



HM-2325A, HM-2330D

HM-2325A_MAN_09.15



Humboldt MiniLoggers

Introduction

Applications

The HM-2325A and HM-2330D MiniLoggers are simple-to-use, four-channel, stand-alone, digital data loggers specifically designed for use in Soil Testing (Triaxial, Consolidation, Direct Shear, CBR/LBR Unconfined Compression); Asphalt Testing (TSR, Hveem, Flow/Stability), and Cement Testing (Soil/Cement and Cement Cubes).

Humboldt MiniLoggers increase lab productivity and cost effectiveness by freeing up technicians while test data is recorded automatically. Both units are fully configurable for automated start, stop and log-rate conditions; and can hold up to 300 readings per channel. Both units also include Humboldt Materials Testing Software (HMTS), which provides expanded control and reporting capabilities from a computer.

Product Use

This product is intended for use only in accordance with the directions and specifications contained in this User Guide.

Product Features

- Four channels with real-time 16-bit data acquisition
- Backlit LCD display
- RS-232 interface for computer or printer.
- Nonvolatile test data storage and instrument calibration
- Battery-backed real-time clock
- Auto conversation of instrument calibration between English or Imperial units and SI or metric units
- Test setup and selection via keypad
- Automatic triggering of test logging data
- View logged test data via the LCD display
- Logging rate as fast as 0.1 second/reading
- Windows-based software included for viewing graphs and tables and exporting test data into an Excel format-file with plug and play features.
- Expandable: Up to sixteen MiniLoggers can be connected to a single computer; and each four channel MiniLogger can accommodate multiple calibrations.
- Units are available for use with either Digital Dial Gauges or Analog Transducers and may be used together.
- Plug and play Serial port communications with Humboldt Material Testing Software (HMTS) for controlling and downloading stored tests.

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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.

Installation and Set-up

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. Make certain that the contents of your shipment match the documentation provided by your packing list.

Electrical Connections

Humboldt MiniLoggers are equipped with an internal, digital, switching power supply, which allows them to be used with most power configurations throughout the world. The units are supplied with an IEC electrical cord with a standard 110V plug.

MiniLoggers arrive 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 with 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.

Instrument Inputs (load cell/transducer connections)

Humboldt MiniLoggers have 4 instrumentation inputs located on the back panel to accommodate load cell/transducer connections. This feature allows you to set up and calibrate up to 4 different instruments, which the unit can quickly switch between for those needing to do multiple types of tests.

Third-party load cells/transducers, which are compatible, can also be used with Humboldt MiniLoggers. Compatible units will have an excitation voltage of 0-10 volts and an output of 0-100 millivolts. Prior to use all third-party instrumentation must be configured and calibrated for use. Please refer to the Configuration and Calibration sections of this manual.

If you are using third-party cables for transducer connections, make sure they are wired to be compatible with the MiniLoggers. Consult Figure #1 for a compatible reference wiring diagram. Plugs to connect third-party instrumentation to the Humboldt MiniLoggers are available, order part HM-000474.

Pin1= +10Vdc Excitation

Pin2= 0Vdc Excitation

Pin3= +dc Output

Pin4= -dc Output

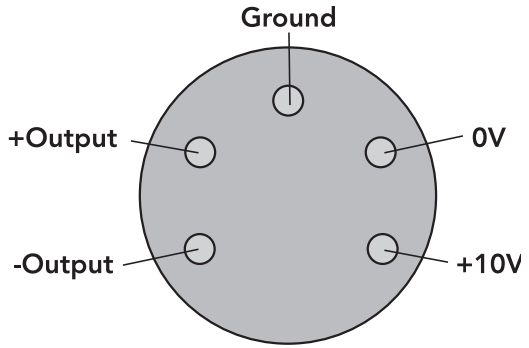


Figure 1. Compatibility wiring diagram for 3rd party cables

Computer Connection

Humboldt MiniLoggers can be connected to a PC computer to take advantage of Humboldt's HMTS software capabilities, conduct real time data logging and enhanced report generation. This is accomplished via the RS-232 port on the back panel of the machine (refer to Figures 7 & 8). Use a RS-232 cable (supplied) and attach it between the computer's RS-232 port and the MiniLogger. The minimum compatible computer configuration is a PC with Pentium 4, 1.2 GHz processor, 512 MB of RAM, and a 80GB hard drive Windows 2000 or XP with SP2 or later.

Additional Device Connection

Additional devices, such as additional MiniLoggers and/or HM-2700 Direct Shear Machines, HM-2560A Direct Residual Shear Machines, HM-3000 Load Frames and other computer-compatible load frames can be connected to a computer via the MiniLogger's RS-485 port. This allows you to daisy-chain several devices to the same computer. Use a standard CAT 5 cable (not included) to link the additional device's output port to the MiniLogger's RS-485 input port (refer to Figures 3 & 4). Dip switches and rotary switch need to be set to primary or secondary usage (see Figure 2 and 3).

