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1. Introduction
1.1 Applications
The HM-5170 is a fully automatic, dual-speed load frame—(0.05 in/min and 1 mm/min) with a resistive touch screen and built-in unit conversion specific to instrumentation calibration (in-lbf to SI) for high-quality CBR/LBR testing. The screen displays real-time graphic stress versus penetration and tabulation of test data specific to load, penetration, and stress. With multi-test storage up to 1000 tests and 2500 points per test, the HM-5170 is ideal for monitoring test data in real-time and assessing a test’s peak value.

1.2 Product Use
This product is intended for use only in accordance with the directions and specifications contained in this User Guide. Your HM-5170 has been configured according to your specifications.

1.3 Key Features
The HM-5170 includes the following key features:

- 7-inch VGA display (480 X 800) with upper and lower travel limit switches.
- Two 32-bit ARM processors, 64 MB of RAM, and 4 GB of Non-Volatile Memory.
- External power for optional Wi-Fi adapter.
- Ethernet connection for network connectivity, as well as data download software for PC.
- Auto upgrade of firmware via Ethernet or USB port.
- High Speed Logging (max 20 readings per second).
- Ambient temperature sensor.
- Emergency stop button and rapid return home at end of test.
- 24 VDC motor drive (direction and motor enable with encoder feedback).
- USB port to export test data and import/export calibration data.
- Multi points (2, 5, or 10) Instrument calibration and auto tare of instrumentation after 10lbf (44N) seating load.
- Two 12-bit differential analog to digital convertors with a max 200,000 samples per second.
- Auto recording of the load reading at penetration of 0.025 in. (0.64 mm), 0.050 in. (1.3 mm), 0.075 in. (1.9 mm), 0.100 in. (2.5 mm), 0.125 in. (3.18 mm), 0.150 in. (3.8 mm), 0.175 in. (4.45 mm), 0.200 in. (5.1
mm), 0.300 in. (7.6 mm), 0.400 in. (10 mm) and 0.500 in. (13 mm),
or at intervals of penetration of 0.25 mm to a total penetration not
exceeding 7.5 mm. And LBR load readings for each 0.010 inch (0.25
mm) penetration up to 0.200 inches (5.08 mm), after which the load
reading will be taken at 0.225, 0.250, 0.275, 0.300, 0.325, 0.350,
0.375, 0.400, 0.450, and 0.500 inches (5.72, 6.35, 6.98, 7.62, 8.26,
8.89, 9.52, 10.16, 11.43, and 12.7 millimeters) of penetration.

Note: CBR operation adheres to AASHTO (T193), ASTM (D1883), or
BS (1337:4); LBR operation adheres to (FM 5-515).

1.4 Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBR/LBR Reporting Software</td>
<td>HM-5001SW</td>
</tr>
<tr>
<td>WiFi Intelligent Bridge</td>
<td>HM-000356</td>
</tr>
<tr>
<td>Linear Transducer</td>
<td>HM-2305.10</td>
</tr>
<tr>
<td>Linear Transducer Bracket</td>
<td>HM-2305BRT</td>
</tr>
<tr>
<td>S-Type Load Cell</td>
<td>HM-2300.100</td>
</tr>
<tr>
<td>Pancake Load Cell</td>
<td>HM-2300.100P</td>
</tr>
<tr>
<td>CBR/LBR Penetration Piston</td>
<td>H-4178</td>
</tr>
</tbody>
</table>

2. General Warnings

2.1 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.

2.2 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.

3. Manufacturer’s Rights and Responsibilities

3.1 Software Copyright

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3.2 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.

3.3 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.

3.4 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.

4. Startup Scenarios
The HM-5170 has been pre-calibrated. The machine is designed to run a specific test and has been calibrated in the factory.

DO NOT RECALIBRATE!

4.1 Instrument Inputs
This refers to load cell/transducer connections. The HM-5170 has 2 instrumentation inputs located on the back panel to accommodate load cell/transducer connections. This feature allows you to set up and calibrate up to 2 different instruments, which the unit can quickly switch between for those needing to do multiple types of tests.

