Agilent Technologies

UPGRADE PROGRAM

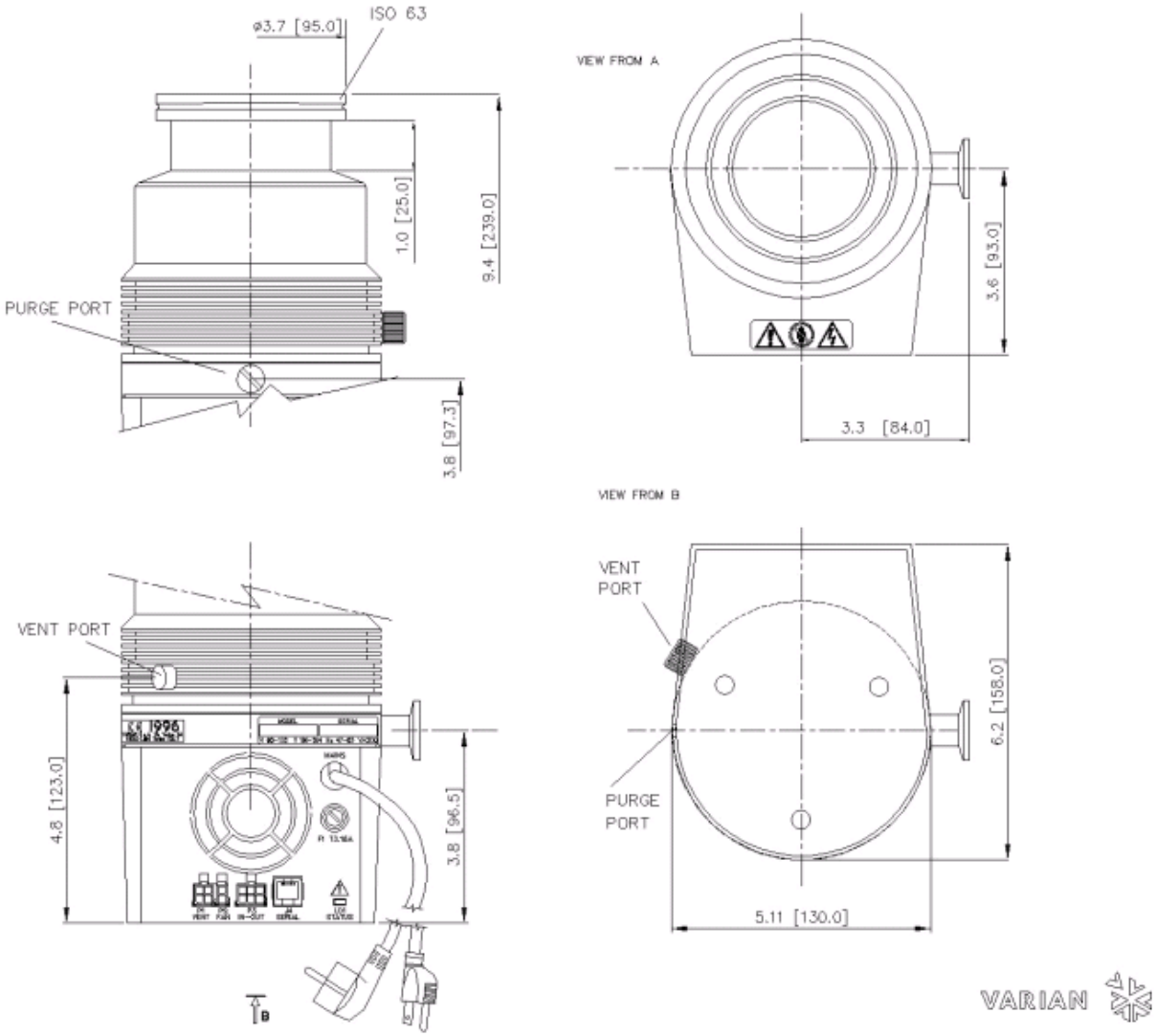
V141 Series Pumps
vs
Turbo-301 Series Pumps

