



PHASE ONE™ DISINTEGRATION TESTER USER GUIDE



About Hanson Research

Hanson Research is a global technology company specializing in analytical test instruments for the pharmaceutical industry. Founded by the innovator of modern dissolution test technology, Hanson Research helps ensure the world's pharmaceuticals are pure, safe, and effective by manufacturing equipment that sets the global standard for quality, innovation, and long-term value. Hanson instruments are used by scientists in over 75 countries worldwide and are supported by the industry's top customer service team. For more information, visit hansonresearch.com.

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Sales and Support

Congratulations on your purchase of the Hanson Phase One™ Disintegration Tester. While we are certain you will enjoy this new product, we also understand from time to time you may have a question or technical issue requiring our assistance. Please feel free to contact us at any time by any of the methods below. We're happy to help!



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Revision History

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To confirm that you have received the latest version of this user guide, contact Hanson Research Technical Support.

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A. Introduction

Phase One Disintegration Tester Overview

The Phase One Disintegration Tester is a two-basket system designed to facilitate testing of tablet disintegration in conformance with USP Chapters <701> and <2040> and other harmonized international standards. The unit consists of a waterbath, two beakers, two basket assemblies, one heater/circulator, a set of two reciprocating arms driven by a single electric motor, and other components as shown in the illustration below.



The tester supports methods requiring two baskets running simultaneously; the baskets are not independently controlled. The standard tester configuration comes with two beakers and two baskets pre-configured for 6-tube (USP Apparatus A) with plastic disks. 3-tube baskets for Apparatus B are available separately. The quick-connect basket assemblies snap onto the basket shaft clips on the ends of the reciprocating arms that provide the dipping action. The waterbath is easily removed without tools for periodic cleaning.

Tester Power Requirements

The internal power supply of the tester automatically switches to accommodate either 120VAC/60Hz or 240VAC/50Hz. All testers come with a detachable 120VAC cable with a 3-prong plug to connect to the power source and a standard female adapter to connect to the input module on the back of the tester. Operating the tester on 240VAC requires an appropriate cable (or adapter) suitable for connecting safely to the power source and to the back of the tester.

Heater/Circulator

Heating and circulation of bath water is provided by a stand-alone PolyScience Heater Circulator (H/C) unit featuring a built-in over-temperature shut-off circuit. The H/C is self-contained with an easy-to-read LCD display and a touchpad for setting the temperature.

Heater Power Requirements

Heater/circulator power is dedicated to either 120VAC/60Hz (10 amps) or 240VAC/50Hz (6 amps), depending on which version was purchased. The H/C has its own power cord configured for the power supply specified at the time of the order. If the power source outlet is configured differently than the plug on the H/C cable as supplied, an appropriate adapter will be required. Note: the outlet plug for the 240VAC version is IEC Type E.

***Do not set heater
above 55 °C***



WARNING! The maximum possible temperature able to be set for the heater is 98 °C (factory-set limit). However, to avoid distortion of the waterbath, bath lid, and baskets, and to protect the tester warranty, the heater should never be allowed to run higher than 55 °C.

A. Introduction

User Interface

The user interface of the Phase One Disintegration Tester consists of an LCD display and a rotary control knob that allows the user to select and activate each of the tester's settings. All operations are controlled with this knob.



Drip Cups

The low-profile plastic drip cups included with the unit are designed to be placed under wet baskets for drip containment, for example when baskets are being removed from the basket shaft holders. They will also fit on top of the beakers and can be used to plug the holes in the waterbath lid to reduce evaporation.

Tester Operation Overview

Once the tester has been unpacked, installed and qualified, routine operation consists of four steps: tester initialization; test setup; running the disintegration test; and cleanup. The tester has the ability to run a timed test or a continuous free run test. A quick-start overview of the operational procedure is as follows:

1. Power up tester and heater and initialize the tester.
2. Fill waterbath with DI water to the level indicated on the label on the front of the bath.
3. Set heater/circulator to desired target temperature. (Do not exceed 55 °C.)
4. Fill beakers with media to appropriate level.
5. Place tablets in baskets (along with plastic disks if necessary).

A. Introduction

6. Install baskets on arms by snapping into basket shaft holder.
7. Highlight the desired test mode—timed or free run.
8. If a timed test, set the time limit.
9. Start the test and monitor at appropriate points.
10. End the test and perform cleanup.

The above steps are described in greater detail in the Operation section of this user guide.

Recommendations for Using This Manual

Hanson Research recommends the following steps for making best use of this user guide:

1. Review the Introduction section for an overview of the instrument.
2. Carefully review and follow all safety instructions.
3. Unpack, inspect, and install the tester according to instructions in the Installation section.
4. Conduct an initial test of the system using the procedures outlined in the Operation section.
5. Review the cleaning, maintenance, and troubleshooting sections to become familiar with keeping the tester in good working condition.
6. Immediately contact Hanson Technical Support with any questions on how to properly operate and maintain the Phase One Disintegration Tester.

