product manual 10.17

HCM-5090.3F

Digital Indicator for Compression Machines

Testing Equipment For Construction Materials

HUMBOLDT

CONTENTS

Unpacking

Initial inspection should include checking for physical damage during shipping and obvious external damage to the product.

Package contents are defined by your packing list. Each Loader is configured according to customer specifications. In your inspection, make certain that the contents of your shipment match the documentation provided by your packing list.

Installation and Equipment Setup

Electrical Connections

The HCM-5090 is equipped with an internal digital switching power supply, which allows it to be used with most power configurations throughout the world. The unit is supplied with an IEC electrical cord with a standard 110V plug.

The HCM-5090 arrives ready for operation. Attach the supplied IEC electrical cord to the machine and plug into a standard wall receptacle for use in the United States. For locations other than the U.S., replace the supplied electrical cord with an IEC cord that has the correct plug for your application. The supplied cord can also be used by cutting the standard plug from the cord and attaching the correct plug.

Power Switch

The Power Switch is located on the upper right hand corner of the back of the machine, above the electrical cord inlet. The Fuse Compartment is located between the electrical cord inlet and the Power Switch. The HCM-5090 uses a 10 amp fuse. To begin operation, attach the supplied electrical cord, plug it in and press the Power Switch.

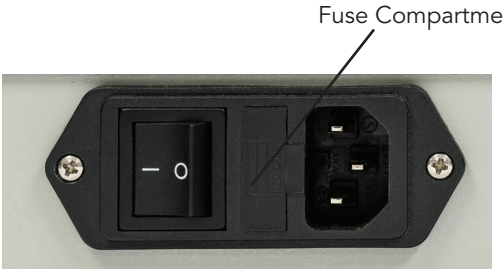
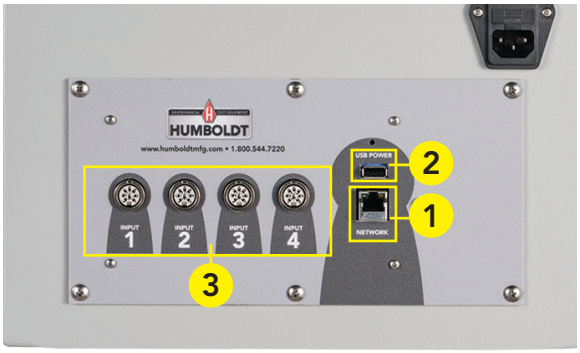


Fig. 1 Power Switch

Instrumentation Connections and Setup

HCM-5090 Rear Instrumentation Panel



Above is a photo of the rear panel of the HCM-5090.

Network (1)
Ethernet input for connecting machine to a local area network (LAN) and/or the internet. **This feature is for future use and does not currently function.**

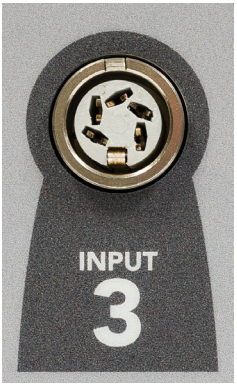
USB Power (2)
The USB Power port is used for powering a wireless access appliance for those who want to use a wireless LAN setup. **This feature is for future use and does not currently function.**

Instrument Inputs (3)
The HCM-5090 rear panel features four (4) inputs for connecting instrumentation to the machine. Each input represents a separate channel. Inputs 1 and 4 have been setup at the factory to read Load. Inputs 3 and 4 have been setup at the factory to read Displacement. Use these Inputs accordingly.

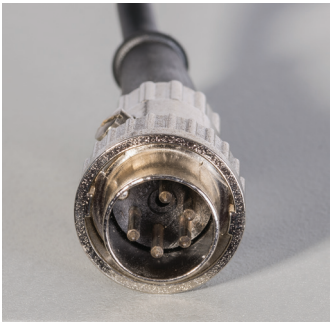
If you have purchased this Digital Indicator with your Compression Machine or have ordered instrumentation from Humboldt with your HCM-5090, this instrumentation has been assigned to a specific Input on the Digital Indicator. Instrumentation will have a numbered tag attached to it and should be plugged into the corresponding input on the Digital Indicator.

Once your compression machine is setup in its final position, you should have all instrumentation validated/calibrated by a certified calibrator. Per ASTM, all concrete testing machines are required to be calibrated every time they are moved. See calibration instructions in the Equipment Setup section of this manual.

Below are photos of an instrumentation input and the instrumentation plug. Install the plugs into the inputs by lining up the guide at the bottom of the plug with the slot at the bottom of the input.



Instrumentation Input



Instrumentation Plug

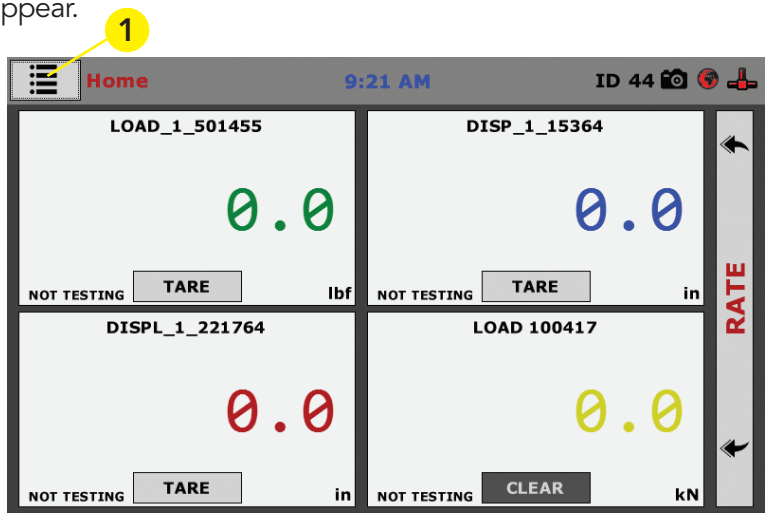
Once you have installed the instrumentation into the correct inputs, your rear panel should look like this if you are using all four inputs.

If you purchased multiple compression machines and/or compressometers/extensometers with your Compression machine/Digital Indicator, their input plugs will be marked to corre

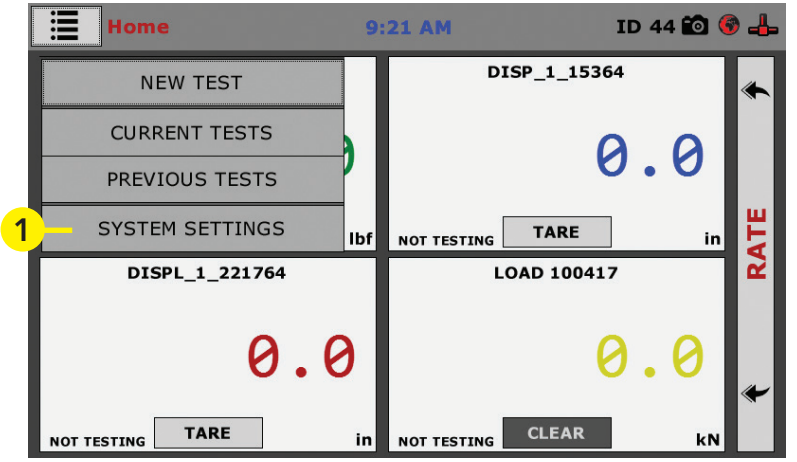
spond to an input on the back of the Digital Indicator. Refer to the Equipment Setup section of this manual, page 25 for additional information and instructions. Third-party instrumentation, which is compatible, can also be used with the HCM-5090. If you plan to use third-party compression machines or instrumentation, please refer to the Equipment Setup section of this manual, page 29, for instructions.

Initial Set Up

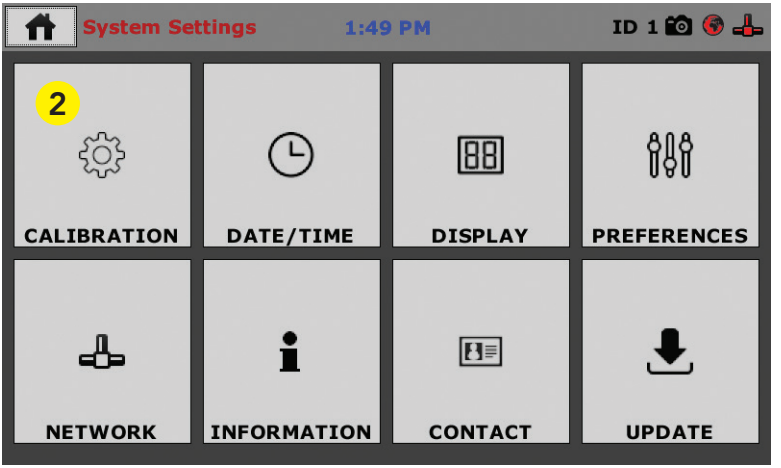
When your HCM-5090 is first turned on, the screen below will appear.



From this screen, to confirm your machine instrumentation has been calibrated or to begin the calibration process, navigate to the Calibration section by clicking the Menu icon in the top left corner of the screen (1). When you click on this button, you will see a drop-down menu appear, see below.

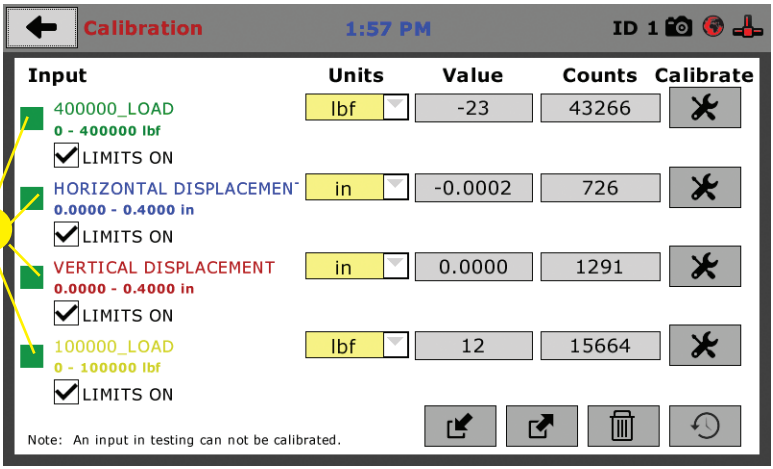


Navigate to the bottom of this drop-down menu and click on System Settings **(1)**. You will see the following screen.



Initial Set Up — Calibration

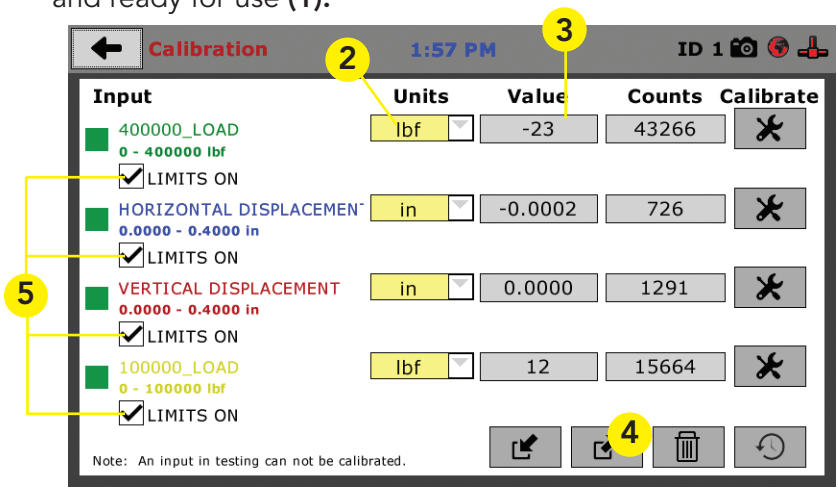
Click on the Calibration tab in the top left corner **(2)**. You will see the following screen.



Calibration Input Screen

The Calibration Input Screen (above) is used to monitor and calibrate instrumentation and assign them to the specific channels of the HCM-5090. The Calibration Input Screen provides a summary of the calibration status of each channel. At this time, verify the calibration information.

A green box at the left of a channel indicates that the channel has instrumentation assigned to it and that it is calibrated and ready for use **(1).**



Each channel has a "Limits On" check box. Use the Limits On to keep the machine from exceeding the sensor limits of the instrumentation. By selecting this option, before the test can exceed the limits of the sensors, all tests will stop running and the motor will stop to avoid damaging connected instrumentation.

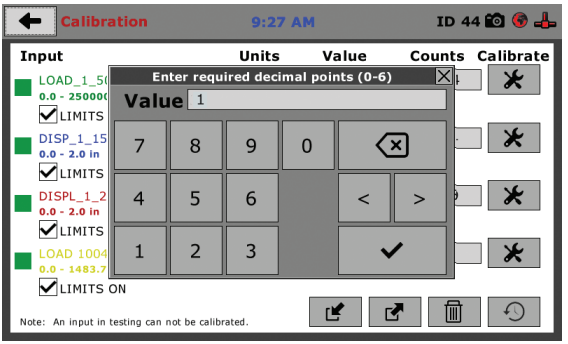
Note: An input cannot be calibrated during testing.

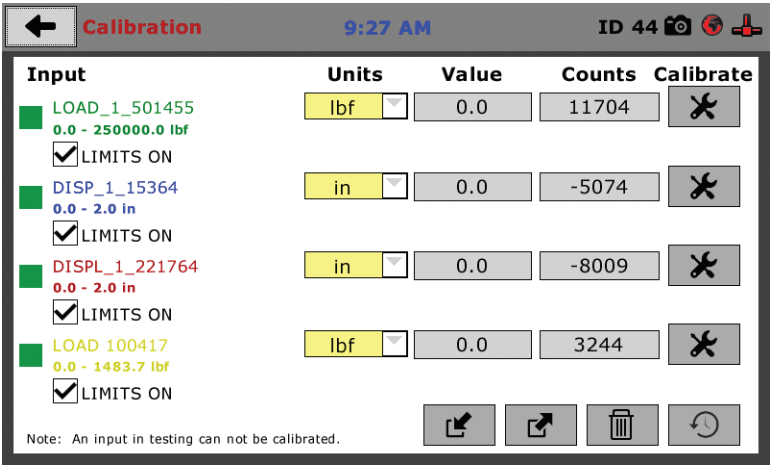
Units (2)

In this field, a calibrated instrument will display the units that were chosen for use at the time of calibration. This field can also be used to automatically toggle conversion of units between imperial and metric units if the need arises.

Value (3)

This field displays the current calibration value. This value can be set with up to 4 decimal point accuracy . If the instrument is not calibrated, the unit will read “N/A.” To change the numbers of decimals shown, click on the field and the following window will appear. Fill in the number of decimal points desired **(1)**.





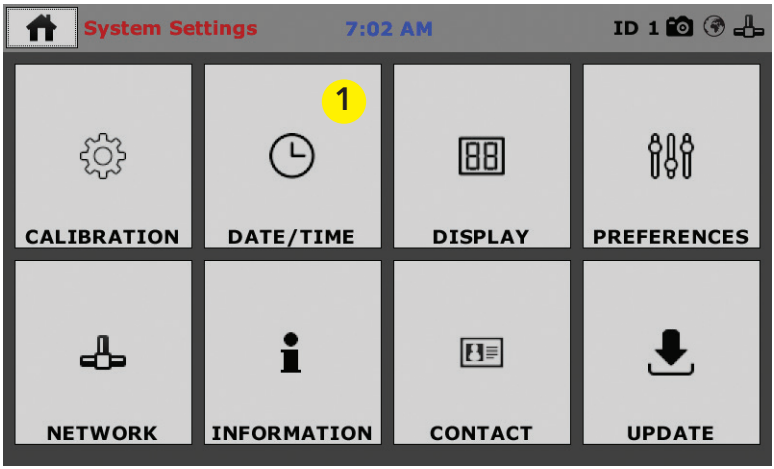
The screen above shows a typical calibration setup. In this example, the HCM-5090 has been set up with two channels for Load and two channels for Displacement.