If you purchased load cells/transducers with your unit, they will either
be mounted and calibrated, or in the case of multiple load cells/transducers, calibrated but not mounted. Additional load cells/transducers will be marked to indicate what input channel was used in the calibration. These load cells/transducers should be connected to the indicated channels.

Third-party load cells/transducers, which are compatible, can also be used with the HM-5030. Compatible units must work with an excitation voltage of 3.3 or 8.25 volts and produce an output of 0-3.3 volts and 0-25 millivolts. Prior to use, all third-party instrumentation must be configured and calibrated. Please refer to the Configuration and Calibration sections of this manual.

If you are using third-party cables for load cells/transducers connections, make sure they are wired to be compatible with the HM-5170. Consult Figure #1 for a compatible reference wiring diagram. Plugs to connect third-party instrumentation to the Humboldt HM-5030 are available; order part HS-000474.

Note: Input 1 will always be a load cell and Input 2 will always be a displacement transducer.

4.2 Mounting Load Cells and Transducers
If you purchased your HM-5170 with instrumentation, one of the load cell/transducer setups should already be mounted see figure 2. If you are using the machine for multiple tests or want to use instrumentation not included, such as third-party instrumentation, the following photos can be used as a guide for load cells/transducers setup.
4.3 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.

4.4 Electrical Connections
The HM-5170 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-5170 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 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.

4.5 Local Area Network Connection
Plug your machine into the network and refer to Section 6.5 "Network". Use a standard CAT 5 or CAT 6 Ethernet cable. If wireless is required, use the 5 volt power USB port located on the back to power a USB access point HM-000356.
4.6 Power Switch
The Power Switch is located above the electrical cord inlet in the back panel on the rear of the machine. The Fuse Compartment is located between the electrical cord inlet and the Power Switch. The HM-5170 uses a 10 amp fuse. To begin operation, press the Power Switch.

5. Home Screen
This is the screen that appears once your machine is powered on.

A. Options
Press this button to select “New Test,” “Current Tests,” “Previous Tests,” and “System Settings” options.

B. Unique Logger Identification Number
This displays the number that is specific to each logger connected to the Internet.

Note: Each logger needs a unique identification number.

C. Mute
Indicates that sound is disabled.
D. Internet Connectivity
This indicates if your machine is connected to the Internet. A red icon indicates connection to the Internet; a gray icon indicates no connection to the Internet.

E. Network Connectivity
This indicates if your machine is connected to the network. A red icon indicates connection to the network; a gray icon indicates no connection to the network.

F. Motor Travel Limit Indicator
If a red box appears, you have reached the maximum motor travel limit. The box will otherwise appear green to indicate whether the up or down arrow has been selected for motor movement.

G. Stop
Press the red square to stop motor movement.

H. Direction of Movement
Press either the up or down arrow to control the direction of motor movement.

I. Instrumentation Type
This displays the type of instrumentation connected and the corresponding unit of measurement.

J. Tare/Clear Tare
This button can be used to tare the input before testing. Once pressed, the “Tare” button will change to a “Clear Tare” button, which will remove the applied tare.

K. Channel
This displays the name of the calibrated channel and can be customized under Setting → Calibration → Calibrate → Name.

L. Calibration Parameters
The level of color indicates calibration parameters. Green indicates within calibration parameters, yellow indicates nearing the end of calibration parameters, and red indicates over calibration parameters.
6. **System Settings Screen**

This screen is accessed through button A in figure 4 (options ), selecting the “System Setting”

![Figure #5 System Settings Screen](image)

**A. Home**

Press this button to return to the home screen.

**B. Calibration**

Select this option to turn input limits on/off, view the calibration value and raw input counts, calibrate, and import/export calibration files.

**C. Date/Time**

Select this option to change the date, time, and clock style.

**D. Display**

Select this option to change the brightness, display settings, and language.

**E. Preferences**

Select this option to change the unique logger identification number, update check frequency, enable/disable sound, enable/disable automatic system updates, change the ambient temperature, set desired motor speed units, change the test storage limit, and view recycled tests.

**F. Update**

Select this option to update from USB, check for updates, and view update details.

**G. Contact**

Select this option to view Humboldt Manufacturing contact information.

