

Manual of Operation and Instruction

Model 5850v2 Gyratory Compactor

NOTE

Before using the Model 5850v2 Gyratory Compactor, carefully read this manual. It is especially important to understand the *Safety Warnings* on page 1–1. Keep this manual in a safe place that is always easily accessible during the use of the Model 5850v2.



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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.



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NOTE

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call 1-877-TROXLER.

ABOUT THIS MANUAL

The Model 5850v2 *Manual of Operation and Instruction* provides detailed information about the compactor. The manual includes product safety information, as well as instructions for the proper installation and use of the compactor.

This manual is organized as follows:

Chapter 1, Introduction to the Model 5850v2 – Provides information on the safe use of the compactor; a brief overview of the compactor and its features; a list of parts and accessories; and instructions for unpacking and inspection.

Chapter 2, Setup and Operation – Describes the compactor keypad, and provides instructions for setting up, starting, and operating the compactor.

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

Chapter 4, Calibration and Verification – Includes instructions for calibrating the compactor and verifying its calibration.

Chapter 5, Special Functions – Describes the functions available from the compactor's **Special** menu.

Appendix A, Troubleshooting and Service – Provides maintenance and service information, as well as instructions on basic troubleshooting.

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

Appendix C, Specifications – Contains the environmental, performance, electrical, and mechanical specifications of the compactor.

HOW TO USE THIS MANUAL

Congratulations on the purchase of the **Model 5850v2 Gyrotory Compactor**.

The Model 5850v2 *Manual of Operation and Instruction* contains information on safely using this unit. Also included in this manual are safety warnings, basic parameter setup, system troubleshooting, and general maintenance.

Do not attempt to operate the Model 5850v2 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 Model 5850v2. 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, symbols and special formatting are used to reveal the purpose of the text as follows:



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⟩

Angle brackets and a different typestyle indicate a key or character (number or letter) to press on the compactor keypad. For example, “Press ⟨**START**⟩” means to press the key labeled *START*.

DISPLAY

A different typestyle is used in text to indicate information or messages displayed on the compactor.

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

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

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INTRODUCTION TO THE MODEL 5850V2

The Model 5850v2 is Troxler's newest Superpave™ Gyrotory Compactor and the most advanced, easiest to use gyrotory compactor on the market today. This chapter introduces the Model 5850v2 and provides information on operating the compactor safely, a list of parts and accessories, and instructions for unpacking and inspecting the system.

SAFETY WARNINGS

The Troxler Model 5850v2 is a safe, durable gyrotory compactor. Troxler cannot anticipate every example of improper or unauthorized use of this unit that may lead to malfunction or accident. Thus, if a use is *not specifically mentioned* as authorized in this manual, consult Troxler before attempting it. Otherwise, it is assumed that the use is unauthorized and improper.

To ensure minimal operator risk, Troxler recommends the following safety precautions:

- ◆ Wear safety glasses when preparing an asphalt specimen.
- ◆ Always wear heat-resistant gloves when handling any hot substance.
- ◆ When moving the mold, grasp it firmly on either side under the top flange.
- ◆ Remove all objects, except the mold and asphalt specimen, from the compaction chamber before pressing the **<START>** key.
- ◆ Do not operate the compactor with the chamber door or any panels removed.
- ◆ Do not wear loose clothing or jewelry when operating the compactor.

- ◆ Keep hands away from the gyratory compactor when the unit is in motion.
- ◆ Keep fingers away from the pinch point area of the gyratory compactor. Be aware of the pinch point.
- ◆ With the service panels removed, the gyratory compactor poses an electrical hazard. Unplug the gyratory compactor before removing the panels.

CAUTIONS AND WARNINGS

Identification of Interconnects:



Lower Right Side of Compactor

- ◆ Connection for 100 – 240 VAC, 50/60 Hz power to the compactor

INTRODUCTION

The Troxler Model 5850v2 Superpave™ Gyrotory Compactor provides compaction of asphalt specimens at a given pressure, angle, and number of gyrations. The Model 5850v2 meets or exceeds all Federal Highway Administration (FHWA) Superpave-recommended specifications.

The Model 5850v2 Gyrotory Compactor provides safe, reliable gyrotory compaction of asphalt specimens using a compaction pressure and gyration angle selected by the operator. The method of specimen compaction is crucial to creating asphalt specimens that behave like construction asphalt and to obtaining meaningful test results.

SAFE OPERATION

For operator safety, all moving parts are covered and cannot be physically accessed during compaction. An interlock switch prevents the gyrotory compactor from operating with the compaction chamber door open. The red **⟨EMERGENCY⟩** safety switch located at the bottom of the control panel stops all moving parts.



WARNING

Do not operate the Model 5850v2 Gyrotory Compactor with the chamber door or any panels removed.

EASE OF OPERATION

The Model 5850v2 compacts asphalt samples to a specific height or a specific number of gyrations, as selected by the operator. The angle of gyration is recorded with every gyration, assuring angle stability.

As selected by the operator, the Model 5850v2 provides a compaction pressure of 90 to 1000 kPa and an angle of gyration between 0.00 and 3.00 degrees. Angle and pressure adjustments can be performed quickly and easily using the keypad.

For ease of operation, the Model 5850v2 provides a fully automatic method of compaction. The Model 5850v2 compacts an asphalt specimen at the touch of a single key.

The Model 5850v2 can be equipped with 150-mm, 100-mm, or 4-inch diameter molds, and can compact specimens with heights of up to 185 mm.

The Model 5850v2 features USB and serial ports for transferring data to USB or serial devices. The operator may choose to automatically send the compaction data to a computer, printer, or USB device upon completion of a compaction cycle.

The Model 5850v2 also provides storage for and allows manual printing of the last 20 compacted specimens. All output is in SI units as described in American Society of Testing and Materials (ASTM) SI10, *Standard for Use of the International System of Units (SI): The Modern Metric System*.

CARE AND MAINTENANCE

The Model 5850v2 requires little maintenance. To reduce the effects of gyration on moving parts, the gyratory compactor requires regular cleaning and lubrication. For a schedule of machine maintenance, refer to Appendix A.



Figure 1–1. Model 5850v2 Gyrotory Compactor

PARTS AND ACCESSORIES

The Model 5850v2 includes the electrical and mechanical parts required to continuously compact hot-mix asphalt. Use Figure 1–1 to locate and identify the following parts:

- ◆ The **power switch** is located on the left side of the compactor.
- ◆ The **emergency stop switch** stops all machine movement.
- ◆ The **keypad** and **display** provide the interface.
- ◆ The **mold** (not shown) with the lower puck inserted receives the asphalt for making specimens. Troxler offers molds with inside diameters of 150 mm, 100 mm, and 4 inches. (Part numbers 116066 and 116069)
- ◆ The **USB** and **serial ports** enable the operator to print or download data to a USB or serial device.
- ◆ The **USB cable** (not shown) connects the compactor to the printer or other USB device. (Part number 110697)
- ◆ The **serial cable** (not shown) connects the compactor to a serial device, such as a computer. (Part number 106514)
- ◆ The **extruder** is used to remove a compacted specimen from the mold.
- ◆ The **cooling table** is used to cool the compacted specimen.
- ◆ The **height standard assembly** (not shown) is used to calibrate the specimen height. (Part number 106989)
- ◆ The **Model 5850v2 Manual of Operation and Instruction** (not shown) provides the operating instructions for the compactor.
- ◆ The **printer** (not shown) allows the operator to print data. (Part number 116220)
- ◆ The **specimen papers** (not shown) prevent the asphalt specimen from sticking to the puck and ram head. (Part number 106953)
- ◆ The optional **Pressure Verification Kit** (not shown) allows the operator to verify the pressure calibration. The pressure is initially calibrated at the factory. (Part number 108706)

INSPECTION

Upon receiving the Model 5850v2 Gyratory Compactor from the factory, perform a complete inspection and inventory as described below.

Check to see that the following are included:

- ◆ Model 5850v2 Gyratory Compactor
- ◆ Mold
- ◆ Power cord
- ◆ Height standard assembly
- ◆ Specimen papers (500 per package)
- ◆ Printer
- ◆ USB cable
- ◆ Serial cable
- ◆ *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.



WARNING

The Model 5850v2 Gyrotory Compactor weighs approximately 227 kg (500 lb.). To prevent personal injury or equipment damage, exercise care while unpacking and lifting the unit.

NOTE

Troxler recommends that all packaging material be saved. It may be reused to pack the compactor for shipping.

1. Use a crowbar or large screwdriver to remove the 12 “L” brackets on one side of the crate and remove the front crate panel. *
2. Remove the accessory boxes around the pallet fixed to the unit. Lift the pallet out of the shipping crate.
 - a. If using a forklift, carefully lift the pallet.
 - b. If using a pallet jack, it may be necessary to make a ramp to access the pallet.
3. Cut away the plastic around the machine, then unbolt the 16 bolts that secure the 4 caster brackets to the pallet.



WARNING

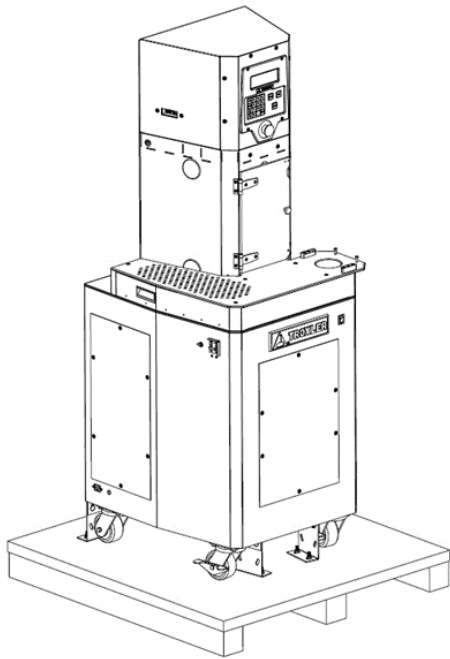
To prevent personal injury or equipment damage, do not tip the compactor while lifting it from the pallet.