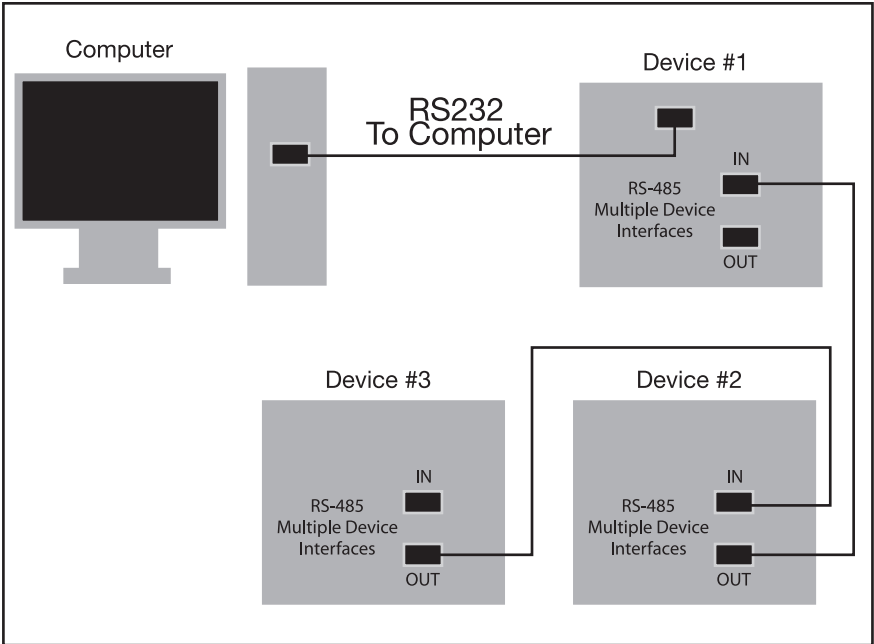


Figure 2. Diagram illustrating computer and multiple device connections.

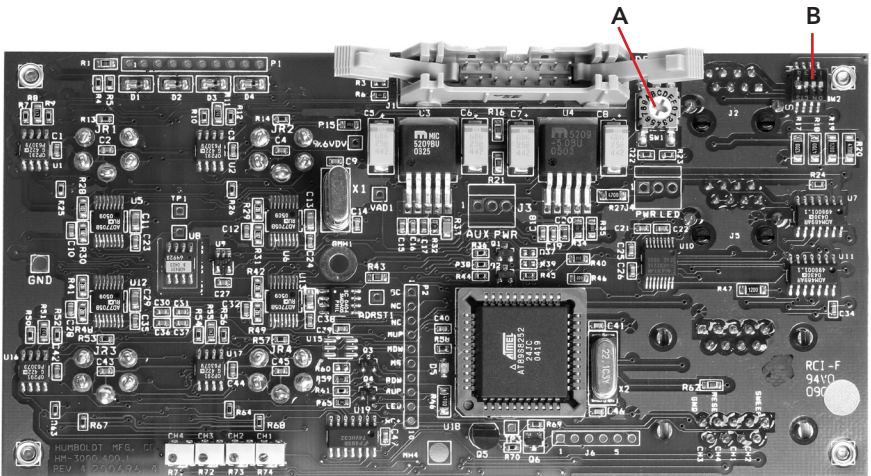
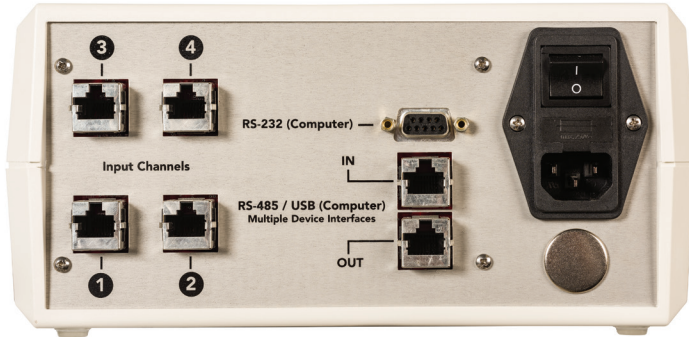


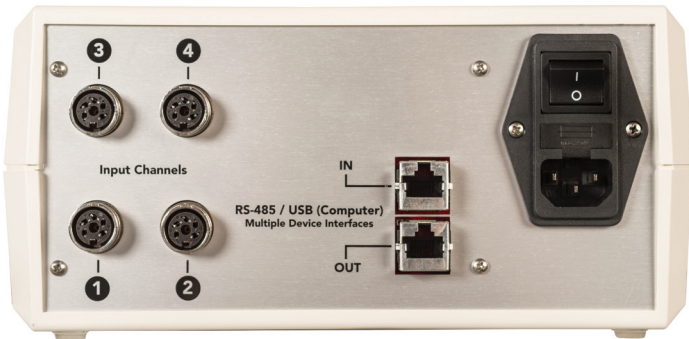
Figure 3. Logic board showing location of rotary switch (A) for setting device numbers 1-15 and dip switches (B) to set device to primary or secondary.

Analog Device Connection

Humboldt MiniLoggers can be set up to output directly to a chart recorder to provide a hard copy printout of test results. To accomplish this, connect your chart recorder via cable attached to the MiniLogger's analogue port on the back panel (see figure 4).



