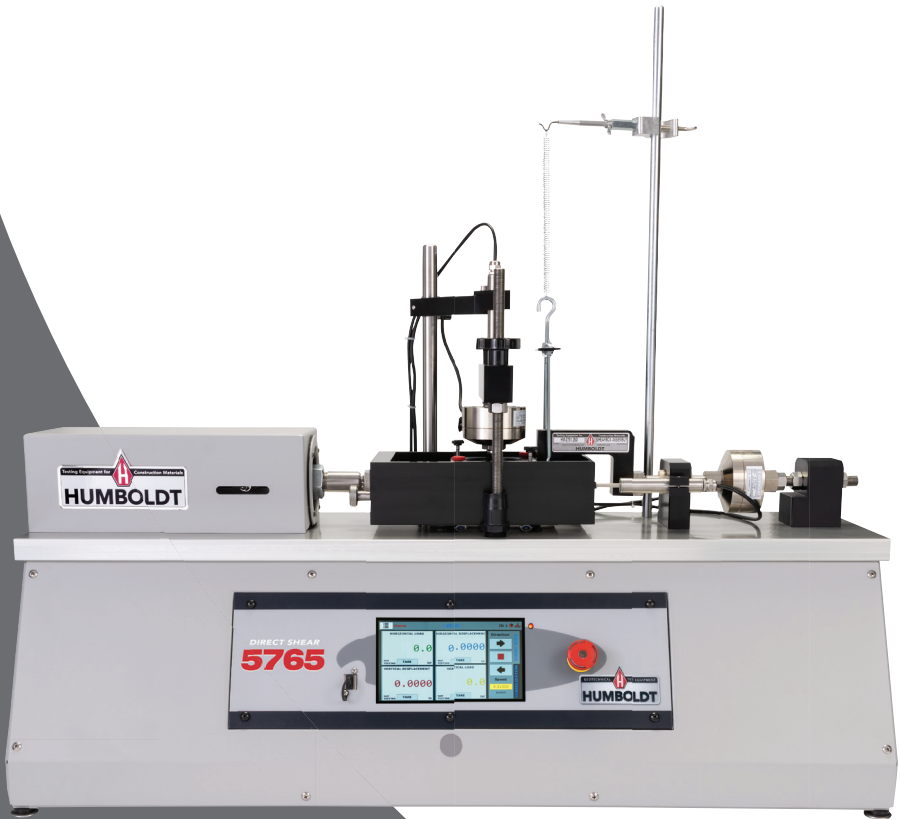
product manual 04.25

HM-5765.3F

Direct/Residual Shear Apparatus



GEOTECHNICAL TEST EQUIPMENT

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.

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-5765 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-5765 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 HM-5765 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

HM-5765 Rear Instrumentation Panel

Above is a photo of the rear instrumentation panel of the HM-5765.

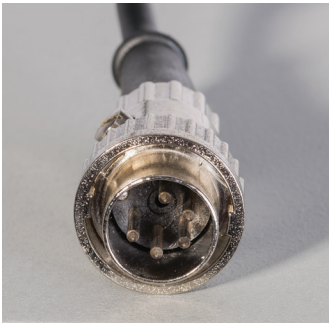
Network (1)
Ethernet input for connecting machine to a local area network (LAN) and/or the internet.

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 panel features four (4) inputs for connecting instrumentation to the machine. Each input represents a separate channel, and has been assigned and calibrated to a specific instrument for use with your HM-5765.

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

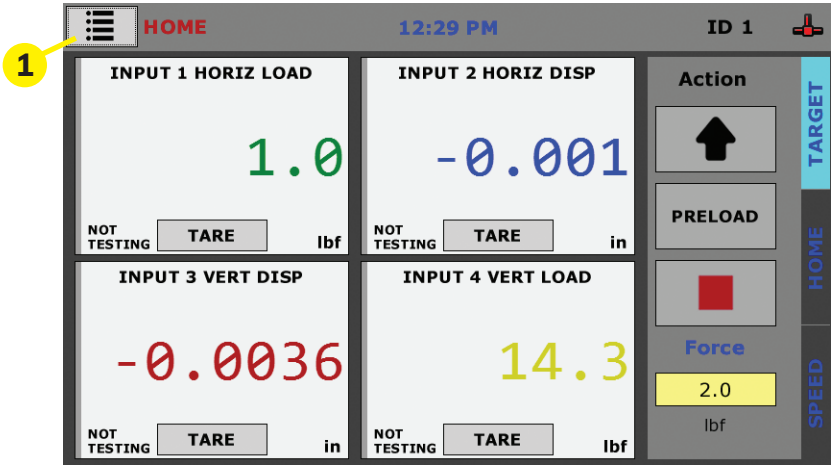
Once you have installed the instrumentation into the correct inputs, your rear panel should look like this:

Initial Set Up

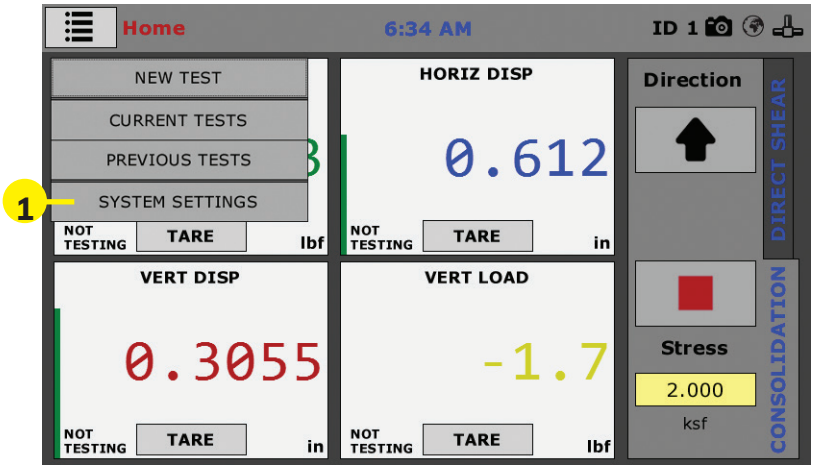
Remember, your HM-5765 Direct/Residual Shear Machine includes all the necessary instrumentation, which is already calibrated and assigned to an Input and will not need calibration, however you should confirm that the instrumentation has been set up and calibrated, that you have plugged them into the 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-5765 is first turned on, the screen below will appear.

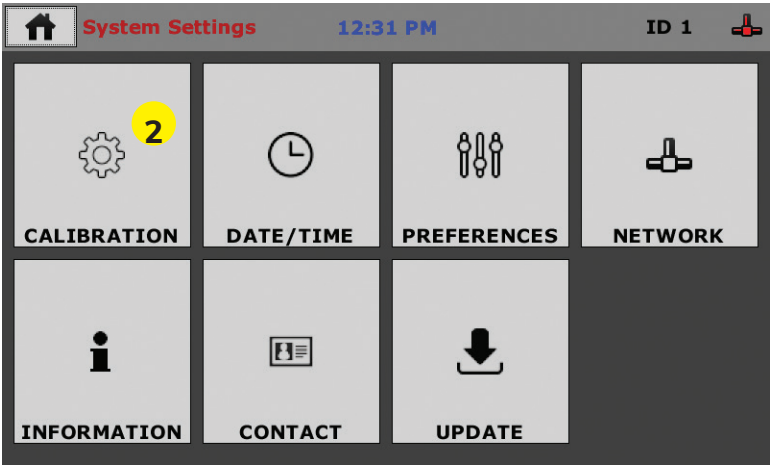


From this screen, to confirm your machine instrumentation has been calibrated, navigate to the Calibration section by clicking the Menu icon in the top left corner of the screen **(1)**. When you click on this button, you will see a drop-down menu appear, see below.

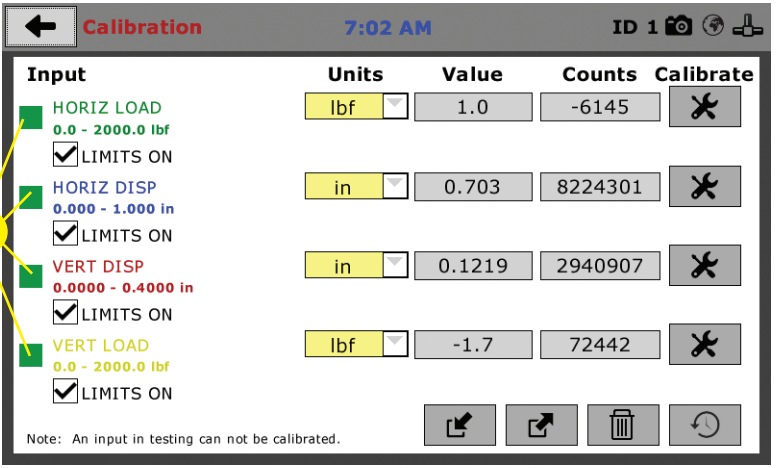


Navigate to the bottom of this drop-down menu and click on System Settings **(1)**. You will see the following screen.

Initial Set Up — Calibration



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

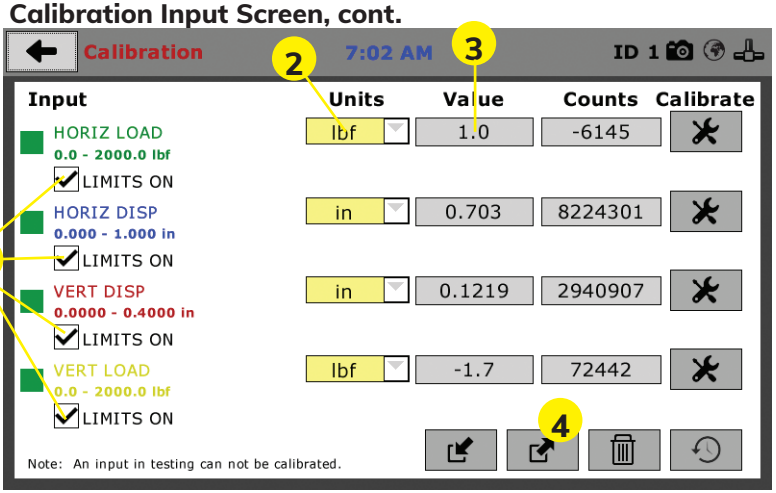


Calibration Input Screen

The Calibration Input Screen (above) is used to monitor and calibrate instrumentation and assign them to specific channels of the HM-5765. 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.

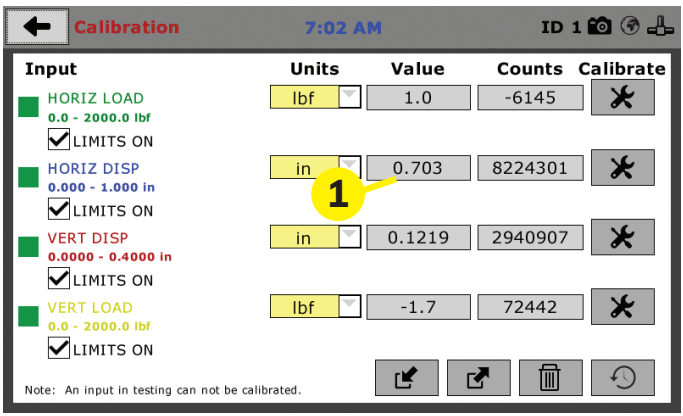
Note: An input cannot be calibrated during testing.

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 already be set with 3 decimal point accuracy **(1)** below. If the instrument is not calibrated, the unit will read N/A.