4. Ensure the caster brakes are not in the locked position, then use a ramp to carefully roll the unit off the pallet.

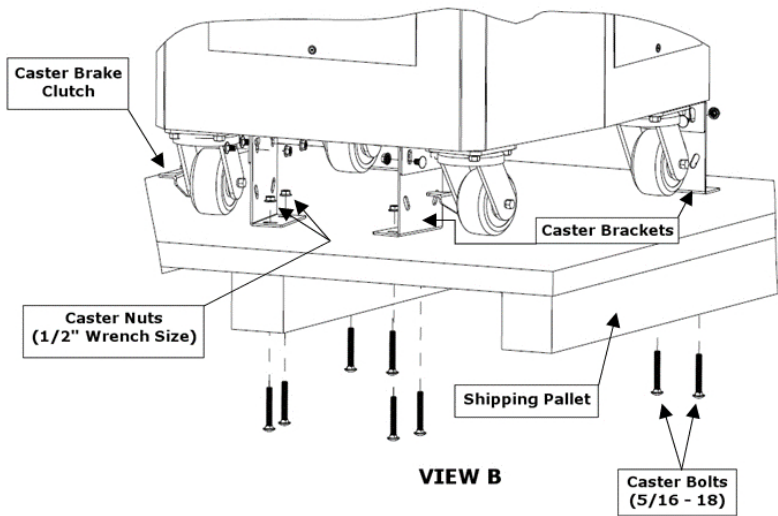
* International customers, to remove the shipping carton from the top of the unit, cut each side of the carton approximately 2 inches above the pallet. Lift the carton up and off the unit.

CAUTION

Use a forklift to lift the compactor and lift it from the side to prevent equipment damage.



VIEW A



VIEW B

Figure 1-2. Unpacking the Gyratory Compactor

SITE SELECTION

After unpacking and inspecting the compactor as described in the previous sections, select a suitable site for installation. Apply the following criteria in selecting the installation site:

- ◆ Place the compactor on a flat, level location.
- ◆ Locate the compactor *no more than* 1.2 m (4 ft) from the required electrical power source (see Appendix C). Ensure that the distance does not place stress on the power cord. The power source must be wired by a qualified electrician.
- ◆ The power switch is located on the left side panel, as shown in Figure 1–1. Ensure that the placement of the compactor provides easy access to the power switch.

1. Following the site selection guidelines in the previous section, set the compactor in place.
2. Lock the casters so that the unit remains in place.
3. Plug the ac power cord into the ac power inlet on the compactor's lower left panel (see Figure 1-1 on page 1-6).
4. Connect the ac power cord to the required ac power source (refer to Appendix C).

NOTE

On 240 VAC units, a connector must be installed on the ac power cord. The connector must meet local safety and electrical code requirements. Refer to the “Electrical Specifications” section on page C-3 for the current and voltage ratings for the compactor.

5. If using the compactor with a computer, use a serial cable to connect the computer to the serial port located on the upper left side of the compactor (see Figure 1-1 on page 1-6).

NOTES

CHAPTER 2

SETUP AND OPERATION

This chapter describes how to get started using the Model 5850v2 Gyrotory Compactor. This information includes a brief description of the control panel and instructions for turning the compactor on, setting it up, and compacting an asphalt specimen.

CONTROL PANEL

Figure 2–1 shows the layout of the Model 5850v2 Gyrotory Compactor control panel. Table 2–1 lists the functions for each key and button on the panel.

Table 2–1. Control Panel Keys and Button

KEY	FUNCTION
⟨EMERGENCY⟩	Stops all machine movement. To release the button, rotate it clockwise.
⟨START⟩	Begins automatic compaction of asphalt specimen.
⟨SETUP⟩	Accesses the <i>Setup</i> functions. These include setting or viewing the run options, setting the data output options, calibrating the compactor, verifying the calibration, and clearing project data.
⟨ESC⟩	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 ⟨NO/CE⟩. During gyration, it aborts the compaction cycle.
⟨YES⟩	Responds <i>Yes</i> to <i>Yes/No</i> questions.
⟨NO/CE⟩	Responds <i>No</i> to <i>Yes/No</i> questions. Also clears an incorrect entry and allows for re-entry.
⟨↑⟩⟨↓⟩	Scrolls through menu options or views screens.
⟨0⟩...⟨9⟩	Enters numeric values.
⟨.⟩	Enters a decimal point.
⟨ENTER⟩	Enters data or views screens.



Figure 2–1. Model 5850v2 Control Panel Layout

TURNING THE SYSTEM ON

NOTE

Control panel screens in this manual are intended as examples only. Values on your displays may differ slightly from those shown.

The power switch is located on the left side panel of the compactor (see Figure 1-1). After the compactor is turned on, it briefly displays the model and software version number, then performs a series of brief self-tests. After self-tests are completed, the compactor displays the **Machine Idle** screen shown below:

```
-Machine Idle-
04-08-2008 11:02 AM
G:100 AI:1.16 P:600
Press <START>
```

Where:

- G** = Operator-selected number of gyrations (this value is 999 if the compactor is set to compact to a target specimen height)
- AI** = Operator-selected internal angle of gyration
- P** = Operator-selected compaction pressure

FIRST TIME SETUP

The Model 5850v2 is shipped with the current date and time (Eastern Standard Time) stored in its memory. By default, the date is displayed in *mm/dd/yyyy* format and the time in *AM/PM* format. To change the date, time, or display format, refer to page 5-3.

The Model 5850v2 provides a number of operator-definable options that control its operation. From the **Setup** menu, the operator can:

- ◆ Select whether the compactor will run for a specified number of gyrations (from 1 to 160) or until the specimen has been compacted to a specified height (50 to 200 mm). Then define

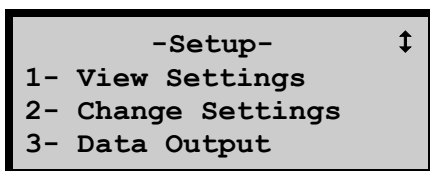
the desired ram pressure (90 to 1000 kPa)

- ◆ Set the desired gyration angle (0.00 to 3.00 degrees)

NOTE

If more than 160 gyrations are required for the application of the gyratory compactor, please contact Troxler Electronic Laboratories at 1-877-TROXLER.

Before using the compactor for the first time, ensure that these options are set properly. Press **(SETUP)** on the keypad to access the **Setup** menu:



Press **(1)** to access the **View Settings** selection. The compactor displays:

- ◆ Selected run count (number of gyrations)
- ◆ Selected mode (number of gyrations or specimen height)
- ◆ Specimen height
- ◆ Gyration angle
- ◆ Ram pressure
- ◆ Mold diameter
- ◆ Gyrate Delay

Refer to Chapter 3 for instructions on changing any of these selections.

The Model 5850v2 also provides numerous options for automatically outputting or printing data following a compaction cycle. The compactor can send the data to a computer or serial

printer via the serial (RS-232) port, or to a 2.0 USB printer or memory device (thumb drive) via the USB port.

PROCEDURE FOR COMPACTING A SPECIMEN



WARNING

To prevent personal injury or equipment damage, before operating the Model 5850v2 Gyratory Compactor, become familiar with the safety warnings on page 1-1.

The following is a checklist for compacting an asphalt specimen with the Model 5850v2 Gyratory Compactor. Each step is discussed in detail in the following sections.

1. Set up the gyratory compactor.
2. Clean all surfaces that contact the mold or pucks during compaction.
3. Lubricate the ram head and upper puck plate with Magnalube-GX.
4. Prepare the asphalt mixture according to the mix requirement.
5. Place the mold in the compactor chamber and ensure the mold flange fully contacts the dowel pins on the lower carriage plate. Close the door panel and press **<START>**.
6. Remove the mold containing the compacted specimen from the compactor chamber and extrude the asphalt specimen using the built-in extruder provided with the compactor.
7. Cool specimen on the cooling table.
 - ◆ The cooling fans and extruder will remain functional after powering off the machine as long as the ac power cord remains plugged in.

PREPARING A SPECIMEN

Use a magnet to lower the puck vertically into the mold with the tapered side facing down. **For the rest of this chapter, the mold with the bottom puck inserted will be referred to as the *mold*.**



WARNING

Always wear heat-resistant gloves when handling any hot substance. When moving the mold, firmly grasp it on either side under the top flange.

Place the asphalt mixture into an oven. Also place the mold (containing the lower puck) into the oven. Heat the asphalt mixture and mold to the compaction temperature of the mixture.

CAUTION

Do not heat the mold above 175 °C (350 °F). Heating above this temperature may warp the mold and create errors in the angle of gyration.

NOTE

While heating the mold, do not place the asphalt mixture into it.

Remove the asphalt mixture from the oven and place it on a work surface. Remove the heated mold from the oven and place it next to the hot-mix asphalt.

Place a specimen paper in the heated mold on top of the lower puck (see Figure 2–2 on page 2–8). Load the hot asphalt mixture into the mold.

NOTE

To maintain the specimen temperature and prevent segregation of the specimen, the asphalt mixture must be loaded into the mold in one continuous motion. The

paper thickness will affect compactor results; it is recommended that you use Troxler specimen papers (part numbers 106952 or 106953).