Channels 1 and 4 are set for Load readings and Channels 2 and 3 are set for Displacement readings.

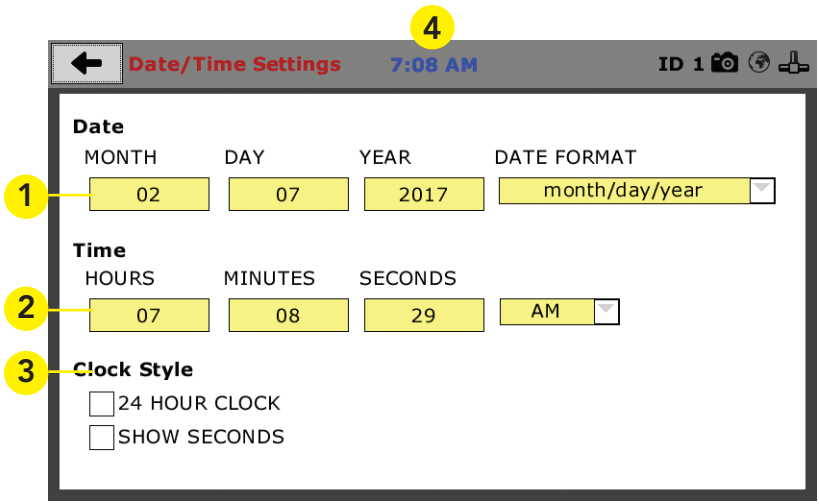
Export Calibration via USB (4)
Press this button to select calibrations to export via USB. It is a good practice to export all your calibrations to a thumb drive. In case of a problem this practice allows you to recover your calibration data quickly.

Initial Set Up — Date and Time

To set up Date and Time settings, return to the System Settings screen and click on the Date/Time Panel. **(1)**



Click on the Date/Time tab **(1)**. You will see the following screen.



Date (1)
Set the month, day, year, and date display format.

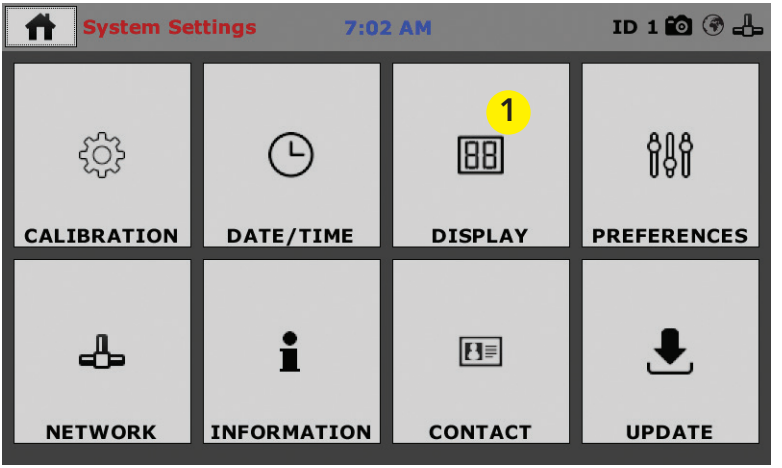
Time (2)
Set the hours, minutes, seconds, and am/pm.

Clock Style (3)
Select a clock view, either a 24-hour or 12-hour clock, as well as the option to show seconds or not.

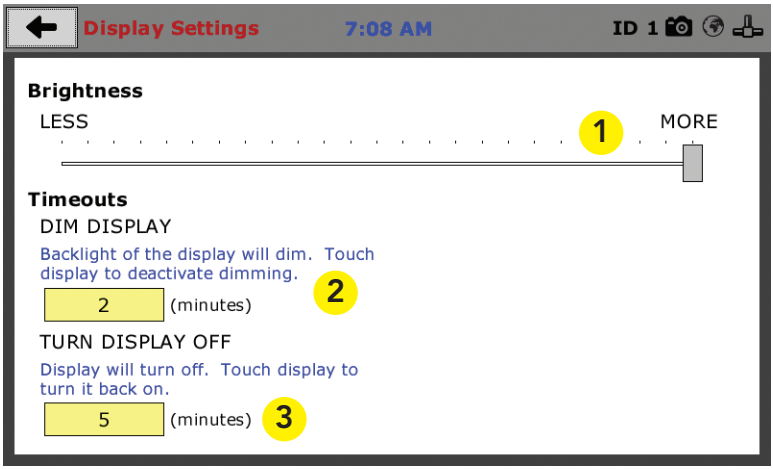
Clock (4)
The current time is displayed and is located on every Indicator screen. Clicking on the time from any screen, you will be taken to the Date/Time Settings Screen.

Initial Set Up — Display

To set up Display settings, return to the System Settings screen and click on the Display Panel. **(1)**



Click on the Display tab **(1)**. You will see the following screen.



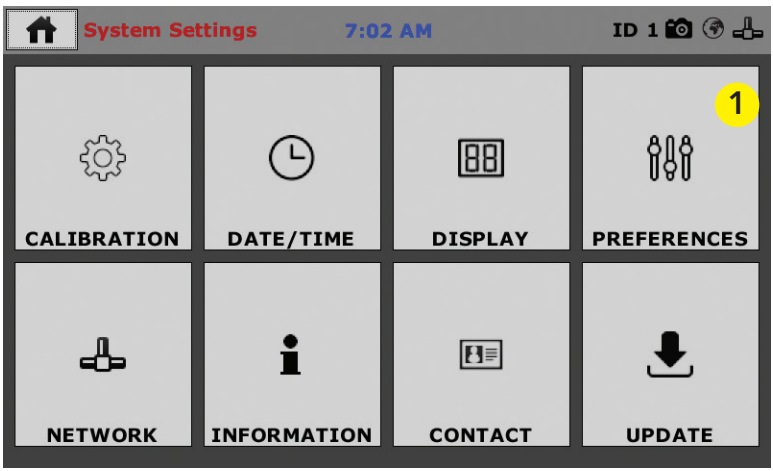
Brightness (1)
Slide the gray bar to the left or right to adjust brightness.

Dim Display (2)
The backlit display will automatically dim to save power. Click the yellow box to change the number of minutes before the display goes dim. After the time has elapsed, touch the display to deactivate dimming.

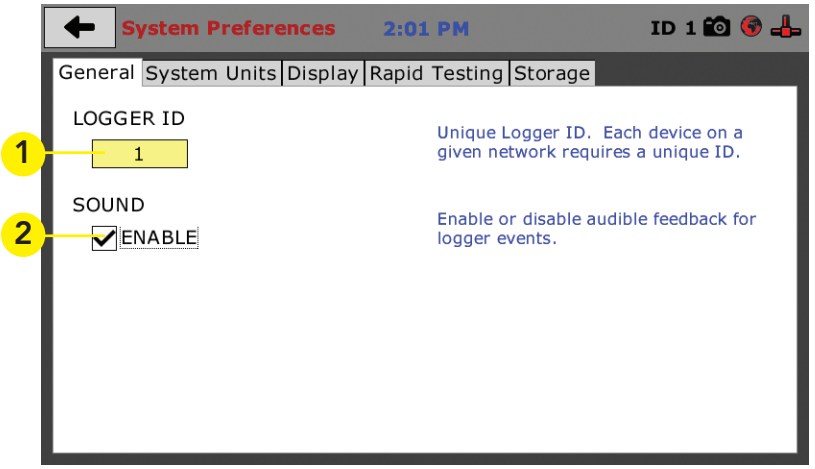
Turn Display Off (3)
The display will automatically turn off to save power. Click the yellow box to change the number of minutes before the display powers off.

Initial Set Up — Preferences

This screen is accessed by clicking on the "Preferences" button. **(1)**



Click on the Preferences tab **(1)**. You will see the following screen.

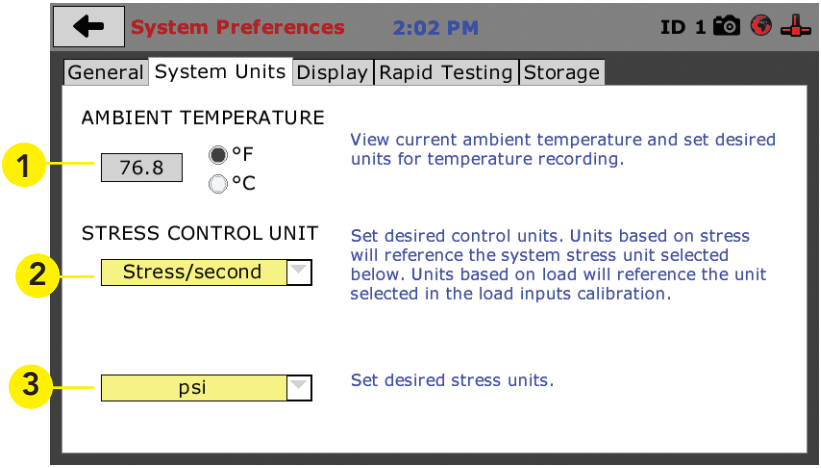


Preferences – General Tab
The Preferences panel is comprised of four (4) tabs and defaults to the General tab, see above.

Logger ID (1)
Each machine that is connected to your network requires a unique Logger ID. These numbers can be assigned any number between 1-245. In most cases, if you are setting up a new machine it has been given the Logger ID 1. This would show in the Logger ID field. (1). If this number conflicts with another machine's Logger ID, one of the machines will have to be changed to another Logger ID.

Sound (2)
Checking this box enables or disables audio feedback for logger events.

Preferences – System Units Tab
This screen is accessed by clicking on the "System Units" Tab under System Preferences.



Ambient Temperature (1)

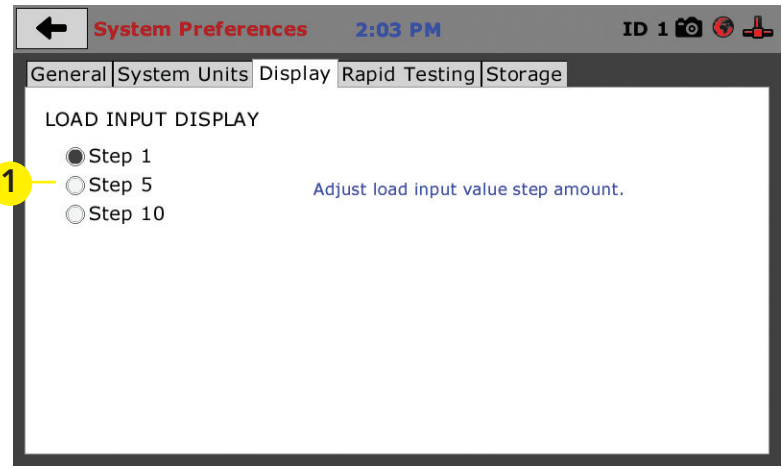
This field displays the current ambient temperature and allows you to select desired units (Fahrenheit or Celsius) for temperature recording.

Stress Control Unit (2)

Choose the desired stress control unit you wish to use from the popup window **(2).** Then choose the desired units from the second popup window **(3)**.

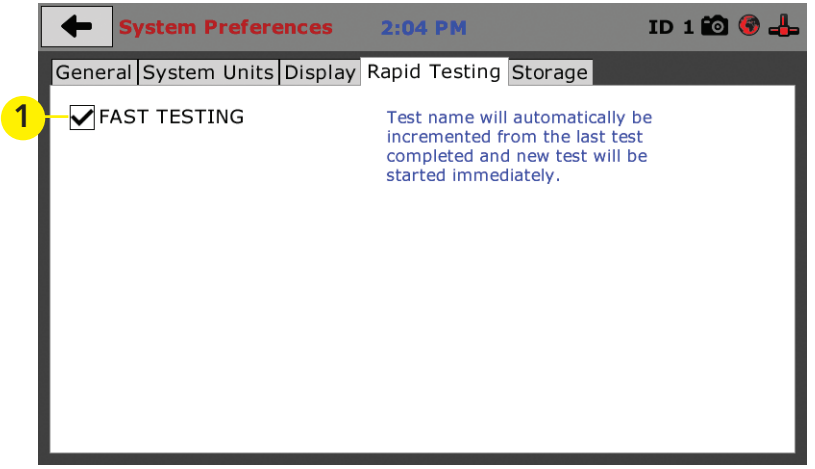
Preferences – Display Tab

Choose the desired load input value step amount **(1)**.



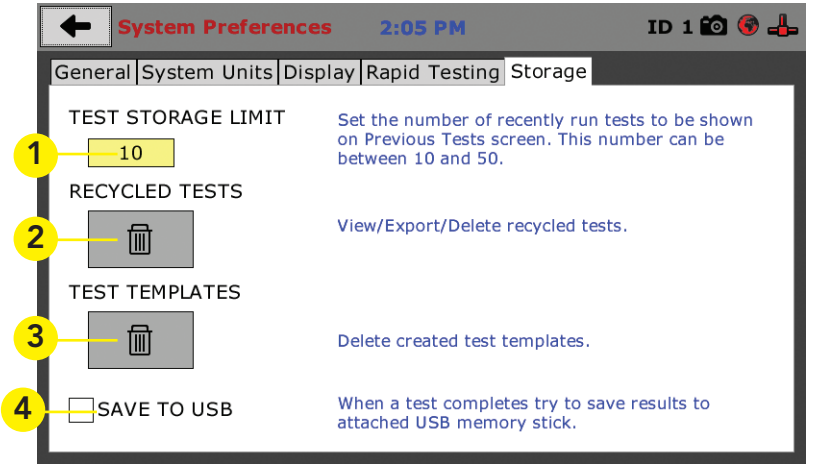
Preferences – Rapid Testing

This screen is accessed by clicking on the Rapid Testing Tab under System Preferences. Clicking the check box next to Fast Testing **(1)** will allow the Digital Indicator to automatically create a new test name based on the last test and start the new test immediately.



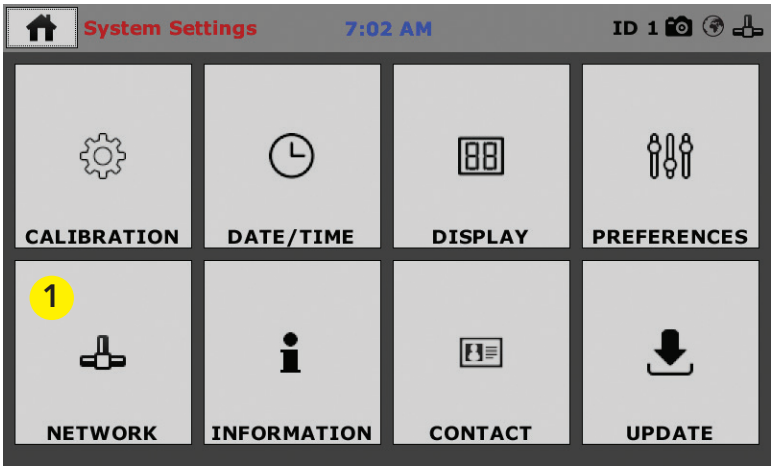
Preferences – Storage Tab

This screen is accessed by clicking on the Storage Tab under System Preferences.