H-2325A.3F Rear Panel



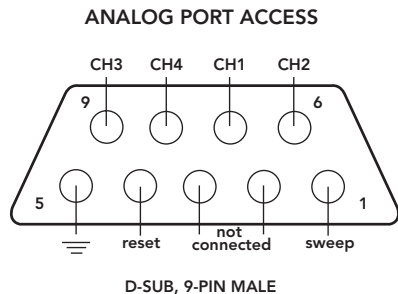
H-2330D.3F Rear Panel

Figure 4. Rear panel of MiniLogger showing Analogue Port, RS-232 Port, RS-485 Input and Output and the four instrumentation channel inputs.

Cable configuration for analogue port access.

Figure 5.

Pins 1, 2, 3 & 4
(Reserved for
Humboldt Chart
Recorder)



Operation

Power Switch

The Power Switch is located in the black panel on the rear of the MiniLogger above the electrical cord inlet. Also, located between the electrical cord inlet and the Power Switch is the Fuse Compartment. Humboldt MiniLoggers use a 10 amp fuse. To begin operation, press the Power Switch.

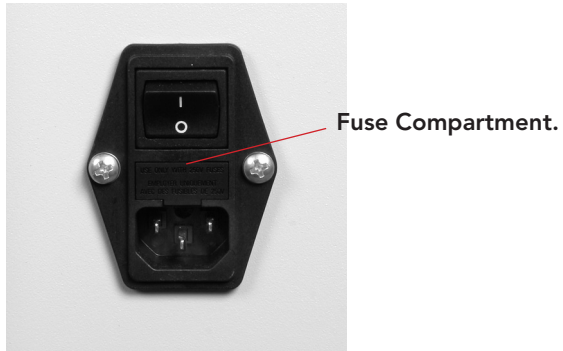


Figure 5. MlniLogger Power Switch, Electrical Cord Inlet and Fuse Compartment.

Key Functions

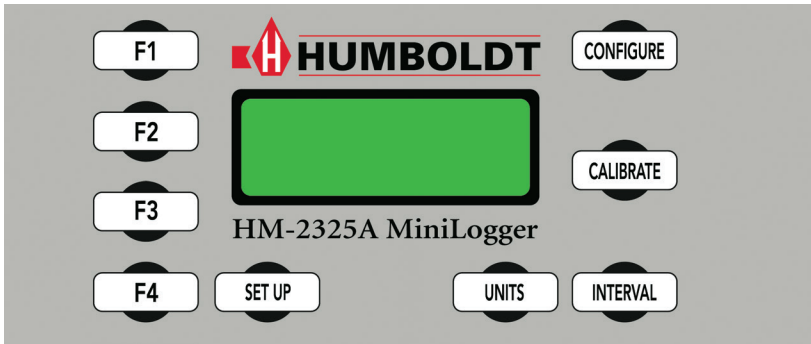


Figure 6. HM-2325A/HM-2330D Front Control Panel

SET UP

Set Up Key

Pushing the Set Up Key brings up the main set up screen from which you can run a test, review your last test, access the engineering set up menus and set the date, time, units, standards criteria. This key also is used to return to a previous screen.

UNITS

Units Key

Pushing the Units key allows you to change calibration units from English to S.I. units.

INTERVAL

Interval Key

Pushing the Interval Key allows you to set the logging interval in HH: MM: SS.format.

CALIBRATE

Calibrate Key

Pushing the Calibrate Key allows you to calibrate each individual channel, i.e. Set Gain, Set Minimum Engineering Value, Set Maximum Engineering Value.

CONFIGURE

Configure Key

Pushing the Configure Key allows you to configure each of the four channels for a specific test by naming the test and setting its engineering minimum and maximum values.

A black circle with a white rounded rectangle on its right side containing the text 'F1'.A black circle with a white rounded rectangle on its right side containing the text 'F2'.A black circle with a white rounded rectangle on its right side containing the text 'F3'.A black circle with a white rounded rectangle on its right side containing the text 'F4'.

Function Keys

The four function keys are used to navigate through the MiniLoggers' menu-driven display. The function keys correspond with the command lines on the menu display. F1 corresponds with the first command line; F2, the second, etc. Command lines that are active in any display will be preceded by an (*). If no (*) is present, the corresponding function key is not active.

Set-up Functions

Set Date

To set the Date press  until you see this screen:




* REVIEW LAST TEST
 * RUN TEST
 * ENGINEERING SETUP
 * SET DATE/TIME/UNITS/STND


Press  (SET DATE/TIME/UNITS/STND). You should see this screen:

* SET DATE
 * SET TIME
 * UNITS = ENG/METRIC

Press  (SET DATE). You should see this screen:

DATE = "MM/DD/YY"
 * INCREASE
 * DECREASE

Press  (DATE) to select the month/date/year. Press  (INCREASE) or Press  (DECREASE) to change the appropriate number.

To return to any prior screen you can always press .


Set Time

To set the Time press  until you see this screen:

* REVIEW LAST TEST
 * RUN TEST
 * ENGINEERING SETUP
 * SET DATE/TIME/UNITS/STND

Press  (SET DATE/TIME/UNITS/STND). You should see this screen:

* SET DATE
* SET TIME
* UNITS = ENG/METRIC

Press  (SET TIME). You should see this screen:

TIME = "HH/MM/SS"

* INCREASE
* DECREASE


Press  (INCREASE). or Press  (DECREASE) to change the appropriate number.