B. Regulatory and Safety

Regulatory Compliance

Hanson Research hereby certifies that this product, including hardware and firmware, was designed, evaluated, validated, inspected, and tested to approved specified quality requirements of Hanson Research Corp. in conformance with current USP, EP, JP, and other international standards (India & Korea).

Canadian Emissions Notice

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set forth in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans les règlements sur le brouillage radioélectrique édictés par le Ministère des Communications du Canada.

General Safety Considerations

- This equipment contains moving parts, which have the potential to pinch or jam.
- The installation category (overvoltage category) for this instrument is Level II. The Level II category pertains to equipment that receives its electrical power from a local source such as an electrical wall outlet.
- This instrument must be connected to a grounded electrical outlet.
- Never work on the electrical components in the system while there is power to the unit. **DISCONNECT POWER BEFORE SERVICING THE INSTRUMENT.**
- Review all safety and environmental precautions pertaining to any chemicals that are to be used in conjunction with this equipment.




B. Regulatory and Safety

CSA Safety Considerations

- For indoor use only
- Maximum altitude 2,000 meters
- Environmental operating temperature 5 °C to 40 °C
- Operating relative humidity 80% for temperatures up to 31 °C, decreasing linearly to 50% relative humidity at 40 °C
- Mains supply ratings 100-240 V~, 50-60 Hz, 15 A
- Mains supply voltage fluctuations not to exceed $\pm 10\%$ of the nominal voltage
- Installation Category II (overvoltage categories)
- Pollution Degree 2
- Please note potential pinch hazards described below.
- Additional hazards may exist if the equipment is not operated according to the instructions in the user guide.

B. Regulatory and Safety

The following safety symbols are used throughout this manual.

Symbol	Definition
	General warning of potential damage or danger from a variety of sources
	Electrical grounding connection.
	Pinch hazard; keep hands and fingers clear.

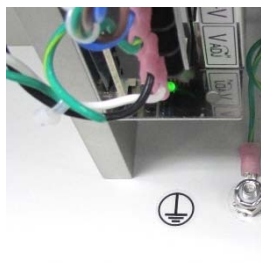
B. Regulatory and Safety

Warning Label Placements



A warning label is placed on the rear cover below the top middle screw. This symbol indicates instrument maintenance must be performed only by authorized service personnel. Injury can occur if untrained personnel are servicing the tester with the rear cover removed.

An electrical grounding symbol is placed on the inside floor of the tester casing.



A warning label placed on the front of the heater/circulator alerts the operator to the fact that the PolyScience manual must be studied before operating the heater.



B. Regulatory and Safety

Pinch Hazards



There is a potential pinch point between the top of the basket arms and the top edge of the slots through which the basket arms extend when the arms travel to their uppermost position.

Although there is a clearance of about 15 mm (0.6 inches) between the top of the arm and edge of the slot, and although the arms cannot move further because the drive mechanism prevents it, the operator should nevertheless keep clear of the arms while they are moving.



A similar potential pinch point exists between the bottom edge of the arms and the bottom edge of the slots when the arms are fully lowered. The risk of injury is low since the arms are driven downward only by gravity. Nevertheless, the operator should remain clear of the arms while they are moving.

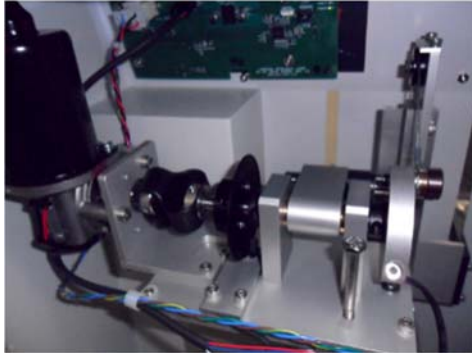


B. Regulatory and Safety

To authorized service personnel



When the back cover is removed, and power is supplied to the drive motor, multiple components will rotate and slide when the tester is commanded to run. These components are a potential pinch hazard. Keeps hands free of this area when power is on.



Tester Installation

Review all safety instructions before proceeding with installation of the Phase One Disintegration Tester.

The installation process consists of three steps:

1. Selecting an appropriate location, which includes confirming environmental and space requirements.
2. Reviewing and conforming to electrical requirements.
3. Unpacking and installing the tester into the confirmed location.

Proceed by following the instructions below.

Environmental Requirements

The installation location should be clean and free of factors that may affect the integrity of disintegration testing results, such as excessive vibration and significant variations in temperature.

Space Requirements

Please refer to Specifications section for space requirements based on the physical dimensions of the tester.

The bench should be level and flat. It must be capable of supporting the full weight (including water) of the tester.

Electrical Requirements

Each tester requires two grounded outlets within 1 meter (3 feet) of the system—one for the disintegration tester, and one for the heater/circulator. See power requirements in previous section.

Power cords must meet the following specifications: IEC 320-C13 connector; SJT 18AWG, 3C, 60 °C, 300 V.



