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# **Instruction Manual for the Rolling Thin Film Oven**

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## 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.

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## 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.

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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

# 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.

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# 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	20 Amp-250V 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	±1°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

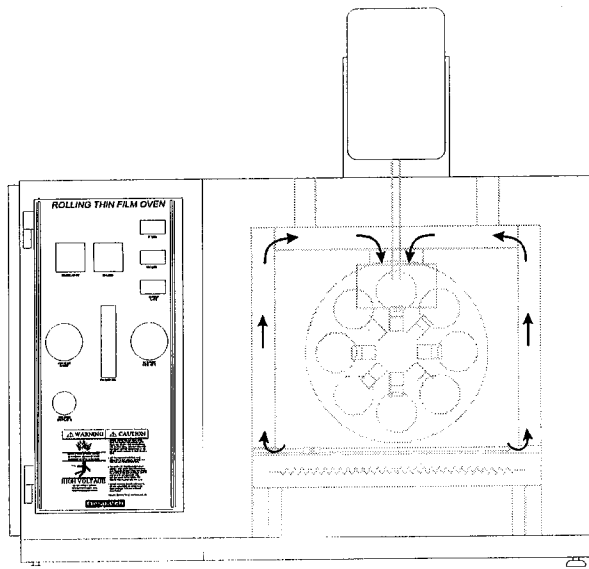
Model	RTF Ovens
Maximum carrier load	8 bottles
Carriage wheel RPM	15 ±0.2
Fan RPM H.P.	1,725 ¼
Approximate net weight lbs KG	305 138



# 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

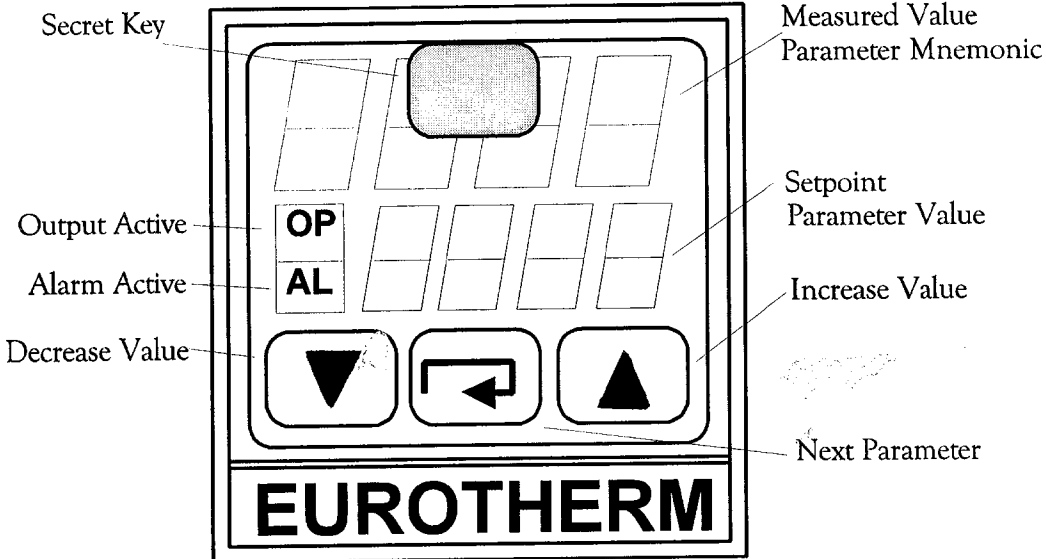


Figure 2 illustrates the TEMPERATURE instrument.

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

Table 5 TEMPERATURE Instrument Features

Features	Description
Measured value	Displays actual oven temperature.
Set point value	Displays temperature Set point.
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 Set point 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 Set point or parameter value.

