product manual 10.23

HC-3186S

Freeze-Thaw Cabinet

Testing Equipment For Construction Materials

HUMBOLDT

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Introduction

Humboldt's Elite Series, Freeze-Thaw Cabinet is used to measure the resistance of concrete to deterioration caused by repeated cycles of freezing and thawing. The HC-3186S.4F Freeze-Thaw is designed to test up to eighteen 3" x 4" x 16" (76 x 102 x 406cm) concrete specimens simultaneously, with one being a control. Key features of the Freeze-Thaw include:

- Fully automatic operation frees operator to perform other lab duties.
- Allows users to establish field control using correlations between concrete strength and durability
- Permits the evaluation of variables in concrete properties and conditioning.
- Useful in the evaluation of the durability of aggregates, as well as the properties of admixtures.

The HC-3186S Freeze-Thaw provides the following capabilities:

- User-created test control is possible, for changing freeze time, minimum temperature, maximum temperature and the number of cycles desired.
- Real-time, on-screen control and monitoring with graphing, allowing different data views to be chosen.
- Test data can be reviewed after a test is completed, which includes tabulation and graph views.
- Touch-screen interface for easy navigation.
- Complete report generation from with the Humboldt NEXT software. Test data can also be exported to computers via a network or thumb drive.
- Remote control and monitoring via network and internet.

It is possible to have up to eight freeze-thaw cycles within a 24-hour period, however, the exact number of cycles is dependent upon the time required for the temperature at the center of the control prism to fall from 40 to 0°F (4.4 to -17.8°C) and then back to 40°F (4.4°C). The temperature at the center of the control specimen is controlled with the use of a 0.75HP (0.6KW) refrigeration unit and electric resistance heaters with fully automatic controls.

Current temperature of the control specimen can be checked by a glance at the large, 7" color display on the controller. It is also possible to track the temperatures of freeze-thaw cycles in real-time with a glance at the display. These graphs and tabular data can be used to produce

reports of tests within the Humboldt NEXT software or downloaded to other computers or software for reports.

For corrosion resistance and long service life, the HC-3186S Freeze-Thaw features a stainless steel, 84"L x 32"W x 35.75"H (213 x 81 x 91cm) cabinet construction with 3" (76mm) insulation on all sides. The internal test compartment measures 74" x 26" x 6" (188 x 66 x 15cm). A 30-amp circuit is required for operation

Controller Specifications

Display	7" (178mm) VGA (480 x 800) Resistive-touch screen
Real-time test data	Graphic and tabulation
Processor	Dual 32-bit ARM
RAM	64MB
Memory, non-volatile	4GB
Data acquisition	1 Channel
Logging speed	1 reading every 5 minutes
Multi-test storage	1000
Points per test	3000
USB port	used to export data via thumb drive
Ethernet connection	for network connectivity
Firmware Update	Ethernet or flash drive

Specifications

Condensor Operating Temperature Range	-30°F to 45°F (-34°C to 7°C) evap (R-404A) Designed for up to 110°F (43°C) ambient
Data channels	1
Data storage	1000 tests and up to 3000 readings per test
Cabinet Dims	84"L x 32"W x 35.75"H (213 x 81 x 91cm)
Controller Dims	22.25"H x 16.25 "W x 6"D (56 x 41 x 15cm)
Voltage	208/230V 50/60Hz Single Phase - 30amps
Net weight	1200 lbs (544kg)

Freeze-Thaw Cabinet includes: (17) H-3185TA Stainless Steel Sample Trays, 3" x 4" x 16.375" (76 x 102 x 406mm)
(1) H-3185TSA Stainless Steel Sample Tray with spout, 3" x 4" x 16.375" (76 x 102 x 406mm)

Hardware Setup

1) Mount the controller box securely on a wall nearest to the Freeze/Thaw cabinet, but away from water or extreme moisture.

2) Plug in all electrical devices on the cabinet such as heaters, cooling system compressor, fan, and mechanical thermostat to the socket at the bottom of the controller box. All electrical connections have twist to lock plugs that easily attach to the controller box. The heaters consist of 3 banks with 3 identical plugs, but the sockets and cables are marked. Be sure each heater cable is plugged into the proper socket.

3) Be sure the power switch is turn off (down) before applying power.

4) The system is shipped without a plug on the inlet power cable so the user can attach a plug to match their socket or the system can be hard wired into a breaker box or junction box. Power requirements are: 220VAC, 50 or 60Hz, single phase, 30 amps.

5) When all cables are connected, turn on the power switch. You will hear a series of relay clicks from the cooling system which is normal. Wait about a minute after power up before starting a test.

6) Figure 3 shows the home screen that appears on the LCD display when the unit is first turned on.

