

# Manual of Operation and Instruction

# Model 5151 Automatic Drying Unit

## NOTE

Before using the Model 5151, carefully read this manual. It is especially important to understand the Safety Warnings at the beginning. Keep this manual in a safe place that is always easily accessible during the use of the ADU.



### **Troxler Electronic Laboratories, Inc.**

3008 E. Cornwallis Road • P.O. Box 12057

Research Triangle Park, NC 27709 U.S.A.

Phone: 1.877.TROXLER

Outside the U.S.A.: +1.919.549.8661

Fax: +1.919.549.0761

[www.troxlerlabs.com](http://www.troxlerlabs.com)

Troxler products are protected by U.S. and foreign patents.

**Copyright © 2009 – 2020**

Troxler Electronic Laboratories, Inc.

All Rights Reserved

No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or information storage and retrieval systems, for any purpose without the express written permission of Troxler Electronic Laboratories, Inc.

*BindOff is a registered trademark of Chemsol, Inc.*

UM-5151  
PN 117010  
Edition 4.0  
July/2020



## SAFETY ALERT SYMBOL

---



The Safety Alert Symbol shall appear within this manual. Wherever it appears in this manual or on safety signs affixed to the machine, this is to make all aware of the potential for personal injury and to be cautious when these images are present.

Always observe all WARNING, CAUTION, and NOTE recommendations listed within this manual before operating the machine.



## TROXLER SERVICE CENTERS

### **Troxler Corporate Headquarters**

P.O. Box 12057

Research Triangle Park, NC 27709

Phone: 1.877.TROXLER (1.877.876.9537)

Outside the U.S.A.: +1.919.549.8661

Fax: +1.919.549.0761

### **Technical Support**

Phone: 1.877.TROXLER

(1.877.876.9537)

TroxTechSupport@troxlerlabs.com

### **North Carolina Service Center**

3008 E. Cornwallis Road

Research Triangle Park, NC 27709

Phone: +1.919.549.8661

Fax: +1.919.549.0761

TroxTechSupport@troxlerlabs.com

### **Florida Office & Service Center**

2376 Forsyth Road

Orlando, FL 32807

Phone: +1.407.681.4221

Fax: +1.407.681.3188

TroxTechSupport@troxlerlabs.com

### **Midwestern Office & Service Center**

1430 Brook Drive

Downers Grove, IL 60515

Phone: +1.630.261.9304

Fax: +1.630.261.9341

TroxTechSupport@troxlerlabs.com

### **Western Office & Service Center**

11300 Sanders Drive, Suite 7

Rancho Cordova, CA 95742

Phone: +1.916.631.0234

Fax: +1.916.631.0541

TroxTechSupport@troxlerlabs.com

### **Southwestern Office & Service Center**

2016 East Randol Mill Rd., Suite 406

Arlington, TX 76011

Phone: +1.817.275.0571

Fax: +1.817.275.8562

TroxTechSupport@troxlerlabs.com

### **Troxler Europe & Service Center**

Troxler Electronics GmbH

Gilchinger Strasse 33 D.82239 Alling

nr. Munich, Germany

Phone: ++ 49.8141.71063

Fax: ++49.8141.80731

troxler@t-online.de

### **Troxler Electronic Technologies (Zhangjiagang)**

1F, Bldg G, No. 1 Guotai North Road

ZJG, China, 215600

Phone: 0086.512.56793702

Fax: 0086.512.56793701

kjin@troxlerlabs.cn

To locate an independent, Troxler-authorized service partner near you, call 1.877.TROXLER (1.877.876.9537).

## ABOUT THIS MANUAL

The Model 5151 *Manual of Operation and Instruction* provides detailed information about the Automatic Drying Unit (ADU). The manual includes product safety information, as well as instructions for the proper installation and use of the ADU.

This manual is organized as follows:

**Chapter 1, Introduction** – Provides information on the safe use of the ADU; a brief overview of the unit and its features; a list of parts and accessories; and instructions for unpacking and inspection.

**Chapter 2, Setup and Operation** – Describes the ADU's keypad and provides instructions for setting up, starting, and operating the unit.

**Chapter 3, Setup Menu** – Provides a detailed description of the options available from the ADU's Setup menu.

**Appendix A, Maintenance & Troubleshooting** – Provides maintenance and service information, as well as instructions for basic troubleshooting.

**Appendix B, Menu Map** – Shows a map of the ADU's Setup menu.

**Appendix C, Specifications** – Contains the mechanical, electrical, and environmental performance specifications for the ADU.

## HOW TO USE THIS MANUAL

The Model 5151 *Manual of Operation and Instruction* contains information on safely using the ADU. Also included in this manual are safety warnings, basic parameter setup, system troubleshooting, and general maintenance.

*Do not* attempt to operate the ADU before reading this manual and the safety warnings posted on the unit. Troxler stresses that *the user is solely responsible* for ensuring the safe use of the ADU. The manufacturer, its subsidiary, representatives, and distributors cannot assume responsibility for any mishaps, damage, or personal injury that may occur from failure to observe the safety warnings in this manual and posted on the unit.

## CONVENTIONS USED IN THIS MANUAL

Throughout this manual the following symbols and special formatting are used to reveal the purpose of the text.



### WARNING

Warnings indicate conditions or procedures that, if not followed correctly, may cause personal injury.

### CAUTION

Cautions indicate conditions or procedures that, if not followed correctly, may cause equipment damage.

### NOTE

Notes indicate important information that must be read to ensure proper operation.

**<KEY>** This style indicates a key or character to press on the ADU keypad.

**DISPLAY-** *Typestyle and shading used to simulate the control panel display*

1. Indicates a procedure with multiple steps.
- ◆ Indicates a list of things needed (such as equipment) or important points to know.
- ▶ Indicates that more than one option is available. Carefully select the option that applies.

