

Hydraulic Pressure Controller



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 Order 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.

Installation and Equipment Setup

Electrical Connections

The HM-5250 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 HM-5250 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 above the electrical cord inlet. The Fuse Compartment is located between the electrical cord inlet and the Power Switch. The HM-5250 uses a 8.5 amp fuse. To begin operation, attach the supplied electrical cord, plug it in and press the Power Switch.

Fuse Compartment



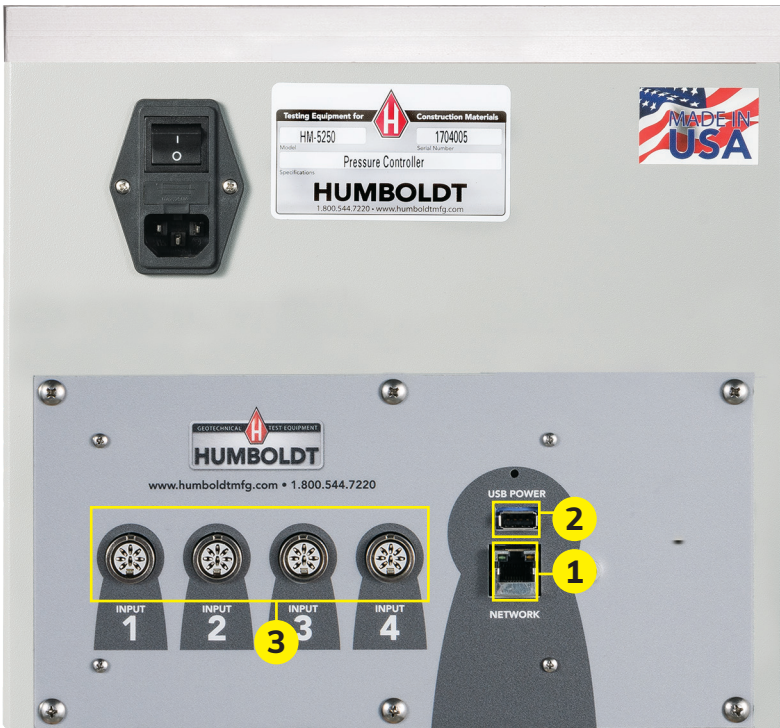
Fig. 1 Power Switch

WARNING

Ensure auxiliary equipment (Triaxial cell, tubing, etc...) is rated for the capacity of the testing device. Keep body parts clear of moving surfaces when operating machine. Ensure all motion has stopped prior to adding or removing testing samples or support equipment. Before disconnecting tubing, ensure applied pressure has been removed.

Instrumentation Connections and Setup

HM-5250 Rear Instrumentation Panel



Above is a photo of the rear instrumentation panel of the HM-5250.

Network (1)

Ethernet input for connecting machine to a local area network (LAN) and/or the internet.

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.

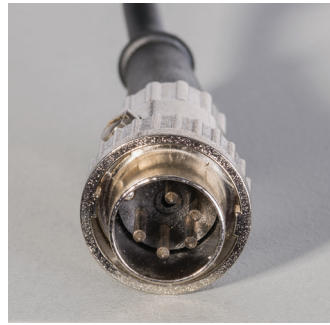
Instrument Inputs (3)

The back panel features four (4) inputs for connecting instrumentation to the machine. Each input represents a separate channel. Channel 1 has been assigned to Cell Pressure and is pre-calibrated. Channel 2 has been assigned to Back Pressure and is pre-calibrated. Channel 3 has been assigned to Pore Pressure and is pre-calibrated. And, Channel 4 has been assigned to Volume and is pre-calibrated. Instrumentation is clearly marked for what channel it is assigned to.

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

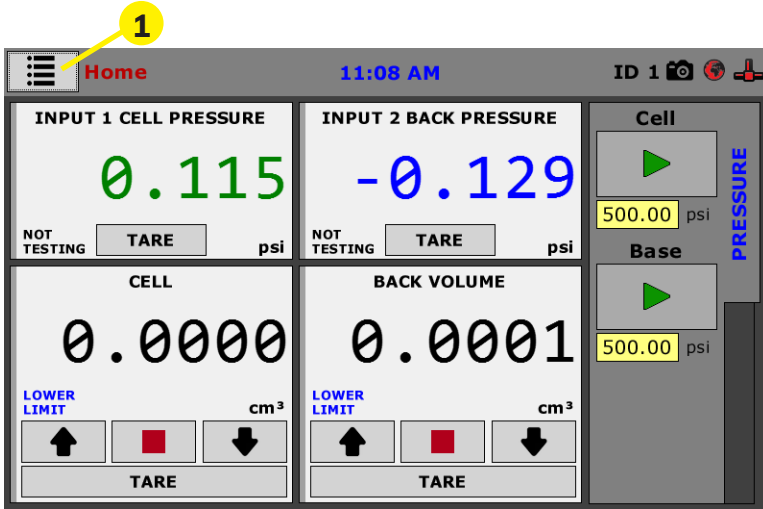
Once you have installed the instrumentation into the correct inputs, your rear panel should look like the photo on the previous page.

Initial Set Up

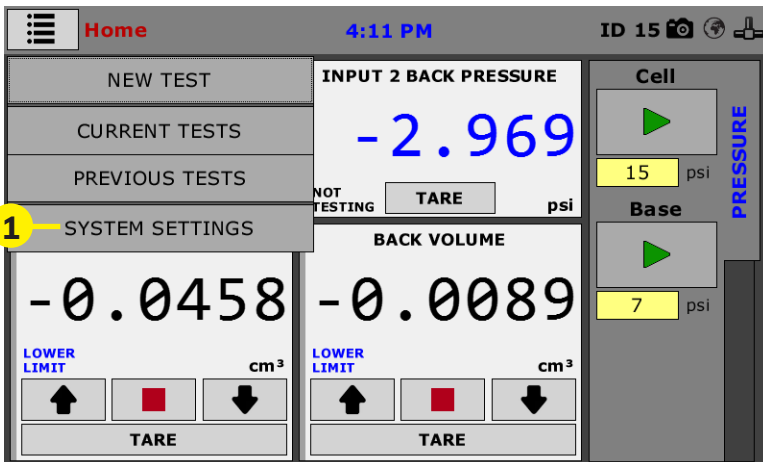
Remember, your HM-5250 Pressure Controller includes all the necessary instrumentation, which is already calibrated and assigned to an Input and will not need calibration, however you should confirm that the instrumentation has been set up and calibrated, that you have plugged them into the correct channel, and that you check with your QC/QA program to set up a frequency of calibration schedule.

DO NOT RECALIBRATE!

When your HM-5250 is first turned on, the screen below will appear.