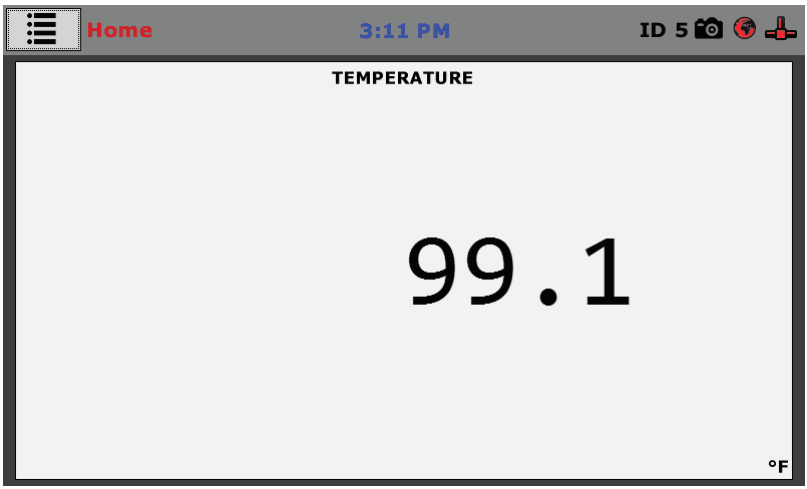

Figure 3

Settings

1) Press the Menu button on the default home screen > System Setting.

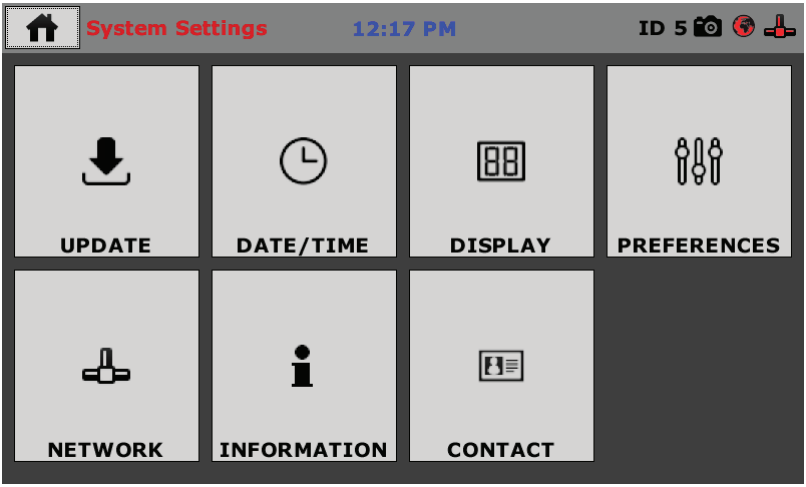

Figure 4

A. Date/time

2) On the System Settings screen, press Date/Time.

3) The Time and Date Settings Screen will appear, as seen in Figure 5.

4) An alternate method is to simply touch the clock, which is located on the top middle of the screen at all times, and it will open the Date/Time Screen.

5) Set the date and time using the keypad that appears by touching the yellow text box for month, day, year, hours, minutes, or seconds (Figure x).

6) The date format can be changed using the drop down menu under “Date Format.”

7) The clock style shown on the top of the screen may be altered by checking or un-checking the boxes for “24 Hour Clock” or “Show Seconds”

