ovens
Maximum carrier load	8 bottles
Carriage wheel RPM	15 ± 0.2
Fan RPM	1,725
	H.P. $\frac{1}{4}$
Approximate net weight lbs	305
	KG 138

THEORY OF OPERATION

The THEORY OF OPERATION section details the function and operation of assemblies and subassemblies on the Despatch Rolling Thin Film (RTF) Oven.

The Despatch RTF Oven is specifically designed for the asphalt thin film oven test as specified in ASTM D2872. The Despatch RTF Oven incorporates solid state heater control with a precision digital TEMPERATURE instrument to deliver quick response with minimal overshoot. The overall result is efficient productivity under strenuous conditions. Despatch RTF Ovens are precise yet practical.

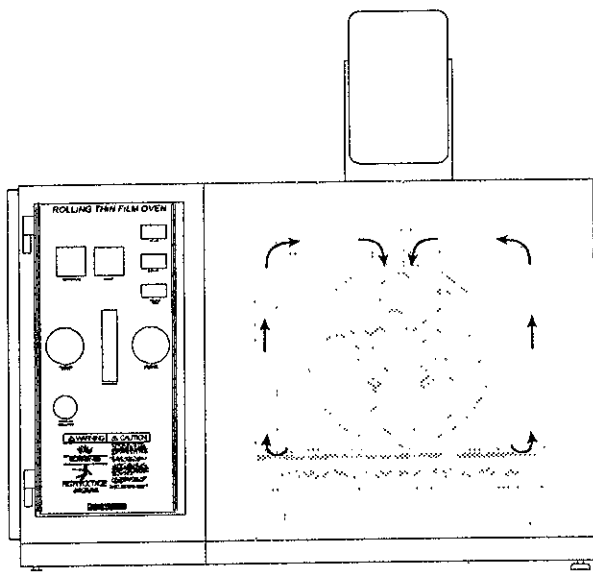


Figure 1 illustrates the forced circulating airflow in the Despatch RTF oven.

The asphalt rolling thin film oven test is used to simulate changes in the properties of asphalt during conventional hot-mixing at 302°F. Asphalt samples are placed in glass sample bottles. The glass bottles are placed in the rotating carriage in the pre-heated oven.

The oven is equipped with a recirculation fan and air plenums covering the side walls and ceiling. Air flows from the floor, through the side plenums, and through the fan to the oven chamber. Repeatability of test results is achieved by accurate temperature control and rapid temperature recovery.

TEMPERATURE Instrument

The oven is equipped with a microprocessor based digital control instrument.

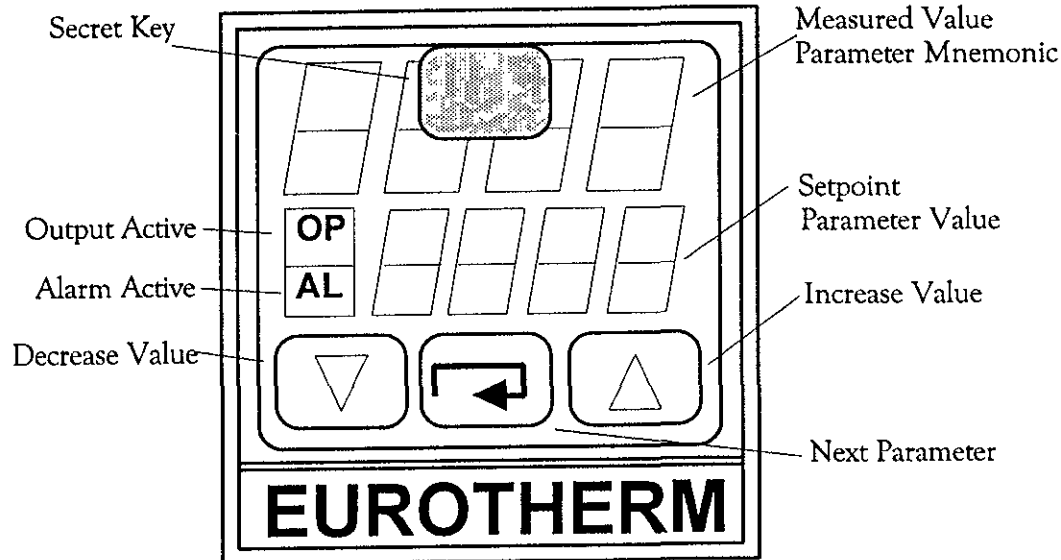


Figure 2 illustrates the TEMPERATURE instrument.

Table 5 TEMPERATURE Instrument Features

Features	Description
Measured value	Displays actual oven temperature.
Setpoint value	Displays temperature setpoint.
Secret key	Allows access to configuration and parameter menus.
Output active	Displays output (call for heat)
Alarm active	Not used on RTF ovens.
Decrease value	Decreases setpoint or parameter value.
Next parameter	Displays next parameter in the parameter menu. Also shows whether the control is in °C or °F
Increase value	Increases setpoint or parameter value.

HI-LIMIT Instrument

The Despatch RTF Oven is equipped with a HI-LIMIT instrument.

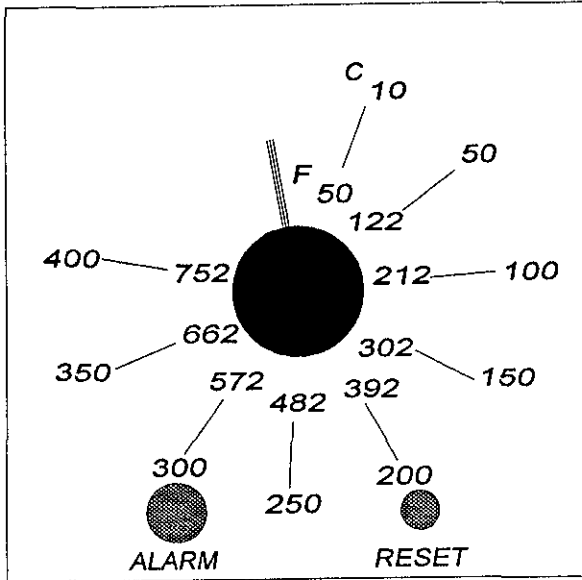


Figure 3 illustrates the HI-LIMIT instrument on the Despatch RTF Oven.

