

Custom Systems

Model 9415 Multi-Channel Pressure Test System

11/2024

Applications

- High speed production testing of pressure sensors
- Controlling pressure in large volumes
- Ideal for manufacturing

Special Features

- Remote transducer module
- High speed pressure control
- Ranges to 300 psi
- Touchscreen user interface



Model 9415 - Multi-Channel Pressure Test System

Description

The Mensor Model 9415 multi-channel pressure test system is optimized for controlling multiple channels with large volumes.

Functionality

The Mensor Model 9415 Multi-Channel Pressure Test System is configured in a 19" rack, with either two, four, six, or eight channels of pressure control.

The Model 9415 can be configured with a variety of accessories that can enhance performance of the system.

Unit setup

The rack system is mounted on casters and should be installed on a level surface with adequate airflow. The emergency shutoff button on the Model 9414 controller, the rack power connection, and the safety valves on the side of the rack if so equipped should be accessible to the operator. Threaded feet/supports should be used where appropriate to keep the unit in place. A dry, clean compressed air or nitrogen supply is required for operation. The remote transducer module Model 9418 should be mounted close to the test devices to minimize the pressure exchanges and maximize the operational speed of the system.

Maintenance

Depending upon the transducers selected, the calibration interval can be 365 or 180 days. Either the entire unit can be shipped to Mensor for calibration or the transducers can be removed from the unit and shipped by themselves to Mensor. Only qualified technicians should open up the Model 9414 housing and remove the transducers.

Each new unit has a 1-year warranty from the date of delivery.

Configuration options: Model 9415

Basic Instruments - Model 9415	
Operating temperature	15 to 40 C
Humidity	10 to 85% RH (non-condensing)
Communications	RS-232, 57600 baud, 8, 1, N
Screen	7.0" color LCD with resistive touchscreen
Warm-up time	Approx. 15 min
Recommended pressure media	Quality class of 1.2.1 (ISO standard 8573.1) (Not suitable for oxygen use.)
Pneumatic interface	¼" Tube, 7/16-20 female SAE, 6mm tube, or 6mm push-to-connect tube fittings
Permissible supply port pressure	110 - 120% FS or 10 psi (0.69 bar), whichever is greater
Weight	~550lbs (250kg) to ~250lbs(113kg) configuration & option dependent
Dimensions refer to "rack options"	Refer to "rack options"
Power	100 to 240 VAC, 47 to 63 Hz, 1500 VA max, 750 VA typical

Rack Options - Model 9415	
36U Rack(nominal dimensions)	Width ≈23" (58.42 cm) Height ≈72" with casters (182.88 cm) Depth ≈31.5"(80.01 cm)
28U Rack(nominal dimensions):	Width ≈23" (58.42 cm) Height ≈58" with casters (147.32 cm) Depth ≈31.5"(80.01 cm)
16U Rack (nominal dimensions)	Width ≈23" (58.42 cm) Height ≈32" with casters (81.28 cm) Depth ≈31.5"(80.01 cm)
Double bay rack (nominal dimensions):	Width ≈ width of left rack+width of right rack Height ≈ tallest rack selected Depth ≈31.5" (80.01 cm)

1) A double bay rack is when two racks are joined together. These racks may or may not be of the same size. This is usually done when two 9415s are housed in the same system or additional functionality is needed.

2) The nominal dimensions provided do not include DUT panels and side mounted accessories.

Pneumatic Range Options - Model 9415	
Standard range	
Pressure range (9414)	0 to 300 PSI
Control channels	2, 4, 6, or 8
Measurement accuracy(9414)	0.01% of full scale
Standard control stability(9414)	0.01% of range
System total volume per 9414 channel	Approximately 11.3 liters using a Model 9412
Remote transducer ranges	Any range below 300 PSI absolute
Remote transducer accuracy	0.01% IS-50
Max number of remote transducers	5

1) Transducer uncertainty may vary depending on the desired pressure range.