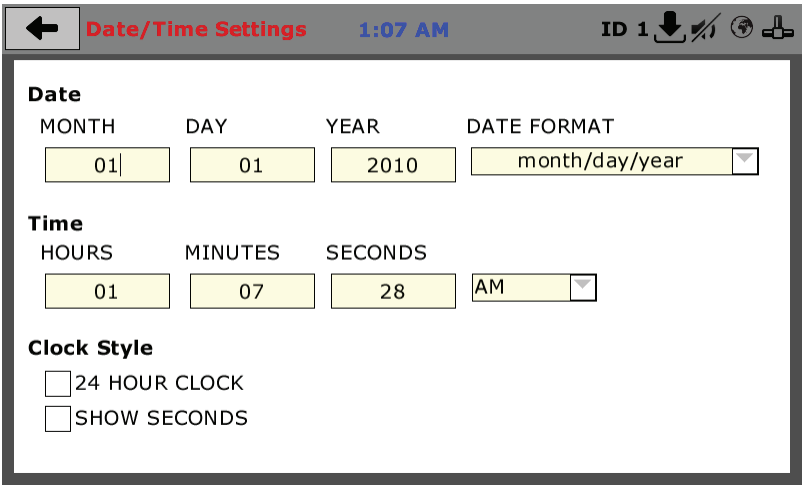

Figure 5

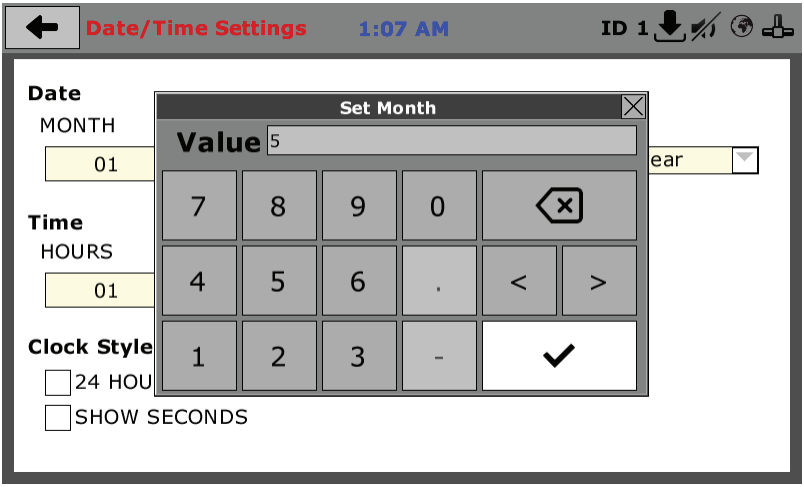

Figure 6

B. Display

1) On the System Settings screen, press Display

2) The Display Settings Screen will appear, as seen in Figure 7. Here, the brightness may be adjusted to a desired level by using the slider on the brightness scale and move it to side of “less” or “more.”

3) To change the time before the screen auto dims, tap the yellow text box under “DIM DISPLAY” (seen in Figure 7), a keypad will appear, and the desired number of minutes can be entered.

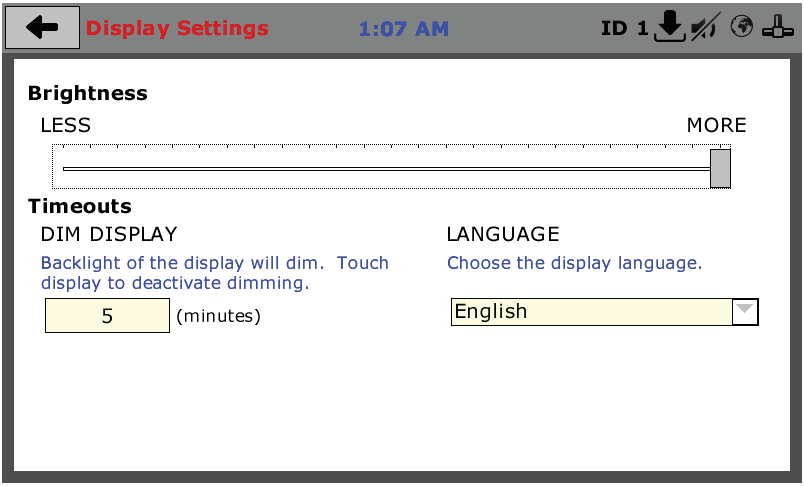

Figure 7

C. Preferences

1) On the System Settings screen, press Preferences. There are 4 options tabs that are used to select user preferences:

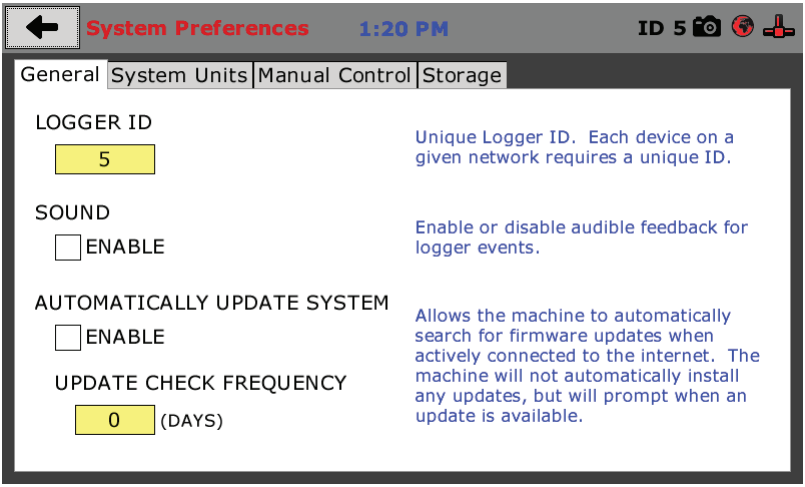

Figure 8

On the main screen you can select the Logger ID number that is used to identify the specific HM-1385 on the network. You can also enable or disable sound and how and when to check for firmware updates. Note: you cannot access the Preferences screen while a test is in progress.

2) On the Preferences screen, press the System Units tab to set the temperature units to Celsius or Fahrenheit.