# TABLE OF CONTENTS

Safe Operation .....	x
----------------------	---

## **CHAPTER 1. INTRODUCTION**

Introduction to the ADU.....	1-2
Parts and Accessories .....	1-4
Unpacking and Inspection .....	1-5
Site Selection .....	1-7
Assembly and First Time Use.....	1-8

## **CHAPTER 2. SETUP AND OPERATION**

Control Panel .....	2-2
Turning the System On.....	2-3
Drying a Sample .....	2-6

## **CHAPTER 3. SETUP MENU**

Setup Menu.....	3-2
-----------------	-----

## **APPENDIX A. MAINTENANCE & TROUBLESHOOTING**

Maintenance & Service.....	A-2
Troubleshooting .....	A-6
Replacement Parts.....	A-9
Optional Accessories.....	A-9
Returning Parts for Service.....	A-10





**APPENDIX B. MENU MAP**

Menu Map Description ..... B-2

**APPENDIX C. SPECIFICATIONS**

Mechanical Specifications..... C-2  
Electrical Specifications..... C-3  
Environmental Performance..... C-4

**INDEX**

**WARRANTY**

## LIST OF FIGURES

Figure 1-1. Model 5151 Automatic Drying Unit.....	1-3
Figure B-1. Model 5151 Menu Map.....	B-3

## LIST OF TABLES

Table 2-1. Control Panel Keys and Buttons.....	2-2
--	-----

# Safe Operation

---

The ADU is a safe, durable unit. Troxler cannot anticipate every example of improper or unauthorized use of this unit that may lead to malfunction or accident. Thus, if a particular use is *not specifically mentioned* in this manual as authorized, then consult Troxler about the alternate use. Otherwise, it is assumed that the use is unauthorized and improper.

## Safety Warnings

Always follow the safety warnings in this manual and the safety procedures of your laboratory/company. Troxler recommends the following safety information:

- ◆ The AC connection for 100 – 132 (or 180 – 240) VAC, 50/60 Hz output power to the vacuum pump provides the same voltage as that supplied to the ADU. To prevent equipment damage, ensure that the vacuum pump is rated for the proper voltage.
- ◆ For electrical safety reasons, the AC power cable that provides power from the ADU to the vacuum pump should not exceed 3 m (10 ft.).
- ◆ The ADU is designed as a bench-top laboratory test instrument. Place the unit on a level, sturdy surface.
- ◆ The ambient temperature should be between 10 and 50°C (50 and 122°F), and the relative humidity should be less than 80%.
- ◆ Only personnel who are familiar with the proper operation of the ADU should operate the device.
- ◆ Always unplug the ADU before performing service or maintenance.
- ◆ Only Troxler service representatives should perform service on the ADU when disassembly is required.

## Cautions and Warnings



### **Right Side of Unit**

- ◆ Connection for 100 – 132 (or 180 – 240) VAC, 50/60 Hz output power to control a vacuum pump. This connection provides the same voltage as that supplied to the ADU. Ensure that the vacuum pump is rated for the proper voltage.
- ◆ 12 mm (1/2 in.) hose fitting for vacuum pump.



# Chapter 1:

# Introduction

---

This chapter covers the following topics and tasks:

- ✓ An introduction to your new ADU
- ✓ Included parts and accessories
- ✓ Inspection and unpacking
- ✓ Assembly and first time use

# Introduction to the ADU

---

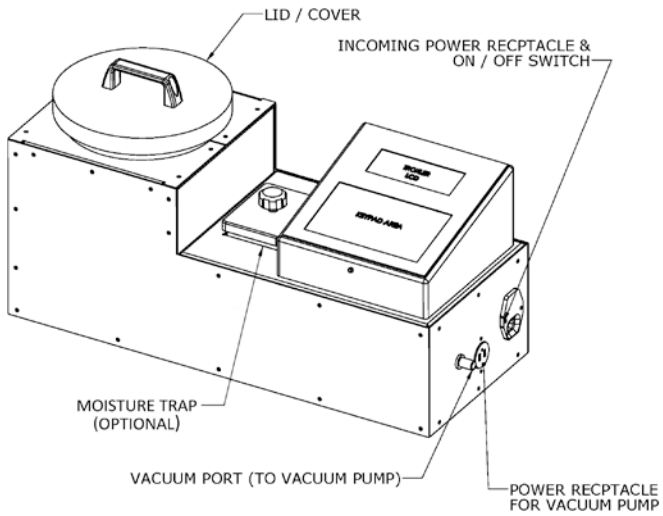
The Automatic Drying Unit is a fully-automated device that dries specimens placed in the chamber. It is intended for use with compacted asphalt core samples as well as loose asphalt mix and loose aggregate (with supplied sample bag). In comparison to the current methods used for drying these samples, the ADU is very fast and convenient.

Currently, compacted asphalt cores are allowed to dry in front of a fan for several hours. The cores are weighed, then dried further and weighed again to be sure that they are truly dry. These cores cannot typically be analyzed for density until the day following their removal from the pavement. The ADU fully automates and significantly shortens this process, allowing the laboratory technician to be free to complete other tasks.

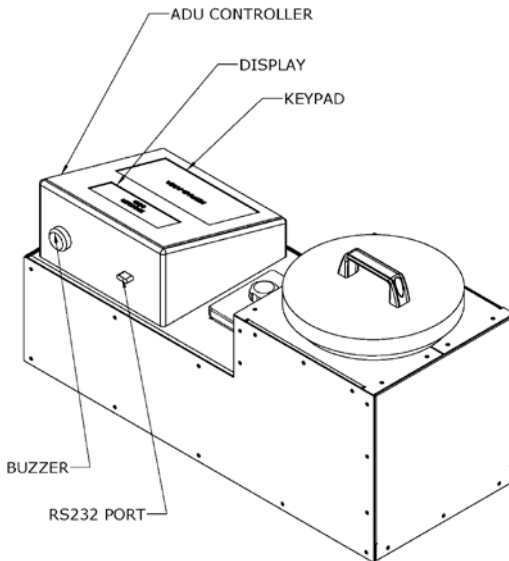
The ADU uses a simple process of vacuuming the air from the sample chamber, thus pulling the water from the sample. A heating element is placed outside the chamber to allow the sample to remain close to ambient temperature. The water that is evacuated from the chamber is transferred to a reservoir and trapped there so that the pump is protected from damage.