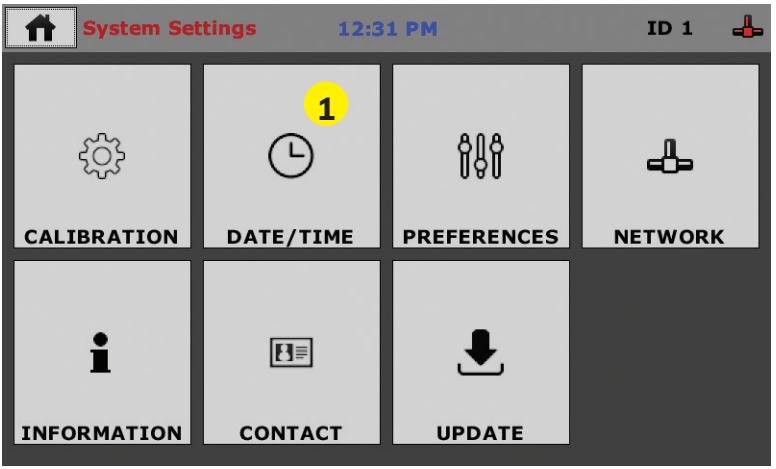


For the HM-5765, values for vertical and horizontal loads will be set at 10.000kN (2000.0 lb), for vertical displacement this value will be set at 10.000mm (0.4000”) and for horizontal displacement this value will be set at 25.000mm (1.000”)

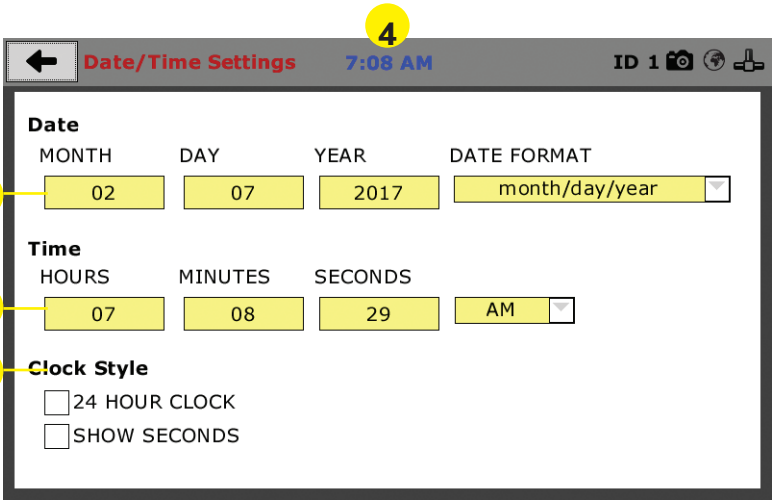
Export Calibration via USB (4)
Press this button to select calibrations to export via USB. It is a good practice to export all your calibrations to a thumb drive. In case of a problem this practice allows you to recover your calibration data quickly.

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)**



You will see the following screen.



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

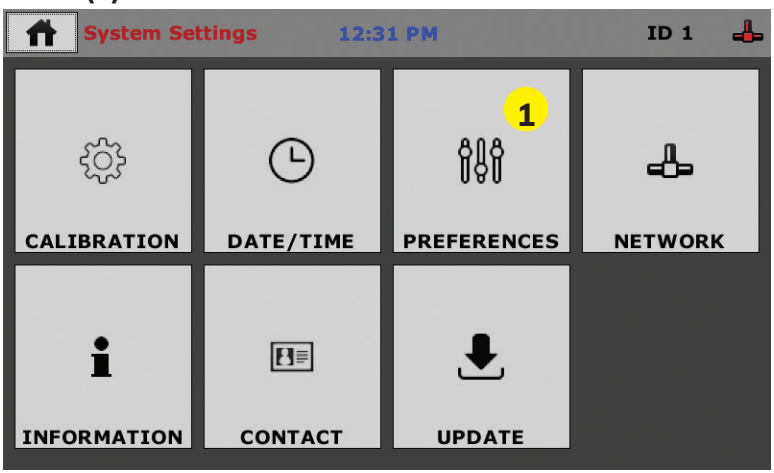
Time (2)
Set the hours, minutes, seconds, and am/pm.

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.

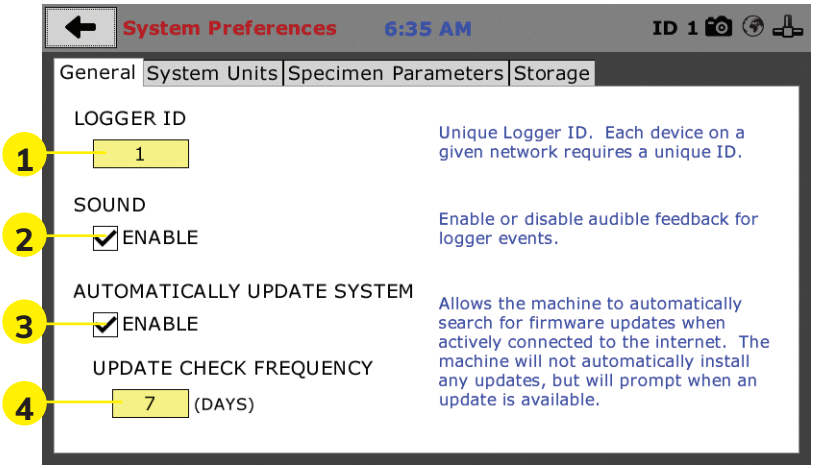
Clock (4)
The current time is displayed and is located on every controller screen. Clicking on the time from any screen, you will be taken to the Date/Time Settings Screen.

Initial Set Up — 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.

Automatically Update System (3)

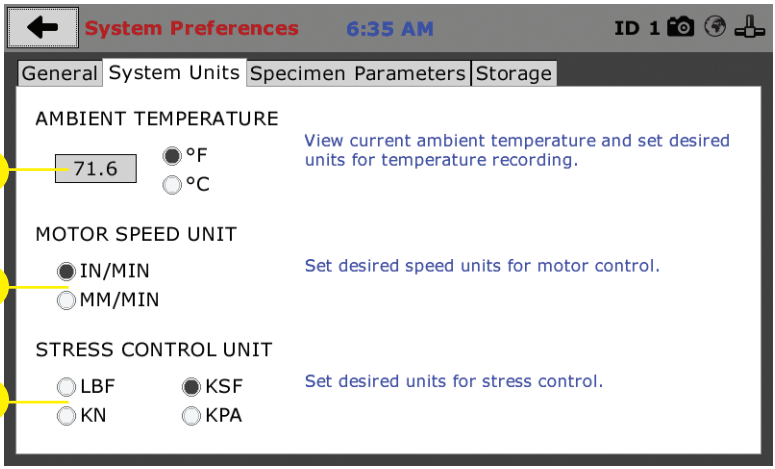
Checking this box allows the machine to automatically search for firmware updates when actively connected to the Internet. The machine will not automatically install updates; it will prompt when an update is available.

Update Check Frequency (4)

The number placed in this box represents the frequency (how many days) the machine checks for updates.

Preferences – System Units Tab

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

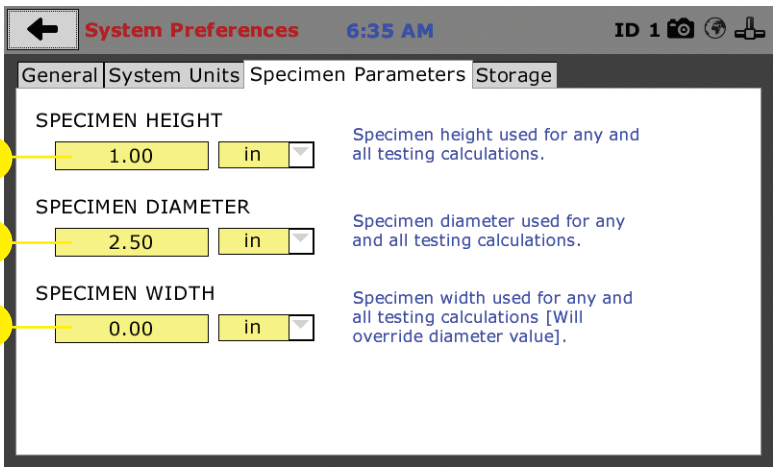


Ambient Temperature (1)
This field displays the current ambient temperature and allows you to select desired units (Fahrenheit or Celsius) for temperature recording.

Motor Speed Unit (2)
Click on the desired units you want to use for motor control (in/min or mm/min).

Stress Control Unit (3)
Click on the desired units you want to use for stress control (LBF, KN, KSF OR KPA).

Preferences – Specimen Parameters Tab
This screen is accessed by clicking on the Specimen Parameters Tab under System Preferences.

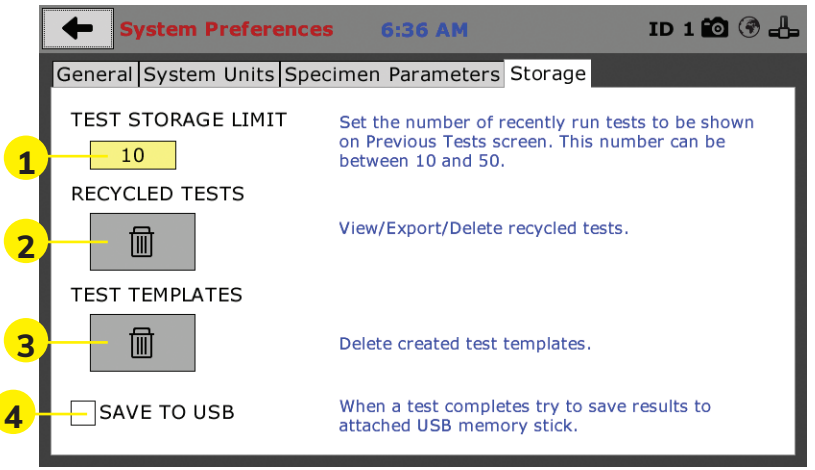


Specimen Height (1)
This field allows you to set the specimen height that will be used for all testing calculations.

Specimen Diameter (2)
This field allows you to set the specimen diameter that will be used for all testing calculations.

Specimen Width (3)
This field allows you to set the specimen width that will be used for all testing calculations.

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.

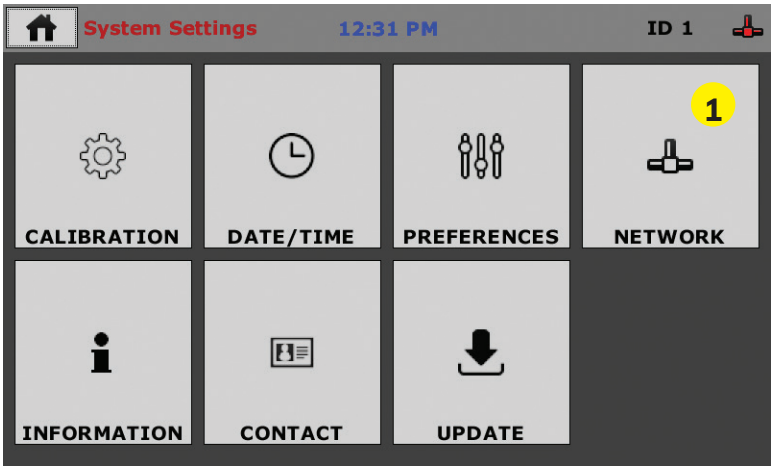
Recycled Tests (2)
This refers to previously run tests that are not displayed in the “Previous Tests” window. These tests are not deleted; they are recycled for later use. Select this button to view/export/delete recycled tests.

