

# Agilent Vaclon *Plus* 1000



## The UHV Solution for Gravitational Waves Detectors

Agilent is now expanding its Vaclon *Plus* product family portfolio with the introduction of the Vaclon *Plus* 1000 L/s ion pump.

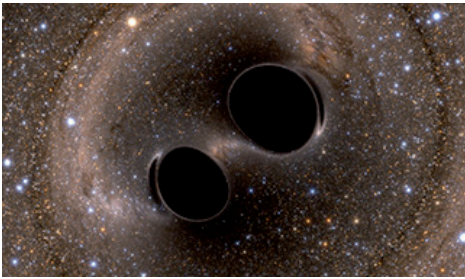
The VIP1000, with a 12 inch ConFlat inlet flange, can be used for those applications that require the evacuation of large volume chambers where stable and ultrahigh vacuum is needed.

An example of a suitable application for the new VIP1000 is undoubtedly the study and detection of gravitational waves. In this field, large pumping volumes and speeds are required along with the complete absence of vibration during system operation.

To ensure cleanliness, the VIP1000 undergoes a complete factory process, including outgassing of the body and internal components in a high-temperature (450°C) vacuum oven. A full automated leak check is executed at the beginning and at the end of the process. To guarantee the pump's specifications, a final electrical check is performed. These processes ensure that the Agilent pump is shipped under ultrahigh vacuum with the highest level of cleanliness available in the ion pump market.

The VIP1000 can be purchased in Diode and StarCell configuration, and with or without heater to satisfy most common application requests.

# Agilent Vaclon Plus 1000



## Features

- Proven Agilent quality
- Noncontaminating technology
- Long operational life
- Vibration-free
- Radiation resistance
- Low cost of ownership



## Target Applications

- Detectors of gravitational waves
- Large vacuum chambers
- Space simulation
- Research centers
- Laboratories



## Gravitational Waves Detected 100 Years After Einstein's Prediction

Agilent has contributed to the detection of gravitational waves 100 years after Einstein predicted them.

The Laser Interferometer Gravitational-Wave Observatory (LIGO) is designed to open the field of gravitational-wave astrophysics through the direct detection of gravitational waves predicted by Einstein's General Theory of Relativity. LIGO's multikilometer-scale gravitational wave detectors use laser interferometry to measure the minute ripples in space-time caused by passing gravitational waves from cataclysmic cosmic sources. These cosmic sources can include the mergers of pairs of neutron stars or black holes, or supernovae. LIGO consists of two widely separated interferometers within the United States, one in Hanford, Washington and the other in Livingston, Louisiana. These interferometers are operated in unison to detect gravitational waves.

KAGRA is a Gravitational Wave detector under construction in Japan, where Agilent VIP1000 Ion Pumps will be part of the vacuum system (assembled and tested at MIRAPRO).

Creating ultraclean and stable high vacuum in these multikilometer detectors is instrumental to the operation of the entire system and was one of the key technological challenges. Furthermore uptime, reliability, and vibrationless operation are an absolute requirement for such detectors.

Agilent designed and built customized ion pumps to fulfil all these stringent criteria, providing the ideal vacuum conditions for the success of this experiment.

Agilent Ion Pumps mounted on LIGO Gravitational Waves Detector and at MIRAPRO for KAGRA Gravitational Wave Interferometer.

\* The images are courtesy of Caltech/MIT/LIGO Laboratory (USA) and of MIRAPRO CO.LTD (Japan)

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## Technical Specification

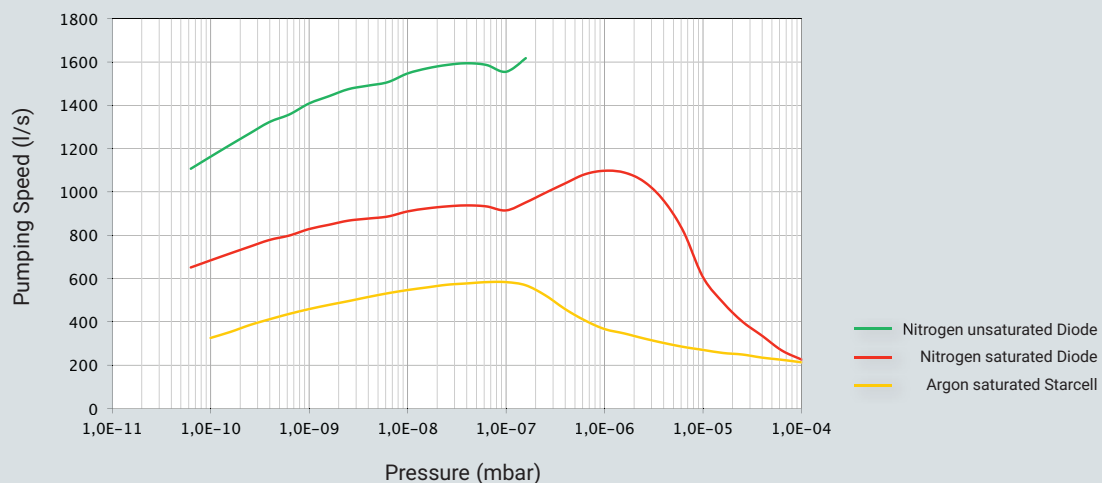
Technical Specification		
Saturated pumping speed for Nitrogen*	Diode 1100 L/s	StarCell 900 L/s
Saturated pumping speed for Argon*		585 L/s
Operating life at 1E <sup>-6</sup> mbar for Nitrogen	50000 hours	80000 hours
Recommended maximum baking pressure with ion pump on	5 x 10 <sup>-6</sup> mbar	
Protect current	200 mA	
Maximum operating voltage	+7000 Vdc +/- 10%	-7000 Vdc +/- 10%
Recommended starting pressure	≤1 x 10 <sup>-6</sup> mbar	≤1 x 10 <sup>-4</sup> mbar
Ultimate pressure	10 <sup>-11</sup> mbar	
Inlet flange	12" CFF (NW250) AISI 304 ESR or 316LN ESR	
Internal volume	136 litres	
<b>Temperature limits:</b>		
Pump without magnets	450 C°	
Pump with magnets	350 C°	
HV cable	220 C°	
Material	Body	AISI 304L
	Cathodes	Titanium
	Anodes	AISI 304L
	Magnets	Ferrite (Ceramic 8)
	Pole piece	Iron
Weight without heaters	lbs (kg)	585 (265)