The HI-LIMIT instrument provides a protective measure for the product and/or the oven itself. Set the HI-LIMIT instrument to a temperature slightly higher than the TEMPERATURE instrument setpoint or to a temperature that should not be exceeded in the process. If the setting on the HI-LIMIT instrument is exceeded the heater will shut down. The HI-LIMIT instrument must be manually reset by pushing the reset button on the HI-LIMIT instrument.

INSTRUCTIONS

The INSTRUCTIONS section provides directions on unpacking, installation, operation and maintenance of the Despatch Rolling Thin Film (RTF) Oven.

Unpacking and Inspection

Remove all packing materials and thoroughly inspect the oven for damage of any kind that could have occurred during shipment.

- See whether the crate and plastic cover sheet inside crate are still in good condition.
- Look at all outside surfaces and corners of the oven for scratches and dents.
- Check the oven switches and indicators for normal movement, bent shafts, cracks, chips or missing parts such as knobs and lenses.
- Check the door and latch for smooth operation.
- Check to see that the leveling pads are secure and in good condition.
- Check the oven thermometer for air bubbles prior to placing it into use. Failure to do so may result in incorrect temperature indications and may complicate rejoining of the column later. If there are air bubbles, go to page 11 of this manual for instructions.

If there is damage, and it could have happened during shipment follow these instructions.

1. Contact the shipper immediately and file a written damage claim.
2. Contact Despatch Industries to report your findings and to order replacement parts for those that were damaged or missing.
3. Please send a copy of your filed damage claims to Despatch.

Unpacking and Inspection (Cont.)

Next, check to make sure you have received all the required materials. Your shipment should include:

- one (1) Despatch RTF Oven,
- one (1) Instruction manual,
- one (1) Warranty card,
- eight (8) glass bottles,
- one (1) thermometer.

If any of these items are missing from the packaged contents, contact Despatch Industries to have the appropriate materials forwarded to you.

Finally, to protect the warranty on your new Despatch RTF Oven, complete the warranty card and mail it to Despatch within 15 days after receipt of the equipment.

Rejoining Fluid in the Thermometer

All thermometers are subject to separations of the fluid in transit due to rough handling. Air bubbles are not a defect, and can easily be rejoined.

1. Place the thermometer on a flat surface with the bulb to the left and examine it carefully. The fluid should be continuous up to where it ends within the contraction chamber. Watch for droplets of fluid separated within the chamber and/or in the capillary immediately above or immediately below. If found, determine how the separation is configured.

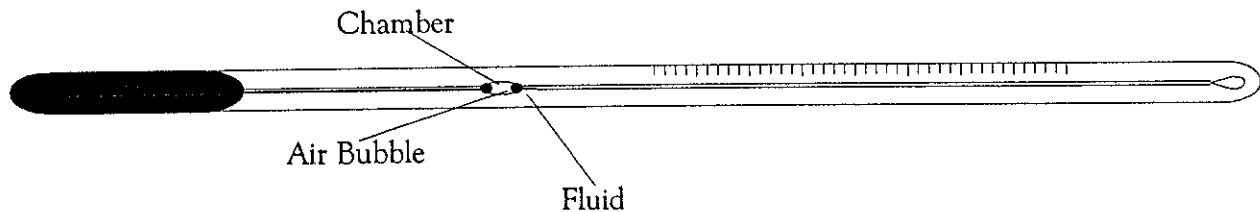


Figure 4 illustrates a simple air bubble.

- If it is a simple separation go to step 2.
- If the fluid is wedged in the upper end of the chamber and/or extends up into the capillary:

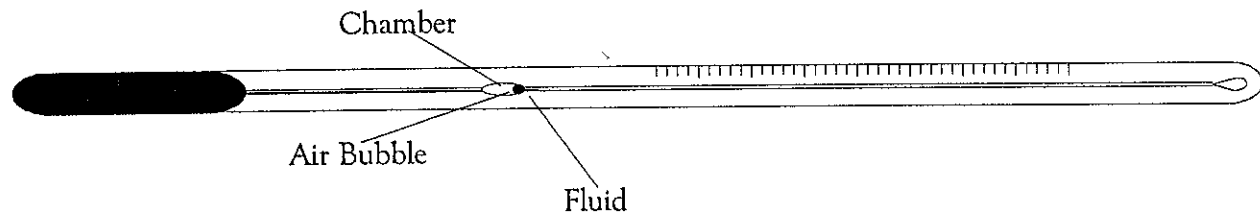


Figure 5 illustrates fluid in the upper end of the chamber and up into the capillary.

- a. Cool the bulb by dipping it into a cold water and ice mixture a few seconds at a time until the wedged fluid retreats into the chamber and forms a droplet. A much colder solution can be obtained with crushed ice and normal alcohol. In extreme cases, dry ice or a slurry of dry ice and alcohol may be needed.
- b. Proceed to paragraph step 2.

Rejoining Fluid in the Thermometer (Cont.)

- If the separation is at the lower end of the chamber and/or in the capillary below the chamber:

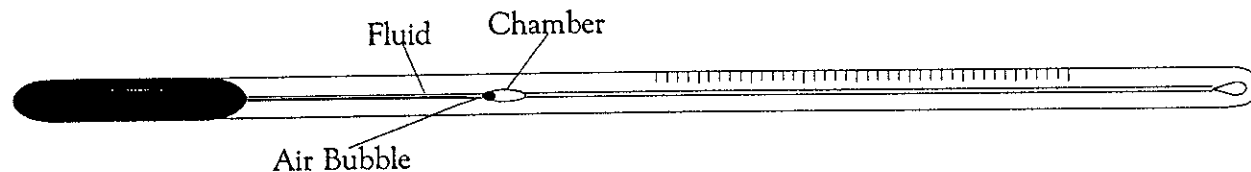


Figure 6 illustrates fluid in the lower end of the chamber and an air bubble below the chamber.

- c. Heat the bulb gradually until the separation rises higher into the chamber and forms a loose droplet.
 - i. Immerse the bulb into a hot liquid for two seconds. You may use a SOFT flame such as the one produced by an alcohol lamp.
 - ii. Withdraw the bulb for 2 seconds
 - iii. Alternate immersing the bulb in a heat source and withdrawing it at 2 second intervals.
 - d. Proceed to step 2.
2. Hold the thermometer in a vertical position and tap it gently but firmly downward onto a padded surface such as a magazine, newspaper or like surface. Repeat if necessary. The force generated by this tapping will drive the separated droplet(s) further down the chamber to rejoin with the main column.
 3. Verify thermometer reading at a known temperature to be certain that the rejoining was successful and the thermometer is now ready for service.
 - a. Suspend both thermometers side by side in a liquid.
 - b. Heat or cool as required to a temperature appropriate for the range of the thermometer(s).