Technical Memo

INDEX

Outline Drawing

V141 ISO63 **9699383/9699387**

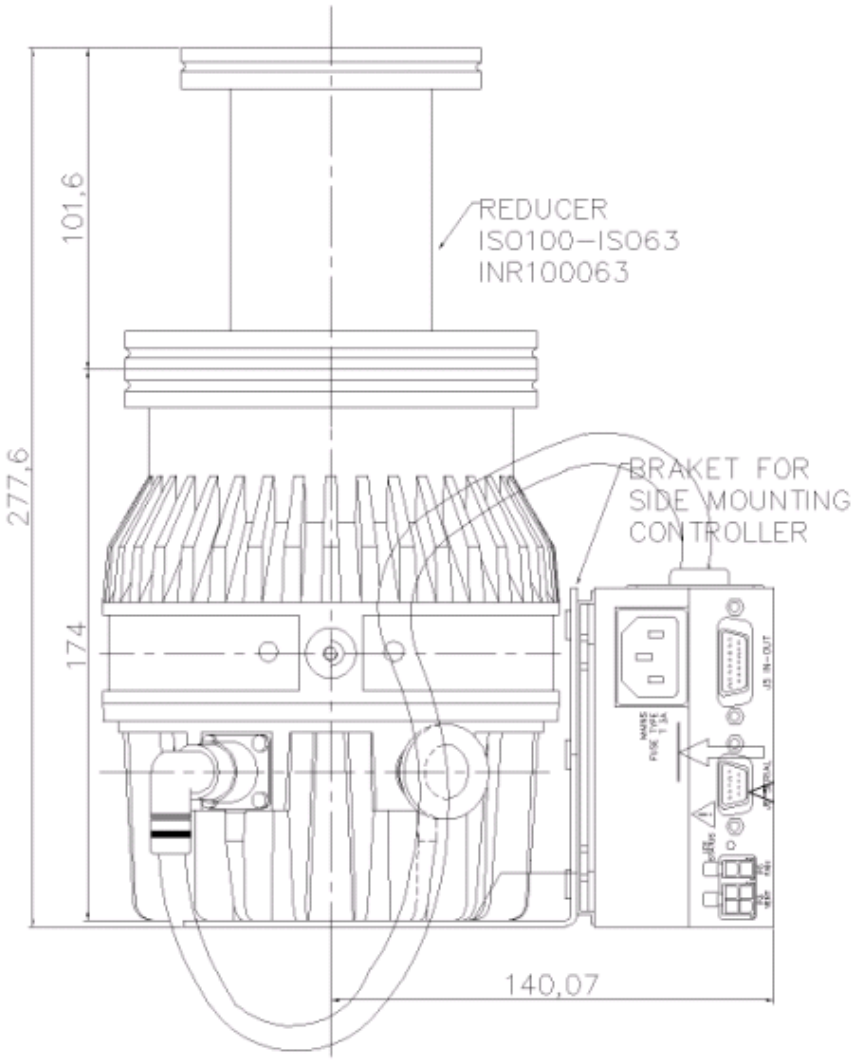


VARIAN

Replacement Suggested

Turbo-301 ISO100 EX9698918

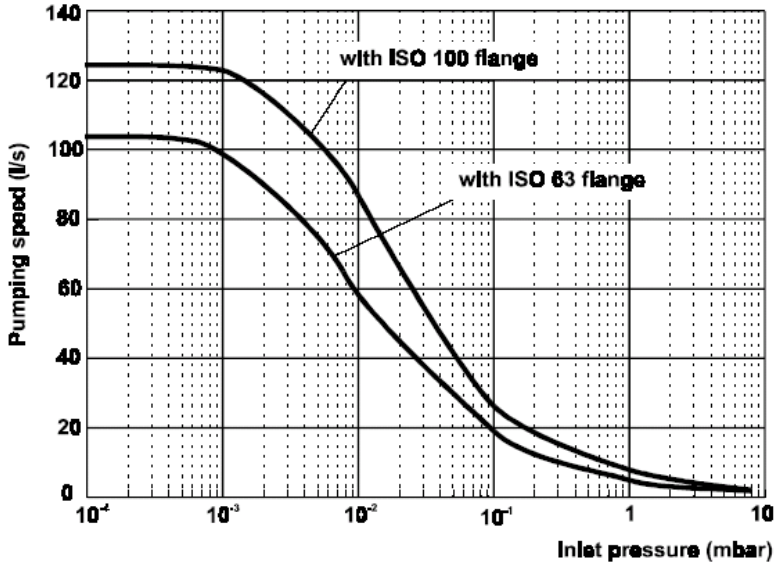
with reducer IRC100063 and on-Board controller



Technical Table

	V141 ISO63	301 ISO63
Total height	239.0	277.6
Vent port height from bottom	123.0	85.0
Foreline port height fm. bottom	96.5	47.0
Vent thread	M8	M8
Purge thread	M12	M12
Water fitting thread	1/8G	1/8G
Inlet flange	ISO63	ISO63
Foreline Flange	KF16	KF16
Vent port position referring to Foreline Flange	On the left 149°	On the right 153°
Purge port position referring to Foreline Flange	180°	On the left 83°