Review all safety instructions before proceeding!

Unpacking and Inspection

Note: Moving, lifting, and carrying the Hanson Phase One Disintegration Tester requires two people working together to prevent damage to the instrument. Lift the instrument by the bottom plate while supporting the back of the tester to prevent it from tipping. The tester weighs 65 lbs. (29.5 kg).

Unpack the Tester

While unpacking the tester, first make note of any damage to the shipping container. If the container is damaged, contact the shipper immediately.

1. Remove straps from shipping container.
2. Slide box up and away from enclosed components.
3. Remove any accessory boxes.
4. Carefully remove tester from shipping container.
5. Remove blue tape securing arms and remove plastic wrap covering the bath lid.
6. Remove the bath lid.
7. Clean waterbath of packing material or other debris.
8. Place tester in final location on bench.

Assemble the Tester

1. Place heater into bath compartment (do not secure).
2. Install bath lid on top of bath while centering the heater in the slot in the bath lid.
3. Clamp heater into place using knob on back of heater.
4. Use the cable clamps provided with the tester to route the heater power cable, if desired.
5. Note: beakers and baskets cannot be installed until the tester is initialized (Section D – Operation).

Electrical Connections

1. Ensure power switch on left back side of tester is in the Off (O) position.
2. Ensure power switch back of heater unit is in the Off (O) position.
3. Insert power cable into back of tester; plug outlet end into power source.
4. Plug heater power cord into power source outlet.

D. Operation

Fill bath before turning on heater.

Operation

Please review and follow all safety and installation instructions before operating the Phase One Disintegration Tester. Before turning on power to the unit, fill the bath with deionized water, or better, to the line indicated on the front of the bath (without beakers in place).

Power on the Tester



The power switch for the tester is located on the back side of the unit. The switch is oriented for horizontal activation (toggle to the left—ON; toggle to the right—OFF (as viewed from the front of the unit).

From the front of the tester reach around to the lower left back corner to toggle the switch to the ON position. Except for servicing, troubleshooting, operator preference, or protocol, there is no need to turn the unit off after this.

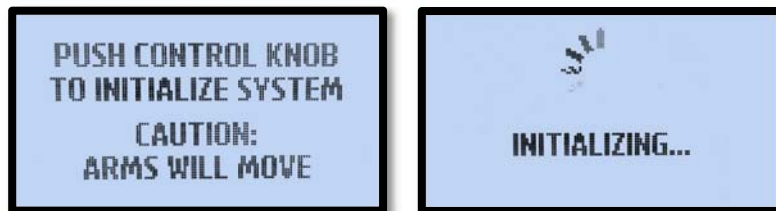
The basket arms will not move when the tester is first powered on. The LCD interface will display the Hanson name and logo for a few seconds, along with the firmware version number as shown below.



D. Operation

Initializing the Tester

With the unit powered on, the orange logo lens will begin flashing, indicating an operator action is required. The INITIALIZE screen will appear, instructing the operator to push the control knob, with a caution that the arms will begin moving.



When the control knob is pressed, the arms will begin seeking the HOME position, also called the LIFT position, in which the baskets are raised completely out of the beakers.

When the initialization process is complete, the orange logo lens will stop flashing and the main menu screen shown below will appear on the display.



D. Operation

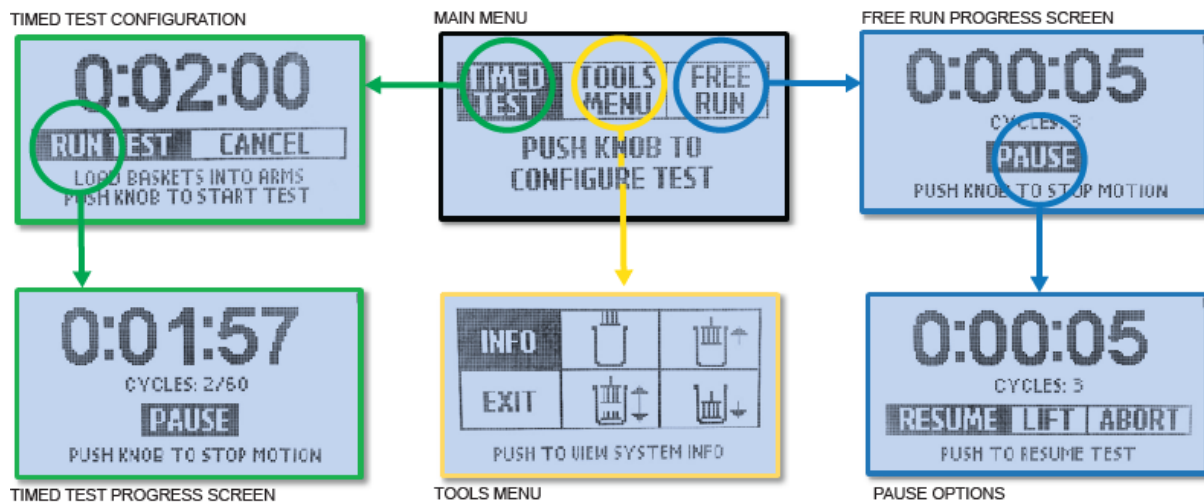
Screen Navigation Using the Control Knob

Rotating the control knob at this screen will highlight the three most frequently used options of the instrument—TIMED TEST, TOOLS MENU, and FREE RUN.