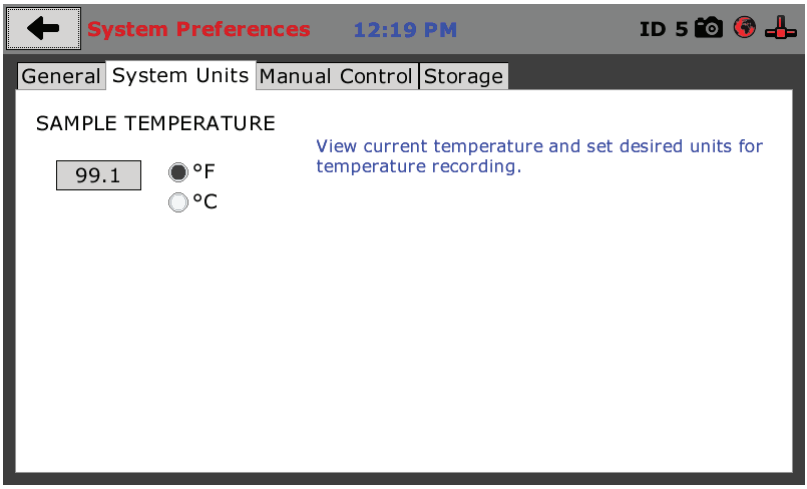

Figure 9

3) On the Preferences screen, press the Manual Control tab to turn on/off the heaters and/or cooling.

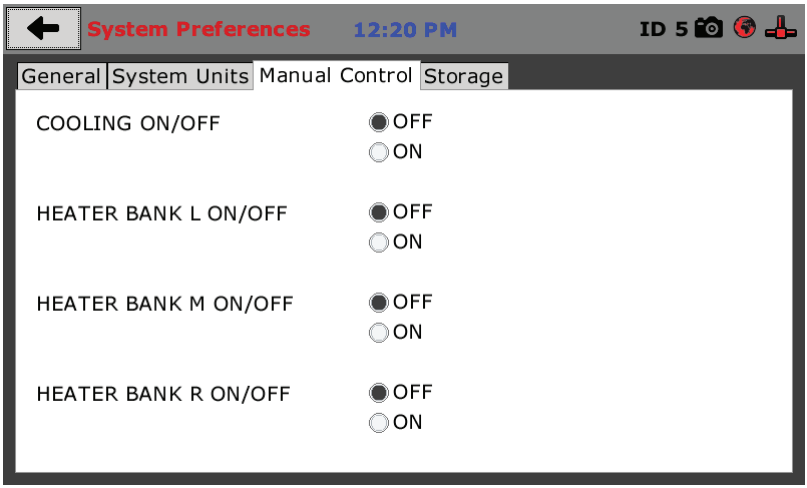

Figure 10

4) On the Preferences screen, press the Storage tab to set limits on how many tests to store and recover deleted tests.

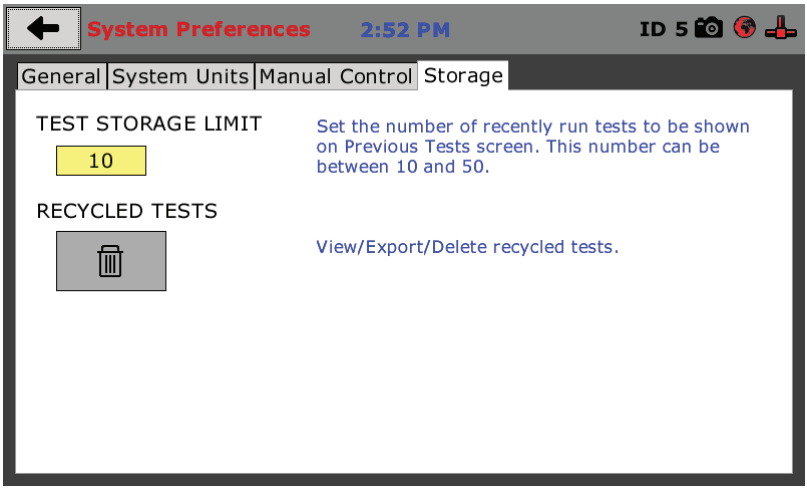

Figure 11

D. Network

5) On the System Settings screen, press Network.

6) The Network Settings screen is shown in Figure 12 below. The Cabinet has a webpage where you can run tests and download data. When using a static IP, type in the IP address shown into a web browser on your PC to access the Cabinet. Note not all network functionality may be available at time of product release. Check for updates frequently.

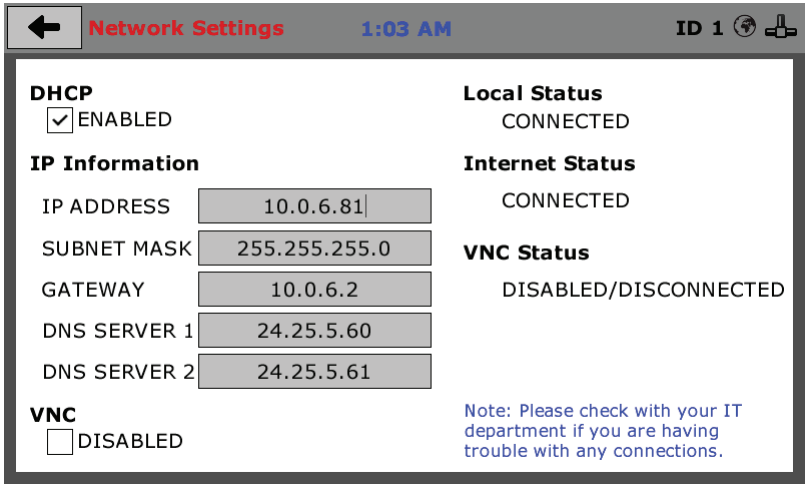

Figure 12

7) By default DHCP is enabled. This will automatically assign all IP Information for the cabinet.