Test Templates (3)
Select this button to delete test templates that have been created, but are no longer desired.

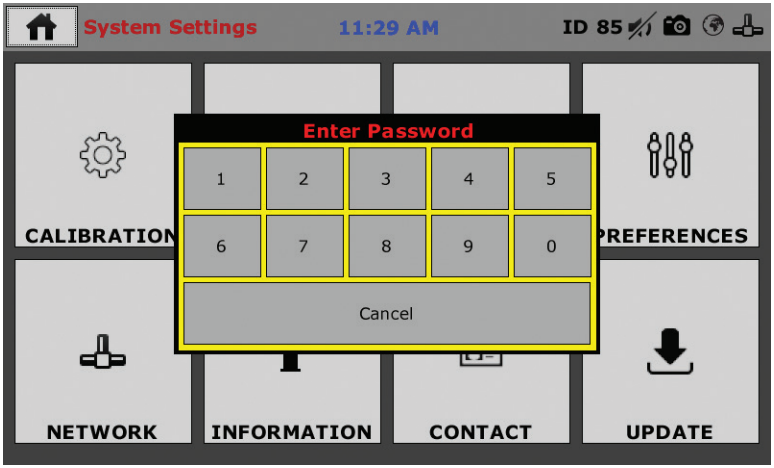
Save to USB Check Box (4)
Checking this Box saves the results of a test to USB thumb drive inserted into the front USB slot on the machine.

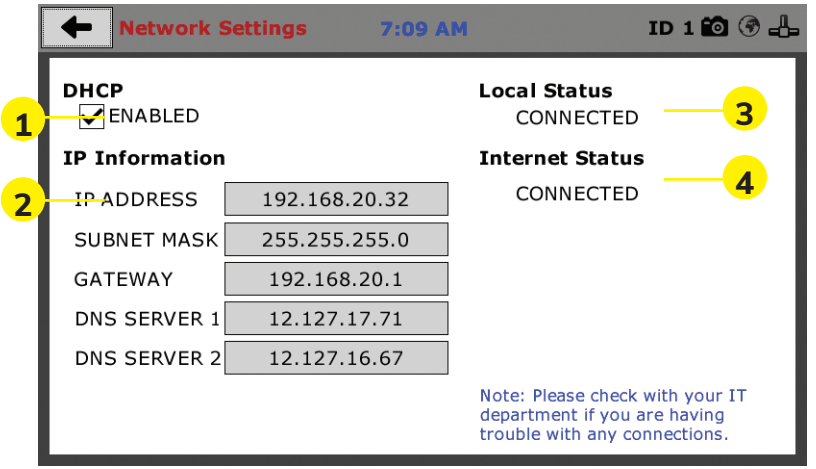
Initial Set Up — Network

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.

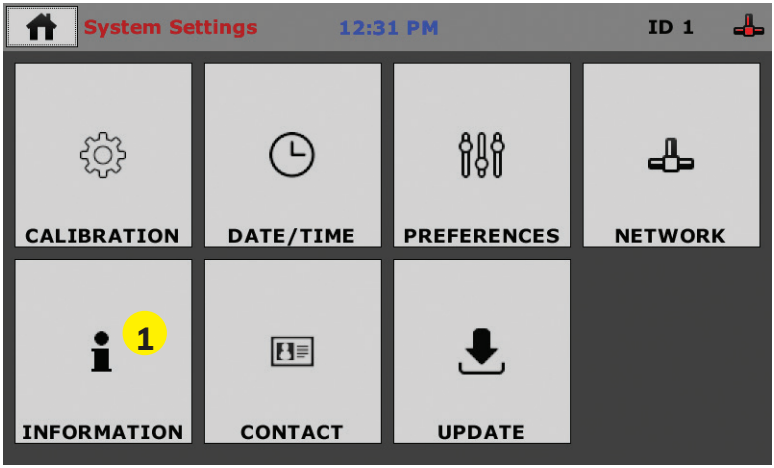
Local Status (3)
This indicates the status of the local network connection, Connected or Disconnected.

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.

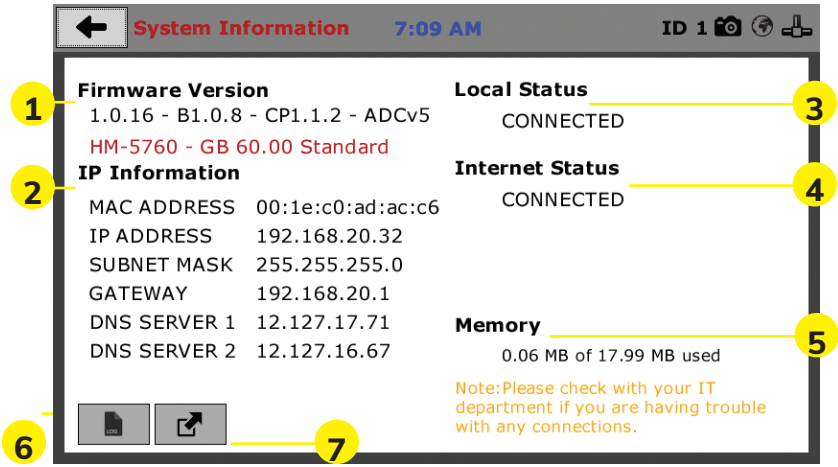
Initial Set Up — Information

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.

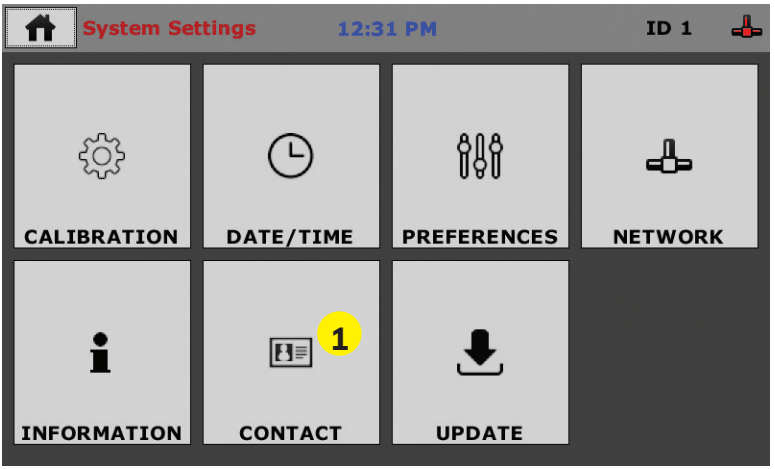
Memory (5)
This indicates the current status of how much available memory is being used by the machine

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.

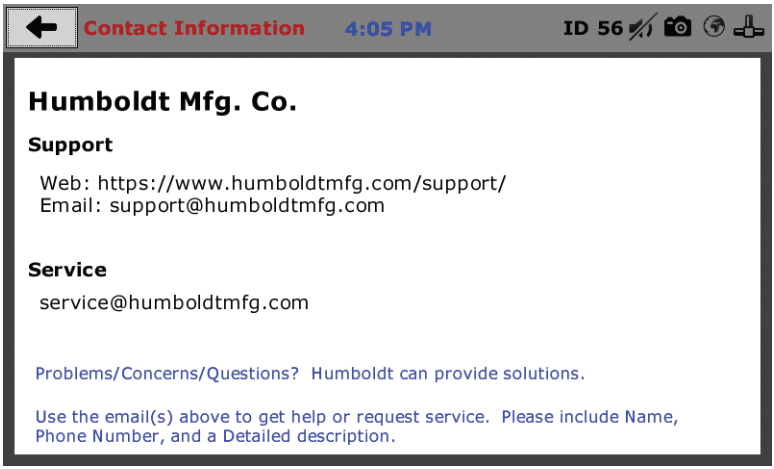
Initial Set Up —Contact

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



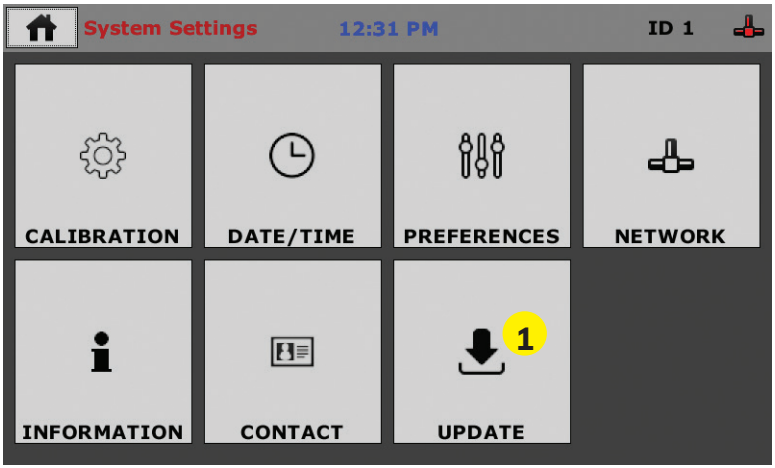
Contact Information
Below is a view of the Contact Information screen showing contact information for Humboldt Support and Service.

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)**



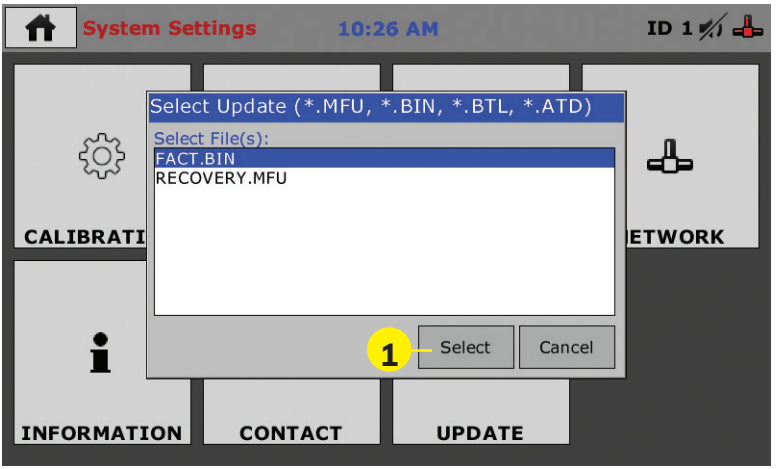
Update from USB (1)

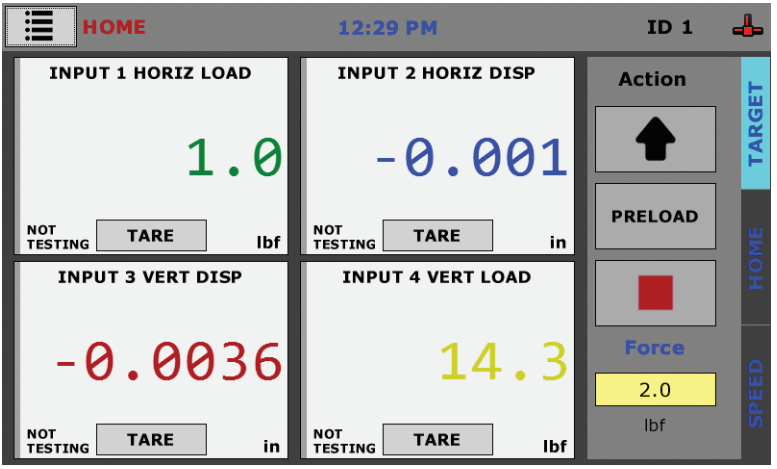
Software updates for your machine can be downloaded from the Humboldt website Support Area using a computer. To access the Software Update area, go to: https://www.humboldtmfg.com/support/software.php.