# HI-LIMIT Instrument

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

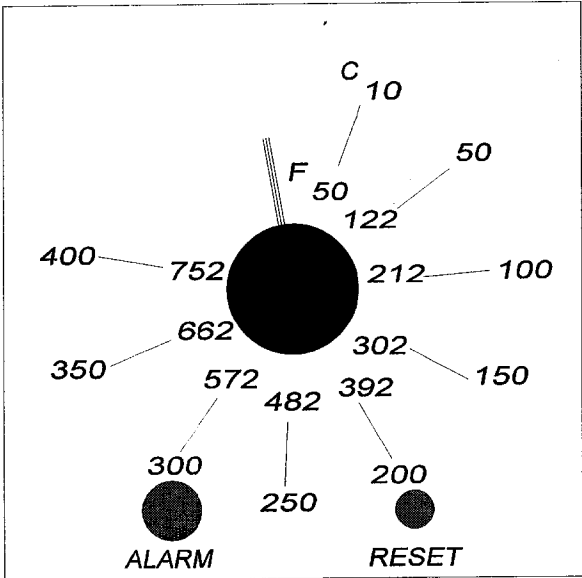


Figure 3 illustrates the HI-LIMIT instrument on the Despatch RTF Oven.

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.
  - 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:
    - a. Cool the bulb by dipping it into a cold water and ice mixture a few seconds at a time until

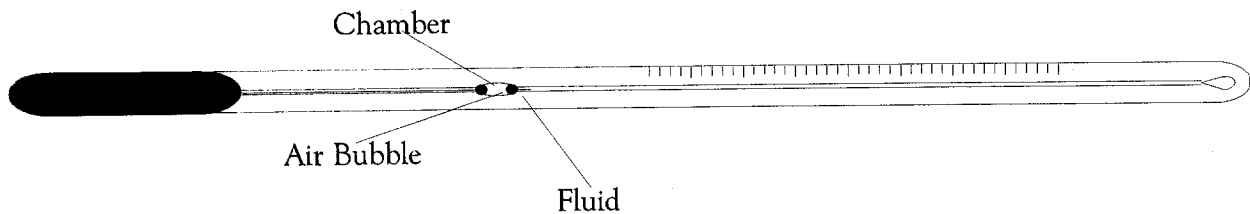


Figure 4 illustrates a simple air bubble.

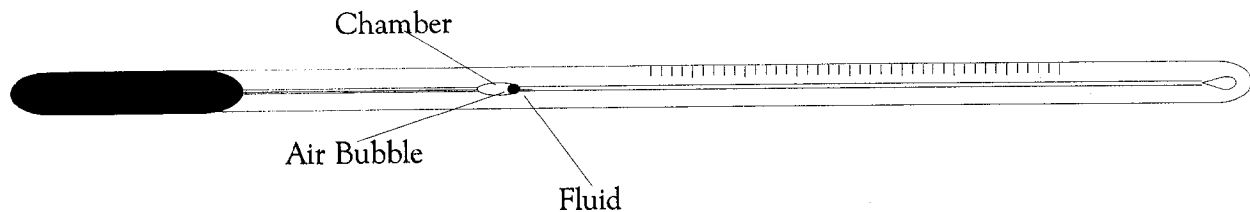


Figure 5 illustrates fluid in the upper end of the chamber and up into the capillary.

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:

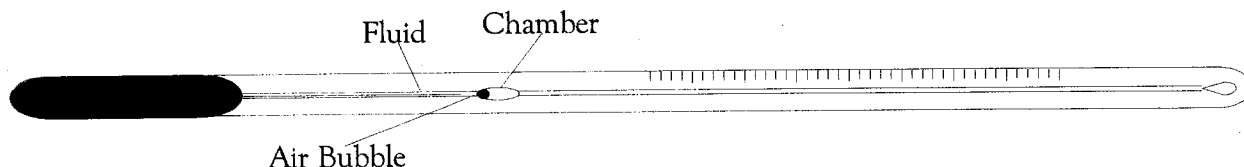


Figure 6 illustrates fluid in the lower end of the chamber and an air bubble below the chamber.

- 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.

**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).
  3. Verify thermometer reading at a known temperature to be certain that the rejoining was successful. 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).

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.

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**WARNING:**

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

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## 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.

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**WARNING:**

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

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The two temperature control instruments are now set.