Configuration Options: Model 9415

Model 9415 Configuration Options:			
Accessory Sub-Unit	Unit Height	Functionality Added	Supporting Units Needed
Power Strip	1U	Power outlets on the front of the unit	N/A
Drawer	4U	Storage space	N/A
Model 9482 (Vacuum Source)	6U	Pumping speed: <ul style="list-style-type: none"> 3.06m³/hr, 1.8cfm at 60Hz 2.53m³/hr, 1.49cfm at 50Hz Max vacuum: 82mbar	N/A
Model 9483 (Premium Vacuum Source)	6U	Pumping speed: <ul style="list-style-type: none"> 3.6m³/hr, 2.1cfm at 60Hz 3.0m³/hr, 1.8cfm at 50Hz Max vacuum: 3.3x10 ⁻¹ mbar	N/A
IDP-15 (Vacuum Source)	8U	Pumping speed: <ul style="list-style-type: none"> 15.4m³/hr, 9.1cfm at 60 Hz 12.8m³/hr, 7.5cfm at 50 Hz Max vacuum: 1.3x10 ⁻² mbar	N/A
Model 9412 (Buffer Tanks)	6U	<ul style="list-style-type: none"> Two 3-gallon buffer tanks (300PSI max) Help stabilize pressure fluctuations Reduce compressor load 	Application Dependent: <ul style="list-style-type: none"> (Sub-atmospheric) Vacuum source such as the Model 9483, 9482, or IDP-15 (Above-atmospheric) Pressure supply
Model 73 (5:1 Booster)	6U	Max compression ratio of 5:1	An ample supply pressure is needed.
DUT Panel and/or Cable Passthrough	N/A	User access point for pneumatic regulation, DUT/supply ports and I/O	N/A
Blank Panel	1U-10U	Aesthetic concealment of pneumatic routing	N/A
Model 9418 (4U Drawer Enclosure)	4U	<ul style="list-style-type: none"> High speed pressure control Refer to the Model 9418 breakdown for additional info 	Requires 4-Channels of the Model 9414 per Model 9418
Model 9418 (Nema 4 Enclosure)	N/A	<ul style="list-style-type: none"> Semi-mobile Does not consume Us Refer to the Model 9418 breakdown for additional info 	Requires 4-Channels of the Model 9414 per Model 9418
Cord Reel	N/A	<ul style="list-style-type: none"> Longer power cord (~30ft) Extends and retracts 	N/A
Disconnect Switch	N/A	Convenient Power Disconnect Switch	N/A
Keyed Disconnect Switch	N/A	Secure Power Disconnect Switch	N/A
Door Switch	N/A	Turns off power when the rear rack door is open.	N/A

(1U≈1.75in)

Rules:

- ❖ The sum of unit heights must not exceed the total Us of the rack.
- ❖ Units cannot be subdivided.
- ❖ Each Model 9414 occupies 4U of space. Every Model 9415 includes at least one Model 9414.
- ❖ Each Model 9414 can only have 2 or 4 channels.
- ❖ Every system must include a vacuum source. This can be the Model 9482, Model 9483, and/or the IDP-15.
- ❖ A Model 9412 is needed for every two-channels.
- ❖ Unused front space will be filled with blank panels.
- ❖ DUT Panel can be mounted on the left and/or right side of the unit.

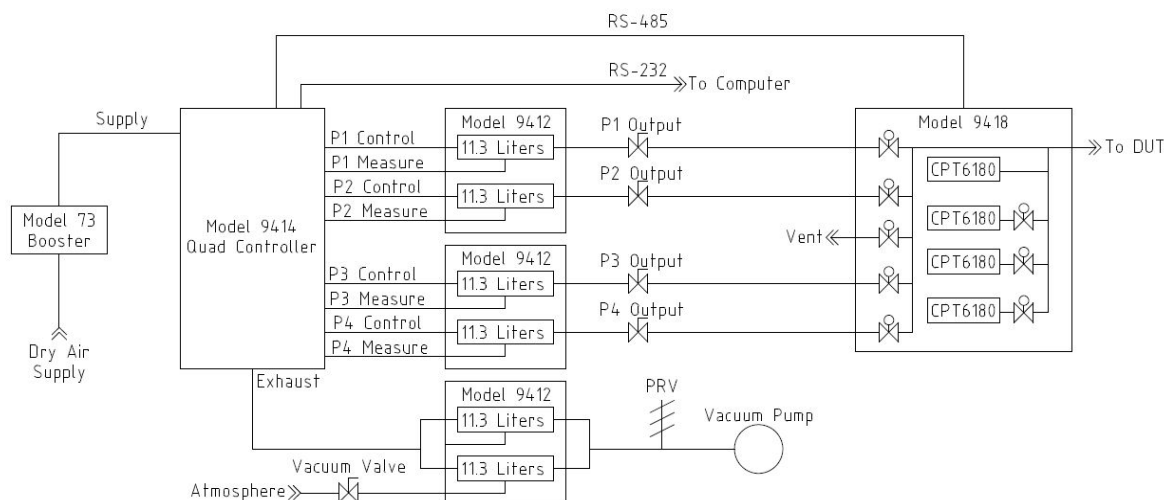
Model 9418 Description:

The Model 9418 combines the outputs of 4-channels into a single output to turn the Model 9415 into a high speed controller. It accomplishes this through the use of flow-control solenoids and pressure transducers in a enclosure that be installed in close proximity to a DUT or assembly line. In general, the closer it is to the DUT, the better the performance.

Users can assign four different set points to their Model 9414 pressure controller. This allows user to remotely switch between the 4 different set points or vent a DUT. This process allows for rapid transitions from one set point to the next.

The Model 9418 can come in a NEMA 4 enclosure or 4U drawer. The NEMA 4 enclosure is intended to be mounted by the user near the DUT being tested. It can also be mounted to the side of the rack as space saving measure. The 4U drawer version is affixed to the rack itself and is not intended to be removed from the unit. The internal transducers can be accessed by opening the drawer.

Pneumatic Schematic (4-Channel 9415; 1 Model 9418)

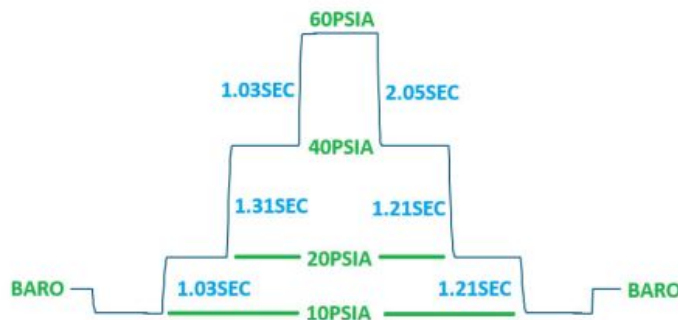


The pneumatic schematic shown above is an example of a 4-Channel Model 9415. It has an additional Model 9412 to act as vacuum buffer source. It also has a Model 73 to boost the incoming air supply. The Model 9418 uses the 4-channels of the Model 9414 to rapidly control a single DUT. Ideally, the Model 9418 would have a minimal hose length to said DUT.

Sample Test Data (4-Channel 9415; 1 Model 9418)

This data was recorded using a 4-Channel 9415 with a Model 9418 and a DUT head volume of 50cc. It was able to rapidly control between 4-different pressure set points in only a matter of seconds. The 4-different set points selected for this test were 10 PSIA, 20 PSIA, 40PSIA, and 60 PSIA.

It transitioned from 10 PSIA to 20 PSIA in 1.03 seconds, 20 PSIA to 40 PSIA in 1.31 seconds, and from 40 PSIA to 60PSIA in 1.03 seconds. When descending it transitioned from 60 PSIA to 40PSIA in 2.05 seconds, 40 PSIA to 20 PSIA in 1.21 seconds, and from 20 PSIA to 10 PSIA in 1.21 seconds. Note that your results may vary. Variance is largely dependent upon DUT volume, vacuum source selected, and hose length from the Model 9418 to the DUT.



Configuration Options Examples: Model 9415

The following examples illustrate of how the Model 9415 can be configured based on the provided table. Note, not all possible configurations are displayed, and not all accessory options are shown.