As each option is highlighted on the screen, a description of that function is shown at the bottom of the display. Pushing the control knob activates the highlighted option.

As each new screen is displayed, turning the control knob left and right will highlight the options available on that screen. For example, the green, yellow, and blue circles shown below illustrate how an operator can reach various functions on other screens by pushing the control knob at each circled option.



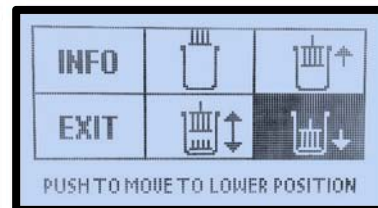
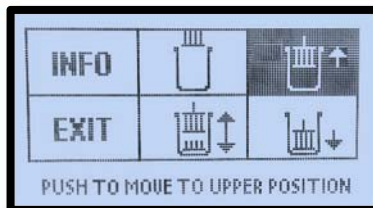
D. Operation

Using the Tools Menu

The TOOLS menu is used at various times during tester operation to move the arms into specific positions.



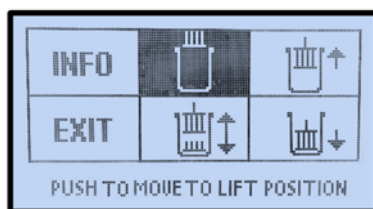
To check the top and bottom static positions of the reciprocating stroke before a test, for example to verify conformance to USP requirements, select the UPPER position and LOWER position icons shown here:



To check the reciprocating stroke dynamically, select the CYCLE icon shown below:



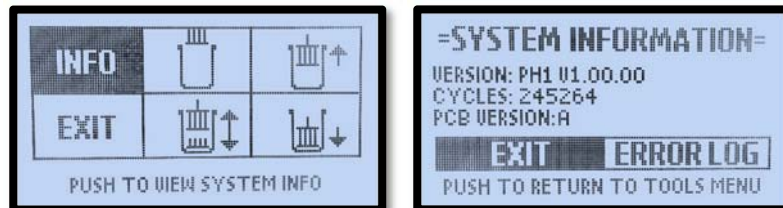
To lift the arms completely out of the beakers, for example to better view the degree of disintegration during a test, select the LIFT icon shown in the image below.



D. Operation

The TOOLS menu also provides access to the INFO screen, where system information and error messages are displayed.

Selecting the INFO icon will display system information including the firmware version, total number of cycles on the tester, and the PCB (printed circuit board) version.



Selecting ERROR LOG as shown below will display the last ten errors encountered by the unit and the cycle count at which each error occurred.

Use the control knob to scroll through the errors. For further details on reading the error log and resolving errors, see the Troubleshooting section.



Heater/Circulator

The Hanson Phase One Disintegration Tester is integrated with the PolyScience LX Immersion Circulator for control of bath temperature. The following is a quick guide for entering the set point temperature and working with the unit. Please refer to the instruction manual included with the tester for complete instructions. Electronic copies of the manual (LX Immersion Circulator Operator's Manual 110-874 PSC/EN) may be obtained from www.polyscience.com

Turn on the Power to the Heater/Circulator



The PolyScience LX Immersion Circulator has its own power supply. The power switch is located partway down the back side of the heater towards the right edge (as viewed from the front). The toggle switch is oriented for vertical activation (toggle to the top—ON, toggle to the bottom—OFF).

When the heater is powered on, the display will light up and indicate the current water temperature in the middle of the display and the target temperature in the lower right.



***Do not set heater
above 55 °C***

WARNING! The maximum possible temperature able to be set for the heater is 98 °C (factory-set limit). However, to avoid distortion of the waterbath, bath lid, and baskets, and to protect the tester warranty, the heater should never be allowed to run higher than 55 °C.

Note: As a safety feature, the heater/circulator function will not turn on, or will shut itself off, when the water level falls below the minimum limit marked on the front of the heater.

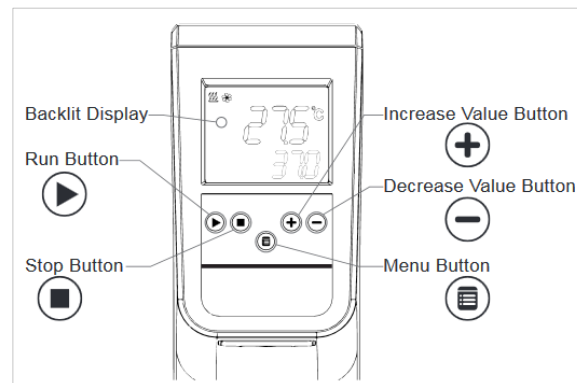
D. Operation

Setting the Temperature and Timer

To set the target temperature:

1. Press menu button to access set point menu.
2. Set desired temperature using increase/decrease buttons.
3. Press the run button to start the timer and the temperature control.

