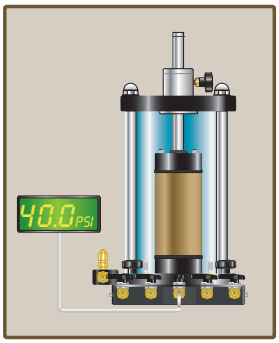
Humboldt Triaxial Testing Systems—
Humboldt provides an extensive line of triaxial testing equipment solutions for today's soil labs. At the heart of our triaxial testing equipment is the Humboldt Concept of providing a modular system of interchangeable, stand-alone components that when combined create highly-versatile systems. This modular concept allows you to easily create a custom solution for your needs, as well as having the ability of taking advantage of upgrades and new technology, while not being locked into an obsolete proprietary system.

Presented below and on the following pages are three triaxial systems based around our HM-3000 and HM-2900 load frames, our HMTS software with triaxial-specific software modules and three different pressure control solutions.

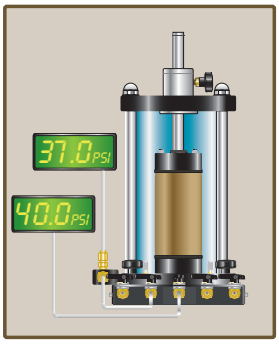
Automated Pressure Control Triaxial System—
Designed for those who want the ultimate in control of their triaxial testing, Humboldt's Automated Pressure Control Triaxial System is a computer-controlled system specifically designed for soil testing laboratories conducting UU, CU and CD Triaxial tests, as well as Unconfined Compression. It is perfect for large, high-volume labs, as well as those who want to utilize technology to increase staff efficiencies and testing accuracy. This system provides complete control of the testing process including data acquisition.

Available in one or three-cell configurations, our automated control panels can handle your testing needs in stride. And, if you want to increase the number of simultaneous tests you can run, Humboldt's HMTS software can easily handle a multitude of tests. All you need to do is add cells and the other appropriate equipment to handle your needs. With the HMTS you will be able to monitor up to 64 sensor signals from a single computer.

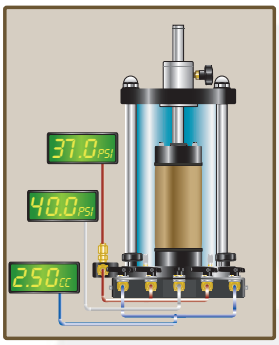
Humboldt's Automated Pressure Control Triaxial System is built around the HM-2450A Stand-alone Pressure Controller, our HMTS test-specific software, which monitors, controls and reports the test data, and, the highly-regarded HM-3000 Load Frame, with its built-in, 4-channel data acquisition for stress, strain, pore water pressure and volume change measurement. The system can



UU-Triaxial Test
Typical Cell Setup



CU-Triaxial Test
Typical Cell Setup



CD-Triaxial Test
Typical Cell Setup

also be configured for use with our Triaxial-specific Load Frame, the HM-2900. While Humboldt's Automated Pressure Control Triaxial System has been designed to work as a complete system, its make-up provides for the ultimate in versatility and expanded possibilities.

See pages 64-65 for a complete component list for the Automated Pressure Control Triaxial System

Manual Pressure Control Triaxial System—
Humboldt's Manual Pressure Control Triaxial System provides a manually-controlled alternative to our automated system. The manual system eliminates the HM-2450A.3F pressure controller from the system and replaces its function with a control panel that allows for manual control of the confining and back pressures.

Like the automated system, our manually-controlled system can run UU, CU and CD Triaxial tests, as well as Unconfined Compression. Manual control panels are available in one or three-cell configurations and can be used in multiple configurations. All you need to do is add cells and the other appropriate equipment to handle your needs. With the HMTS you will be able to accommodate up to 64 incoming signals from your computer.

Humboldt's Manual Pressure Control Triaxial System is built around our HMTS test-specific software, which monitors, controls and reports the test data, and, the highly-regarded HM-3000 Load Frame. with its built-in, 4-channel data acquisition for stress, strain, pore water pressure and volume change measurement. The system can also be configured for use with our Triaxial-specific Load Frame, the HM-2900. While Humboldt's Manual Pressure Control Triaxial System has been designed to work as a complete system, its make-up provides for the ultimate in versatility and expanded possibilities.