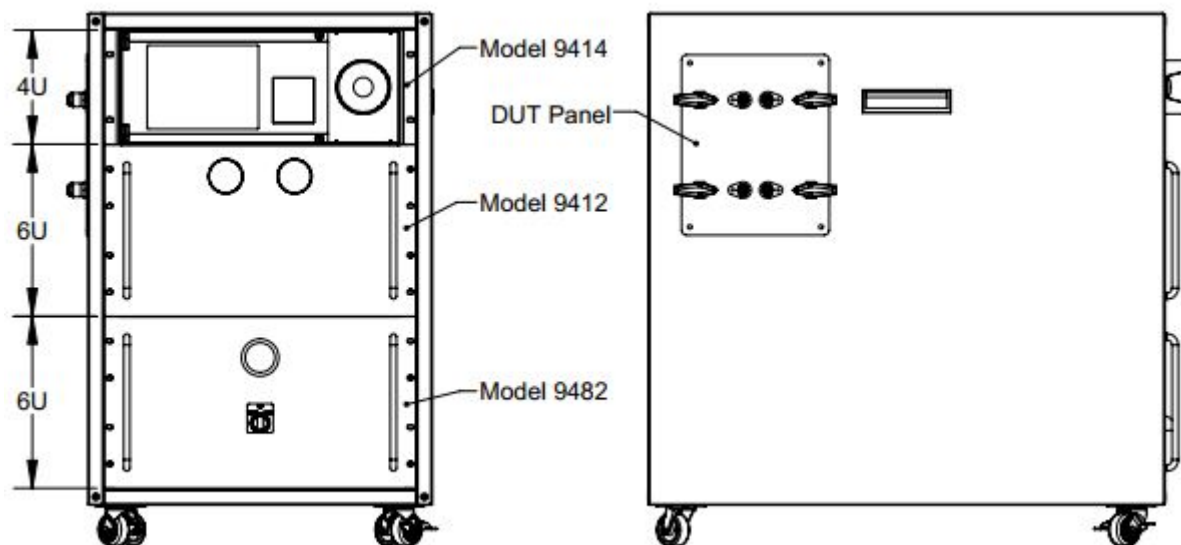
Example 1: 2-Channel 16U Model 9415

In this configuration, the Model 9415 is configured as a 2-channel instrument inside of a 16U rack. The nominal dimensions of a rack this size can be found in the Rack Options - Model 9415 table.

The Model 9414 is the controller and is setup in a 2-channel configuration. The Model 9412 is needed to act as a buffer source for the Model 9414. One Model 9412 is needed for every 2-channels. The Model 9482 provides a vacuum source for the unit and allows sub-atmospheric pressure to be reached.

DUT Panels are typical mounted on the side of the Model 9415 as shown below. This panel can be placed on the left or right side of the unit. If desired or needed panels can be present on both sides of the unit. DUT Panels typical have pneumatic ports, ball valves, and communication ports present.