**H. Information**

Select this option to view the firmware version, IP information, local status, Internet status, and memory usage.
I. Network
Select this option to enable/disable DHCP, view IP information, view local status, and view Internet status.

6.1 Calibration Screen
This screen is accessed through selection of the “Calibration” button B in figure 5.

A. Input
This is a summary of the calibration of connected channels. A red box indicates current use in testing; a green box indicates no current use in testing. Select “limits on” to keep machine from exceeding sensor limits. If “select limits” is on and limits are exceeded, all tests will stop running and the motor will stop to avoid damaging connected instruments. Note: An input in testing cannot be calibrated.

B. Units
The display units of calibration instrument can be customized. Available options include kN, lbf, and N for load and cm, in, and mm for penetration.

C. Value
This displays the current calibration value. If it is not calibrated, the value will read “N/A.”

D. Counts
This displays current A/D input counts.

E. Calibrate
Select this button to perform or modify calibration. When you click on this button you will be asked for your password.
F. Restore Factory Calibration

Select this button to restore factory calibration. You will see a display of the current value with system calibration and the current value with factory calibration. Beside each is the option to select for restoration, and at the bottom of the page is an option to restore all. Press the “restore factory calibration” button to restore the factory calibration.

G. Delete Calibration

Press this button to select calibrations to delete.

H. Export Calibration to USB

Press this button to select calibrations to export to USB.
I. Import Calibration from USB
Press this button to select calibrations to import from USB.

6.1.1 Calibration Sensor Details screen
This screen is accessed through selection of the “Calibrate” button E, in figure 6.

A. Input Type
For a CBR test, the types will always be load and displacement. For other tests, available options include displacement, pressure, and volume.

B. Capacity
This refers to the maximum sensor capacity found on the sensor specifications sheet.

C. Full Scale Output
This can be found on the sensor specifications sheet or, if not known, can be left at 0. If a number other than 0 is entered, your machine will automatically generate a 2 point calibration. If you would like to do a manual calibration, leave the number at 0.

D. Next
Press this button to continue to the next screen, “Limits.”
6.1.2 Calibration Limits Screen
This screen is accessed through selection of the “Calibrate” button E, in figure 6, then after progression through the “Sensor Details” screen.

A. Calibration Limits
The calibration limit cannot exceed sensor capacity unless limits are turned off. The number of significant digits (digits after the decimal) is how many digits will be available in calibrated readings.

A window above will open to set the calibration limit. Use the arrow buttons < > to make corrections, then press the button with the check when you are done.

Note: Significant digits make readings more precise. A displacement calibration must have at least 3 significant digits for the test to run correctly.

B. Limits On
Select this box to turn limits on/off. If limits are turned off, the calibration limit can exceed sensor capacity.

Note: Accuracy cannot be guaranteed if calibration limit is exceeded.
C. Calibration Method
Select “Per FS Output” to automatically do a 2 point calibration. More information on FS Output can be found under section “Sensor Details” Section 6.1.1 on page 13.

Select “Multi-Point Curve” to do a manual entry for calibration. If your output is at 0 and “Per FS Output” is chosen as the calibration method, your machine will prompt to correct the calibration method. Correct the calibration method by selecting “Multi-Point Curve” or entering a value besides 0.

D. Back or Next
Use the left arrow to return to the previous screen, “Sensor Details.” Use the right arrow to continue to the next screen, “Multi Point.”

6.1.3 Calibration Multi Point Screen
This screen is accessed through selection of the “Calibrate” button E, in Figure 6, then after progression through the “Sensor Details” and “Limits” screens.

![Figure #9 Calibration Screen - Five Point](image)

A. Point
B. Applied
C. A/D Counts
D. Entry Method
E. Calibration
F. Back or Next
D. Select “Quick Click” to prompt to capture A/D counts when Set Point has been pressed.

Select “Manual Entry” to manually enter applied or A/D Counts also allows for entry of negative applied values.

Note: If “Manual Entry” is selected, all appropriate cells of the calibration table must be filled. The number of appropriate cells depends on your calibration type.

