

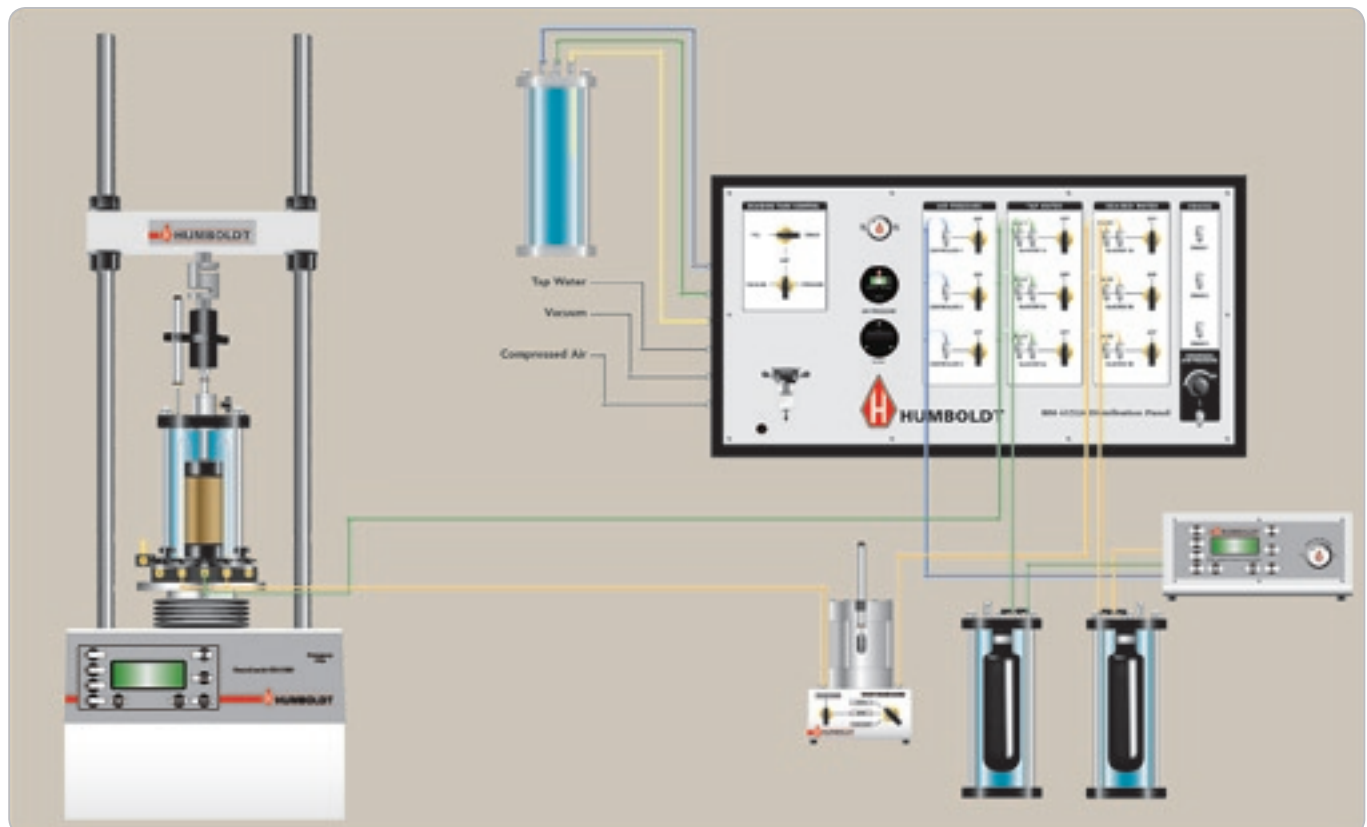
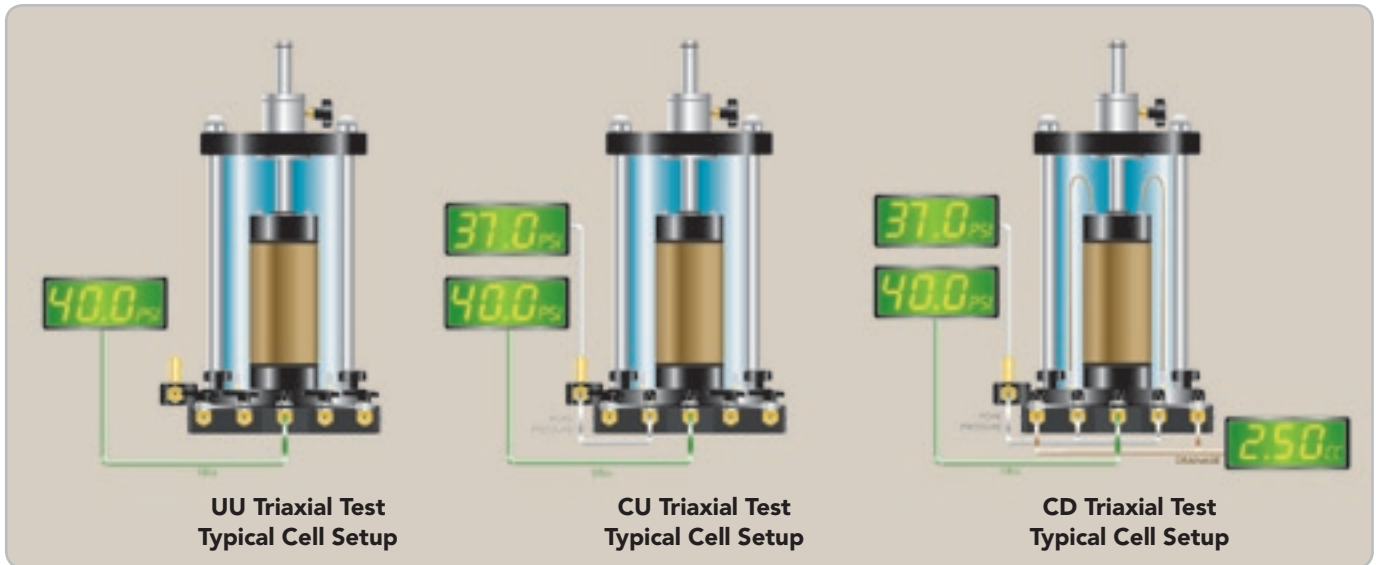