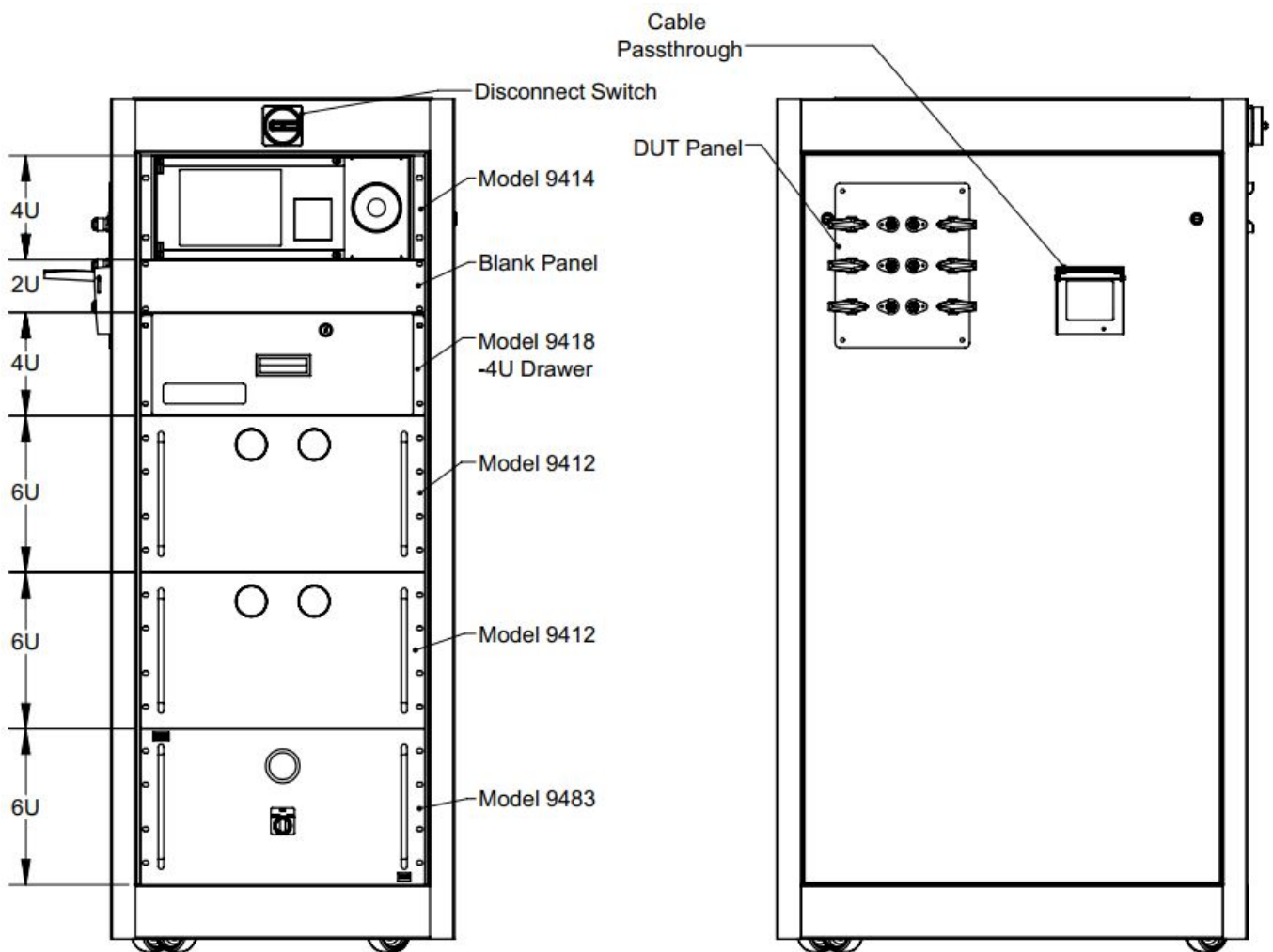
The DUT panel in this configuration has four ports. There is one port per channel. One port for supply pressure and one port to the vacuum source.



Example 2: 4-Channel 28U Model 9415

In this example, the Model 9414 is the controller and is setup in a 4-channel configuration in a 28U rack. The nominal dimensions of a rack this size can be found in the Rack Options - Model 9415 table. One Model 9412 is needed for every 2-channels, therefore, there are a total of two 9412s. The Model 9483 provides a vacuum source for the unit and allows sub-atmospheric pressure to be reached. The disconnect switch on the front of the unit allows rapid power shutdown and startup. The Model 9418 is in a 4U drawer configuration and is integrated into the rest of the unit.

In this example, the DUT panel is on the left side of the unit along with a cable passthrough. The DUT panel has a total of 6 ports. One port per channel, one port for the pressure supply, and one port for the vacuum source. Cables passthroughs can be used to allow direct hose and communication connections.



