



miniLogger, 120/220V 50/60Hz— HM-2325A.3F

- Four individual, 16-bit analog to digital converters
- Instrumentation excitation supply of 10 VDC
- Analog outputs for XYt chart recorder
- Ideal with instruments, such as Pressure Transducers, Load Cells, and Strain Transducers.



miniLogger, 120/220V 50/60Hz— HM-2330D.3F

- For use with Digital Indicators
- Four individual, Digital Indicator inputs.
- Instrumentation excitation supply of 5 VDC.

Data Storage	1000 readings/channel
Voltage	110/220 VAC 50/60Hz
Weight	6 lbs. (2.7Kg)
Dimension (L x W x H)	8.3 x 9.5 x 4.7 inch (210 x 240 x 120mm)

Data Storage	1000 readings/channel
Voltage	110/220 VAC 50/60Hz
Weight	6 lbs. (2.7Kg)
Dimension (L x W x H)	8.3 x 9.5 x 4.7 inch (210 x 240 x 120mm)

**Humboldt miniLoggers—
Cost-effective Data Acquisition**

Automating data acquisition for your geotechnical lab is easy with Humboldt's miniLoggers— our simple-to-use, four-channel data loggers specifically designed for use within construction materials testing labs. You can use Humboldt miniLoggers to cost-effectively update your older, non-computerized load frames, direct shear and consolidation machines with computerized data acquisition; increasing lab output, freeing-up technicians and providing more accurate test results.

Humboldt miniLoggers can automatically accumulate test data using a wide variety of transducers, load cells and digital indicators; and, come with Humboldt's, highly-regarded, Materials Testing software. miniLoggers can be used to automate data acquisition for many of your labs tests such as:

Soil: triaxial, direct shear, consolidation, permeability, CBR/LBR, unconfined compression and soil cement

Asphalt: Marshall flow/stability, TSR Hveem

Cost-effective, Modular Design

Humboldt's modular-design, data acquisition concept is designed to give you the most flexible and cost-effective method of data logging your lab. Rather than having to buy into a large data logging system and then growing into it, Humboldt mini-loggers give you the flexibility and low cost outlay of being able to buy loggers on an "as you grow" basis, increasing your data logging capability as your expansion demands. Being 4-channel loggers, you get enough channels to run the test you are trying to automate and have the luxury of having the controls for that test right at the machine rather than at the computer on the other side of the lab.

In this way, single miniLoggers can be used as stand-alone units for test operations requiring up to 4 channels and connect them directly to a PC for data acquisition, or up to 16 miniLoggers can be "daisy-chained" together providing 64 channels of data logging to a single PC.

Features:

- Four channels with real-time data acquisition
- Backlit LCD display
- RS232 interface for computer or printer
- USB output with use of HM-000379 Cable
- 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 and exporting test data into an Excel format files with plug and play features.
- Up to sixteen units can be connected to a computer.



Submersible Load Cells—

For those concerned with reducing the effects of hysteresis on testing results, we offer a submersible load cell, which is designed to work within the triaxial cell. Positioning the load cell within the triaxial cell eliminates the possible drag effect introduced by using a plunger between the sample and an externally-mounted load

Performance Specifications:

- Overload Capacity:** 200%
- Excitation Voltage:** 10 VDC, Maximum
- Non-linearity:** ±0.05% Full Scale Output
- Hysteresis:** 0.05% Full Scale Output
- Diameter:** 75mm
- Cable Length:** 2m
- Height Excluding Ram:** 50mm

Submersible Load Cells

Capacity	Model
Load Cell 1000 lbf (5 kN)	HM-2300.010S
Load Cell 2000 lbf (10 kN)	HM-2300.020S
Load Cell 5000 lbf (25 kN)	HM-2300.050S

Pancake Load Cells—

Pancake-design load cells are available for those who want to use a load cell design that theoretically provides the least amount of deflection in applications.

Capacity	Model
Load Cell 2000 lbf (10 kN)	HM-2300.020P
Load Cell 5000 lbf (25 kN)	HM-2300.050P
Load Cell 10000 lbf (50 kN)	HM-2300.100P
Load Cell 15000 lbf (75 kN)	HM-2300.150P
Load Cell 25000 lbf (125 kN)	HM-2300.250P
Load Cell 50000 lbf (250 kN)	HM-2300.500P

Performance Specifications:

- Overload Capacity:** 150%
- Excitation Voltage:** 20 VDC, Maximum
- Non-linearity:** ±0.05% Full Scale Output
- Hysteresis:** 0.05% Full Scale Output
- Diameter:** 4.13" (104.8mm)
- Cable Length:** 2m
- Height Excluding Ram:** 2.5" (63.5mm)

Swivel, Top Platen— HM-2003E

4.25" (108mm) diameter top swivel platen.