The pump draws the air and water from the sample and chamber until the pressure reaches a level predetermined as a "dry calibration" value. At this point the sample is considered dry and the process is complete. The sample can then be further analyzed for the properties that need to be determined.





### FRONT VIEW



### REAR VIEW

Figure 1-1. Model 5151 Automatic Drying Unit

# Parts and Accessories

The ADU includes the electrical and mechanical parts required to dry asphalt specimens. Use Figure 1-1 to locate and identify the following parts:

- ◆ The **power switch** is located on the right side of the ADU.
- ◆ The **keypad** and **display** provide the user interface.
- ◆ The **serial port** enables the operator to download data to a computer for saving or printing.
- ◆ The **chamber lid** (part number 117410) seals the chamber.
- ◆ The **cold trap lid** seals the cold trap (if included as part of the unit).
- ◆ The **vacuum pump** (not shown) removes moisture from the specimen.
- ◆ The vacuum pump **power receptacle** powers the vacuum pump.
- ◆ The *Model 5151 Manual of Operation and Instruction* (not shown) provides the operating instructions for the ADU.

## NOTE

Troxler provides the option to purchase the ADU with or without a Busch 7 CFM heavy-duty pump (part number 117209). If you choose to replace this pump with an alternative, please ensure that it has the same or similar specifications. Troxler also recommends using high-quality vacuum oil with any pump used (part number 177232).

The cold trap is also an optional feature that may be included in the ADU.

# Unpacking and Inspection



## WARNING

The ADU weighs approximately 50 lbs (22.7 kg) and its weight is not distributed evenly. To prevent personal injury, observe proper lifting techniques when unpacking and installing the unit. Troxler recommends that the ADU be lifted by two people, with one person at each end.

## Unpacking

Upon receiving the ADU from the factory, perform a complete inspection and inventory as described below.

1. Inspect the contents of the shipping case. If the shipping case or any other part or accessory appears damaged, notify the carrier and your Troxler representative immediately.
2. Open the carton and carefully remove the unit. Save all packing material for reuse if the unit needs to be returned to Troxler for service or repair.
3. Check the shipping case for the items listed in the on page 1-6. If any part or accessory is missing, contact your Troxler representative.
4. Inspect the outside surfaces of the ADU and its accessories for damage.

## Inspection

After unpacking, check to see that the following are included:

- ◆ Model 5151 Automatic Drying Unit
- ◆ Pump with attached moisture reservoir (if purchased)
- ◆ Vacuum tubing (2) and clamps (2)
- ◆ Chamber Lid
- ◆ Cold Trap Lid (if purchased)
- ◆ Power cord
- ◆ Aggregate bag
- ◆ Sample tray
- ◆ *Manual of Operation and Instruction*

Inspect each part for damage that may have occurred during shipment. If any parts or accessories appear damaged, notify the carrier and your Troxler representative immediately.

# Site Selection

---

After unpacking and inspecting the ADU, select a suitable site for installation. Apply the following criteria when selecting a site:

- ◆ The ADU has no special ventilation requirements.
- ◆ Place the ADU on a level, sturdy work surface near a vacuum pump.
- ◆ The ADU requires a 100 – 132 (or 180 – 240) VAC, 50/60 Hz single phase input power.
- ◆ For electrical safety reasons, the AC power cable that provides power from the ADU to the vacuum pump should not exceed 3 ft (10 m).

# **Assembly and First Time Use**

To begin using the ADU, follow the installation steps below:

1. Following the site selection guidelines in the previous section, set the ADU in the selected location.
2. Using the 12 mm (1/2 in.) ID tubing and hose clamps provided with the unit, connect the vacuum pump to the vacuum fitting on the side of the unit.
3. Remove the filler plug on the pump and add oil to the fill line. Do not overfill! Replace the filler plug.
4. Connect the vacuum pump's AC power cord to the AC power outlet on the left side of the ADU.
5. Connect the ADU to a standard outlet.

## **CAUTION**

The AC connection for 100 – 132 (or 180 – 240) VAC, 50/60 Hz output power to control a vacuum pump provides the same voltage as that supplied to the ADU. To prevent equipment damage, ensure that the vacuum pump is rated for the proper voltage.

# Chapter 2:

# Setup and Operation

---

This chapter covers the following topics and tasks:

- ✓ Getting started with the ADU
- ✓ About the control panel
- ✓ Instructions for drying a sample

# Control Panel

---

Table 2-1 lists the functions for each key and button on the ADU control panel.

Table 2-1. Control Panel Keys and Buttons

<b>KEY</b>	<b>FUNCTION</b>
⟨ <b>START</b> ⟩	Press to begin the pressure check.
⟨ <b>SETUP</b> ⟩	Press to access the <i>Setup</i> functions.
⟨ <b>ESC</b> ⟩	Returns to the next higher-level menu without updating or storing data. In response to <i>Yes/No</i> questions, it has the same effect as pressing ⟨ <b>NO/CE</b> ⟩.
⟨ <b>YES</b> ⟩	Press to respond <i>Yes</i> to <i>Yes/No</i> questions.
⟨ <b>NO/CE</b> ⟩	Press to respond <i>No</i> to <i>Yes/No</i> questions. Also clears an incorrect entry and allows for re-entry.
⟨↑⟩⟨↓⟩	Press to scroll through menu options or to view screens.
⟨ <b>0</b> ⟩ .. ⟨ <b>9</b> ⟩	Press to enter numeric values.
⟨ <b>.</b> ⟩	Press to enter a decimal point.
⟨ <b>ENTER</b> ⟩	Press to begin drying the asphalt specimen, after entering data, and to acknowledge display screens.