## Resetting the HI-LIMIT Instrument

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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 Set point, push the black reset button.

### **WARNING:**

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

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## 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.

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## Loading the Oven

1. Load the bottles into the carriage locations which are not blocked 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.
- ✓ Clean Dry Air There is a 1/4" bulkhead tube fitting to connect the air supply.
- ✓ Moisture Indicator The indicator should be blue in color. This unit has an air bypass to sample the air for moisture. It is normal to have a hissing sound as air is leaking through this valve.

# Startup/Operation

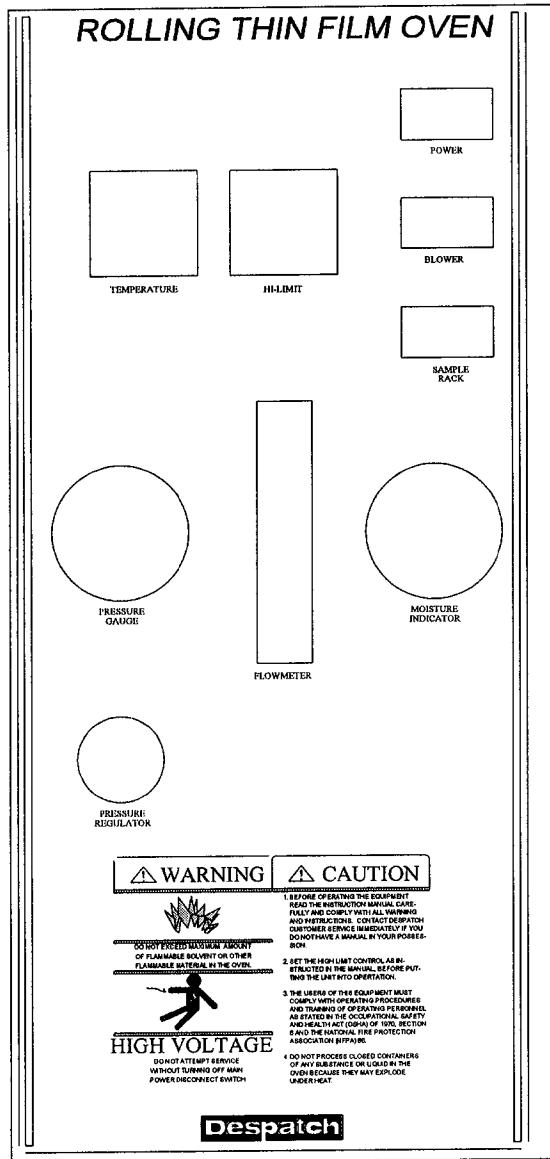


Figure 7 illustrates the control panel on the Despatch RTF Oven.

## 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.

Turn the power switch on. The POWER pilot light will come on.

1. Turn the blower switch on. The BLOWER pilot light will come on, the fan and heater will start and the oven will begin heating.
2. Set the flowmeter air flow rate per ASTM specifications at  $4000 \pm 200\text{ML/Min}$ .
3. Verify that the moisture indicator is blue in color.

4. Press any pushbutton on the TEMPERATURE control instrument to light up the pushbuttons.
5. Enter the operating temperature on the TEMPERATURE control instrument.
6. Adjust the Set point using the ▾ key or the ▲ key.
7. Load the oven as required.
8. Turn the sample rack switch on. The pilot light will come on and the sample rack will begin to rotate.

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**Note:**

The air must be clean and dry. The air pressure to the unit does not have to be 100 PSI, but high enough to achieve the flow rate. The pressure regulator can be adjusted to ensure the proper airflow rate.

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**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

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## Shut-down

1. Turn the SAMPLE RACK switch to the OFF position.
2. Turn the BLOWER switch to the OFF position (After oven temperature is below 212° F).
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 Set point 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.

## Gearmotor

Test the gearmotor 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.

## Carousel Shaft Bushing

The bushing which supports the carousel shaft should be cleaned on approximately two month, or 200 hours of usage, intervals. This time interval is only an estimate, and is dependent upon the properties of the binder under test. This cleaning requires the removal of the carousel assembly. Clean bushing surface with 600 grit wet/dry cloth, and wipe clean with mineral spirits.

