

# Custom Systems

## Model 9471 CPC6050 Rack

10/2024

### Applications

- Manufacturing
- Calibration
- Healthcare and Avionics
- Research and Development Laboratories

### Special features

- Customizable Configuration
- Pressure Ranges: -1...210 bar [-15...3,045 psi]
- Control Stability <math>< 0.0003\%FS</math>
- Accuracy 0.01% FS to 0.008% FS
- Precision 0.004% FS



**Model 9471 CPC6050 Rack**

### Description

The Model 9471 is a customizable rack unit that houses a CPC6050 pressure controller. Various sub-units can be integrated into the Model 9471 to provide different functionalities, making it a turnkey support system for the CPC6050.

### Functionality

The touch screen, combined with an intuitive user interface, ensures maximum ease of use. The availability of multiple menu languages enhances its operability. Users can specify a pressure set point either via the touchscreen or through a remote interface. Additionally, the pressure can be adjusted in defined, programmable steps using the STEP buttons. Extensive test programs can be easily created using the instrument menu. Depending on the application, the control rate can be set to precision, high speed, or a user-defined variable rate.

### Unit Setup

The rack system is mounted on casters and should be installed on a level surface with adequate airflow. The disconnect switch and DUT panel, if equipped, should be accessible to the operator. Threaded feet should be used where appropriate to secure the unit. A dry, clean supply of compressed air or nitrogen is required for operation.

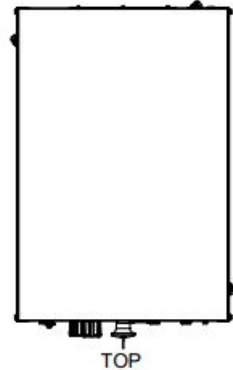
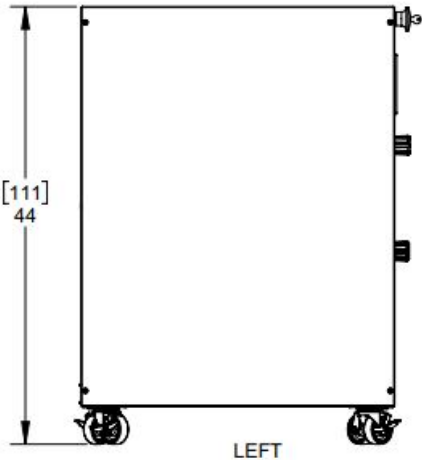
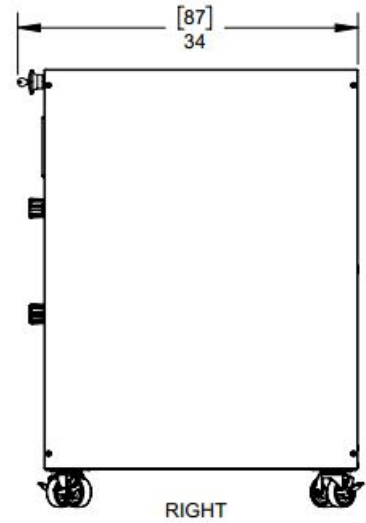
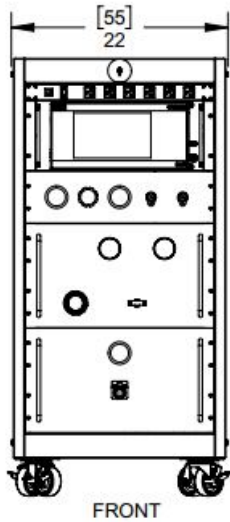
### Maintenance

The calibration interval is 365 days, depending on usage conditions. The entire instrument can be shipped to Mensor for calibration, or the transducer can be removed from the CPC6050 and shipped separately. Maintenance requirements for Model Sub-Units are detailed in their respective datasheets/manuals.

The CPC6050 controller inside of each unit has a two-year warranty. The rest of the machine has a 1-year warranty from the date of delivery.

# Nominal Dimensions: Inches [Centimeters]

There will be some minor variations in dimensions depending on what accessories are picked, where the DUT panel is located, and how it is configured.



## Configuration Options:

The Model 9471 is a CPC6050 housed in a rack, which offers a total of 20U of space. The remaining space, not taken up by the CPC6050, is usually occupied by supporting equipment necessary to enable the CPC6050's functionality. For information on the various working ranges, please refer to the CPC6050 datasheet. Additionally, consult the table below to determine the accessories required for your desired turnkey system.

