

Turbo-V Pump Features and Benefits



Wide Pumping Speed Range: 70 to 6,000 l/s

Varian offers a complete range of turbomolecular pumps, to cover all possible applications and market segments.

High Speed, High Compression

Maximizing performance at minimum cost and size: this is our design mission. Our use of technology ensures maximum performance without compromising pump size, cost, or reliability. We use our technologies to meet the mainstream of our customers' applications, providing them with high performance, reliable pumping solutions at a competitive cost.



Very High Foreline Tolerance

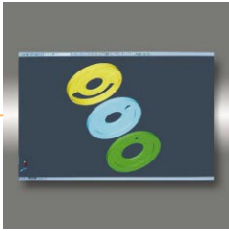
Working with a foreline pressure as high as 18 mbar yields a substantial advantage: the size of the primary pump can be significantly reduced such that even a backing pump as small as the 5 m³/hr SH-100 (dry) or DS 102 can be used to operate our V 301 Navigator in all its pumping profiles. Thanks to one of the features of the MacroTorr® technology you can now reduce the cost of your vacuum system and get better performance at the same time.



On Board Controller "Plug & Pump" Ready-to-Use Navigator SW

Operating and controlling a turbomolecular pump has never been so simple. Thanks to our Navigator Software you can connect your laptop directly to the pump control unit and start to use it. You can start or stop the pump, as well

as check its temperature and gas load conditions. You can also monitor pump parameters over time, as well as do straightforward diagnostics directly on the vacuum system with a click of the mouse in the Windows™ based environment. From buttons to charts to dialoggers, everything is simple in our Navigator Software.

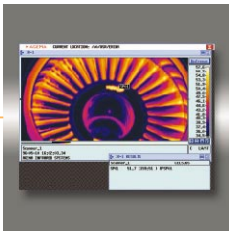


State-of-the-Art MacroTorr® Technology

The most effective pumping stage technology currently available.

Thanks to this powerful Varian innovation you can:

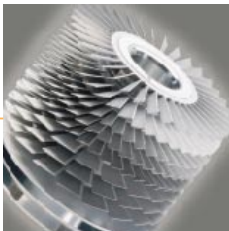
- maximize the throughput of the pump
- extend the foreline tolerance up to 18 mbar
- increase the compression ratio by decades, most notably for light gases without compromising the size or weight of the pump. In fact, the MacroTorr® stages set in the V301 Navigator is hosted in the space of one inch.



Designed for Very High Gas Load Operation

Varian has been always focused on high throughput applications. Thanks to state-of-the-art numerical modeling tools, pumping stages are designed to minimize the power consumption.

Special care is given to the thermal design of the cooling fins and the internal temperature distribution, to ensure efficient operation.



Monolithic Rotor

Our patented cutting tools and EDM process, combined with a sophisticated CAD/CAM manufacturing operation, allow Varian to produce pump rotors from a single piece of high tech aluminum alloy. This major technological achievement improves the life of the pump for different reasons:

- the weight of the rotor is minimized, allowing installation of the pump in absolutely any position without compromising the pump performance
- the lighter the pump structure, the lower the stresses on the material and on the bearings themselves, resulting in longer pump life!

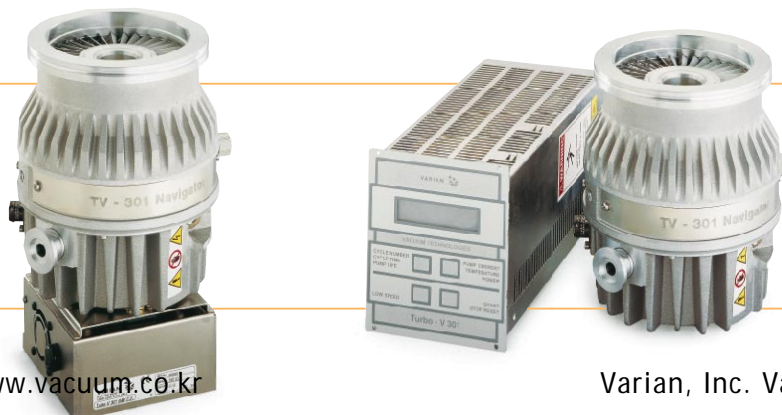


Highly Reliable, Maintenance-Free Ceramic Ball Bearings

No oil, no refill, no contamination. This is our design philosophy. All of our pumps are designed around ceramic ball bearing technology.

Ceramic is lighter, harder, smoother, and thermally more stable than any steel. So a ceramic ball bearing can run faster, hotter and more quietly than any steel ball bearing. The lubrication of the bearings is critical. After years of research Varian has developed its proprietary Dry Lubrication technology to guarantee excellent pump life time in any position and in any gas load working condition. Thanks to ceramic bearings and Dry Lubrication technology, you can count on an ultimate MTF of our products of 120,000 h plus. Thanks to Varian, performance has never been so reliable.