S-Type Load Cells—

Load cells are bi-directional for both tension and compression loads. Constructed from stainless steel. Load cells can be used with various instrumentation to measure loads. Includes: 6 ft. cable with 5-pin DIN plug and calibration certificate.

Performance Specifications:

- Excitation Voltage:** 10 VDC, Maximum 15 VDC
- Rated output:** 3.0 mv/V Minimum
- Non-linearity:** 0.03% Full Scale Output
- Hysteresis:** 0.02% FSO
- Non-repeatability:** 0.01% FSO
- Creep (30 minutes):** 0.03% FSO
- Zero Balance:** ±1.0% FSO

Bridge resistance

- Input: 350 ohms, nominal
- Output: 350 ohms, ±3.5 ohms

Overload

- Safe Static: 150% of Rated Capacity
- Ultimate: 175% of Rated Capacity

Temperature

- Compensated range: 0-150°F
- Effect on output: 0.0006% FSO/°F
- Effect on zero: 0.0008% FSO/°F

Finish:

Nickel-plated or Stainless Steel

Seal:

Waterproof

S-type Load Cells

Capacity	Model
Load Cell 500 lbf (2.5 kN)	HM-2300.005
Load Cell 1000 lbf (5 kN)	HM-2300.010
Load Cell 2000 lbf (10 kN)	HM-2300.020
Load Cell 5000 lbf (25 kN)	HM-2300.050
Load Cell 10000 lbf (50 kN)	HM-2300.100



Linear Strain Conversion Transducers (LSCT)

Extremely accurate and reliable strain gauge instruments. Compact size does not require a module. High resolution and performance superior to LVDT.

- Less than 250g spring force on spindle
- Non-linearity better than $\pm 0.1\%$ of full scale deflection
- Hysteresis-compensated with linearity better than $\pm 0.1\%$ of full scale in both directions
- Negligible temperature effect

Stainless steel casing for environmental protection. Operating temperature range 0 to 70°C. Requires input of 10V dc; output up to 6.5 mV per volt.

LSCT

Size	Model
Linear strain transducer, .4" (10mm)	HM-2310.04
Linear strain transducer, 1.0" (25mm)	HM-2310.10
Linear strain transducer, 2.0" (50mm)	HM-2310.20

LSCT Mounting Bracket— HM-4178BRT

Bracket used for CBR and 3" bracket.

LSCT Mounting Bracket— HM-2310BR

Bracket used in mounting LSCT to equipment in replacement of dial gauge.

LSCT Mounting Bracket— HM-4193BR

Bracket used in mounting LSCT or dial gauge to the upper part of a triaxial cell with a 5/8" (15.5mm) dia. ram for strain measurement. (HM-2310BR also required for use with LSCT.)

Transducer (load cell, LSCT, Pressure)

Data Cable Extension— HM-2310C

Sold by the foot, specify length desired.

De-Airing Block— HM-4170B

For use with Pore Pressure Transducer

Pore Pressure Transducer— HM-4170

Highly accurate, 200 psi (1400 kPa) Pore Pressure Transducer. Designed for geotechnical lab applications with outstanding overload protection and protected from corrosive water. Requires input of 10 V DC, with an output of 100 mV. Supplied with 2 meter cable and 5-pin DIN plug.

Digital Pressure Transducer— HM-4172

Solid state transducer/readout unit incorporates the latest semiconductor technology into a high-quality, yet inexpensive strain gauge. Three-digit readout display has $\pm .25\%$ of full scale accuracy—comparable to others at twice the cost. Battery operated with very long battery life—typically up to 5 years. On/off button at top of readout has factory set "on" time built into the memory. Readout shuts off automatically after 20 minutes.