8) To disable DHCP, simply uncheck the box. Once DHCP is disabled, the screen will look like Figure 13.

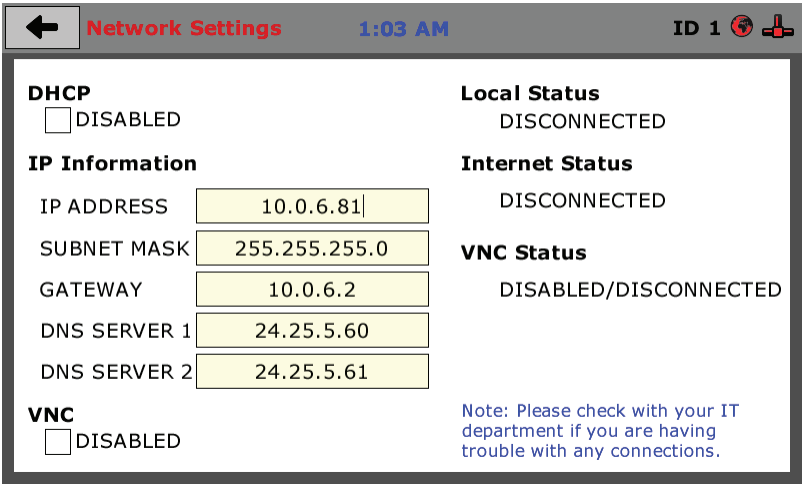

Figure 13

9) All IP Information is now free to be changed for purposes such as static IP.

Note: Disabling DHCP and failing to correctly setup the IP Information will prevent the cabinet from successfully accessing the internet and checking for updates.

Operation

A. Running a test

1) Press the Menu button on the default home screen: New Test.

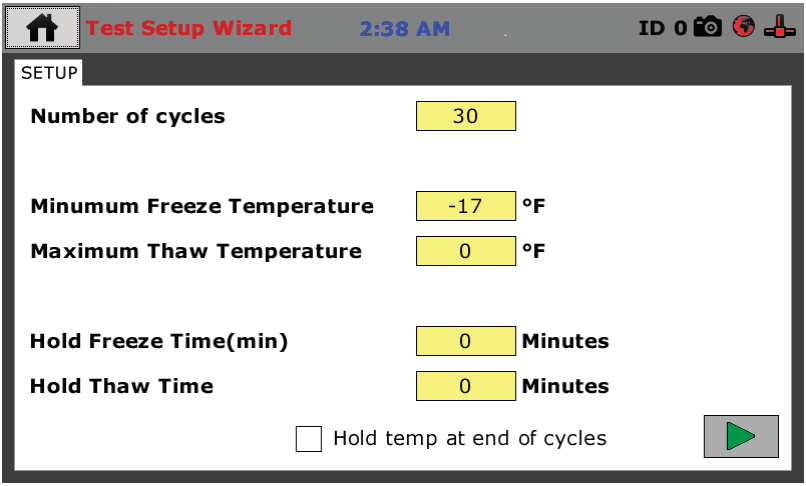

Figure 14

2) On this screen you can set (press the yellow area) the number of freeze / thaw cycles you wish to perform, as well as the min and max temperatures and hold times if desired.

3) After the number of cycles are reached, if the “Hold temp at end of cycles” box is checked, the system will keep the cabinet at the thaw temperature until the Stop test button is pressed.

4) Press the button to give the test a unique name. Once you hit the return button, testing starts immediately.

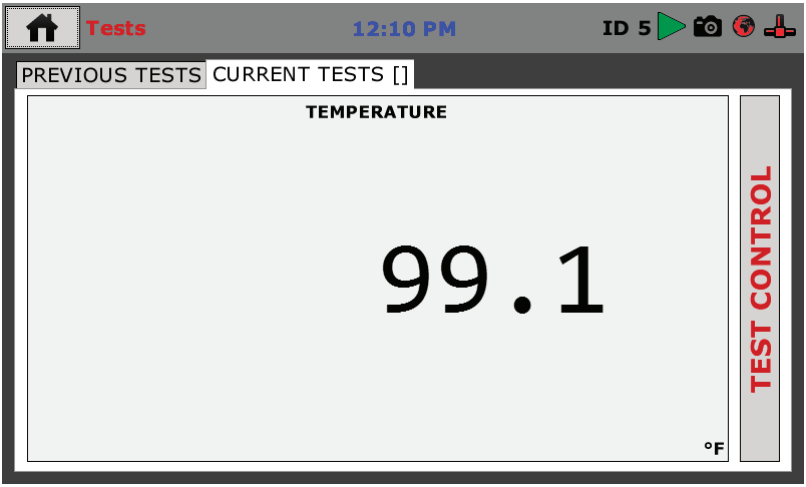

Figure 15

5) Pressing the TEST CONTROL bar will open a window as shown in Figure 16. Note this window is only available when a test is running.