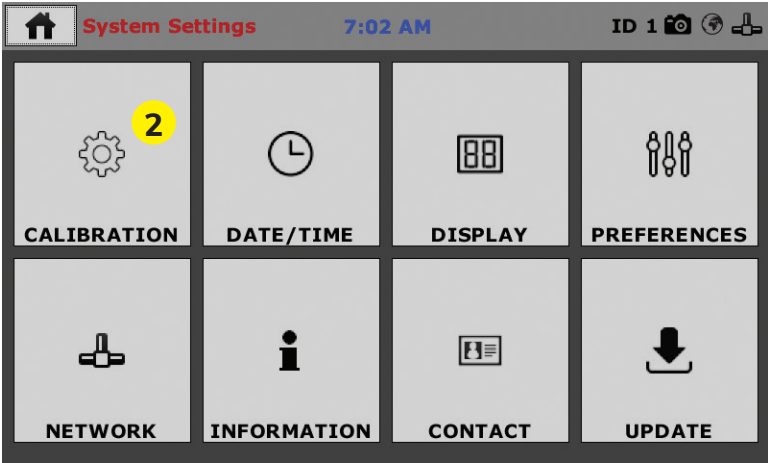


From this screen, to confirm your machine instrumentation has been calibrated, navigate to the Calibration section by clicking the Menu icon in the top left corner of the screen (1). When you click on this button, you will see a drop-down menu appear, see below.

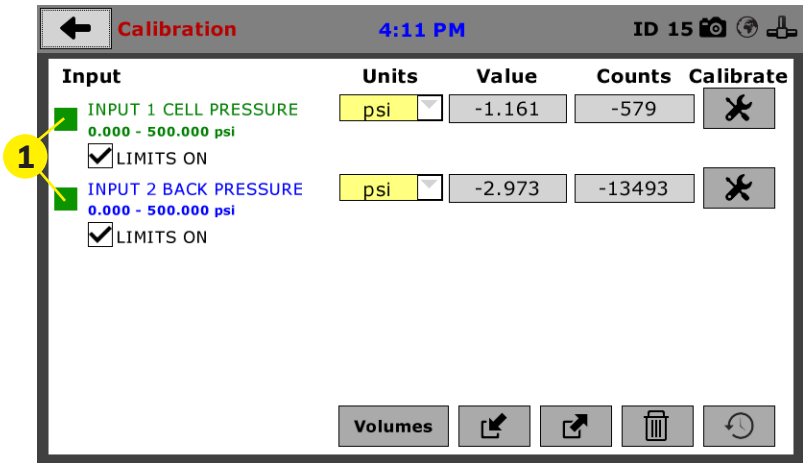


Navigate to the bottom of this drop-down menu and click on System Settings (1). You will see the following screen.

Initial Set Up — Calibration



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

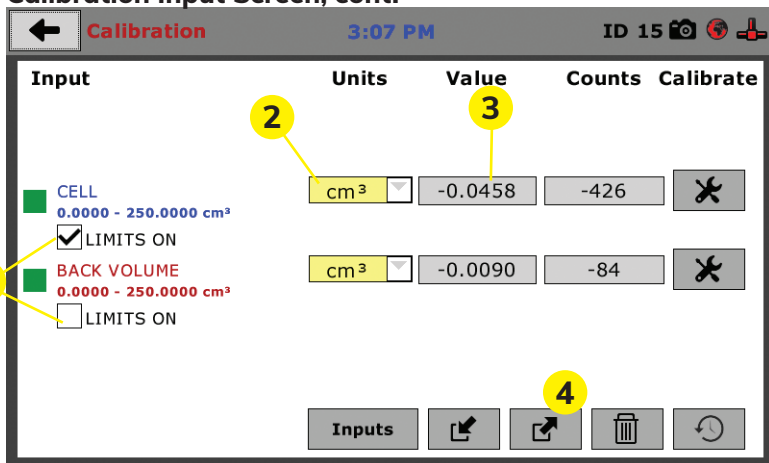


Calibration Input Screen

The Calibration Input Screen (above) is used to monitor and calibrate instrumentation and assign them to specific channels of the HM-5250. 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).

Calibration Input Screen, cont.



Each channel has a “Limits On” check box (1). 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.

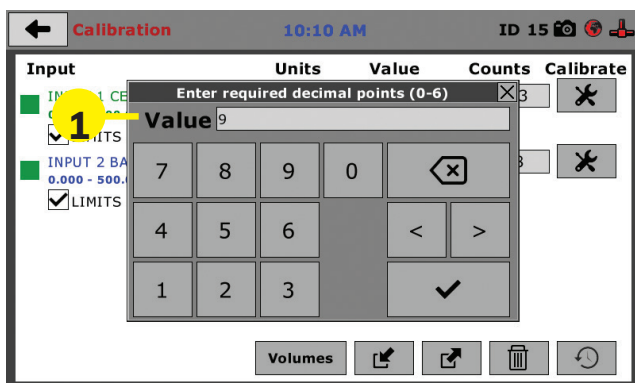
Note: An input cannot be calibrated during testing.

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 lb.-in. and SI units if the need arises.

Value (3)

This field displays the current calibration value. This value should 1 decimal point accuracy for pressure in psi (kpa) and 3 decimal point accuracy for volume in cm³ (1) below. If the instrument is not calibrated, the unit will read “N/A.”



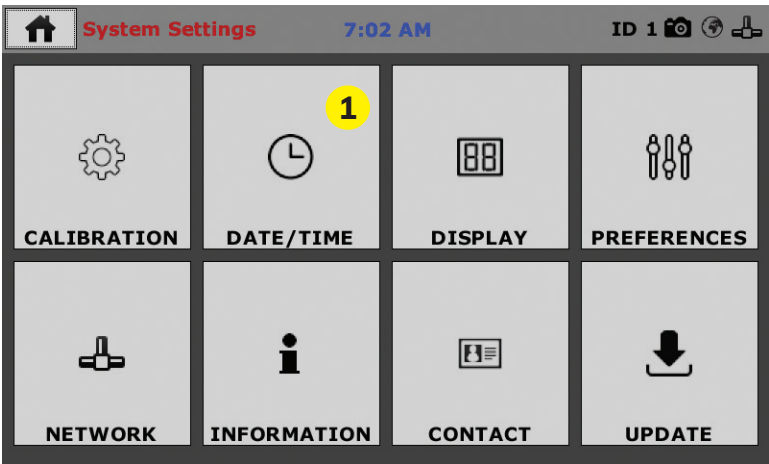
For the HM-5250, the value for volume is measured through the position of the stepper motors internally, and pressure is measured by way of two pressure transducers mounted on the back of each pressure cylinder.