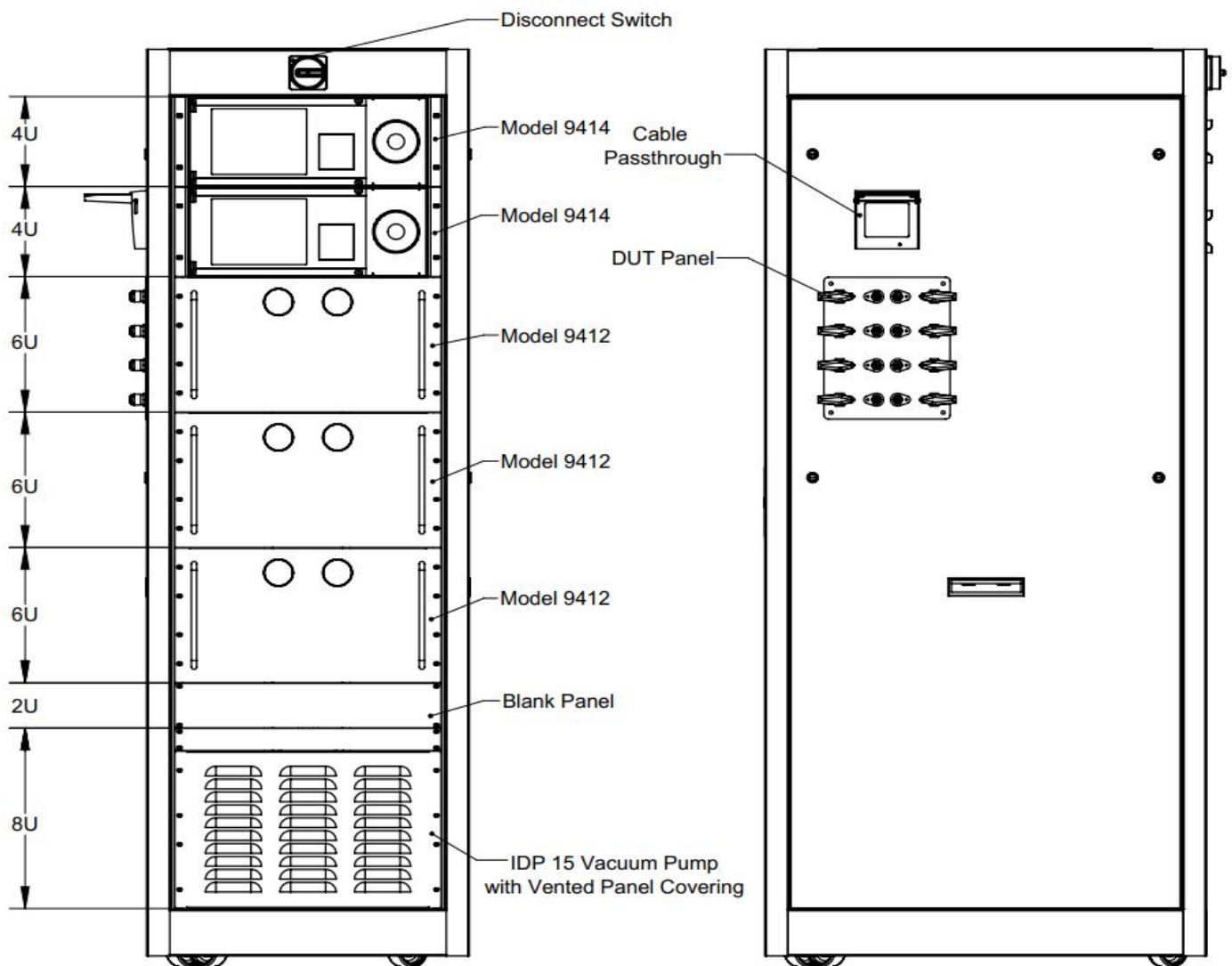
Example 3: 6-Channel 36U Model 9415

In this configuration the top Model 9414 is the master controller and the Model 9414 beneath it is the slave. The master controller is configured for 4-channels and the bottom controller is configured for 2-channels. This gives the instrument a total of 6-channels in the 36U rack shown below. The nominal dimensions of a rack this size can be found in the Rack Options - Model 9415 table.

There are a total of three Model 9412s, one for every 2-channels. The IDP-15 vacuum pump is too large to be it's own separate unit and is therefore permanently mounted to the base of the rack. The vented and blank panel provide an aesthetic and protective front cover for the pump. The disconnect switch on the front of the unit allows rapid power shutdown and startup.

The DUT panel has a total of eight ports. One port per channel, one port for the pressure supply, and one port for the vacuum source. Cables passthroughs can be used to allow direct hose and communication connections.

In this configuration, a Model 9418 (NEMA 4 enclosure version) can be mounted near the DUT. It would take up four of the channel ports.