CAUTION:

Never use a sharp flame such as a propane flame and never place the thermometer bulb directly in the flame. Instead, use the heated air stream rising above the flame (at least 1 inch above the tip of the flame).

CAUTION:

Closely observe the upward progress of the column. Never allow the fluid to fill the expansion chamber more than halfway, as breakage of the bulb will result!

Agreement within standard tolerances assures that air bubbles have been successfully removed. If not, go to step 1 and repeat the procedure.

Set-up

1. Move the oven to the installation location. The oven must have a minimum of two (2) inches clearance in the rear to provide proper ventilation. The oven may be placed next to another oven, with 3 inch clearance (the doors will still open). Make sure oven is level and plumb; this will assure proper heat distribution and operation of all mechanical components.
2. Identify correct power source indicated on the specification plate.
3. Connect power to the RTF Oven. The oven is supplied with a power cord and plug.
4. Connect a supply of clean, dry air to the oven.
5. Adjust leveling legs so that sample bottles are level with the horizontal axis.

WARNING:
All grounding and safety equipment must be in compliance with applicable codes, ordinances and acceptable safe practices.

Oven HI-LIMIT Instrument

The oven is shipped with a HI-LIMIT instrument setting of 350°F. Follow these instructions to change the setting.

1. Press the POWER switch to ON.
2. Set TEMPERATURE instrument at 14°C (25°F) above the desired operating temperature.
3. Push the HI-LIMIT instrument black button to reset the HI-LIMIT instrument and operate the oven until the TEMPERATURE instrument is regulating.
4. Carefully adjust HI-LIMIT instrument downward until it trips.
5. Reset the TEMPERATURE instrument at the desired operating temperature.

WARNING:
Never operate the oven at a temperature in excess of the maximum operating temperature of 400°F (204°C).

The two temperature control instruments are now set.

Resetting the HI-LIMIT Instrument

The HI-LIMIT instrument must be reset whenever it is tripped.

1. Allow the oven to cool down (or turn the HI-LIMIT instrument thermostat up several degrees).
2. When temperature drops below setpoint, push the black reset button.

WARNING:

Do not use the oven in wet, corrosive or explosive environments.

Operating

Users and operators of this oven must comply with operating procedures and training of operating personnel as required by the Occupational Safety and Health Act (OSHA) of 1970, Section 6 and relevant safety standards, as well as other safety rules and regulations of state and local governments. Refer to the relevant safety standards in OSHA and National Fire Protection Association (NFPA), Section 86 of 1990.

NOTE:

If less than 8 bottles are loaded, load them symmetrically -- with an equal number of empty spaces between the bottles. Symmetrical loading will prevent an unnecessary load on the carriage motor.

Loading the Oven

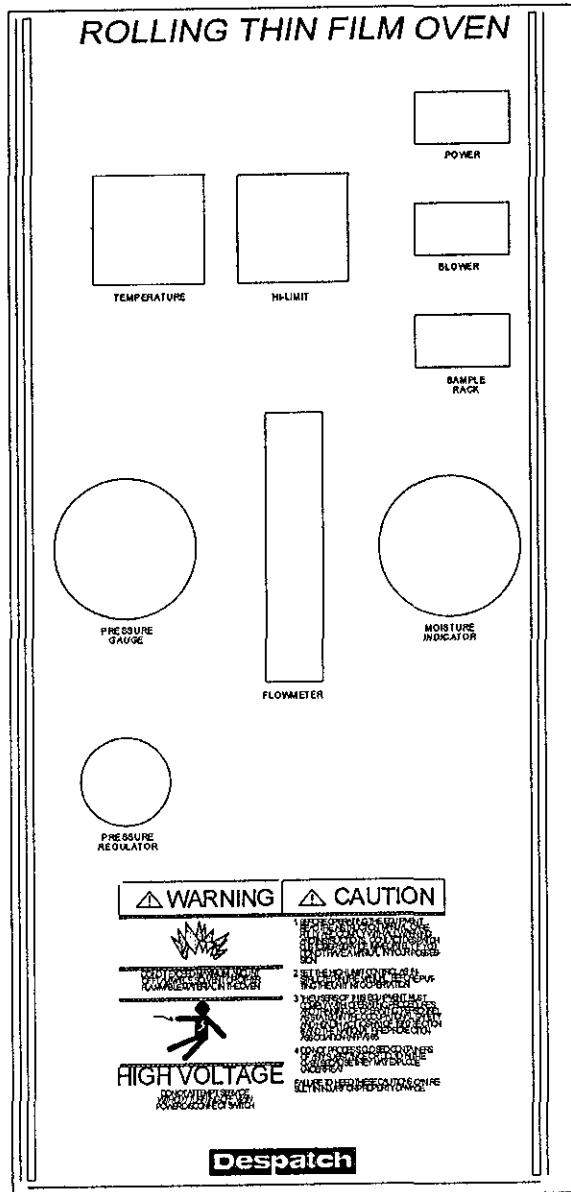
1. Load the bottles into the carriage locations which are not locked by the fan or the air nozzle.
2. Using the sample rack switch, rotate the carriage wheel so that the remaining slots are accessible.
3. Load the remaining bottles.

When loading the oven avoid spills of anything onto the heater elements or onto the floor of the oven chamber. Do not place the load on the oven chamber floor plate.

Pre-Startup Checklist

- ✓ Know the system. Read this manual carefully. Make use of its instructions and explanations. The know how of safe, continuous, satisfactory, trouble-free operation depends primarily on the degree of your understanding of the system and of your willingness to keep all parts in proper operating condition.
- ✓ Check line voltage. Voltage must correspond to nameplate requirements of motors and controls. Refer to the section on power connections in the INTRODUCTION of this manual.
- ✓ Fresh air and exhaust. Do not be careless about restrictions in and around the fresh air and exhaust openings. Under no condition permit them to become so filled with dirt that they appreciably reduce the air quantity. The proper ventilation clearances should be fulfilled at all times. Refer to the Set-up instructions in this manual.
- ✓ Ventilation There are two (2) exhaust openings on the top of the unit.