Humboldt and Triaxial Testing

Humboldt provides a complete offering of Triaxial testing equipment to fit almost any need; from automated systems with data acquisition software to simple load frame setups utilizing load rings and dial gauges. For our triaxial systems, we utilize a modular design concept that allows you to build your setup from individual components, giving you the flexibility to build exactly what you want to handle any of your test requirements from individual specimen testing to multiple, computer-controlled automated tests. Humboldt can supply all the components you'll need to construct a customized testing solution to

fulfill your needs today, as well as tomorrow. Triaxial setups for testing UU, CU and CD can be quickly set up from the array of Humboldt components, such as:

- Load Frames
- Distribution Panels
- Pressure Controllers
- Air/Water Bladders
- Volume Change Apparatus
- Triaxial Cells
- Strain Transducers
- De-Airing Tanks
- Data Acquisition
- Accessories/Consumables
- Load Cells
- Sample Prep
- Data Loggers
- Software



Fully automated triaxial setup showing the plumbing interconnection between components. ASTM D4767



The HM-3000 Digital MasterLoader is the most versatile load frame available. Stand-alone or computer-driven, the HM-3000 can handle it all—automating your lab and increasing your productivity.

Designed for applications requiring multi-purpose loading systems, the HM-3000 is ideal for just about any application from road construction to high-volume commercial and educational laboratories. The HM-3000 MasterLoader provides fully-automatic test performance allowing unattended operation while controlling motor start/stop, speed selection and test data acquisition. Its modular design allows the machine to be custom configured to handle any test necessary.

You can buy the machine to handle any specific test needs and add on to its capabilities at a later time. This way you only pay for what you need, but you are never faced with an obsolete system.

The HM-3000 will function as a standalone device or can be interfaced with a computer using Humboldt's HMTS software. It also provides an analog output port if you need to utilize an XYt chart recorder. The HM-3000 is specifically designed for soil testing labs conducting multiple testing operations including: UU, CU and CD triaxials, UC, CBR and LBR. With its built-in four-channel data logger, the HM-3000 can acquire data from load, strain, pore pressure and volume transducers. The data acquisition can be automated by setting trigger conditions to start and stop logging. Tests can be initiated or terminated automatically increasing lab productivity.

Features include:

- Four channels with real-time data acquisition
- Backlit LCD display
- RS232 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
- Humboldt HMTS, Basic, User-Defined Level software included for data acquisition

Digital MasterLoader— HM-3000.3F

Includes:

SHH04— 3/4-16 Bolt x 3-1/2 inch long

WF04— Washer for SHH04 Bolt

H-4178.2— 3/4-16 Stud x 1-1/2 inch long

H-4454.3— 3/4-16 Plug / Adapter

HM-3000.10.1— Cylinder Bracket Holder

HM-3000.10.2— Displacement Indicator Platform

HM-3000.10.3— Displacement Indicator Rod.



HM-3000.3F



Typical CU Triaxial, 1-Cell Setup using HM-3000.3F

Part #	Qty	Description
HM-3000.3F	1	Digital MasterLoader 110/220V
HM-3003SW	1	CU Triaxial Reporting Software
HM-4150	1	FlexPanel I (3-Burette Panel)
HM-4199B	1	Triaxial Cell, Brass Fittings
HM-4199.XX	1	Top Cap & Base
HM-2300.020	1	S-Type Load Cell, 2,000lbf (50 kN)
HM-2310.20	1	Strain Transducer 2" (50mm)
HM-4170	1	Pore Pressure Transducer 200 PSI
HM-4178BRT	1	Displacement Transducer Bracket
HM-200387	1	Ball Seat Adapter