See pages 66-67 for a complete component list for the Manual Pressure Control Triaxial System

FlexPanel Pressure Control Triaxial System—
Humboldt's FlexPanel pressure control option eliminates the use of the air/water bladder interface concept of pressure control in lieu of its highly-accurate burette system. FlexPanels have a set of three burettes for each triaxial cell. The three burettes connect to the cell, top cap and base pedestal. This extremely versatile pressure system controls the pressure, water, de-airing tank and vacuum from a single panel. The three burettes allow the control of the cell pressure and the back pressure for a single cell. They can monitor volume change in the sample and can be used to measure the flow of water through the sample for permeability testing.

The three-burette design can manually measure volume change or permeability in a triaxial test sample without the use of a volume change apparatus. This is a benefit of this pressure distribution panel over the air/water bladder system.

See pages 68-69 for a complete component list for the FlexPanel Pressure Control Triaxial System

Automatic Pressure Control

Component List for 1 and 3-Cell Triaxial System with Automatic Pressure Control

Automatic Pressure Control System,1-Cell Setup

COMPONENTS		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Pore Pressure Transducer	HM-4170	1
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
Pressure		
Pressure Distribution Panel	HM-4154	1
Air/Water Bladder	HM-4151A	2
Pressure Controller	HM-2450A.3F	1
DeAiring System	HM-4187A.3F	1
Vacuum Pump	H-1763A.4F	1
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Volume Change		
Volume Change Apparatus (Required for CU & CD Triaxial)	HM-2315	1
Strain Transducer, 1'' (25mm)	HM-2310.10	1
LSCT/LVDT Mounting Bracket	HM-2310BR	1
Triaxial Cell (choose 1 below)		
3"/ 75mm dia. capacity	HM-4199B	1
4"/ 100mm dia. capacity	HM-4199B-4	1
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	1
Installation Kit	HM-4167	1

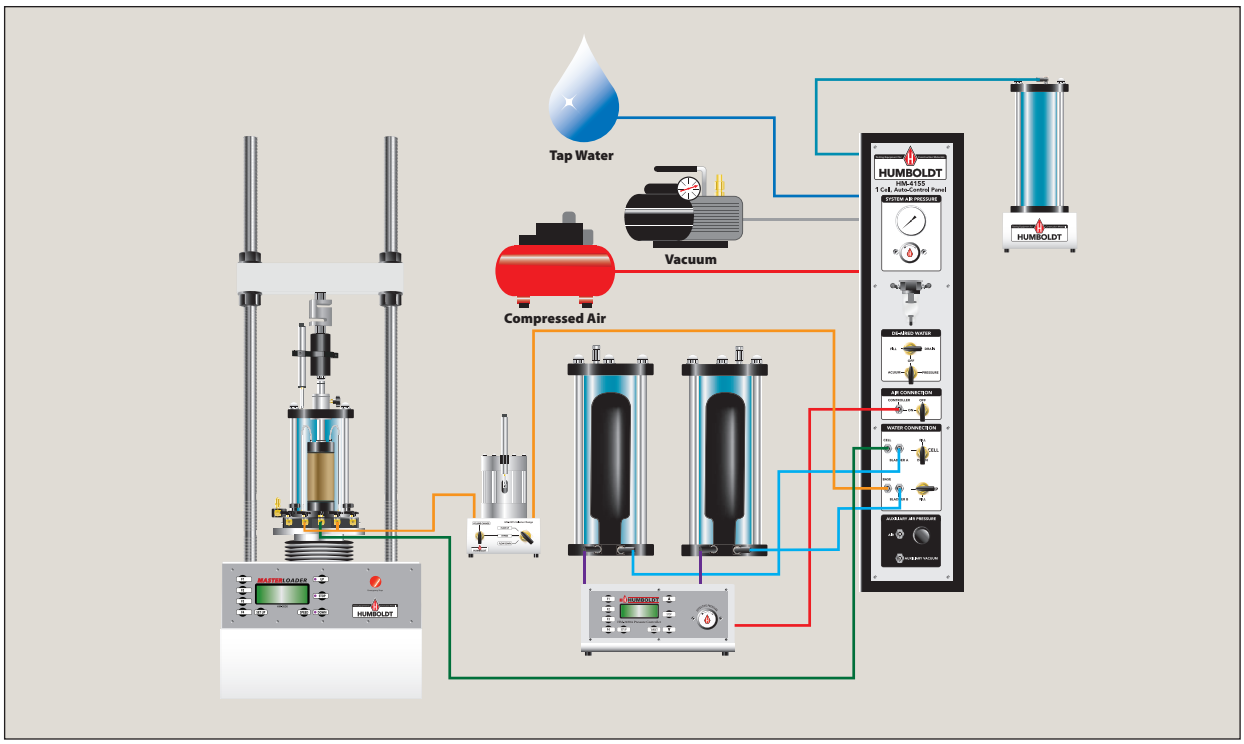
Automatic Pressure Control System, 3-Cell Setup

