

The New Turbo-V 301 Navigator

More efficiency,
longer life, flexibility
for system integration
and easy service



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Agilent Technologies

Turbo-V 301 Navigator



Varian introduces a major evolution in its groundbreaking "plug and pump" Navigator turbomolecular pumps that reduces power consumption and bearing temperature significantly, resulting in extended pump life. The Turbo-V 301 Navigator delivers 300 liter/second performance using half the power of previous models, and can be easily integrated into a range of systems requiring superior vacuum performance.

The compact Turbo-V 301 extends the Navigator pump family's tradition of flexibility, ease of installation, operation, and

integration into OEM systems. The TV 301, engineered for high efficiency, reliability and extended pump life, sets new performance standards through an extensive redesign of the already state-of-the-art MacroTorr pumping section. Redesigned pump stages, featuring optimized geometry, enable foreline operating pressures up to 16 mbar (12 Torr), full pumping speed up to 10^{-3} mbar (Torr), and the possibility to run the pump at atmospheric pressure. The AC induction motor of the pump is very flexible and rugged, so the pump is able to run without any problem from atmospheric pressure up to the ultimate vacuum.

Ceramic bearings also make the Turbo-V 301 virtually maintenance free.

The Navigator control unit is provided in two versions: the first for the universal worldwide mains voltages, the second for the 24 Volts operations. It eliminates the need for an external transformer, enabling easy installation worldwide. A 1/4 rack version of the controller is also available. The Navigator Software package lets the pump operate remotely by using a laptop, and gives access to all the pump working parameters,



through the RS232 control unit interface. Flexibility and reliability are further extended through the optional interface with DeviceNet, a widely used open communications network designed to connect industrial devices to PLCs and PCs - eliminating expensive hardwiring while providing device-level diagnostics.



Features	Benefits
Universal Mains and 24 VDC voltage for Control Unit.	Voltage and frequency flexibility for easy installation worldwide.
RS232/485 communication protocols.	Easy interface with Navigator software, or can help developing the own Customer software.
Quick-fix mounting mechanism on Navigator Control Unit.	Instant mounting is possible simply clicking the pump into position.
Optimized geometry for "low power consumption" MacroTorr stages.	Motor needs less power, minimizing energy consumption and maximizing pump life expectancy.
SST water cooling channel.	Allows pump operation even where water quality is poor.
Innovative heat sink body, and optimized cooling fins for air cooling.	Operating temperatures can be substantially lower, for optimized performances.
Dismountable foreline.	Allows great versatility for connection to user system.
Ready for MoniTorr operation.	Plug & Play connectivity to the Varian's Remote Assist advanced maintenance program.
Induction (Asynchronous) motor.	The pump never stops whatever the gas throughput is.
CE/CSA certification.	Worldwide safety norms compliance.

Global Support

Varian offers "as new" remanufactured exchange units for time-critical situations. These fully-reconditioned units are like new and meet the strictest specifications. Exchange units can be shipped within 24 hours of order placement and are kept in stock in the US, Europe, Japan, Korea and Taiwan.

Cleaning Service, Failure Analysis and Technical Support are also available at these locations. Varian offers customized Service Plans (i.e. Service Contracts, Extended Warranty, etc.) to meet the most demanding needs.

Turbo-V 301 Navigator

Applications

Analytical Instrumentation

- Electron microscopy: SEM, TEM
- Mass spectrometry : GC-MS, LC-MS, ICP-MS
- Surface analysis
- Residual gas analysis

High Energy Physics and General Purpose Vacuum

- Nuclear research
- Plasma physics
- Space applications
- Storage rings
- Particle accelerators
- Space simulation chambers