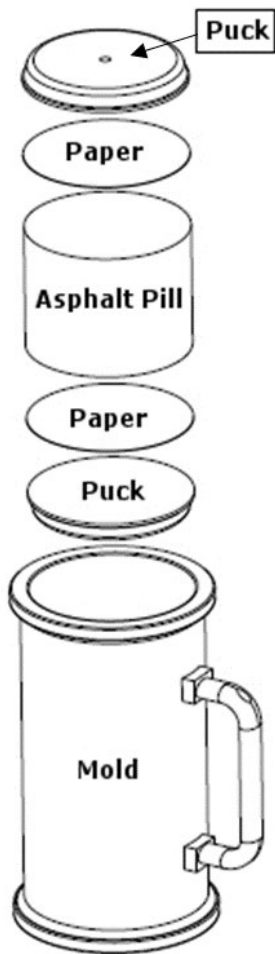


Figure 2-2. Loading the Mold

Place another specimen paper on top of the asphalt mix. Place the upper puck, with its large side down, into the mold. Keep the upper puck oriented horizontally while inserting it to prevent it from becoming wedged in the mold or use a magnet to lower the puck into the mold.

CAUTION

If the upper or lower puck becomes wedged in the mold, it must be removed and inserted correctly before compacting the asphalt specimen.

Wearing heat-resistant gloves and safety glasses, place the hot mold on the mold tray (see Figure 2–3 on page 2–13).

Slide the mold into the compaction chamber so that it rests against the two locating pins at the back of the lower carriage plate. Close the chamber door.

COMPACTING THE SPECIMEN

The Model 5850v2 Gyrotory Compactor provides a fully automatic method of controlling compaction. In *Automatic* mode, the operator begins the compaction cycle using a single keystroke. The Model 5850v2 compacts the specimen based on the number of gyrations or the target specimen height specified by the operator. In *Automatic* mode, the compactor can also automatically print or download compaction data upon completion of the compaction cycle.

Place the loaded mold into the compaction chamber and close the chamber door. Press **(START)**.

If there is no mold in the chamber, or if the mold is not in the proper location, the compactor displays an error message.

If the mold is in place, the compactor begins the compaction cycle. The compactor clamps the mold, raises the ram into position, induces the angle of gyration, and begins compaction. During the compaction cycle, the compactor displays a screen similar to the one shown below:

-Gyrating-
Gyration: #:##
Spec. Ht.: ###.# mm
G:100 AI:1.16 P:600

Where:

Gyration # = Number of gyrations completed

Spec. Ht. = The current specimen height

G = Operator-selected number of gyrations (this value is 160 if the compactor is set to compact to a target specimen height)

AI = Internal angle of gyration

P = Operator-selected compaction pressure

The compactor continues until the desired number of gyrations or target specimen height, as selected by the operator, is reached. The compactor then unclamps the mold, removes the angle of gyration, and lowers the ram to its home position.

If the *Post Gyrate Delay* function is enabled (see page 3–8), the compactor will center itself and maintain a minimal pressure for the user-specified delay time before unclamping the mold and lowering the ram.

If the *Auto Output* function (see page 3–11) is enabled, the compactor automatically outputs the gyration versus height data.

The compactor then returns to the **Machine Idle** display shown on page 2–4.

Open the chamber door and, **wearing heat-resistant gloves**, remove the mold from the compaction chamber. Extrude the specimen from the mold using the extruder provided with the unit.

REMOVING THE SAMPLE FROM THE MOLD

1. Using the Extruder Positioning Buttons, lower the extruder to the lowest position.



2. Remove sample mold from the chamber and slide the mold into the extruder rails from left to right until the bottom flange of the mold contacts the shoulder screws.
3. Using the Extruder Positioning Buttons, raise the extruder until the sample releases from the mold.
4. Using the Extruder Positioning buttons, lower the extruder to the lowest position.
5. Remove mold from extruder.

COOLING THE SAMPLE

1. Place sample on Cooling Table.
2. Power-up the Cooling Table Fan.



CLEANING AND LUBRICATING

CAUTION

Failure to properly clean and lubricate the Model 5850v2 before each use may result in compaction errors, premature equipment wear, and other problems. Debris larger than 0.004 in. can throw the angle out of tolerance.

Every 2-3 months:

1. Vacuum the mold table and compaction chamber.
2. Clean the mold table and lower the carriage plate, ram head, upper carriage assembly, and upper puck plate (see Figure 2-3) with Bindoff or similar cleaner.*
3. Clean the mold and pucks with Bindoff or similar cleaner.*

CAUTION

Do not use a degreasing cleaner or glass cleaner to clean the clear chamber door. To prevent damage to the door surface, use a mild detergent only.

Before each use:

1. Clean the mold, lower carriage plate, and ram head (see Figure 2-3 on page 2-13), as well as the upper carriage assembly and upper puck plate (View B) with Bindoff or similar cleaner*.
2. Ensure that the mold flanges are free of dirt and asphalt residue.
3. Lubricate the ram head with Magnalube-GX.
4. Inspect the upper puck plate. If dry, lubricate it with Magnalube-GX.

*If using a cleaner that removes oil, relubricate the components with a thin film of light oil or WD-40.

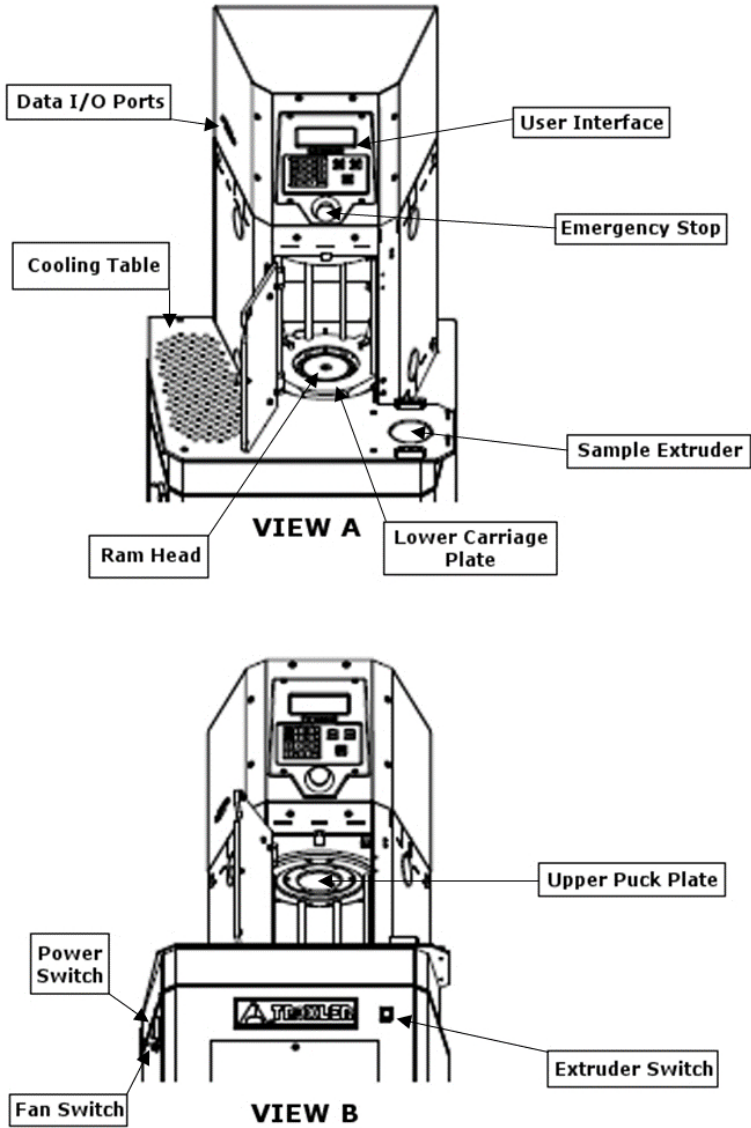


Figure 2–3. Compaction Chamber

SHEAR OPTIONS & PERFORMANCE TESTS

The Model 5850v2 can compact samples as tall as 185 mm for use with AMPT (Asphalt Mix Performance Tester). The compactor also offers a shear option, either before or after purchase. This optional feature includes transducers that measure the shear forces acting on the specimen during gyration.

The Model 5850v2 also utilizes the Gyrotory Shear Kit (GSK), which turns any gyrotory compactor into a shear-enabled unit without the expense of purchasing the shear option. Place the 1.125” tall device in your 150mm mold, fill with mix, and run the specimen. The GSK calculates the shear moment at each rotation.

For more information about the shear option, or to learn more about the Gyrotory Shear Kit, contact Troxler at 1-877-TROXLER or visit our website at www.troxlerlabs.com.

CHAPTER 3

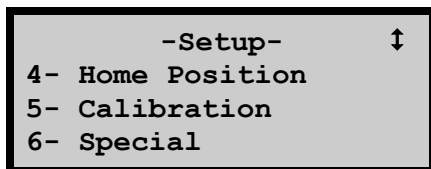
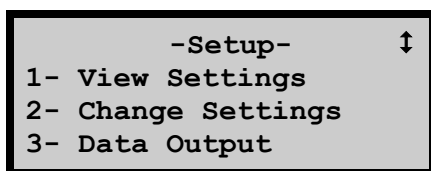
SETUP MENU

The compactor's **Setup** menu enables the operator to select and define the operating parameters of the Model 5850v2 Gyratory Compactor. This chapter describes the many menu options.

SETUP MENU

The compactor's **Setup** menu enables the operator to select and define the operating parameters of an automatic compaction cycle, to determine the destination and format for outputting or downloading compaction data, to calibrate the compactor, and to perform other special functions.

To access the **Setup** menu, press **<SETUP>** on the keypad. Use the arrow keys to scroll through the menu options. To select an option, press the numeric key that corresponds to desired option. The following sections describe each selection.