Once on this page, click on the Elite Series Firmware tab. You will see a list of Humboldt Elite Series machines. Click on the HM-5765 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-5765. 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.





Operation from a Computer and NEXT Software

This manual covers the setup and operation of the HM-5765.3F Electro-Mechanical Direct/Residual Shear Apparatus 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-5765 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-5765 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 HM-5765 uses a 10 amp fuse. To begin operation, attach the supplied electrical cord, plug it in and press the Power Switch.

Power Switch

Instrumentation Connections and Setup

HM-5765 Rear Instrumentation Panel

Above is a photo of the rear instrumentation panel of the HM-5765.

Network (1)

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

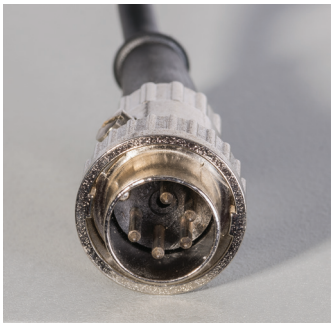
USB Power (2)

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 panel features four (4) input channels for connecting instrumentation to the machine. Each input represents a separate channel, and has been assigned and calibrated to a specific instrument for use with your HM-5765.

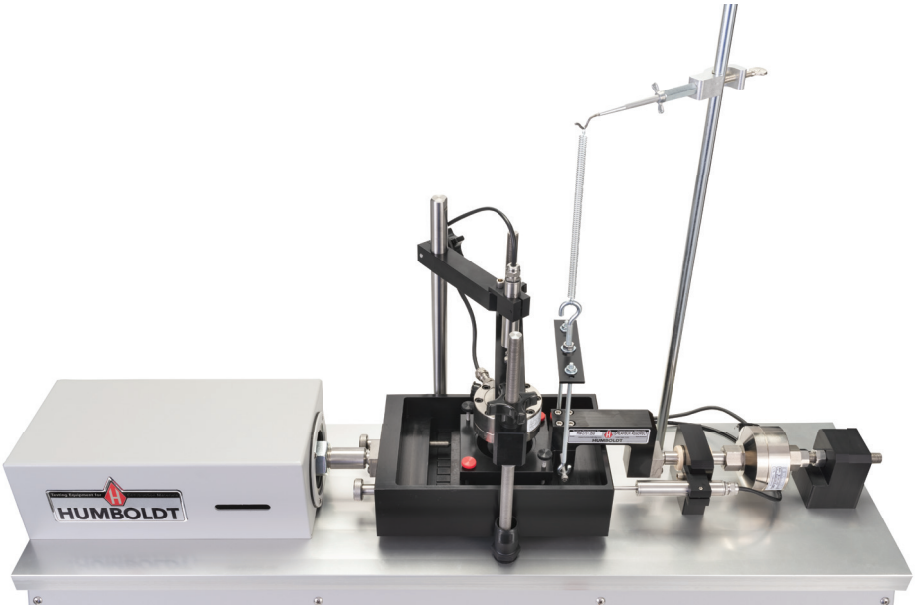
Below are photos of an instrumentation input and the instrumentation plug. The instrumentation plugs have been numbered and should be installed in the corresponding numbered input. Install the plugs into the inputs by lining up the guide at the bottom of the plug with the slot at the bottom of the input channel. Ignore the locking collar on the plugs they are not required for this application.



Once you have installed the instrumentation into the correct inputs, your rear panel should look like this:

Test Deck Setup

Below is a how your HM-5765 should be set up for operation. When you receive your unit, your instrumentation should already be mounted in place. It has been tied down with plastic ties for shipping so you should remove these ties before operation. You may have to make small position adjustments to the instrumentation for optimal operation.



Shearbox Assembly

Shearbox assemblies are not included with the HM-5765 Direct Shear Machine, but are required. They are available in both round and square configurations in several sizes, see below. You, most likely, ordered at least one for use with your HM-5765.

HM-2751.25D

HM-2751.60S

Shearbox Assemblies	
Round	Model
2.0"	HM-2751.20D
2.42"	HM-2751.24D
2.5"	HM-2751.25D
4.0"	HM-2751.40D
50mm	HM-2751.50D
60mm	HM-2751.60D
100mm	HM-2751.100D

Shearbox Assemblies	
Square	Model
2.0"	HM-2751.20S
2.42"	HM-2751.24S
2.5"	HM-2751.25S
4.0"	HM-2751.40S
50mm	HM-2751.50S
60mm	HM-2751.60S
100mm	HM-2751.100S

Shearbox assemblies include: sample shearbox, (2) porous plates, (1) loading pad, and (1) grid plate. All shearboxes feature mounting screws for use with the ASTM D3080-compliant counter-balance device.

Shearbox Replacement Screws

Replacement screws for shearboxes are available:

Thumbscrew, Metal, Black Head	HM-003274
Thumbscrew, Plastic	HM-003275
Thumbscrew Head, Red	HM-003276

Sample Prep

Please refer to ASTM D3080 for instructions on sample preparation. Humboldt offers the following items to aid in sample preparation.

Accessory	Model
Cutter	HM-2702.XXS/D
Dolly tamper	HM-2703.XXS/D
Porous plate	HM-2704.XXS/D
Calibration disk, square	HM-2755.XXS
Calibration disk, round*	HM-1220.XX.4
Replacement Pressure Ball 5/8" 440 Stainless Steel	HM-001076

* Can be used for shear boxes and consolidation cells.

Part Numbers ending in .XX require a size code to be entered referring to the sample size to be tested.
For direct/residual shear samples, sizes are: .20 = 2.0"; .242 = 2.42"; .25 = 2.5"; .40 = 4.0"; .50 = 50mm; .60 = 60mm,and .100 = 100mm. **NOTE:** use "S" for square and"D" for round samples.

Shearbox Placement

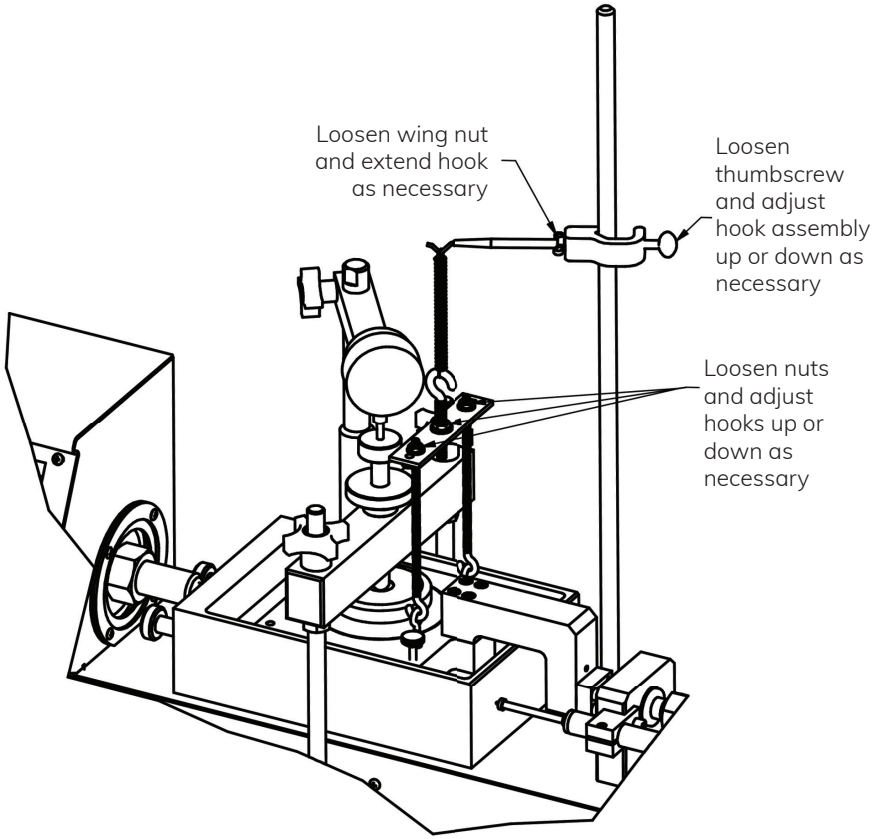
Once you have prepared your sample and are ready to place the shearbox into the HM-5765, place the shearbox into the reservoir/carriage and slide it as far to the right as it can go. Refer to the photo on page 27 for placement. Once the shearbox is placed into the reservoir/carriage, tighten the two large screws located on the left of the reservoir/carriage to secure the shearbox in place. Make sure that the horizontal load cell butts up to the shearbox and tighten all adjustment screws.

Once the shearbox is in place, attach the counter-balance device for ASTM D3080 compliance to the long steel screws on the right side of the shearbox. Remove the plastic screws with the red heads from the shearbox and using the metal screws separate the shear box halves to approximately the diameter of the maximum-sized particle in the test specimen or 0.025". (0.64 mm). Once this is completed, adjust the counter-balance device as necessary to apply a counter force for the purpose of counteracting the weight of the top half of the shear box. To adjust:

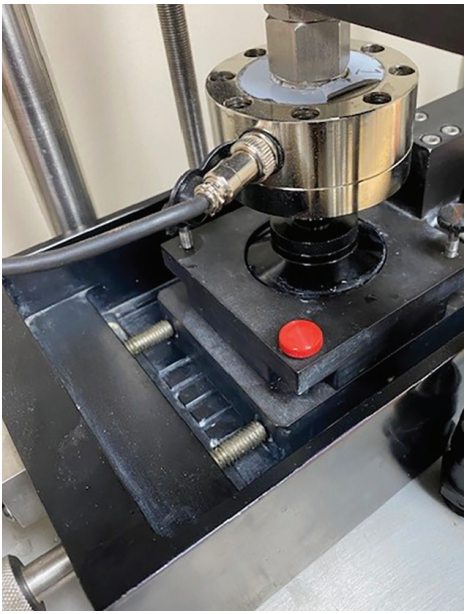
1. Coarse adjustment is accomplished by raising or lowering the support hook assembly. To do so, loosen the thumbscrew on the support hook and adjust the position of the hook. Tighten the thumbscrew again to secure the support hook.

2. Fine adjustment is accomplished by loosening the nuts that secure either the hooks on the hanger bar and adjusting the hooks up or down. When the adjustment is complete, tighten the nuts to secure the hooks.

Once this is completed unhook the spring from the hook supporting the hanger bar and load your test specimen into the shearbox. When this is complete, reattach the spring to the hook supporting the hanger bar. At this point you would be ready to test.



Humboldt recommends using this guide to familiarize yourself with the operation of your HM-5765 Direct Shear machine's operation, before doing actual testing. We also suggest you use some insignificant samples or samples made specifically for setup purposes before testing real samples.



Calibration of Instrumentation

The HM-5765 Direct/Residual Shear Machine includes all necessary instrumentation. All instrumentation included with this unit has been calibrated and assigned to specific channels for use. These channels are marked on the corresponding instrumentation and the correct calibration information will appear in the channel calibration parameters, once you have installed the instrumentation to the correct inputs.

DO NOT RECALIBRATE!