When the timer is running, the remaining time and the set point temperature will appear alternately on the display.



When the time period has elapsed, the circulator will make a beeping sound three times, then go silent for 15-20 seconds and then repeat the beeping sound. The circulator will continue circulating the bath fluid at the set point until the Stop Button is pressed, which will stop the beeping and also reset the timer.

To access the timer, press the menu button twice and then enter the desired time period using the (+/-) buttons. The timer range is 00:05 to 99:00 (hh:mm). The factory default value is 24:00

For details on heater/circulator operation, see LX Immersion Circulator Operator's Manual 110-874 PSC/EN.

E. Disintegration Testing

Beakers and Baskets Preparation

Before running a disintegration test, the basket assembly will need to be prepared, the beaker media level will need to be determined, the heater/circulator will need to be set, and the media will need to be brought to the required temperature.

Filling the Beakers

USP <701> calls for a minimum submersion of the wire mesh base of the basket assembly when the basket is at the highest point of the stroke during a disintegration test. Because of slight variations in beaker dimensions and inside surface geometry, the amount of fluid required to fill a particular beaker to a specific level in order to accommodate this requirement may vary. Use the TOOLS MENU and the procedure below to help establish the fluid level for a test.

1. Fill beakers with the required media to about the 900 mL mark and insert beakers into the bath.
2. Snap basket assemblies onto the ends of the arms, as described earlier.
3. If disks are a requirement for the test, include them in the tubes for this procedure.
4. From the main menu select TOOLS.
5. Move the baskets to the upper limit of the stroke to ensure that the wire mesh screen meets the minimum submersion requirement.
6. Add or remove media as required to satisfy the wire mesh screen's minimum submersion requirement.
7. Using the TOOLS menu, move the baskets to the LOWER position and confirm the beaker media does not overflow the top of the glass tubes.

E. Disintegration Testing

Preparing Basket Assemblies



1. Ensure the basket assemblies are clean and dry.
2. Snap the glass tubes into the clips in the basket assembly.
3. Ensure the bottom of each tube is in contact with the wire mesh at the base of the basket assembly.
4. Drop dosage forms into the tubes.
5. If disks are required for the test, place the disks into the tubes on top of the dosage forms, ensuring the small side of the trapezoid is down, as shown at left.
6. Using the TOOLS menu, move the baskets to the LIFT position.
7. Angle the basket and insert the flange of the shaft into the basket shaft holder; ensure the flange sits squarely inside the groove as shown below.



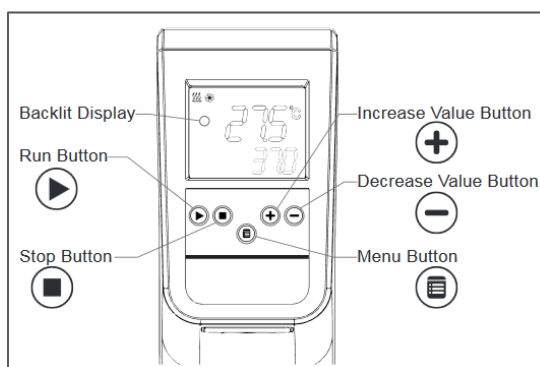
8. Note: the assembly is **INCORRECT** if the flange rests on the top or side of the shaft holder as shown below.



E. Disintegration Testing

Setting the Heater/Circulator

1. Turn on the heater/circulator using the power switch located on the back right side of the unit.
2. Press the Stop button if the heater is running.
3. Press the Menu button until the temperature function and the word “Set” appears on the screen.
4. Use the plus (+) and minus (-) buttons to set the target bath temperature.
5. Press the Menu button until the timer function and the word “Set” appear on the screen.
6. Use the plus (+) and minus (-) buttons to set the timer.
7. Press the Run button to start the heater/circulator.



Verify Media Temperature

Allow water in bath to come up to temperature (approximately 15 minutes when starting from room temperature). Placing baskets into warmed media will lower the temperature slightly. Set temperature to 38 °C to compensate for this effect. Check temperature of media inside the beaker using an external calibrated thermometer. Adjust heater setting as needed to bring media to correct temperature for the test.

Place Dosages in Basket

After all other test preparations are complete, and just before starting the test, ensure the basket assemblies, mesh screens and glass tubes are completely dry before placing dosage forms into the tubes. If required by the test method or SOP, place disks on top of dosages.

E. Disintegration Testing

Test Modes

The Phase One disintegration tester offers two modes of operation—timed and untimed (free run).