Export Calibration via USB (4)

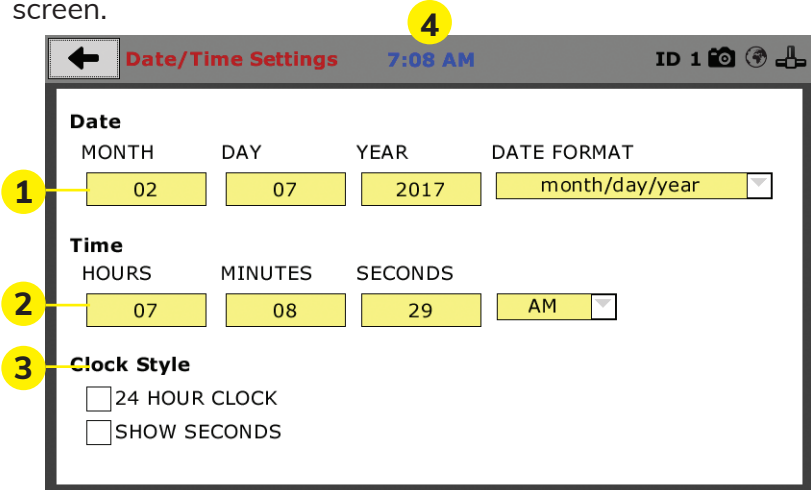
Press this button to select calibrations to export via USB. It is a good practice to export all your calibrations to a thumb drive. In case of a problem this practice allows you to recover your calibration data quickly.

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)

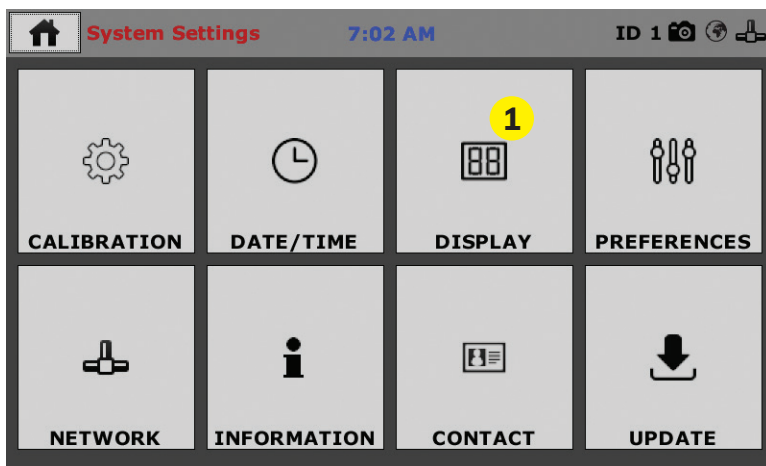
Select a clock view, either a 24-hour or 12-hour clock, as well as the option to show seconds or not.

Clock (4)

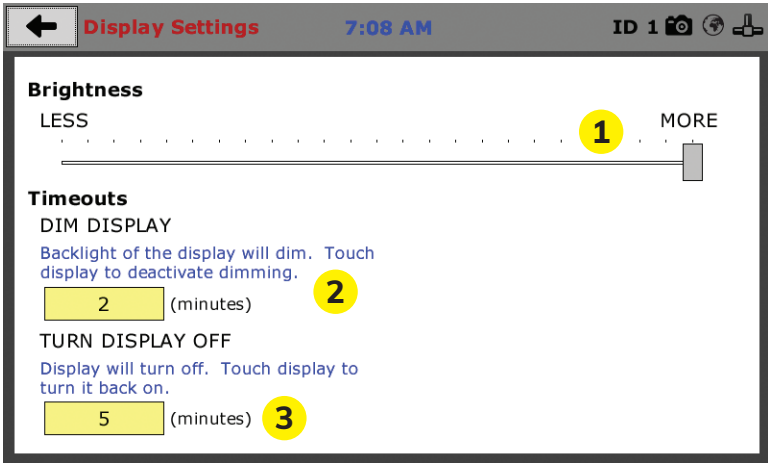
The current time is displayed and is located on every controller screen. Clicking on the time from any screen, you will be taken to the Date/Time Settings Screen.

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)

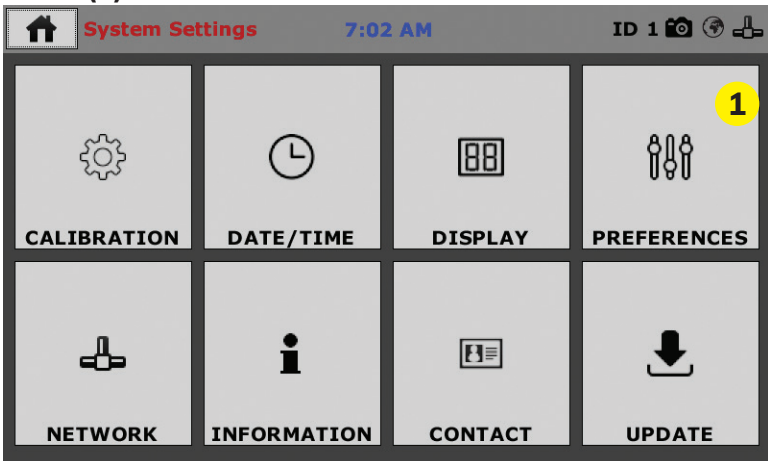
The backlight of the display will automatically dim to save power. Click the yellow box to change the number of minutes before the display goes dim. After the time has elapsed, touch the display to deactivate dimming.

Turn Display Off (3)

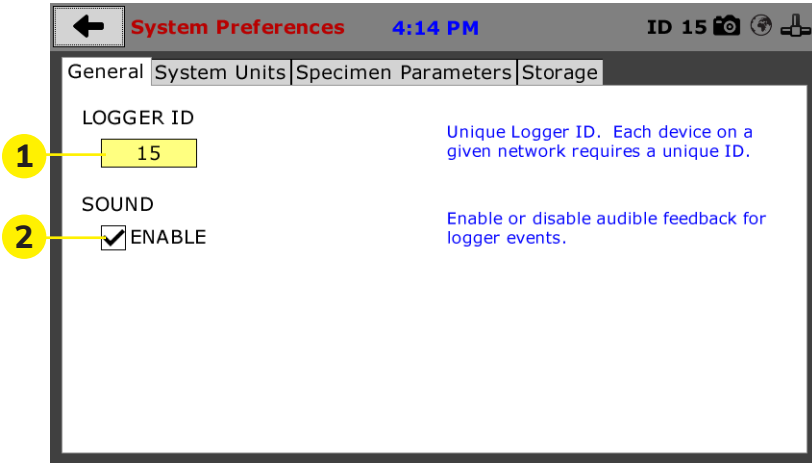
The display will automatically turn off to save power. Click the yellow box to change the number of minutes before the display powers off.