COMPONENTS		
Load Frame (choose 1 below)		
50kN(11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Pore Pressure Transducer	HM-4170	3
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
Pressure		
Pressure Distribution Panel	HM-4155	1
Air/Water Bladder	HM-4151A	6
Pressure Controller	HM-2450A.3F	3
DeAiring System	HM-4187A.3F	1
Vacuum Pump	H-1763A.4F	1
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Volume Change		
Volume Change Apparatus (Required for CU & CD Triaxial)	HM-2315	3
Strain Transducer, 1'' (25mm)	HM-2310.10	3
LSCT/LVDT Mounting Bracket	HM-2310BR	3
Triaxial Cell (choose 1 below)		
3"/ 75mm dia. capacity	HM-4199B	3
4"/ 100mm dia. capacity	HM-4199B-4	3
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	3
Installation Kit	HM-4167	1

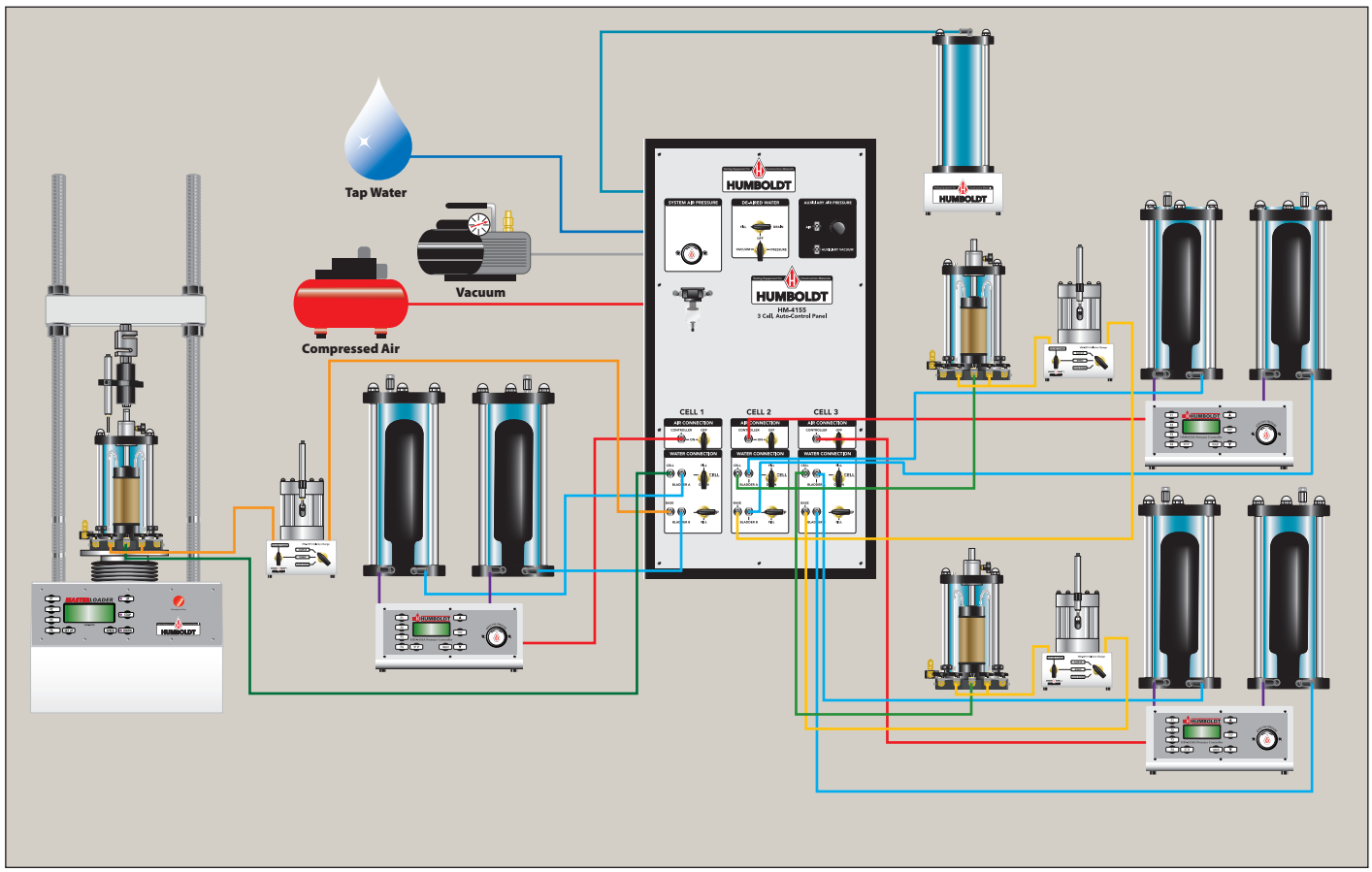
Standard Triaxial Sample Prep Accessories:

(See page 79 for a complete list and description. Items with .XX require a sample size)

Accessory	Item #	Required	Accessory	Item #	Required
Acrylic Base Disk	HM-4179.XX	2 or 6	2-Part Compaction Mold	HM-3817.XX	1
Membranes	HM-4180.XX	1	Base Plate Pedestal	HM-3817.XXBP	1
Membrane Stretcher	HM-4181.XX	1	2-Part Vacuum Split Mold	HM-3827.XX	1
O-Rings (12-pack)	HM-4182.XX	1	Split Miter Box	HM-3847.XX	1
O-Ring Placing Tool	HM-4183.XX	1	Filter Paper (100-pack)	HM-4189.XX	1
Porous Stone	HM-4184.XX	2 or 6	Filter Strips	HM-4189FS	1
Membrane Tester	HM-4185.XX	1	High Vacuum Grease	HM-4198	1



Automatic Pressure Control System,1-Cell Setup



Automatic Pressure Control System, 3-Cell Setup

Manual Pressure Control

Component List for 1 and 3-Cell Triaxial System with Manual Pressure Control

Manual Pressure Control System,1-Cell Setup

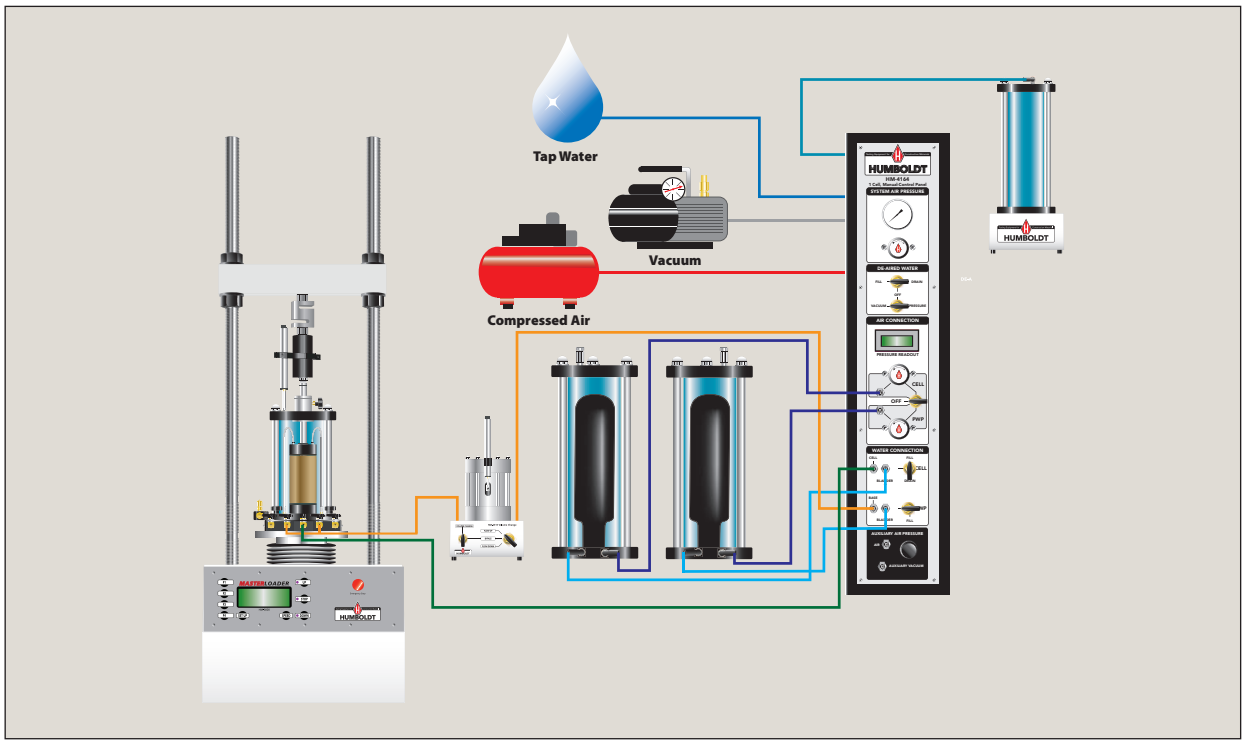
COMPONENTS		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
Pressure		
Pressure Distribution Panel	HM-4164.3F	1
Air/Water Bladder	HM-4151A	2
DeAiring System	HM-4187A.3F	1
Pore Pressure Transducer	HM-4170	1
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Vacuum Pump	H-1763A.4F	1
Volume Change		
Volume Change Apparatus (Required for CU & CD Triaxial)	HM-2315	1
Strain Transducer, 1'' (25mm)	HM-2310.10	1
LSCT/LVDT Mounting Bracket	HM-2310BR	1
Triaxial Cell (choose 1 below)		
3"/ 75mm dia. capacity	HM-4199B	1
4"/ 100mm dia. capacity	HM-4199B-4	1
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	1
Installation Kit	HM-4167	1