To return to any prior screen you can always press .

Set Units


To set the Units the MiniLogger will use to display results, press until you see this screen:

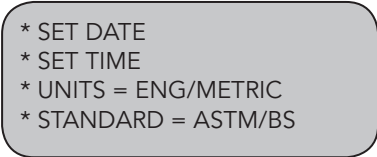
* SET DATE
* SET TIME
* UNITS = ENG/METRIC
* STANDARD = ASTM/BS

Press  (UNITS) to toggle between English and Metric Units. Select the units desired—the flashing units are the active choice.


To return to any prior screen you can always press .

Set Standards


To set the Standards the MiniLogger will use, press  until you see this screen:




- * SET DATE
- * SET TIME
- * UNITS = ENG/METRIC
- * STANDARD = ASTM/BS

Press  (STANDARD) to toggle between ASTM and BRITISH STANDARD.




Select the standard desired—the flashing standard is the active choice.

To return to any prior screen you can always press .

Set Sampling (Logging) Interval


To set or change the sampling interval press  until the following setup screen appears:

"SAMPLE INTERVAL"
* PERIOD "HH: MM: SS"
* INCREASE
* DECREASE

Press  (PERIOD) to cycle between the hour/minute/second to select the desired increment. Press  (INCREASE) to  (DECREASE) to change to the appropriate number

Channel Configuration

If you are adding new instrumentation, changing existing instrumentation or reconfiguring the MiniLogger's channel setup, you need to configure the channel for use with the devices you have.

To configure a channel, press  .

You will be asked for a password, enter:










You should see this screen:

CONFIGURATION screen
 * SELECT CHANNEL "CH1"
 * CONFIGURE CHANNEL
 * CONFIGURE TEST



Press  (SELECT CHANNEL) to scroll through and choose the channel you wish to configure. Once you have selected a channel press  (CONFIGURE CHANNEL). You should see this screen:

"CH1" CONFIGURATION
 * NAME = "CH1"
 ENG MIN = 0
 * ENG MAX = "VALUE"


Naming Channel

From the previous screen, shown above, Press  (NAME) to select the name you wish to change, press the key until the name you wish to change is indicated. You should see this screen:

"CH1" CONFIGURATION
 * NAME = "CH1"
 * INCREASE
 * DECREASE

Press  (INCREASE) or  (DECREASE) repeatedly to scroll through the available channel names for an appropriate choice. Choices for channel names are: CH1, CH2, CH3, CH4, LOAD1, LOAD2, LOAD3, LOAD4, DISP1, DISP2, DISP3, DISP4, FLOW, STAB, PRES1, PRES2, PRES3, PRES4, VOLU1, VOLU2, VOLU3 and VOLU4.

NOTE: It is important to assign an appropriate name when naming channels because the MiniLogger will choose a unit of measure based on the name assigned. For example, if you are configuring a load cell, name the channel Load 1, 2, 3 or 4. This will ensure that the channel reads in lbs (kN). The same applies to Displacement (DISP 1, 2, 3 or 4) reading in in/mm and Pressure (PRES1, 2, 3 or 4) reading in psi (kPa).

Once a name has been chosen for a channel Press  to return to the previous screen. You should see this screen (LOAD1 was chosen as name):


```

"CH1" CONFIGURATION
* NAME =          "LOAD1"
  ENG MIN =         0
* ENG MAX =       "VALUE"
  
```

Set Min

The Engineering Zero (ENG MIN) is not configurable and is set at 0.





Set Max

Press  (ENG MAX) to set the Engineering Maximum value.

You should see this screen:

```

"CH1" MAX SETUP
* ENG MAX =       "000000"
* INCREASE
* DECREASE
  
```


Press  (ENG MAX) to move between the numbers. Keep pressing  until the digit you want to change is flashing. Once you have selected the number you want to change, press  (INCREASE) or  (DECREASE) to change the number to the desired value. Below is a configuration chart for Humboldt instrumentation. These are the numbers that correspond to each Humboldt device.

To return to any prior screen you can always press .

Humboldt Instrumentation Configuration Chart

Load Cell	Part#	Eng Max (lbf)	Metric Max (kN)
10,000 lb. (50kN)	HM-2300.100	010000	050.00
5,000 lb. (25kN)	HM-2300.050	005000	025.00
2,000 lb. (10kN)	HM-2300.020	2000.0	10.000
1,000 lb. (5kN)	HM-2300.010	1000.0	05.000
500 lb. (2.5kN)	HM-2300.005	0500.0	02.500
LSCT Transducer	Part#	Eng Max (in.)	Metric Max (mm)
0.4" (10.0mm)	HM-2310.04	0.4000	10.000
1.0" (25.4mm)	HM-2310.10	01.000	25.000
2.0" (50.8mm)	HM-2310.20	02.000	50.000
Pore Pressure	Part#	Eng Max (psi)	Metric Max (kPa)
100psi (1000kPa)	HM-4170	0100.0	001000

Channel Test Configuration



In order to perform a test, channels must be configured for the specific test you wish to run. To configure a channel, press .