E. Calibration Type

This gives the option for a one point calibration, five point calibration, ten point calibration, or custom calibration. If a point calibration is selected, your machine will automatically fill the applied column in increments corresponding to your set calibration limit. The custom setting allows entry for any number of calibration points between 1 and 10 in addition to a 0 point.

F. Back or Next

Use the left arrow to return to the previous screen, “Limits.” Use the right arrow to continue to the next screen, “Name.”

Below are examples of calibration options:

6.1.3.1 One Point Calibration Method

A. Set Point
Pressing this button to capture A/D counts and select the next row down see figure 10.

B. Clear Point
Pressing this button to clear the point see figure 10.

C. Clear All Points
When first enter the "Multi Point" screen, there is an option to clear all points to reconfigure calibration points see figure 10.
As shown below, the first row will be highlighted to indicate selected input. At this step press the set Point to capture the A/D counts for Zero Load (see figure 10).

The second row will be highlighted indicating the required load of 10000 lbf to be applied to the sensor (see figure 11).

After the 10000 lbf been applied to the sensor press the Set Point to capture the A/D counts for 10000 lbf Load (see figure 12).
6.1.3.2 Five Point Calibration Method
The display below is an example of a five Point calibration.

6.1.3.3 Point Calibration Method
The display below is an example of a ten Point calibration.

6.1.3.4 Custom Calibration Method
The displays below are an example of a custom calibration sequence.
6.1.4 Sensor Name Screen
This screen is accessed through selection of the “Calibrate” button E, in figure 6, after progression through the “Sensor Details,” “Limits,” and “Multi Point” screens.
A. Input Name
Enter a name for your input. There is a maximum of 25 characters. A window below will open to set the desired Input name. Use the arrow buttons \(<\) \(>\) to make corrections. Press the button with the check \(\checkmark\) to save the name when you are done.

B. Default Name
If no name is entered in the space above, a default name will be selected for your input. This default name corresponds to your unique logger identification number and will appear in the brackets.

C. Check \(\checkmark\)

D. Back \(\leftarrow\)
Press back to review the previous screen, “Multi Point.”

E. Save \(\square\)
Press “save” to save a summary of your channel information.
6.2 Date/Time
This screen is accessed through selection of the “Date/Time” button C in figure 5.

A. Back
Press this button to return to the previous screen.

B. Date
Set the month, day, year, and date display format.

C. Time
Set the hours, minutes, seconds, and am/pm.

D. Clock Style
This includes the option to view a 24 hour clock or a 12 hour clock, as well as the option to show seconds or not show seconds.

E. Clock
The current time is displayed on each screen. Touch the clock for rapid return to this screen for date/time modifications.

6.3 Display
This screen is accessed through selection of the “Display” button D in figure 5.
A. Brightness
Slide the gray bar to the left or right to adjust brightness.

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

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

D. Language
Select the yellow box to choose the display language. Available options are English, Español, and Chinese.

6.4 Preferences
6.4.1 General
This screen is accessed through selection of the “Display” button E in figure 5.

A. Logger ID
Each logger who is connected to the network needs a unique identification number. This number can be between 1 - 245.

B. Sound
Enable or disable audible feedback for logger events.

C. Automatically Update System
This option allows the machine to automatically search for firmware updates when actively connected to the Internet. The machine will not automatically install any updates, but will prompt when an update is available.

D. Update Check Frequency
This number represents the frequency with which the machine checks for updates.

Figure 16: System Preference - General
6.4.2 System Units
This screen is accessed through selection of the “Preferences button,” then “System Units.”

![Figure 17: System Preference - Units](image)

**A. Ambient Temperature**
View current ambient temperature and select desired units (Fahrenheit or Celsius) for temperature recording.

**B. Motor Speed Unit**
Set desired speed units for motor control (in/min or mm/min).

6.4.3 Storage
This screen is accessed through selection of the “Preferences” button, then “Storage.”

![Figure 18: System Preference - Storage](image)

**A. Test Storage Limit**
Set the number of previously run tests to be available on the “Previous Tests” screen. This number can be between 10-50.