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### **WARNINGS:**

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

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### **WARNING:**

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

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# Replacement

## Parts

To return parts contact Despatch Industries Parts Department at 1-800-473-7373 to obtain an MRA (material return authorization) number. This number must be attached to the returned part for our identification.

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.

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### 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.

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## TEMPERATURE Instrument

(Tools needed: standard and Phillips screwdrivers)

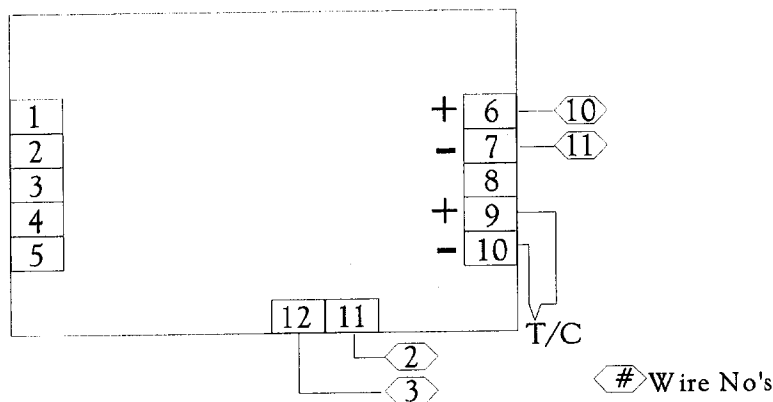
1. Disconnect power.
2. Remove screws from the front control panel.
3. Open the front panel.
4. Remove the wire from terminal blocks.

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### WARNING:

Electric live load condition present.

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**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.

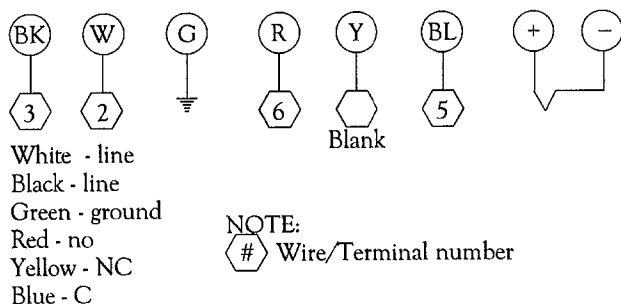


Figure 9 illustrates the connections to the HI-LIMIT instrument.

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).

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**WARNING:**  
Electric live load condition  
present.

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**WARNING:**  
The gear motor will operate.

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## Fan Motor

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

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

## **Carriage Assembly**

(Tools needed: socket set and 5/32 Allen wrench)

1. Disconnect power.
2. Open oven door.
3. Remove recirculating fan guard.
4. Remove recirculating fan.
5. Remove hex nut from center of carriage assembly.
6. Slide carriage assembly from shaft and remove.  
This is a tight fit and may require some effort to remove.
7. To reassemble - Perform steps 3-6 in reverse order.
8. 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.

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**WARNING:**

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

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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.