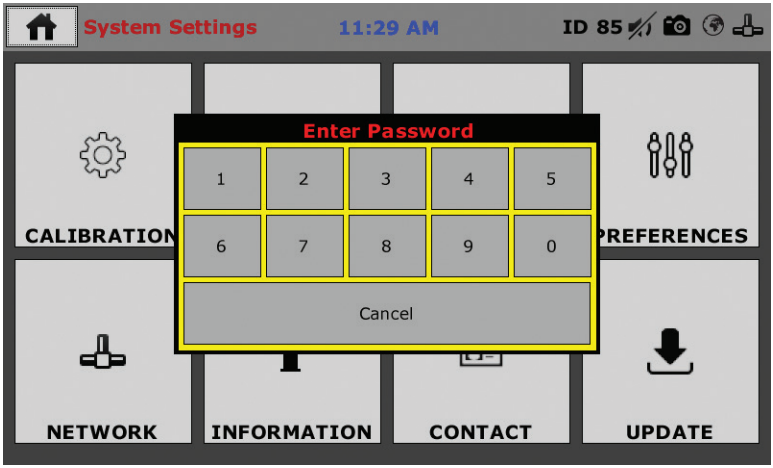


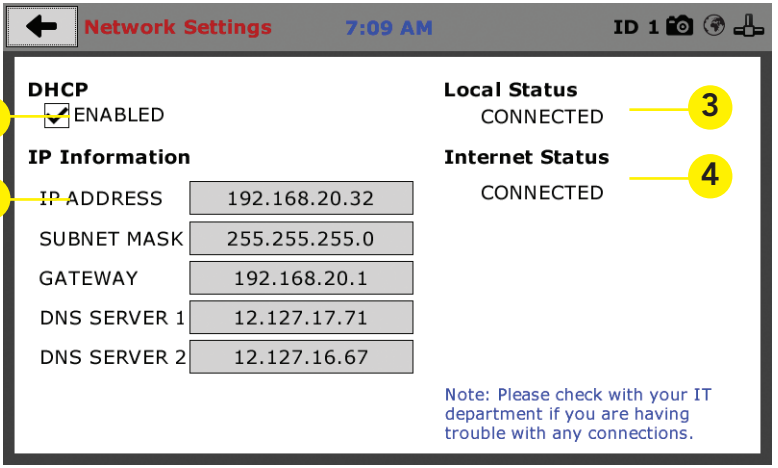
Initial Set Up — Network

To set up Network settings, return to the System Settings screen and click on the Network panel. **(1)**



A password is required to access the Network Settings. That password is: **27604**.





Network Settings Screen

The screen above is the Network Settings screen, it provides information on your IP information and network status.

DHCP (1)

Check this box to enable/disable the Dynamic Host Configuration Protocol (DHCP). If enabled, your machine will pick up IP information from your router. If disabled, you will need to manually enter the network information for a static IP, please consult your network administrator for this.

IP Information (2)

This information will be filled in automatically if the DHCP is checked, otherwise you will have to manually supply this information. The IP address must be unique for each machine.

Local Status (3)

This indicates the status of the local network connection, Connected or Disconnected.

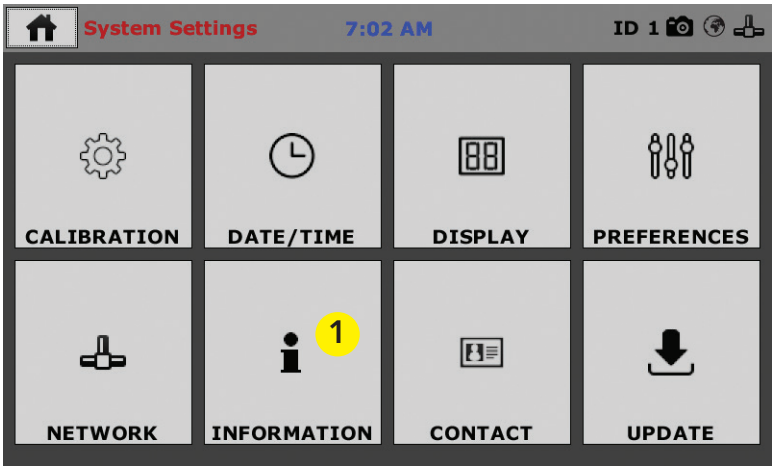
Internet Status (4)

This indicates the status of your Internet connection, Connected or Disconnected.

Note: If you are experiencing issues with any connections, please contact your IT department for assistance.

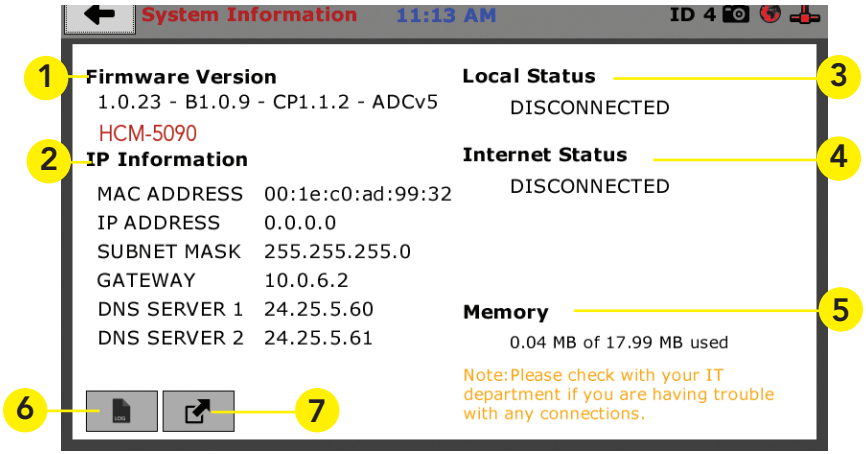
Initial Set Up — Information

Clicking on this panel provides a view of the current status of the machine. **(1)**



System Information

Below is a view of the System Information screen. It provides a current status of the machine.



Firmware Version (1)

The current version of the machine firmware is shown here. If you contact product support, you will need to supply this information.

IP Information (2)

This information will be filled in automatically if DHCP is checked, otherwise you will have to manually supply this information. The IP address must be unique for each machine.

Local Status (3)

This indicates the status of the local network connection, Connected or Disconnected.

Internet Status (4)
This indicates the status of your Internet connection, Connected or Disconnected.

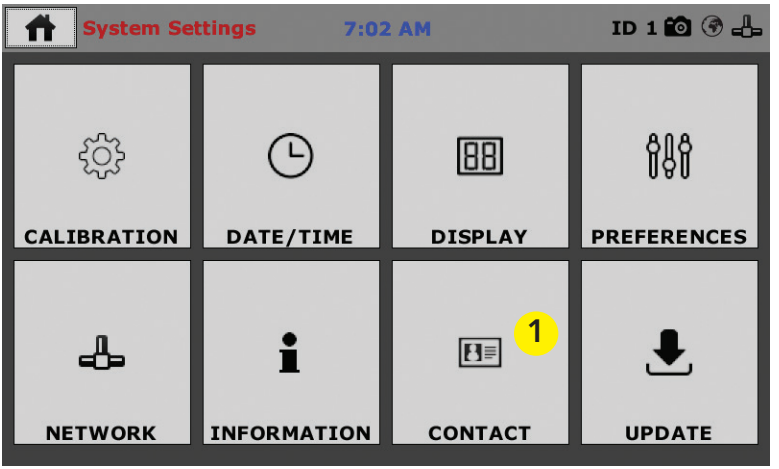
Memory (5)
This indicates the current status of how much available memory is being used by the machine

Factory Screen (6)
This is for Humboldt use only.

Export Log File (7)
This button exports a log file from the machine to a USB thumb drive. Be sure to insert a thumb drive before exporting the file or you will receive an error. This file can be helpful in trouble shooting by Humboldt Support.

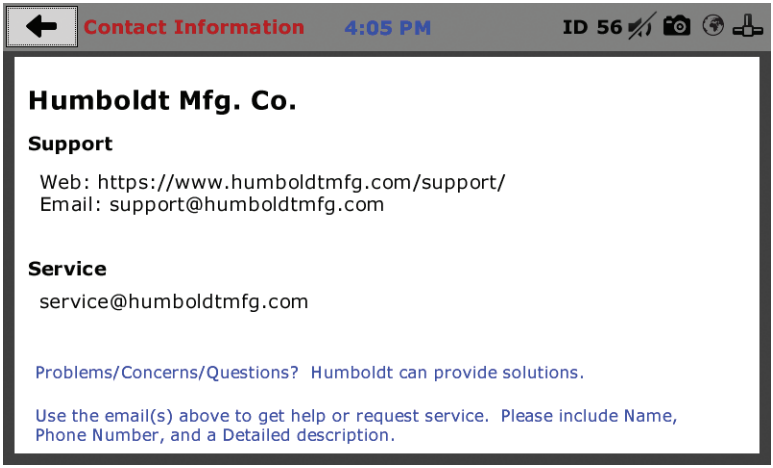
Initial Set Up —Contact

Clicking on this panel provides contact information for Humboldt Support and Service**(1)**



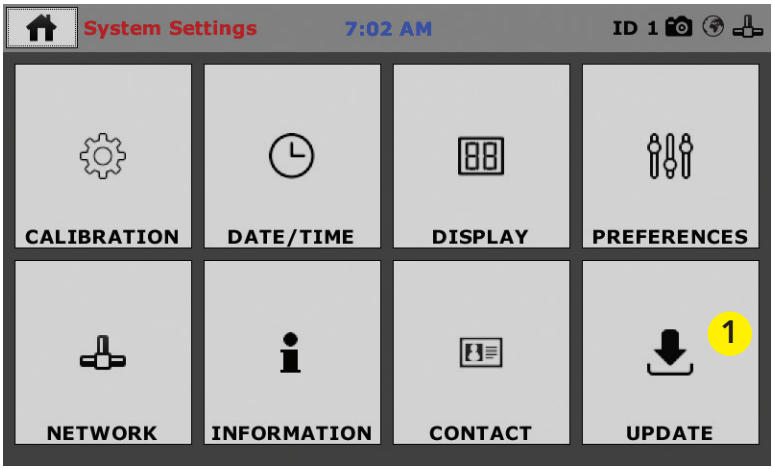
Contact Information
Below is a view of the Contact Information screen showing contact information for Humboldt Support and Service.

For quickest response go to this link on our website: https://www.humboldtmfg.com/support and fill in the support form. This will provide us with the necessary information to assist you and you will be added to the next position in the support cue. You can also email Humboldt Support at support@humboldtmfg.com or Humboldt Service at service@humboldtmfg.com. Please include contact information and a detailed description of your reason for contact.



Initial Set Up — Update

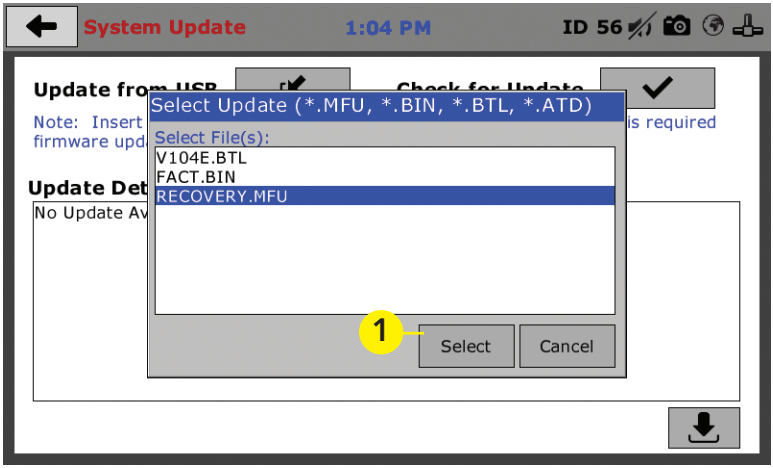
Clicking on this panel provides information on checking for Updates, performing updates and an update history for the machine. **(1)**



Update from USB (1)
Software updates for your machine can be downloaded from the Humboldt website Support Area using a computer. To access the Software Update area, go to: https://www.humboldtmfg.com/support/software.php.

Once on this page, click on the Elite Series Firmware tab.

1) You will see a list of Humboldt Elite Series machines.
2) Click on the HCM-5090 Current Version link and the firmware update will begin to download to your computer.
3) Once the download is complete, load the file onto a USB thumb drive and insert the thumb drive into the USB port on the front of the HCM-5090.
4) With the USB thumb drive inserted into the USB port, click on Update from USB **(1)**.
5) A window will open and you will see a list of Updates. Select a file to use for your update and click the Select button.



6) The update process will begin. This may take several minutes. Your HCM-5090 may reboot several times during the update, do not turn off or reset machine during this process.

Equipment Setup

Installation and Equipment Setup

Electrical Connections

The HCM-5090 is equipped with an internal digital switching power supply, which allows it to be used with most power configurations throughout the world. The unit is supplied with an IEC electrical cord with a standard 110V plug.

The HCM-5090 arrives ready for operation. Attach the supplied IEC electrical cord to the machine and plug into a standard wall receptacle for use in the United States. For locations other than the U.S., replace the supplied electrical cord with an IEC cord that has the correct plug for your application. The supplied cord can also be used by cutting the standard plug from the cord and attaching the correct plug.

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The Power Switch is located on the lower left-hand corner of the back of the machine, next to the electrical cord inlet. The Fuse Compartment is located between the electrical cord inlet and the Power Switch. The HCM-5090 uses a 10 amp fuse. To begin operation, attach the supplied electrical cord, plug it in and press the Power Switch.

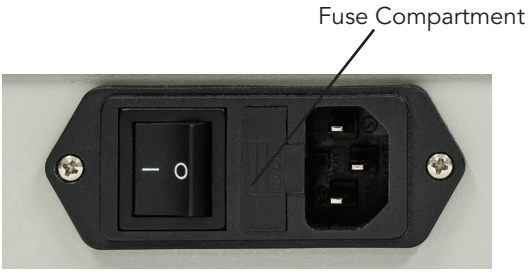
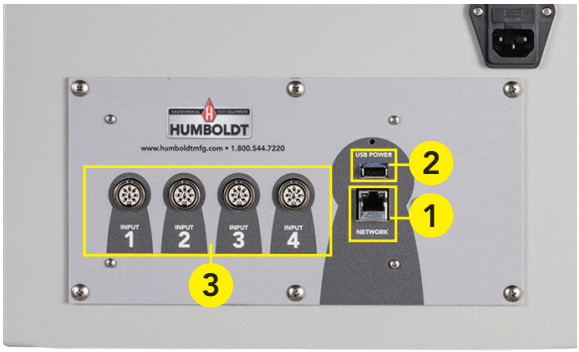


Fig. 1 Power Switch

Instrumentation Connections and Setup

HCM-5090 Rear Instrumentation Panel



Above is a photo of the rear panel of the HCM-5080.

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Ethernet input for connecting machine to a local area network (LAN) and/or the internet. **This feature is for future use and does not currently function.**

USB Power (2)
The USB Power port is used for powering a wireless access appliance for those who want to use a wireless LAN setup. **This feature is for future use and does not currently function.**

Instrument Inputs (3)
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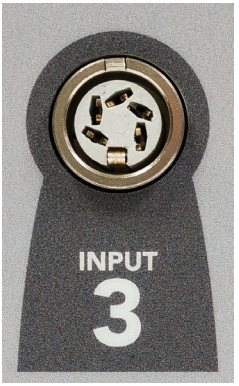
Once your compression machine is setup in its final position, you should have all instrumentation validated/calibrated by a certified calibrator. See calibration instructions in the Equipment Setup section of this manual.