**B. Recycled Tests**
This refers to previously run tests that are not displayed in the “Previous Tests” window. These tests are not deleted, but are recycled for later use. Select this button to view/export/delete recycled tests.
6.4.3.1 Recycled Tests
This screen is accessed through selection of the “Preferences” button, “Storage”, and “Recycled Tests.”

A. Previous Tests
The names of previous tests are displayed here.

B. Delete all Tests
Press this button to delete all previous tests. A prompt will ask you to confirm this action.
Note: Tests cannot be taken back from the recycle bin.

C. Data
This is a graphical representation of the data.

D. Tabulation View
Press this button to switch to a tabulation view of the data. Press it again to return to a graphical view.

E. Export Test File
Press this button to export a test file.

F. Delete a Test
Press this button to delete a single test. A prompt will ask you to confirm this action.
6.5 Network
This screen is accessed through selection of the “Network” button.

![Network Settings](image)

A. DHCP
Select this to enable/disable the Dynamic Host Configuration Protocol. If enabled, your machine will pick up IP information from your router. If disabled, you will need to manually enter the network information.

B. IP Information
The IP address must be unique for each machine.

C. Local Status
This indicates the status of the local network connection.

D. Internet Status
This indicates your machine’s ability to connect to the Internet.

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

6.6 Connection Information
This screen is accessed through selection of the “Information” button.

![System Information](image)
A. Firmware Version
This is a summary of your machine’s connection status and software versions. If you contact Humboldt customer support for assistance, they may ask for this information.

B. Event Log
This opens your machine’s event log. If you contact Humboldt customer support for assistance, they may ask for this information.

6.6.1 Password

A. A password prompt will open if the "event log" or "factory screen" buttons are pressed. Enter the password or press “cancel” to close the password prompt and return to the information screen.

6.6.2 Event Log

A. After the correct password is entered, the event log will be displayed. This shows all system events, including powering on/off, modifications, and test information. Press “clear” to delete event log details or “close” to exit the event log window.
6.7 Contact Information
This screen is accessed through selection of the “Contact” button.

If you require assistance, please email Humboldt Support at support@humboldtmfg.com or Humboldt Service at service@humboldtmfg.com. Please include your name, telephone number, and a detailed description of your reason for contact.

6.8 Update
This screen is accessed through selection of the “Updates” button.

A. Update from USB
Software updates for your machine can be downloaded from www.humboldtmfg.com. Insert a thumb drive with these firmware updates and then select this icon. A window will open to select update files. If you would like to close this window and return to the "Updates" screen, press "cancel."

B. Check for Update
If your machine is connected to the Internet, the software will automatically check for updates. How often this occurs can be customized under the "Preferences" button. However, you may select this button to force an immediate check for updates.
C. Update Details
If updates are downloaded from the Internet, this shows the changes that were made.

D. Multi File Update
This refers to the file extension of an update. Any files on USB that are valid for this product will be displayed here. Select this button to run updates.

7. New Test
This screen is accessed through selection of the “New Test” button.

![Figure 26: CBR / LBR Test Setup](image)

7.1 Test Setup Wizard
A. Testing Standard
Select a testing standard based on which test you would like to run.

B. Motor Speed
Motor speed options correspond with testing standards.

C. Run Test
Press this button to begin the test. The screen will prompt for an input value, or test name.
7.2 Test File Save As
This screen is accessed through selection of the “New Test” button, then selection of the green arrow to run a test.

A. Caps Lock
Press this button to activate caps lock for capitalization. Press again to deactivate caps lock.

B. Delete
Press this button to delete a character.

C. Navigation
Press this button to move your cursor so that corrections can be made.

7.3 Start Testing

A. Go Button
Once your value is entered, click the check button to begin the test.
7.4 Motor Running
The motor will run until it apply 10 lbf on the sample, then it will stop and prompt that the seating load has been met.

![Figure 29: Applying Seating Load](image)

7.5 Surcharge Weights
Place surcharge weights if necessary and press “continue.” The test will then trigger and the first data point will be recorded. As a result, the “Current Tests” screen will be shown.

![Figure 30: Surcharge Weights Prompt](image)
8. Current Tests
This screen is accessed through selection of the “Current Tests” button or through progression of the “Test Setup Wizard.”