How to Perform a Calibration

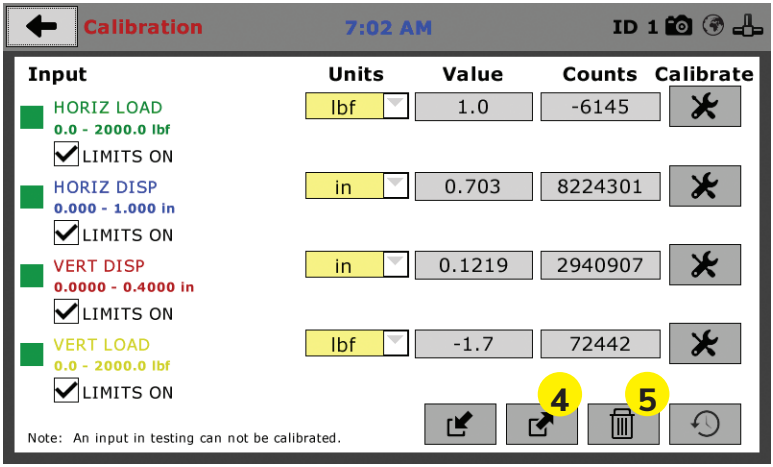
All instrumentation included with this unit has been calibrated and assigned to specific channels for use. Humboldt recommends and standard lab practice dictates that your HM-5765 should be calibrated periodically. For most, this period is usually a year, though other rules may apply to the frequency of calibration.

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

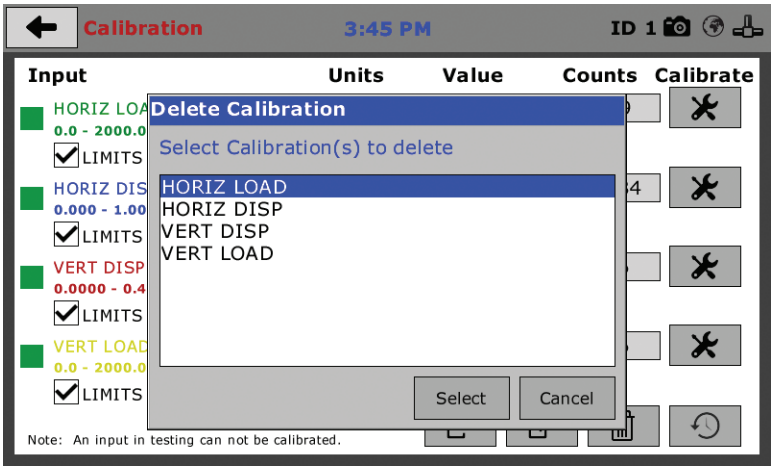
To begin a calibration, it is always a good idea to save the current calibration settings. If you have already saved these settings to a USB thumb drive or your computer, this step can be skipped.

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.

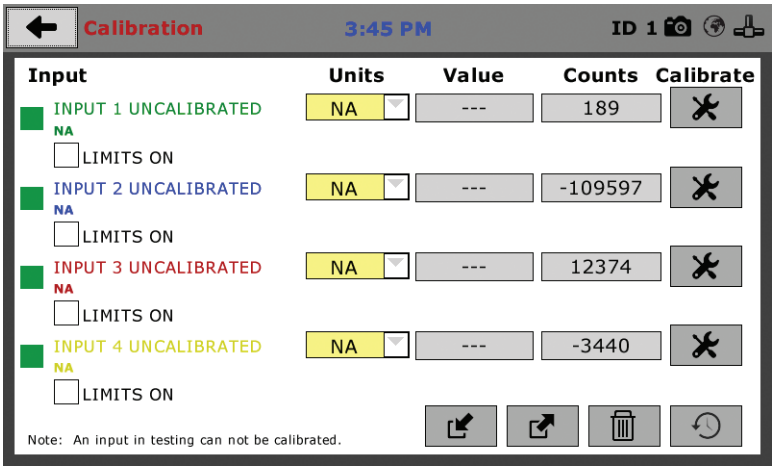


Once your calibrations have been saved, click on the trash can icon **(5)** to begin to erase all four (4) Input calibrations. When you press the trash can icon, this screen will appear.



On this screen select an Input calibration to delete, one at a time, and then press the Select button. The channel will be deleted. Do this for all four (4) channels.

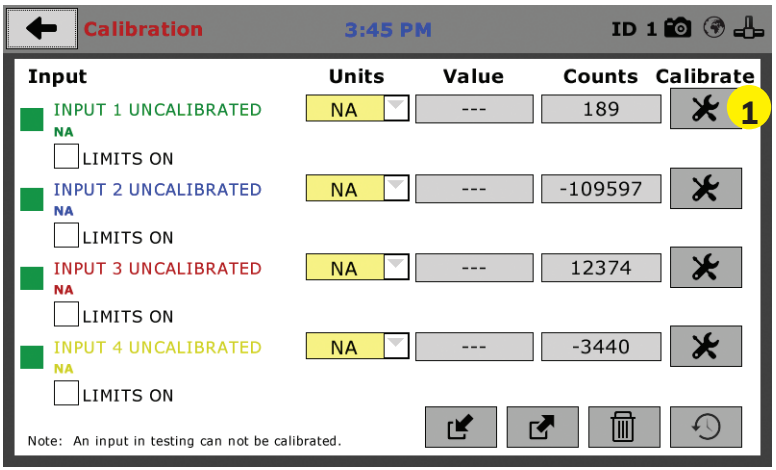
Once all Input calibrations have been cleared, your Calibration window should look like the one below with no Inputs calibrated.



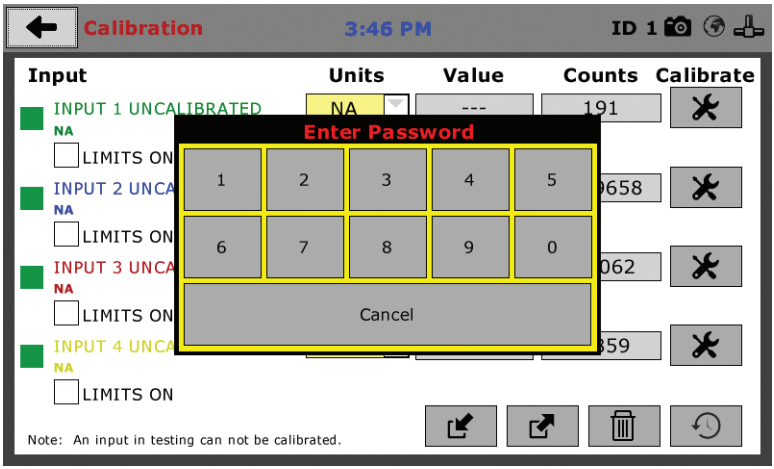
The four Inputs of the HM-5765 have been programmed so that Input One (1) is always set to be Horizontal Load. Input Two (2) is programmed to be Horizontal Displacement. Input Three (3) is programmed to be Vertical Displacement and Input Four (4) is programmed to be Vertical Load.

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 HM-5765 while placing the instrumentation into the certified calibration device, which provides a specific set load or displacement.

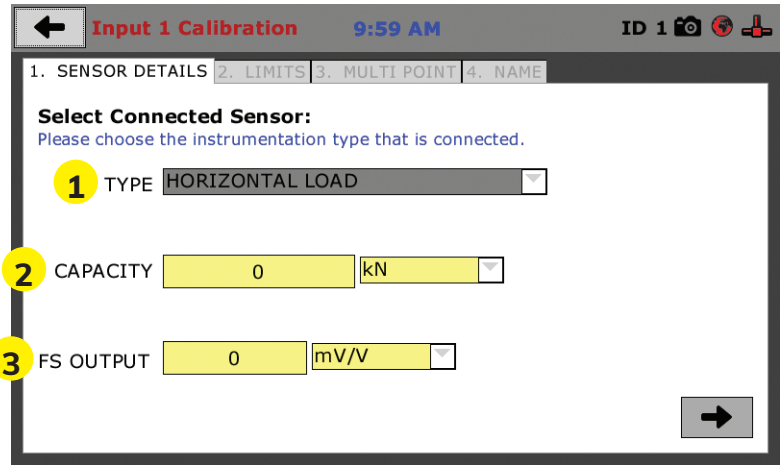
Once this has been done, click the Calibrate button next to the appropriate Input **(1)**.



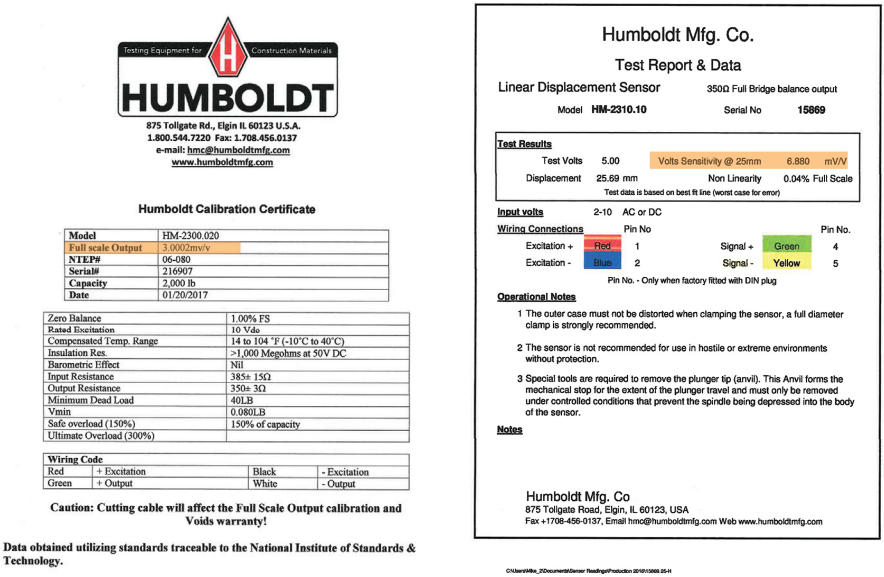
A pop-up window will appear requiring you to enter the password, which is **22234**.



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 Horizontal Load. For Capacity **(2)**, fill in the maximum capacity of the sensor and choose either lbf or kN. 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. Below are typical calibration sheets with the FS Output information highlighted in orange.



HUMBOLDT

Testing Equipment for Construction Materials

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.

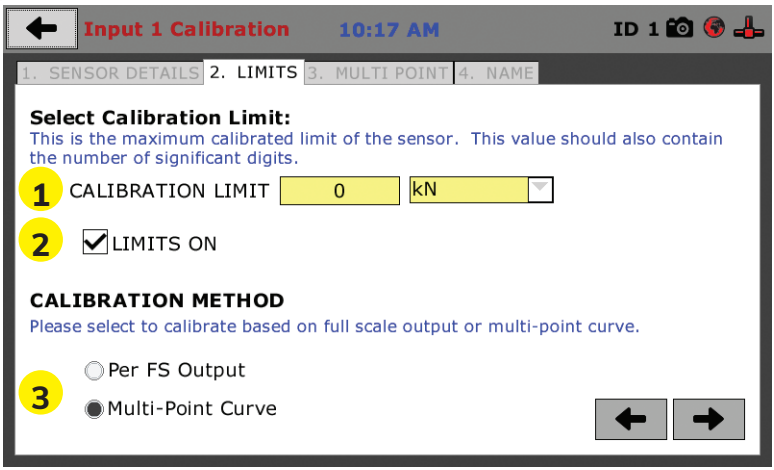
3 Special tools are required to remove the plunger tip (anvil). This Anvil forms the mechanical stop for the extent of the plunger travel and must only be removed under controlled conditions that prevent the spindle being depressed into the body of the sensor.