VIEW SETTINGS

To view the currently selected run options, select **View Settings** from the **Setup** menu shown on page 3–2. The compactor displays:

- ◆ Selected run count (number of gyrations)
- ◆ Selected mode (number of gyrations or specimen height)
- ◆ Specimen height
- ◆ Gyration angle
- ◆ Ram pressure
- ◆ Mold diameter
- ◆ Gyrate Delay

Press **(ESC)** to return to the **Setup** menu.

CHANGE SETTINGS

The **Change Settings** selection from the **Setup** menu allows you to:

- ◆ Select whether the compactor will run for a specified number of gyrations or until the specimen has been compacted to a specified height
- ◆ Specify the number of gyrations (from 1 to 160) the compactor will run when compacting a specimen
- ◆ Set the desired specimen height
- ◆ Set the desired gyration angle (0.00 to 3.0 degrees)
- ◆ Define the desired ram pressure (90 to 1000 kPa)
- ◆ Select the mold diameter (150-mm, 100-mm, or 4-inch)

To access these options, press **<2>** from the **Setup** menu (see page 3–2). The **Change Settings** menu displays, as shown below. Use the arrow keys to scroll through the menu options. To select an option, press the numeric key that corresponds to desired option. The following sections describe each selection.

```
-Change Settings-  ↑  
1- Operation Mode  
2- # of Gyrations  
3- Height
```

```
-Change Settings-  ↑  
4- Angle  
5- Pressure  
6- Mold Diameter
```

```
-Change Settings-  ↑  
7- Post Gyrate Delay
```

OPERATION MODE

The Model 5850v2 provides two modes of gyration. Based on operator selection, the unit may either compact the specimen for a set number of gyrations or until the specimen reaches a specified target height. The default mode of gyration is the number of gyrations.

To select the gyration mode, press **<1>** from the **Change Settings** menu shown on page 3–4. The compactor displays the **Operation Mode** menu shown below.

```
-Operation Mode-  
1- # Gyrations  
2- Specimen Height  
Press # to Select
```

Press the numeric key that corresponds to the desired operation mode. The compactor displays a brief confirmation message, and then returns to the **Change Settings** menu.

NUMBER OF GYRATIONS

To enter the number of gyrations for a compaction cycle, press **<2>** from the **Change Settings** menu shown on page 3–4. The compactor displays:

```
Input Number of  
Gyrations  
  100  
Press <ENTER>
```

Use the number keys to enter the desired number of gyrations (from 1 to 160). Use the **<NO/CE>** key to backspace. Press **<ENTER>**. The display returns to the **Change Settings** menu.

SPECIMEN HEIGHT

The Model 5850v2 can also compact the asphalt specimen to a specified target height. The operator can specify a height of 50 to 180 mm. The final specimen height may vary slightly from the value entered. Differences in specimen height are mix dependent. If the height is not acceptable, modify the height set on the unit.

To set the desired specimen height, press **(3)** from the **Change Settings** menu shown on page 3–4. The compactor displays:

```
Input Target
Specimen Height (mm)
  115.0
Press <ENTER>
```

Use the number keys to enter the specimen height (50 to 180 mm). Use the **(NO/CE)** key to backspace. Press **(ENTER)**. The display returns to the **Change Settings** menu.

GYRATION ANGLE

The Model 5850v2 can be set to an internal gyration angle of 0.00 to 3.00 degrees. To set the angle, press **(4)** from the **Change Settings** menu shown on page 3–4. The compactor displays:

```
Input Gyration
Internal Angle
  1.16
Press <ENTER>
```

Use the number keys to enter the desired gyration angle (from 0.00 to 3.00 degrees). Use the **(NO/CE)** key to backspace. Press **(ENTER)**. The display returns to the **Change Settings** menu shown on page 3–4.

PRESSURE

NOTE

To ensure proper compactor operation, calibrate the angle as described in Chapter 4 after changing the ram pressure.

The Model 5850v2 ram pressure can be set between 90 and 1000 kPa. To set the ram pressure, press <5> from the **Change Settings** menu shown on page 3–4. The compactor displays:

```
Input Compaction
Pressure (kPa)
  600
Press <ENTER>
```

Use the number keys to enter the desired ram pressure (from 90 to 1000 kPa). Use the <NO/CE> key to backspace. Press <ENTER>. The display returns to the **Change Settings** menu.

MOLD DIAMETER

CAUTION

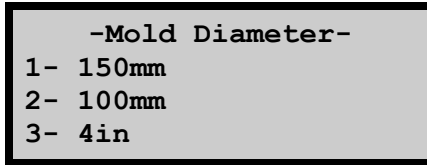
Ensure that the mold diameter selected in the compactor software is correct for the mold size in use before compacting a specimen. Failure to select the proper mold diameter in the software can cause erroneous compaction results or equipment damage.

NOTE

To ensure proper compactor operation, calibrate the compaction pressure and specimen height as described in Chapter 4 after changing the mold diameter.

The Model 5850v2 can produce 150-mm, 100-mm, or 4-inch diameter asphalt specimens.

To configure the compactor software for the diameter of the mold in use, press **(6)** from the **Change Settings** menu on page 3–4. The compactor displays:



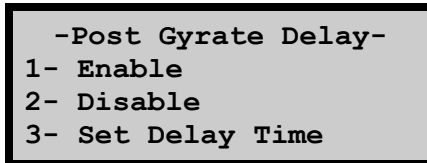
Press the numeric key that corresponds to the desired mold diameter. The compactor displays a brief confirmation message, and then returns to the Mold Diameter menu shown above. Press **(ESC)** to return to the **Change Settings** menu shown on page 3–4.

POST GYRATE DELAY

The Model 5850v2 provides the option for a user-specified delay time upon completing the compaction of a specimen. This delay maintains a minimum pressure on the sample and allows low gyration specimens to cool before the ram lowers.

Press **SETUP** button and **Change Settings**.

To enable the Post Gyration Delay, scroll using the $\uparrow\downarrow$ buttons, press **(7)** from the **Change Settings** menu. The compactor displays:



Press **(1)** to enable the function and press **(2)** to disable it. The compactor briefly displays the message **Post Gyration Delay is Enabled (or Disabled)**.

Select **<3>** to change Post Gyrate Delay time.

NOTE
Gyration process will proceed as normal.

```
Input Number of
Minutes
  XX
Press <ENTER>
```

Valid entries of **1** to **90** minutes for extra time when post delay is needed.

```
-Post Gyrate Delay-
  MM:SS
  Remaining
<ESC> to Abort
```

When the post-gyrate delay is enabled, after gyrations are complete the screen will display:

NOTE
Where MM represents minutes and SS represents seconds.

During the delay, the pump remains on. The carriage plate is centered, the pressure is set to minimum, and the ram position remains constant. The time counts down until it has elapsed or pressing **<ESC> to Abort** early.

Once the time has expired, the process is completed as usual; ram is lowered, pump is turned off and data is output (**enabled**).

DATA OUTPUT

The Model 5850v2 provides numerous options for outputting or printing data. Compaction data can be printed manually from the compactor's memory or automatically upon completion of a compaction cycle.

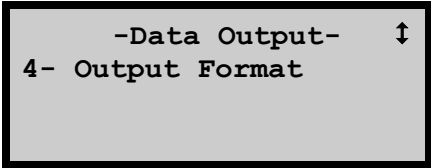
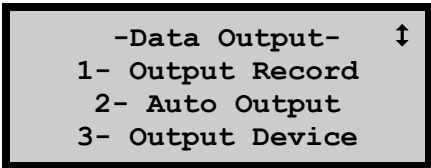
The compactor can send the data to a computer or serial printer via the serial (RS-232) port, or to a USB printer or memory device (thumb drive) via the USB port.

NOTE

The 5850v2 can only print from printers that are compatible to a 2.0 USB port.

The output data can be formatted either in a height-versus-gyration table format or in a *full table* format that includes the height, ram pressure, gyration angle, and gyration rate for each gyration.

To configure the data output options, press **<3>** from the **Setup** menu (see page 3-2). The compactor displays the **Data Output** menu shown below. Use the arrow keys to scroll through the menu options. To select an option, press the numeric key that corresponds to desired option. The following sections describe each selection.



OUTPUT RECORD

The *Output Record* function allows the operator to manually download or print compaction data stored in the compactor's

memory. The compactor stores up to 20 data records that contain information on the last 20 compaction cycles. Each data record includes the sample height (mm), ram pressure, gyration angle, and gyration rate versus the gyration number for a specimen, as well as the date and time of compaction. Printed table format data sets also include a blank for the Sample ID.

To manually download or print a data record, press **<3>** from the **Data Output** menu shown on page 3–10. The compactor searches the data records and then displays the specimens currently stored in memory, as shown below:

>04/08/09	04:24P	↑
04/08/09	01:52P	
04/08/09	08:45A	
04/08/09	08:15A	

Using the arrow keys, move the cursor (**>**) to the desired data record and press **<ENTER>**. The compactor sends the specimen data in the desired format to the selected device (see page 3–12), then returns to the **Data Output** menu.

AUTO OUTPUT

Upon completion of a compaction cycle, the Model 5850v2 can automatically download or print gyration data via the serial or USB port.

To toggle the *Auto Output* feature on or off, press **<2>** from the **Data Output** menu shown on page 3–10. The compactor briefly displays the message **Auto Output Is Now ON** (or **OFF**), then returns to the **Data Output** menu.