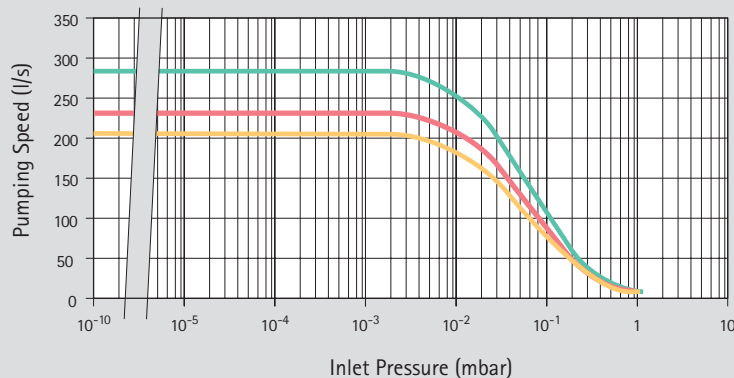
Semiconductors

- PVD
- Load Locks, Automation, Wafer Handling
- Defect analysis

Industrial Market Segment

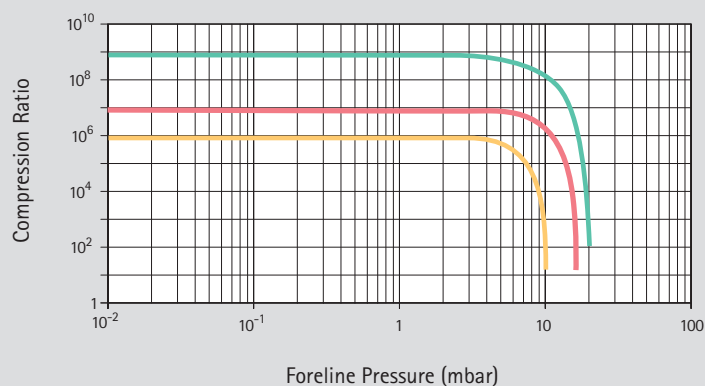
- Thin Film Coating
 - Optical coatings (Ophthalmic, precision opto-electronics)*
 - Data-Storage coatings (CD, DVD, memory disk, read heads)*
 - Surface treatments (functional, decorative)*
- Metallization
- Evacuation of Lamps
- TV & Monitor picture tube manufacturing
- X-Ray tubes & Electron devices
- Load-Lock Chambers
- Other Industrial applications

Pumping Speed vs Inlet Pressure



— Nitrogen — Helium — Hydrogen

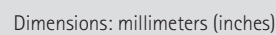
Compression Ratio vs Foreline Pressure



— Nitrogen — Helium — Hydrogen

A complete pump vacuum performances mapping (showing power, flow and foreline pressure) is available on request.

Pump



Dimensions: millimeters (inches)

Technical Specifications

Pumps

Connection nominal diameter	Input	ISO 100 CFF 6 in.	ISO 160 CFF 8 in.
	Output	NW16 KF/G 0.25 in. removable	
Pumping speed for	Nitrogen N ₂	250 l/s	280 l/s
	Helium He	220 l/s	230 l/s
	Hydrogen H ₂	200 l/s	210 l/s
Compression ratio for	Nitrogen N ₂	7x10 ⁸	
	Helium He	1x10 ⁵	
	Hydrogen H ₂	1x10 ⁴	
Fore Vacuum Pressure max	Nitrogen N ₂	18 mbar (13.5 Torr)	
	Helium He	16 mbar (12 Torr)	
	Hydrogen H ₂	10 mbar (7.5 Torr)	
Gas Throughput	Nitrogen N ₂	mbar l/s (Torr l/s)	no limit
	Helium He	mbar l/s (Torr l/s)	no limit
	Hydrogen H ₂	mbar l/s (Torr l/s)	no limit
Recommended backing pump	Rotary Vane Pump	Varian DS102	
	Dry Scroll Pump	Varian SH-100	
Ultimate pressure	with Rotary Vane pump DS 102	< 5 x 10 ⁻¹⁰ mbar (Torr)	
	with Dry Scroll pump SH-100	< 5 x 10 ⁻⁹ mbar (Torr)	
Rotational Speed	56.000 rpm		
Run up Time	2,5 min		
Cooling	Air (opt. Water)		
Power consumption/heater	150 W		
Motor technology	Induction (Asynchronous)		
Weight	Pump 4.2 kg (9.2 lbs.)		
	Navigator Controller 1 kg (2.2 lbs.)		
	1/4 Rack Controller 4.5 kg (8.4 lbs.)		
Dimensions	Pump	Ø x h	14.4 x 17.4 cm (5.6 x 6.8 in.)
	Navigator Controller	w x d x h	10.7 x 10.7 x 6.4 cm (4.2 x 4.2 x 2.5 in.)
	1/4 Rack Controller	w x d x h	10.7 x 24.4 x 12.8 cm (4.2 x 9.5 x 4.9 in.)