Digital Pore Pressure Set, 120V 60Hz— HM-4175

Digital Pore Pressure Set, 220V 50/60Hz— HM-4175.4F

For accurately measuring and monitoring pore water pressures and back pressure. For determining level of saturation ("B" parameter) during saturation stages of triaxial/permeability tests. Includes readout, pore pressure transducer, and de-airing block assembly. Shipping wt. 8 lb. (3.63kg)

Digital Indicators—

Switchable inch/metric digital indicator is accurate to $\pm .0001"$ (.002mm). Instant zero feature. Locks in maximum reading on LCD display with characters 0.240" high and 0.115" wide. Runs either clockwise or counter clockwise. Operates with replaceable batteries or AC power with automatic shutoff. Will replace any mechanical dial gauge.

Digital Indicators

Range	Resolution	Model
.250" / 6.35mm	.0001" / .002mm	HM-4469.02
.600" / 15.0mm	.0001" / .002mm	HM-4469.05
1.0" / 25.4mm	.0001" / .002mm	HM-4469.10
2.0" / 50.0mm	.0001" / .002mm	HM-4469.20
4.0" / 101.6mm	.0001" / .002mm	HM-4469.40

CABLES

AC Adapter for Digital Indicator, 120V 60Hz— HM-4469AC

Allows Indicator to run off AC power.

Data Cable for Digital Indicator— HM-4469C

Used with HM-2330D.3F MiniLogger

Serial Data Cable for Digital Indicator— HM-4469RS

USB Data Cable for Digital Indicator— HM-4469USB

Data cables to transfer data from indicator to computer.

Multi-Device Cable— HM-000379

Allows one computer to control multiple, daisy-chained machines.



H-4454.050D

H-4454.050

Load Rings—

Sometimes called “Proving Rings,” Load Rings are used with various asphalt, concrete, or soil instrumentation to measure loads, and are ideal for use with our MasterLoader compression machines, Direct Shear machines and other testing equipment. Our high quality tensile steel rings have spherical seatings suitable for all shear boxes and load frames. Each load ring is shipped with a fitted dial gauge and calibration certificate, and supplied with tables listing all measurement units. 8-1/4” (210mm) high, 3/4-16 UNF thread female mounting. Available with digital indicators compatible with data acquisition systems. Eight models range in size from 110 to 22,000 lbf (0.5 to 100.0 kN). Meet ASTM E74.

Load Ring with Digital Indicator

lbf	kN	kgf	Model
110	0.5	50	H-4454.001D
220	1.0	100	H-4454.002D
550	2.5	250	H-4454.005D
1100	5.0	500	H-4454.010D
2200	10.0	1000	H-4454.020D
5500	25.0	2500	H-4454.050D
11000	50.0	5000	H-4454.100D
22000	100.0	10000	H-4454.200D

Load Ring with Dial Gauge

lbf	kN	kgf	Model
110	0.5	50	H-4454.001
220	1.0	100	H-4454.002
550	2.5	250	H-4454.005
1100	5.0	500	H-4454.010
2200	10.0	1000	H-4454.020
5500	25.0	2500	H-4454.050
11000	50.0	5000	H-4454.100
22000	100.0	10000	H-4454.200

Magnetic Indicator Mount— H-4470

Convenient, portable mount for mounting indicators and gauges. Mount has magnetic base, which mounts on flat or curved metallic surfaces. Non-magnetic stainless steel holding rod is 6 x 1/4” (154 x 6.4mm) and set in hardened ball socket so indicator or gauge may be mounted in almost any position.

Gauge Contact Point Extensions—

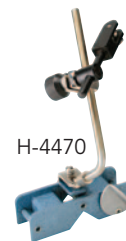
Used in applications where gauges require longer contact points to ensure correct gauge placement. Contact Points feature hardened steel points with polished tip to prevent scratching. Points fit all standard indicators and gauges. Not compatible with H-4471, H-4471CC, H-4465.12, and H-4465.12CC gauges.



H-4158.1



H-4665.25CC



H-4470



H-4466.30
H-4466.15
H-4466.10

Dial Gauges

Indicators are built to American Gauge Design Specifications for accuracy and are used in field and laboratory testing applications. Dials are high-quality, low-friction type, designed for long life and accurate repeatable readings. All dial indicators have continuous graduations and revolution counters that show revolutions of the indicator hand. They are furnished with a lug back (with a 90° mounting hole to be used vertically or horizontally), a regular contact point .25” long, and a dust cap. Dials listed are clockwise rotation; counter-clockwise rotation see note below.