Notes

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

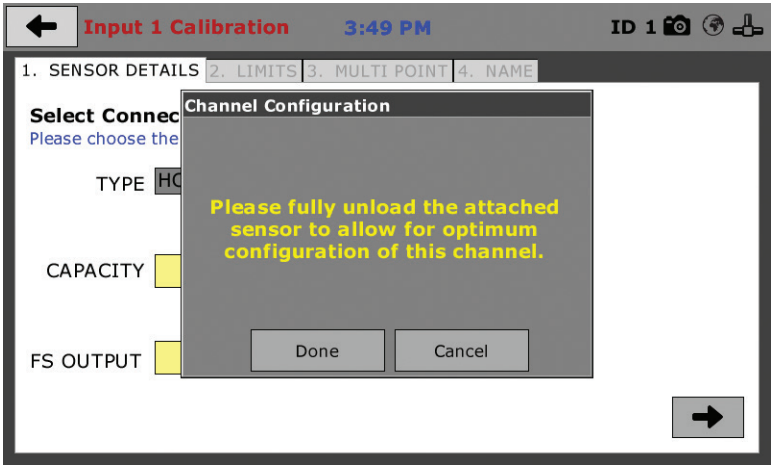
C:\Users\Mike_2\Documents\Sensor Readings\Production 2016\15869.35-H

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

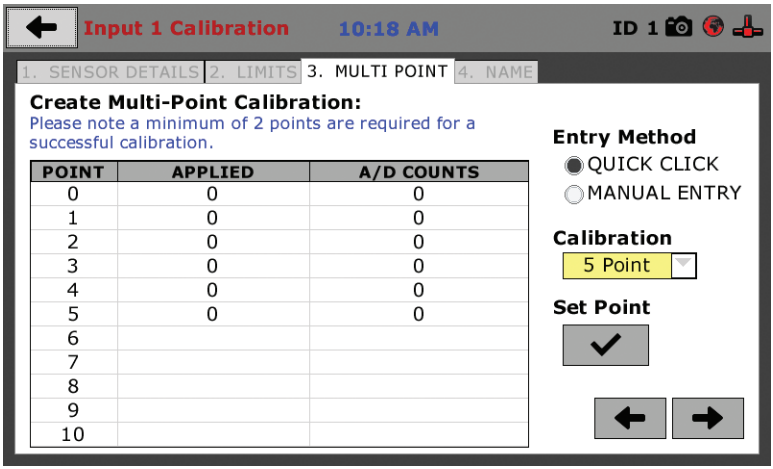


On Tab 2, in the Calibration Limit field **(1)**, enter the maximum calibrated limit of the sensor. This value should contain the number of decimal points you require for degree of accuracy, up to 5 points. Limits On **(2)**, should be checked if you don't want the machine to apply a load greater than the Calibration Limit **(1)**. 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.

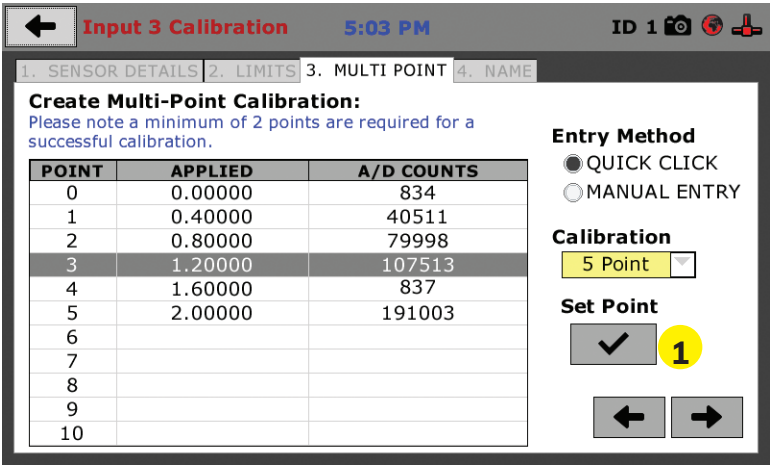


If you choose Multi-Point (Recommended calibration method) Curve and click on the Right Arrow in the bottom right-hand corner of the screen, you will be taken to Tab 3.



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.

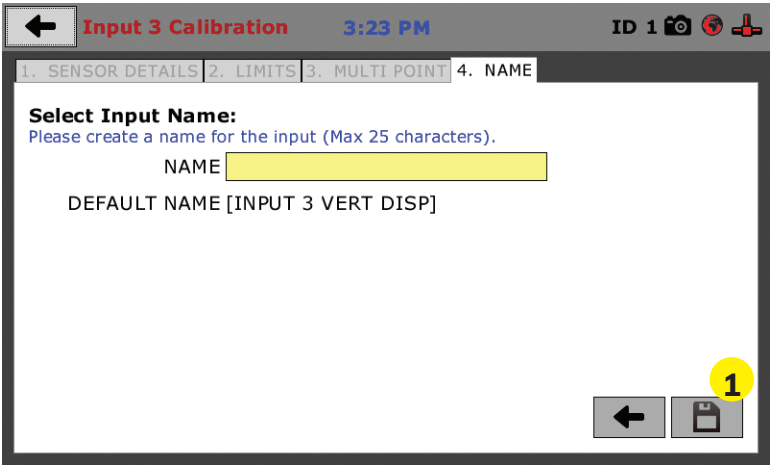
With your instrumentation sensor placed in a calibration frame and the sensor plugged into the an Input on the HM-5765. You will set the “0” point at 0 with no load applied to the sensor. The “5” point will be set with the maximum load capacity of the sensor applied. Points “1” through “4” are usually 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.

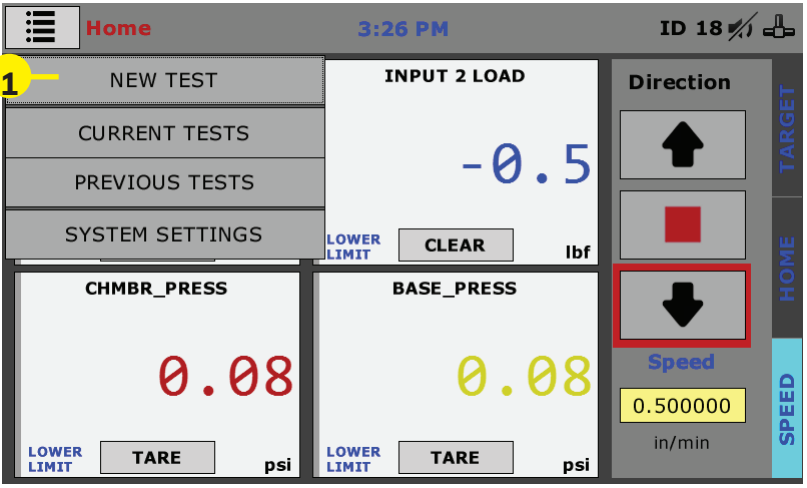


The screen will provide a default name, but you can name the Input anything you'd like. Once you've named the Input, click on the disk icon in the lower, right-hand corner **(1)**. This will save it. Use this method for calibrating any additional Inputs necessary.

Test Setup

Test Setup

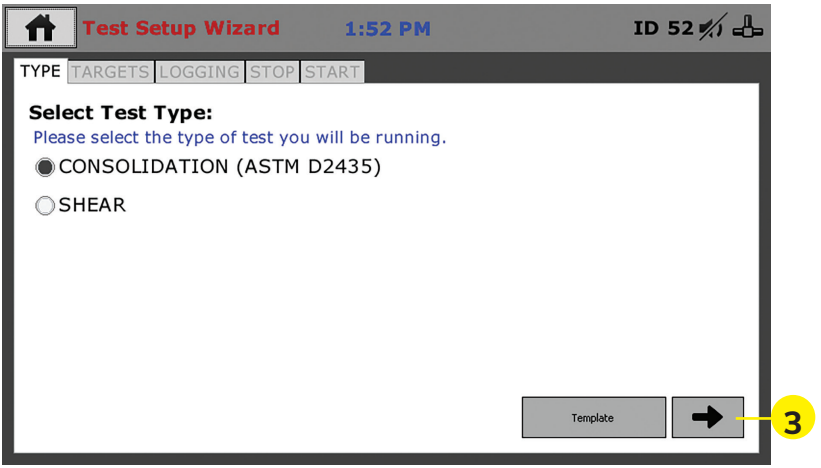
To begin a new test, Click on the Menu icon in the top left corner of the screen (1). When you click on this button, you will see a drop-down menu appear, see below. Click on NEW TEST (**1**).



Consolidation

Test Setup Wizard – Select Test Type

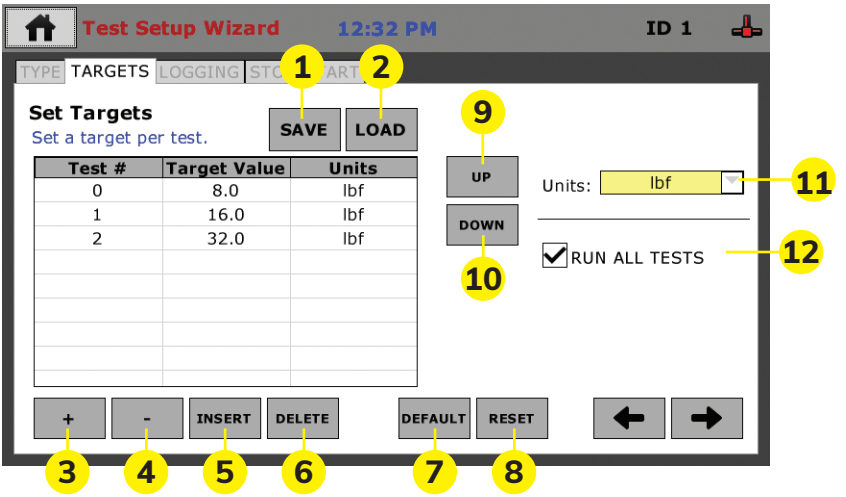
Clicking on NEW TEST **(1)** above brings up the Test Setup Wizard. On the first screen of the Wizard, you can select the type of test you want to perform — click on Consolidation and then click on the arrow button in the bottom right-hand corner **(3)** to continue.



Test Setup Wizard – Sensor Input Selection

Verify that the channel inputs match the connected sensors.

When you click on the Right Arrow in the lower, right-hand corner of the screen, Target window will appear. Verify that the desired load sequence is displayed in the tabulation window. If it needs to be modified there are several options (shown below) that allow you to modify or completely change the loading sequence.



(1)SAVE: This will save the current load sequence to memory for future recall. This is useful if multiple tests are using the same load sequence.

(2)LOAD: This will bring up a menu showing all the previously saved load sequences. From here you can select the desired load sequence for the test.

(3)+: Selecting this button will add a new load immediately following the currently selected sequence. The user can click on the blank Target Value box to enter the desired load value for that specific load.

(4)-: Selecting this box will remove the highlighted load shown in the tabulation window. To highlight a specific load, select the desired load in the load sequence window. Once selected, it will be highlighted in blue.

(5)Insert: Selecting this button will insert a new load into the load sequence. To use this feature correctly the user must select the load immediately preceding where the new load is to be inserted on the tabulation table.

(6)Delete: This will remove the selected load from the sequence. To use this feature. Select the desired load to be removed from the sequence. When the selected box is highlighted in a blue background press the Delete button to remove that specific load from the sequence.

(7)Default: Selecting this will load the default load sequence found in ASTM D2435.

(8)Reset: Selecting this button will reset the load sequence to the previously saved sequence from the last test.

(9)Up: Pressing this button will move the active sequence box up. Once at the desired load, it can be modified or removed as needed.