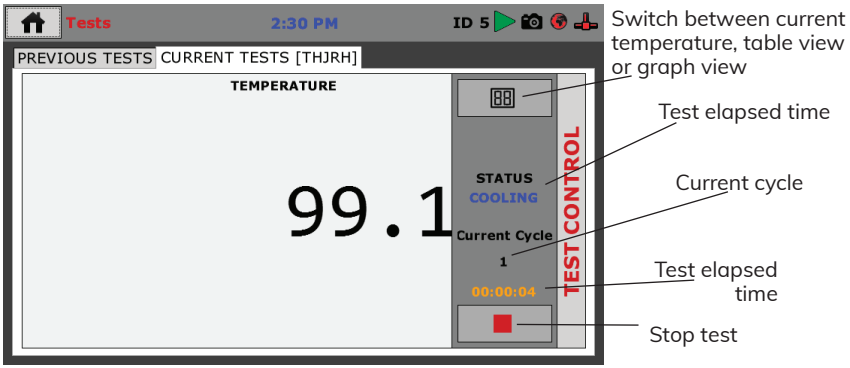

Figure 16

6) Pressing the PREVIOUS TESTS tab will open a window to view previous tests

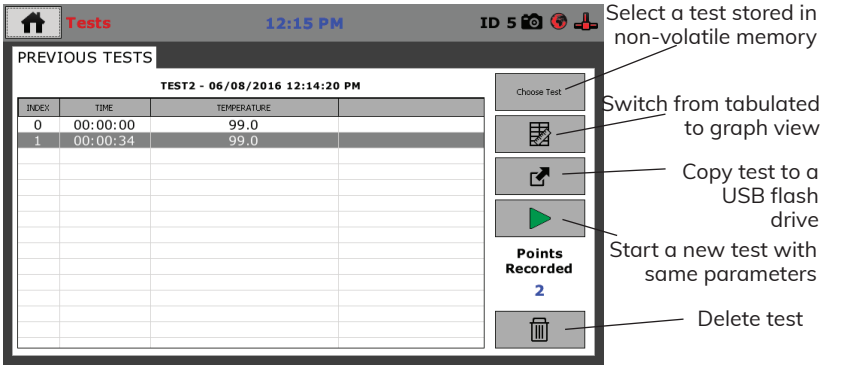

Figure 17

7) Pressing the Choose Test button will open a window to choose the test stored in non-volatile memory.

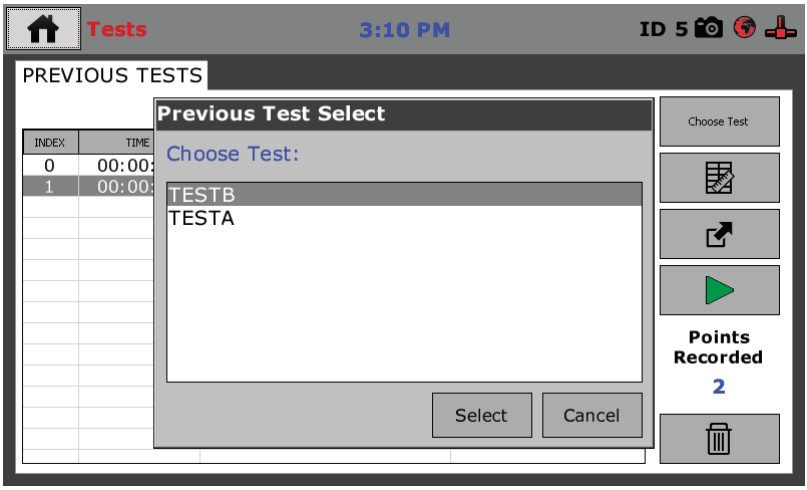

Figure 18

8) After testing is complete, the Current Test tab will disappear and the test will be moved into the Previous Test tab.

Added Features

1) To Take a Screen Shot of results or anything on the screen, hold the menu icon on the top left corner and drag it to the top-middle of the screen—illustrated in Figure 22 below. NOTE: The screen shot is always saved to USB so there must be a USB drive in the port.