## Model 9471 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"> <li>3.06m<sup>3</sup>/hr, 1.8cfm at 60Hz</li> <li>2.53m<sup>3</sup>/hr, 1.49cfm at 50Hz</li> </ul> Max vacuum: 27.5inHg=82mbar	N/A
Model 9483 (Premium Vacuum Source)	6U	Pumping speed: <ul style="list-style-type: none"> <li>3.6m<sup>3</sup>/hr, 2.1cfm at 60Hz</li> <li>3.0m<sup>3</sup>/hr, 1.8cfm at 50Hz</li> </ul> Max vacuum: 3.3x10 <sup>-1</sup> mbar	N/A
Model 9484 (Pressure Source)	6U	<ul style="list-style-type: none"> <li>Allows CPC6050 to operate up to 110PSI</li> <li>The internal compressor cycles from 120 to 150PSI</li> </ul>	N/A
Model 9412 (Buffer Tanks)	6U	<ul style="list-style-type: none"> <li>Two 3-gallon buffer tanks (300PSI max)</li> <li>Help stabilize pressure fluctuations</li> <li>Reduce compressor load</li> </ul>	Application Dependent: <ul style="list-style-type: none"> <li>(Sub-atmospheric)Model 9483 or 9482</li> <li>(Above-atmospheric)Model 9484</li> </ul> At a minimum, an external pressure and/or vacuum source is needed.
Model 75 (25:1 Booster)	6U	<ul style="list-style-type: none"> <li>Max compression ratio of 25:1</li> <li>Allows CPC6050 to operate at its max possible range of 3045PSI</li> </ul>	An ample 135PSI supply is needed for max possible range.
Model 73 (5:1 Booster)	6U	<ul style="list-style-type: none"> <li>Max compression ratio of 5:1</li> <li>CPC6050 can operate up to 675PSI</li> </ul>	An ample 150PSI supply is needed for the CPC6050 to comfortably control to 675 PSI.
DUT Panel	3U-10U	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
A-CPS	N/A	<ul style="list-style-type: none"> <li>DUT contamination prevention</li> <li>Up to 2 can be used per CPC6050 (dependent on the number of DUT Channels)</li> </ul>	N/A
Cord Reel	N/A	<ul style="list-style-type: none"> <li>Longer power cord (~30ft)</li> <li>Extends and retracts</li> </ul>	N/A
Rear Internal Tank Mount	N/A	Application/Tank/Setup Dependent: <ul style="list-style-type: none"> <li>Additional Buffer Volume</li> <li>Does not consume Us</li> <li>Refillable pressure source</li> </ul>	Application Dependent
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 20U.
- ❖ Units cannot be subdivided.
- ❖ Each CPC6050 occupies 4U of space. Every Model 9471 includes at least one CPC6050.
- ❖ Unused front space will be filled with blank panels.
- ❖ The minimum DUT panel size is 3U, but this may vary based on the number of ports regulators, and gauges required.
- ❖ DUT panels can be mounted on the rear of the unit to save space. Note that the rear door must be opened or removed to access these panels.