Controllers

Input Voltages	Navigator controller, 24 Vdc	24 Vdc ± 10%
	Navigator controller, 120/220 Vac	100/120/220/240 Volt, 1 phase, 50/60 Hz
	Rack controller, 220 Vac	100/120/220/240 Volt, 1 phase, 50/60 Hz (Line Voltage change over)
	Rack controller, 120 Vac	100/120/220/240 Volt, 1 phase, 50/60 Hz (Line Voltage change over)
Maximum Input Power	Navigator controller, 24 Vdc	200 W
	Navigator controller, 120/220 Vac	300 VA
	Rack controllers	350 VA
Output Voltage	75 Vac, 3 phases	
Output Frequency	963 Hz	
Nominal Power	150 W	
Start-up Power	150 W	
Operating temperature	0°C to +40°C	
Storage temperature	-20°C to + 70°C	

Ordering Information

Description	Part Number
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Complete Systems (Pump + Navigator Controller)

Turbo-V 301 Navigator Complete System, ISO 100, 24 Vdc	9698824
Turbo-V 301 Navigator Complete System, CFF 6 in., 24 Vdc	9698825
Turbo-V 301 Navigator Complete System, ISO 160, 24 Vdc	9698826
Turbo-V 301 Navigator Complete System, CFF 8 in., 24 Vdc	9698827
Turbo-V 301 Navigator Complete System, ISO 100, 120/220 Vac	9698828
Turbo-V 301 Navigator Complete System, CFF 6 in., 120/220 Vac	9698829
Turbo-V 301 Navigator Complete System, ISO 160, 120/220 Vac	9698830
Turbo-V 301 Navigator Complete System, CFF 8 in., 120/220 Vac	9698831

Pumps

Turbo-V 301 Navigator Pump, ISO 100	9698918
Turbo-V 301 Navigator Pump, CFF 6 in.	9698919
Turbo-V 301 Navigator Pump, ISO 160	9698920
Turbo-V 301 Navigator Pump, CFF 8 in.	9698921

Controllers

Turbo-V 301 Navigator Controller, 24 Vdc	9698972
Turbo-V 301 Navigator Controller, 120/220 Vac	9698973
Turbo-V 301 1/4 Rack Controller, 220 V	9699437
Turbo-V 301 1/4 Rack Controller, 110 V	9699537

Description	Part Number
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Accessories

Mains cable NEMA plug, 3m long	9699958
Mains cable European plug, 3m long	9699957
Serial cable and Navigator Software	9699883
Inlet Screen DN100	9699302
Inlet Screen DN160	9699304
Vent Valve	9699834
Air cooling kit	9699299
Water cooling metric flexible tube	9699347
Water cooling fractional inch flexible tube	9699337
Heater band 120 Vac	9699804
220 Vac	9699803
Vibration isolator ISO 100	9699344
CFF 6 in.	9699334
ISO 160	9699345
CFF 8 in.	9699335
Bracket for side mouting	9699970

Gas Purge

10 SCCM	NW16KF	9699239
10 SCCM	1/4 Swagelok	9699240
20 SCCM	NW16KF	9699241
20 SCCM	1/4 Swagelok	9699242
10 SCCM	1/4 Swagelok - 1/4 Swagelok	9699232
20 SCCM	1/4 Swagelok - 1/4 Swagelok	9699236

Complete system includes: Pump, Inlet Screen, Navigator Controller, 2 Mains Cables (NEMA plug and European plug), Serial Cable and Navigator Software, Bracket for side mounting

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*All specifications are subject
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