# Turning the System On

To begin using the ADU, turn on the power switch, which is located on the right-side panel. The ADU displays the following startup screen, which shows the software version (V) and the Serial Number (SN) of the unit.

```
Troxler ADU 5151  
  
V0.13 SN:  xxxxxxxx  
07-01-2020  09:15 AM
```

After a short delay, the ADU displays the following screen:

```
Troxler ADU 5151  
Pressure Check  
Seal Chamber Lid  
Press <START>
```

Follow the instructions on the display screen to perform the Pressure Check, which takes 90 seconds to complete. The Leak Test will take 60 seconds to complete.

```
Troxler ADU 5151  
Performing Pressure  
Check. Please Wait.  
Pressure:      5.5 RVQ
```

```
-Leak Test-  
RVQm:  5.5  
RVQc:  7.4  
Time:   2 s
```

At the end of one minute (if there is no leakage) the ADU displays the following screen.

```
Results:
9.5 vs 7.4 RVQ
Change: 1.90 RVQ
PASSED Press <ENTER>
```

```
Troxler ADU 5151
Pressure Check
Results:
Passed <ENTER>
```

If leakage is present, the ADU will display the following screen.

```
Leak Detected
14.4 vs 88.0 RVQ
Change: 77.59 RVQ
FAILED Press <ENTER>
```

Press 'YES' to check seal or Press 'No' to ignore leakage and continue to dry sample.

```
Stop and Check Seal?
YES: Check Seal
NO: Ignore Leakage
Continue to Dry
```

If 'YES' is pressed, the ADU will display the following screen and users can check the sealing then perform the Pressure Check again.

```
Troxler ADU 5151
Pressure Check
Results:
FAILED <ENTER>
```

```
Unable to Reach
Sufficient Vacuum
Check Lid and Hoses and
Retry. <ENTER>
```

```
Troxler ADU 5151
Pressure Check
Seal Chamber Lid
Press <START>
```

If 'NO' is pressed, the ADU will display the following screen and users can start to dry samples.

```
Troxler ADU 5151
Pressure Check
Results:
Passed <ENTER>
```

```
Troxler ADU 5151
Place sample in
chamber, seal lid,
Press <ENTER>
```

## NOTE

It is important to perform a check at the start of each workday and preferably twice per day. The Pressure Check automatically adjusts the ADU for changes in atmospheric pressure.

# Drying a Sample

---

## Compacted Asphalt Core Samples

1. To dry a typical 100 mm or 150 mm (4 in. or 6 in.) compacted asphalt core sample, the ADU must be set to *Core mode* under the Profile menu, located in the **Setup** menu (see page 3-4).
2. Acquire core specimens in accordance with ASTM D5361.
3. Place the core(s) in the sample chamber resting on the sample tray. The sample(s) should not make contact with the sides of the chamber. If multiple samples are dried together, the samples should not be in contact with each other.
4. Once the sample(s) are in the chamber, place the lid securely on the top of the chamber. It is important that the lid gasket make good contact with the chamber in order to seal tightly.
5. Press **(ENTER)** to begin the measurement.
6. The following screen will display:

```
Troxler ADU 5151
Drying...
Cycle # 1
Pressure:      4.4 RVQ
```

7. The ADU then begins a series of vacuum cycles during which it removes the moisture from the sample(s). At the same time, the heating unit is warming the chamber to ensure that the sample remains near room temperature.
8. The number of cycles is determined by how long it takes to get to a predetermined "dry calibration" value. Larger

samples and samples with more void space will generally take longer, as will extremely wet samples.

9. If the number of cycles reaches 20 before the "dry calibration" value is reached, the ADU will stop and give a message to rotate the sample, replace the lid, and press **<ENTER>**. After the vacuum begins again, the sample(s) will dry quickly.

```
Please turn sample over  
to continue drying.  
Press <ENTER>  
when ready
```

10. Upon completion of the vacuum cycles, the ADU will beep and then release the pressure in the chamber. The sample(s) may then be removed.
11. The display screen will show the number of cycles completed to dry the sample(s). The ADU will then display:

```
Drying Complete  
Please remove sample  
Dry moisture chamber  
Press <ENTER>
```

The following screen will display after pressing **<ENTER>**:

```
Troxler ADU 5151  
Place sample in  
chamber, seal Lid  
Press <ENTER>
```

## NOTE

The Pressure Check automatically adjusts the ADU for changes in atmospheric pressure. If a significant change in atmospheric pressure occurs during the course of a workday, perform a new Pressure Check.

## Loose Asphalt Mix or Aggregate Samples

The ADU can also be used to dry loose aggregate or asphalt mix. Before performing this procedure, change the Profile to *Aggregate* mode in the **Setup** menu (see page 3-4).

To calculate the moisture content of loose aggregate, follow the typical procedure used when drying the sample in an oven. Simply weigh the sample before drying, place sample in the ADU, and run through a cycle. Weigh the material after the cycle and calculate the percent moisture that was contained in the sample.

The process for drying loose samples is very similar to drying a compacted core sample. Follow the instructions below for drying loose mix and aggregate.

1. Place the loose sample inside the aggregate bag provided with the unit. Always ensure the bag is properly secured before drying. Failure to do so could damage the ADU and void any remaining warranty.
2. Place the bag in the sample chamber and rest it on the sample tray. The bag should not make contact with the sides of the chamber.
3. Place the lid securely on the chamber. It is important that the lid gasket make good contact with the chamber in order to seal properly.

4. Press **<ENTER>** to begin the measurement.
5. If the number of cycles reaches 10 before the “dry calibration” is reached, the ADU will stop and give a message to turn the sample over. Remove the bag from the chamber and gently shake it. Turn the bag over and place back into the chamber. Replace the lid and press **<ENTER>** to complete the drying.

## Extremely Wet Samples

If the sample has completed 40 cycles and is not completely dry, remove the sample from the chamber to prevent overheating.