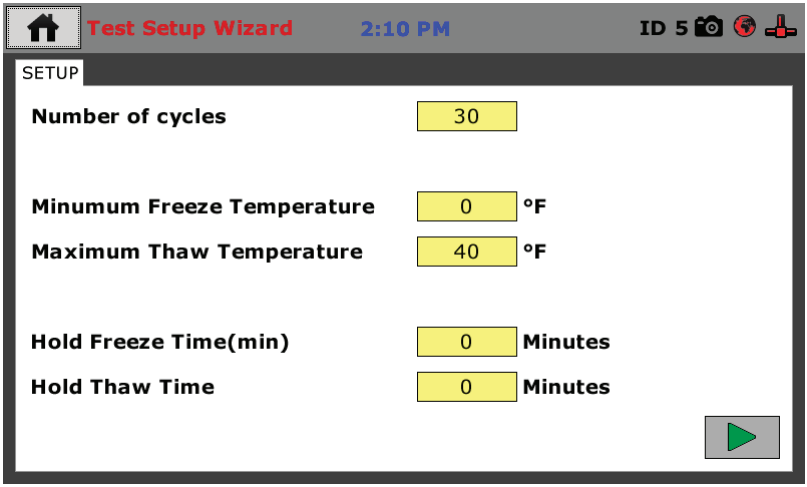

Figure 19

2) When the screenshot is being taken, there will be a camera icon in the top right corner, as seen in figure 19 above.

3) To view the tests on the computer:

a. Go to www.humboldtmfg.com

b. Click “Support”

c. Click "Software"

d. Click on the "Data Download Software" tab

e. The screen illustrated in Figure 20 below will appear.

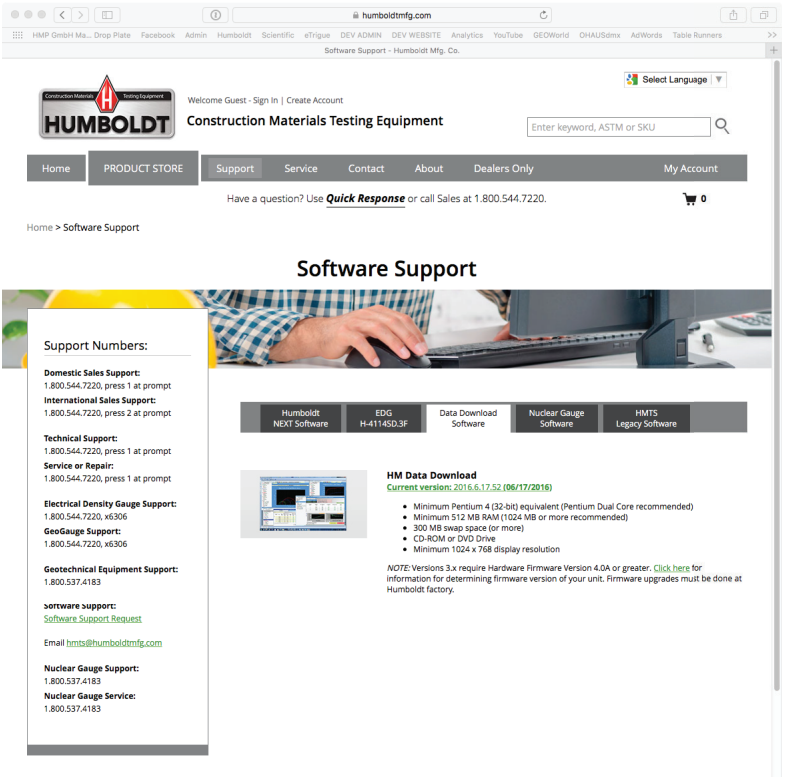

Figure 20

f. Click the Current version link and the software will download.

g. This software will retrieve the file from USB and view recorded data on the computer.

Appendix

Figures 25 and 26 illustrate the Network Settings screen when DHCP is enabled and then disabled respectively. When DHCP is disabled, IP Information can be changed. This is required if you wish to use the unit on a static IP network.

Note: Also notice the two icons in the top right corner of the screen. The furthest right icon indicates the status of a local network, and the globe shaped icon represents the status of internet connection. In figure 25 the icons are transparent indicating the machine is connected to a local network that does have internet access. Figure 26 shows the icons red, indicating no local network or internet connection.