Startup/Operation



WARNING:
 Do not use flammable solvent or flammable material in this oven. Do not process closed containers of any substance or liquid in this oven because they may explode under heat.

Figure 7 illustrates the control panel on the Despatch RTF Oven.

1. Turn the power switch on. The POWER pilot light will come on.
2. Turn the blower switch on. The BLOWER pilot light will come on, the fan and heater will start and the oven will begin heating.
3. Set the dry air flow and air pressure as required.

Startup/Operation (Cont.)

4. Verify that the moisture indicator is blue in color.
5. Press any pushbutton on the TEMPERATURE control instrument to light up the pushbuttons.
6. Enter the operating temperature on the TEMPERATURE control instrument.
7. Adjust the setpoint using the ▼ key and the ▲ key.
8. Load the oven as required.
9. Turn the sample rack switch on. The pilot light will come on and the sample rack will begin to rotate.

NOTE:

To make the control readout and the thermometer readings match, it may be necessary to enter an offset value (OFSt) into the protected list parameters. This value is set to zero at the factory. See Parameter Programming on page 28 and Calibration in page 30.

Shut-down

1. Turn the SAMPLE RACK switch to the OFF position.
2. Turn the BLOWER switch to the OFF position.
3. Turn the POWER switch to the OFF position.

Maintenance

Do not attempt any service on this oven before opening the main power disconnect switch.

Checklist

- ✓ Keep equipment clean. Gradual dirt accumulation retards air flow. A dirty oven can result in unsatisfactory operation such as unbalanced temperature in the work chamber, reduced heating capacity, reduced production, overheated components, etc. Keep the walls, floor and ceiling of the oven work chamber free of dirt and dust. Floating dust or accumulated dirt may produce unsatisfactory work results. Keep all equipment accessible. Do not permit other materials to be stored or piled against it.
- ✓ Protect controls against excessive heat. This is particularly true of controls, motors or other equipment containing electronic components. Temperatures in excess of 130°F (55°C) should be avoided.
- ✓ Establish maintenance & check-up schedules. Do this promptly and follow them faithfully. Careful operation and maintenance will be more than paid for in continuous, safe and economical operation.
- ✓ Maintain equipment in good repair. Make repairs immediately. Delays may be costly in added expense for labor and materials and in prolonged shut down.
- ✓ Practice safety. Make it a prime policy to know what you are doing before you do it. Make CAUTION, PATIENCE, and GOOD JUDGEMENT the safety watchwords for the operation of your oven.
- ✓ Lubrication All door latches, hinges, door operating mechanisms, bearing or wear surfaces should be lubricated to ensure easy operation.

Tests

Tests should be performed carefully and regularly. The safety of personnel as well as the condition of equipment may depend upon the proper operation of any one of the functions of these controls. Test the TEMPERATURE instrument every 40 hours. Check that the TEMPERATURE instrument heater LED is cycling on and off, indicating that the heater is working.

Test the HI-LIMIT instrument every 40 hours. With the oven operating at a given temperature, gradually turn the HI-LIMIT instrument knob down to the setpoint operating temperature. The HI-LIMIT instrument has tripped when the white LED above the POWER switch shuts off. Push the HI-LIMIT instrument RESET button after returning the thermostat to its original setting.

WARNINGS:

Failure to heed warnings in this manual and on the oven could result in death, personal injury or property damage.

WARNING:

Disconnect the main power switch or power cord before attempting any repairs or adjustments.

Gearmotor

Test the gearmotors every 40 hours. Verify that the sample rack rotates when the sample rack switch is turned on.

Moisture Indicator

Check the moisture indicator every 20 hours. A blue color indicates that the air supply is dry. A white or pink color indicates that the air supply contains moisture and that the customer supplied desiccant filter should be changed. The indicator will return to blue after the dry air is re-established.

Replacement

Parts

To return parts contact Despatch Industries to obtain an MRA (material return authorization) number. This number must be attached to the returned part for our identification. If required, a new part will be sent and invoiced to you. When the return part is received, credit will be given, if in warranty.

Be sure that when you are ordering parts or service to give the model, serial and part number. This will expedite the process of obtaining your replacement part.

NOTE:

When replacing the TEMPERATURE instrument, the HI-LIMIT instrument and the gear motor, the side access panel may need to be removed. Move the oven to a location to allow this.

TEMPERATURE Instrument

(Tools needed: standard and Phillips screwdrivers)

1. Disconnect power.
2. Remove screws from the front control panel.
3. Open the front panel.
4. Remove the wire from terminal blocks.

WARNING:

Electric live load condition present.

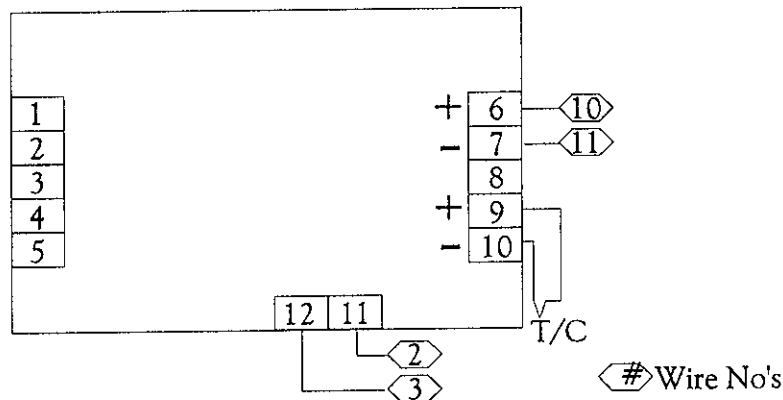


Figure 8 illustrates the connections to the TEMPERATURE instrument.

5. Remove the TEMPERATURE instrument mounting clips.
6. Remove the old TEMPERATURE instrument from the control panel.

TEMPERATURE Instrument (Cont.)

7. Install the new TEMPERATURE instrument into the control panel.
8. Secure the TEMPERATURE instrument mounting clips.
9. Reconnect the wire to the terminal blocks.
10. Close the front control panel.
11. Replace the front control panel screws.
12. Reconnect power to the oven.
13. Turn power switch to the ON position.
14. Set temperature instrument parameter. See parameter programming on page 28.

HI-LIMIT Instrument

(Tools needed: standard and Phillips screwdrivers)

1. Disconnect power.
2. Remove screws from the front control panel.
3. Open the front control panel.
4. Remove HI-LIMIT wires from the HI-LIMIT terminal strip.