- In the timed-test mode, the instrument automatically stops cycling after an operator-defined test duration. In this mode the timer counts DOWN from the programmed number of hours, minutes, and seconds to zero.
- In the untimed free-run mode, the tester operates continuously until manually stopped by the operator. In free-run mode the timer counts UP from zero.

Fixed Time Test

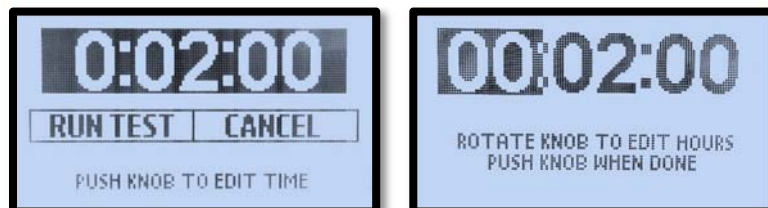
To set up a fixed-time test, at the main menu highlight TIMED TEST and push the control knob. The screen will default to the RUN TEST option and will display the duration setting of the previously programmed timed test.



If this duration is correct, and if all other test preparations have been completed (baskets, beakers, heater circulator, dosage form, etc.), the test can be started by pushing the control knob.

If the pre-existing test duration setting is not correct, re-set the timer as follows:

Rotate the control knob to highlight the time setting displayed at the top of the screen, then press the control knob to highlight just the hours.



E. Disintegration Testing

With the hours highlighted, rotate the knob left or right until the desired number is displayed. Press the knob to set the hours. The screen will now highlight the minutes as shown below.



Rotate the knob until the desired number of minutes is displayed. Press the knob to set the minutes. The screen will now highlight the number of seconds as shown below.



Rotate the knob until the desired number of seconds is displayed. Press the knob to set the seconds. The display will now return to the RUN TEST screen, this time with the new test duration value displayed.



If all other test preparations have been completed as described earlier, simply press the control knob to start the timed test.

E. Disintegration Testing

While the test is in progress, the screen will display the timer counting DOWN. It will also display the number of cycles completed so far and the total number of cycles expected.



In this mode the PAUSE function will be highlighted. Press the control knob at any time to pause the test. For further details on this function, refer to Pausing a Test.

When the timed test concludes normally, the screen will display Test Complete and the Hanson logo lens will begin blinking.



Press the control knob to confirm that the test is complete. Note that this will cause the arms to move to the LIFT position.

E. Disintegration Testing

Free Run Test

To set up a free-run (untimed, continuous) test, at the main menu highlight FREE RUN but do not yet press the control knob.



Before activating this option, ensure the media is up to temperature, the baskets and dosage are in position, and any other test preparations are complete. Use the TOOLS MENU as needed to help verify the setup.

With all preparations completed and FREE RUN highlighted, press the control knob to start the test. Note that the arms will begin moving immediately.

At this point the screen will display the elapsed time (counting UP from zero), the number of reciprocating cycles completed so far, and the PAUSE function will be highlighted.

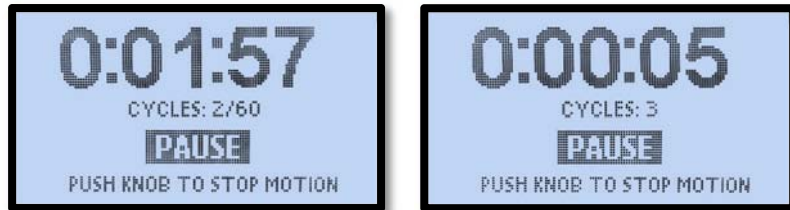


Press the control knob at any time to pause the test. For further details on this function, see Pausing a Test.

E. Disintegration Testing

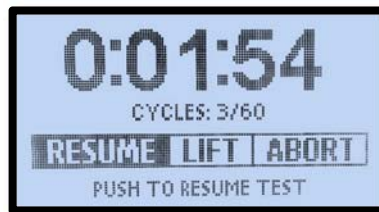
Pausing a Test

While a disintegration test is running, whether in timed or free run mode, the screen will display the option to pause the test.



When the control knob is pressed while PAUSE is highlighted, the following actions will occur:

- The motion of the arms will stop immediately.
- The timer will stop counting up or down.
- The orange logo lens will begin blinking
- The screen will display three choices: RESUME, LIFT, or ABORT. Note that the RESUME option will be highlighted by default (as shown below).



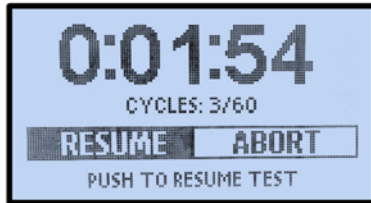
- Selecting RESUME by pressing the control knob causes the test to continue from where it left off. The timer and cycle count will continue from their previous values. The display will revert to highlighting the PAUSE function.
- Selecting LIFT will move the baskets to their highest position, completely out of the beakers, with the option to resume the test at a later time.

E. Disintegration Testing

- On activating the LIFT function, the process screen shown below will appear temporarily.