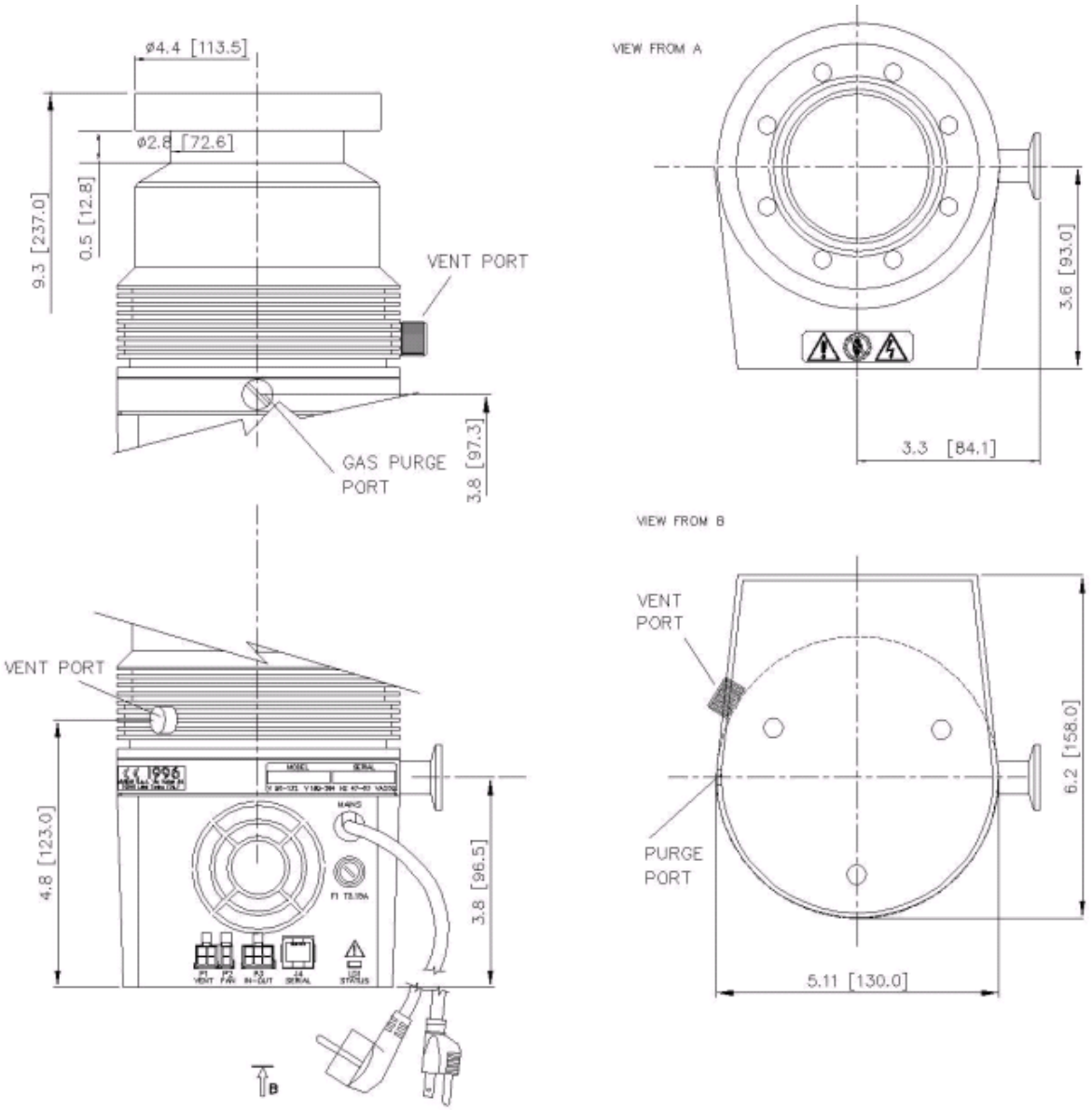
Pumping Speed Curve:
V141 ISO63



Turbo-301 ISO100 with reducer
Curve is not available; anyway the pumping speed will be reduced as follows:

Nitrogen:	170 l/s
Helium	180 l/s
Hydrogen	165 l/s

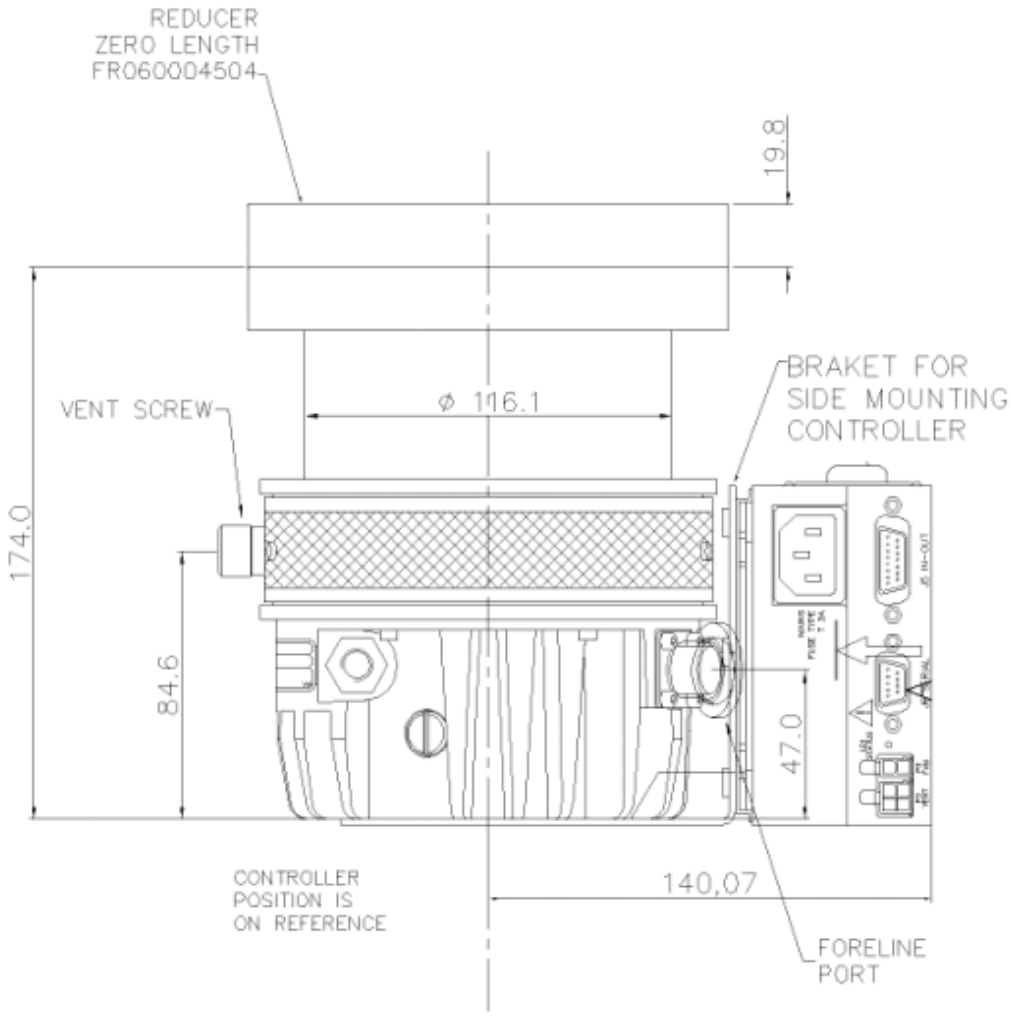
V141 CFF 4-½ 9699382/9699386



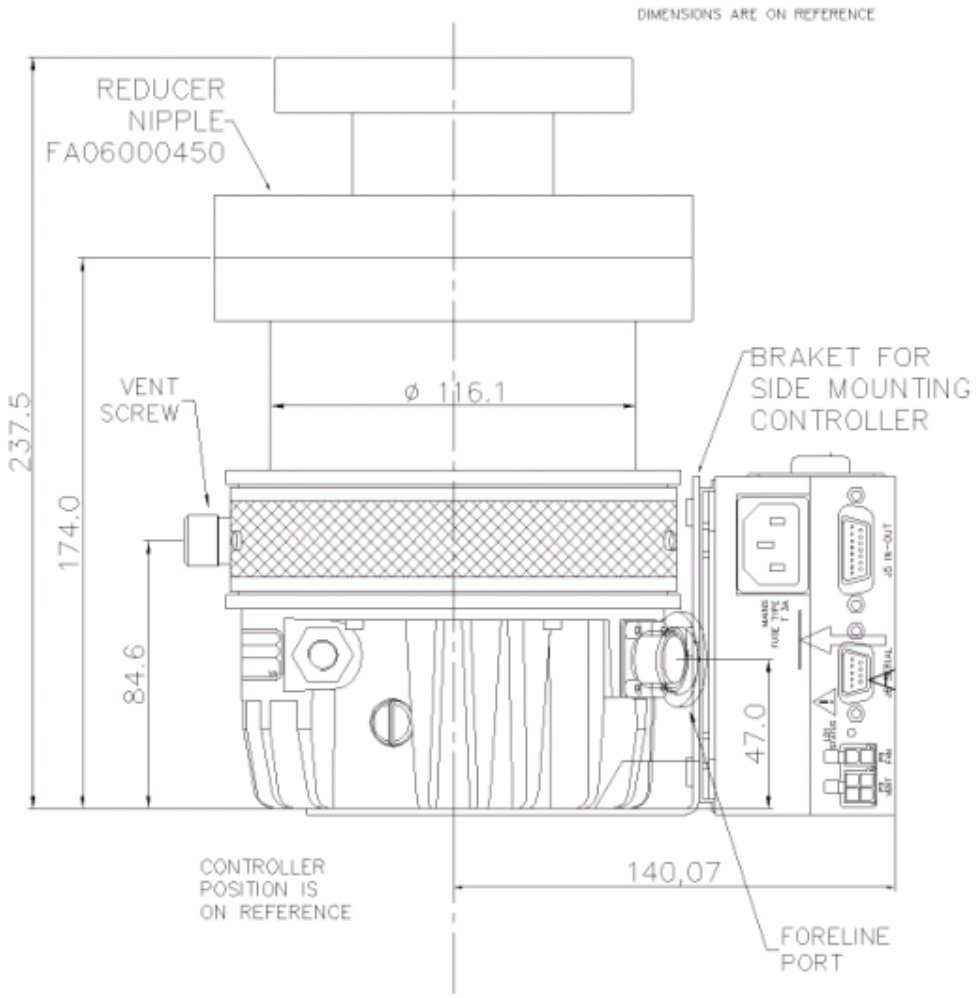
Replacement Suggested

Turbo-301 CFF 6 EX9698919

with reducer zero length and on-Board Controller



Or with reducing nipple:

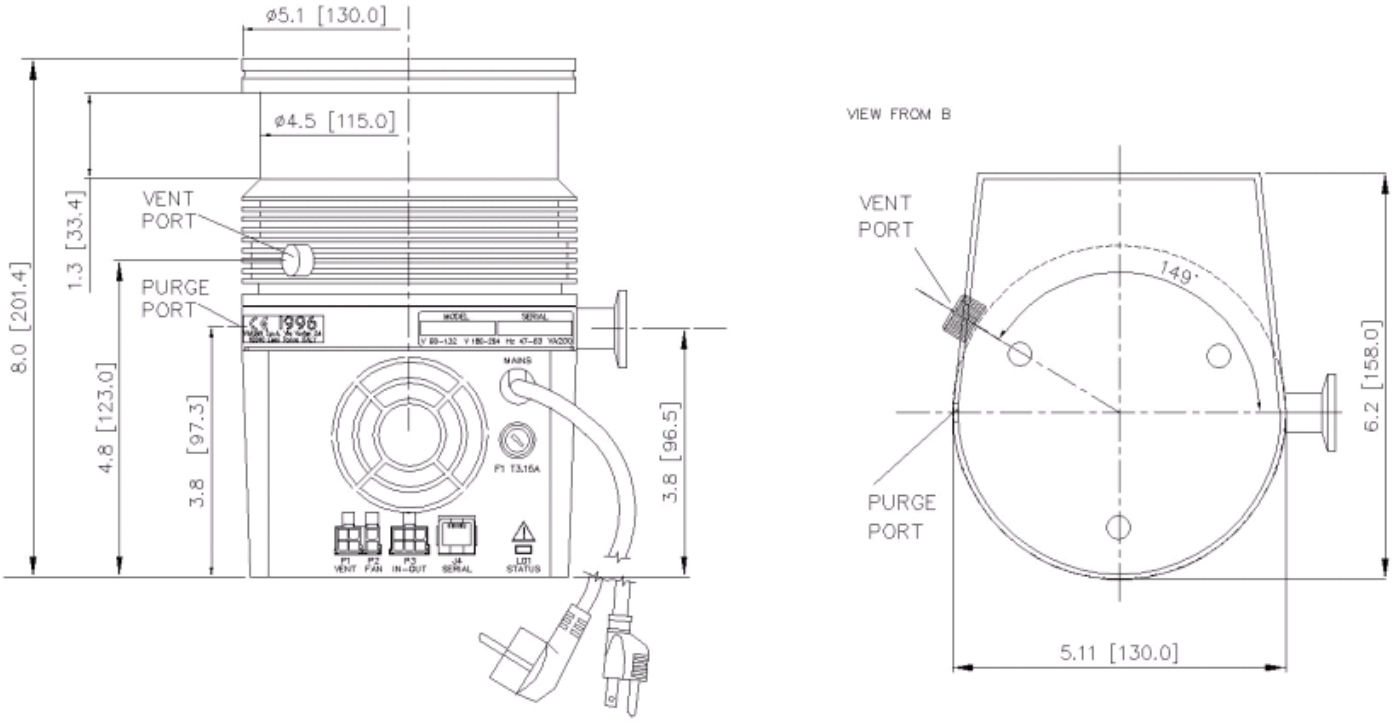


Technical Tables

	V141 CFF4½	301 CFF6 w. Ø length reduc.	301 CFF6 w. nipple reduc.
Total height	237.0	193.8	237.5
Vent port height from bottom	123.0	84.6	84.6
Foreline port height fm. bottom	96.5	47.0	47.0
Vent thread	M8	M8	M8
Purge thread	M12	M12	M12
Water fitting thread	1/8G	1/8G	1/8G
Inlet flange	CFF4½	CFF6+reducer	CFF6+reducer
Foreline Flange	KF16	KF16	KF16
Vent port position referring to Foreline Flange	On the left 149°	On the right 153°	On the right 153°
Purge port position referring to Foreline Flange	180°	On the left 83°	On the left 83°