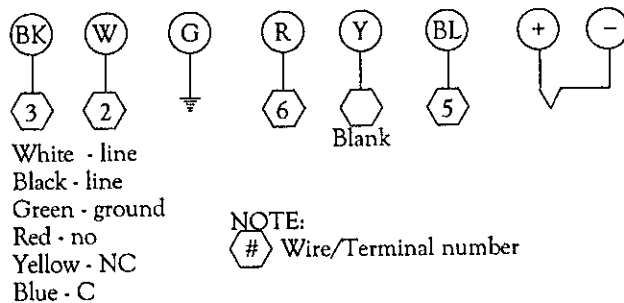


Figure 9 illustrates the connections to the HI-LIMIT instrument.

5. Remove the HI-LIMIT instrument mounting clips.
6. Remove the old HI-LIMIT instrument from the control panel.
7. Install the new HI-LIMIT instrument into the control panel.
8. Secure the HI-LIMIT instrument mounting clips.
9. Re-wire the HI-LIMIT wires to the HI-LIMIT terminal strip (see Figure 9).
10. Close the front control panel.
11. Replace the front control panel screws.
12. Reconnect the power to the oven.
13. Turn power switch to the ON position.
14. Test HI-LIMIT operation (see page 13).

WARNING:
Electric live load condition present.

WARNING:
The gear motor will operate.

Fan Motor

(Tools needed: standard screwdriver set, Allen wrench and a socket set)

1. Disconnect the power.
2. Open oven doors.
3. Remove fan wheel
4. Loosen set screws on fan wheel.
5. Remove fan wheel.
6. Remove wires from motor.
7. Remove motor.
8. Remove screws from motor/motor base.
9. Remove motor (motor can be tipped as required).
10. Mount new motor.
11. Insert motor shaft into shaft collar.
12. Secure motor to motor base.
13. Reattach fan wheel.
14. Tighten set screw on fan wheel.
15. Check that the set screw hits the flat machined area of the motor shaft.
16. Reconnect motor lead wires.
17. Close the oven door.
18. Reconnect power.

Heater Unit

(Tools needed: crescent wrench and socket set)

1. Disconnect power.
2. Open oven door.
3. Remove air coil assembly.
4. Remove chamber bottom access panel.
5. Disconnect heater lead wires.
6. Remove screws from heater frame.
7. Remove and discard heater.
8. Install new heater.
9. Replace screws.
10. Reconnect heater leads.
11. Replace chamber bottom access plate.
12. Replace screws.
13. Replace the air coil assembly.
14. Close the oven door.
15. Reconnect power.

Gearmotor

(Tools needed: standard screwdriver and socket set)

1. Disconnect power.
2. Open side access panel.
3. Remove gear drive guard.
4. Disconnect gear drive linkage.
5. Disconnect gear motor lead wires.
6. Remove gear motor mounting screws.
7. Remove and discard gear motor.
8. Install new gear motor.
9. Mount gear motor mounting screws.
10. Mount gear drive linkage.
11. Mount gear drive guard.
12. Reconnect gear motor lead wires.
13. Close side access panel.
14. Reconnect power.

APPENDIX

Special Instructions

The Despatch Rolling Thin Film (RTF) Oven has been tested and preset at the factory for normal operating conditions. In most applications, it will not be necessary to alter the oven's settings. This section contains additional information and reference material to access the TEMPERATURE instrument parameter programming. This section also covers Temperature Scale Conversion and Calibration. Calibration instructions are also covered for the HI-LIMIT instrument.

The Despatch RTF Oven TEMPERATURE instrument includes alphanumeric displays for the programmable capabilities of the instrument. The alpha-numeric in the TEMPERATURE instrument require only a single programming sequence. The programming sequence is called Parameter Programming. Parameter programming selects all the applicable parameters to operate and configure the TEMPERATURE instrument properly.

The Temperature Scale Conversion section provides information needed to convert the TEMPERATURE instrument to °C or back to °F.

The Calibration section covers the procedure necessary to recalibrate the TEMPERATURE instrument. Recalibration may be necessary if the TEMPERATURE instrument does not comply with known standards or to specifically align the TEMPERATURE instrument for a specific operating condition. The Calibration section also covers the procedure for aligning the HI-LIMIT instrument for recalibration.

WARNING:
Make sure you understand what you are changing before doing so. Changing parameters will alter the functions of the TEMPERATURE instrument.

Parameter Programming

The instrument and control parameters are set through the Parameter Programming mode. In most applications, it is not necessary to alter the oven's settings. However, the following instructions describe how to access, view and if desired, change the parameters.

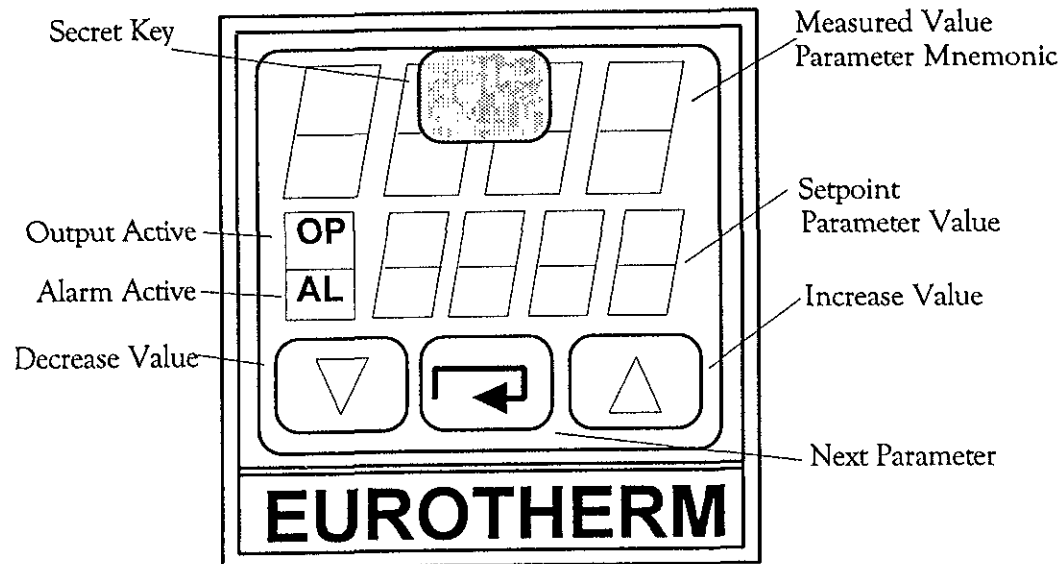






Figure 10 illustrates the TEMPERATURE instrument.