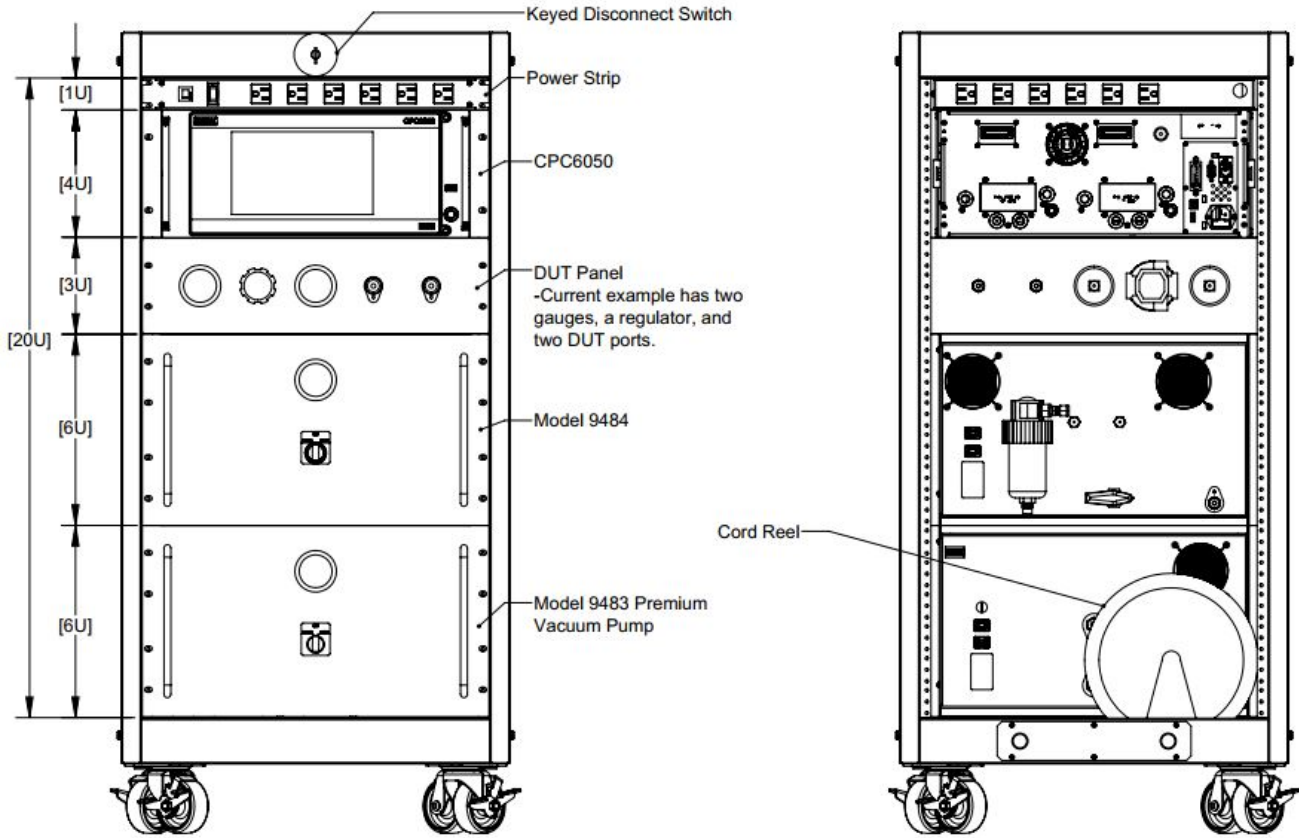
# Configurations Examples:

The following examples provide visual samples of how the Model 9471 can be configured based on the provided table. Note that all rear doors have been hidden, not all possible configurations are displayed, and not all accessory options are shown.

## Example 1:

In this configuration, the CPC6050 controller can operate from 110 PSI down to sub-atmospheric levels, though the operating range may be limited by the selected transducer. The power strip allows external devices to be plugged in and receive power. The key disconnect switch enables power to be shut down freely but requires the key to turn back on.