For Pumping Speed curve, please refer to pumping speed curves for ISO63

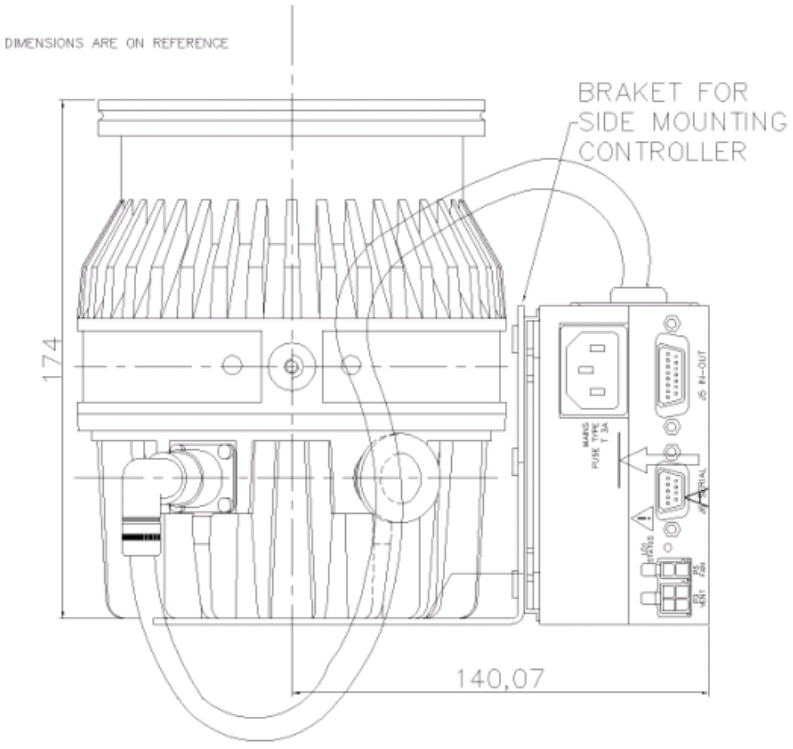
V141 ISO63 9699381/9699385



Replacement suggested

Turbo-301 ISO100 EX9698918

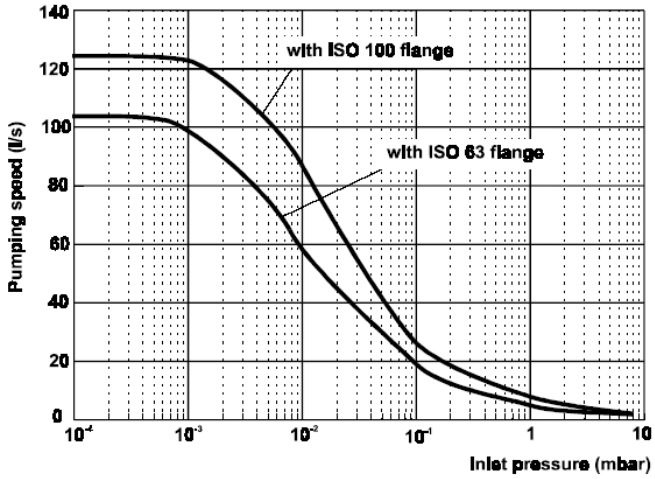
with on-Board controller



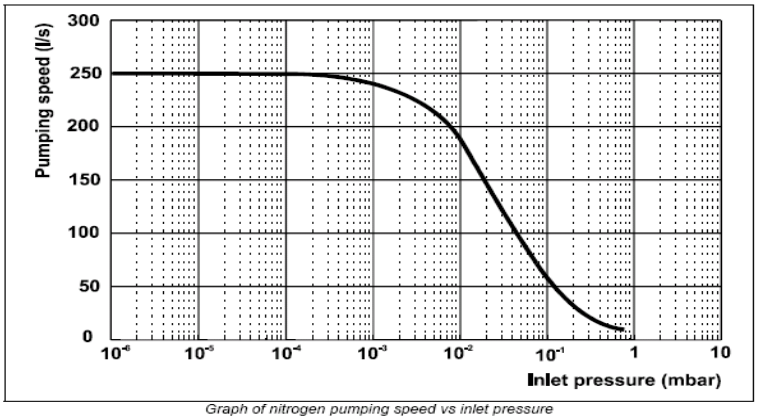
Technical Table:

	V141 ISO100	301 ISO100
Total height	201.4	174.0
Vent port height from bottom	123.0	84.6
Foreline port height fm. bottom	96.5	47.0
Vent thread	M8	M8
Purge thread	M12	M12
Water fitting thread	1/8G	1/8G
Inlet flange	ISO100	ISO100
Foreline Flange	KF16	KF16
Vent port position referring to Foreline Flange	149°	On the right 153°
Purge port position referring to Foreline Flange	180°	On the left 83°