\* Tested according to ISO/DIS 3556-1-1992

## Ordering Information

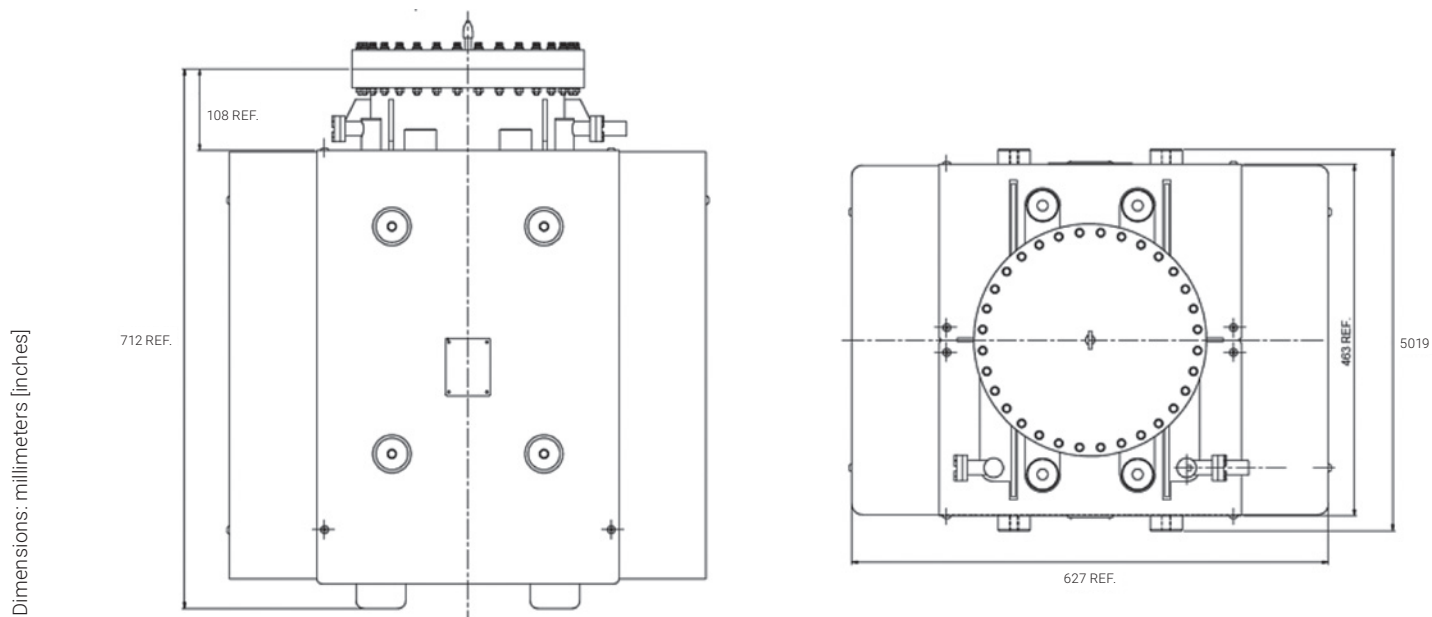
Configurations	Part Numbers
VIP1000 Diode without heater	X3604-64000
VIP1000 Diode with 115 V heater	X3604-64101
VIP1000 Diode with 230 V heater	X3604-64102
VIP1000 StarCell without heater	X3604-64120
VIP1000 StarCell with 115 V heater	X3604-64121
VIP1000 StarCell with 230 V heater	X3604-64122
The VIP1000 can be driven by the 4UHV controller with the configuration with 200 Watts.	
Controller Unit: 4UHV	Part Numbers
200W NEG	9299010
200W POS	9299011
The selection of the controller is strictly dependent on the starting pressure. If starting pressure is in the 10 <sup>-6</sup> mbar range, a single channel with 200 Watts is sufficient to start and maintain the operational function of the pump. If starting pressure is above 10 <sup>-6</sup> mbar range, please contact your Agilent representative.	
Cables selection	Part Numbers
Pumps are equipped with standard Fischer high voltage feedthroughs.	
Cable lengths available:	
4 m Fischer cable	9290705
7 m Fischer cable	9290707
10 m Fischer cable	9290708
20 m Fischer cable	9290709

## Pumping Speed vs Pressure



# Agilent Vaclon Plus 1000

Outline Drawing



Dimensions: millimeters [inches]

3D Drawings available for download

[www.agilent.com/chem/vacuum](http://www.agilent.com/chem/vacuum)

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