You will be asked for a password, enter:





You should see this screen:

CONFIGURATION screen
 * SELECT CHANNEL "CH1"
 * CONFIGURE CHANNEL
 * CONFIGURE TEST

Press  (SELECT CHANNEL) to scroll through and choose the channel you wish to calibrate. Once you have selected a channel press  (CONFIGURE TEST). You should see this screen:

* CBR/LBR TEST "N"
 * MARSHALL TEST "N"
 * UNCONFINED TEST "N"
 * NEXT

To assign a test to the selected channel, press the corresponding function key to the test you wish to select. For Triaxial and Soil Cement Tests, press  (NEXT) to access these tests. Pressing a key will toggle between "Y" and "N". For example, press  to choose Marshall Test, which will change the "N" to a "Y" next to Marshall Test. This would indicate that the channel selected would be set up to run Marshall tests.

NOTE: Multiple tests can be assigned to a single channel, however, multiple channels of the same category cannot be assigned to the same test.

Example: If channel 1 is configured with a 10,000 lb (50KN) load cell, and channel 2 is configured with a 5,000 lb (25KN) load cell, it is possible to use either channel to perform a Marshall test. However, only channel 1 can be used to perform a CBR test due to the need for the 10,000 lb (50kN) Load Cell connected to channel 1.

To return to any prior screen you can always press .

Calibration

This menu item is used to calibrate or verify the calibration of the Humboldt MiniLogger.



WARNING: Calibration should only be performed by trained personnel with proper, certified equipment. Humboldt MiniLoggers and their instrumentation should be calibrated once a year.

Channel Calibration


To calibrate a channel, press  You will be asked for a password, enter:

     You should see this screen:


CALIBRATION SCREEN
 * SELECT CHANNEL "CH1"
 * CALIBRATE CHANNEL
 * CLEAR CALIBRATION

Press  (SELECT CHANNEL) to scroll through and choose the channel you wish to calibrate. Once you have chosen the desired channel you wish to calibrate press  (CLEAR CALIBRATION).

WARNING: IF YOU CLEAR A CALIBRATION IT IS LOST FOREVER!


After the calibration has been cleared, Press  (CALIBRATE CHANNEL) You should see this screen:

"CH1" CALIBRATION
 * SET GAIN
 * SET MIN
 * SET MAX


Press  (SET GAIN). With the instrument you wish to calibrate mounted to a calibration frame attached to a load frame, record the division min value with no load on the instrument (X divisions).



Next, apply the full engineering load value to instrument on the calibration frame and again, record the division min reading (X divisions). Subtract the two values. This value should be a number larger than the maximum rating of the instrument.


If not, you need to increase the gain to compensate for the difference. Press

 (SET GAIN) and repeat until the difference between the two values is more than the maximum rating of the instrument.

EXAMPLE:

If you are calibrating a 10,000 lb. load cell, you need a difference value of at least 10,000 divisions. If you register a min value reading of 450 divisions with no load on the instrument and your min is 8450 divisions at full load on the instrument, your difference value will be 8000 divisions. ($8450 - 450 = 8000$). To increase the gain press  (SET GAIN) until you have more than 10,000 divisions.

Once the gain has been set, the zero point needs to be set. To set the zero point, apply the 0% force to the instrument and press  (SET MIN). Next apply the 100% force to the instrument and press  (SET MAX).

To return to any prior screen you can always press .

Below is an Instrumentation calibration chart listing max divisions, as well as typical gain factors needed in calibrating each instrument type.

Humboldt Calibration Instrumentation Chart

Load Cell	Part#	English (divisions)	Gain	Metric (divisions)	Gain
10,000 lb. (50kN)	HM-2300.100	10000	4	5000	4
5,000 lb. (25kN)	HM-2300.050	5000	2	2500	4
2,000 lb. (10kN)	HM-2300.020	20000	8	10000	4
1,000 lb. (5kN)	HM-2300.010	10000	4	5000	4
500 lb. (2.5kN)	HM-2300.005	5000	4	2500	4
LSCT Transducer					
0.4" (10.0mm)	HM-2310.04	4000	2	10000	2
1.0" (25.4mm)	HM-2310.10	1000	1	25000	2
2.0" (50.8mm)	HM-2310.20	2000	1	50000	4
Pore Pressure					
100psi (1000kPa)	HM-4170	1000	1	1000	1

Calibration Backup

The miniLogger contains a backup memory. This memory can be used for storing current calibrations in the event your logger's calibrations are lost.

To backup calibrations:

1. Turn off your logger.
2. Press and hold the F1 key.
3. Turn the logger back on, while continuing to hold the F1 key.
4. As the logger powers up, you will hear a single quick beep, release the F1 key.
5. The logger will power up as normal.
6. After the logger has booted to the main screen, press the F1 key.
7. You will hear four beeps; the logger's calibration has successfully been backed up.

To recover calibrations:


This will recall the calibrations that were backed up using procedure 1. All four inputs calibrations are retrieved. If an input does not contain a calibration, a blank calibration will be restored.