Below are photos of an instrumentation input and the instrumentation plug. Install the plugs into the inputs by lining up the guide at the bottom of the plug with the slot at the bottom of the input.



Instrumentation Input

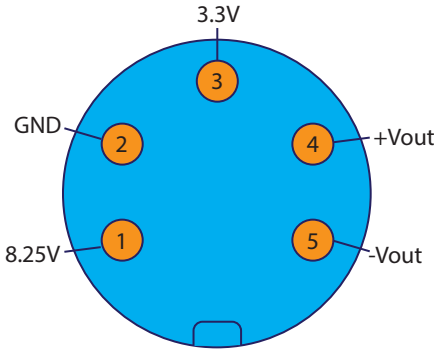

Instrumentation Plug

Once you have installed the instrumentation into the correct inputs, your rear panel should look like this if you are using all four inputs.

If you purchased multiple compression machines and/or compressometers/extensiometers with your Compression machine/Digital Indicator, their input plugs will be marked to correspond to the correct type of input on the back of the Digital Indicator. Remember: Inputs 1 and 4 are configured to read Load and Inputs 2 and 3 are configured to read Displacement.

Third-Party Instrumentation

Third-party load cells/transducers and compression machines, which are compatible, can also be used with the HCM-5090. Compatible units must work with an excitation voltage of 8.25 volts and produce an output of 0-5 volts. Prior to use, all third-party instrumentation must be configured and calibrated. If you are using third-party cables for load cells/transducers connections, make sure they are wired to be compatible with the HCM-5090, see illustration below. Plugs to connect third-party instrumentation to the Humboldt HCM-5090 are available; order part HS-000474.



Calibration of Instrumentation

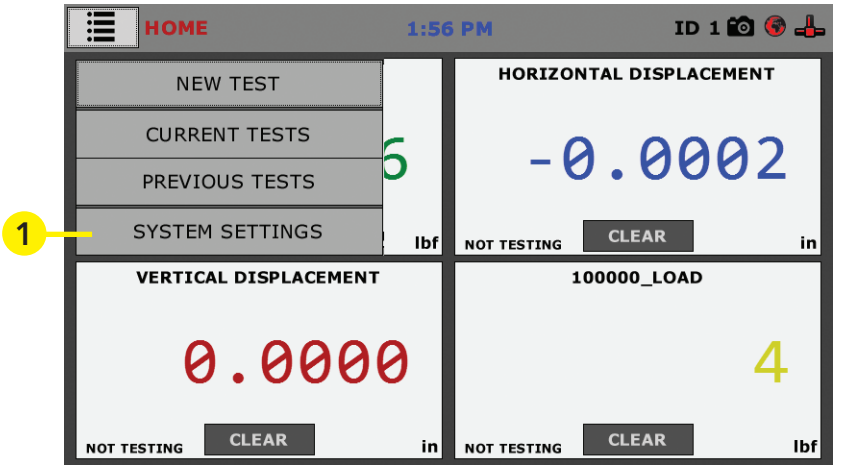
Once your compression machine is setup in its final position, you should have all instrumentation validated/calibrated by a certified calibrator. See calibration instructions in the Equipment Setup section of this manual.

How to Perform a Calibration

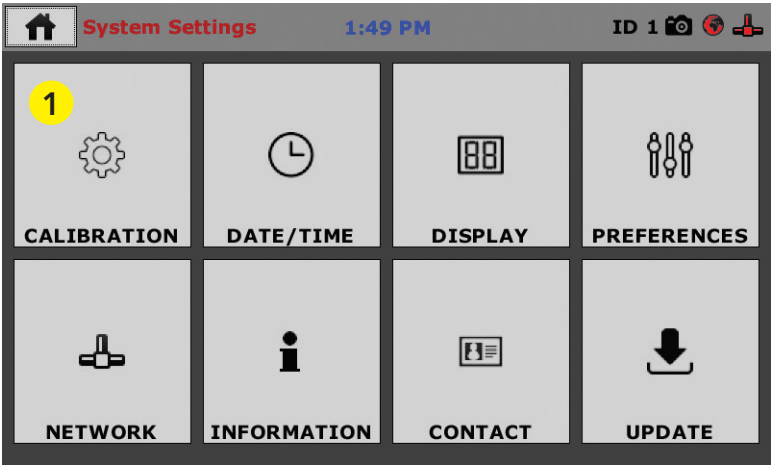
Humboldt recommends and standard lab practice dictates that your HCM-5090 should be calibrated periodically. For most, this period is usually a year, though other rules may apply to the frequency of calibration.

To perform a calibration, it will be necessary to either hire a calibration service to come in to calibrate your machine or you must have the necessary calibration equipment to perform this service.

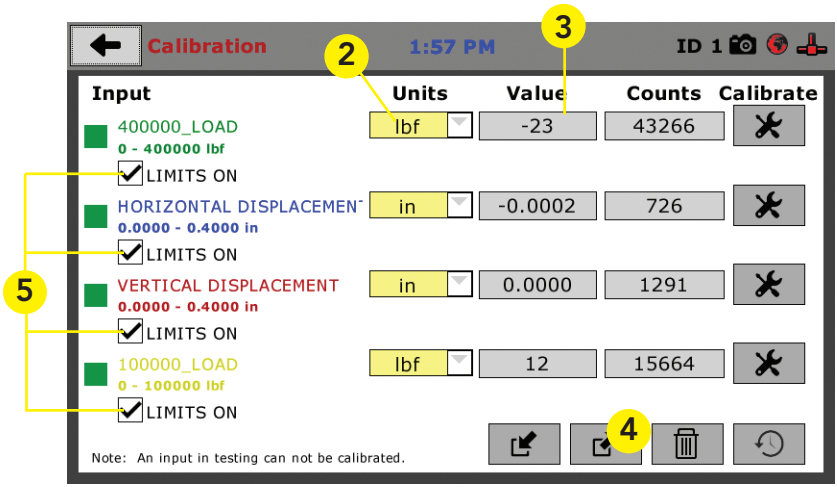
To begin a calibration, navigate to the Calibration section by clicking the Menu icon in the top left corner of the screen (1). When you click on this button, you will see a drop-down menu appear, see below.



Navigate to the bottom of this drop-down menu and click on System Settings **(1)**. You will see the following screen.



Click on the Calibration tab in the top left corner **(1)**. You will see the following screen.



Calibration Input Screen

The Calibration Input Screen (above) is used to monitor and calibrate instrumentation and assign them to specific channels of the HCM-5090. The Calibration Input Screen provides a summary of the calibration status of each channel. At this time, verify the calibration information.

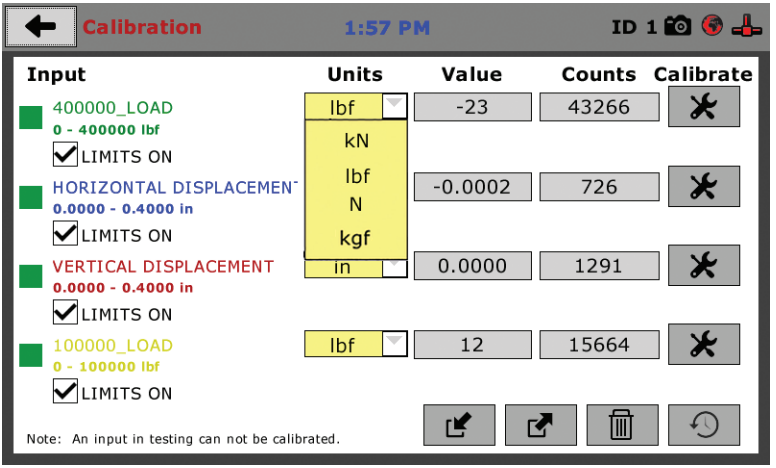
A green box at the left of a channel indicates that the channel has instrumentation assigned to it and that it is calibrated and ready for use **(1).**

The "Limits On" check box **(5)** shown above is not applicable to the HM-5090 Digital Indicator since the pump is manually controlled. Checking or unchecking this box will have no effect on operation.

Note: An input cannot be calibrated during testing.

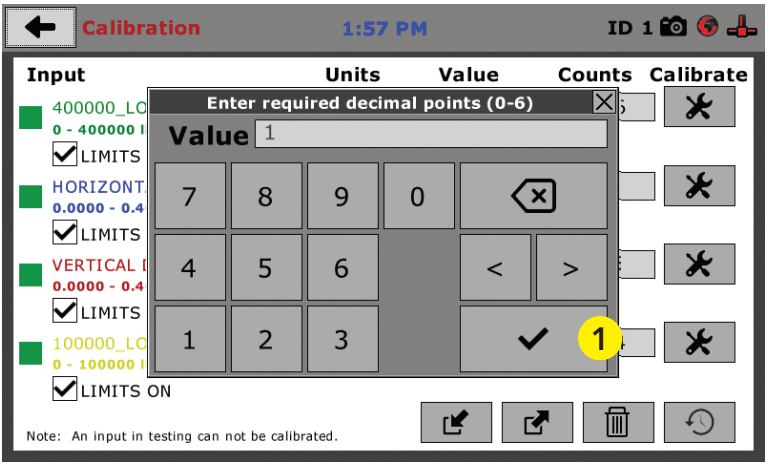
Units (2)

In this field, a calibrated instrument will display the units that were chosen for use at the time of calibration. This field can also be used to automatically toggle conversion of units between lb.-in. and SI units if the need arises. To view choices for types of Units, click on the Units field and the Unit choices will be displayed, see on next page.



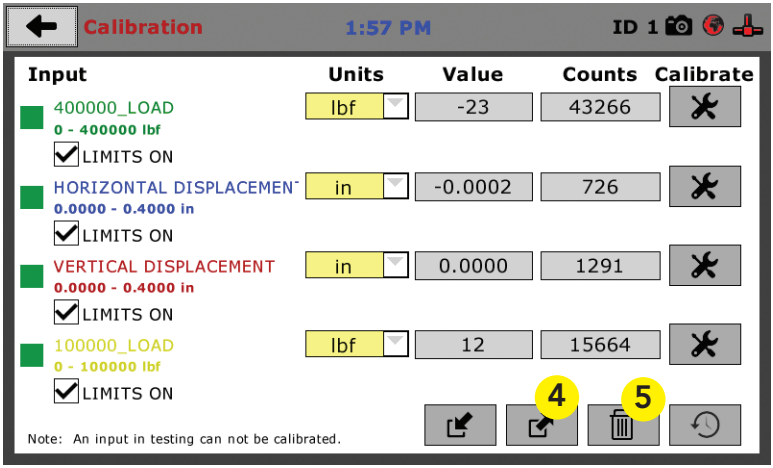
Value (3)

This field displays the current calibration value. This value should already be set with 3 decimal point accuracy. If the instrument is not calibrated, the unit will read "N/A". Clicking on this field will bring up a window where you can enter the required decimal points required for the value. Once you have entered a value, Click the Check Mark **(1)** in the lower right-hand corner to save the value



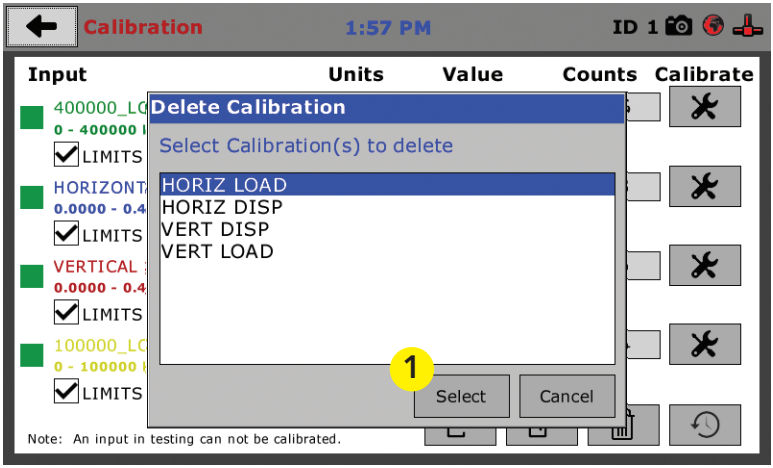
Performing a New Calibration

The first step in calibrating instrumentation to an input is to remove any calibration that is already being used for that input. To do this, Press the Export Calibration Button **(4)** (see next page) to select calibrations to export via USB. It is a good practice to export all your calibrations to a thumb drive. In case of a problem this practice allows you to recover your calibration data quickly.



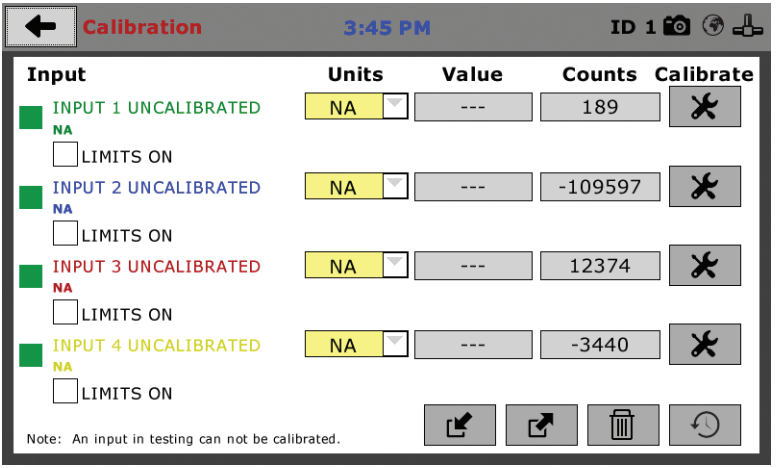
Once your calibrations have been saved, you will see a pop up screen that says: Calibration Export Successful.

To begin to remove existing calibrations, click on the trash can icon **(5)** to begin to erase the Input calibrations you wish to recalibrate. When you press the trash can icon, this screen will appear.



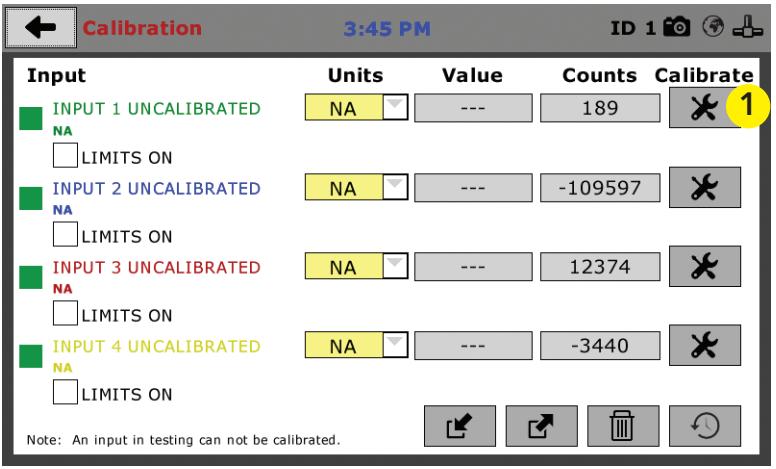
On this screen select an Input calibration to delete, one at a time, and then press the Select button **(1)**. The calibration will be deleted. You can do this for all Inputs you wish to calibrate.

Once all Input calibrations have been cleared, your Calibration window should look like the one below with no Inputs calibrated.