1. Press the  key repeatedly until AL.SP is displayed.
2. Press the secret key.
3. Press the  key until the desired parameter is displayed. Refer to the Protected List table on the following page.
4. Use the  key and the  key to change the parameter value.
5. Exit the parameter by pressing the secret key, or by not pressing any key for 10 seconds.

NOTE:
The Parameter Programming mode will automatically exit to its normal mode by simply not pressing any keys for about 10 seconds.

Parameter Program Mode Outline

Table 6 Open List

Mnemonic	Parameter	Adjustable Range	Comments
none	Setpoint	Upper limit: SPHi Lower limit: SPLo	Not adjustable during self tuning.
°C or °F	Display units	View only	Display units selected in configuration.
tunE	Self tune on demand	Disable self tune: OFF Initiate self tune: on	Not displayed if SPrr enabled.
ALSP	Alarm setpoint	Configure input sensor range for full scale (absolute temperature) alarms. 0 to upper range limit for deviation alarms.	Alarm function selected in configuration. AL.SP operative only for temperature alarms: configuration codes 1 through 4 and 6 Due to hysteresis, deviation band alarm setting must be at least 2°C (4°F)

Table 7 Protected List

Not accessible if self tuning is in progress.

Mnemonic	Factory Setting	Parameter	Adjustable Range	Comments
ConF	6213	Configuration code	View only in this list	Contact factory if anything other than 6213 or 6217
Id	91E	Instrument model identification	View only: 91E	
ProP	11	Proportional band	2 to 400°C (*1 to 400°C) 4 to 720°F (*2 to 720°F), or equivalent in percent	Units (°C, °F or %) selected in configuration.
Int.t	163	Integral time constant	OFF plus 10 to 2000s	Valid for PID control only.
dErt	1	Derivative time constant	OFF plus 1 to 200s	Valid for PID control only.
OFSt	0	Calibration offset	-50 to 50°C (-90.0 to 90.0°F)	Display value = measured value + offset
SPHi	400	Setpoint high limit	Configured input sensor range	Must be greater than SPLo
SPLo	0	Setpoint low limit	Configured input sensor range	Must be less than SPHi
SPrr	OFF	Setpoint ramp rate	OFF plus 0.1 to 50.0°C/min (0.2 to 90°F/min)	Self-tuning inhibited if ramping is enabled
H.ct	1.0	Heat cycle time		
LPbr	OFF	Loop break time constant	OFF plus 10 to 4000s	
LinE	60	Line frequency	50 Hertz: 50 60 Hertz: 60	Set to line frequency upon installation.

Calibration

TEMPERATURE Instrument

The TEMPERATURE instrument is factory tested and calibrated. Under normal operating conditions, recalibration should not be necessary. However, if the instrument does not comply with known standards, OR if the user would like to recalibrate the TEMPERATURE instrument for a specific operating condition, then recalibration is easily accomplished.

(Equipment needed: Heat on loss thermometer ASTM 13C)

1. Verify that the OFFSET programmed is 0. Refer to Instructions on viewing the parameter in the Parameter Programming Mode on page 28 of this manual.
2. Locate the thermometer at the appropriate position in the chamber.
3. Operate the chamber until it reaches the desired operating temperature and the TEMPERATURE instrument is regulating. The user may wish to have a loaded chamber with a standard amount of product to simulate a specific operating condition. It will take several minutes for the unit to stabilize at the controlled temperature.
4. Subtract the average controlled temperature (number appearing on the TEMPERATURE instrument display) from the actual chamber temperature (number appearing on the thermometer).

$$\text{Actual Chamber Temperature} - \text{Controlled Temperature} = ?$$

Because the ASTM 13C thermometer is in °C, the reading must be converted to °F to calculate the offset if the control is to read in °F. Refer to the conversion table.

Table 8 Temperature Conversion

°C	160	160.5	161	161.5	162	162.5	163	163.5	164	164.5	165	165.5	166
°F	320.0	320.9	321.8	322.7	323.6	324.5	325.4	326.3	327.2	328.1	329.0	329.9	330.8

5. Enter value from Step 4., 4. as the new OFSz value.

WARNING:
Maintenance on the Despatch Rolling Thin Film Oven should be completed by only qualified personnel.

WARNING:
Failure to heed the warnings in this manual and on the Despatch RTF Oven could result in death, personal injury or property damage.

HI-LIMIT Instrument

The HI-LIMIT instrument equipped on the Despatch RTF Oven does not display sensor temperature. The HI-LIMIT instrument has been tested and calibrated at the factory and recalibration should not be necessary. However, since the HI-LIMIT instrument is a non-indicating device, the HI-LIMIT instrument may need to be recalibrated against known standards so that the temperature dial indication on the HI-LIMIT instrument matches the HI-LIMIT instrument thermocouple input.

(Tools Needed: 1/16 inch Allen wrench)

1. Set TEMPERATURE instrument at 25°C (14°F) above the desired operating temperature.
2. Push black button to reset the HI-LIMIT instrument and operate chamber until the TEMPERATURE instrument is regulating.
3. Loosen the set screw on the black knob on the HI-LIMIT instrument with a 1/16 inch Allen wrench.
4. Adjust the HI-LIMIT instrument downward until it trips.
5. Align the HI-LIMIT instrument dial with the TEMPERATURE instrument temperature display.
6. Carefully tighten the set screw.
7. Reset TEMPERATURE instrument at the desired operating temperature.

The two temperature control instruments are now set.

WARNING:

Failure to heed the warnings in this manual and on the RTF Oven could result in death, personal injury or property damage.

NOTE:

Reset the HI-LIMIT instrument whenever it has tripped. First allow the cabinet to cool slightly by turning the HI-LIMIT instrument dial up several degrees. After the cabinet has cooled, push the black reset button.

Temperature Scale Conversion (°C/°F)

The temperature instrument has been factory preset to operate in °F. To operate in °C, the configuration code must be changed from the factory preset value of 6213 to 6217. The procedure for making the change is outlined below.

1. Cycle power OFF and ON. Self test follows: tESt appears followed by 1111,8888, then the four-digit configuration code.
2. When the four-digit configuration code appears, press and hold the secret key until the left digit begins blinking.