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)

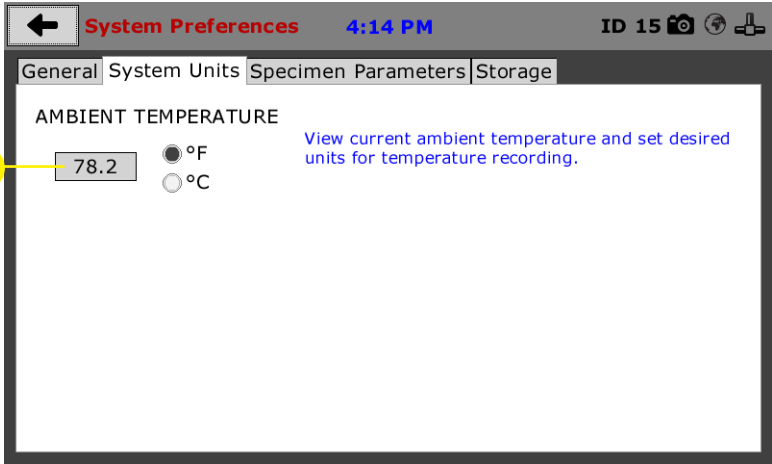
Each machine that is connected to your network requires a unique Logger ID. These numbers can be assigned any number between 1-245. In most cases, if you are setting up a new machine it has been given the Logger ID 1. This would show in the Logger ID field. (1). If this number conflicts with another 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 (see next page) is accessed by clicking on the "System Units" Tab under System Preferences.

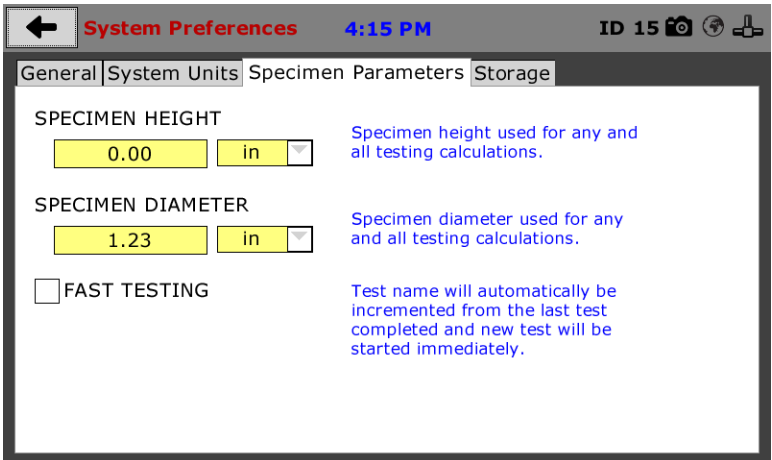


Ambient Temperature (1)

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

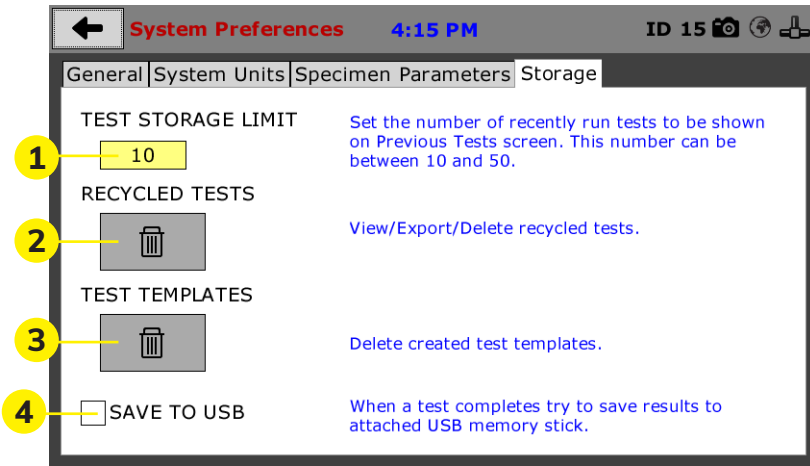
Manual Control

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



Preferences – Storage Tab

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



Test Storage Limit (1)

This field allows you to set the number of previously run tests to be available on the “Previous Tests” screen. This number can be between 10-50.

Recycled Tests (2)

This refers to previously run tests that are not displayed in the “Previous Tests” window. These tests are not deleted; they are recycled for later use. Select this button to view/export/delete recycled tests.

Test Templates (3)

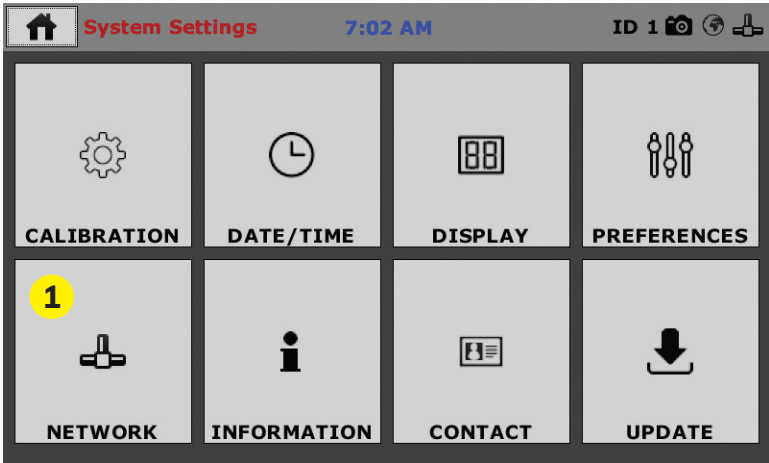
Select this button to delete test templates that have been created, but are no longer desired.

Save to USB Check Box (4)

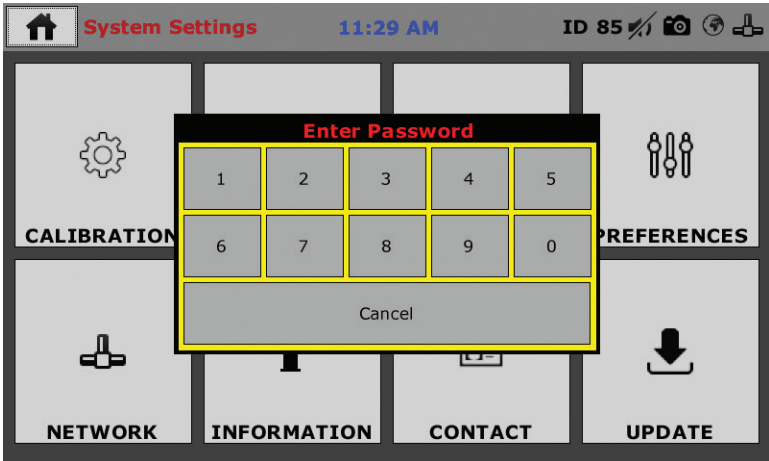
Checking this Box saves the results of a test to USB thumb drive inserted into the front USB slot on the machine.

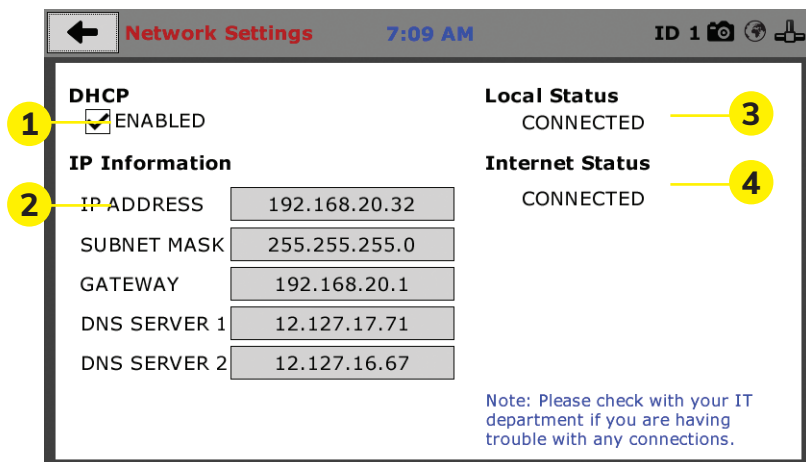
Initial Set Up — Network

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.