Manual Pressure Control System, 3-Cell Setup

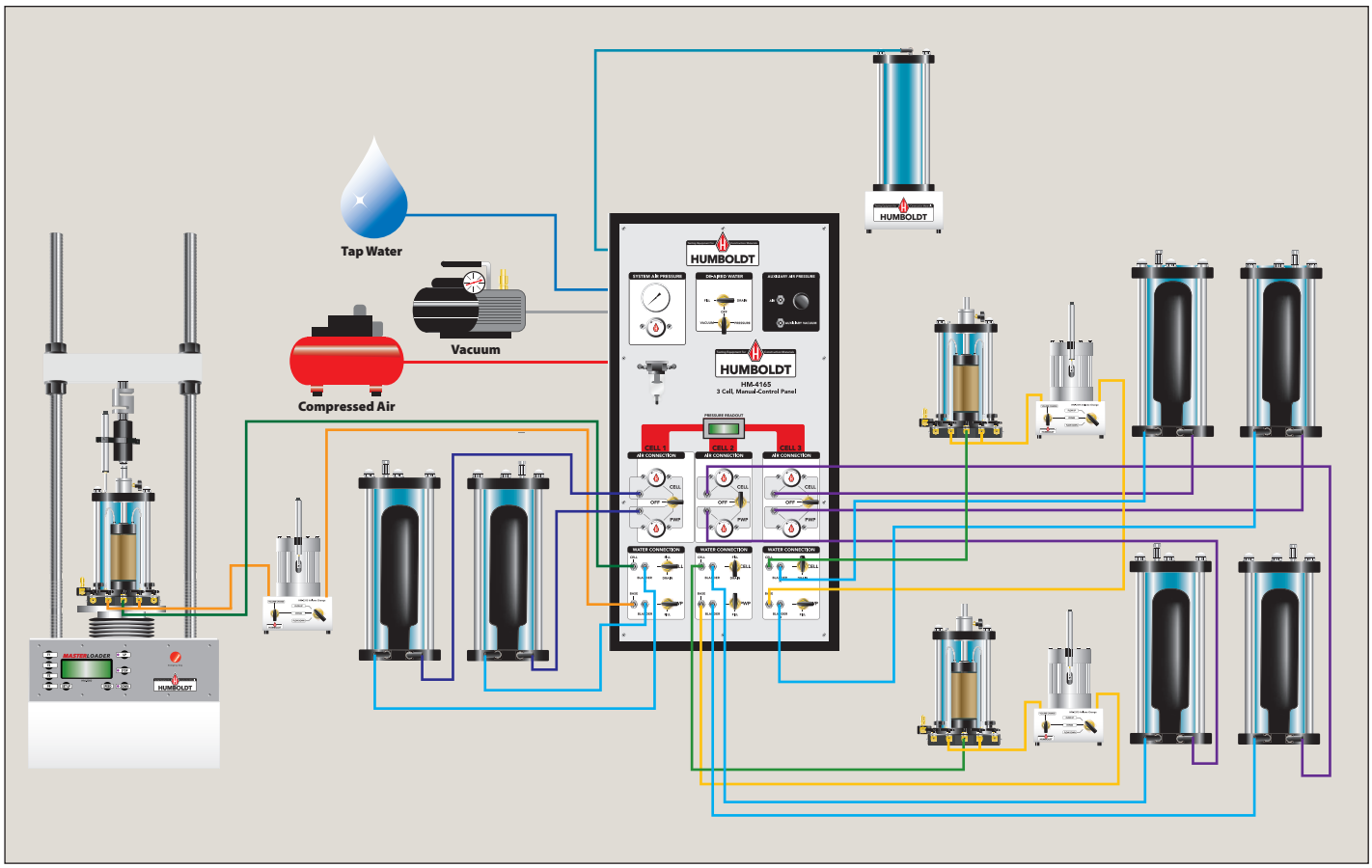
COMPONENTS		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
MiniLogger	HM-2325A.3F	1
Pressure		
Pressure Distribution Panel	HM-4165.3F	1
Air/Water Bladder	HM-4151A	6
DeAiring System	HM-4187A.3F	1
Pore Pressure Transducer	HM-4170	3
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Vacuum Pump	H-1763A.4F	1
Volume Change		
Volume Change Apparatus (Required for CU & CD Triaxial)	HM-2315	3
Strain Transducer, 1'' (25mm)	HM-2310.10	3
LSCT/LVDT Mounting Bracket	HM-2310BR	3
Triaxial Cell (choose 1 below)		
3"/ 75mm dia. capacity	HM-4199B	3
4"/ 100mm dia. capacity	HM-4199B-4	3
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	3
Installation Kit	HM-4167	1