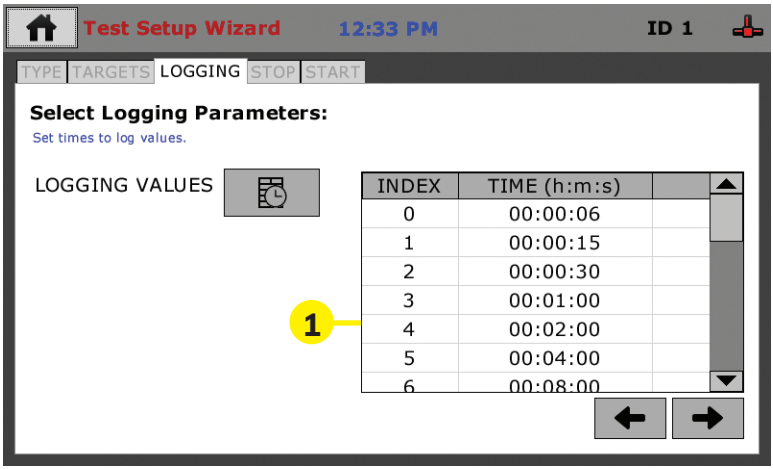
(10)Down: Pressing this button will move the active sequence box down.

(11)Units: Choose the desired units for the load to be applied during the test.

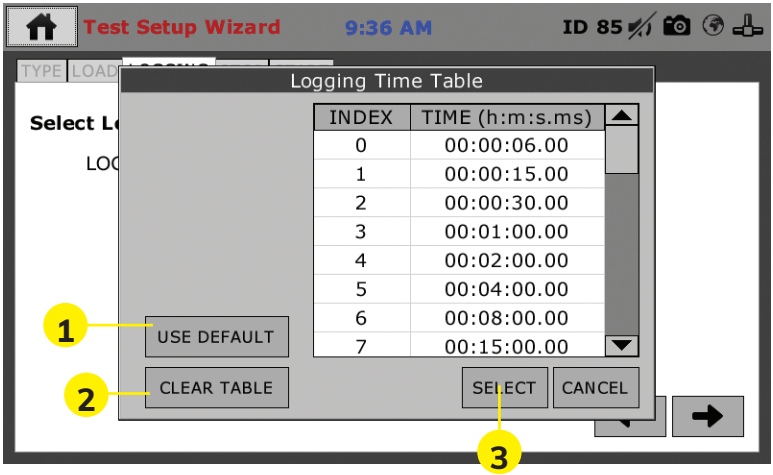
(12)Run all Tests: Checking this box will cause the test to run all loads within the sequence regardless of any previous loads having been run previously during the test.

Test Setup Wizard – Select Logging Values

From here select the desired logging intervals for your test. The test will default to the ASTM D2435 standard. If the displayed values in the logging table (1) match the desired logging interval press the right arrow in the lower right corner to advance to the stop conditions. If you wish to change the logging interval press the Logging Values button.



For those who want to use different parameters, you can either click on Use Default **(1)** and change the values to suit your application, or, click on Clear Table **(2)** and fill in the blank table with your values. Once you are satisfied with the completed table, click on the Select button **(3)** to use the Table. Once Select or Cancel are pressed, the window will automatically close.



Use Default (1): This will automatically load the ASTM standard logging interval for a consolidation test.

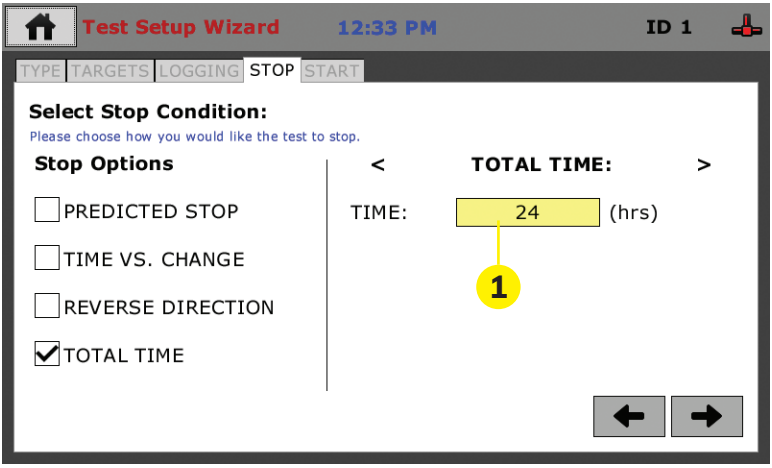
Clear Table (2): This will remove all the time intervals currently loaded for the test. It will be necessary to manually enter the desired values for each time interval by selecting the desired box in the Time column and entering the desired time.

Select (3): This will load the displayed timetable into the test.

Cancel (4): This will close the Logging Timetable window and revert to the original values shown in the previous window.

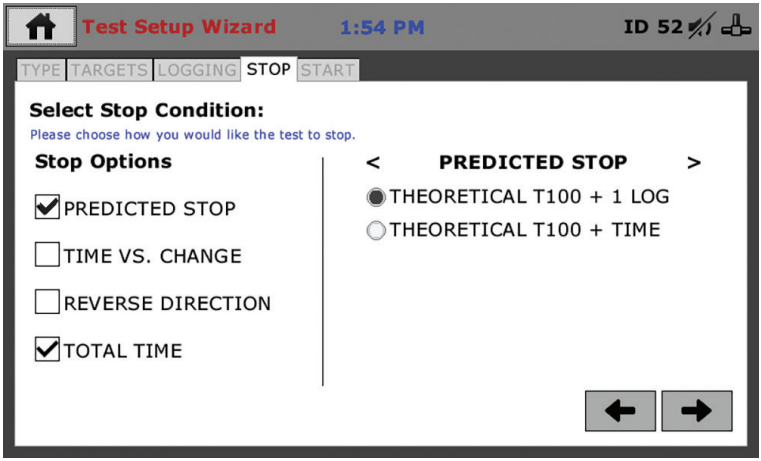
Test Setup Wizard – Select Stop Parameters

Next you need to select the Stop Parameters for the test. To choose the Stop Value Parameter, Click on the yellow field **(1)** and select a time period from the pop up window that appears.

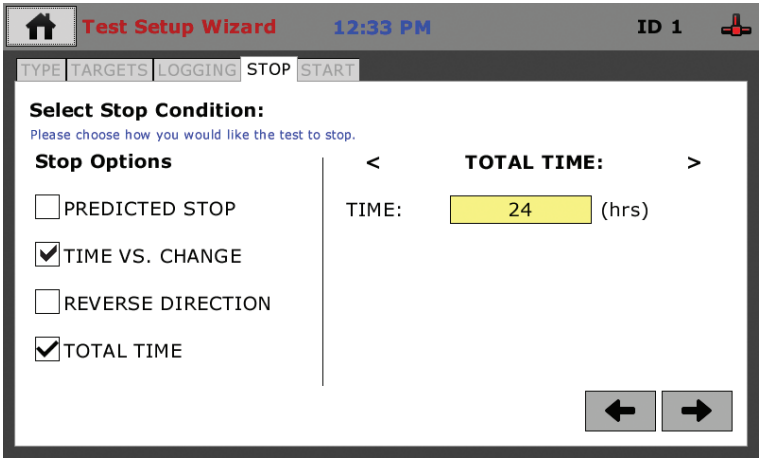


Total Time: Checking this box will allow the user to apply a specific amount of time for the test duration. By pressing the yellow box under Total Time the test duration (in hours) can be selected.

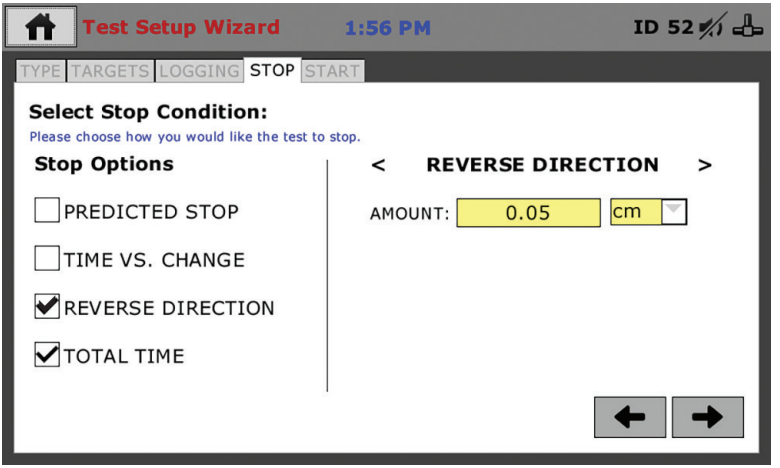
Selecting the right or left arrow will allow the user to cycle through all the stop conditions to review what the setting parameters were set to during previous tests. If the appropriate box is checked for that parameter under Stop Options, then that stop condition will be applied to the test.



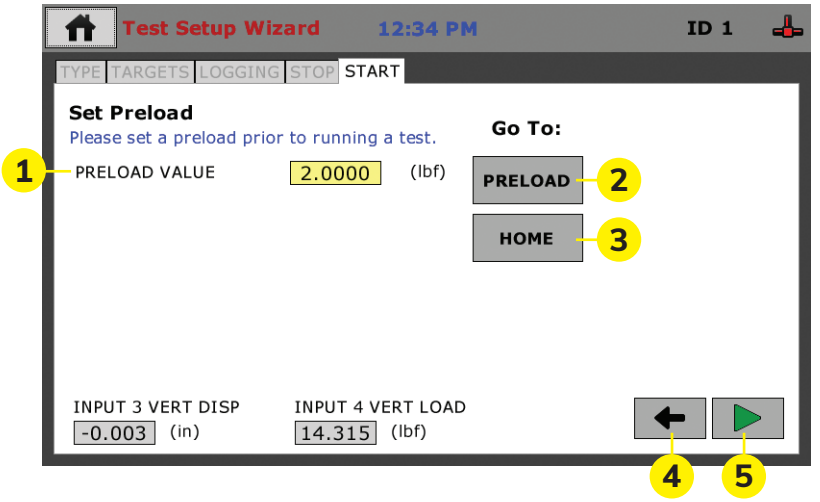
Selecting the Predicted Stop box will allow the user to set either T100+ 1 Log, or T100+Time as a stop condition for each load sequence.



Selecting the Time vs. Change box will cause the test to advance to the next load sequence if the HM-5475 does not detect at least the amount of movement in the sample over a specified amount of time. Both the amount of movement and the timespan are defined by the user. These values can be modified by selecting each of the three yellow boxes to define the user's desired values.



Checking the Reverse Direction box will allow the test to advance to the next load sequence if the sample starts to swell. The amount of swell required for the test to advance is determined by the user by entering the desired values in the yellow boxes.



Start Tab

(1)Preload Value: Allows user to select the preload value for the test. **Note:** this value is also applied to the Main Screen under the Target tab (page 30). If preload is selected on the Main Screen, it will apply a preload that has been selected from this window.