1. From the main screen of your logger, press the Setup key.
2. Press F4 (More Setup)
3. Press F4 (More Setup)
4. Press F1 (Recall Calibration)
5. You will hear four beeps and you should see your calibrations restored.

Standard Tests

CBR/LBR


First center the CBR mold on platen with the first surcharge weight in the mold. Run the Load Frame until a 10 lb. seating load is applied. Stop the machine and add the remainder of the surcharge weight.

Press  You should see this screen:

* REVIEW LAST TEST
* RUN TEST
* ENGINEERING SETUP
* SET DATE/TIME/UNITS/STND


Press  (RUN TEST) You should see this screen:

* MARSHALL TEST
* CBR/LBR TEST
* UNCONFINED TEST
* NEXT

Press  (CBR/LBR TEST) You should see this screen:

CBR/LBR TEST # of readings
LOAD "##"
DISP "##"
* END TEST

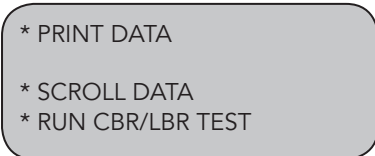
Run the machine as normal at a speed of 0.05 inch/min. The load and displacement will be zeroed at that time indicating the start of the test.

NOTE: If you apply all the surcharge weight in the mold at the beginning of the test, just run your load frame as normal. The display will show the current reading of the load and displacement. The MiniLogger will collect a load reading every 0.025 inches. Once the displacement reaches 0.5 inches, data collection will stop. At any time you can press  to end the test. This will stop all data collection, but will not stop the machine from advancing, please use the stop switch on the Load Frame.

Important Note:



The Load Frame will not stop automatically, the operator needs to stop the machine manually.


You should see this screen:

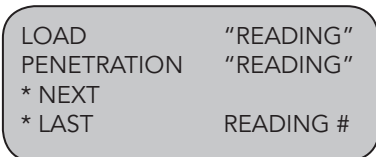


```



* PRINT DATA
* SCROLL DATA
* RUN CBR/LBR TEST
  
```

Pressing  (PRINT DATA) will print the data to a printer or save a file in ASCII mode to your computer using Humboldt Material Testing Software (HMTS) or Windows Hyper terminal. Once the data has been printed or transferred, you can begin another test after you have readied a test mold on the platen by pressing  (RUN CBR/LBR TEST).

If you don't have a printer or a computer connected to the HM-3000, you can press  (SCROLL DATA) to scroll the data. You should see this screen:



LOAD	"READING"
PENETRATION	"READING"
* NEXT	
* LAST	READING #

Using the  (NEXT) key to scroll through the readings and the  (LAST) key to view the last reading taken.


To return to any prior screen you can always press .

Marshall

Center the breaking head on the platen. Raise the head to the start position, close to the load cell. There should be about a 1/4" gap between the head and the load cell.

Press  You should see this screen:


* REVIEW LAST TEST
 * RUN TEST
 * ENGINEERING SETUP
 * SET DATE/TIME/UNITS/STND

Press  (RUN TEST) You should see this screen:

* MARSHALL TEST
 * CBR/LBR TEST
 * UNCONFINED TEST
 * NEXT

Press  (MARSHALL TEST) You should see this screen:

MARSHALL TEST # of readings
 STAB " #"
 FLOW " #"
 * END TEST

The display above will give constant real-time readings of the stability and flow measurements during the test cycle. You can end the test at any time by pressing . This will stop all data collection, but will not stop the machine from advancing, please use the stop switch on the Load Frame.


Use the up button on the Load Frame to raise the platen. As the breaking head makes contact with the load cell, the MiniLogger will automatically zero the stability and flow readings and begin to take readings every 0.1 seconds. Once the test has reached peak stability (i.e. peak load) and fallen back 2%, data will cease being collected.

Important Note:



The Load Frame will not stop automatically, the operator needs to stop the machine manually.


You should see this screen:

STAB PEAK	"#"
FLOW PEAK	"#"
REVIEW DATA	
* RUN MARSHALL TEST	



Peak values are shown on the first two lines. To review all the data, press  (REVIEW DATA). You should see this screen:


* PRINT DATA
* SCROLL DATA
* RUN MARSHALL TEST

Pressing  (PRINT DATA) will print the data to a printer or save a file in ASCII mode to your computer using Humboldt Material testing Software (HMTS) or Windows Hyper terminal. Once the data has been printed or transferred, you can begin another test after you have loaded another sample and raised the breaking head to the start position, close to the load cell. by pressing  (RUN MARSHALL TEST) and the up button on your load frame.

If you don't have a printer or a computer connected to the MiniLogger, you can press  (SCROLL DATA) to scroll the data. You should see this screen:


STAB	"READING"
FLOW	"READING"
* NEXT	
* LAST	Time = 0.0 sec

Using the  (NEXT) key to scroll through the readings and the  (LAST) key to view the last reading taken.


To return to any prior screen you can always press .

Unconfined Compression

Center the soil sample on the platen. Raise the sample to the start position, close to the unconfined upper platen. There should be about a 1/4" gap between the top of the sample and the unconfined upper platen.