OUTPUT DEVICE

The compactor can send the data to a computer or serial printer via the serial (RS-232) port, or to a USB printer or memory device (thumb drive) via the USB port. To select the destination for the output data, press **<3>** from the **Data Output** menu shown on page 3–10. The compactor displays:

```
-Output Destination-
1- Serial Port
2- USB Printer
3- Thumb Drive
```

Press the numeric key that corresponds to the desired output destination. The compactor displays a brief confirmation message and returns to the **Output Destination** menu. Press **<ESC>** to return to the **Data Output** menu.

The GyroImport software is used to convert the data on the USB memory device to a Microsoft Excel workbook. The software may be downloaded from the 5850v2 product page on the Troxler website (www.troxlerlabs.com) or it can be requested from Customer Service at **1-877-TROXLER**.

OUTPUT FORMAT

The Model 5850v2 outputs data in a *height-versus-gyration* format, similar to the one shown in Figure 3–1, and shows the specimen height, or thickness, for each gyration during a compaction cycle. A *full table* output includes specimen height, gyration angle, ram pressure, and shear stress (if enabled) for each gyration.

To print the output data, press **<4>** from the **Data Output** menu (shown on page 3–10). The compactor displays:

```
-Output Format-
1- Table
2- Formatted
3- GyroPave
```

- ▶ Press **(1)** to select the Table format. The compactor displays a brief confirmation message, and then returns to the **Data Output** menu.

Troxler 5850 Gyrotory Compactor											
Sample ID: _____	Time: 01:09P				Date: 08/27/10						
Serial No: 63627											
Pressure: 600 KPa											
	1	2	3	4	5	6	7	8	9	10	
0	113.9	113.9	113.9	113.9	113.9	113.9	113.9	113.9	113.9	113.9	mm
	1.160	1.159	1.160	1.160	1.159	1.159	1.160	1.159	1.159	1.160	deg
	600	600	600	600	600	600	600	600	600	600	kPa

Figure 3–1. Sample Height Versus Gyration Table

- ▶ Press **(2)** to select the formatted data. The data is output in Comma Separated Variable (.csv) format. The compactor displays a confirmation message, and then returns to the **Data Output** menu.
- ▶ Press **(3)** to select GyroPave software compatible data format. The data is similar to the Table format, but only height measurements are output. The compactor displays a confirmation message and then returns to the **Data Output** menu.

NOTE

If *Thumb Drive* is the selected output device, the result will be the following files: Ax.hdr (header file); Ax.txt (formatted data format); AxGP.txt (GyroPave data format); AxTABLE.txt (table data format). (Where “x” represents the file index number of the data stored in the compactor’s memory.)

HOME POSITION

The Model 5850v2 contains hydraulic actuators that control specimen compaction. One actuator applies ram pressure; another actuator clamps the mold; and two actuators inside the compaction chamber set and control the gyration angle.

The *Home Position* function returns all the hydraulic actuators to their home position. To access this function, press **<4>** from the **Setup** menu (see page 3–2). The compactor drives the four actuators to their home position, while displaying **Moving Gyrotory to Home Position**. When the actuators are in their home position, the compactor returns to the **Setup** menu.

CALIBRATION

Chapter 4 describes the calibration functions available from the compactor's **Calibration** menu. To access this menu, press **<5>** from the **Setup** menu (see page 3–2).

SPECIAL

Chapter 5 describes the functions available from the compactor's **Special** menu. To access this menu, press **<6>** from the **Setup** menu (see page 3–2).

CHAPTER 4

CALIBRATION

The Model 5850v2 allows for simple calibration of the specimen height and compaction pressure, and for offsetting the angle of gyration. This chapter provides a recommended schedule for calibration and verification of these parameters, as well as instructions for performing these procedures.

CALIBRATION SCHEDULE

The Troxler Model 5850v2 Gyrotory Compactor is calibrated at the factory, and requires no initial calibration upon receipt, unless specified by your lab.

Troxler recommends the following calibration schedule for the Model 5850v2. If calibrating the compaction pressure and specimen height, calibrate the pressure first and then calibrate the height.

NOTE

To ensure proper compactor operation, calibrate the compaction pressure and specimen height after changing the ram pressure (see page 3–7).

PRESSURE CALIBRATION

See page 4–7 for details on pressure calibration.

- ◆ Calibrate the compaction pressure at least once every 3 months.

SPECIMEN HEIGHT CALIBRATION

See page 4–11 for details on specimen height calibration.

- ◆ Calibrate the specimen height at least once every 3 months.
- ◆ Calibrate the specimen height after calibrating the compaction pressure.

ANGLE VERIFICATION AND OFFSET

See page 4–3 for details on angle verification.

Verify the angle as described on page 4–3 after every 800 samples or once per year, whichever comes first. If the angle is more than $\pm 0.02^\circ$ from the target, use the *Angle Offset* function as described on page 4–13.

ANGLE VERIFICATION

The operator-selected internal angle of gyration is displayed on the **Machine Idle** screen as well as during gyration. This angle can be easily verified using an internal angle device, such as the Dynamic Angle Verification (DAV) device available from Troxler (part number 108706).

To verify the internal angle, follow the instructions in Chapter 3 to:

1. Set the operation mode to *number of gyrations*.
2. Set the number of gyrations to 10.
3. Set the compaction pressure to 600 kPa.
4. Set the gyration angle to 1.16° .

NOTE

To ensure the accuracy of internal angle measurements, the probes of the internal angle device must be aligned with the edge of the mold pull as shown below.

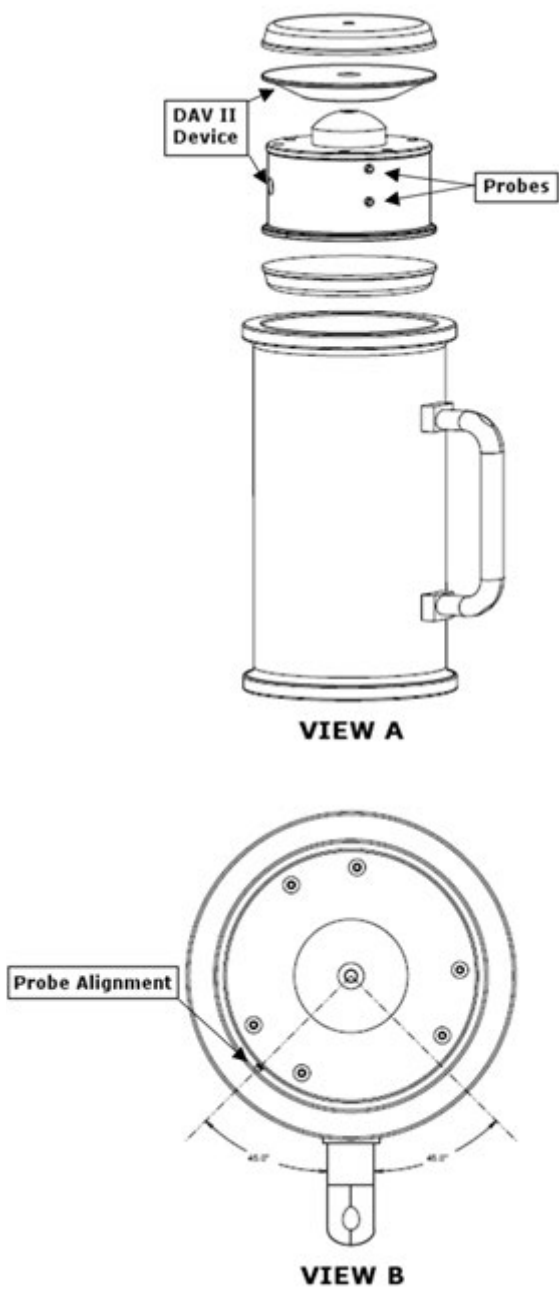


Figure 4–1. Aligning the Internal Angle Device Probes

5. Follow the instructions provided with the internal angle device to measure the *bottom angle*. Ensure that the probes of the internal angle device are aligned as shown in Figure 4-1. The probes should be aligned:
 - a. with the edge of the mold pull and
 - b. 45° clockwise from the handle.
6. Remove the mold from the chamber and record the measured angle from the internal angle device (if you use a device with recording capabilities).
7. Repeat the two previous steps two more times, first with the device aligned 45° counterclockwise from the handle and then with it in line with the pull handle.
8. Follow the instructions provided with the internal angle device to measure the *top angle*. Ensure that the probes of the internal angle device are aligned as shown in Figure 4–1. The probes should be aligned:
 - a. with the edge of the mold pull and
 - b. 45° clockwise from the handle.
9. Remove the mold from the chamber and record the measured angle from the internal angle device.
10. Repeat the two previous steps two more times, first with the device aligned 45° counterclockwise from the handle and then with it in line with the pull handle.
11. Calculate the average of the bottom angle and top angle measurements (six measurements total, eight for EU).
12. Compare the average to the entered angle of 1.16°. If the difference is more than $\pm 0.02^\circ$, refer to the *Angle Offset* section on page 4–13.

CALIBRATION



WARNING

To prevent personal injury or equipment damage, before operating the Model 5850v2 Gyrotory Compactor, become familiar with the safety warnings on page 1-1.

The Model 5850v2 allows for simple calibration of the compaction pressure and specimen height, and for offsetting the gyration angle.

To access the **Calibration** menu, press **<5>** from the **Setup** menu shown on page 3-2. The compactor displays:

```
-Calibration-      ↑
1- Pressure
2- Height
3- Angle Offset
```

```
-Calibration-      ↑
4- Print Calibration
```

Use the arrow keys to scroll through the menu options. To select an option, press the numeric key that corresponds to desired option. The following sections describe each selection.

PRESSURE

NOTE

For optimum performance—if operating the compactor at a ram pressure other than 600 kPa—calibrate the specimen height and gyration angle after changing the ram pressure (see page 3–7).