1. Hold down the **<ESC>** key to stop the drying cycle.
2. Remove the sample and allow it to cool at room temperature for at least 30 minutes.
3. After the sample has cooled, place it back into the chamber to finish drying.

## Moisture Reservoir or Cold Trap (Optional)

After a sample is dried, water will collect in the moisture reservoir (or optional cold trap). It is recommended that this be dried after a very wet sample or after two to four typical samples dried in the ADU.

If too much moisture is allowed to accumulate in the reservoir, the moisture may be drawn into the pump, shortening the pump life.





# Chapter 3:

## Setup Menu

---

This chapter covers the following topics and tasks:

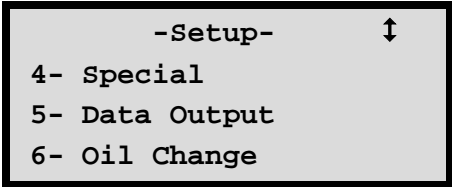
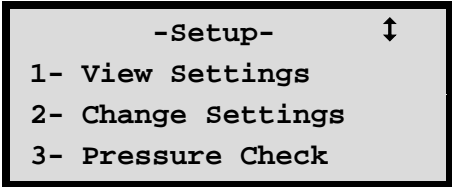
- ✓ View and change settings
- ✓ Perform a Pressure Check
- ✓ Change the unit's oil
- ✓ Export data

# Setup Menu

---

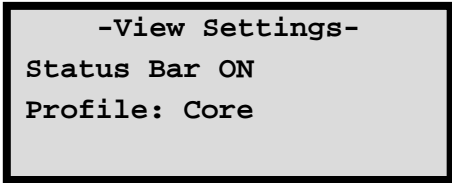
The ADU software offers a number of options that can be configured for greater flexibility of operation. These options are accessed from the **Setup** menu.

To access the **Setup** menu, press **<SETUP>** on the keypad. To select an option, press the numeric key that corresponds to the desired option. The following sections describe each selection seen below.



## View Settings

To view the currently selected options, press **<1>** from the **Setup** menu. The screen displays:



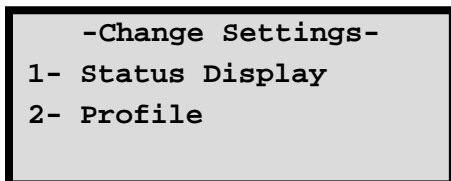
Press **<ESC>** to return to the **Setup** menu.

## Change Settings

The **Change Settings** selection enables you to:

- ◆ Change the way you monitor the drying status.
- ◆ Change the drying profile for different sample types.

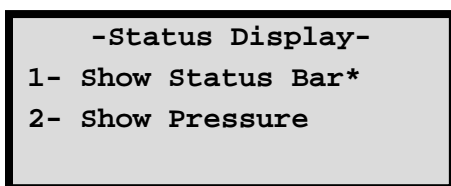
To access these options, press **(2)** from the **Setup** menu. The screen displays:



## Status Display

The Status Display gives information regarding the progress of the sample being dried. If the Show Status Bar option is selected, the ADU displays a shaded bar to represent the drying process. When the bar shading is gone, the sample is dry. The Show Pressure option simply displays the pressure in RVQ as the sample is drying.

To access the options for the Status Display, press **(1)** from the **Change Settings** menu. The screen displays:



## NOTE

The asterisk (\*) in the Change Settings menu denotes the active setting.

- ▶ To show the Status Bar, press <1> from the **Status Display** menu.
- ▶ To show the Pressure, press <2> from the **Status Display** menu.
- ▶ Press <ESC> to exit the **Status Display** menu and return to the **Change Settings** menu.

## Profile

To change the current profile setting, press <2> from the **Change Settings** menu.



## NOTE

The asterisk (\*) in the Change Settings menu denotes the active setting.

- ▶ Press <1> 1 for drying asphalt core samples.
- ▶ Press <2> for drying loose asphalt or aggregate samples.

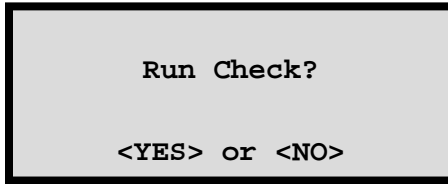
## NOTE

Always use the aggregate sample bag when drying loose samples. See page 2-8 for more information.

## Pressure Check

The ADU is calibrated at the factory and requires no initial calibration upon receipt. Pressure checks must be performed daily and can be repeated if necessary.

To run the pressure check, press **(3)** from the **Setup** menu. The screen displays:



### NOTE

Before running a Pressure Check, make sure the chamber is empty and the lid is tightly sealed.

- ▶ Press **(YES)** to run the check. Press **(START)** to begin.
- ▶ Press **(NO)** or **(ESC)** to exit the pressure check menu.

## Special Menu

The ADU software contains functions that are typically not used on a day-to-day basis. These functions are accessed from the **Special** menu, which is a submenu of the **Setup** menu. Currently, these functions allow you to set the date and time and to clear all data.

To access these functions press **<4>** from the **Setup** menu. The ADU displays:

```
-Special-  
1- Clock/Calendar  
2- Erase Records  
3- Change Batteries
```

### Clock/Calendar

To set the current time and date, press **<1>** from the **Special** menu. The ADU displays:

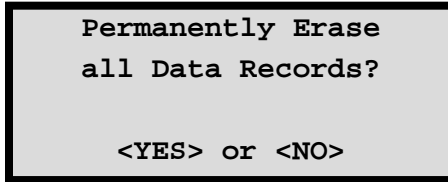
```
-Clock/Calendar- ↑  
1- Change Time  
2- Change Date  
3- Time Format
```

```
-Clock/Calendar- ↑  
4- Date Format
```

- ▶ Use the keypad to select the option you want to change and follow the on-screen instructions.
- ▶ Press **<ESC>** to exit the **Special** menu and return to the **Setup** menu.