Pumping speed curve for N2
V141 ISO100

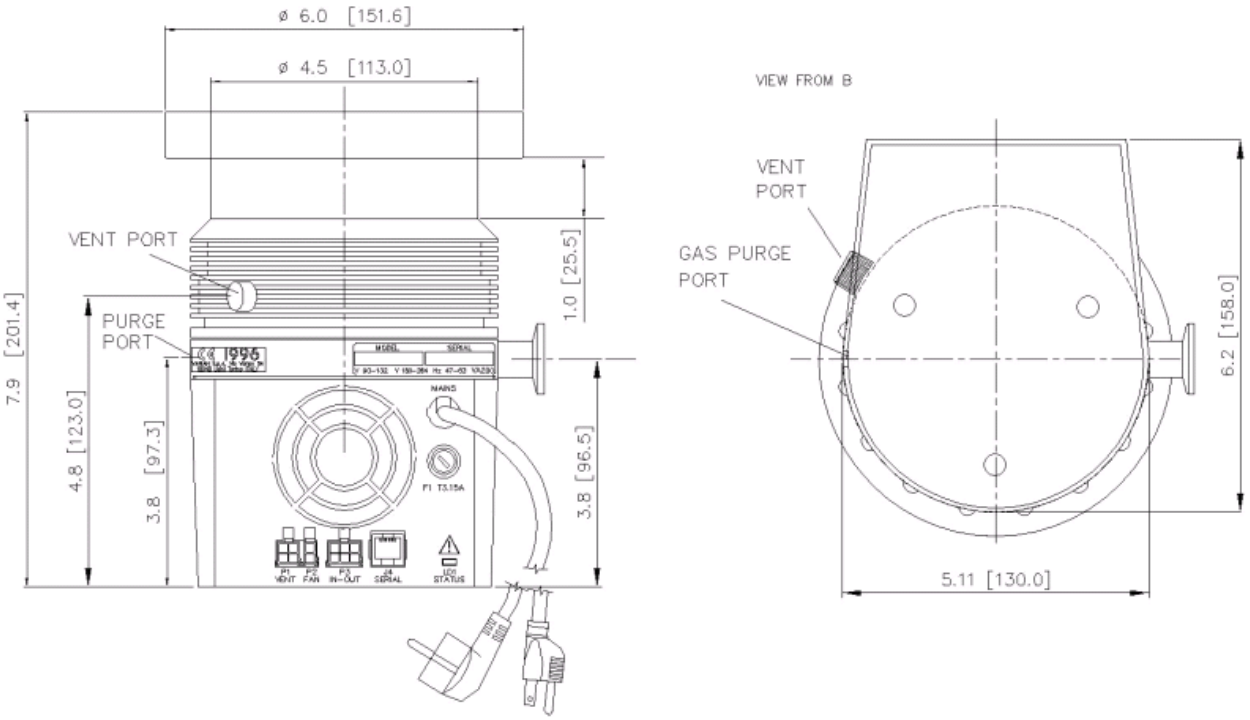


Turbo-301 ISO100



Graph of nitrogen pumping speed vs inlet pressure

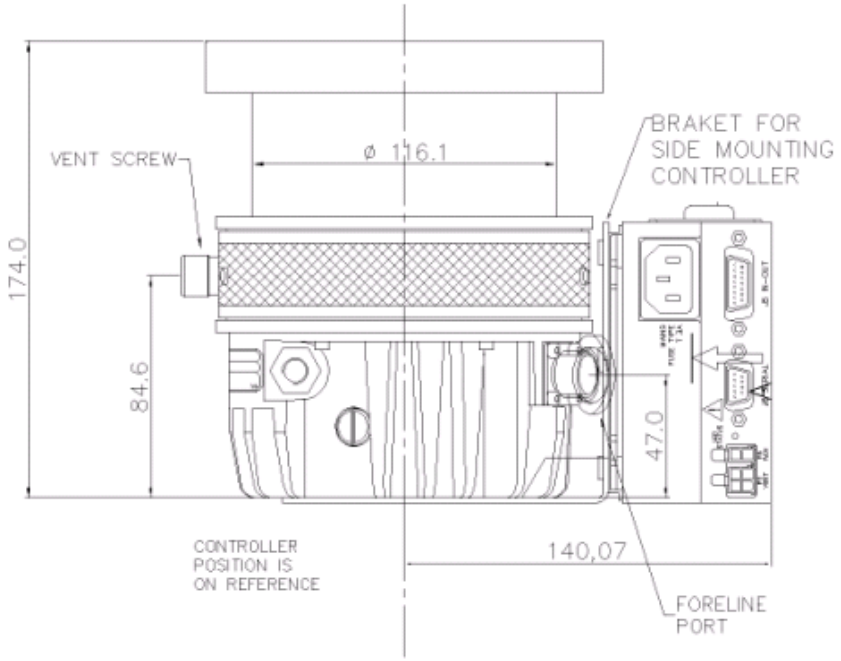
V141 CFF 6 9699380/9699384



Replacement suggested:

Turbo-301 CFF 6 EX9698919

with on-Board controller

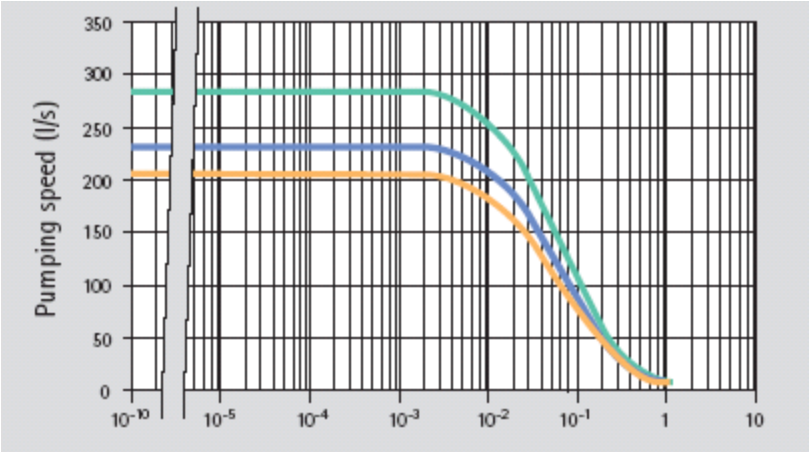


Technical Table

	V141 CFF6	301 CFF6
Total height	201.4	174.0
Vent port height from bottom	123.0	84.6
Foreline port height fm. bottom	96.5	47.0
Vent thread	M8	M8
Purge thread	M12	M12
Water fitting thread	1/8G	1/8G
Inlet flange	CFF6	CFF6
Foreline Flange	KF16	KF16
Vent port position referring to Foreline Flange	149°	On the right 153°
Purge port position referring to Foreline Flange	180°	On the left 83°