Table 9 Configuration Code Table


	°F	°C
Configuration Code	6213	6217

3. Enter the new configuration code table.

Use the ▼ key to select the digit position (1 through 4).
Use the ▲ key to modify the digit value.

4. To exit the configuration mode do one of these.

The secret key = accept new configurations; parameter value check follows.

The  key = abort; return to previous configuration.

If the control is to operate in °C, the following protected list parameters should also be changed for proper operation. A detailed procedure to access, view and change the parameters is described on page 28 of this manual. If the temperature instrument is reverted back to °F, then the parameters should be changed back to the original setting.

Table 10 Temperature Conversion Parameters

Mnemonic	Parameter	Setting for °F	Setting for °C
ProP	Proportional Band	11	6
Sp.Hi	Setpoint Hi-limit	400	204

Troubleshooting

Equipment which operates for long periods of time may develop problems. Below are possible problems and suggested solutions. If you have a problem not listed and do not know what to do, contact Despatch Industries at our toll free Help Line 800-473-7373, FAX 612-781-5353.

<u>Difficulty</u>	<u>Probable Cause</u>	<u>Suggested Remedy</u>
Failure to heat	No power	Check power source and/or oven and wall fuses.
	Broken or frayed cord	Replace with new cord and plug set.
	Burned out heater	Replace heater (see warranty statement).
	TEMPERATURE instrument malfunction	Replace temperature instrument.
	Loose wire connections	Disconnect power and check connections.
Slow heat up	HI-LIMIT instrument tripped	Reset the HI-LIMIT instrument.
	Low line voltage	Supply sufficient power and proper connections. Check for circuit overload.
Frequent heater element out	Harmful fumes generated by load	Increase vent opening or discontinue process.
	Spillage or splattering of material on heater elements	Disconnect power and clean oven chamber and elements.
	Overheating oven	Check the HI-LIMIT instrument.
Erratic temp.	TEMPERATURE instrument malfunction	Replace TEMPERATURE instrument.
Sample rack does not rotate	Gearmotor burn out	Replace gearmotor.
	Gearmotor fuses	Check and replace if necessary.

Troubleshooting (Cont.)

Difficulty	Probable Cause	Suggested Remedy
Inaccurate temp.	TEMPERATURE instrument offset	Check TEMPERATURE instrument offset adjustment.
	TEMPERATURE instrument misconfiguration	Check programming mode parameters.
	High limit setting	High limit should be 10-25+ °F higher than setpoint.
Excess surface or door temp.	Door seal deterioration	Replace door seal.
Excessive vibration	Dirty fan wheel	Clean fan.
	Unbalanced fan wheel	Replace fan wheel.
Oven will not control at setpoint	HI-LIMIT instrument set too low	Set the HI-LIMIT higher.
	TEMPERATURE instrument malfunction	Replace TEMPERATURE instrument.
Heater does not shutdown until temp. reaches the HI-LIMIT setting	TEMPERATURE instrument malfunction	Replace TEMPERATURE instrument.
	Relay malfunction	Replace relay.

Warranty

For years Despatch has delivered an exceptional product backed by a strong sense of responsibility and drive for long term customer satisfaction. These business principles enable us to offer the exclusive and comprehensive "Classic™ Four Plus One Service Warranty Program".

Despatch Classic™ Service Warranty Program

The basis of this outstanding, exclusive service program is a four-year replacement warranty covering defects in workmanship or material on all Despatch manufactured components and assemblies. Add to this a comprehensive 1 year parts warranty on the entire unit and you have one of the strongest warranties in the industry.

Immediate Service Response

The key to the Classic™ Service Program is response. A toll free Help-Line connects you to our Customer Service response center giving you immediate access to specialized assistance. Our customer service Product Service Technicians have over 200 years experience and access to detail design and manufacturing documentation specific to your Despatch unit. This exacting level of service is a benefit only Despatch can provide and means that you can expect speedy, accurate and the most cost effective response.

Field Service Network

A growing network of Service Professionals are available to support your Despatch equipment. From routine calibration and preventive maintenance to emergency breakdown response, our service network is positioned to reach 90 percent of our installed base within four hours. This is service you can depend on.

Best Service Protection in the Industry!