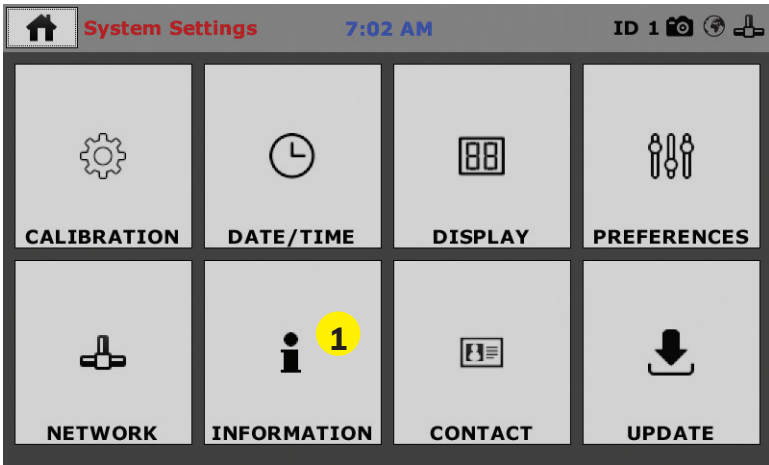
Internet Status (4)

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.

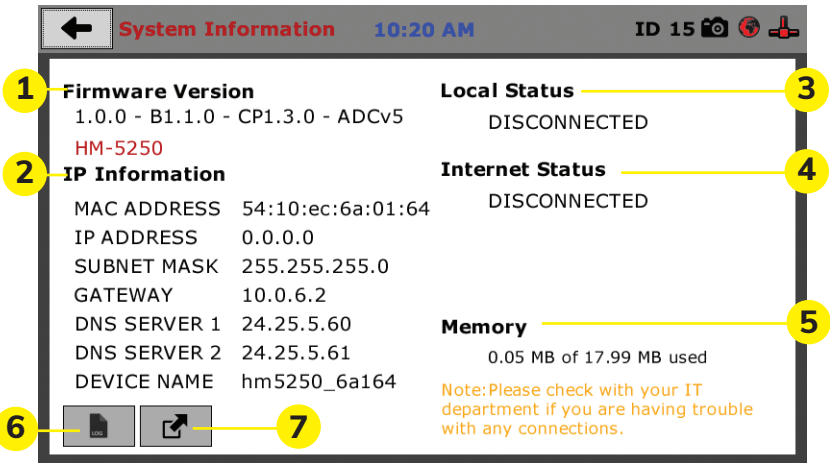
Initial Set Up — Information

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)

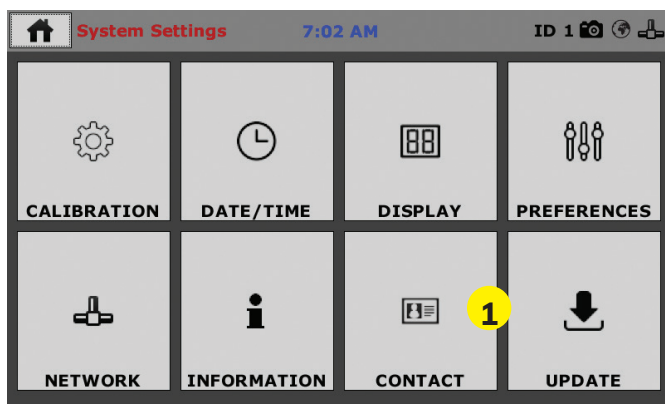
This is for Humboldt use only.

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.

Clicking on this panel provides contact information for

Initial Set Up —Contact

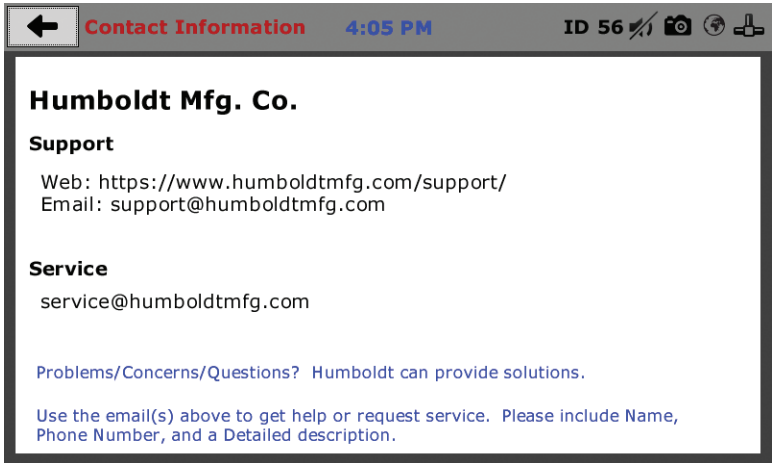


Contact Information

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

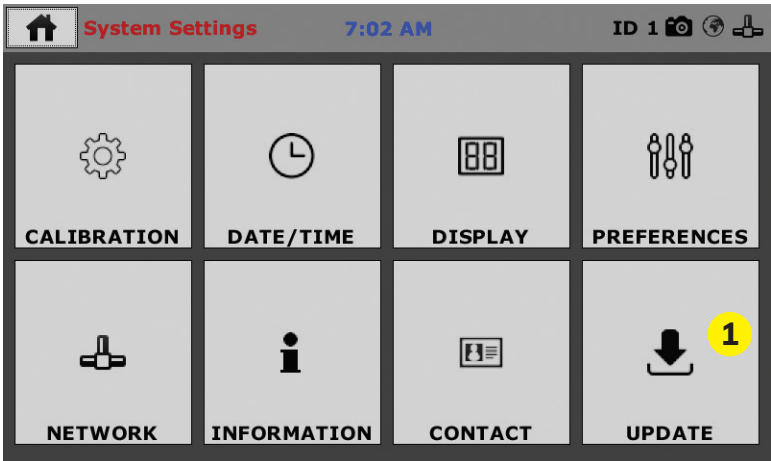
For quickest response go to this link on our website: <https://www.humboldtmg.com/support> and fill in the support form.