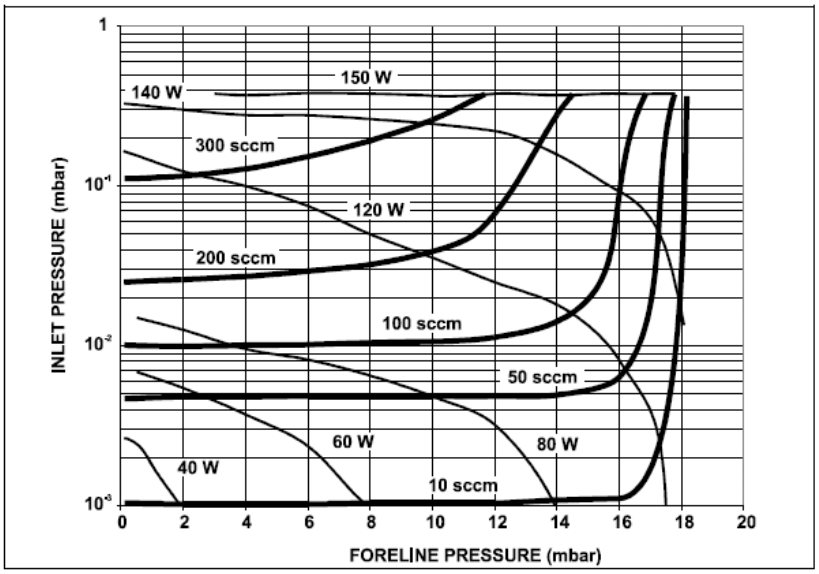
Pumping speed curve:
For V141 CFF6, refer to curves for ISO160 pumps

For Turbo-301 CFF6,



(green = Nitrogen)

Power consumption curve for Turbo-301 pump depending on the gas flow on the inlet



Technical Specification

	V141		Turbo-301	
Connection nominal diameter				
Inlet	ISO100 CFF6 ISO63 CFF4½		ISO100 CFF6 ISO100 + adapter CFF6 + adapter	
Outlet	NW16KF		NW16KF	
Pumping speed l/s	DN63	DN100	DN63	DN100
N2	105	125	170	250
He	107	120	180	220
H2	100	100	165	200
Compression ratio for				
N2	3x10e+8		7x10e+8	
He	8x10e+5		1x10e+5	
H2	9x10e+4		1x10e+4	
Max Forevacuum pressure mbar				
N2	30		18	
He			16	
H2			10	
Gas Throughput mbar.l/s				
N2	No limit		No limit	
He	No limit		No limit	
H2	No limit		No limit	
Recommended baking pump				
Diaphragm	MD12			
Rotary	SD40		DS102	
Dry			SH100	
Ultimate pressure mbar				
With rotary	2x10e-10		<5x10e-10	
With diaphragm	2x10e-8			
With dry			<5x10e-9	

Rotational speed	62000	56000
Run up time min.	<1.5	2.5
Cooling	Air (optional)	Air Optional water
Coolant water		flow: 200 l/h (0.89 GPM) temperature: + 10° C to + 30° C pressure: 3 to 5 bar (45 to 75 Psi)
Power consumption W	90	150
Vibration level (displacement)	< 0.01 µm at inlet flange	< 0.01 µm at inlet flange
Noise level	NA	45 dB (A) at 1 meter
Motor technology	NA	Asynchronous
input	NA	75 Vac, three phase, 963 Hz
Weight Kg	ISO 3.5 CFF 6.5	ISO 4.5 CFF 8

Technical Advantages

The major technical advantage of the Turbo-301 is the flexibility of after-sales-support: considering that the system includes 2 separate items, they can be exchanged separately, that can make the customer save money.

The Turbo-301 has a higher pumping speed if compared to the V141, even the compression ratio and the max tolerated foreline pressure are a bit lower than the previous pump.

From the vacuum connection point of view, 2 version of the V141 can be easily replaced by the 301, the ISO100 and CFF6; for the other 2 types, CFF4½ and ISO63 a reducer is needed (included in the package)

Accessories

1. The V141 didn't need the air cooling kit; anyway if the additional fan 9699323 was used, this must be replaced by the to 9699290 (+ extension 9699940 in case the AG rack controller is used).

2. vent valve has not changed if Navigator on board controller is used (9699834); with 301-AG controller, the vent valve has pn 9699844 (n.o. with extension 9699941)

3. inlet screen has not changed (DN100 9699302)

4. damper has not changed (ISO100 pn 9699344, CFF6 pn 9699334)

5. purge port thread has not changed.

6. RS232 communication port needs an adapter from phone type connection to D type connection (not supplied)

7. The 301 controller offers as standard the serial communication on both, Navigator and AG Rack pn 9698992; the RS485 communication is also standard availability, where the V141 had this option only as modified std.

Controller Comparison

The 301 controller is available in 2 versions: either ¼ AG rack controller (base, with RS232-484 on board; with Profibus interface) or on-board Navigator controller.

301-AG Rack controller

We offer the possibility to have a ¼ Rack AG (Active Gauge) controller that is very innovative from the operational point of view, and with increased control and communication capabilities.