## Erase Records

To use this function, press **(2)** from the **Special** menu. The ADU displays:



Permanently Erase  
all Data Records?  
  
<YES> or <NO>

- ▶ Press **(YES)** to erase all records.
- ▶ Press **(NO)** to exit and return to the **Special** menu.

If **(YES)** is selected, the ADU displays:



Data Records  
Have Been  
Erased!

The screen then returns to the **Special** menu.

## Change Batteries

The AA batteries allow the ADU to keep the time and date in its memory and should be changed once per year to prevent loss of this information.

If the batteries have not been changed for one year, you will be notified when the ADU starts up. After changing the batteries, you will need to reset the battery reminder.

To reset the reminder, press **<3>** from the **Special** menu. The ADU displays:

```
-AA Batteries-
Last Change 03/28/11
Batteries Changed?
<YES> or <NO>
```

- ▶ Press **<NO>** to exit and return to the **Special** menu.
- ▶ Press **<YES>** to reset the battery change date. The ADU displays:

```
Are you sure you
want to reset the
Battery Change Date?
<YES> or <NO>
```

- ▶ Press **<YES>** to confirm the battery date change. The display returns to the **Special** menu.
- ▶ Press **<NO>** to exit and return to the **Special** menu.



## Data Record and Output

The ADU can store up to 20 drying records and up to 4 Pressure Check records. The checks will be listed first in the records.

To select the desired data record and output format, press **<5>** from the **Setup** menu. The screen displays:

```
-Data Output-  
1- Output Record
```

- ▶ To choose the desired output record, press **<1>** from the **Data Output** menu. Scroll to the desired record and press **<ENTER>**.
- ▶ Press **<ESC>** to return to the **Setup** menu.

After choosing the desired output record, the ADU displays:

```
-Data Output-  
1- View*  
2- Output to Serial
```

- ▶ Press **<1>** and then **<ENTER>** to view the selected data record. Use the arrow keys to scroll to the desired record information.
- ▶ Press **<2>** and then **<ENTER>** to send the selected data record to a computer connected through the Serial port using the HyperTerminal accessory in the Windows operating system. The ADU displays:

Sending data...

## Oil Change

The ADU has the ability to keep track of how long the vacuum pump has been running since the oil was last changed. If the pump is thought to have been running longer than the suggested 40 hours since the last oil change, you will be notified when the ADU starts up.

To view the time since the last oil change or to reset the Oil Change Timer, press **<6>** from the **Setup** menu. The screen displays:

-Oil Change-  
3hrs 19mins 44secs  
Changed the oil?  
<YES> or <NO>

- ▶ If **<YES>** is selected, the ADU displays:

Are you sure you  
Want to reset the  
Oil Change Timer?  
<YES> or <NO>

- ▶ Press **<YES>** to reset the Oil Change Timer.
- ▶ Press **<NO>** to exit the Oil Change menu and return to the Setup menu.

# Appendix A: Maintenance & Troubleshooting

---

This section covers the following topics and tasks:

- ✓ Maintenance schedules and tasks
- ✓ Troubleshooting

# **Maintenance & Service**

---

## **Maintenance Schedule**

### **Daily, Before Use**

- ◆ Dry the sample chamber with a lint-free cloth.
- ◆ Perform a Pressure Check (see page 3-5).

### **Daily, End of Day**

- ◆ Run Pump Cleaning Cycle at the end of every day that the ADU is used. (see page
- ◆ This cleans out moisture which may accumulate in the pump for best pump performance.

### **Every Few Uses**

- ◆ Dry the moisture reservoir and filter (see page A-3).
- ◆ If unit includes optional cold trap, dry cold trap (see page A-3).

### **Every 40 Hours of Operation**

- ◆ If necessary, clean the sample chamber with BindOff (part number 018141) or residue cleaner.
- ◆ Change the pump oil (see page A-3).
- ◆ Replace the reservoir filter (part number 117226) if necessary.

### **Yearly**

- ◆ Change the batteries (see page A-3).

# Maintenance Procedures

## Drying the Moisture Reservoir and Filter

1. Open the toggle clamps on top of the reservoir and remove the filter.
2. Dry the filter in front of a fan or in a warm environment for a few hours.
3. Use a lint-free cloth to dry the moisture reservoir.
4. Reinstall the filter and reservoir.

## Drying the Cold Trap (If included in unit)

1. Remove the cold trap lid.
2. Use a lint-free cloth to dry the cold trap and divider plate.
3. Replace the cold trap lid.

## Cleaning the Sample Chamber

1. Remove loose asphalt material from the chamber regularly. Vacuum any remaining pieces.
2. Dry the chamber with a lint-free cloth before use.
3. Clean the sample chamber with BindOff (part number 018141) or similar residue cleaner if needed.

## Changing the Pump Oil

1. Unscrew the filler plug.

2. Drain the oil from the pump and dispose of the used oil properly.
3. Add new oil (part number 117232) to the fill line.  
**Do not overfill!**
4. Reinstall the filler plug.

## **Changing the Batteries**

- 1.** Unscrew the four screws that attach the control panel to the unit.
- 2.** Remove the control panel and turn it over so the internal parts are exposed.
- 3.** Locate the batteries attached to the right-side wall.
- 4.** Replace the AA batteries.
- 5.** Reinstall the control panel.

# Troubleshooting

---



## WARNING

To prevent personal injury or equipment damage, read and become familiar with the safety warnings at the beginning of this manual.

### **The pump attempts to start, but stops or just makes a humming noise.**

- ◆ Remove the sample chamber lid and begin a Pressure check.
- ◆ The Pressure Check will fail. This is OK.
- ◆ This operation will “reset” the pressure in the pump.

### **The ADU does not turn on or is unresponsive**

- ◆ Ensure the power cord is properly plugged in.
- ◆ Turn the power off and then back on to reset the unit.
- ◆ Ensure the power outlet has power.