Press  You should see this screen:

* REVIEW LAST TEST
 * RUN TEST
 * ENGINEERING SETUP
 * SET DATE/TIME/UNITS/STND


Press  (RUN TEST) You should see this screen:

* MARSHALL TEST
 * CBR/LBR TEST
 * UNCONFINED TEST
 * NEXT

Press  (UNCONFINED TEST).

Once the speed has been set, Use the up button on the Load Frame to raise the platen. You should see this screen:


U. C. TEST	# of readings
LOAD	"#"
DISP	"#"
* END TEST	

The display above will give constant real-time readings of the load and displacement measurements during the test cycle. You can end the test at any time by pressing . This will stop all data collection, but will not stop the machine from advancing, please use the stop switch on the Load Frame.



Once the sample makes contact with the unconfined upper platen the MiniLogger will automatically zero the load and displacement readings and collect a load reading every "X" second, depending on what sampling interval has been set (see sampling interval). Once the load cell has reached its peak load and fallen 2%, the MiniLogger will stop collecting data, but will not stop the machine from advancing, please use the stop switch on the Load Frame.


You should see this screen:

```
LOAD PEAK      "##"
DISP PEAK      "##"
* REVIEW DATA
* RUN UNCONFINED TEST
```



Peak values are shown on the first two lines. To review all the data, press  (REVIEW DATA). You should see this screen:

```
* PRINT DATA
* SCROLL DATA
* RUN UNCONFINED TEST
```

Pressing  (PRINT DATA) will print the data to a printer or save a file in ASCII mode to your computer using Humboldt Material Testing Software (HMTS) or Windows Hyper terminal. Once the data has been printed or transferred, you can begin another test after you have loaded another sample and raised the head to the start position, close to the load cell. by pressing  (RUN UNCONFINED TEST).

If you don't have a printer or a computer connected to the MiniLogger, you can press  (SCROLL DATA) to scroll the data. You should see this screen:


```
LOAD           "##"
DISP           "##"
* NEXT
* LAST          READING #
```

Using the  (NEXT) key to scroll through the readings and the  (LAST) key to view the last reading taken.


To return to any prior screen you can always press .

Soil Cement/TSR


Center the soil cement sample on the platen. Raise the sample to the start position, close to the soil cement upper platen. There should be about a 1/4" gap between the top of the sample and the soil cement upper platen.

Press  You should see this screen:

* REVIEW LAST TEST
 * RUN TEST
 * ENGINEERING SETUP
 * SET DATE/TIME/UNITS/STND

Press  (RUN TEST) You should see this screen:

* MARSHALL TEST
 * CBR/LBR TEST
 * UNCONFINED TEST
 * NEXT

Press  (NEXT). You should see this screen:

* TRIAXIAL TEST
 *SOIL CEMENT TEST
 * LAST

Press  (SOIL CEMENT TEST). You should see this screen:

SOIL CEMENT TEST # of readings
 LOAD "#"

 * END TEST

The display above will give constant real-time readings of the load during the test cycle. You can end the test at any time by pressing **F4** (END TEST). This will stop all data collection, but will not stop the machine from advancing, please use the stop switch on the Load Frame.

Once the sample makes contact with the upper platen the MiniLogger will automatically zero the load every "X" second, depending on what sampling interval has been set (see sampling interval). Once the load cell has reached its peak load and fallen 2%, the MiniLogger will stop collecting data but will not stop the machine from advancing, please use the stop switch on the Load Frame.

You should see this screen:

```

LOAD PEAK          "#"
* REVIEW DATA
* RUN SOIL CEMENT TEST
  
```

The Peak value is shown on the first line. To review all the data, press **F3** (REVIEW DATA). You should see this screen:

```

* PRINT DATA
* SCROLL DATA
* RUN SOIL CEMENT TEST
  
```

Pressing **F1** (PRINT DATA) will print the data to a printer or save a file in ASCII mode to your computer using Humboldt Material Testing Software (HMTS) or Windows Hyper terminal. Once the data has been printed or transferred, you can begin another test after you have loaded another sample and raised the specimen to the start position, close to the load cell. by pressing **F4** (RUN SOIL CEMENT TEST).

If you don't have a printer or a computer connected to the MiniLogger, you can press **F3** (SCROLL DATA) to scroll the data. You should see this screen:

```

LOAD              "READING"
* NEXT
* LAST            READING #
  
```

Using the **F3** (NEXT) key to scroll through the readings and the **F4** (LAST) key to view the last reading taken.