Typical UU Triaxial, 1-Cell Setup using HM-3000.3F

Part #	Qty	Description
HM-3000.3F	1	Digital MasterLoader 110/220V
HM-3002SW	1	UU Triaxial Reporting Software
HM-4140	1	FlexPanel I (3-Burette Panel)
HM-4199B	1	Triaxial Cell, Brass Fittings
HM-4199.XX	1	Top Cap & Base
HM-2300.020	1	S-Type Load Cell, 2,000lbf (50 kN)
HM-2310.20	1	Strain Transducer 2" (50mm)
HM-4179.XX	2	Acrylic Base Disk
HM-4178BRT	1	Displacement Transducer Bracket
HM-200387	1	Ball Seat Adapter

Typical Unconfined Compression Setup using HM-3000.3F

Part #	Qty	Description
HM-3000.3F	1	Digital MasterLoader 110/220V
HM-3004SW	1	UC Triaxial Reporting Software
HM-2300.020	1	S-Type Load Cell, 2,000lbf (50 kN)
HM-2310.20	1	Strain Transducer 2" (50mm)
HM-4178BRT	1	Displacement Transducer Bracket
HM-2002	1	Unconfined Upper Platen

Typical Triaxial Sample Prep Items

Part #	Qty	Description
HM-4180.XX	1	Membranes, 12/pk
HM-4181.XX	1	Membrane Stretcher
HM-4182.XX	1	O-Rings, 12/pk
HM-4184.XX	2	Porous Stone
HM-4187E	1	De-Airing Tank, 6 Liter, 110V
HM-3847.XX	1	Split Miter Box
HM-4189.XX	1	Filter Paper, 100/pk
HM-4189FS	1	Filter Strips 5 x 150mm 100/pk

Part Numbers ending in .XX require a size code to be entered referring to the sample size to be tested. **For Triaxial** samples, sizes are: .14 = 1.4"; .15 = 1.5"; .20 = 2.0"; .25 = 2.5"; .28 = 28"; .30 = 3.0".40 = 4.0"; .35 = 35mm; .38 = 38mm; .50 = 50mm; .70 = 70mm, and .100 = 100mm.



Triaxial Setup using the HM-3000.3F Load Frame

Pictured is the HM-3000.3F Load frame with a typical Triaxial setup. See the charts to the left for items to order for the setup shown.

Specifications

Dimensions (l x w x h)	17 x 19 x 59 inch (430 x 480 x 1500mm)
Platen Travel	4 inches (100mm) Max.
Net Weight	240 lbs. (110Kg)
Shipping Weight	285 lbs. (130Kg)
Speed Range	0 - 3.0000 inch/min (0 - 75.0000 mm/min)
Load Capacity	11000 lbf (50 kN)
Vertical Clearance	40 inch (1000mm) Max.
Horizontal Clearance	15 inch (380mm)
Voltage	110/220 VAC 50/60HZ
Current	8.5 Amps
Analog to Digital Converter	16 Bit
Data Storage	4000 Readings
Data Collection Rate	100 ms
Computer Port	RS232

Covers: CBR, UU, CU, CD, UC, Marshall and Hveem Tests
ASTM: D1883, D2850, D2166, D4767, and D1559
AASHTO: T193, T296, T297, T208, T245, and T246
BS 1377: Part 4: 1990, BS 1377: Part 7: 1990,
BS 1377: Part 8: 1990, BS 598: Part 107



The HM-2800 Multi-speed Load Frame is designed for those who want a high-quality but simple, multi-purpose load frame without built-in data acquisition capabilities. The HM-2800 is ideal for applications where the operator either is not concerned with data acquisition; or, already has an existing data acquisition system or plans on constructing one. With its digital display, the HM-2800 also provides the operator the ability to select any speed with three decimal accuracy within its speed range.

The HM-2800 features a quiet, direct drive DC motor that provides a loading speed range from .008 to 1.999 in/min., controlled through the use of edit keys and a digital display. It also incorporates a separate, dedicated control to accommodate 2.00 in/min. for use in Marshall and TSR Testing. The controls also accommodate a rapid travel speed of 2.25 in/min for moving the platen into position quickly.

Features include:

- 10" platen provides roomy, stable base for test equipment
- Backlit LCD display
- Test speeds adjustable from .008 to 1.999 in/min. via keypad
- User selectable unit change between U.S. Standard and Metric from keypad

Specifications

Dimensions (l x w x h)	17 x 22 x 51 inch (432 x 559 x 1295mm)
Platen Travel	3 inches (76mm) Max.
Net Weight	206 lbs. (94kg)
Shipping Weight	300 lbs. (660kg)
Speed Range	0 - 1.99 inch/min (0 - 50.5 mm/min)
Load Capacity	11000 lbf (50 kN)
Vertical Clearance	32 inch (812mm) Max.
Horizontal Clearance	11 inch (279mm)
Voltage	120 VAC 50/60HZ 220 VAC 50/60HZ
Current	9 Amps @ 125V 4.5 Amps @250V

Multi-Speed Load Frame— HM-2800

Includes:

SHH04—3/4-16 Bolt x 3-1/2 inch long

WF04—Washer for SHH04 Bolt

Multi-Speed Load Frame, 220 50/60Hz— HM-2800.4F

Includes:

SHH04—3/4-16 Bolt x 3-1/2 inch long

WF04—Washer for SHH04 Bolt

HM-2000.56— Step-down transformer for electric conversion

Covers: CBR, UU, CU, CD, UC, Marshall and Hveem Tests
ASTM: D1883, D2850, D2166, D4767, D5581 and D6927
AASHTO: T193, T296, T297, T208, T245, and T246
BS 1377: Part 4: 1990, BS 1377: Part 7: 1990,
BS 1377: Part 8: 1990, BS 598: Part 107



Typical CU Triaxial, 1-Cell Setup using HM-2800

Part #	Qty	Description
HM-2800	1	Multi-Speed Load Frame
HM-4150	1	FlexPanel I (3-Burette Panel)
HM-4199B	1	Triaxial Cell, Brass Fittings
HM-4199.XX	1	Top Cap & Base Pedestal 2.8"
H-4454.020	1	Load Ring 2,200 lbf (10 kN)
H-4463	1	Dial Gauge 2.0" travel, 0.001" divisions)
HM-4170	1	Pore Pressure Transducer, 200 PSI
HM-2350	1	Single Channel Readout
HM-200387	1	Ball Seat Adapter

Typical UU Triaxial, 1-Cell Setup using HM-2800

Part #	Qty	Description
HM-2800	1	Digital MasterLoader 110/220V
HM-4140	1	FlexPanel I (3-Burette Panel)
HM-4199B	1	Triaxial Cell, Brass Fittings
HM-4199.XX	1	Top Cap & Base
H-4454.020	1	Load Ring 2,200 lbf (10 kN)
H-4463	1	Dial Gauge 2.0" travel, 0.001" divisions)
HM-4179.XX	2	Acrylic Base Disk
HM-200387	1	Ball Seat Adapter

Typical Unconfined Compression Setup using HM-2800

Part #	Qty	Description
HM-2800	1	Multi-Speed Load Frame
HM-2002	1	Unconfined Upper Platen
HM-3000.10.2	1	Displacement Indicator Platform
HM-3000.10.3	1	Displacement Indicator Rod
H-4454.005	1	Load Ring 500 lbf (2.5 kN)
H-4158.1	1	Dial Gauge 1.0" travel, 0.001" divisions)

Typical Soil Cement Setup using HM-2800

Part #	Qty	Description
HM-2800	1	Multi-Speed Load Frame
HM-2003E	1	Upper Swivel Platen
HM-4454.050	1	Load Ring 5,000 lbf (25 kN)

Part Numbers ending in .XX require a size code to be entered referring to the sample size to be tested. **For Triaxial** samples, sizes are: .14 = 1.4"; .15 = 1.5"; .20 = 2.0"; .25 = 2.5"; .28 = 28"; .30 = 3.0".40 = 4.0"; .35 = 35mm; .38 = 38mm; .50 = 50mm; .70 = 70mm, and .100 = 100mm.



HM-2800 w/ typical Triaxial Setup

Triaxial Setup using the HM-2800 Load Frame

The HM-2800 provides a simpler, less advanced solution to doing CBR testing than the HM-3000. The HM-2800 features the ability to assign a speed of operation between .008 and 1.99 inches/minute for doing the multitude of tests required by today's labs including Triaxial testing. Pictured above is the HM-2800 Load Frame with a typical Triaxial setup. See the chart to the left for items to order for the setup shown.

Typical Triaxial Sample Prep Items

Part #	Qty	Description
HM-4180.XX	1	Membranes, 12/pk
HM-4181.XX	1	Membrane Stretcher
HM-4182.XX	1	O-Rings, 12/pk
HM-4184.XX	2	Porous Stone
HM-4187E	1	De-Airing Tank, 6 Liter, 110V
HM-3847.XX	1	Split Miter Box
HM-4189.XX	1	Filter Paper, 100/pk
HM-4189FS	1	Filter Strips 5 x 150mm 100/pk



Fully Automated Triaxial Testing System—

The Humboldt Fully Automated Triaxial Testing System is a state-of-the-art system specifically designed for soil testing laboratories conducting UU, CU and CD Triaxial and Unconfined Compression Tests. This is the most advanced and complete automated triaxial testing system available to soil testing laboratories. The system consists of a microprocessor-based stepper motor driven HM-3000.3F compression frame with a built-in, 4-channel data acquisition for stress, strain, pore water pressure and volume change measurement. The HM-4152A Distribution Panel is designed to accommodate all the necessary connections and valves for filling and draining up to 3 triaxial cells, the HM-2450A.3F Pressure Controller with automatic back pressure valve provides automatic incremental back pressure saturation with B-value calculation and check, the HM-2315 Volume Change Measuring Apparatus measures the volume during various stages of triaxial testing and the Humboldt Material Testing Software HMTS for monitors, controls and reports the test data. The complete system also requires a supply of good clean compressed air, vacuum pump and a computer please contact Humboldt for system requirements.