Dial Gauges, Inches

Range	Division	Dia.	Brake	Model	CC*
.200"	.0001"	2.25"	No	H-4460	H-4460CC
.200"	.0001"	2.25"	Yes	H-4461A	NA
.300"	.0001"	2.25"	No	H-4462	H-4462CC
.500"	.0001"	2.25"	No	H-4471	H-4471CC
1.000"	.001"	2.25"	No	H-4158.1	H-4158.1CC
2.000"	.001"	2.75"	No	H-4463	H-4463CC
3.000"	.001"	2.75"	No	H-4464	H-4464CC
4.000"	.001"	2.75"	No	H-4465	H-4465CC
5.000"	.001"	2.75"	No	H-4466	NA

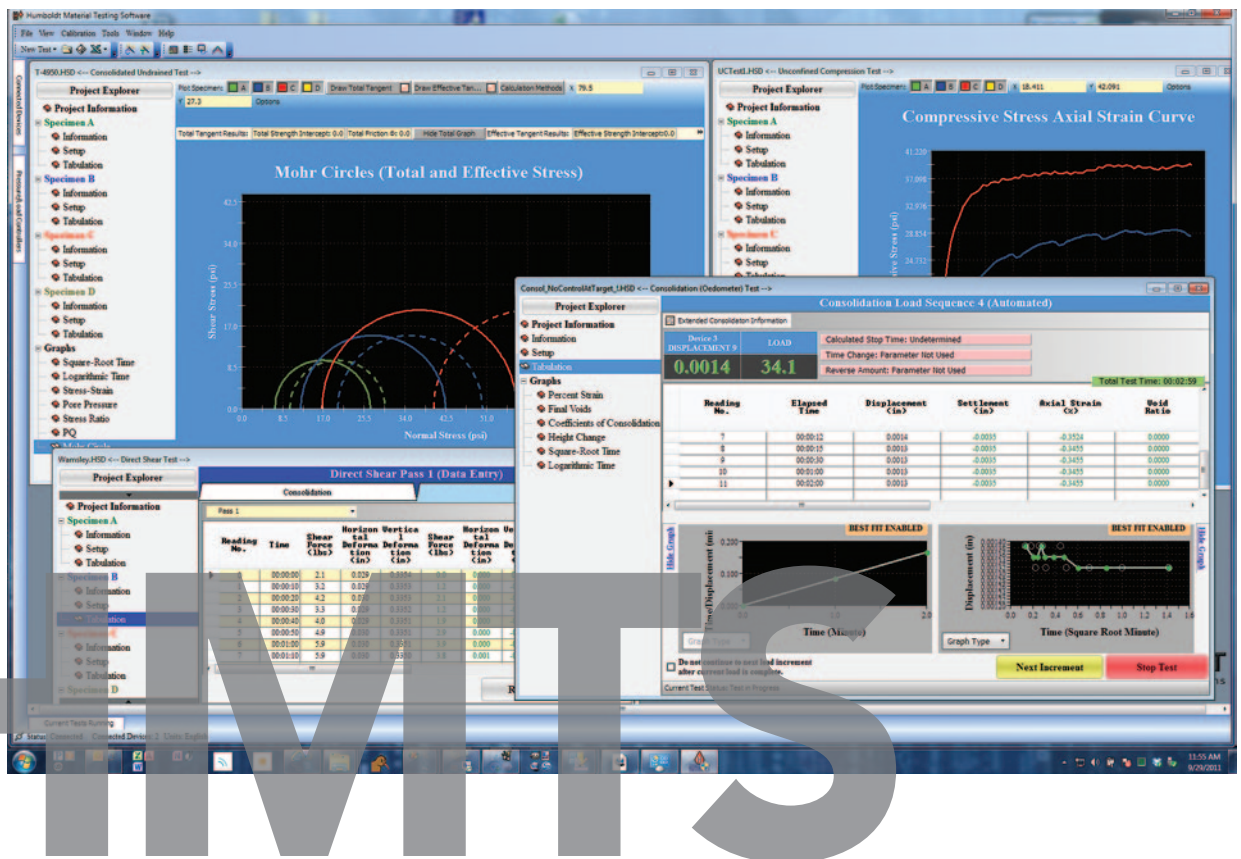
*counter-clockwise reading dial indicators