To return to any prior screen you can always press **SETUP**

UU Triaxial

See Unconfined Compression

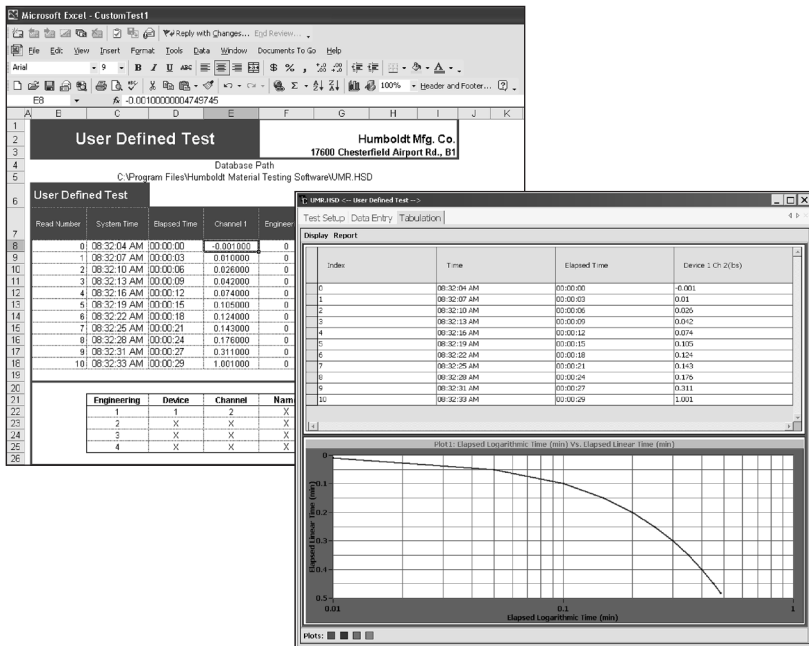
CU Triaxial

See Unconfined Compression, plus add third channel for Pore Pressure into test configuration.

Software

Humboldt's MiniLoggers comes with Humboldt's HMTS data collection software. This software can be used to collect data from tests by creating user-defined test parameters (start/stop). The resulting data can then be opened in Microsoft Excel to view the data collected, as well as create a simple table and graph.

Optional pre-defined reporting software modules and templates are available for specific tests, such as CBR, Triaxial, etc. These modules provide more control over start and stop conditions for specific tests, as well as provide extended reporting capabilities. Contact Humboldt for more information.



Table/graph and Excel output of user-defined test generated from software included.

The minimum compatible computer configuration is a PC with Pentium III 550 MHz processor, 512 MB of RAM and a 40GB hard drive running Windows® XP Professional system software.

Specifications**Mechanical Specifications**

Dimensions (l x w x h)	8.3 x 9.5 x 4.7 inch (210 x 240 x 120mm)
Shipping Weight	6 lbs. (2.7Kg)

Electrical /Electronics Specifications

Voltage	110/220 VAC 50/60HZ
Data storage	300 Readings/Channel
Computer port	RS232

Test Accessories

HM-3001—California Bearing Ratio (CBR) Accessory Set:

HM-2300.100	Load cell 10,000 lb. (50 kN)
HM-2310.10	Displacement Transducer 1.0" (25mm)
HM-4178BRT	Displacement Transducer Bracket
H-4178	CBR Plunger

HM-3002—Unconsolidated Undrained (UU) Triaxial Accessory Set:

HM-2300.020	Load cell 2,000 lb. (10 kN)
HM-200387	Ball seat adapter
HM-2310.20	Displacement Transducer 2.0" (50mm)
HM-4178BRT	Displacement Transducer Bracket

HM-3003—Consolidated Undrained (CU) Triaxial Accessory Set:

HM-2300.020	Load cell 2,000 lb. (10 kN)
HM-200387	Ball seat adapter
HM-2310.20	Displacement Transducer 2.0" (50mm)
HM-4178BRT	Displacement Transducer Bracket
HM-4170	Pore Water Pressure Transducer 200 PSI (1400 kPa)

HM-3004—Unconfined Compression (UC) Accessory Set:

HM-2300.005	Load cell 500 lb. (2.5 kN)
HM-2310.20	Displacement Transducer 2.0" (50mm)
HM-4178BRT	Displacement Transducer Bracket
HM-2002	Unconfined Upper Platen

HM-3005—Marshall Stability Accessory Set:

HM-2300.100	Load cell 10,000 lb. (50 kN)
HM-2310.10	Displacement Transducer 1.0" (25mm)
HM-4178BRT	Displacement Transducer Bracket

HM-3006 - Soil Cement Accessory Set:

HM-2300.100	Load cell 10,000 lb, (50KN)
HM-2003A	Upper Swivel platen

Reporting Software

HM-3001SW	CBR Reporting Software
HM-3002SW	UU Triaxial Reporting Software
HM-3003SW	CU Triaxial Reporting Software
HM-2004SW	Unconfined Compression Reporting Software

Support

Phone support is available for general operating questions and trouble shooting problems between 8am and 5pm Eastern Time. Please call:

1.800.537.4183

1.919.832.6509 or fax: 1.919.833.5283

support@humboldtmg.com

For sales and sales-related information, such as available accessories, general sales questions, pricing, please call:

1.800.544.7220

1.708.456.6300 or fax: 1.708.456.0137

hmc@humboldtmg.com

Hidden Functions

The following are functions that are possible if needed, to access them, please contact support at the numbers or email address listed above.

1. System reset

Reset available in case of serious problem in system memory.

This will cancel all data in memory calibration/configuration of all channels.

2. System restore

Restore to be made in case of above. This will restore all factory calibration/configuration of channels to their full scale.

3. System raw data

Raw data of analog to digital converter can be viewed to determine if instrumentation connected is functioning correctly.

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

HUMBOLDT

www.humboldtmfg.com