Typical Automated Triaxial, 3-Cell Setup

Part #	Qty	Description
HM-3000.3F	1	Digital MasterLoader 110/220V
HM-3002SW	1	UU Triaxial Reporting Software
HM-3003SW	1	CU Triaxial Reporting Software
HM-4152A	1	Distribution Panel (3 cells)
HM-4151A	6	Air/Water Bladder Cylinder
HM-4199B	3	Triaxial Cell, Brass Fittings
HM-4199.XX	3	Top Cap & Base Pedestal
HM-2300.020	1	S-Type Load Cell, 2,000lbf (50 kN)
HM-2310.20	1	Strain Transducer 2" (50mm)
HM-4170	3	Pore Pressure Transducer 200 PSI
HM-2315	3	Automatic Volume Change Apparatus
HM-2310.10	3	Strain Transducer 1" (25mm)
HM-2310BR	3	Strain Transducer Bracket
HM-4178BRT	1	Displacement Transducer Bracket

Part #	Qty	Description
HM-200387	1	Ball Seat Adapter and Converter
HM-4180.XX	1	Membranes, 12/pk
HM-4181.XX	1	Membrane Stretcher
HM-4182.XX	1	O-Rings, 12/pk
HM-4184.XX	6	Porous Stone
HM-4187E	1	De-Airing Tank, 6 Liter, 110V
HM-3847.XX	1	Split Miter Box
HM-4189.XX	1	Filter Paper, 100/pk
HM-4189FS	1	Filter Strips 5 x 150mm 100/pk
HM-4198	1	Vacuum Grease
HM-4179.XX	6	Acrylic Base
HM-2325A.3F	1	MiniLogger 4 CH Analog Data Acquisition
HM-2450A.3F	3	Pressure Controller



Automatic Volume Change Apparatus— HM-2315

The apparatus is used for measuring the volume change of a soil sample by monitoring the flow of water through the chamber of the unit. The lower assembly contains changeover valves, which when used in conjunction with the upper assembly provides limitless capacity. The unit can be used with a linear strain transducer, digital indicator, or as part of an automated system. It is accurate to better than ± 0.05 ml and is easily de-aired in seconds. Includes connectors, valves, and tubing. Order indicator separately. Shipping wt. 21 lbs. (9.5kg)

Transducer for use with above— HM-2310.10

Transducer Bracket for use with HM-2310.10— HM-2310BR

Digital Indicator for use with above— HM-4469.10



HM-2315

Pressure Controller— HM-2450A.3F

Stand alone unit for accurate control of air pressure in the Triaxial laboratory testing. It provides automatic incremental back pressure saturation with B-value calculation and check, when used with HMTS (Humboldt Material Testing Software) and Humboldt Triaxial testing equipment. The on board digitalized and bias pressure regulators plus two air/water bladder systems (HM-4151A) and the distribution panel (HM-4152A) allow simultaneous control of the confining and back pressure while maintaining a constant differential pressure.



HM-2450A.3F

Specifications

Pressure Readout	psi/kPa
Maximum Input Pressure	200/1400
Maximum Output Pressure	150/1000
Pressure Resolution	0.1/1
Input Voltage	110/220 VAC 50/60 Hz
Display	LCD
Dimension (L x W x H)	12 x 12 x 7 inches (300 x 300 x 175 mm)

Distribution Panel— HM-4152A

The HM-4152A Distribution Panel is designed to provide all the necessary port connections in one panel for fully automated Triaxial testing. It provides distribution of de-aired water, tap water, pressure and vacuum within the Triaxial testing system for up to 3 Triaxial cells, 1 de-airing tank, 3 cell/back pressure controllers, and 6 air/water bladder cylinders. The panel also houses a pressure regulator, digital pressure readout, air/water filter for the input pressure and de-aired water tank control valves.

Specifications

Pressure Readout	PSI / BAR / MPA
Maximum Input Pressure	200 / 14 / 1.4
Maximum Output Pressure	150 / 10 / 1
Pressure Resolution	0.1 / 0.01 / 0.001
Input Voltage	9V DC
Display	LCD
Dimension (L x W x H)	37.5 x 8 x 19.5 inches (952 x 203 x 495 mm)



HM-4152A

HM-4151A

See Page 67 for Air/Water Bladder Cylinders



HM-4140

HM-4150

HM-4150A

HM-4160

HM-4160A

Humboldt FlexPanels Features:

- Bias pressure regulator allows simultaneous control of confining & back pressures, while maintaining a constant differential
- Longer Burette and 0.02ml graduation give more accurate results, better productivity, and faster turnaround
- Cost efficient, expandable system
- Uses no-volume-change Swagelock valves
- Bridge feature delivers simultaneous control of base and top pressures by adjusting one pressure regulator
- Quick-connect hookups for fast and reliable set up.
- Master control panel houses digital pressure readout for the controlling pressure, inlet vacuum regulator & gauge, inlet pressure regulators & gauge, de-aired water tank controls, tap & de-aired water supply outlets, and pressure & vacuum outlets
- Humboldt's bridge and bias controls simplify testing
- Long burette design provides a highly accurate scale, as well as faster test response and results
- Lightweight, aluminum frame is extremely durable and resists rust
- Complies with ASTM D5084; BS 1377 Part 6 1990.