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@humboldtmg.com or Humboldt Service at service@humboldtmg.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)**



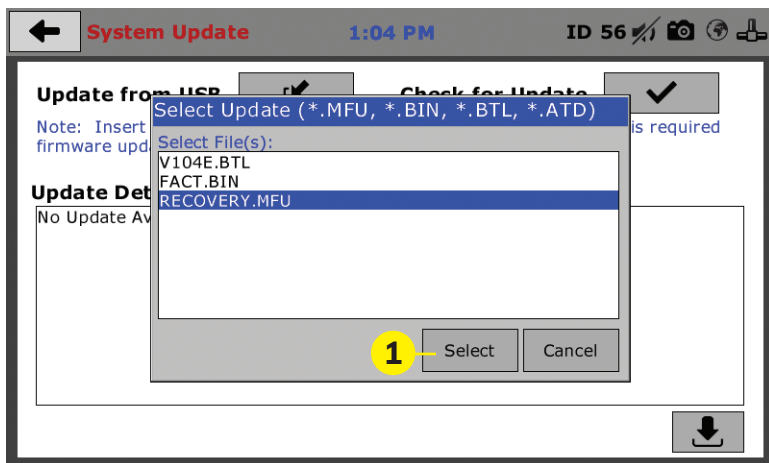


Update from USB (1)

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.humboldtmg.com/support/software.php>.

Once on this page, click on the Elite Series Firmware tab. You will see a list of Humboldt Elite Series machines. Click on the HM-5250 Current Version link and the firmware update will begin to download to your computer. 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 HM-5250. With the USB thumb drive inserted into the USB port, click on Update from USB **(1)**.

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.



The update process will begin. This may take several minutes. Your HM-5250 may reboot several times during the update, do not turn off or reset machine during this process.

Operation from a Computer and NEXT Software

This manual covers the setup and operation of the HM-5250.3F Pressure Controller in Stand-alone Mode only. For information on operating your load frame with Humboldt's NEXT Software and a computer, please refer to the Humboldt NEXT software manual.



Equipment Setup

Installation and Equipment Setup

Electrical Connections

The HM-5250 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 HM-5250 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 above the electrical cord inlet. The Fuse Compartment is located between the electrical cord inlet and the Power Switch. The HM-5250 uses a 8.5 amp fuse. To begin operation, attach the supplied electrical cord, plug it in and press the Power Switch.

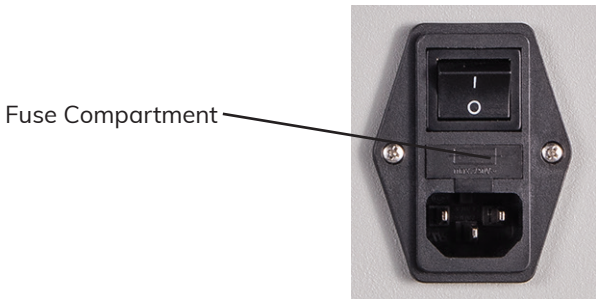


Fig. 1 Power Switch

Instrumentation Connections and Setup

HM-5250 Rear Instrumentation Panel



Above is a photo of the rear instrumentation panel of the HM-5250.

Network (1)

Ethernet input for connecting machine to a local area network (LAN) and/or the internet.

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.

Instrument Inputs (3)

The back panel features four (4) inputs for connecting instrumentation to the machine. Each input represents a separate channel. Channel 1 has been assigned to Cell Pressure and is pre-calibrated. Channel 2 has been assigned to Back Pressure and is pre-calibrated. Channels 3-4 are not connected to any sensors, and are inactive.

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 the photo on the previous page.

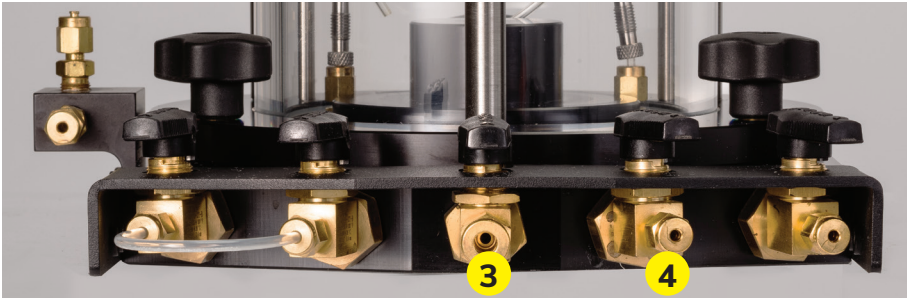
Initial Set Up

Remember, your HM-5250 Pressure Controller includes all the necessary instrumentation, which is already calibrated and assigned to an Input and will not need calibration, however you should confirm that the instrumentation has been set up and calibrated, that you have plugged them into the correct channel, and that you check with your QC/QA program to set up a frequency of calibration schedule.

Cell Hookups (3) (4)

To connect the HM-5250 Controller to a Triaxial Cell, while looking at the controller from behind, Measure a length of 0.25" tubing and insert one end into the Cell Valve Input **(3)** on the Right-side of the HM-5250. On the other side of the tubing install a HM-4197.25 ferrule and attach the tubing to the Triaxial Cell's Cell Valve **(3)**. (See photo below)

To Connect the HM-5250 to the Base Valve of the Triaxial Cell, Measure a length of 0.125" tubing and insert one end into the Base Valve Input **(4)** on the Left-side of the HM-5250. On the other side of the tubing install a HM-4197.12 ferrule and attach the tubing to the Triaxial Cell's Base Valve **(4)**. (See photo below)



Priming the Volume Chambers

The volume chambers for the HM-5250 are shipped empty and you will have to prime them before operation.

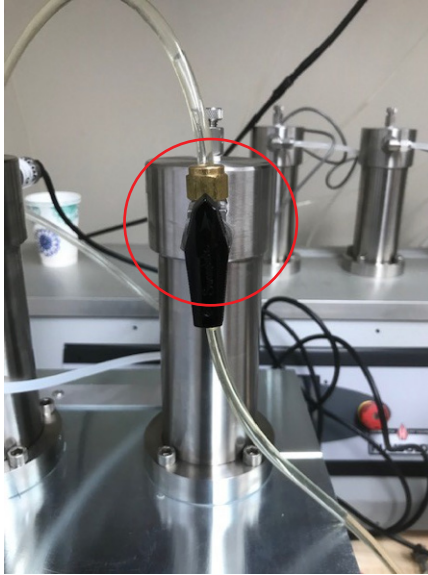
This is only necessary at the initial startup and does not have to be repeated every test.