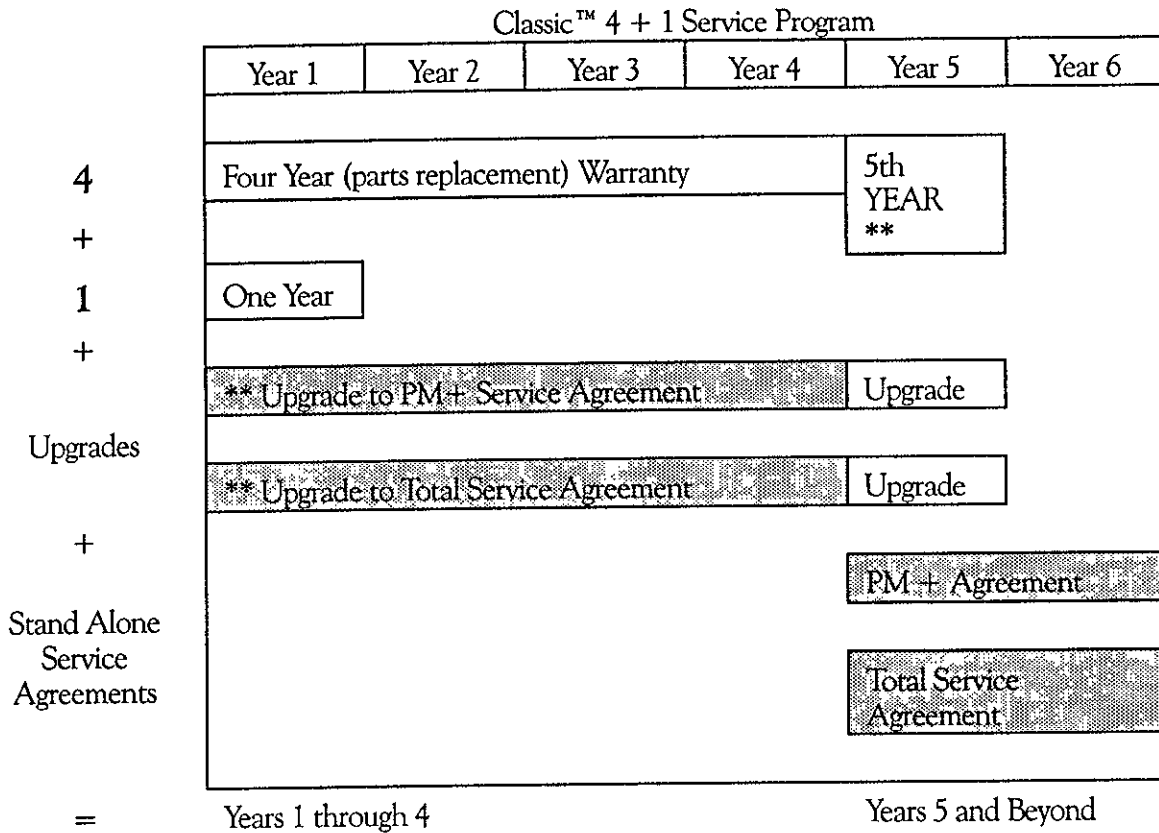


Figure 11 illustrates the Classic™ 4 Plus 1 Service Program

** Receive 5th year parts replacement warranty free with purchase of PM+ or Total Service Agreement within the first two years.

Classic™ Series Warranty

Parts and Material

Despatch warrants all parts and assemblies manufactured by Despatch for the Classic™ Series oven to be free from defects in material and workmanship for a period of four (4) years from the date of shipment or start-up, by Authorized Despatch Service Representative, whichever is later.

Despatch further warrants all parts and assemblies to be free from defects in material and workmanship for a period of one (1) year from date of shipment or start-up, by Authorized Despatch Service Representative, whichever is later.

Despatch will repair or replace, at our option, f.o.b. Despatch's factory, parts covered by this warranty. Despatch is not responsible for parts defects resulting from misuse, abuse, acts of nature or utility performance not to Despatch specification including electrical, environmental and fresh air/exhaust provisions.

Labor and Expenses

Despatch Classic™ Series warranty cover parts replacement or repair. Labor and other expenses related to the removal and replacement of such parts are the owners responsibility as is any necessary reprogramming, calibration and certification.

Exclusions/Limitations of Liability

The foregoing warranty shall be deemed valid and binding upon Seller if and only if Purchaser loads, operates and maintains the equipment supplied hereunder in accordance with the instruction manual provided upon delivery of the equipment. Seller does not guarantee the process of manufacture by Purchaser or the quality of product to be produced by subject equipment. This warranty does not cover expenses to diagnose, repair or replace components or associated failures.

Exclusions/Limitations of Liability (Cont.)

Parts failures caused by improper operation, abuse, misuse, acts of nature, and nonconforming utilities and environments are not covered by this warranty.

Despatch shall not in any event be liable for indirect, special, consequential or liquidated damages or penalties, including loss of revenue, profits or business opportunities resulting from interruption of product production. Despatch shall further be held blameless for any damages or expenses resulting from delays in our attempts to diagnose and repair the equipment, unavailability of spare parts or inaccessibility of the equipment. Specifically excluded from this warranty is responsibility for internal and external corrosion damage to the equipment.

Emergency Service

In an emergency situation, Customer agrees to:

1. Immediately shut off fuel or energy supply (gas and electricity).
2. Call 911 for emergency assistance if needed.
3. Call Despatch Service Help-Line at 800-473-7373.

Non-Compliance

Despatch reserves the right to suspend and withhold service as provided under this Warranty in the event of non-compliance by the Customer to any terms and conditions of this Warranty. Further, Despatch is held harmless for any loss of production, incurred expenses, or other inconveniences due to suspension of service under this non-compliance provision.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, AND SPECIFICALLY THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

SEE ATTACHED DESCRIPTION OF DESPATCH CUSTOMER SERVICE PROCEDURES AND RELATED CUSTOMER RESPONSIBILITIES WHICH ARE INTEGRAL TO THIS WARRANTY.

THE FOREGOING WARRANTY IS NOT TRANSFERRABLE IN SITUATIONS WHERE EQUIPMENT OWNERSHIP IS TRANSFERRED TO ANOTHER PARTY.

Despatch Customer Service

Procedures and Customer Responsibilities

To provide the most effective service to our customers under this warranty, all requests for repairs are to be initiated by the Customer by telephone to the Despatch Service Help Line, 800-473-7373. The Standard Period of Maintenance (SPM) is defined as 8 a.m. to 5 p.m. local time, excluding weekends and Despatch Holidays. Calls placed within the SPM will be handled as follows.

Help Line calls connect the customer with the Despatch Response Center. The Response Center will record all pertinent information, including SERIAL and MODEL NUMBER of the unit(s), the urgency and nature of the problem, and the name and phone number of the caller or other contact. This information will be passed to the first available service support technician who will research the units serial file so as to be familiar with customer unit when he calls the customer back. Despatch service technicians will make every effort to call back within four (4) working hours, or less, from receipt of the initial call. Despatch will advise the Customer on suggested steps and/or tests to either resolve the problem or help to confirm the diagnosis of the problem.

Customer Agrees to cooperate in performing such tests and attempting to resolve the problem as quickly as possible. Customer also agrees to replace minor parts such as fuses, latches, etc. as instructed by Despatch Service Technicians. This approach has Despatch and the Customer cooperating to effect the most expedient and cost effective repair and minimize down time. If in Despatch's sole judgement, the equipment cannot be repaired in this manner, an on-site visit by a Despatch authorized service representative may be scheduled to repair the equipment. Customer agrees that, when requested and authorized, such charges will be paid by the Customer within 30 days from receipt of invoice.

Attachment A - Sustained Service Support

At Despatch long term customer satisfaction means more than responding quickly and effectively to our customers' service requirements. It means offering comprehensive customer support well beyond the scope of our initial contractual commitment. Despatch's Service Products Division offers a Total Service Agreement package or a Preventive Maintenance Plus agreement (PM+). These service products are unique in the industry and offer the following benefits to our customer:

- Priority response for minimum production interruption.
- Preventive maintenance for longer product life.
- Discount on parts and services where applicable.
- Single payment for reduced billing expense.
- Elimination of need for a separate purchase order for each service requested.

Because these extra service options are aimed at extending our new equipment productivity, we will also extend the Despatch four year manufactured parts warranty for another 12 months. This bonus warranty is automatically yours when you purchase a service agreement from Despatch within the first 12 months after shipment of the equipment.