

Varian, Inc.
Vacuum Technologies

Smart Rotary
Vane Pumps



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Inspiring Excellence

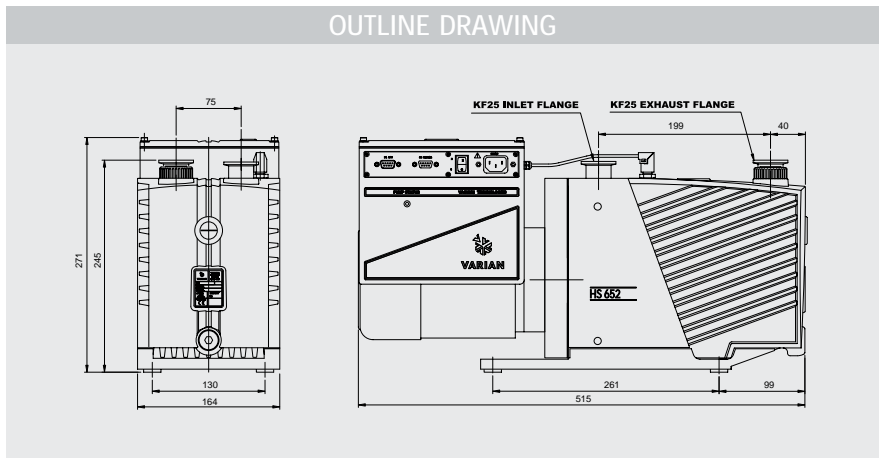
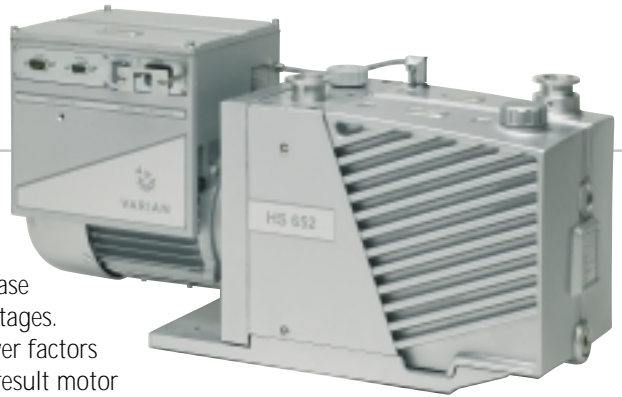
 **Agilent Technologies**

Smart Rotary Vane Pumps

The first rotary vane pumps with truly “smart” capabilities. Varian’s HS452 and HS652 rotary vane pumps employ an innovative frequency inverter technology that delivers optimal and consistent performance while encompassing the worldwide range of voltage and frequency conditions. Operating with low power requirements, the microprocessor controlled frequency inverter, combined with a 3-phase motor, is an efficient driving unit capable of delivering the high starting torque required of a dual-stage oil pump. HS452 and HS652 technology solves the common problems inherent in traditional single-phase motors. Smart Pumps start with inrush current about 7 times lower than that of equivalent traditional pumps. Unlike traditional pumps, Smart Pump’s software driven startup procedure recognizes faulty pumps within seconds, and so avoids uncontrolled load conditions. The result is very easy pump integration.

The 3-phase inverter output is constant and independent of single-phase input frequencies and voltages. Motor efficiency and power factors remain optimal and as a result motor and pump working temperatures remain low and constant worldwide. Smart Pumps can be remotely driven via discrete I/O or RS232/RS485 interfaces. Varian’s T-plus Navigator Software facilitates communication making it very

easy to drive the pump. Pump performance can be tailored by setting the rotational speed for specific applications. The software monitors and logs pump parameters making it possible to perform pump and system diagnostics.



FEATURES	ADVANTAGES	BENEFITS
Inverter Technology	<ul style="list-style-type: none"> Reduced power requirements Single phase Truly universal voltage and frequency compatibility Higher nominal rotational speed (2000 rpm) 	<ul style="list-style-type: none"> Reduced system costs Worldwide compatibility Constant performance Higher reliability Ideally suited for steady and high gas load applications
I/O and RS232 / RS485 communication capabilities	<ul style="list-style-type: none"> Adjustable speed: 45 - 68 Hz Tailored pump performance Adjustable acoustical signals 	<ul style="list-style-type: none"> Easy integration Reduced system costs
Remote diagnostics	Control of: <ul style="list-style-type: none"> oil consumption temperature power current 	<ul style="list-style-type: none"> Reduced maintenance costs Improved uptime Higher reliability