### **The sample does not dry**

- ◆ Ensure the power cord is properly plugged in.
- ◆ Ensure the pump is correctly attached to the ADU and all hoses and clamps are secure.
- ◆ Ensure the pump is turned on.
- ◆ Ensure the lid is properly sealed.
- ◆ Perform a new Pressure Check (see page 3-5).
- ◆ Ensure the correct amount of oil is in the pump.  
Replace oil if necessary.



- ◆ Check that the ADU is set to the correct profile (see page 3-4).

## **The unit fails during the pressure check or when drying samples**

- ◆ Ensure the pump is turned on.
- ◆ Ensure the pump is correctly attached to the ADU and all hoses and clamps are secure.
- ◆ Ensure the correct amount of oil is in the pump. Replace oil if necessary.
- ◆ Ensure the lid is properly sealed.

## **The unit continues to run after sample drying is complete**

- ◆ Stop the cycle by holding down the **<ESC>** key. Allow the pump to cool for at least 30 minutes.
- ◆ Perform a Pressure Check (see page 3-5).
- ◆ Inspect hoses and clamps to ensure they are not restricting air flow (i.e., check for pinched or damaged hoses).
- ◆ Change the oil (see page A-3).

## **All display error messages**

- ◆ Record the error message and contact Troxler at **1.877.TROXLER** or [troxtechsupport@troxlerlabs.com](mailto:troxtechsupport@troxlerlabs.com) for more information.

# Replacement Parts

---

Replacement parts and accessories can be ordered through your Troxler Representative or by calling **1-877-TROXLER**.

<b>Part Number</b>	<b>Description</b>
117233	Aggregate bag
117410	Chamber lid
117411	Chamber lid gasket
117226	Filter, Moisture Reservoir
016215.0010R	Fuse, 5X22Mm 10A 250V
117201	Hose Clamp, 11/16 to 1-1/4 dia., 5/16 Width
006506	Hose Clamp, 5/8" diameter
117232	Oil, synthetic blend (32 oz)
012483	Power cable
117412	Sample tray (puck holder)
117209.0020	Vacuum pump – 15 Micron Ultimate Vacuum
117205	Vacuum tubing (from pump to ADU) – 3 ft., 1/2"

## Optional Parts & Accessories

<b>Part Number</b>	<b>Description</b>
106949	Serial Cable

# Returning Parts for Service

All shipments to the factory (located in the United States) must be accompanied by a Returned Goods Authorization (RGA) number and a description of the unit and its problem. This information is used by Troxler personnel to expedite the repair work.

To obtain an RGA number, please complete the electronic form (available at [www.troxlerlabs.com](http://www.troxlerlabs.com)) and fax or email it to the factory or branch office.

If you do not use the form, please have the following information available when contacting Troxler for an RGA number:

- ◆ Unit (or part) model and serial number
- ◆ Problem or difficulty you are having with the unit
- ◆ Shipment method to Troxler and for return shipment
- ◆ Shipping and billing address (not a P.O. Box), including street address and ZIP code.
- ◆ Telephone number/contact person
- ◆ Payment method: credit card, account number, or purchase order number.

## NOTE

**All government agencies (city, county, state, and federal) are required to send purchase orders.**

# Appendix B: Menu Map

---

This section covers the following topics and tasks:

- ✓ ADU menu map

# Menu Map Description

Figure B-1 is a map of the compactor's **Setup** menu and each of its submenus. To access the **Setup** menu, press **(SETUP)**.

The menu map uses indentation to indicate submenus that result from selection of a menu item. For example, the first eight lines of Figure B-1 are:

- Setup-
- 1- View Settings
- 2- Change Settings
  - Change Settings-
  - 1- Status Display
    - Status Display-
    - 1- Show Status Bar
    - 2- Show Pressure

This indicates that the first two menu items under the Setup menu are View Settings and Change Settings. When the Change Settings item is selected, the ADU displays the Change Settings submenu.

## NOTE

The menu map contains only the displays that allow or require a choice by the operator. Other displays (such as numerical entries, status information, confirmation messages, or error displays) are not included.

Figure B-1. Model 5151 Menu Map

- Setup-
- 1- View Settings
- 2- Change Settings
  - Change Settings-
  - 1- Status Display
    - Status Display-
    - 1- Show Status Bar
    - 2- Show Pressure
  - 2- Profile
    - Profile-
    - 1- Core
    - 2- Aggregate
- 3- Pressure Check
- 4- Special
  - Special-
  - 1- Clock/Calendar
    - Clock/Calendar-
    - 1- Change Time
    - 2- Change Date
    - 3- Time Format
      - Time Format-
      - 1- AM/PM
      - 2- 24-Hour
    - 4- Date Format
      - Date Format-
      - 1- mm/dd/yyyy
      - 2- dd/mm/yyyy
  - 2- Erase Records
- 5- Data Output
  - Data Output-
  - 1- Output Record
- 6- Oil Change

# NOTES



# Appendix C: Specifications

---

This section covers the following topics and tasks:

- ✓ Mechanical specifications
- ✓ Electrical specifications
- ✓ Environmental conditions

# Mechanical Specifications

---

Size	25" W x 10" D x 12" H (63.5 x 25.4 x 30.5 cm)
Weight	23 lbs (10.4 kg)
ADU Shipping Dimensions	20" W x 20" D x 30" H (50.8 x 50.8 x 76.2 cm)
ADU Shipping Weight	50 lbs (22.7 kg)
Pump Shipping Dimensions	22" W x 16" D x 16" H (55.8 x 40.6 x 40.6 cm)
Pump Shipping Weight	35 lbs (15.8 kg)
Measure Units	Pressure reported in RVQ
Drying time	Moisture content dependent 10 – 20 minutes average
Calibration	Internal pressure check performed daily at a minimum

# **Electrical Specifications**

---

Power	120 VAC, 50/60 Hz
Serial Port	9-pin male RS232
Connector	8 data bit, 1 stop bit, no parity
Baud Rate	9600