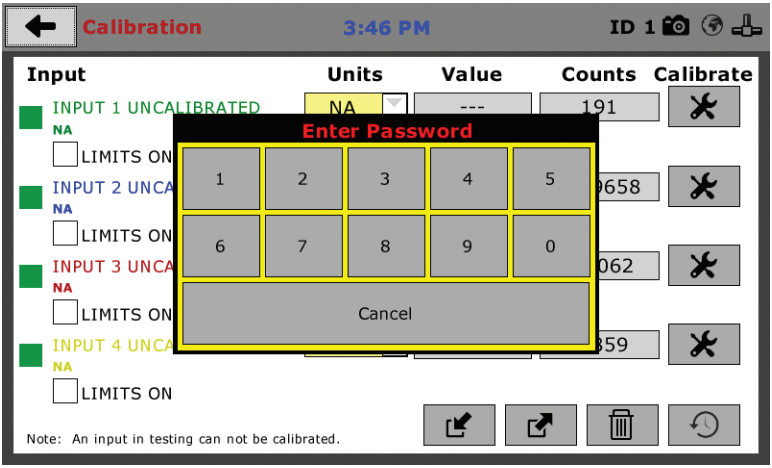


Calibrating your instrumentation to the appropriate Input requires a separate device, which can provide precise and specific loads or displacement, and, which has been certified to be accurate. The calibration process involves plugging the instrumentation into the HCM-5090 while placing the instrumentation into the certified calibration device, which provides a specific set load or displacement.

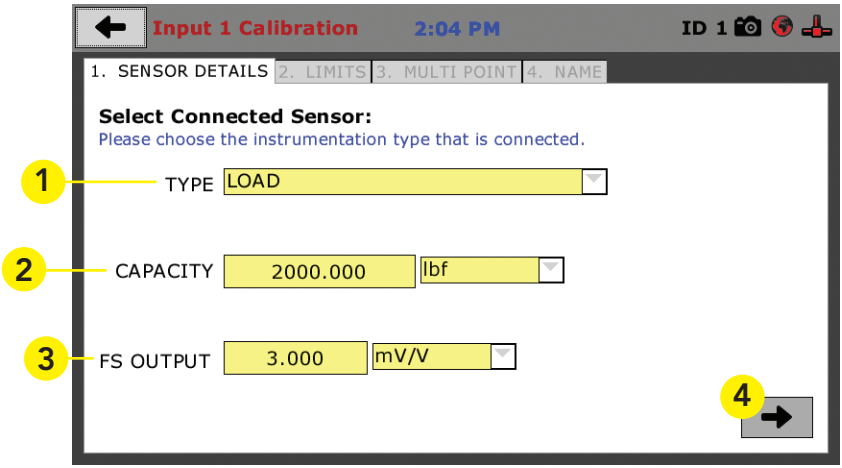
Once this has been done, click the Calibrate button next to the appropriate Input **(1)**.



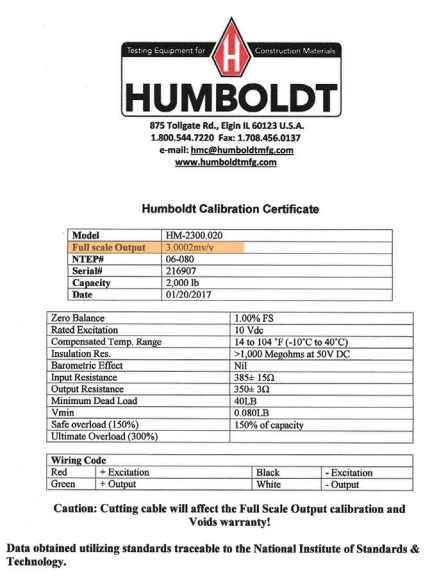
A pop-up window will appear requiring you to enter the password, which is **22234**.



Upon filling in the password, you will see this screen, Tab 1 Sensor Details of the Calibration settings.



On Tab 1, the Sensor Type **(1)** will default to Load. For Capacity **(2)**, fill in the maximum capacity of the sensor and choose either lbf, kN, N or kgf. For FS output **(3)**, refer to the calibration sheet, which came with the instrument your are using and enter it here and then choose mV/V. The next page shows typical calibration sheets with the FS Output information highlighted in orange.



Testing Equipment for Construction Materials

HUMBOLDT

875 Tollgate Rd., Elgin IL 60123 U.S.A.
1.800.544.7220 Fax: 1.708.456.0137
e-mail: hmc@humboldtmfg.com
www.humboldtmfg.com

Humboldt Calibration Certificate

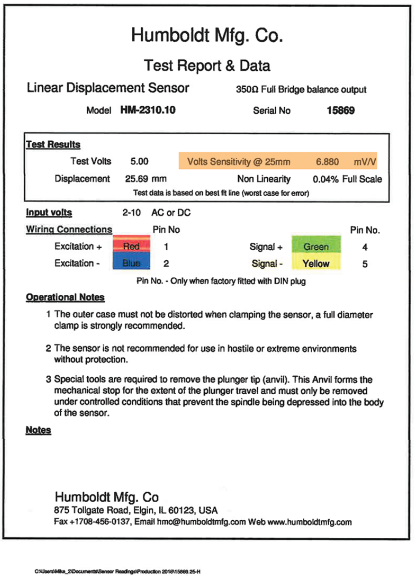
Model	HM-2300.020
Full scale Output	3.0002mv/v
NTEP#	06-080
Serial#	216907
Capacity	2,000 lb
Date	01/20/2017

Zero Balance	1.00% FS
Rated Excitation	10 Vdc
Compensated Temp. Range	14 to 104 °F (-10°C to 40°C)
Insulation Res.	>1,000 Megohms at 50V DC
Barometric Effect	Nil
Input Resistance	385± 15Ω
Output Resistance	350± 3Ω
Minimum Dead Load	40LB
Vmin	0.080LB
Safe overload (150%)	150% of capacity
Ultimate Overload (300%)	

Wiring Code			
Red	+ Excitation	Black	- Excitation
Green	+ Output	White	- Output

Caution: Cutting cable will affect the Full Scale Output calibration and Voids warranty!

Data obtained utilizing standards traceable to the National Institute of Standards & Technology.



Humboldt Mfg. Co.

Test Report & Data

Linear Displacement Sensor — 350Ω Full Bridge balance output

Model **HM-2310.10** — Serial No **15869**

Test Results

Test Volts	5.00	Volts Sensitivity @ 25mm	6.880 mV/V
Displacement	25.69 mm	Non Linearity	0.04% Full Scale

Test data is based on best fit line (worst case for error)

Input volts 2-10 AC or DC

Wiring Connections

		Pin No			Pin No.
Excitation +	Red	1	Signal +	Green	4
Excitation -	Blue	2	Signal -	Yellow	5

Pin No. - Only when factory fitted with DIN plug

Operational Notes

1 The outer case must not be distorted when clamping the sensor, a full diameter clamp is strongly recommended.

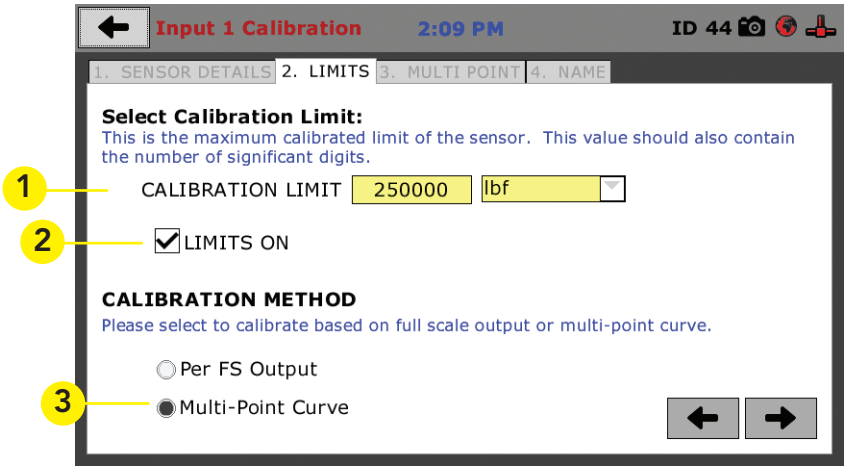
2 The sensor is not recommended for use in hostile or extreme environments without protection.

3 Special tools are required to remove the plunger tip (anvil). This Anvil forms the mechanical stop for the extent of the plunger travel and must only be removed under controlled conditions that prevent the spindle being depressed into the body of the sensor.

Notes

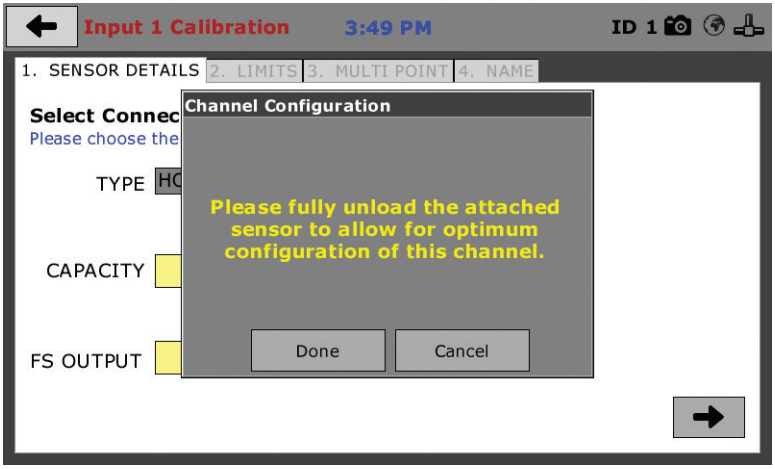
Humboldt Mfg. Co
875 Tollgate Road, Elgin, IL 60123, USA
Fax +1708-456-0137, Email hmc@humboldtmfg.com Web www.humboldtmfg.com

Once this is complete, click on the Right Arrow **(4)**, in the bottom right-hand corner of the screen to save these settings. You will be taken to Tab 2, Limits.

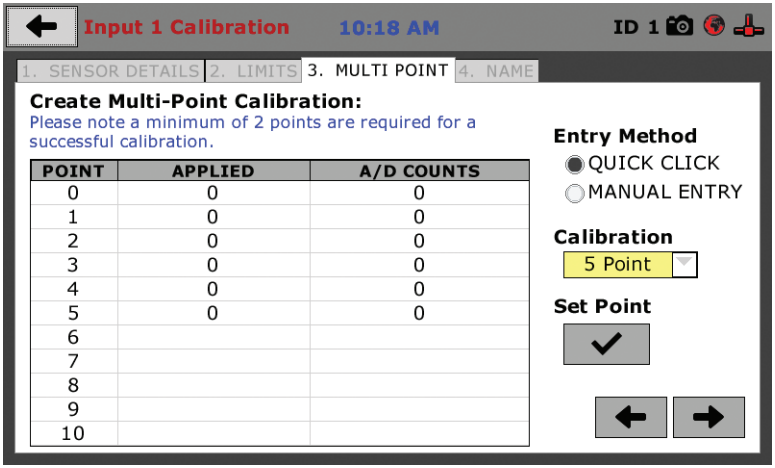


On Tab 2, in the Calibration Limit field **(1)**, enter the maximum calibrated limit of the sensor. This value should contain the number of decimal points you require for degree of accuracy, up to 5 points. Limits On **(2)**, has no bearing on operation with the HCM-5090. Calibration Method **(3)** determines whether this calibration will be based only on the maximum load capacity of the sensor or upon a multi-point curve of up to a maximum of 10 points.

If you choose Per FS Output (not a recommended calibration method) it will base your calibration on the maximum load capacity of the sensor vs. zero load capacity of the sensor. If you choose this method and click on the Right Arrow in the bottom right-hand corner of the screen. You will be prompted to remove any load on the sensor and click on Done **(4)** when you have done so.

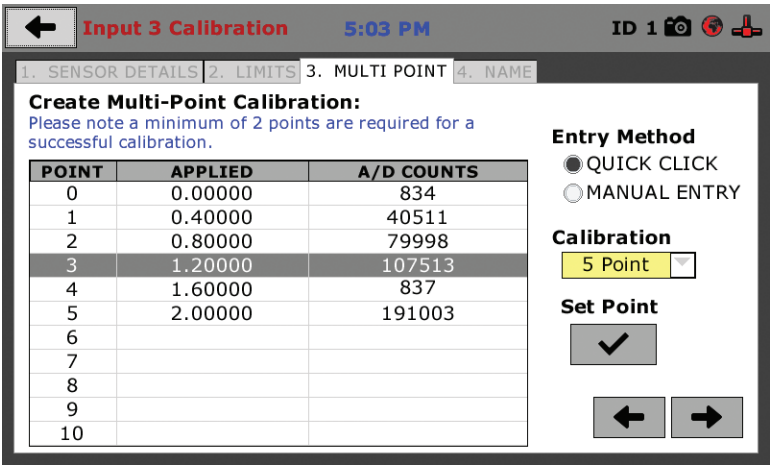


If you choose Multi-Point (Recommended calibration method) Curve and click on the Right Arrow in the bottom right-hand corner of the screen, you will be taken to Tab 3.



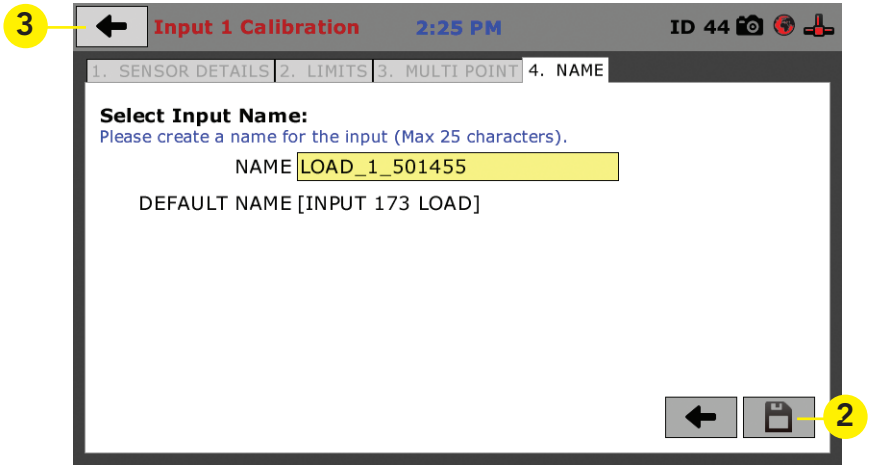
On Tab 3 you will be able to set the number of points you want to use for your calibration. You can choose 1-point, 5-point, 10-point or Custom, which allows you to use any number of points up to a total of 10. In the example on the previous screen shot above, a 5-point calibration has been chosen.

With your instrumentation sensor placed in a calibration frame and the sensor plugged into the an Input on the HCM-5090. You will set the "0" point at 0 with no load applied to the sensor. The "5" point will be set with the maximum load capacity of the sensor applied. Points "1" through "4" are usually determined by spacing them out evenly between the no load reading and the maximum load reading. As an example, if you have a sensor with a 1,000 lb maximum force capability, you would set the "0" point at "0" and the "5" point at 1,000. Points "1" through "4" would typically be set at: "1" 200; "2" 400; "3" 600; "4" 800 and "5" 1000. Or, divide the maximum load number by the number of points, in this case 5, which works out to 200 point increments between points. See below.



Each point would be chosen by clicking on the corresponding point row above. The load would be applied to the sensor and an A/D Counts reading would appear. To set the point, click on the Set Point button **(1)**. This would be repeated until all points have been set. In the example above, Point 3 is being calibrated and is ready to have the Set Point button **(1)** clicked. Point 4 still needs to be calibrated.