TECHNICAL SPECIFICATIONS		HS452	HS652
Free air displacement	m ³ /h (cfm)	27 (19)	39 (27.5)
Pumping speed (Pneurop standard)	m ³ /h (cfm)	22 (15.4)	32 (22.4)
Ultimate total pressure	mbar	2 x 10 ⁻³	
Ultimate total pressure with gas ballast	mbar	1 x 10 ⁻²	
Operating Voltage	V	100-120/200-240 ±10%, 50/60 Hz	
Inverter maximum output power	W	780	
Nominal rotational speed	RPM	2000	
Weight	Kg	33	

Application Note

Steady state high gas load applications exploit the major benefits of the smart technologies. When operated at pressures lower than the auto-tuning pressure, the HS452 and HS652 outperform the equivalent traditional DS402 and DS602 pumps by 10% at 60 Hz and by 30% at 50 Hz. The Smart Pumps can run below auto-tuning pressure at their full speed of 2000 rpm. As shown in the pumping speed curve at top right, the HS452 has an auto-tuning pressure of 100 mbar while the HS652 has an auto-tuning pressure of 40 mbar.

Despite the lower power requirements of 780 W max, the Smart Pumps deliver good performance in the roughing phase. Fast cycling or inrush applications need to be evaluated on a case by case basis with our application engineers.

Applications

• Mass Spectrometry

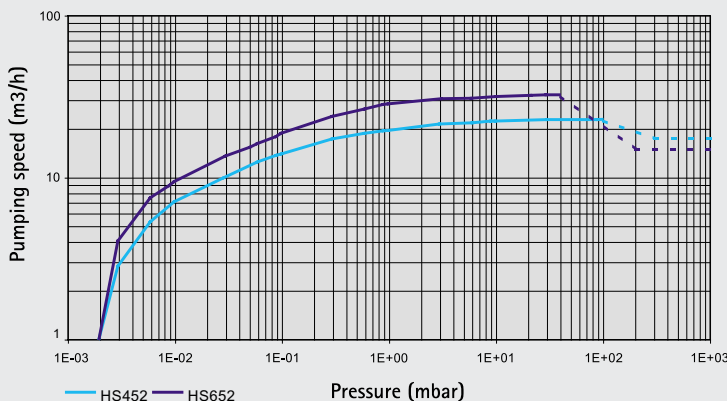
The HS452 and HS652 address all the requirements of LC-MS and ICP-MS applications:

- Large pumping capacity
- Consistent worldwide performance
- Single phase
- Universal voltage and frequency compatibility
- Low power requirements
- Remote control and diagnostics
- Adjustable performance

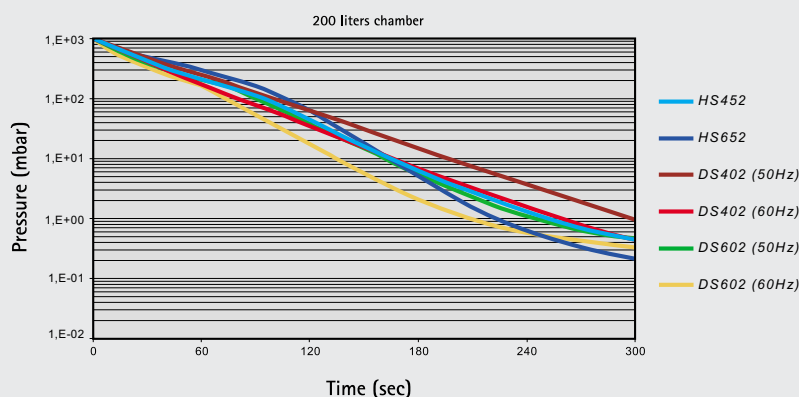
Smart Rotary Vane Pumps are also used in the following applications:

- Turbo Pump Backing
- Leak Detection Systems
- Freeze Driers
- Glove Boxes
- Thin Film Deposition
- High-Speed Centrifuges
- Energy Storage Flywheels
- Sterilizers

HS452 & HS652 - PUMP SPEED CURVE



HS452, HS652, DS402, DS 602 - PUMP DOWN CURVES



ORDERING INFORMATION

Pump	P/N
HS652 Smart Pump 1phase worldwide motor	949-9365
HS452 Smart Pump 1phase worldwide motor	949-9360
IP44 accessory connector Kit	949-9367

Accessories	P/N
NW25 oil exhaust filter	949-9392
Oil return kit	949-9376
Rotary vane fluid, GP type, 1 liter	949-9390
Rotary vane fluid, GP type, 2 liter	949-9391
European plug power cable 2mt, 1ph	9499396
USA plug power cable 2mt, 1ph	9499397
UK plug power cable 2mt, 1ph	9499398
Minor maintenance kit	949-9371
Major maintenance kit	949-9382

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