## 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.

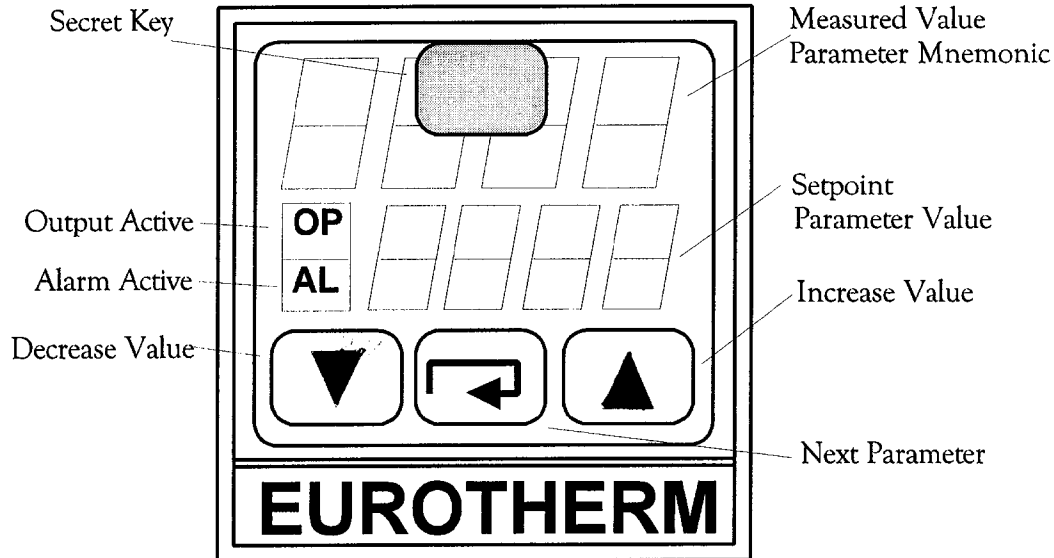






Figure 10 illustrates the TEMPERATURE instrument.

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.

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# Parameter Program Mode Outline

**Table 6 Open List**

Mnemonic	Parameter	Adjustable Range	Comments
none	Setpoint	Upper limit: SP.Hi Lower limit: SP.Lo	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 SP.rr 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**

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	13	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	210	Integral time constant	OFF plus 10 to 2000s	Valid for PID control only.
dEr.t	10	Derivative time constant	OFF plus 1 to 200s	Valid for PID control only.
OFSt	-3.7*	Calibration offset	-50 to 50°C (-90.0 to 90.0°F)	Display value = measured value + offset
SP.Hi	400	Setpoint high limit	Configured input sensor range	Must be greater than SP.Lo
SP.Lo	0	Setpoint low limit	Configured input sensor range	Must be less than SP.Hi
SP.rr	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		
LP.br	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.

\*This may vary from oven to oven.

# 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.

**WARNING:**

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

(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).

**WARNING:**

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

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

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.

## 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.

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**WARNING:**

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

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**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.

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## 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: tES<sub>t</sub> 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	621 3	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

Difficulty	Probable Cause	Suggested Remedy
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.
	TEMPERATURE instrument	Replace Temperature instrument.
Slow heat up	Loose wire connections	Disconnect power and check connections.
	Low line voltage	Supply sufficient power and proper connections. Check for circuit overload.
	Harmful fumes generated by load	Increase vent opening or discontinue process.
Frequent heater element out	Spillage or splattering of material on heater elements	Disconnect power and clean oven chamber and elements.
	Overheating oven	Check the HI-LIMIT instrument.
	TEMPERATURE instrument malfunction	Replace TEMPERATURE instrument.
Erratic temp.	TEMPERATURE instrument malfunction	Replace TEMPERATURE instrument.
	Gearmotor burn out	Replace gearmotor.
Sample Rack Does not rotate	Gearmotor fuses	Check and replace if necessary.
	Control Configuration	Check Control Parameters page 29.
Temperature Overshooting Set point.	No Load in Oven	Place Load in oven when testing.
	TEMPERATURE instrument offset	Check TEMPERATURE instrument offset adjustment.
Inaccurate temp	TEMPERATURE instrument misconfiguration	Check programming mode parameters.
	High limit setting	High limit should be 10-25+°F higher than Set point.

## Troubleshooting (Cont.)

Difficulty	Probable Cause	Suggested Remedy
Thermometer doesn't read the same as control	TEMPERATURE instrument offset	Check calibration (page 30)
Excess surface Or door temp	Door Seal deterioration	Replace door seal.
Excessive vibration	Dirty fan wheel	Clean fan. Replace fan wheel.
Heater doesn't Shutdown until temp reaches The HI-LIMIT setting	TEMPERATURE instrument Relay malfunction	Replace TEMPERATURE instrument. Replace Relay.
Carousel bushing Squeaks or Squeals	Binder build up on the bearing surface	Clean bearing per maintenance section.