Humboldt FlexPanels

	HM-4140	HM-4150	HM-4160	HM-4150A	HM-4160A
Pressure/ Resolution	2-150 psi (0.1 psi) Metric Models: 14-1000 kPa (1 kPa)				
Vacuum	0-14.7 psi (0-100kPa) or 30 Hg				
Inner Burette					
Cell	50cc x 0.1 cc (ml)				
Top	NA	10cc x 0.02 cc (ml)			
Base	10cc x 0.02 cc (ml)				
Outer Burette					
Cell	400cc (ml)				
Top	NA	460cc (ml)			
Base	460cc (ml)				
Voltage	115V 50/60Hz 220V 50/60Hz (use .4F suffix to part number, i.e. H-4150.4F)			NA	
Power	6 watts				
Operating Temp.	14 to 158°F (-10 to 70°C)				
Dimensions	8" x 8" x 37.5" (203 x 203 x 952mm)	8" x 25.5" x 37.5" (203 x 648 x 952mm)	8" x 43.5" x 37.5" (203 x 1105 x 952mm)	8" x 19.5" x 37.5" (203 x 495 x 952mm)	8" x 37.5" x 37.5" (203 x 952 x 952mm)
Shipping Weight	35lb (16kg)	95lb (43kg)	145lb (66kg)	107lb (49kg)	157 (71kg)



Rear of panel showing quick-connect hookups and plumbing.

Humboldt FlexPanels are available with regulators reading in kPa. To order, use an M suffix to the Model Number, i.e. HM-4150M.



HM-4156A

Pressure Control/Distribution Panel— HM-4156A

The HM-4156A panel utilizes the HM-4152A distribution panel and adds an integral control panel, which allows you to set and monitor cell and back pressure for each of the possible three triaxial cells. The Pressure Control/Distribution Panel offers a simple and efficient method of monitoring up to 6 independent pressures. The panel controls the distribution of the confining and back pressure supplies to up to 3 triaxial cells by way of pressure regulators and digital pressure readout. In addition the panel offers an air/water filter for the input pressure and de-aired water tank control valves.

Specifications

Pressure Readout	PSI / BAR / MPA
Maximum Input Pressure	200 / 14 / 1.4
Maximum Output Pressure	150 / 10 / 1
Pressure Resolution	0.1 / 0.01 / 0.001
Input Voltage	9V DC
Display	LCD
Dimension (L x W x H)	37.5 x 8 x 19.5 inches (952 x 203 x 495 mm)



HM-4151A

Air/Water Bladder Cylinder— HM-4151A

The Air/Water Bladder Cylinder is used to deliver pressurized de-aired water to the triaxial cell. It acts as an interface between the compressed air, used as a pressure source, and the deaired water, which is used as the means of pressurizing the sample. The cylinder will operate continuously to a maximum pressure of 150 psi (1000 kPa).

Spare Replacement Bladder for HM-4151A— HM-4151.1



HM-4199B

Triaxial Cells

HM-4199B Triaxial Cells are available for use with sample sizes from 1.4" (35mm) to 4" (100mm). The clear acrylic chamber has a working pressure of 150 psi (1,000 kPa) and is tested to 250 psi (1,700 kPa). The design features a solid base, which provides an extremely stable test platform making it faster and easier to center the cell on the load frame platen— reducing setup times. HM-4199B cells provide easy access to the test chamber by utilizing a one-piece, chamber unit that is quickly removed through the removal of three easy-turn knobs. These cells also have an integral de-airing block for the pore pressure transducer built into the side. The cells have five no-volume-change valves aligned on one side for maximum convenience. Two valves handle top drainage, two valves handle bottom drainage, and one valve handles filling and drainage, as well as providing confining pressure to the cell. The removable base pedestal accommodates various sample diameters. Top caps and base pedestals are available in a choice of black-anodized aluminum or stainless steel in various sizes (see chart below). Other sizes are available. The cell top and base are precision machined from 6061 T6 aluminum, hard-coated and Teflon impregnated. A 5/8" hardened stainless steel piston runs inside a linear bearing to reduce friction. Choice of brass or stainless steel valve fittings (stainless steel for use with hazardous materials). When ordering, specify top cap and base pedestal for desired sample size. Order porous stones separately, see page 70. Cell dimensions are: 13-3/4" H x 8-3/4" dia. (349.2 x 222.3mm); overall diameter is: 11" (279.4mm).