The Pressure Verification Kit includes all the equipment needed to calibrate and/or verify the compaction pressure, including a calibration load cell.

Before calibrating or verifying the pressure, clean the compactor and connect the load cell as described below:

1. To remove any grease or asphalt, clean the mold tray, ram head, lower carriage plate, upper carriage assembly, and upper puck plate (see Figure 2–3 on page 2–13) with Bindoff or similar cleaner.*

*If using a cleaner that removes oil, relubricate the components with a thin film of light oil or WD-40.

2. Connect the load cell as follows:
 - a. Using the supplied serial cable, connect the load cell to the control unit's serial port.
 - b. Connect the dc charger to the load cell and plug the charger into an electrical outlet.

To begin pressure calibration, press **<1>** at the **Calibration** menu shown on page 4–6. The compactor displays:

```
Connect Load cell to
ser. Port. Set it in
chamber. Press <ENTER>
```

CAUTION

Ensure that the load cell is placed on a height standard as described below. Failure to do so will cause damage to the load cell.

1. Place the HS (Height Standard) in the center of the lower carriage plate as shown in Figure 4-2.
2. Place the calibration load cell in the center as shown below.
3. Route the load cell cables through the notch in the upper center of the chamber opening as shown in Figure 4-3. Close the chamber door.

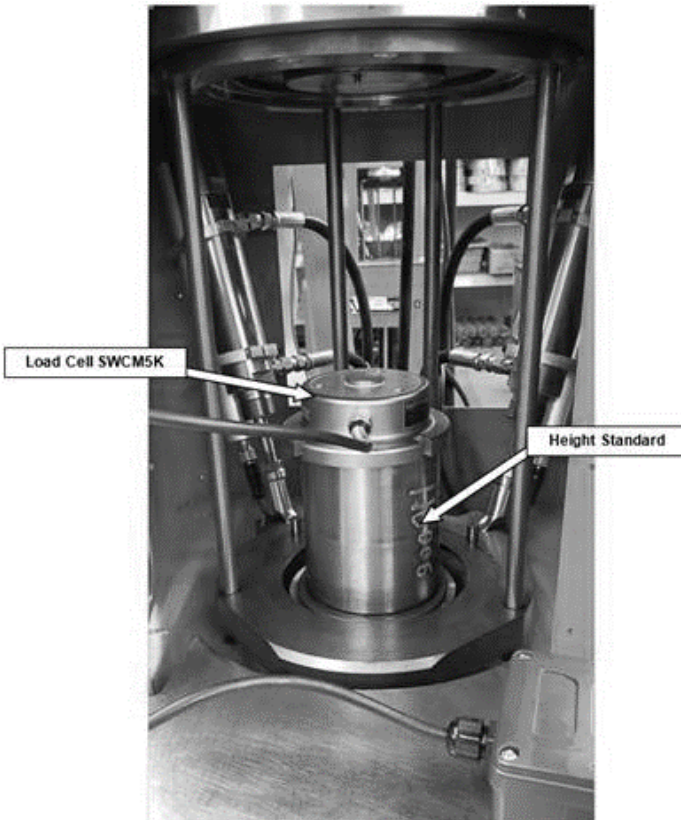


Figure 4-2. Height Standard & Load Cell on top of the Ram



Figure 4–3. Serial Cable Connected to the Load Cell & USB/Serial Interface



WARNING

To prevent equipment damage do not use a USB cable longer than 6 feet (for printing).

CAUTION

Use caution when opening and closing the chamber door to prevent catching or pinching the load cell cables.

4. Press **<ENTER>**. The compactor measures the unloaded pressure on the load cell. During this measurement, the control unit displays:

```
Pressure Cal/Verify
Testing Calibration
Load Cell
Please Wait
```

NOTE

If the load cell is not properly connected, the control unit briefly displays the following error message. Check the load cell connection. Press **<ENTER>** to continue.

```
Pressure Cal/Verify
Communication Error
Check Load Cell
Press <ENTER>
```

5. After measuring the unloaded pressure on the load cell, the compactor raises the ram until the load cell contacts the upper puck plate. The compactor then applies pressure and displays:

```
Pressure Cal/Verify

Applying Pressure
```

During calibration and verification, the compactor raises the compaction ram and performs a series of pressure measurements at high and low pressure. Upon completion, the compactor verifies the pressure calibration, and then displays the compaction pressure as measured internally by the compactor (*System*) and as measured by the load cell (*Load Cell*):


```
-Pressure Readings-  
System:   ###  
Load Cell: ###  
Press <ENTER>
```

6. If the *System* pressure differs from the *Load Cell* pressure by more than 10 kPa, or if the *System* pressure is not within 600 ± 18 kPa, check all cable connections and the position of the load cell and puck. Repeat the calibration. If repeated attempts to calibrate the pressure fail, contact your Troxler representative.
7. Press **<ENTER>**. The compactor stores new calibration constants based on the *System* and *Load Cell* values. It then lowers the ram and returns to the **Calibration** menu shown on page 4–6.
8. Open the chamber door and remove the calibration load cell and pucks. Unplug the dc charger from the electrical outlet and disconnect the load cell from the dc charger and control unit. Return all parts to the Performance Verification Kit case.

SPECIMEN HEIGHT

If calibrating the height and pressure, calibrate the pressure first. Then calibrate the specimen height.

NOTE

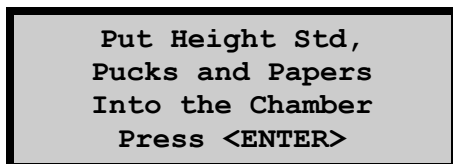
For optimum performance—if operating the compactor at a ram pressure other than 600 kPa—calibrate the specimen height and gyration angle after changing the ram pressure.

NOTE

Before calibrating the specimen height, clean the ram head, lower carriage plate, upper carriage assembly, and upper puck plate with de-greaser. Failure to do so may cause the height calibration to be inaccurate.

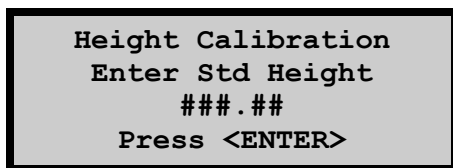
A height standard assembly is supplied with each compactor. This standard, along with two pucks and two specimen papers, is used to calibrate the specimen height.

1. To begin height calibration, press **<2>** at the **Calibration** menu shown on page 4–6. The compactor displays:



Put Height Std,
Pucks and Papers
Into the Chamber
Press <ENTER>

2. Place a clean puck, with the large side down, in the center of the carriage plate. Place two specimen papers and the height standard assembly in the center of the puck. Place a second clean puck on the top of the height standard assembly.
3. Close the chamber door and press **<ENTER>**. The compactor displays:



Height Calibration
Enter Std Height
###.##
Press <ENTER>

The height of the height standard assembly is stamped on its side. Enter the height to the nearest hundredth and press **<ENTER>**. The compactor finds its home position and then raises the ram until the upper puck reaches the upper puck plate.

The compactor then applies pressure and waits for the pressure to stabilize. When the pressure has stabilized, the compactor takes a series of measurements and then verifies the height calibration.

When the calibration is complete, the compactor displays the *Measured* height and the *Standard* height, as shown below. The displayed height should be within ± 0.10 mm of the value stamped on the height standard assembly. If not, repeat the height calibration.

```
Height Calibration
Measured:###.##mm
Standard:###.##mm
Press <ENTER>
```

4. Press **<ENTER>**. The compactor stores the new calibration constants based on the *Measured* and *Standard* values. It then displays the message **Calibration Finished** and lowers the ram to its home position. When the ram reaches the home position, the compactor returns to the **Calibration** menu shown on page 4–6. Open the chamber door and remove the height standard assembly, pucks, and specimen papers.

ANGLE OFFSET

The Model 5850v2 can be set to a gyration angle of 0.00 to 3.00 degrees. As noted earlier, Troxler recommends verifying the angle after every 800 samples or once per year using an internal angle device, such as the Dynamic Angle Verification (DAV) device available from Troxler. Refer to page 4–3 for instructions on verifying the angle.

Use the internal angle device during verification to take three *bottom angle* measurements and three *top angle* measurements. Determine the average of these six measurements (8 for EU). If the average angle is more than $\pm 0.02^\circ$ from the target, the *Angle Offset* function can be used to compensate for the difference by comparing control system feedback parameters to the average measured internal angle.

To use the *Angle Offset* function, press **<3>** at the **Calibration** menu shown on page 4–6. The compactor displays:

```
-Angle Offset-
0.00 Degrees
1- Change
2- Enable
```

Press **(1)** to enter the average of the six internal angle measurements (eight for EU). The compactor displays:

```
Input Measured
Internal Angle
  #.###
Press <ENTER>
```

Enter the measured angle and press **(ENTER)**. The compactor displays the following (where #.## is the value just entered):

```
-Angle Offset-
  #.## Degrees
1- Change
2- Enable
```

To enable the *Angle Offset* function using this value, press **(2)**.

PRINT CALIBRATION

The *Print Calibration* function can be used to manually download or print calibration data from the compactor. To use this function, press **(4)** at the **Calibration** menu shown on page 4–6. The compactor sends the calibration data to the selected output device (see page 3–12), then returns to the **Calibration** menu.

CHAPTER 5

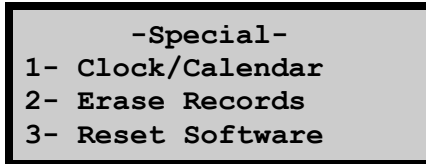
SPECIAL FUNCTIONS

The Model 5850v2 Gyrotory Compactor firmware includes a number of functions that typically are not used on a day-to-day basis. These functions are accessed from the **Special** menu, which is a submenu of the **Setup** menu.