# Despatch Product Warranty

## **Parts, Materials and Labor:**

Despatch warrants all parts and materials to be free from defects in material and workmanship for a period of one (1) year from the date of shipment unless otherwise mutually agreed upon in writing, or 2,000 hours of operation, whichever occurs first. (Note: Laboratory Oven electric heaters are warranted for a period of five (5) years from date of shipment.)

Despatch will repair or replace, at Despatch's option, FOB Despatch's factory, parts and materials covered by this warranty. Despatch is not responsible for parts or material failures resulting from misuse, abuse, inadequate preventive maintenance, acts of nature or non-conforming utilities, including electrical, fuel supply environmental and intake/exhaust provisions. This warranty also does not cover normal wear or routine maintenance parts and materials expressly designed as expendable/consumable and replaceable.

Labor services for parts and materials replacement and repair to support this warranty are available at Despatch's normal service fees. This service is provided worldwide by a network of factory trained professionals.

## **Terms and Conditions:**

The foregoing warranty shall be deemed valid and binding upon Despatch if and only if the Customer:

1. Installs, loads, operates and maintains the equipment supplied hereunder in accordance with the instruction manual provided upon delivery and product labeling affixed to the subject equipment.
2. Agrees to follow the Emergency Procedure spelled out below.

## **Exclusions/Limitations of Liability:**

This warranty DOES NOT cover expenses incurred in the process of diagnosing and/or repairing equipment resulting from: a) operator error, b) attempted service or modifications by other than Despatch authorized technicians, c) any use of the equipment which is inconsistent with the operation manual or labeling, or d) acts of nature, such as floods, fires, earthquake, or acts of war or civil emergency.

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 process or 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 damages to the equipment.

## **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 term and conditions of this warranty. Further, Despatch is held harmless for any loss of production, incurred expenses, and other inconveniences due to suspension of service under this non-compliance provision.

## **Emergency Procedure:**

In any emergency situation, Customer agrees to a) immediately shut off fuel or energy supply (gas and electricity), b) call 911 for emergency assistance if needed, and c) call Despatch Service.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, AND SPECIFICALLY THERE ARE NOT IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

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

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*Despatch Service*  
Worldwide Phone 612-781-5363; Worldwide Fax 612-781-5485; North America Phone 800-473-7373

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# Despatch Service Support Programs

Despatch continues to deliver exceptional products backed by a strong sense of responsibility and drive for long term customer satisfaction. Your partnership with Despatch can offer even higher value through your subscription to one of Despatch's high value service programs.

## **Warranty**

Despatch's exclusive, comprehensive service programs start with the warranty which is described on the other side of this document. This warranty can be expanded immediately to meet your most stringent service needs. Despatch Service will be able to answer your service questions and provide a quotation for the immediate expansion of your product warranty.

## **Immediate Service Response**

The key to an effective service program is response. Wherever your location, Despatch is only a phone call away. Our North American customers can reach Despatch at 1-800-473-7373. Worldwide customers can call 1-612-781-5363 or FAX 1-612-781-5485. Our customer Service Technicians have over 200 years combined experience and access to detailed design and manufacturing documentation specific to your Despatch unit(s). 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 worldwide network of factory trained Service Professionals is available to support your Despatch equipment. From routine repair to certified instrument calibration, the Despatch service network is positioned to respond to your needs. As a manufacturer of custom equipment, our service programs are customized to meet your specific needs regarding:

1. Service scope
2. Response time
3. Preventive maintenance frequency and content
4. Payment method

## **Sustained Service Support**

At Despatch, long term customer satisfaction means more than just responding quickly and effectively to our customers service needs. It means offering comprehensive customer support well beyond the scope and duration of our initial warranty. Despatch offers two basic service packages which are customized to each individual customer's need. These service packages are titled Full Service and Preventive Maintenance Plus+ service agreement products. Each is unique in the industry and offer the following benefits

1. Priority response for minimum production interruption
2. Preventive maintenance for longer product life
3. Discounts on parts and services
4. Various payment plans to ease budgeting and recording expenses
5. Reduce purchase ordering costs

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