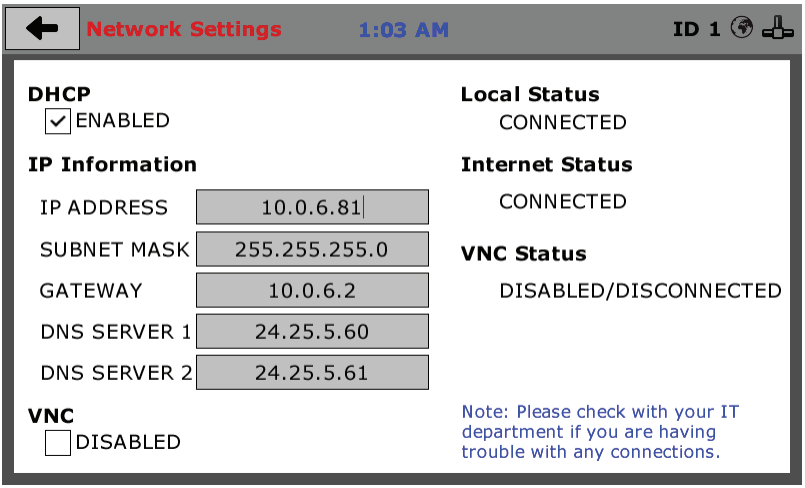

Figure 21

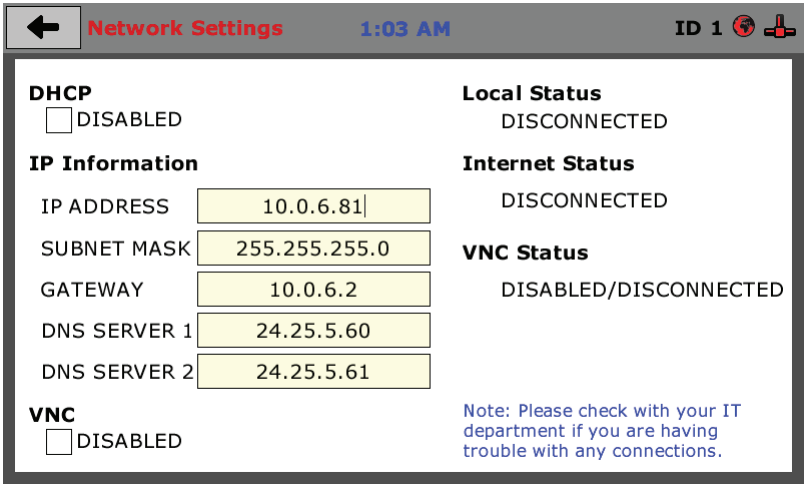

Figure 22

Figure 27 shows the Contact information screen. This screen can be found from the home Screen by pressing the top left button to drop down the menu, accessing the Setup menu and choosing contact. This screen provides the information for contacting Humboldt should any problems arise. In the event of emailing Humboldt directly, screen-shots would be extremely helpful to solving the problem quickly.

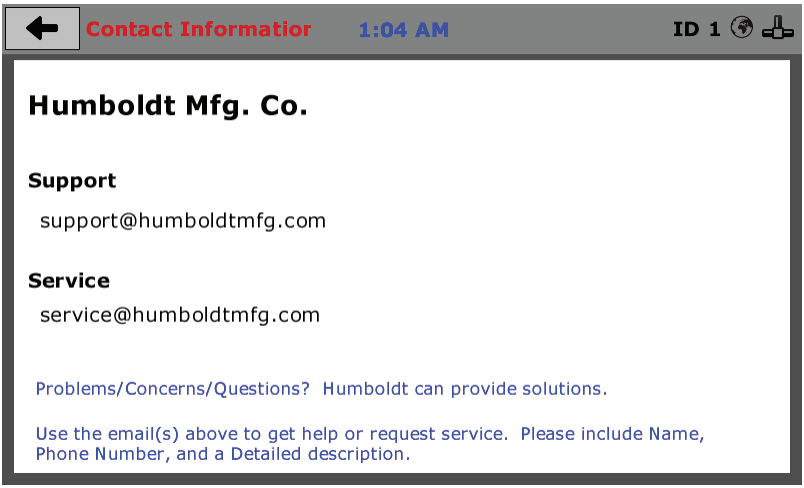

Figure 23

In Figure 28 above, illustrates the screen that will appear upon boot up if clock settings were lost. The appropriate date and time settings will need to be reset.

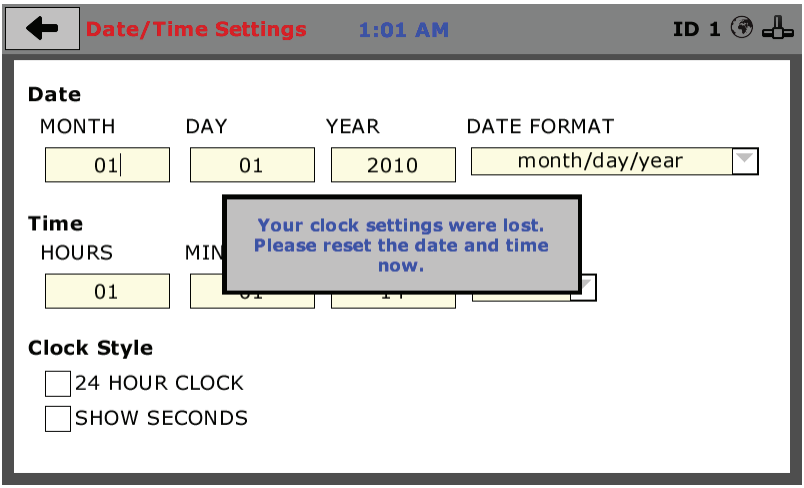

Figure 24

Warning

Heater strips can reach a high temperature that can cause burns to exposed skin; do not touch while machine is testing. Ensure control panel is closed while power is connected to avoid electrical shock.

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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