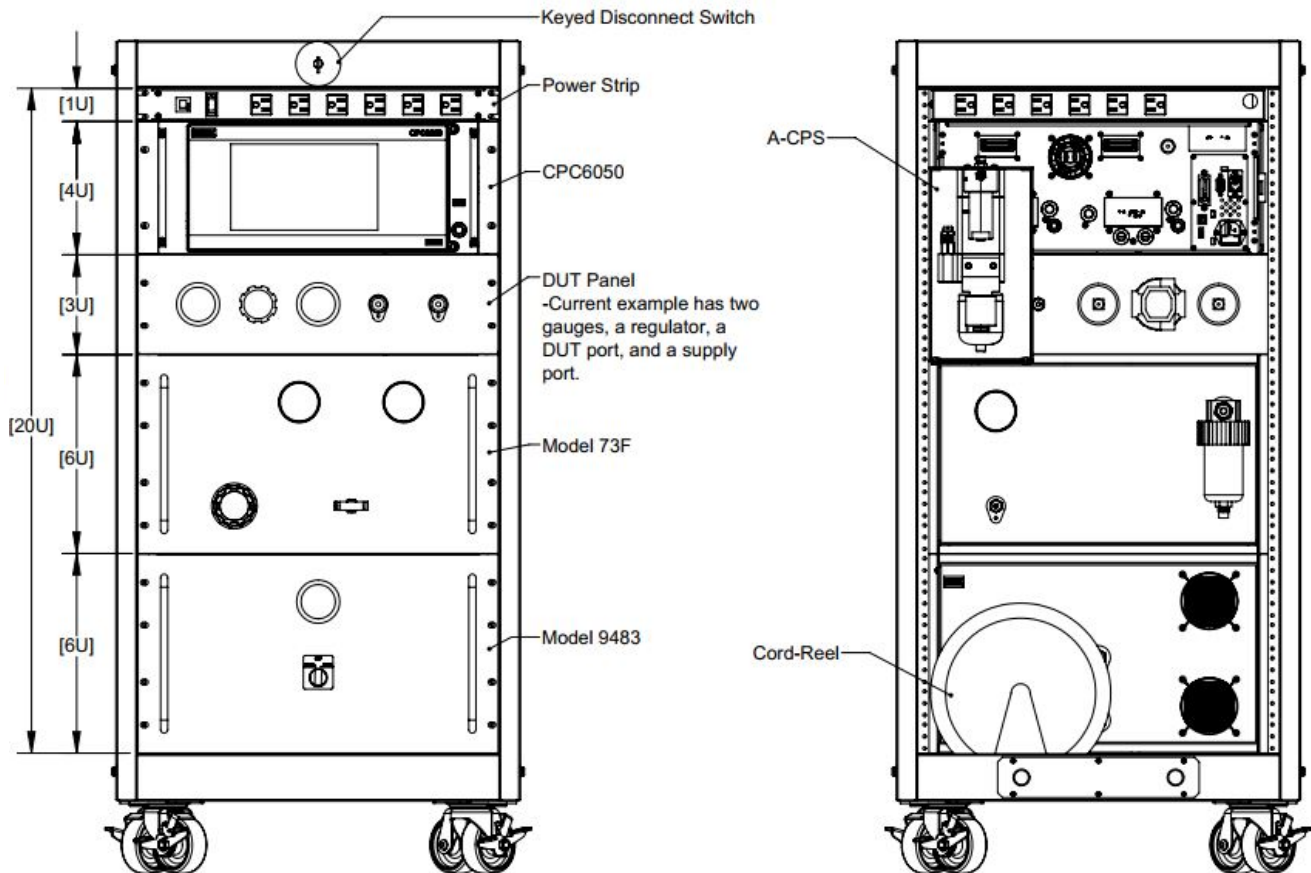
The regulator on this rack includes two gauges, a regulator, and two DUT ports, allowing for pressure down-regulation if needed. At the rear of the instrument, the cord reel extends the primary power cable up to 30 feet and allows it to fully retract.



## Example 2:

In this setup, the CPC6050 can operate from 675 PSI down to below atmospheric pressure with an ample supply of 150 PSI. The operating range may be limited by the selected transducers. The Model 73 increases the incoming pressure with a 5:1 compression ratio, and the Model 9483 allows for sub-atmospheric operation. A keyed disconnect switch ensures secure power shutdown, and a power strip provides power to external devices.