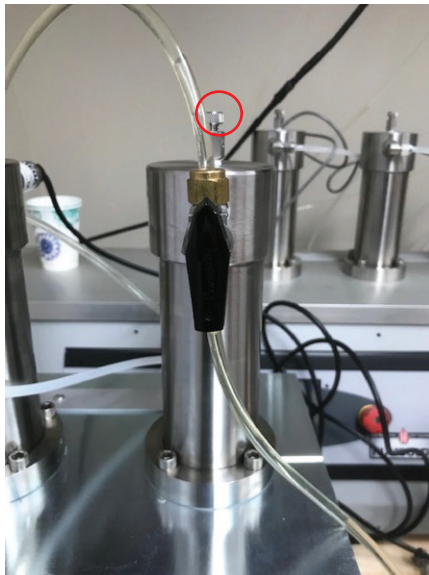
Test Setup

Filling the Hydraulic Pistons

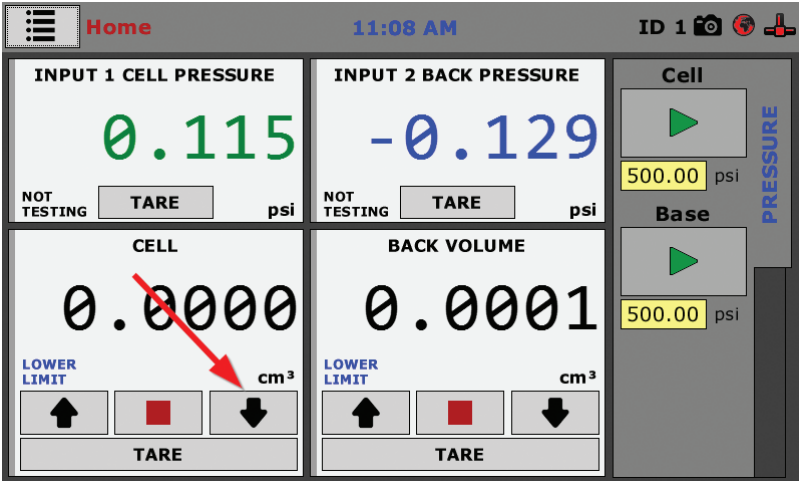
Turn the FLOW VALVE on the CELL PRESSURE Chamber (Left side) so that it is OPEN (pointing up), see photo below.



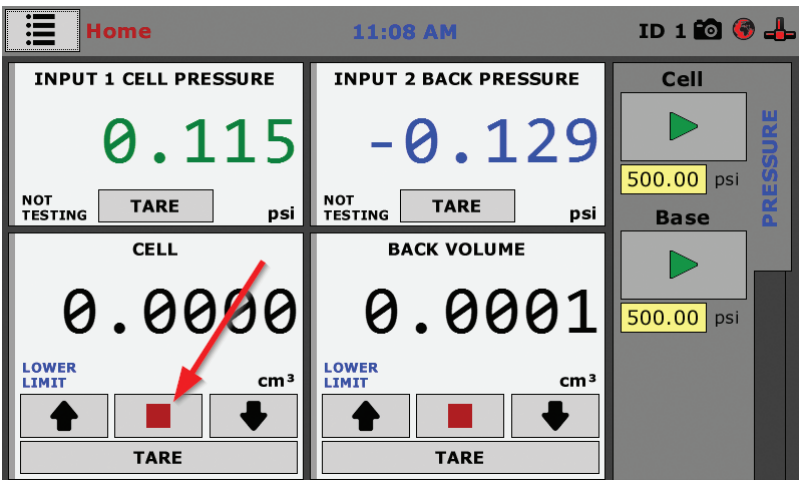
2. Ensure that the RELIEF VALVE on the top of the CELL PRESSURE Chamber (left side) is closed (circled in Red below). Also, ensure that the lines running from the water source and the HM-5250 have been purged of air before connecting them to the input port on the HM-5250.



3. Navigate to the Pressure Tab on the HM-5250 touch-screen and push the DOWN ARROW in the Cell Section at the bottom left of the screen (see Red arrow below).

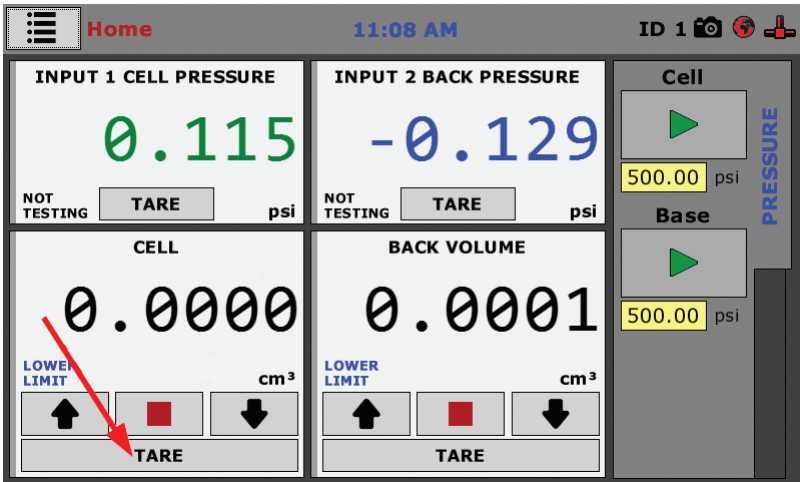


4. Once the piston has moved all the way to the bottom of the cylinder, press the STOP button in the Cell Section (see Red arrow below). You will know when the piston has bottomed out when it stops moving and it will be indicated on the volume readout (lower display window)



Note: Have a rag ready to capture water, which will exit from the RELIEF VALVE at the top of the CELL PRESSURE Chamber (left side)

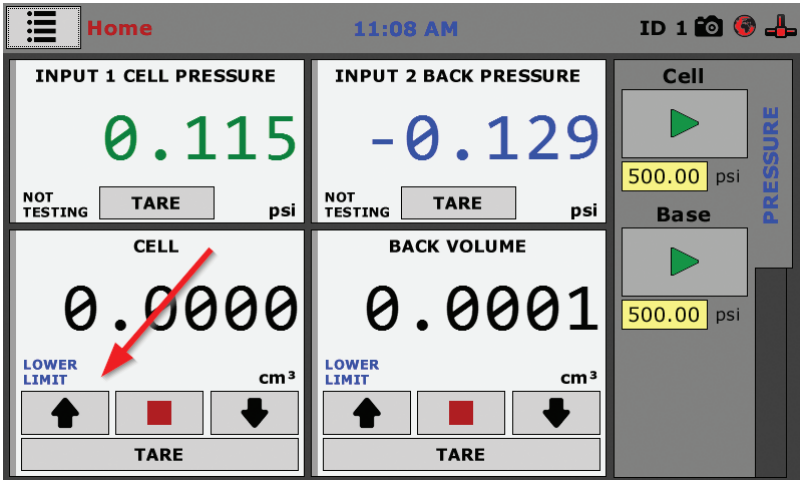
5. Close control valve, open bleed valve, and press the UP button on the touch screen to remove any air from the pressure chamber.
6. Close bleed valve when air has been removed from the chamber and only water comes out of the drain port on the bleed valve. Press the stop button on the touch screen.



7. Repeat this process for the BASE PRESSURE Chamber (Right side)

Purging the Lines of Air

1. Turn the CONTROL VALVE, at the top of the CELL PRESSURE Chamber (left side), to the DOWN position.
2. Ensure that a line is connected to the CELL PRESSURE Chamber OUTPUT PORT on the HM-5250.
3. Press the UP ARROW on the touch screen to push water from the cylinder through the attached line.



4. Allow air to escape the open end of line until there is a constant flow of water with no air bubbles present.

Note: Have a container ready to capture water exiting from the line.