A. Test Name
The test name that you entered will be displayed here.

B. Test in Progress
This indicates that a test is currently running.

C. Tabulation View
Press this button to switch to a tabulation view of your data.

D. Status
This indicates if your test is running or not.

E. Points
This shows how many total test points have been recorded.

F. Start Date
This shows the date that the current test was triggered.

G. Stop Test
Press this button to stop the test.

H. Data
This is a graphical representation of your test data.
8.1 Tabulation View

This is a tabulation view of the data.

![Figure 32: Data Tabulation]

A. Index
Displayed here is an index of the recorded test points taken.

B. Time
This records the elapsed time from when the test was triggered to when the point was recorded.

C. Load
This measurement changes based on calibration units.

D. Force
This is load divided by sample area, the penetration plunger area being 3 square inches. If using test method BS (1377:4), the force column will not be visible.

E. Penetration
This is the displacement measurement, or the measurement penetration into the soils.

F. Graph View
Press this button to view a real-time graphical display of your data. An example if shown below.

8.2 Graph View
This is a graphical representation of the data.

![Figure 33: Graph View]
9. Previous Tests
Once the test stops or is manually stopped, the screen will move to the “Previous Tests” screen. This screen can also be accessed by selecting the “Previous Tests” button.

![Figure 34: Previous Tests]

9.1 Choose Test

A. Choose Test
Press this button to access a list of previous tests.

B. Previous Tests
Choose a previous test by clicking one of the test names.

C. Select
Press “select” to view the test.

10. System Reset
A reset is available in case of a serious problem in system memory. This will clear all data in memory, including input calibration and configuration of all channels. A reset returns the machine to its original factory state. To proceed with this option and reset, hold the “Reset” button on the back of the machine at startup.
11. Software
Humboldt offers comprehensive CBR/LBR data reporting software. The software can be used to control the HM-5170, run tests, and collect data in real time. The software also offers detailed reports and interactive graphs. It can be used with the HMTS Next software but will require purchasing the HM-5001SW software module.

A pre-defined reporting software module and template are available for specific tests, such as CBR. This module provides more control over start and stop conditions for specific tests, as well as provides extended reporting capabilities. Contact Humboldt for more information.

12. HM Download Software
This software is designed to download tests that have been run directly on the HM-5170. It downloads and saves tests directly to a PC. Custom graphs and reports can be generated and exported into multiple formats.

13. Specifications

13.1 Applicable Standards
Covers: CBR Tests ASTM D1883, AASHTO T193, BS 1377:4, and LBR FM 5-515

13.2 Physical Specifications
Net Weight: 206 lbs. (94 kg)
Shipping Weight: 300 lbs. (136 kg)
Overall Height: 39”
Base Dimension (l x w x h): 17 x 22 x 51 inch (432 x 559 x 1295mm)
Platen Travel: 3 1/2” (88mm)
Load Capacity: 11000 lbs. (50 KN)
Vertical Clearance: 32 inch (812mm)
Horizontal Clearance: 11 inch (279mm)

13.3 Electrical/Electronic Specifications
Voltage: 110 /220 VAC 50/60 HZ
Current: 12 Amps
Analogue to Digital Converter: 12 Bit
200,000 samples per second
Multi test storage up to 1000
Up to 2500 points per test
LAN Communication

The HM-5170 is sold as a CBR-specific set and includes:
(1) HM-5170X CBR-Specific Load Frame (110 /220 VAC 50/60 HZ, 1 phase)
(1) HM-2300.100 Load Cell 10,000lbf (50kN)
(1) HM-2305.10 Strain Indicator, 1.000” x .001” (25.000mm x .001mm)
(1) H-4178 Penetration Piston with Stud
(1) HM-2305BRT Strain Indicator Bracket

13.4 Accessories
HM-5001SW  CBR / LBR Reporting software
HM-000356  Wireless WiFi intelligent bridge

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

1.800.537.4183
1.919.832.6509 or fax: 1.708.456.0137
hmc@humboldt.com

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

1.800.544.7220
1.708.456.6300 or fax: 1.708.456.0137
hmc@humboldt.com
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.