HM-4199.28

Triaxial Cell and Top Cap/Base Pedestal Set

Size	Cell	Top Cap/Base Pedestal Set
35mm	HM-4199B	HM-4199.35
1.4"		HM-4199.14
50mm		HM-4199.50
2.0"		HM-4199.20
70mm		HM-4199.70
2.8"		HM-4199.28
100mm	HM-4199B-4	HM-4199.100
4.0"		HM-4199.40
150mm	HM-4199B-6	HM-4199.150
6"		HM-4199.60

Stainless Triaxial Cell and Top Cap/Base Pedestal Set

Size	Cell	Top Cap/Base Pedestal Set
35mm	HM-4199SS	HM-4199.35SS
1.4"		HM-4199.14SS
50mm		HM-4199.50SS
2.0"		HM-4199.20SS
70mm		HM-4199.70SS
2.8"		HM-4199.28SS
100mm	HM-4199SS-4	HM-4199.100SS
4.0"		HM-4199.40SS
150mm	HM-4199SS-6	HM-4199.150SS
6"		HM-4199.60SS

To order individual Top Caps or Pedestal Bases, use the part number for the set of the desired size indicated above and add a "T" suffix for a Top and a "B" suffix for a base, i.e. HM-4199.20T would be the part number for a 2" Top Cap.



Precision Diameter Tape, 0.75 to 7" — HM-4174 Precision Diameter Tape, 28 to 200mm — HM-4174M

Diameter tapes provide a fast, reliable method for measuring the diameter of concrete, soil and asphalt cores and cylinders. One reading provides round and out-of-round diameters within an accuracy of .001" (.03mm) by means of special graduations and vernier scale. All tapes are made from a stainless alloy and are precision engraved to ensure accuracy. Tape has diameter range of 2 to 12" (50 to 300mm on metric model). Includes certificate of calibration. Tapes are calibrated and include a NIST-traceable certification. Meet ASTM D2166, D2850, D4767, BS 1377:8.



Length Comparator — HM-4173

Length comparator designed to quickly and accurately measure the height of soil samples to within ±0.1% of the total height. Includes a digital indicator accurate to within 0.0001 inches (0.002mm) with 0 to 1" (0 to 25mm) total range. The comparator is comprised of an upright support 14" (356mm) tall attached to a 6 x 6 x 2" (150 x 150 x 50mm) granite base and includes a 6" (152mm) reference bar. Other reference bars such as 4.0", 3.0" and 2.0" for other sample sizes are available. Meets ASTM D2166, D2850, D4767, BS 1377:8. Reference bar includes Calibration Report traceable to the National Institute of Standards and Technology. Shipping wt. 16 lb (7.2kg)

Soil Sample Trimmer, 1.0 to 3.0" — HM-3130

Soil Sample Trimmer, 1.0 to 4.0" — HM-3140

Sample trimmer for cutting samples to precise diameters. The HM-3130 handles samples up to 3" and HM-4140 handles up to 4" samples by employing easily interchangeable top platens. Stainless steel pins in pedestal & top platen hold sample in position. Top platen bearing assembly is lowered & locked and sample trimmed with wire saw, order top platens and saw separately. Shipping wt. 6 lbs. (2.72kg)



Wire Saw — HM-3175

Sample trimming saw with replaceable wire blade.

Open-Type Miter Box — H-4187

For trimming and squaring soil specimens, miter box consists of base and sides. Opening is 3.2"W x 3-1/2"H (81 x 89mm) Plated for corrosion resistance. Shipping wt. 10 lbs. (4.5kg)

Sample Trimmer Top Platens

Top Platen	Model
1.0"	HM-3130.10
1.4"	HM-3130.14
1.875"	HM-3130.18
2.0"	HM-3130.20
2.5"	HM-3130.25
2.8"	HM-3130.28
3.0"	HM-3130.30
4.0"	HM-3130.40



Two-Part Compaction Molds

Sample	Mold	Base Plate
1.4"	HM-3817.14	HM-3817.14BP
1.5"	HM-3817.15	HM-3817.15BP
1.875"	HM-3817.18	HM-3817.18BP
2.0"	HM-3817.20	HM-3817.20BP
2.36"	HM-3817.23	HM-3817.23BP
2.5"	HM-3817.25	HM-3817.25BP
2.8"	HM-3817.28	HM-3817.28BP
4.0"	HM-3817.40	HM-3817.40BP
6.0"	HM-3817.60	HM-3817.60BP
35mm	HM-3817.35	HM-3817.35BP
38mm	HM-3817.38	HM-3817.38BP
50mm	HM-3817.50	HM-3817.50BP
70mm	HM-3817.70	HM-3817.70BP
100mm	HM-3817.100	HM-3817.100BP
150mm	HM-3817.150	HM-3817.150BP



Two-Part Compaction Molds

Two-part Aluminum molds with easy-close band clamp closure. Base plate/Pedestal combination provides a stable platform for mold during production.