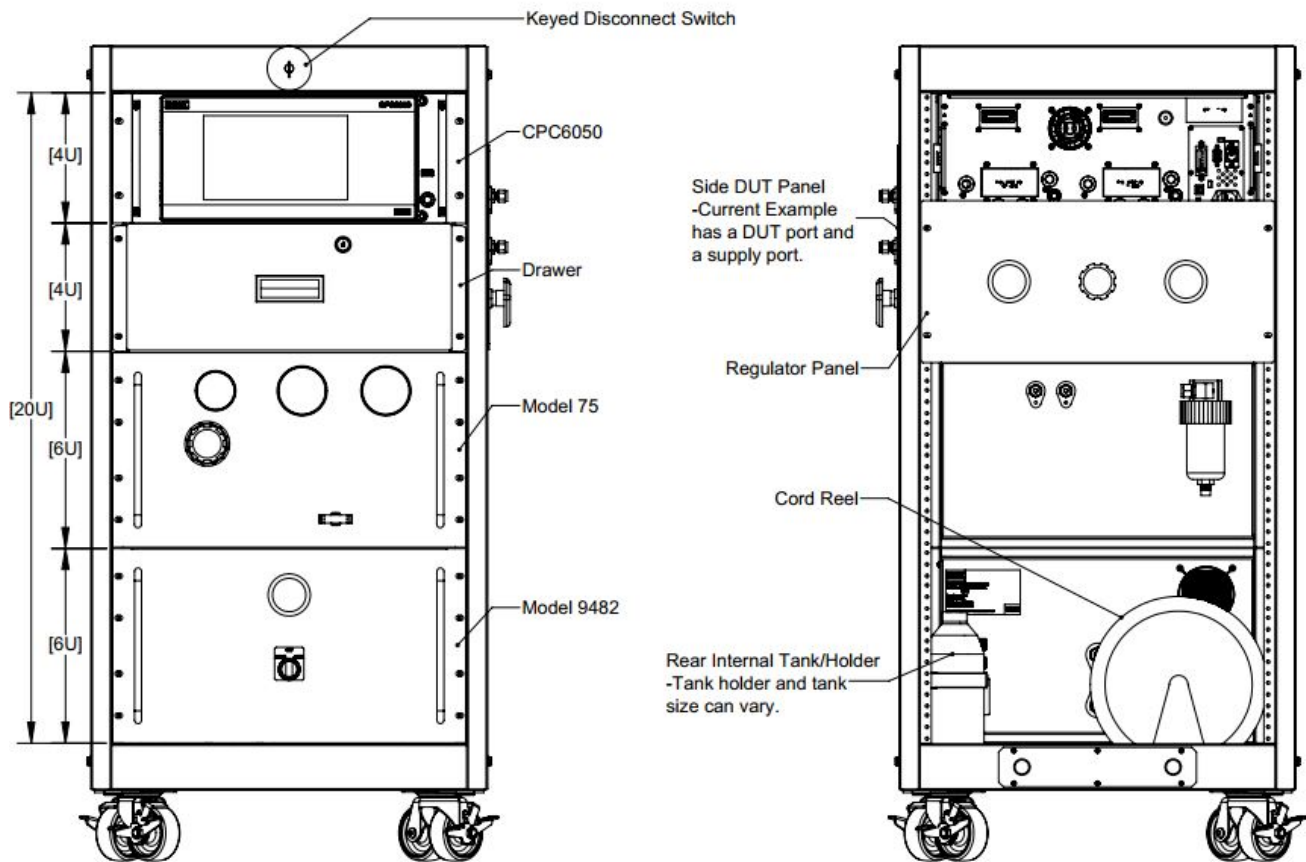
The front-facing DUT panel offers easy access to the DUT ports. At the rear, a cord reel supplies an extendable and retractable power cable. The A-CPS, also mounted at the rear, is an automatic contamination prevention system. It connects to one of the DUT ports and prevents contamination by routing the pressure flow through a liquid trap and a coalescing filter.



### Example 3:

In this setup, the Model 9471, with a pressure supply of 135 PSI, can operate the CPC6050 from its maximum pressure of 3035 PSI down to below atmospheric pressure. The actual range may be limited by the transducer used. The Model 75 boosts incoming pressure, the drawer offers storage, and the Model 9482 allows for sub-atmospheric operations. The rear internal tank mount can serve various purposes based on customer specifications, such as a buffer volume or a refillable pressure supply. Note that the exact tank mount and tank may differ in size and appearance based on the tank volume desired pressure range, and intended function.

In this example, the DUT panel is mounted on the side of the unit, and a regulator panel is mounted on the back. This side and rear mounting gives the operator easy access to the DUT ports and keeps the front of the unit clear. Usually, the DUT and regulator panels are combined into one DUT panel, but they can be separated if needed to restrict access to the regulators or due to the number of ports, valves, I/O, gagues, and regulators.



### DUT Panel Options:

DUT panels are typically placed at the front of the unit and must be at least 3U in size. Depending on the number of gauges, ports, regulators, and valves, the panel might need to be larger. Communication passthrough ports to the CPC6050 can also be integrated into the DUT panel. These can be D-Sub, Ethernet, USB, and/or GPIB. Panels can also be placed on the left, right, or rear of the rack. If placed at the rear, the rack's door must be opened or removed to access the panel.