Once all Points have been calibrated, click on the Right Arrow in the bottom right-hand corner of the screen. You will be taken to Tab 4.



On Tab 4, you will be asked to name the calibrated Input. Fill in your Input Name and click on the Save button **(2)** to save your calibration.

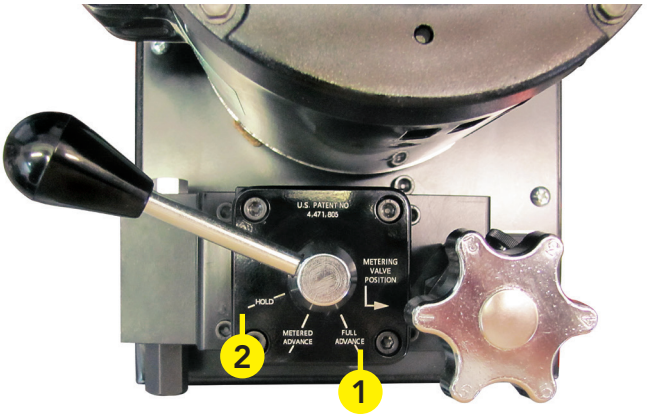
Your compression machine is now ready for use. To return to the Home Screen, click on the Arrow **(3)** in the upper right-hand corner of the screen.

Test Setup

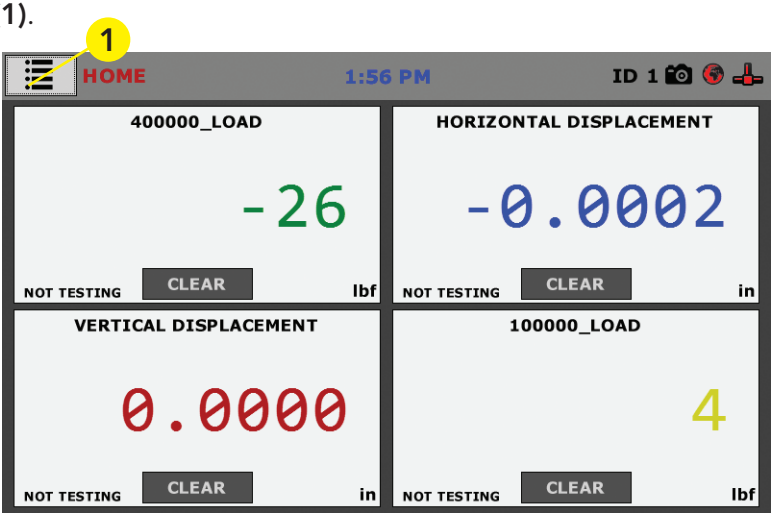
Test Setup

To begin a new test, such as ASTM C39 for cylinders, prepare your cylinder and mount it into the compression machine per the standard.

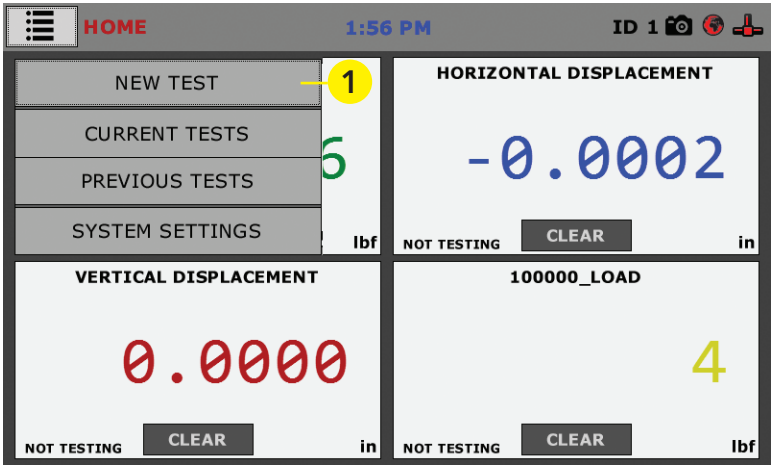
Use the hydraulic load control valve in the Full Advance position **(1)**, to advance the machine's piston to the desired starting position. This is normally a point where an air gap of 1/16" (1.5 mm) or less can be seen between the top of the test sample (in this case, the top of the pad cap) and the bottom of the upper test platen. Then, place the control valve in the Hold position **(2)**.



Click on the Menu icon in the top left corner of the Digital Indicator's screen **(1)**.



When you click on this button, you will see a drop-down menu appear, see below. Click on NEW TEST (1).



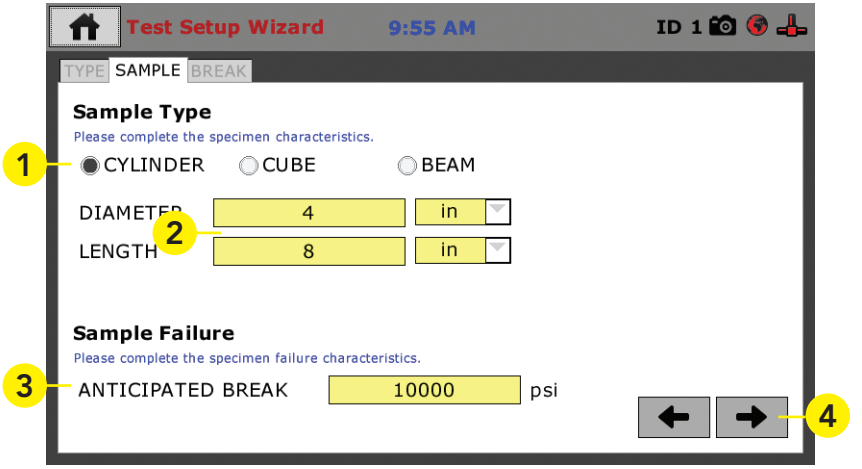
Test Setup Wizard – Select Test Type

Clicking on NEW TEST **(1)** above brings up the Test Setup Wizard (see below). On the first screen of the Wizard, you can select the type of test you want to perform — ASTM C39, D78, C293, C469, C1019, C109/109M and BS EN 12390-3.

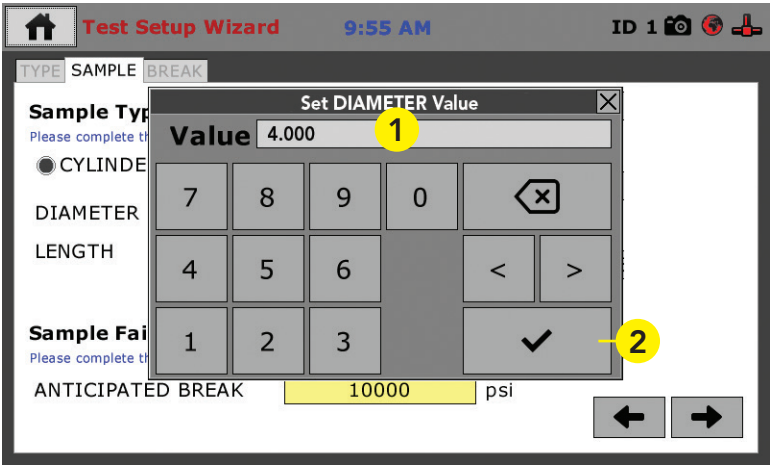
Select a test **(1)** from the choices provided on the screen by clicking on the radio button next to the test. In this example we have chosen ASTM C39. Then, click on the Right Arrow button **(2)** in the bottom right-hand corner.

You will see the following screen.

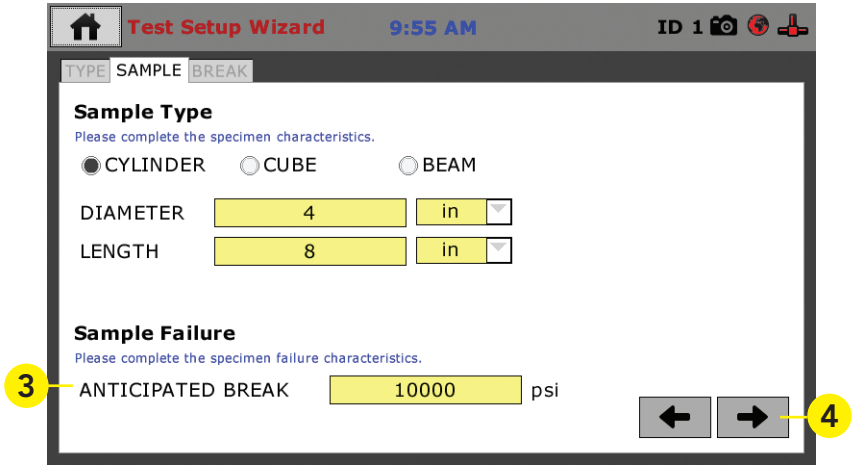
Test Setup Wizard – Sample Type



The screen above allows you to choose the type of test specimen **(1)** to be tested and to fill in its size in the corresponding yellow fields **(2)**. Because we chose ASTM C39 on the previous screen, the machine will automatically choose Cylinder as your Sample Type. When you click on the yellow fields, a Set Value screen will popup to allow you to set these values, see below **(1)**. Once you have entered a value, Click the Check Mark **(2)** in the lower right-hand corner to save the value, see below.

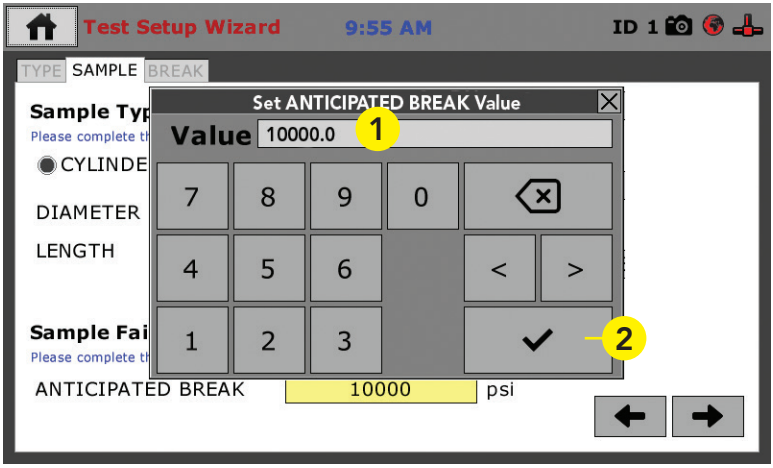


You will be returned to the Sample Tab of the Test Setup Wizard, below.



You can also provide an Anticipated Break (Sample Failure) value in the yellow field **(3)** provided.

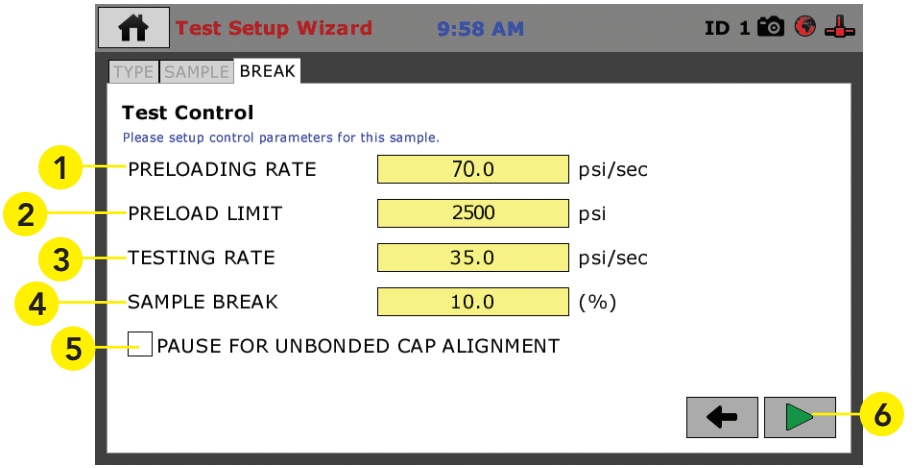
When you click on the yellow fields, a Set Value screen will popup to allow you to set these values, see below **(1)**.



Once you have entered a value, Click the Check Mark **(2)** in the lower right-hand corner to save the value. You will be returned to the Sample Tab of the Test Setup Wizard.

Once you have filled in the needed data, click on the Right Arrow button **(4)** in the bottom right-hand corner of the Sample Tab of the Test Setup Wizard to continue. You will now see the following screen.

Test Setup Wizard – Break – Test Control

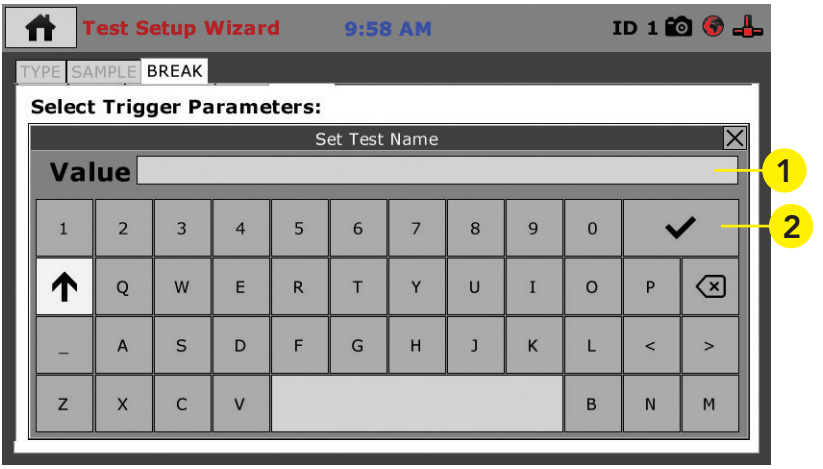


On this screen, you will enter values, which dictate your test parameters. To begin, you can set a Preloading Rate **(1)** and Limit **(2)**, which establishes a base load prior to the actual test.

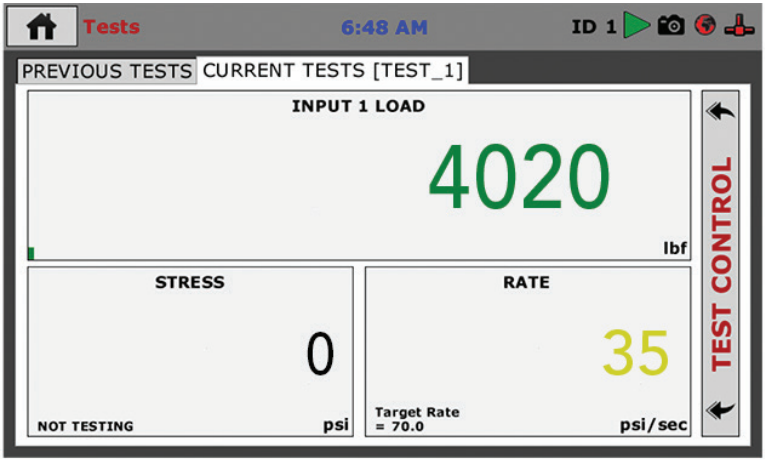
You will also enter a value for the Rate of the Test **(3)**. The Sample Break **(4)** value refers to the percentage of the initial break load the test will continue before stopping. There is also a check box **(5)** for providing a pause in the process to allow for alignment of an unbonded cap, if necessary.