Latex Membranes	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4180.14	HM-4180.15	HM-4180.20	HM-4180.28	HM-4180.40	HM-4180.60	HM-4180.14	HM-4180.15	HM-4180.20	HM-4180.28	HM-4180.40	HM-4180.60

Made from non-porous latex rubber. Length varies according to sample diameter. All have sufficient length to enclose full length of sample, both top & base of pedestal, and disc—plus enough surplus to allow doubling over the O-rings. 12/pkg. Membranes are 0.012" in thickness. For 0.025" thickness, add T suffix after part number, i.e. HM-4180.28T

Membrane Stretcher	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4181.14	HM-4181.15	HM-4181.20	HM-4181.28	HM-4181.40	HM-4181.60	HM-4181.14	HM-4181.15	HM-4181.20	HM-4181.28	HM-4181.40	HM-4181.60

Simple & effective method of sheathing (encasing) sample with latex membrane without creasing or damaging the sleeve.

O-Rings	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4182.14	HM-4182.15	HM-4182.20	HM-4182.28	HM-4182.40	HM-4182.60	HM-4182.14	HM-4182.15	HM-4182.20	HM-4182.28	HM-4182.40	HM-4182.60

For sealing membranes from confining fluid and sample. Neoprene. 12/pkg.

O-Rings Placing Tool	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4183.14	HM-4183.15	HM-4183.20	HM-4183.28	HM-4183.40	HM-4183.60	HM-4183.14	HM-4183.15	HM-4183.20	HM-4183.28	HM-4183.40	HM-4183.60

Positions rings to seal membrane with minimum disturbance to specimen.

Porous Stones	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4184.35	HM-4184.38	HM-4184.50	HM-4184.70	HM-4184.100	HM-4184.150	HM-4184.14	HM-4184.15	HM-4184.20	HM-4184.28	HM-4184.40	HM-4184.60

Used for permeability and triaxial testing to allow even distribution of water through sample. Two stones required per cell, each 1/4" thick (6mm).

Membrane Tester	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4185.14	HM-4185.15	HM-4185.20	HM-4185.28	HM-4185.40	HM-4185.60	HM-4185.14	HM-4185.15	HM-4185.20	HM-4185.28	HM-4185.40	HM-4185.60

Tester is easy to use for quick visual detection of possible flaws in membranes.

2-Part Split Miter Box	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-3847.35	HM-3847.38	HM-3847.50	HM-3847.70	HM-3847.100	HM-3847.150	HM-3847.14	HM-3847.15	HM-3847.20	HM-3847.28	HM-3847.40	HM-3847.60

For use with undisturbed samples and for sample trimming of cohesive soils. Made from non-ferrous metal.

2-Part Vacuum Split Former	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-3827.35	HM-3827.38	HM-3827.50	HM-3827.70	HM-3827.100	HM-3827.150	HM-3827.14	HM-3827.15	HM-3827.20	HM-3827.28	HM-3827.40	HM-3827.60

For use with non-cohesive soils and disturbed samples. Made from non-ferrous metal. Larger sizes require use of supporting jacks.

Sample Trimmer with Knife	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4186.14	HM-4186.15	HM-4186.20	HM-4186.28	HM-4186.40	HM-4186.60	HM-4186.14	HM-4186.15	HM-4186.20	HM-4186.28	HM-4186.40	HM-4186.60

Used to trim sample ends or cut sample to a specific length.



HM-4189.28



HM-4189FS



HM-4179.28

Filter Paper	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4189.15	HM-4189.15	HM-4189.20	HM-4189.28	HM-4189.40	HM-4189.60	HM-4189.15	HM-4189.15	HM-4189.20	HM-4189.28	HM-4189.40	HM-4189.60

Used to prevent soil from penetrating into porous stones or into panel. 100/pkg.

Filter Paper Strips	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4189FS											

Wrapped around sample to accelerate saturation in triaxial testing, 5 x 150mm, Grade 55, 100/pkg.

Base Disk	35mm	38mm	50mm	70mm	100mm	150mm	1.4"	1.5"	2.0"	2.8"	4.0"	6.0"
	HM-4179.35	HM-4179.38	HM-4179.50	HM-4179.70	HM-4179.100	HM-4179.150	HM-4179.14	HM-4179.15	HM-4179.20	HM-4186.28	HM-4179.40	HM-4179.60

Acrylic disk used in UU triaxial tests.

High Vacuum Grease— HM-4198

Effective means of sealing latex membranes to sides of the top cap.



HM-4198

Digital Pore Pressure Set— HM-4175

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)



HM-4175

De-Airing Water Tank— For use with Triaxial/Permeability Distribution Panels. Cast acrylic chamber, 6" dia x 16"H (152 x 406mm). Head plate mounted with three fittings. One is modified to allow 1/4" tubing to pass through to tank bottom, one for filling with tap water and the other for extracting the water once de-aired. The third fitting is used to connect vacuum/pressure to tank. Shipping wt. 13 lb. (5.8kg)

Nold De-Aerator Water System— HM-4187

Completely self-contained unit produces 8-liter batches of de-aired water without the use of heat. Combined mechanical agitation and vacuum evacuation removes gasses at much higher rate than conventional heat-boiling methods. Will de-air water to less than 0.5 pph dissolved oxygen in 4 minutes. 1/55hp motor 110V, 60Hz. 7.5 x 7.5 x 20" (190 x 190 x 508mm). Shipping wt. 19 lb (8.6kg)



HM-4187E



HM-4187