Standard Triaxial Sample Prep Accessories:
(See page 79 for a complete list and description. Items with .XX require a sample size)

Accessory	Item #	Required	Accessory	Item #	Required
Acrylic Base Disk	HM-4179.XX	2 or 6	2-Part Compaction Mold	HM-3817.XX	1
Membranes	HM-4180.XX	1	Base Plate Pedestal	HM-3817.XXBP	1
Membrane Stretcher	HM-4181.XX	1	2-Part Vacuum Split Mold	HM-3827.XX	1
O-Rings (12-pack)	HM-4182.XX	1	Split Miter Box	HM-3847.XX	1
O-Ring Placing Tool	HM-4183.XX	1	Filter Paper (100-pack)	HM-4189.XX	1
Porous Stone	HM-4184.XX	2 or 6	Filter Strips	HM-4189FS	1
Membrane Tester	HM-4185.XX	1	High Vacuum Grease	HM-4198	1



Manual Pressure Control System,1-Cell Setup



Manual Pressure Control System, 3-Cell Setup

FlexPanels Pressure Control

Component List for 1 and 3-Cell Triaxial System with FlexPanel Pressure Control

FlexPanel Pressure Control System,1-Cell Setup

COMPONENTS		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Pore Pressure Transducer	HM-4170	1
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
Pressure		
Pressure Distribution Panel	HM-4150.3F	1
DeAiring System	HM-4187A.3F	1
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Vacuum Pump	H-1763A.4F	1
Volume Change		
Volume Change Apparatus (Required for CD Triaxial)	HM-2315	1
Strain Transducer, 1'' (25mm)	HM-2310.10	1
LSCT/LVDT Mounting Bracket	HM-2310BR	1
Triaxial Cell (choose 1 below)		
3"/ 75mm dia. capacity	HM-4199B	1
4"/ 100mm dia. capacity	HM-4199B-4	1
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	1
Installation Kit	HM-4167	1