Test Setup Wizard – Start

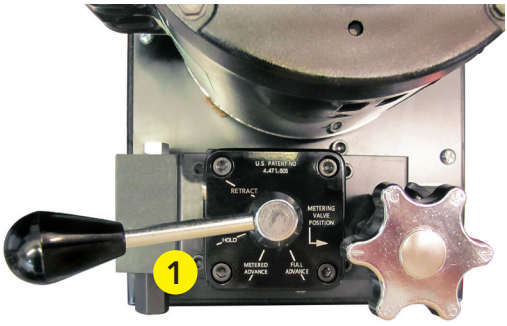
You are now setup to run a test. Proceed with the test by pressing the Green Arrow **(6)** in the bottom, right-hand corner of the screen above. You will see the following screen.

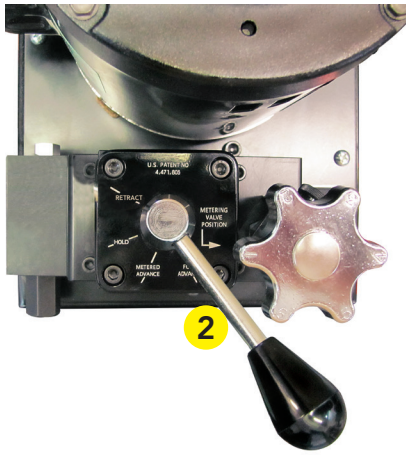


In the Value Field **(1)** (above) give your test a name. When finished, click on the check mark key **(2)** to save. Once saved, the Indicator will be ready to log, depending upon how you set your Start Parameters. You will see the following screen, ready to start logging.

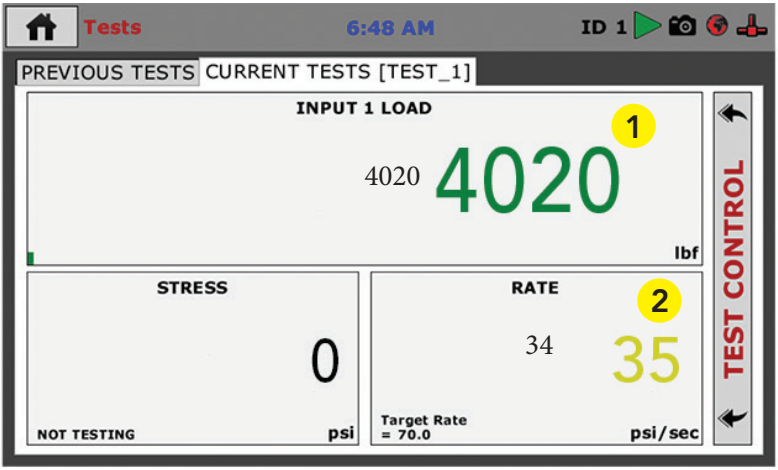


At this point, see below, move the Hydraulic Load Control Valve from the Hold position **(1)** to the Full Advance position (valve fully open) **(2)**. As the Input Load increases, the Rate will also begin to register.

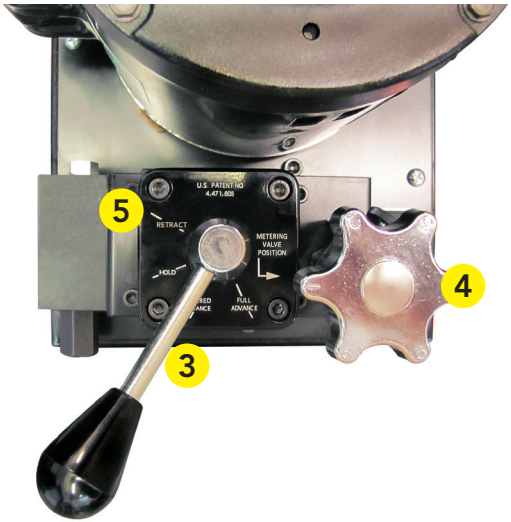




Continue with the Hydraulic Load Control Valve in the Full Advance position until you reach a reading that is 40% of the Anticipated Break Value. In our example that would be 4000 psi/sec, which is 40% of our Anticipated Break Value of 10000 psi/sec **(1)**, see below.

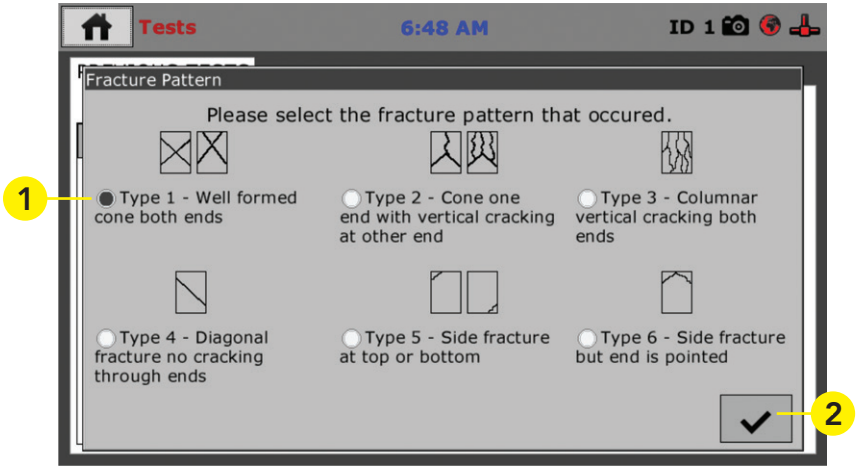


Once the Load reaches the 40% reading, switch the Hydraulic Load Control Value to the Metered Advance position **(3)** for the remainder of the test (See below). You will want to use the hydraulic valve on the compression machine pump **(4)**, (see below), to adjust the Rate in the Rate section **(2)** of the Test window (see above) so that it reads 35 ±7 psi/sec.

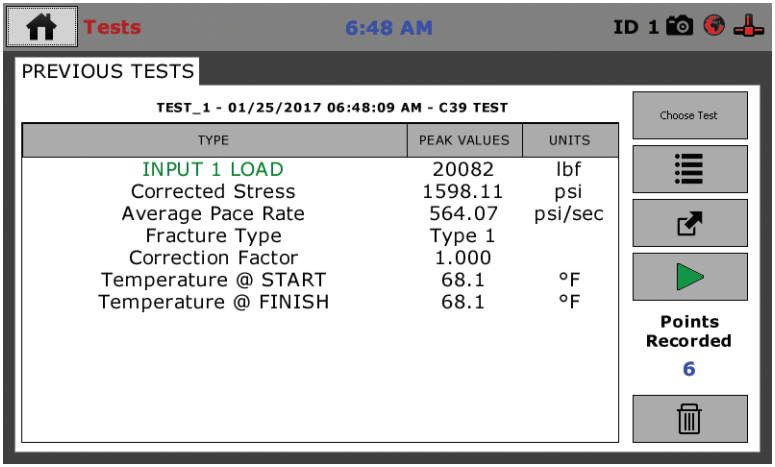


When the specimen breaks, the Digital Indicator will continue to log until it detects a reduction in the Load of 10% of the Peak Value. At this point it will automatically stop logging. At this point, move the Hydraulic Load Control Valve to the Retract position (**5**).

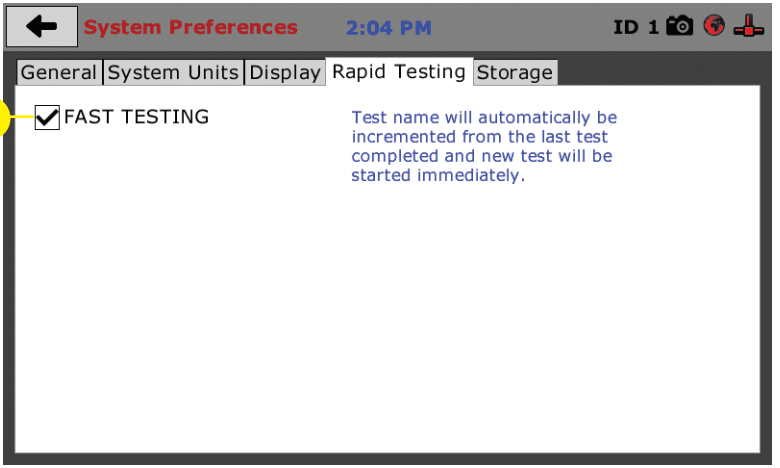
When the test reaches its end, the screen below will come up on the Digital Indicator. Here, you need to select the fracture pattern that occurred during the test by clicking the radio button next to the illustration that best represents the break **(1)**. Once you've selected a fracture pattern, click on the Check Mark **(2)** in the lower right-hand corner of the screen to continue.



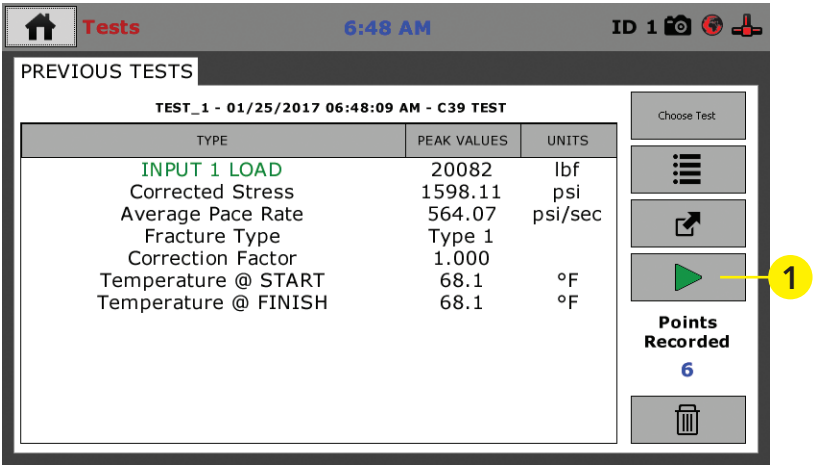
You will now see the screen below, which provides the results of the completed test.



If you plan on breaking multiple samples using the same parameters and you have selected and you have selected Fast Testing on the Rapid Testing Tab of the System Preferences (2) see below.



You can set your next specimen into the compression machine and push the green arrow button **(1).**

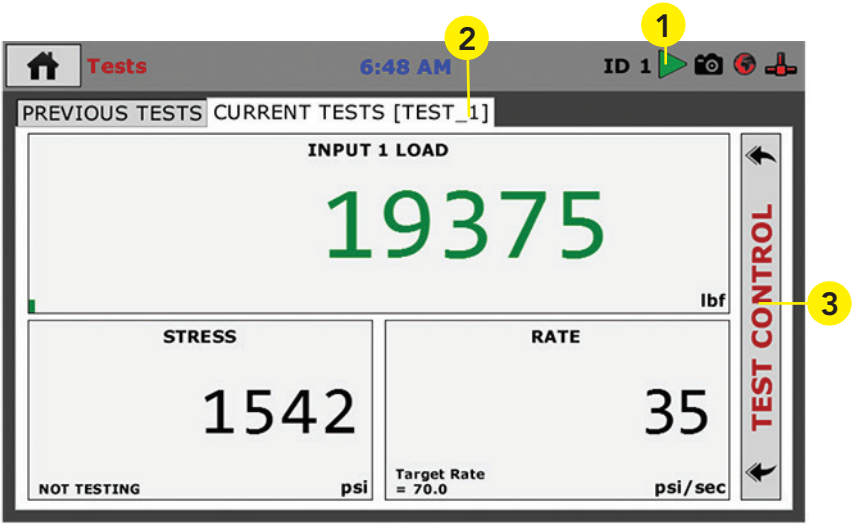


A new test will begin and each new test will be given a unique name by adding a number at the end of the name you chose previously for these tests.

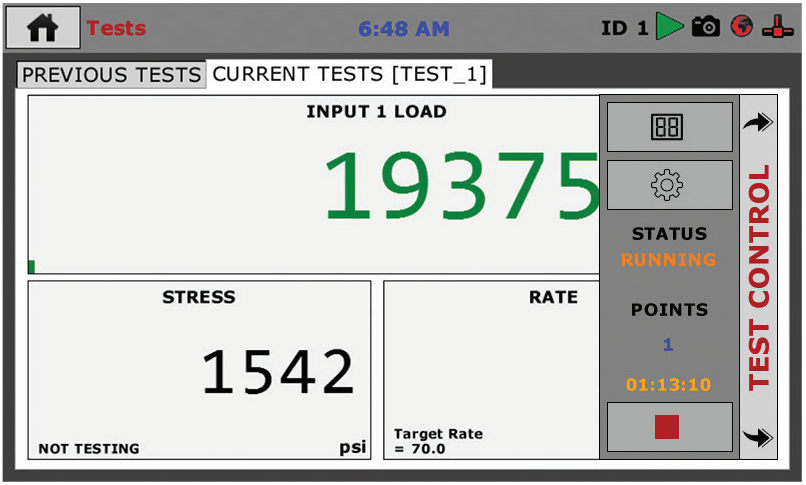
To continue for each new test, follow the instructions outlined previously on how to run a test above. If you didn't choose Fast Testing, you will have to name each test as described previously.

Tests — Test Control Tab

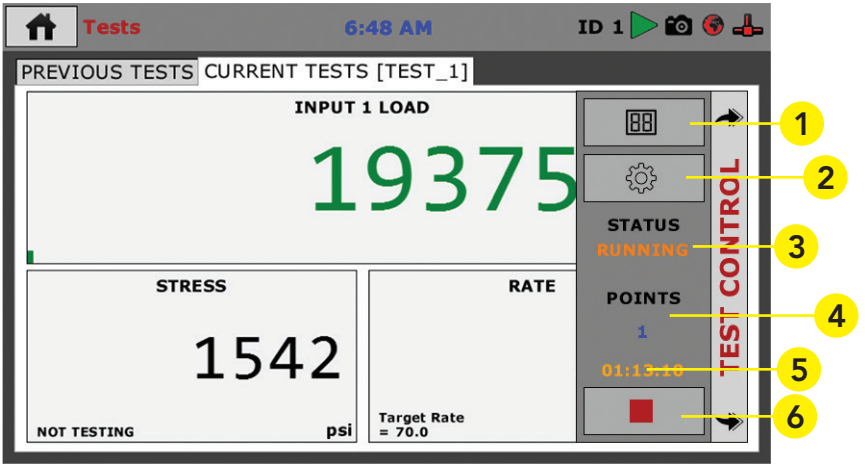
Below is the Current Test Screen, the Green Arrow **(1)** in the screen header indicates that a test is currently running. The name of the test **(2)** is shown in the current tab. To access different views, control or stop the current test, click on the Test Control tab **(3)** at the right of the screen.



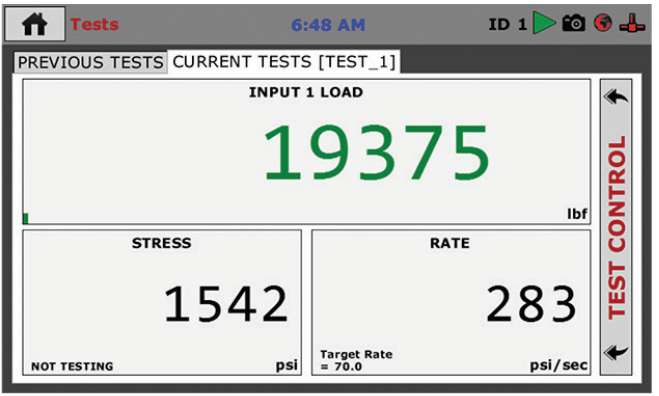
Clicking on this tab opens the Test Control panel, see below.