# Environmental Performance

Use	Indoor
Storage Temperature	-55 to 85°C (-67 to 185°F)
Operating Temperature	12 to 38°C (55 to 101°F)
Altitude Rating	2000 m (6561.7 ft.) maximum
Main Supply Voltage Fluctuation	±10%
Humidity	Maximum 80% for temperatures up to 31°C (88°F)

# INDEX

Accessories.....	1-4, 7
Altitude rating.....	C-4
Asphalt, loose.....	2-7
Batteries, changing.....	3-7, A-2, A-4
Baud rate.....	C-3
Centers, service.....	iii
Chamber, sample.....	A-3
Change settings .....	3-3
Clock/Calendar menu .....	3-6
Cold Trap.....	1-4, 1-6, 2-8, A-2, A-3
Control panel .....	1-4, 2-2
Data output.....	3-9
Electrical specifications.....	C-3
Environmental conditions .....	C-4
Erase records .....	3-7
Filter.....	A-3
First time use .....	1-8
Fluctuation, supply voltage .....	C-4
Humidity.....	C-4
HyperTerminal .....	3-9

Inspection .....	1-6
Keypad .....	2-2
Maintenance schedule.....	A-2
Mechanical specifications.....	C-2
Menu	
Clock/Calendar .....	3-6
Map .....	2, 3
Setup .....	3-2
Special.....	3-6
Moisture reservoir .....	2-8, A-3
Filter .....	A-3
Oil.....	3-10, A-3
Change.....	3-10, A-3
Operating Temperature .....	C-4
Parts .....	1-4, 7
Returning .....	A-8
Port, serial .....	1-4
Power	
Switch.....	1-4
Pressure check .....	2-3, 2-4, 3-5
Records .....	3-9
Erase.....	3-7
RGA number .....	A-8

Safety warnings .....	x
Sample	
Aggregate .....	2-7
Drying .....	2-5
Wet .....	2-8
Sample chamber .....	A-3
Serial port .....	1-4, C-3
Service centers .....	iii
Settings	
Change .....	3-3
Profile .....	3-4
View .....	3-2
Setup menu .....	3-2
Site selection .....	1-7
Size .....	C-2
Software	
HyperTerminal .....	3-9
Special menu .....	3-6
Specifications	
Electrical .....	C-3
Mechanical .....	C-2
Startup .....	2-3
Status bar .....	3-3
Storage temperature .....	C-4
Switch, power .....	1-4

Temperature  
    Operating..... C-4  
    Storage ..... C-4  
Troubleshooting..... A-5

Unpacking..... 1-5

View Settings ..... 3-2

Weight..... C-2

Wet samples..... 2-8



## NOTES

## **TROXLER ELECTRONIC LABORATORIES, INC.**

### **LIMITED WARRANTY**

TROXLER ELECTRONIC LABORATORIES, INC., and subsidiary, TROXLER INTERNATIONAL, LTD., hereinafter referred to as "TROXLER," warrants this instrument, Model 5151, Serial Number \_\_\_\_\_, against defects in material and workmanship for a period of twelve (12) months from date of shipment. For products sold through authorized TROXLER representatives, the date of shipment will be as of the transfer from representative to purchaser. During the applicable warranty period, TROXLER's obligation under this warranty shall be limited exclusively to the repair at a TROXLER facility at no charge, except for shipping to and from TROXLER'S plant, of any instrument which may prove defective under normal use and which TROXLER's examination shall disclose to its satisfaction to be thus defective. Normal use is defined for the purpose of this warranty as operation under normal load, usage, and conditions with proper care and maintenance and competent supervision. In no event shall TROXLER be held liable for damages, delays, or losses consequential, incidental, or otherwise attributable to the failure of this instrument. TROXLER's liability being specifically limited to repair as stated hereinabove. This warranty is automatically initiated except where modified by contractual or other written and signed agreement.

**THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF, AND THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND TROXLER NEITHER ASSUMES, NOR AUTHORIZES ANYONE TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF THE INSTRUMENT. THIS WARRANTY SHALL NOT APPLY TO THE INSTRUMENT OR ANY PART THEREOF, WHICH HAS BEEN SUBJECTED TO DAMAGE BY ACCIDENT, NEGLIGENCE, ALTERATION, ABUSE, MISUSE, OR SERVICE NOT AUTHORIZED IN WRITING BY TROXLER. SUCH DAMAGE TO INCLUDE BUT NOT BE LIMITED TO BURNING OF CIRCUIT BOARDS AND HARNESS FROM IMPROPER SOLDERING TECHNIQUES AND DAMAGE TO THE INSTRUMENT DUE TO PURCHASER'S FAILURE TO PERFORM MAINTENANCE AS OUTLINED IN THE AUTHORIZED OPERATOR'S MANUAL. DUE TO THE NATURE OF THEIR USE, MECHANICAL ACCESSORY PARTS AND BATTERIES ARE WARRANTED FOR 90 DAYS ONLY FROM DATE OF SHIPMENT.**

#### **TROXLER ELECTRONIC LABORATORIES, INC.**

Troxler International, Ltd.  
3008 Cornwallis Road  
Post Office Box 12057  
Research Triangle Park, NC 27709 USA

#### **NOTICE TO CONSUMERS**

Any disclaimer or limitation on the remedies expressed above shall not be effective to the extent prohibited by state or federal law.

NOTE: THIS WARRANTY EXCLUDES DAMAGE INCURRED IN SHIPMENT. IF THIS INSTRUMENT IS RECEIVED IN DAMAGED CONDITION, THE CARRIER SHOULD BE CONTACTED IMMEDIATELY. ALL CLAIMS FOR DAMAGE IN TRANSIT SHOULD BE FILED WITH THE CARRIER. IF REQUESTED, TROXLER WILL AID IN FILING OF CLAIMS AND/OR LOCATING PRODUCTS LOST IN TRANSIT.