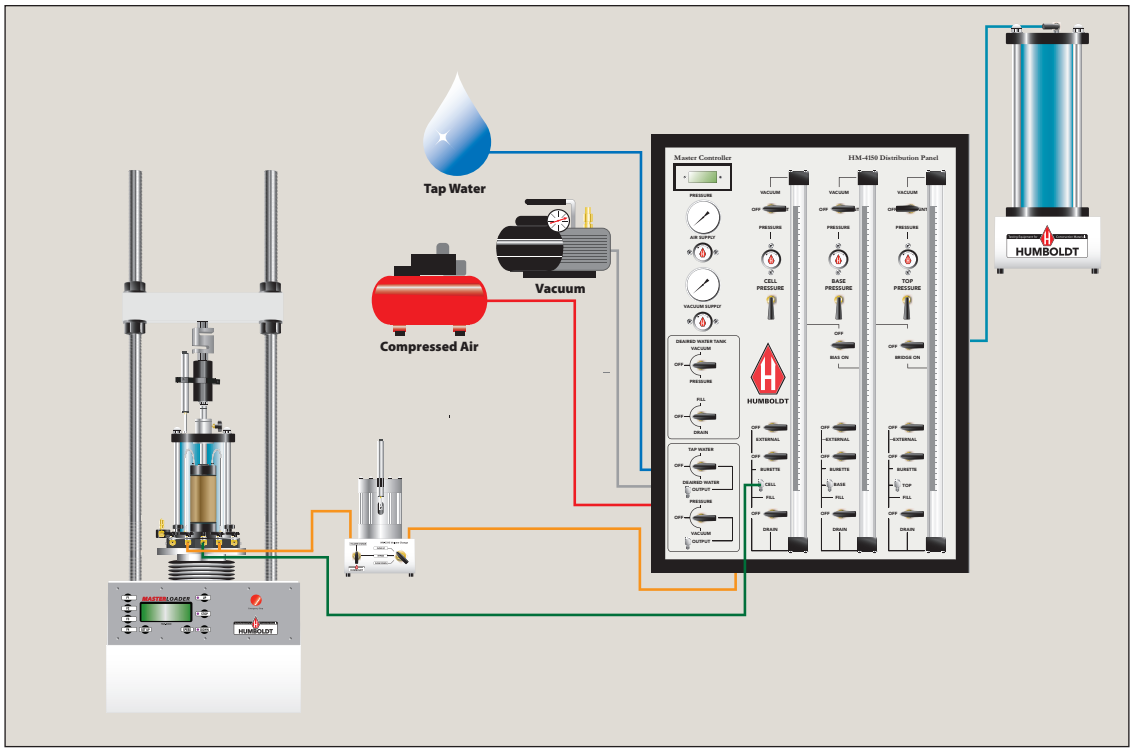
FlexPanel Pressure Control System, 3-Cell Setup

COMPONENTS		
Load Frame (choose 1 below)		
50kN (11240 lbf) capacity	HM-3000.3F	1
15kN (3372 lbf) capacity	HM-2900.3F	1
Load/Strain		
Load Cell	HM-2300.020	1
Strain Transducer (LSCT)	HM-2310.20	1
Pore Pressure Transducer	HM-4170	3
Ball Seat Adapter	HM-200387	1
Strain Transducer Bracket	HM-4178BRT	1
UU Triaxial Software Module	HM-3002SW	1
CU Triaxial Software Module	HM-3003SW	1
CD Triaxial Software Module	HM-3006SW	1
MiniLogger	HM-2325A.3F	1
Pressure		
Pressure Distribution Panel	HM-4150.3F	1
Pressure Distribution Panel	HM-4160A	1
DeAiring System	HM-4187A.3F	1
Silent Air Compressor	HM-4220 or HM.4220.4F	1
Vacuum Pump	H-1763A.4F	1
Volume Change		
Volume Change Apparatus (Required for CD Triaxial)	HM-2315	3
Strain Transducer, 1'' (25mm)	HM-2310.10	3
LSCT/LVDT Mounting Bracket	HM-2310BR	3
Triaxial Cell (choose 1 below)		
3"/ 75mm dia. capacity	HM-4199B	3
4"/ 100mm dia. capacity	HM-4199B-4	3
Top Cap/ Base Pedestal Set (specify specimen size)	HM-4199.XX	3
Installation Kit	HM-4167	1