SPECIAL MENU

The **Special** menu provides access to a number of functions that typically are not used on a day-to-day basis. These functions enable the operator to set the date and time, to clear all project (specimen) data, and to reset the software.

To access these functions, press **<6>** from the **Setup** menu. The compactor displays the **Special** menu shown below.



```
-Special-  
1- Clock/Calendar  
2- Erase Records  
3- Reset Software
```

Use the arrow keys to scroll through the menu options. To select an option, press the numeric key that corresponds to the desired option. The following sections describe each selection.

CLOCK/CALENDAR

The compactor stores the gyration data for the last 20 specimens, using the date and times to identify each specimen. The time and date of compaction are downloaded with the data.

To set the current time and date, press **<1>** from the **Special** menu shown on page 5-2. The compactor displays the **Clock/Calendar** menu shown below. Use the arrow keys to scroll through the menu options. To select an option, press the numeric key that corresponds to desired option. The following sections describe each selection.

```

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

```

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

CHANGE TIME

To set the time, press **<1>** from the **Clock/Calendar** menu shown above. The compactor displays:

```

      08:45 AM
Arrows toggle AM/PM
Input Time and
Press <ENTER>
  
```

Note that in this example, the time is displayed in *AM/PM* format. To change the format, see the *Time Format* section on page 5-5.

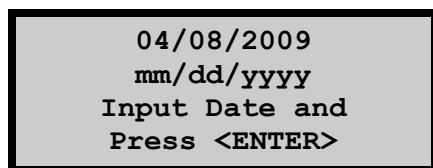
The top line of the display shows the current clock setting. To accept this setting, press **<ENTER>**. The compactor returns to the **Clock/Calendar** menu. To change the clock setting, enter the current time using the numeric keys and press **<ENTER>**. The compactor returns to the **Clock/Calendar** menu.

NOTE

The hour and minutes must be entered as two-digit numerals, with leading zeroes as required. For example, to set the time to 7:06, press **<0>** **<7>** **<0>** **<6>**, and then press **<ENTER>**.

CHANGE DATE

To set the date, press **<2>** from the **Clock/Calendar** menu shown on page 5-3. The compactor displays:



Note that in this example, the date is displayed in *mm/dd/yyyy* format. To change the format, see the *Date Format* section on page 5-5.

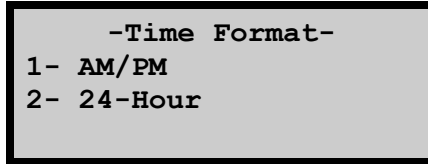
The top line of the display shows the current date setting. To accept this date and return to the **Clock/Calendar** menu, press **<ENTER>**. To change the date, enter the current date using the numeric keys and press **<ENTER>**. The compactor returns to the **Clock/Calendar** menu.

NOTE

The month and day must be entered as two-digit numerals, with leading zeroes as required. The year must be entered as a four-digit numeral. For example, to set the date to *April 8, 2009*, press **<0>** **<4>** **<0>** **<8>** **<2>** **<0>** **<0>** **<9>**, then press **<ENTER>**.

TIME FORMAT

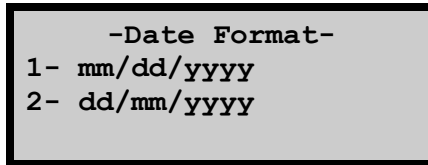
The compactor can display the time in either *AM/PM* or *24-hour* format. To set the desired format, press **<3>** from the **Clock/Calendar** menu shown on page 5-3. The compactor displays:



Press the numeric key that corresponds to the desired time format. The compactor returns to the **Clock/Calendar** menu.

DATE FORMAT

The compactor can display the date in either *mm/dd/yyyy* or *dd/mm/yyyy* format, where *mm* = month, *dd* = day, and *yyyy* = year. To set the desired format, press **<4>** from the **Clock/Calendar** menu shown on page 5-3. The compactor displays:



Press the numeric key that corresponds to the desired date format. The compactor returns to the **Clock/Calendar** menu.

ERASE RECORDS

The *Erase Records* function erases all data records stored in the compactor's memory. To erase data records, press **<2>** from the **Special** menu shown on page 5-2. The compactor displays:

Permanently Erase
all Data Records?

<YES> or <NO>

- ▶ To erase all data records, press **<YES>**. The compactor restores the default settings, displays a brief confirmation message, and returns to the **Special** menu.
- ▶ To return to the **Special** menu without erasing the data records, press **<NO/CE>** or **<ESC>**.

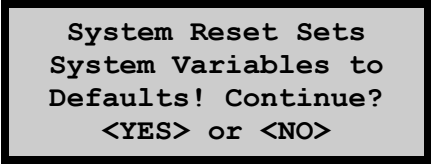
RESET SOFTWARE

The *Reset Software* function restores all software functions and settings to their default (factory) settings.

NOTE

The *Reset Software* function *does not* erase data records or calibration constants stored in the compactor memory.

To use this function, press **<3>** from the **Special** menu shown on page 5–2. The compactor displays:



```
System Reset Sets  
System Variables to  
Defaults! Continue?  
<YES> or <NO>
```

- ▶ To restore the default settings, press **<YES>**. The compactor restores the default settings, displays a brief confirmation message, and returns to the **Special** menu.
- ▶ To return to the **Special** menu without restoring the default settings, press **<NO/CE>** or **<ESC>**.

NOTES

APPENDIX A

TROUBLESHOOTING AND SERVICE

This appendix contains information on servicing and maintaining the Model 5850v2 Gyratory Compactor.

TROUBLESHOOTING



WARNING

To prevent personal injury or equipment damage, become familiar with the safety warnings on page 1–1 before operating the compactor.

Gyratory compactor does not turn on

1. Ensure that the unit is plugged in.
2. Check that the power switch is in the *ON* position.
3. Ensure the Emergency Stop button is not engaged.
4. Check the power to the wall outlet.
5. Check that the fuse for the wall outlet is not blown or that the circuit breaker is not tripped.

Moving parts are not moving

1. Ensure the unit is turned on.
2. Check that the chamber door is closed.
3. A switch may be broken. Check the service panels and emergency switches.
4. Verify that the hydraulic oil in the reservoir is at the proper level. Fill, if necessary, with light grade (ISO VG 32, SAE 10) hydraulic oil.

Gyration data does not download to the computer

1. Check that the computer is properly connected to the compactor's serial port.
2. Check that the *Auto Output* feature is enabled (see page 3–11).
3. Check that the serial port is specified as the output device (see page 3–12).

Gyration data does not print automatically following a compaction cycle

1. Ensure that the *Auto Output* feature is enabled (see page 3–11).
2. Ensure that the proper output device is selected (see page 3–12).

Gyration data does not print or download properly

1. Ensure that the *Auto Output* feature is enabled (see page 3–11).
2. If printing or downloading data to a USB device, ensure that the device is compatible with the compactor. A list of compatible USB memory devices and printers is available on the 5850v2 product page at www.troxlerlabs.com/.

General calibration problems

1. Check all cable connections.
2. For the height calibration, ensure that the puck, specimen papers, and height standard assembly are located properly on the lower carriage plate.
3. For the pressure calibration, ensure that the pucks and the load cell are located properly on the lower carriage plate.
4. Repeat the calibration once. If you still have problems with the calibration, call your Troxler representative.

Compactor displays: Pressure Calibration Communication Error

1. Check all connections between the compactor and the external load cell.
2. Check the power connection to the load cell.

All other compactor error messages

Record the error message, and then contact Troxler at 1.877.TROXLER (1.877.876.9537) for further information.

GENERAL MAINTENANCE SCHEDULE

The following sections provide a recommended schedule for performing regular maintenance on the Model 5850v2 Gyrotory Compactor.

CAUTION

Do not use a degreasing cleaner *or glass cleaner* to clean the clear chamber door. To prevent damage to the door surface, use a mild detergent only.

NOTE

Use any degreasing cleaner and a clean rag to clean metal parts. See the safety warnings on page 1–1.

DAILY, BEFORE USE

1. Clean the mold table, lower carriage plate (including the mold positioning pins), and ram head (see Figure 2–3, View A on page 2–13), as well as the upper carriage assembly and upper puck plate (View B) with Bindoff or similar cleaner.*
2. Clean the mold and pucks with Bindoff or similar cleaner. *

BEFORE EACH CYCLE

1. If necessary, clean the mold tray, lower carriage plate (including the mold positioning pins), and ram head (see Figure 2–3, View A on page 2–13), as well as the upper carriage assembly and upper puck plate (View B) with Bindoff or similar cleaner.*

*If using a cleaner that removes oil, relubricate the components with a thin film of light oil or WD-40.

2. Ensure that the mold flanges are free of dirt and asphalt residue.
3. Lubricate the ram head with Magnalube-GX.
4. Inspect the upper puck plate. If dry, lubricate it with Magnalube-GX.