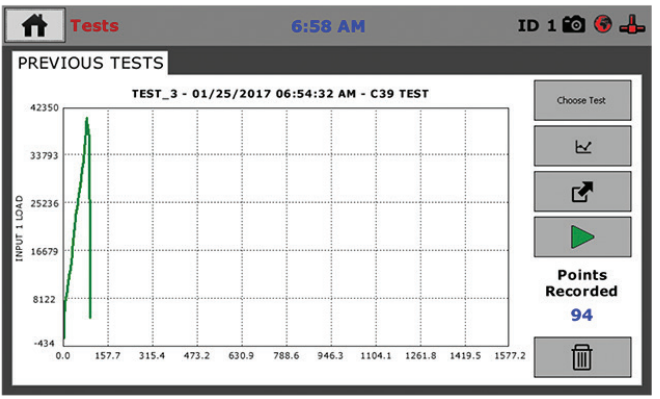
To Toggle through the different available views of a current test, click on the Switch Views button **(1)**.



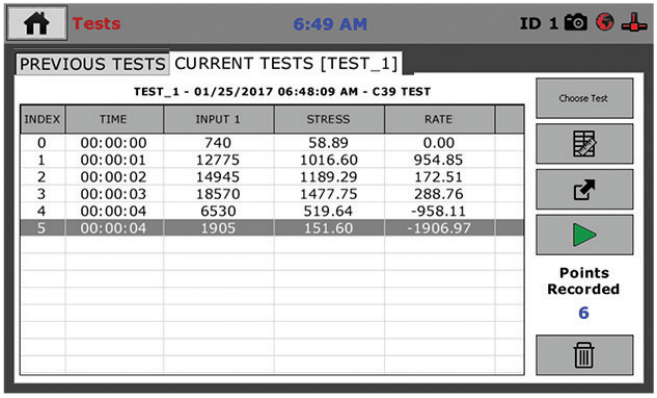
The views that are available are: Live Readouts, Graph or Tabulation. Examples of these screens are below.



Live Readouts

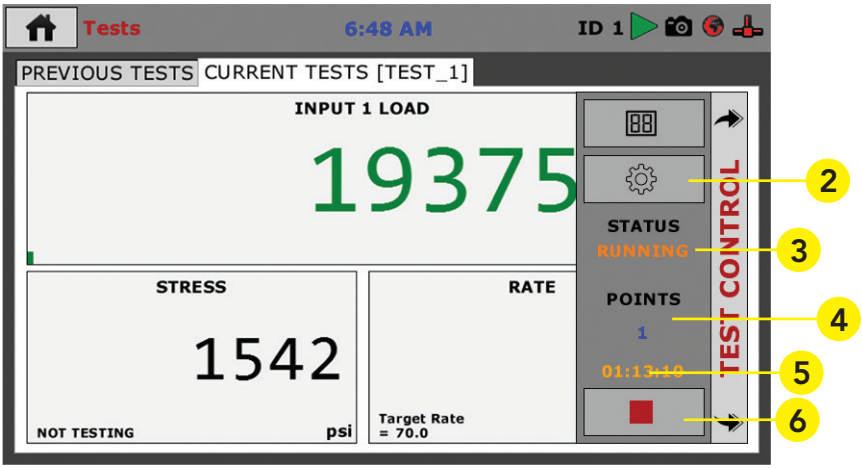


Graph



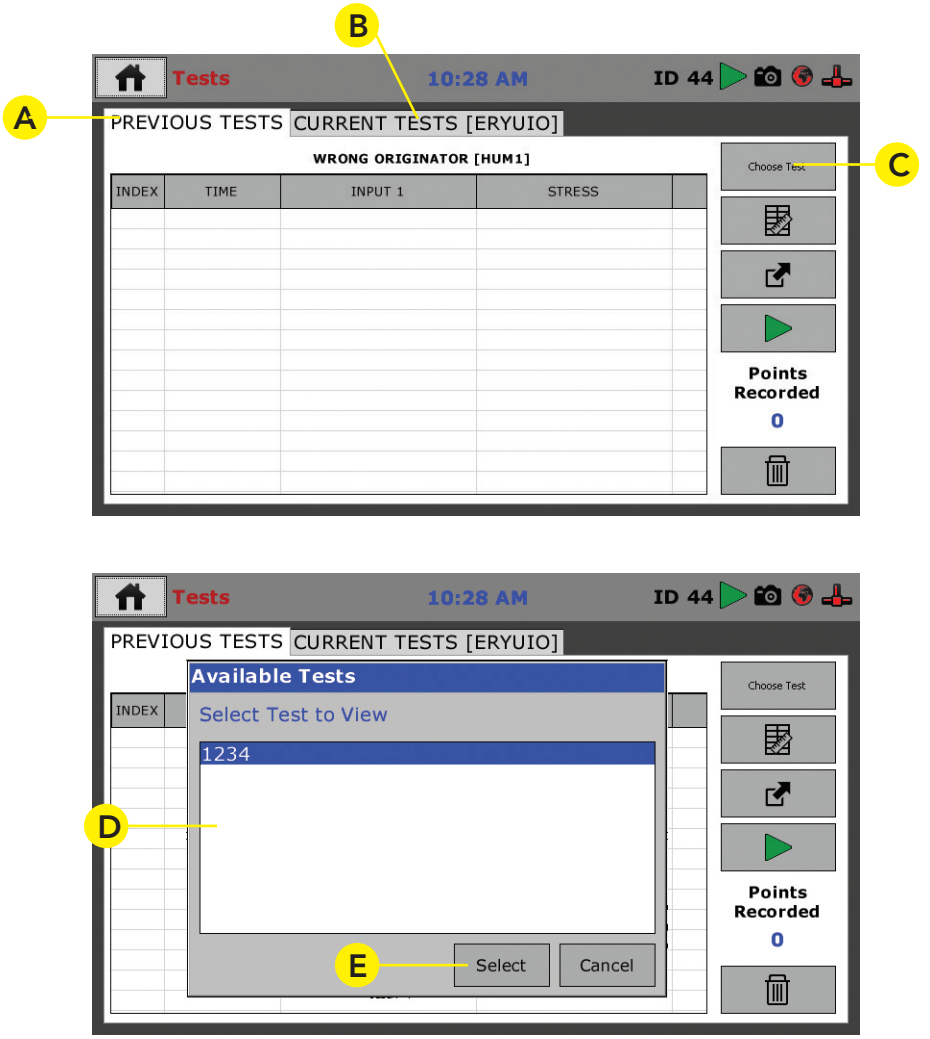
Tabulation

In the Tabulations view, the Digital Indicator will record a reading every second of the test. The latest readings will be at the bottom.



Also available on the Test Control Tab are the following items:

Test Selection (2) By clicking on the Test selection button **(2)** brings up the screen below. Here you can toggle between the Previous Tests tab **(A)**, which shows previous test data and the Current Test tab **(B)**. To select a previous test Click the Choose Test button **(C)**. A popup menu will appear listing the previous tests to choose from **(D)**. Choose the test you want to view from the list and then click Select **(E)**.



Status Monitor (3), This indicates whether a test is running or not running.

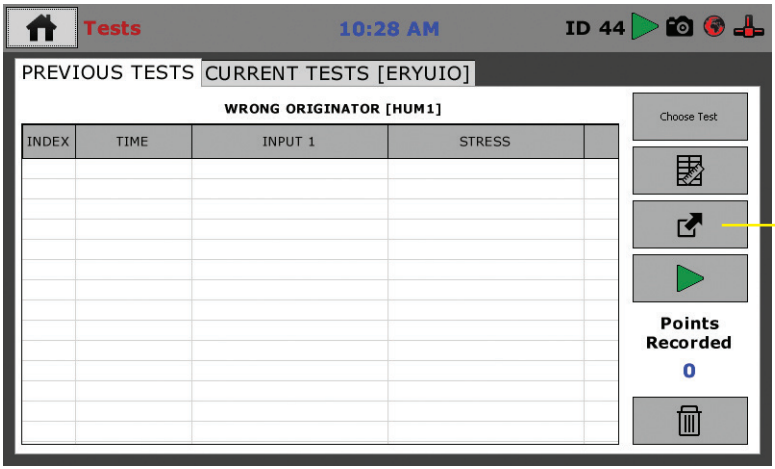
Points (4) indicates how many total test points have been recorded in the current test at any given time.

Start Time (5) This indicates the starting time that the current test was triggered.

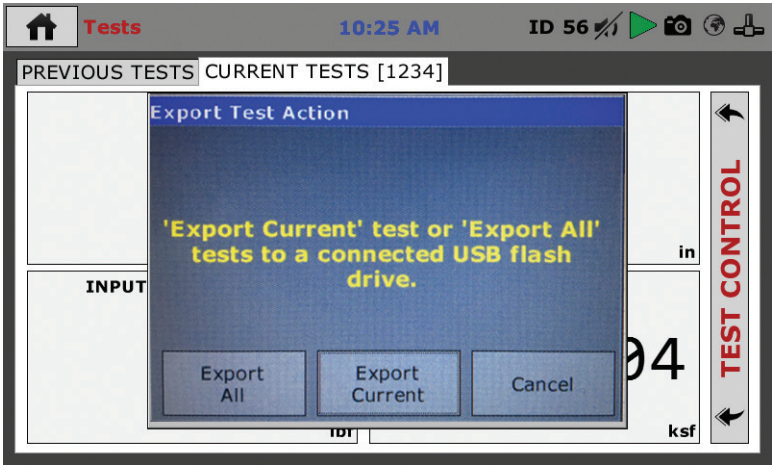
Stop Test button (6), When clicked, this button will stop the current test.

Exporting Data — Test Control Tab

To export test data for use with Microsoft Excel® and other similar programs, First insert a USB flash drive into the USB slot on the front of the HCM-5080. Next, Click on the Export button



You will see the following screen. You have the choice of exporting All tests or just the Current test. Your choice will be loaded to the installed USB flash drive.



Test Data is exported in Humboldt HTD format. To read this data, you will need Humboldt's HM Data Download software. This software can be downloaded from our website at the following URL: https://www.humboldtmfg.com/support/software.php

HCM-5090.3F Specifications

The Humboldt Digtial Indicator

Humboldt's HCM-5090 compression machine Digital Indicator is designed to make breaking cylinders, cubes and beams easier and more precise. This Digital Indicator delivers a whole new level of speed, accuracy and ease-of-use for compression machines. Its 7" color screen provides a large and clean layout of information and makes quick, visual monitoring a breeze.

The HCM-5090 Digital Indicator is set up with four independent data channels and is configured at the factory to have two channels to read load and two channels to read displacement— one for horizontal and one for vertical. This design allows you to set up your configuration to include your compression machine to break cylinders and perform compressometer and extensiometer tests, as well as another machine to break cylinders, all of which can be controlled from the single HCM-5090 Digital Indicator.

Testing Standards

The HCM-5090 Digital Indicator incorporates these standard tests in its design: ASTM C39, C78, C293, C469, C496, C1019, C109/C109M and EN 12390-3. Just pick the test you want to run as you configure your test and the Digital Indicator will handle it. And, at the end of the test, the piston can be set to return to the start position for the next test, speeding up testing operations. The Digital Indicator can also automatically hold a load at any desired point for a specific time.

Digital Indicator

The HCM-5090 Digital Indicator provides a 7" (178mm) touch-screen Digital Indicator, giving you finger-tip control of your testing processes, as well as providing real-time, visual views of your data in both tabular and graph formats. The touch screen provides colorful, at-a-glance monitoring of testing functions without a computer.

Operators can see all the data in several formats at the machine while the test is running. Data can then be viewed simultaneously or downloaded later to a computer in the lab, in the next room or at a different location.

Digital Indicator Features:

- 4-channel data acquisition
- Hi-res, 7", waterproof, touch-screen provides total control and real-time graphical display of tests
- Machine control and data acquisition via machine touch-screen
- Real-time graphical chart and numerical display of test via touch-screen display
- Effective sampling rate of 1 reading per second
- Stores up to 1000 tests with 3000 points per test
- USB port provides data transfer to thumb drive, PC or tablet, plus it can power a wireless access point for wireless communications

HCM-5090 Digital Indicator Specifications	
HCM-5090.3F	120-220V 50/60Hz
Display	7" (178mm) VGA (480 x 800) Resistive-touch screen
Processor	Dual 32-bit ARM
RAM	4GB
Analog to digital converter	24 bit
Data acquisition	4 Channels
Data Speed	1000Hz (1kH)
Logging speed	1 reading per second
Multi-test storage	1000
Points per test	3000

HCM-5090BRK Retrofit Package Includes	
HCM-5090.3F	Digital Indicator
HCM-5090BR	Mounting Bracket
HCM-4177.4	Cable for Pressure Transducer 10,000 psi with Plug
HCX.XXXX	Bolts and lock washers to mount bracket to frame

HCM-5090BRKT Retrofit Pkg. w/ Transducer Includes	
HCM-5090.3F	Digital Indicator
HCM-5090BR	Mounting Bracket
HCM-4177.1	Pressure Transducer 10,000 psi
HCM-4177.4	Cable for Pressure Transducer 10,000 psi with Plug
HCX.XXXX	Bolts and lock washers to mount bracket to frame

Accessories	
HCM-4177	Pressure Transducer, 10,000 psi with Cable and Plug
HCM-4177.1	Pressure Transducer, 10,000 psi
HCM-4177.4	Cable for Pressure Transducer 10,000 psi with Plug
HCM-5090BR	Mounting Bracket

General Warnings

Safety Warnings

Operators should take care to operate this machine under maximum load restrictions. The machine is programmed at the factory to provide safety shutdown if the upper or lower maximum travel is exceeded, as well as if the upper instrument calibration is exceeded.

Electrical Warnings

Typically, there is no reason for the operator to open the machine. However, if the customer's engineers attempt to change settings to the circuit board connected to the back panel, the machine must first be unplugged. Unplugging the internal connection to the back panel circuit board while the machine is under power will result in permanent damage to the circuit board.

Important Notice

The information contained herein is supplied without representation or warranty of any kind. Humboldt Mfg. Co. therefore assumes no responsibility and shall have no liability, consequential or otherwise, of any kind arising from the use of the described equipment contained in this manual.

Updated Products

The manufacturer reserves the right to change or modify product design or construction without prior notice and without incurring any obligation to make such changes and modifications on products previously or subsequently sold.

Fitness for Application

The manufacturer makes no recommendations or claims regarding fitness for applications other than the specific tests as defined in this User Guide.

Unpacking

Initial inspection should include checking for physical damage during shipping and obvious external damage to the product.

Package contents are defined by your packing list. Each Loader is configured according to customer specifications. In your inspection, make certain that the contents of your shipment match the documentation provided by your packing list.

Place unit on a flat, smooth surface and use leveling feet (supplied) and a bubble level to ensure that the unit is level side-to-side and back-to-front.

Warranty

Humboldt Mfg. Co. warrants its products to be free from defects in material or workmanship. The exclusive remedy for this warranty is Humboldt Mfg. Co., factory replacement of any part or parts of such product, for the warranty of this product please refer to Humboldt Mfg. Co. catalog on Terms and Conditions of Sale. The purchaser is responsible for the transportation charges. Humboldt Mfg. Co. shall not be responsible under this warranty if the goods have been improperly maintained, installed, operated or the goods have been altered or modified so as to adversely affect the operation, use performance or durability or so as to change their intended use. The Humboldt Mfg. Co. liability under the warranty contained in this clause is limited to the repair or replacement of defective goods and making good, defective workmanship.

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Testing Equipment For Construction Materials
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