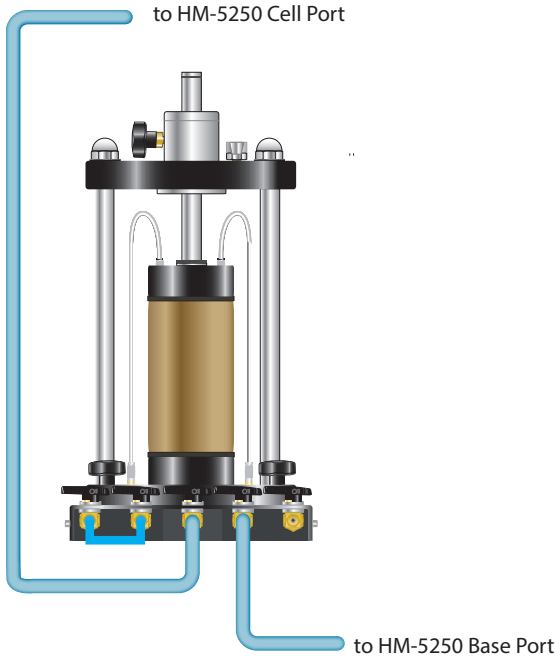
5. Once all air has been removed from the line, Press the STOP BUTTON and set the VALVE KNOB to the closed position. (see photo below)



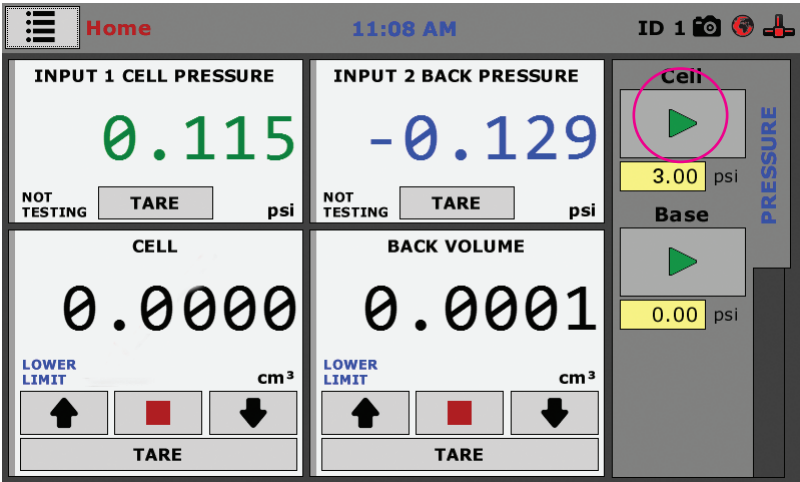
6. Repeat steps 1-5 for the BASE PRESSURE Chamber (right side).

Flushing the Triaxial Cell Water Lines

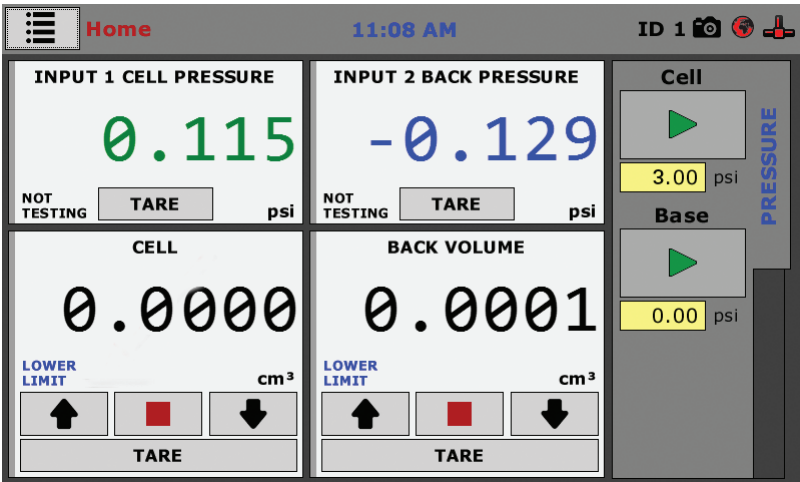
1. Close all the VALVES on the Triaxial Cell
2. Connect the line from the CELL OUTPUT PORT (left chamber) on the HM-5250 (see photo below) to the CELL VALVE (center port) on the Triaxial Cell.
3. Connect the line from the BASE OUTPUT PORT (right chamber) on the HM-5250 (see photo below) to the BASE VALVE (port to the right of the CELL VALVE) on the Triaxial Cell.
4. Before proceeding, make sure the Triaxial Cell is configured like the drawing below.



5. Input 3 psi for CELL PRESSURE in the yellow PSI Field on the touch screen of the HM-5250, and then, Press the corresponding green START BUTTON, (see photo below).



- Open the CELL VALVE (center valve) on the Triaxial Cell.
- Input 3 psi for BASE PRESSURE in the yellow PSI Field on the touch screen of the HM-5250, and then, Press the corresponding green START BUTTON, (see photo below).



- Open the BASE VALVE (valve to the right of the center valve) on the Triaxial Cell.
- Once both lines have been purged of air press the stop buttons on the touch screen, close the valves on the Triaxial chamber, and close the control valves on the HM-5250.

10. NOTE: A two way valve needs to be installed between the water source and HM-5250 so that the the user can fill up the triaxial chamber when preparing the test equipment for a test.

HM-5250.3F Specifications

The HM-5250.3F is a fully-automated hydraulic pressure controller, which is highly accurate up to 500psi (3500kpa) in pressure and 200cc (200ml) in volume. It is designed specifically for geotechnical laboratory triaxial testing (UU, CU and CD) and provides control and monitoring of cell pressure, back pressure and volume change when used with our Elite Series load frames.

The HM-5250 provides two (2) integral and independent data acquisition channels, which can be utilized in stand-alone configuration or accessed through a LAN-networked computer using Humboldt's NEXT software. The unit is built with durable, high-quality components and features the use of stepper motors and precision gears to ensure smooth and reliable operation of pressures, as well as precise results.

In stand-alone mode, this pressure controller provides a 7" (178mm) touch-screen controller. This new waterproof, touch screen provides colorful, at-a-glance monitoring of testing functions without the use of a computer. Operator could see all the data in several formats at the controller while the test is running. Then can be viewed simultaneously or downloaded later to a computer in the lab, in the next room or at a different location, while also providing report generation capabilities from within Humboldt's NEXT software or our enhanced test- specific modules.

Specifications	
Maximum Pressure	500psi (3500kpa)
Volume Capacity	200cc (200ml)
Voltage	110-220V 50/60Hz - 8.0 amps
Dimension (L x W x H)	13" x 11.5" x 22" (330 x 292 x 559mm)

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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Humboldt Mfg. Co.
875 Tollgate Road
Elgin, Illinois 60123 U.S.A.

U.S.A. Toll Free: 1.800.544.7220
Voice: 1.708.468.6300
Fax: 1.708.456.0137
Email: hmc@humboldtmgf.com