EVERY 80 HOURS OF OPERATION

1. Wipe or scrape away any asphalt residue that has adhered to the mold tray, lower carriage plate, ram head, upper carriage assembly, or upper puck plate (see Figure 2–3 on page 2–13)
2. After cleaning, wipe the areas with a clean, dry cloth.
3. Inspect the ram head. Check for pitting or chipping. If replacement is necessary, contact your Troxler representative.
4. Check the following for excessive wear (damage beyond the point of operation) or damage:
 - ◆ Lower carriage plate and upper carriage assembly – Ensure that the surface is reasonably flat. Check for deep gouges, pitting or chipping. If replacement is necessary, contact your Troxler representative.
 - ◆ Ram head – Ensure that the surface is reasonably flat. Check for deep gouges, pitting or chipping. If replacement is necessary, contact your Troxler representative.
 - ◆ Mold locating pins (in the lower carriage plate) – Check for wear or flattening. Replace if necessary.
 - ◆ Pucks – Ensure that the surfaces and edges are free of pitting or galling. Replace if necessary.
 - ◆ Mold – Check for pitting or galling. Check upper and lower flanges for wear. Replace if necessary.
 - ◆ Retaining ring (inside the bottom of the mold) – Ensure that the ring is in place. If necessary, return the mold to Troxler for servicing.
5. Remove the rear service panel and perform the following steps:
 - ◆ Hydraulic oil level – Inspect the oil level after 10 minutes of down time. The oil level should be no lower than one inch from the top surface of the reservoir. If oil is needed, remove the reservoir fill cap, and add a light grade (ISO VG 32, SAE 10) hydraulic oil as necessary. Remove the funnel and replace the reservoir fill cap.

NOTE

Use only a light grade (ISO VG 32, SAE 10) hydraulic oil to fill the hydraulic reservoir.

- ◆ Hydraulic power unit – Examine all hoses and fittings for leaks.
 - ◆ Hydraulic hoses and braided sleeve – Examine the hydraulic hoses and their braided sleeves for wear. If the sleeve is worn through and the rubber hydraulic hose is worn, replace the hose and sleeve.
- 6.** Open the chamber door and examine each hydraulic hose for wear. If the rubber cover is worn, replace the hose.

REPLACING THE BATTERIES

The compactor uses two AA batteries to maintain the real-time clock (date and time). To avoid loss of the real-time clock settings, replace the batteries at least once a year.



WARNING

Carefully note the polarity of the batteries when installing them in the battery holder. A battery may explode or leak if installed improperly.

The battery holder is located behind the control panel. To replace the batteries:

1. Turn the power switch off and disconnect the AC power cord from the left side connector (see Figure 1-1 on page 1-6).
2. Remove the four screws that secure the control panel.
3. Carefully remove the control panel, using care not to damage any of the cables connected to it.
4. The battery holder is located on the rear of the control panel. Note the polarity of the AA batteries.
5. Remove the old batteries and install new AA batteries.

NOTE

If the new batteries are installed within approximately one minute after the old ones are removed, the real-time clock settings should be maintained.

6. Install the control panel using the four screws removed in step 2.
7. Reconnect the ac power cord and turn the power switch on.
8. Verify that the compactor displays the current date and time. Reset, if necessary, as described on page 5-3.

REPLACEMENT PARTS

The list below shows part numbers for parts that are replaced often. Other replacement parts can be ordered by calling **1-877-TROXLER** or visiting our online catalog at www.troxlerlabs.com.

<u>PART #</u>	<u>DESCRIPTION</u>
106514	Cable, serial, 8-ft
110697	Cable, USB communications
110665	Gravity extruder
106989	Height standard assembly
116066	Mold assembly, 100 mm
116069	Mold assembly, 150 mm
116901	Model 5850v2 <i>Manual of Operation and Instruction</i>
108664	Power cord, 13 A, 10-ft
116220	Printer, 5850v2
106953	Specimen paper, 150 mm (1 package of 500)
106952	Specimen paper, 100 mm (1 package of 500)

OPTIONAL ACCESSORIES

<u>PART #</u>	<u>DESCRIPTION</u>
108706	Pressure Verification Kit
110062	Dynamic Angle Verification (DAV) II with HMS system
116089	Electric Extruder
018141	Bindoff (1 gallon)
012786	Lubricant, Magnalube-GX (1-lb can)
018290	Lubricant brush
018682	Heat-resistant gloves
Call	GyrolImport Software and Operator Manual
Call	Shear Measurement Upgrade

RETURNING PARTS FOR SERVICE

All shipments to the factory must be accompanied by a Returned Goods Authorization (RGA) number, and a description of the instrument, and its problem. This information is used by Troxler shipping and service personnel to expedite the repair work.

To obtain an RGA number, please call or fax the factory or branch office with your request. Please have the following information available when contacting Troxler for an RGA number:

- ◆ Unit (or part) model and serial number.
- ◆ Part number/serial number (if applicable).
- ◆ Is the unit (part) still under warranty?
- ◆ Problem or difficulty you are having with the unit.
- ◆ Shipment method to Troxler and for return shipment.
- ◆ Shipping and billing address (not P.O. Box) – street address and zip.
- ◆ Telephone number/contact (for questions from Troxler).
- ◆ Will an estimate be required prior to performing any work on the part?
- ◆ Payment method: credit card, account number, or purchase order number. **All government agencies (city, county, state, and federal) are required to send purchase order numbers.**

NOTE

To prevent order duplication, if an order has been placed by telephone, please write “Confirming Order” on any follow-up written requests.

NOTES

APPENDIX B

MENU MAP

This appendix provides a map of the menus in the Model 5850v2 Gyrotory Compactor control software.

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>**. Where applicable, the default (as shipped) menu settings are shown in shaded text.

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- Operation Mode
 - Operation Mode-
 - 1- # Gyration
 - 2- Specimen Height

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 compactor displays the Change Settings submenu.

The first menu item under the Change Settings submenu is Operation Mode. When this item is selected, the compactor displays the Operation Mode submenu, which has two menu items, # Gyration and Specimen Height.

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 5850v2 Menu Map

- Setup-
- 1- View Settings
- 2- Change Settings
 - Change Settings-
 - 1- Operation Mode
 - Operation Mode-
 - 1- # Gyration
 - 2- Specimen Height
 - 2- # of Gyration
 - 3- Height
 - 4- Angle
 - 5- Pressure
 - 6- Mold Diameter
 - Mold Diameter-
 - 1- 150mm
 - 2- 100mm
 - 3- 4in
 - 7- Post Gyrate Delay
 - Post Gyrate Delay-
 - 1- Enable
 - 2- Disable
 - 3- Set Delay Time
 - 8- Angle Reference
 - Angle
 - 1- Internal
 - 2- External
- 3- Data Output
 - Data Output-
 - 1- Output Record
 - 2- Auto Output
 - 3- Output Device
 - Output Destination-
 - 1- Serial Port
 - 2- USB Printer
 - 3- Thumb Drive
 - 4- Output Format
 - Output Format-
 - 1- Table
 - 2- Formatted
 - 3- GyroPave
 - 5- Real-Time Data
- 4- Home Position

Figure B-1. Model 5850v2 Menu Map (Continued)

- Setup-
- 5- Calibration
 - Calibration-
 - 1- Pressure
 - 2- Height
 - 3- Angle Offset
 - 4- Print Calibration
- 6- 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
 - 3- Reset Software

APPENDIX C

SPECIFICATIONS

This appendix provides environmental conditions and specifications for the Model 5850v2 Gyratory Compactor.

CONTENTS

Environmental Conditions	C-2
Electrical Specifications	C-3
Mechanical Specifications	C-4

ENVIRONMENTAL CONDITIONS

Ambient Storage Temperature	-55 to 85 °C (-67 to 185 °F)
Ambient Operating Temperature	10 to 50 °C (50 to 122 °F)
Altitude Rating	2000 meters maximum
Main Supply Voltage Fluctuation	±10%
Pollution Degree	2
Installation Categories (Overvoltage Categories)	II
Humidity	92% maximum

ELECTRICAL SPECIFICATIONS

Power Requirements:

120 V units	120 VAC ($\pm 10\%$), 12 A, 60 Hz
240 V units	240 VAC ($\pm 10\%$), 6 A, 50/60 Hz, Single Phase

Serial Port:

Connector	9-pin male D-subminiature connector RS-232 standard
Data format	8 data bits, 1 stop bit, no parity
Baud rate	9600
Cable type	RS-232 null modem 9-pin female – 9 (25) pin female

USB Port

A list of compatible USB memory devices and printers is available on the 5850v2 product page at www.troxlerlabs.com.

Modes of Operation

Compact to operator-specified number of gyrations or specimen height

Data Acquisition

Gyration number, specimen height (to nearest 0.1 mm), angle of gyration, shear value (optional)

Unit of Measure

SI Units

Internal Data Storage

Results from 20 tests stored in memory

Printer Connection

USB 2.0

MECHANICAL SPECIFICATIONS

Size	162.6 H x 71.1 D x 68 W cm (64 H x 28 D x 26.75 W in.)
Weight	Approximately 227 kg (500 lb.)
Shipping Weight (est.) Unit with Packaging	328.8 kg (725 lb.)
Shipping Weight, (est.) with All Accessories	487.6 kg (1075 lb.)
Mold Weight	11.6 kg (25.5 lb.)
Puck Weight	3 kg (6.6 lb.)
Compaction Pressure	90 – 1000 kPa (13 – 145 psi)
Pressure Accuracy	Meets or exceeds AASHTO T-324 specifications
Number of Gyration	Adjustable from 1 – 160
Angle of Gyration	0.00 – 3.0 ± 0.02 degrees Internal or external
Mold Dimensions	150 mm ID x 317.5 mm height (100 mm and 4 in. ID also available) 50.0 mm minimum specimen height
Maximum Mold Temperature	175 °C (350 °F)
Speed of Gyration	30 ± 0.5 gyrations/minute
Hydraulic Oil	Light grade (ISO VG 32, SAE 10) hydraulic oil

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TROXLER ELECTRONIC LABORATORIES, INC.

LIMITED WARRANTY

TROXLER ELECTRONIC LABORATORIES, INC., and subsidiary, TROXLER INTERNATIONAL, LTD., hereinafter referred to as "TROXLER," warrants this instrument, Model 5850v2, 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.