Dial Gauges, Metric

Range	Division	Dia.	Brake	Model	CC*
8mm	.002mm	57mm	No	H-4465.08	NA
12mm	.002mm	57mm	No	H-4465.12	H-4465.12CC
25mm	.010mm	57mm	No	H-4465.25	H-4465.25CC
50mm	.020mm	70mm	No	H-4465.50	H-4465.50CC

*counter-clockwise reading dial indicators

Contact Point Extensions	Model
.25" (6.4mm) Extension	H-4466.2
1" (25mm) Extension	H-4466.10
1.5" (38mm) Extension	H-4466.15
2" (50mm) Extension	H-4466.20
3" (76mm) Extension	H-4466.30
5" (127mm) Extension	H-4466.5



From a single operation to controlling a complete geotechnical lab, Humboldt Material Testing Software (HMTS), in conjunction with compatible Humboldt testing equipment, provides a complete solution for the acquisition, recording and presentation of testing data. HMTS works in conjunction with Microsoft Excel to present test data in easy-to-read Excel workbook format files, which can be evaluated directly or sent to any computer using Microsoft Excel. The HMTS is configured in two levels of functionality.

Basic, User-Defined Level

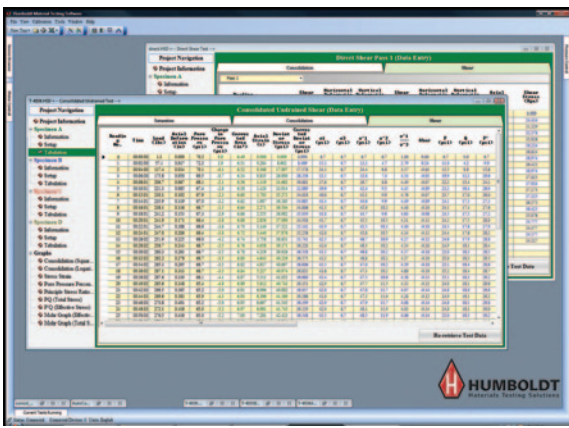
Our basic solution, or user-defined level software, is provided free with our HM-3000 MasterLoader, HM-2900 Pro Loader, HM-2325A and HM-2330D MiniLoggers, HM-2560A 25Sixty Shear and the HM-2750A and HM-2750D Shear Testers. This free software allows you to:

- set up and run user-configured tests;
- save test configurations as templates for rapid setup of future tests;
- collect and view data in real time with basic graphing functions;
- generate graphs in real time through the use of custom-designed Excel templates for report generation and printing, and
- simultaneously run multiple tests on one computer—based on the number of Humboldt logger-capable machines listed above you have connected.

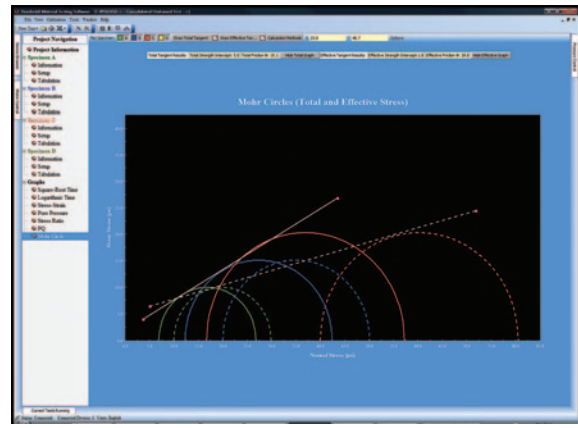
Advanced, Module Level

The advanced version of the HMTS involves upgrading the capabilities of the basic HMTS by purchasing and registering test-specific modules that are unlocked, with a registration code, from the free version of the software. Purchasing test-specific modules allows you to go beyond the functionality of the basic software by providing you with the following capabilities:

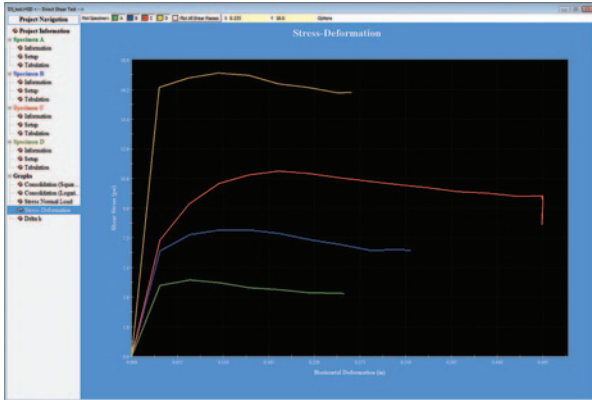
- test-specific setup that guides you through the process, which includes selecting data collection parameters that best fit the specific test;
- input specific project information for each test, such as project name, client information, etc;
- all test-specific initial, intermediate, and final parameters required by ASTM and BS standards is dynamically calculated for you, based on your input of specimen information, such as size, weight, etc.
- tabulated test data, graphs and all test-specific calculations are provided in real time, allowing you to monitor tests in process;
- generate test-specific reports that include all graphs and data presented in the projects. Reports are generated in Microsoft Excel workbooks allowing you to modify any report template to fit your company's needs
- simultaneously run multiple tests on one computer, involving any of the available HMTS modules and any compatible Humboldt equipment up to 255 device connections, which is up to 1020 inputs;
- create and store test-specific test setup templates for rapid setup of future tests;
- produce test-specific graphs, which allow you to draw construction lines to calculate angles and other test-specific parameters;
- automatically recover from a PC shutdown without loss of data;
- single click between imperial and metric units;
- easily change between different test standards, and
- access free, downloadable software upgrades for purchased modules.



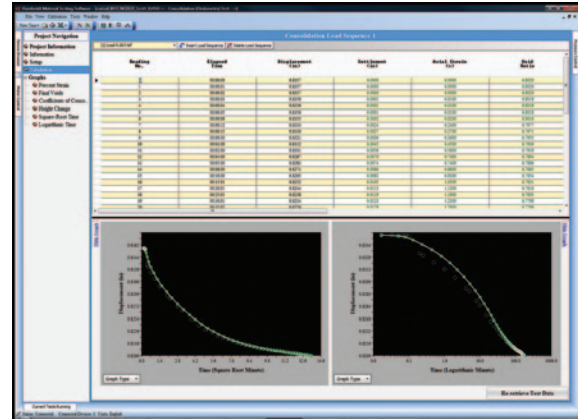
Data Entry Tabulation from CU Shear and Direct Shear tests.



Mohr Circles plot from CU test.



Stress Deformation graph from Direct Shear test.



Consolidation tabulation with plots.

Available advanced modules include:

Consolidation— HM-1100SW

ASTM: D2435, D4546, AASHTO: T216, BS: 1377:5

Direct Shear— HM-2700SW

ASTM D3080, AASHTO T236 and BS1377:7

CBR/LBR— HM-3001SW

ASTM D1883; AASHTO T193; BS 1377 Part 4

Unconfined Compression— HM-3004SW

ASTM D2166, BS 1377-7

UU Triaxial— HM-3002SW

ASTM D2850, BS 1377-7

CU Triaxial— HM-3003SW

ASTM D4767, BS 1377-8

CD Triaxial— HM-3006SW

ASTM D4767, BS 1377-8

Marshall Design— HM-3005SW

ASTM D6927, D4123-82; AASHTO T245, T283, BS 598-107

Operating System Requirements

Windows 2000 (with at least Service Pack 4), Windows XP Professional, Windows XP Home, Windows Vista and Windows 7. Other Windows versions, such as Windows 3.1, Windows 95, 98, and NT are not supported.

Software Requirements

Microsoft® Excel is required for creating reports.

Hardware Requirements

- Pentium® 4 (32-bit) equivalent or faster
- Minimum 512 MB RAM (1024 MB or more recommended)
- 300 MB swap space (or more)
- CD-ROM or DVD Drive
- 1024 x 768 display resolution

Internet Connection

As recommended above, it is highly recommended that you have an internet connection. With an internet connection you can:

- Check for updates.
- Automatic updates are performed.
- Tests can be sent to Humboldt or to anyone you choose.
- Humboldt can be notified of issues.
- Registration can be sent directly to Humboldt for quicker processing.
- In the event of issues with the software we can connect to your computer remotely and help you.

How to Use the Software

The HMTS disk contains the complete HMTS offering including all test-specific modules. After installation on your computer, you will be able to use the Basic Level software capabilities for any applicable application, for as long as you like for free. You will also be able to use all the Advanced Level Modules, with full capabilities 20 times for each test module as a free trial. The software will keep track of the number of uses and display the remaining number of tests available on the screen.