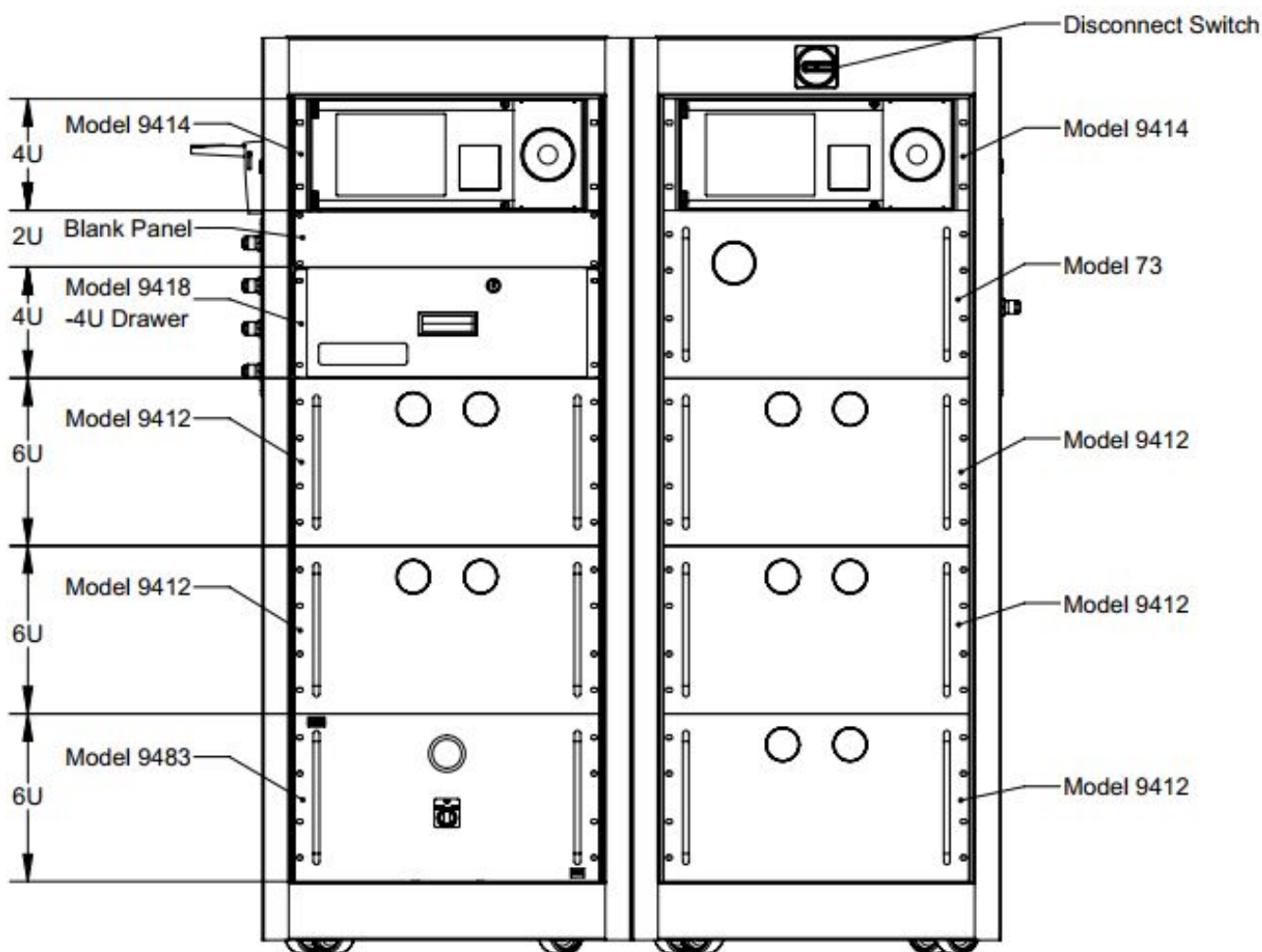


Example 4: 8-Channel 28U Doublebay Model 9415

In this configuration, the left Model 9414 is the master controller and the Model 9414 to the right of it is the slave. Both controllers are configured for 4-channels. This gives the instrument a total of 8-channels in the two 28U racks shown below. The nominal dimensions of a rack this size can be found in the previous Rack Options - Model 9415 table. Different rack sizes can be bonded together as needed or desired.

Four of the Model 9412s are present for all the channels. The fifth Model 9412 acts as a buffer volume for the vacuum source. In this case, the vacuum source is the Model 9483. The Model 73 increases the incoming supply pressure with a 5:1 compression ratio. The disconnect switch on the front of the unit allows rapid power shutdown and startup.

Two Model 9418s can be used in this configuration. In addition to the 4U drawer Model 9418 illustrated below, another Model 9418 in a NEMA 4 enclosure can be mounted near the DUT. This would take up eight of the channels ports.



Scope of Delivery

- A Model 9415 with selected options
- DUT Hoses

Options

- Refer to the Model 9414 datasheet for all the possible configurations
- External Refer to the Model 9415 Configuration Options table to view the possible options and configurations

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