Ball valves can control and redirect pneumatic ports/lines based on customer specifications. Pressure lines are typically 1/4" tubes, and vacuum lines are 3/8" tubes, with adaptors as needed. Ports can be 1/4" tube, 3/8" tube, 6mm, or quick connects. Additional port options are available upon request.

# Specifications

## Model CPC6050

Base instrument		
<b>Instrument</b>		
Instrument version	19" rack-mounting kit	
Weight	approx. 22.7 kg (50 lbs) incl. all internal options	
Warm-up time	approx. 15 min	
<b>Display</b>		
Screen	10.1" color LCD with capacitive touchscreen	
Resolution	4 ... 6 digits depending on range and units	
<b>Connections</b>		
Pressure connections	up to 8 ports with 7/16"- 20 F SAE, up to 2 ports with 1/8" F NPT and 1 port with	
Filter elements	The instrument has a 40-micron filters on all pressure ports.	10-32 UNF female
Pressure port adapters	Standard: without Option: 6 mm tube fitting, 1/4" tube fitting, 1/4" female NPT fittings, 1/8" female NPT fittings or 1/8" female BSP fittings	
Barometer port adapters	Standard: barb fitting Option: 6 mm tube fitting, 1/4" tube fitting	
Permissible pressure media	Dry, clean air or nitrogen (ISO 8573-1:2010 class 5.5.4 or better)	
Wetted parts	Aluminum, brass, 316 and 316L stainless steel, Buna N, FKM/FPM, PCTFE, PEEK, PTFE, PPS, glass-filled epoxy, RTV, ceramic, silicone, silicone grease, Urethane	
Overpressure protection	Safety relief valve fixed to reference pressure transducer and adjusted to customized measuring range	
<b>Permissible pressure</b>		
Supply port	110% FS or 0.69 bar (10 psi), whichever is greater	
Measure/Control port	max. 105% FS	
<b>Permissible ambient conditions</b>		
Humidity	5 ... 95% r. h. (relative humidity non-condensing)	
Compensated temperature range	15 ... 45 °C (59 ... 113 °F)	
Mounting position	horizontal	
<b>Control parameter</b>	<b>SVR module <sup>9)</sup></b>	<b>LPPump module</b>
Control stability	< 0.003% FS of the active range (typical 0.001 % FS <sup>10)</sup> )	< 0.003% FS of the active range (typical 0.001 % FS <sup>10)</sup> )
Control mode	precision, high speed and custom	external supply on / off
Control time	15 s <sup>11)</sup>	25 s <sup>11)</sup>
Control range	0 ... 100% FS	0 ... 100% FS
Minimum control pressure	0.0017 bar (0.025 psi) over exhaust pressure or 0.05 % FS, whichever is greater	0.0034 bar (0.05 psi) over exhaust pressure or 0.05% FS, whichever is greater
Overshoots	< 1% FS in high speed control mode (typical <0.05% FS in precision control mode)	< 1% FS in high speed control mode (<0.1% FS in pump only mode)
Test volume	50 ... 1,000 ccm	50 ... 300 ccm
<b>Communication</b>		
Interface	Standard: Ethernet, IEEE-488, USB, RS-232.	
Command sets	Mensor, WIKA SCPI, others optional	
Response time	approx. 100 ms	
Internal program	up to 24 sequences with up to 99 steps each	

Additional information regarding the CPC6050 can be found on its datasheet and manual which are located on Mensor's website.

## Base Instrument - Model 9471

Operating Temperature	15 to 40C
Storage Temperature	5 to 40C
Humidity	10 to 85% RH (non-condensing)
Warm-Up Time	Approx. 15 min
Recommended Pressure Media	Quality class of 1.2.1 (ISO standard 8573.1) ( Not suitable for oxygen use.)
Weight	~550lbs (250kg) to ~250lbs(113kg) (Configuration/option dependent)
Power	100 to 240 VAC, 47 to 63 Hz
Max Possible Pressure	3750 PSI (Configuration/option dependent)
Min Possible Pressure	$3.3 \times 10^{-1}$ mbar ( $2.5 \times 10^{-1}$ Torr) (Configuration/option dependent)

### Scope of delivery

- A Model 9471 (contains the CPC6050) with selected options
- A hose per DUT port

### Options

- Refer to the latest CPC6050 datasheet and manual to view all the possible controller configurations
- Refer to the Model 9471 Configuration Options table to view the possible options and configurations

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