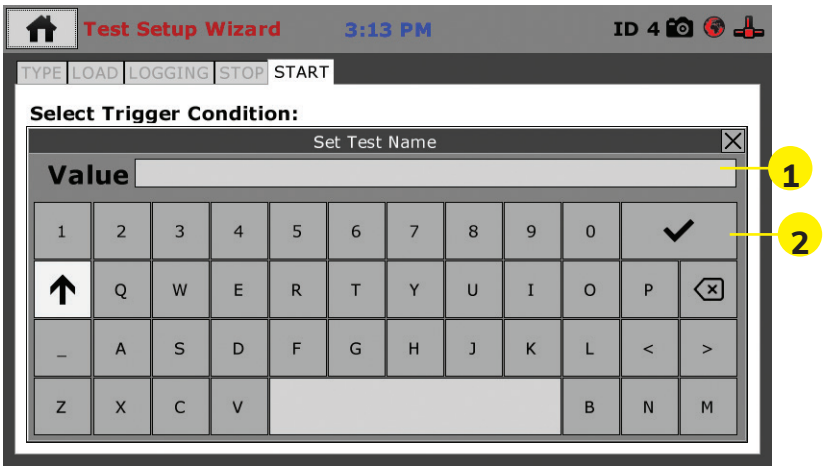
(2)Preload Button: Selecting this button will cause the HM-5475 to move to the selected preload value.

(3)Home Button: Selecting this button will cause the platen to move to the home position.

(4)Go Back (Left arrow key): Will revert to the previous test setup window.

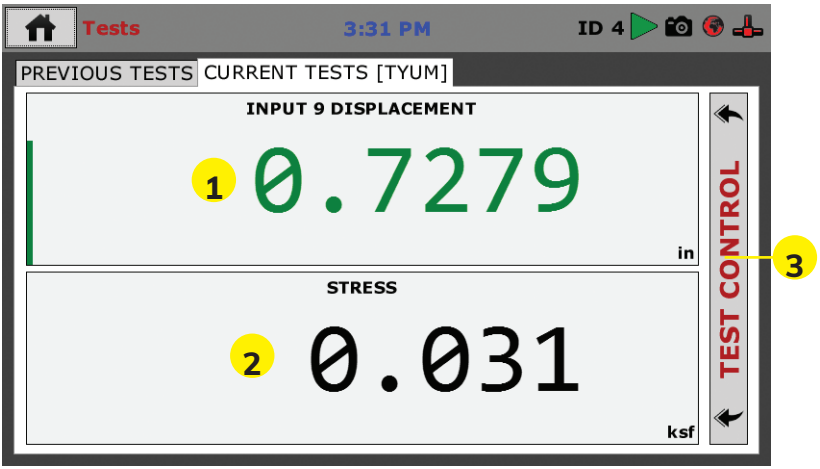
(5)Start: Will open a pop-up window for naming the test.

Once the preload has been selected and applied, press the Green Arrow at the bottom right-hand corner of the screen (**9**). You will then see the screen below.

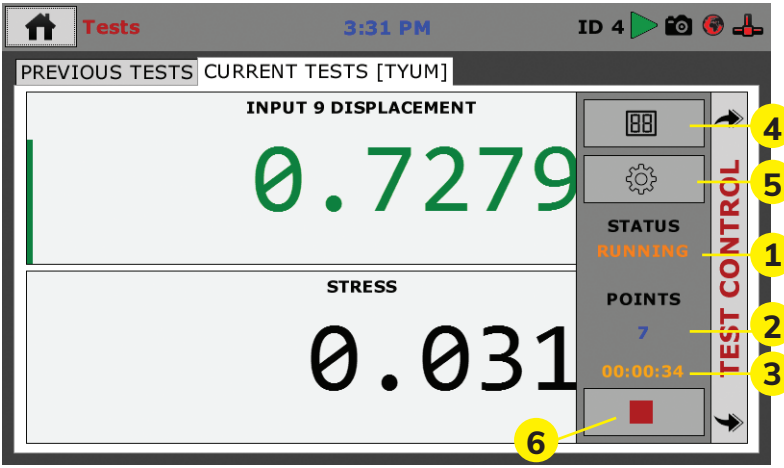


In the Value Field, create a name for your test (**1**). Press the check mark button (**2**) to save your test name. Once the test has been named and the check mark button has been pressed the test will initiate.

Once completed, press the Green Arrow at the bottom right-hand corner of the screen (**4**) and you will be taken to the following screen and your test will begin.

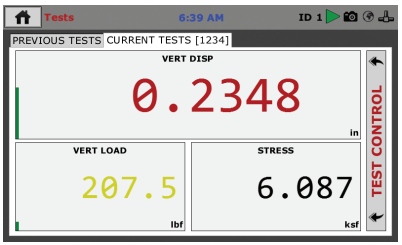


You can monitor your test from this window, which allows you to view the Displacement (**1**) and the Stress (**2**), or for additional information, click on the Test Control bar on the right of the window (**3**), which will reveal the additional panel shown below.

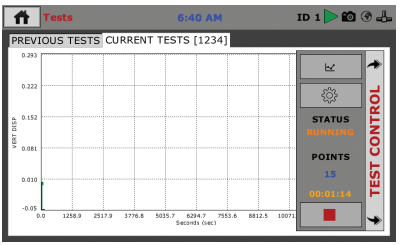


From this new panel you are given the Current Status of your test, in this case, Running (**1**). You can also see the number of points currently read (**2**) and the current duration of the test (**3**).

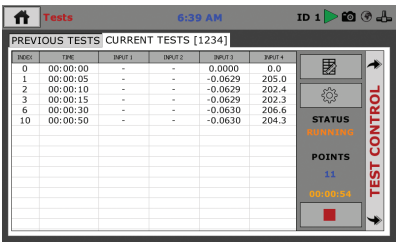
In addition, by clicking on the Test View button **(4)** you can toggle through three different views of the current test. These views are:



Selection View

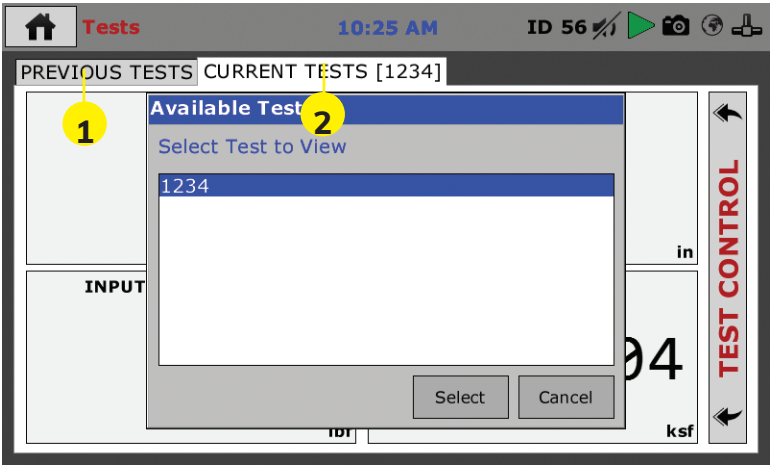


Graph View

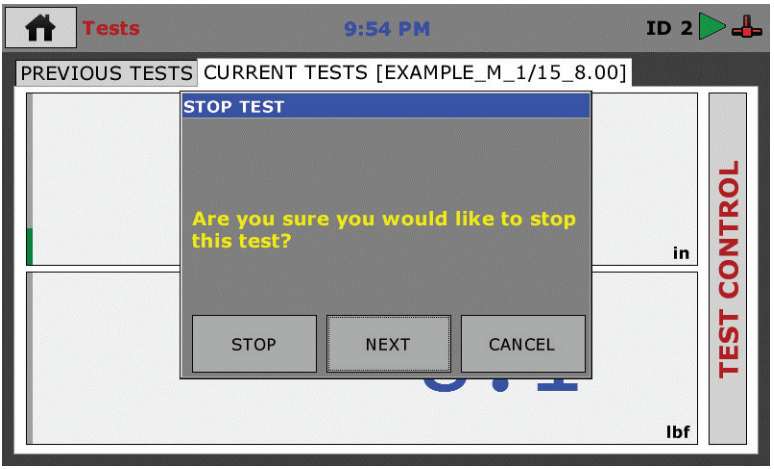


Tabulation View

By clicking on the Test selection button (5) brings up the screen below. Here you can toggle between the Previous Tests tab **(1)**, which shows previous test data and the Current Tests tab **(2)**.



By clicking on the button with the red box (6) stops the current test.



Selecting STOP will terminate the test.
Selecting NEXT will advance the test to the next load sequence.
Selecting CANCEL will close the window and continue the test at the current load sequence.

HM-5765.3F Specifications

The Humboldt HM-5765 Direct/Residual Shear apparatus is a fully-automated system utilizing pneumatic loading to apply vertical loads to a sample eliminating the need for loading weights used in dead weight-type systems.

The microprocessor-based system features a stepper-motor drive system and a 7” touch-screen display that allows the operator to control and monitor all test functions.

Like all Elite Series machines, the HM-5765 is built around Humboldt’s integral, 4-channel data logger with touch-screen control, which allows the HM-5765 to be used as a standalone device capable of full test control and data logging. It can also be controlled by a networked computer at any location with access to the network.

The HM-5765 is supplied complete with two 2,000 lbf (10kN) capacity load cell; 1” (25.4mm) horizontal strain transducer, a 0.4” (10.2mm) vertical strain transducer and Humboldt’s NEXT Direct Shear software module. Shear box assemblies and related accessories are not included and should be ordered separately.

HM-5765.3F Specifications:	
Horiz. movement	2" (50mm) Maximum
Horiz. shear force	2000 lbf (10kN)
Vertical load	2000 lbf (10kN)
Data Channels	4
Speed Range	0.00001 to 0.49999 in./min. 0.00001 to 12.9999 mm/min.
Data storage	1000 tests and up to 3000 readings per test
Dimensions (L x D x H)	30" x 15.5" x 22" (760 x 394 x 558mm)
Voltage	110/220V 50/60Hz - 6.5amps

Controller Specifications:	
Display (Resistive Touch)	7" (178mm) VGA (480 x 800)
Real-time test data	Graphic and tabulation
Processor	Dual 32-bit ARM
RAM	64MB
Memory, non-volatile	4GB
Analog to digital converter	24 bit
Data acquisition	4 Channels
Logging speed	up to 50 readings per second
Multi-test storage	1000
Points per test	3000
USB port (front)	export data, import/export calibration data, WiFi
USB port (back)	provides external power for wireless access point
Ethernet connection	for network connectivity
Emergency stop	Large button
24-bit differential analog to digital converter	4
Ambient temperature sensor	1
Limit switches	2
Firmware Update	Ethernet or flash drive

General Warnings

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.

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.

Manufacturer's Rights and Responsibilities
Software Copyright

The programmable, read-only memory, integrated circuit package contained in this equipment and covered with a copyright notice label contains proprietary and confidential software, which is the sole property of HUMBOLDT MFG. CO. It is licensed for use by the original purchaser of this equipment for a period of 99 years. Transfer of the license can be obtained by a request, in writing, from HUMBOLDT MFG. CO.

With the exception of HUMBOLDT Authorized Service Facilities, you may not copy, alter, de-compile, or reverse assemble the software in any fashion except as instructed in this manual. US copyright laws, trademark laws, and trade secrets protect the materials. Any person(s) and /or organizations that attempt or accomplish the above violation or knowingly aid or abet the violation by supplying equipment or technology will be subject to civil damages and criminal prosecution. With the exception of HUMBOLDT Authorized Service Facilities, you may not copy, alter, de-compile, or reverse assemble the software in any fashion except as instructed in this manual. U.S. copyright laws, trademark laws, and trade secrets protect the materials.

Any person(s) and /or organizations that attempt or accomplish the above violation or knowingly aid or abet the violation by supplying equipment or technology will be subject to civil damages and criminal prosecution.

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@humboldtmfg.com

GEOTECHNICAL TEST EQUIPMENT
HUMBOLDT