- The screen will then display two choices: RESUME or ABORT. Note that the RESUME option will be highlighted by default (as shown below).



- Selecting ABORT will end the test. On activating the ABORT function, the process screen shown below will appear temporarily.



- During the abort process the arms will move to the LIFT position and the logo lens will begin flashing. Note: the test timer and cycle count values will not be maintained. The screen will return to the main menu as shown below.



E. Disintegration Testing

Post-test Disassembly and Cleaning

When a test is completed, disassemble and clean up as follows:

1. Finish recording any observations and results before disabling the test setup.
2. Disconnect baskets from arms by tilting and removing from basket shaft holder as shown.
3. Use the red plastic drip cups supplied with the tester (or other devices) to collect drippage while guiding the basket assemblies away from the arms.
4. Dispose of test media in an appropriate manner
5. Rinse baskets and beakers in warm water.
6. If necessary, remove tubes from basket assemblies as needed to be able to clean in between tubes and mesh screens.
7. Dry the beakers and basket assemblies.



F. Maintenance

Scheduled Maintenance

WARNING! Instrument maintenance must be performed only by Hanson factory-certified engineers. Injury can occur if untrained personnel service the tester with rear cover removed.

Guidelines for Cleaning Baskets, Beakers, and Bath

Baskets. Baskets should be rinsed at the end of each test or succession of tests as required by the laboratory SOP. Baskets can be rinsed with glass tubes left in place or removed.



CAUTION! To avoid damage to basket assembly components, fluids used to wash or rinse the dark gray plastic parts should not exceed 50 °C.

Beakers. If beakers are to remain out of the bath for an extended period of time, the red drip cups can be placed into the bath lid openings to reduce the evaporation rate.

Bath lid. Any spillage of beaker media onto the bath lid should be cleaned up immediately. For ease of cleaning, the lid can be lifted from the bath and washed with lukewarm water and a sponge.

Waterbath. The waterbath is easily removed from the tester after draining with a syphon. Clean the bath using warm water and a soft cloth, no detergents.



WARNING! The use of cleaning agents or chemicals to clean the waterbath or the lid may damage the plastic which will void the warranty.

F. Maintenance

General Cleaning Instructions

Beakers with any media in them should not be placed on top of tester since spillage can result. Spillage can migrate into the enclosure and may affect the performance of the tester. Wet baskets should be placed in drip cups before placing them on top of tester. Any media that may have spilled and dripped onto the painted metal components or the metal frame and onto the base should be cleaned immediately with a cloth towel.

Glass beakers and glass tubes. Rinse with warm water and if necessary an appropriate detergent.

Basket assembly. Rinse with warm DI water.

Waterbath. The following procedure is recommended for cleaning the waterbath.

1. Remove the beakers if present.
2. Remove the bath lid.
3. Turn off the heater circulator and unplug.
4. Remove the heater circulator by loosening the clamp on the back and lifting it out of the waterbath.
5. Drain the waterbath using a Hanson Super Siphon or other suitable means.
6. Rinse top cover and waterbath with warm water and wipe with a soft cloth. Do not use any detergents on these parts.



**Do not use
detergents on
waterbath.**

Lubrication

All mechanical components that require lubrication have been pre-lubricated and do not require additional lubrication.

F. Maintenance

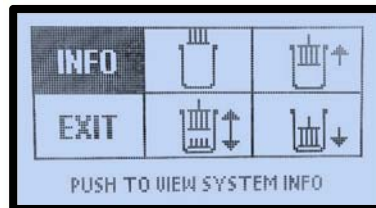
Viewing the Firmware Version

The firmware version is displayed for a few seconds on the first screen to appear when the instrument is turned on. It can also be viewed from the INFO screen, accessible as follows:

From the main menu, select TOOLS MENU.



Select INFO.



The System Information screen as shown below will display the firmware version, total number of cycles on the instrument and the printed circuit board (PCB) version.



F. Maintenance

Firmware Upgrades

The operating system firmware of the tester can be updated by either the following methods:

- Phase One Firmware Upgrade Kit (p/n TBA). This kit consists of a portable programmer pre-loaded with the latest version of the firmware. Upgrade is accomplished by connecting directly to the instrument's main board. This requires removal of the back panel of the instrument. All instrument data, such as total cycle count and error log content are preserved during the upgrade.
- Phase One Board Replacement Kit, p/n 40-107-011. This kit consists of a replacement main board, pre-programmed with the latest version of the firmware. This method requires removal of the back panel of the instrument, followed by removal and replacement of the main board. A higher degree of technical proficiency is required and in most cases a higher degree of revalidation of the instrument. All of the instrument data, such as total cycle count and error log content will be lost during the main board replacement.

Both of the above solutions come with documented service instructions. Consult with Hanson Technical Support or your local Hanson-authorized service center for help in deciding which option is best for a particular situation.

G. Troubleshooting

Error Log

The Hanson Phase One Disintegration tester detects and logs error events in non-volatile memory. View these events using the ERROR LOG in the TOOLS menu.