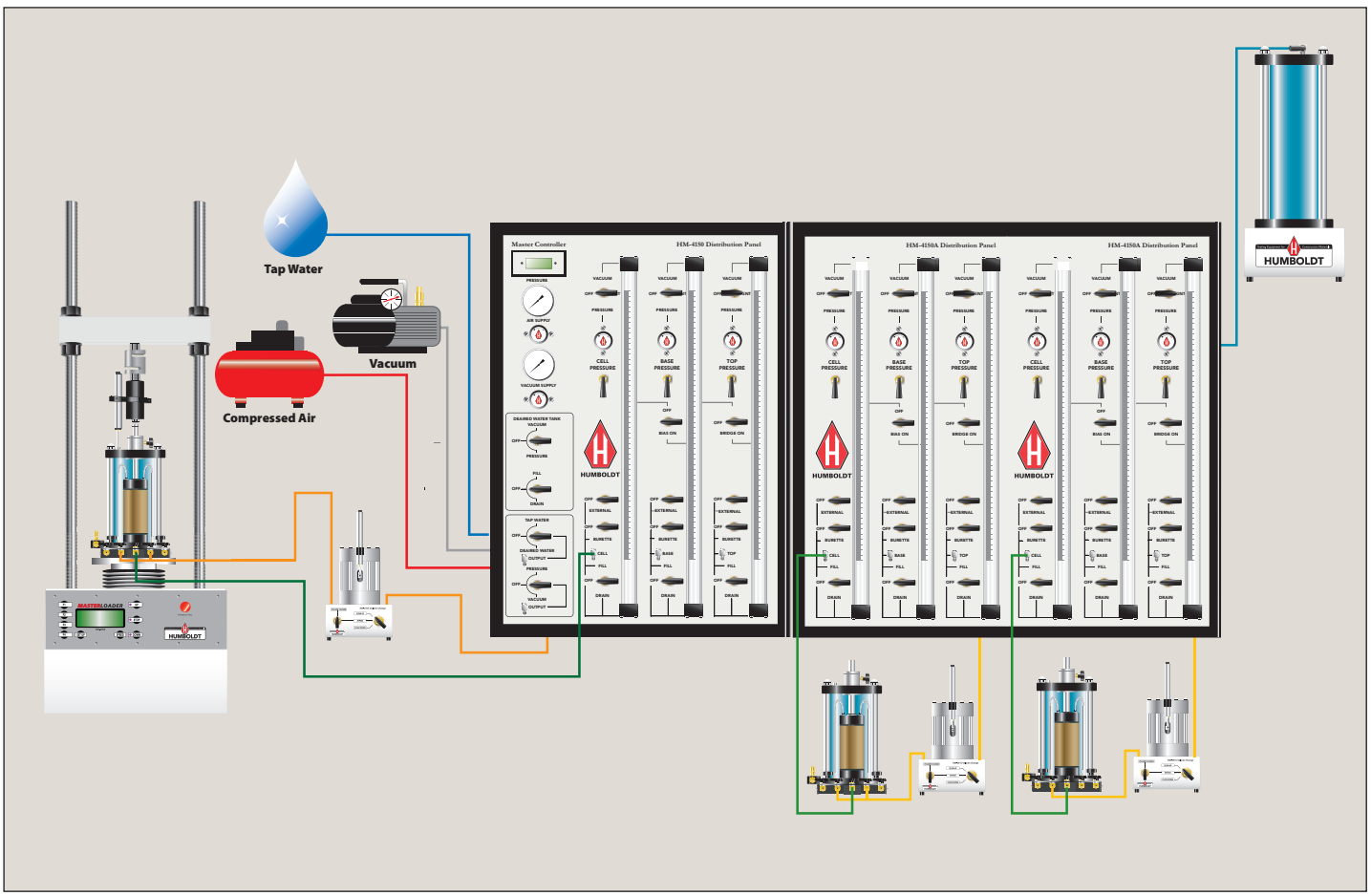
Standard Triaxial Sample Prep Accessories:

(See page 79 for a complete list and description. Items with .XX require a sample size)

Accessory	Item #	Required	Accessory	Item #	Required
Acrylic Base Disk	HM-4179.XX	2 or 6	2-Part Compaction Mold	HM-3817.XX	1
Membranes	HM-4180.XX	1	Base Plate Pedestal	HM-3817.XXBP	1
Membrane Stretcher	HM-4181.XX	1	2-Part Vacuum Split Mold	HM-3827.XX	1
O-Rings (12-pack)	HM-4182.XX	1	Split Miter Box	HM-3847.XX	1
O-Ring Placing Tool	HM-4183.XX	1	Filter Paper (100-pack)	HM-4189.XX	1
Porous Stone	HM-4184.XX	2 or 6	Filter Strips	HM-4189FS	1
Membrane Tester	HM-4185.XX	1	High Vacuum Grease	HM-4198	1



FlexPanel Pressure Control System,1-Cell Setup



FlexPanel Pressure Control System, 3-Cell Setup