Varian turbo pumps feature integrated and standard rack controllers



Pump Models

Pump Specification	Turbo-V 70		Turbo-V 70 D		Turbo-V 70 LP		Turbo-V 301 Navigator	
	DN 40	DN 63	DN 40	DN 63	DN 40	DN 63	DN 100	DN 160
Pumping Speed, l/s								
Nitrogen	46	68	40	60	46	68	250	280
Helium	52	60	27	30	52	60	220	230
Hydrogen	42	45	20	20	42	45	200	210
Compression Ratio								
Nitrogen	5×10^7	5×10^7	5×10^7	5×10^7	5×10^8	5×10^8	7×10^8	7×10^8
Helium	4×10^3	4×10^3	7×10^3	7×10^3	8×10^4	8×10^4	1×10^5	1×10^5
Hydrogen	4×10^2	4×10^2	1.5×10^3	1.5×10^3	1×10^4	1×10^4	1×10^4	1×10^4
Base pressure, mbar								
with recommended mechanical pump	1×10^{-9}	1×10^{-9}	1×10^{-9}	1×10^{-9}	2×10^{-10}	2×10^{-10}	$< 5 \times 10^{-10}$	$< 5 \times 10^{-10}$
with recommended dry pump	N/A	N/A	1×10^{-6}	1×10^{-6}	2×10^{-9}	2×10^{-9}	$< 5 \times 10^{-9}$	$< 5 \times 10^{-9}$
Startup Time, min								
	< 1	< 1	< 1	< 1	< 1	< 1	2.5	2.5
Rotational Speed, rpm								
	75,000	75,000	75,000	75,000	75,000	75,000	56,000	56,000
Recommended Forepump								
Two-stage mechanical pump	DS 102	DS 102	DS 102	DS 102	DS 102	DS 102	DS 102	DS 102
Dry pump	N/A	N/A	MD12	MD12	MDP12	MDP12	SH-100	SH-100
Inlet Flange, nominal diameter								
Klump Flange, mm	40	-	40	-	40	-	-	-
ConFlat®, mm (inches OD)	35 (2.75)	63 (4.5)	35 (2.75)	63 (4.5)	35 (2.75)	63 (4.5)	100 (6)	160 (8)
ISO clamp style, mm	-	63	-	63	-	63	100	160
Foreline Flange, nominal diameter								
Wheeler, inches ID	-	-	-	-	-	-	-	-
Klump Flange	NW16	NW16	NW16	NW16	NW16	NW16	NW16	NW16
ISO clamp style	-	-	-	-	-	-	-	-



Turbo-V 551 Navigator		Turbo-V 701 Navigator	Turbo-V 1001 Navigator			Turbo-V 2000 HT	Turbo-V 6000	
DN 100	DN 160	DN 200	DN 160	DN 200	DN 250	DN 250	DN 500	
350	550	690	790	950	1,050	1,950	6,000	
450	600	620	820	870	900	2,000	7,000	
450	510	510	820	900	920	1,500	6,500	
$> 1 \times 10^9$	$> 1 \times 10^9$	1×10^9	$> 1 \times 10^9$	1×10^9	1×10^9	$> 1 \times 10^9$	$> 1 \times 10^{10}$	
1×10^7	1×10^7	1×10^7	5×10^7	1×10^7	1×10^7	2×10^6	2.3×10^5	
1×10^6	1×10^6	1×10^6	2×10^6	1×10^6	1×10^6	2×10^5	8×10^3	
$< 1 \times 10^{-10}$	$< 1 \times 10^{-10}$	$< 1 \times 10^{-10}$	$< 1 \times 10^{-10}$	$< 1 \times 10^{-10}$	$< 1 \times 10^{-10}$	1×10^{-10}	$< 1 \times 10^{-10}$	
$< 1 \times 10^{-10}$	$< 1 \times 10^{-10}$	$< 1 \times 10^{-10}$	$< 1 \times 10^{-10}$	$< 1 \times 10^{-10}$	$< 1 \times 10^{-10}$	1×10^{-10}	N/A	
< 5	< 5	< 5	< 4	< 4	< 4	10	30	
42,000	42,000	42,000	38,000	38,000	38,000	33,000	14,000	
DS 302 TS300	DS 302 TS300	DS 402 TS300	DS 402 TS300	DS 402 TS300	DS 402 TS300	DS 602 TS600	DS 1602 N/A	
-	-	-	-	-	-	-	-	
100 (6)	160 (8)	200 (10)	-	200 (10)	-	250 (12)	-	
100	160	200	160	200	250	250	500	
-	-	-	-	-	-	-	20	
NW25	NW25	NW25	NW40	NW40	NW40	NW40	-	
-	-	-	-	-	-	-	100	