From the main menu (shown below), select TOOLS, then INFO.



From the System Information screen, select ERROR LOG. The screen will display the last ten error events. Rotate the control knob to scroll through the entries.



Errors are sorted by the order of occurrence such that the latest error is always item 01 on the list. Each entry includes the error name, error code, and the cycle count of the tester when the error occurred. The four errors the tester can detect are listed in the table below.

Error Code	Error Name	Description
1801	Speed Sensor Failure	The sensor that validates instrument speed has failed.
1802	Index Sensor Failure	The sensor that counts instrument cycles has failed.
1803	Lift Motion Failure	Instrument was not able to reach the lift position.
1804	Memory Failure	Verification of memory integrity has failed.

For remedies to these and other trouble conditions, see Troubleshooting.

G. Troubleshooting

Troubleshooting

If the tester shows signs of improper operation, refer to the troubleshooting chart below to assess and resolve the problem.

Problem	Possible Causes	Recommended Action
Tester will not turn on	Power switch is turned off; power cable is disconnected; building power source (outlet) is not functioning.	Turn power switch to ON position; check and connect power cable; check wall outlet.
Power getting to tester but display is not working	Static discharge to the tester	Power tester off at power switch; then power on
	Defective display or defective internal power supply	Contact Hanson Tech Support
Heater will not turn on	Power switch is turned off; power cable is disconnected; building power source (outlet) is not functioning.	Turn power switch to ON position; check and connect power cable; check wall outlet.
	Defective heater	Contact Hanson Tech Support
Basket arms will not move or stopped during operation	Defective controller, motor failure, or mechanical drive failure.	Contact Hanson Tech Support
	Sensor error	Check error log; cycle power to unit. If error persists, contact Hanson Tech Support
Erratic motion of arms but no error message	Screws in drive train may be loose; electrostatic discharge to unit; or sensor failure.	Cycle power to tester. If error persists, contact Hanson Tech Support.
Arms stop moving, with error message "Speed Sensor Failure"	Screws in drive train may be loose; electrostatic discharge to tester; or sensor failure.	Cycle power to tester. If error persists, contact Hanson Tech Support.
Arms stop moving, with error message "Count Sensor Failure"	Screws in drive train may be loose; electrostatic discharge to tester; or sensor failure.	Cycle power to tester. If error persists, contact Hanson Tech Support.
Control knob does not respond to user input	Electrostatic discharge to tester	Cycle power to tester. If condition persists, contact Hanson Tech Support.
"Error log failure" message appears	Possible internal memory failure has occurred.	Cycle power to unit. If error persists, contact Hanson Tech Support.

H. Specifications

Phase One Disintegration Tester Specifications

Part Numbers:

- 40-101-001 (with 120 V, 60 Hz heater/circulator)
- 40-101-002 (with 240 V, 50 Hz heater/circulator)

Weight: 29.5 kg (65 lbs.) dry

Dimensions: 54 cm H x 47.6 cm D x 44 cm W (21-1/4 in x 18-3/4 in x 17-1/4 in)

USP <701> Conformance:

- Stroke distance: 53 to 57 mm
- Stroke frequency: 29 to 32 cycles per minute
- Temperature: 35 °C to 39 °C

Wetted Materials:

- Basket structure: PVC
- Wire mesh screen: Type 316 SS
- Glass beakers and tubes: Borosilicate
- Disks: Acrylic

Spare Parts

Parts listed below may be ordered separately:

- 6-tube Basket Assembly (40-107-006), designed to meet USP <701> requirements. Basket assembly includes glass tubes and acrylic disks.
- 3-tube Basket Assembly (40-107-003) designed to meet USP <2040> requirements. Basket assembly includes glass tubes and acrylic disks.
- Disintegration Beaker (40-107-004)
- Drip Cups - Set of 10 (40-107-005)
- Tube, Glass - Set of 6, suited to 6-tube Basket Assembly (40-107-116)
- Tube, Glass - Set of 3, suited for 3-tube Basket Assembly (40-107-113)
- Disks - Set of 6, for 6-tube Basket Assembly (40-107-113)
- Disks - Set of 3, for 3-tube Basket Assembly (40-107-126)

I. General Warranty

General Warranty

Hanson Research (Hanson) products are warranted for one full year including parts and labor. Service contracts and Preventive Maintenance contracts are available for post-warranty support. International dealer warranties may vary. Hanson makes no warranty, expressed or implied, for glassware, consumables, or products not manufactured by Hanson, as evidenced by nameplate on the item or other designation. Hanson will give reasonable assistance to buyer in obtaining from the respective manufacturer whatever adjustment is available under the manufacturer's own warranty. Hanson shall be released from any and all obligations under any warranty, either expressed or implied, if the product covered is repaired or modified by other than its own personnel, or without written authorization from Hanson. There are no other warranties, expressed or implied, and Hanson shall not be liable under any circumstances for damages of any kind, direct, consequential, or otherwise.



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