The new rack controller is micro-processor-controlled, solid-state, frequency converter with self-diagnostic and self-protection features.

The most important features are:

- Front/remote/serial operation,
- 24Vdc pump fan cooling drive,
- Vent valve drive (valve delay and opening time are adjustable),
- Pump speed reading after stop command (allows monitoring of pump slow down time after the stop command during the venting phase),
- Regenerative braking (most effective pump deceleration without heat generation at the motor level),
- Pressure reading through the EyeSys Mini-IMG Gauge or the Full Range Gauge FRG700
- Input voltage auto setting,
- Remote I/O compatible with previous version,
- Navigator default serial compatible with the previous RS232 and RS485 version,
- Profibus interface (optional).

The controller is available in three models: base version (pn 9698991), with RS232-485 option (pn 9698992), with Profibus option (pn 9698993).

301 Navigator on-board controller

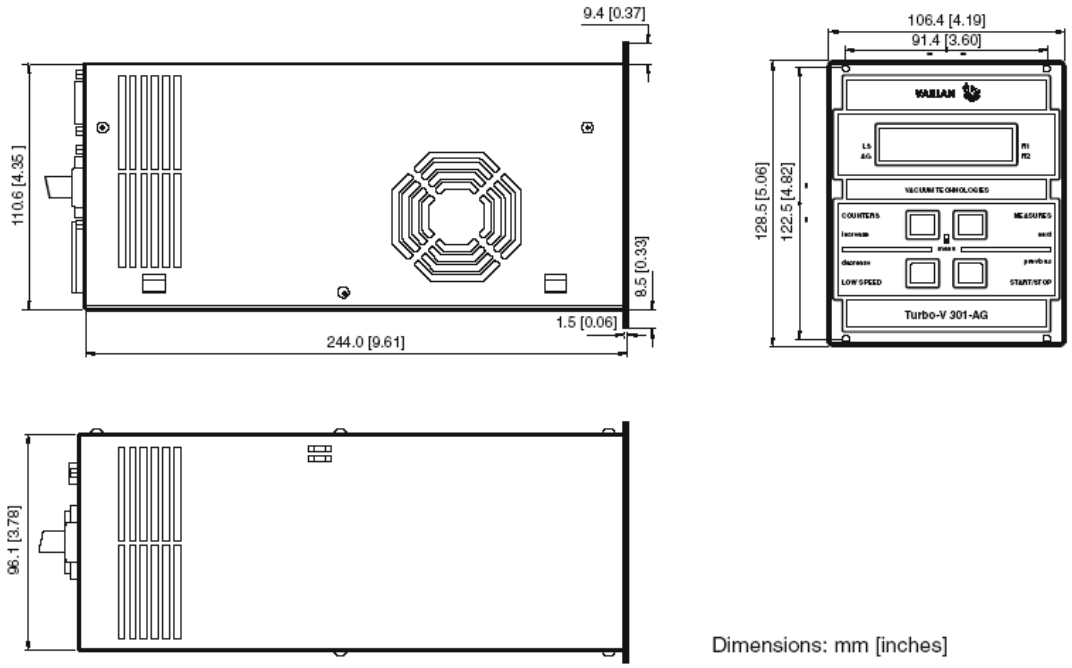
The 301 Navigator on-board controller is in general more compact than the V141 controller; furthermore, it can be easily installed and disinstalled from the pump; it can be either mounted on the bottom or on the side of the turbo pump using the dedicated bracket.; it offers as std both serial communication options, RS232 and RS485; it offers the communication via T-Plus Software (Contact Technical Support), for parameters setting and downloading through a PC.

The 301 Navigator on-board offers more features in the I/O signals if compared to the previous V141 on board controller (see table); it's easy to use with the new concept plug-and-pump.

Controller outline:

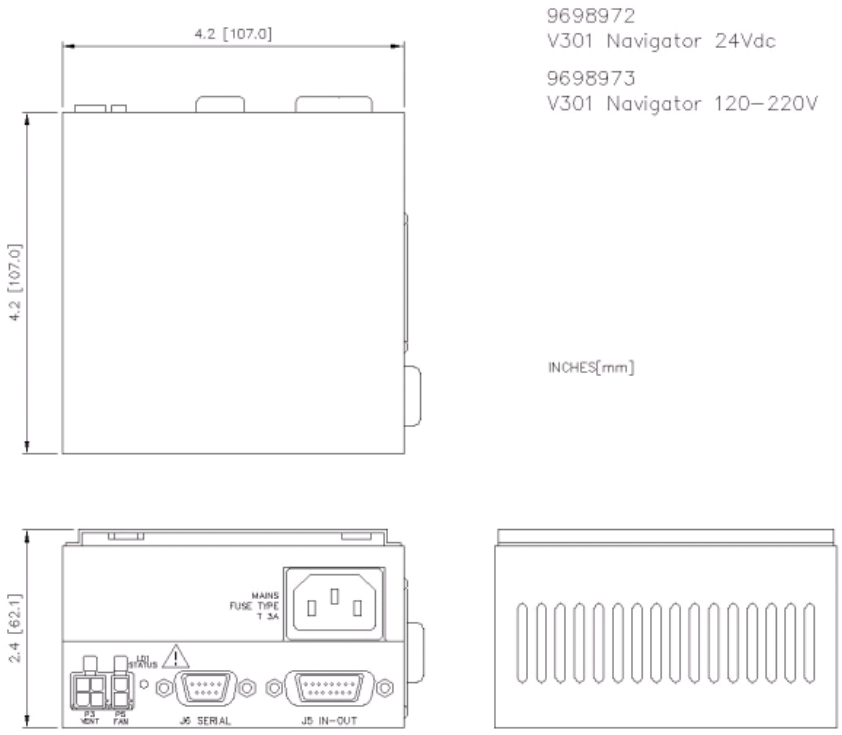
V141: the controller is integrated with the turbo pump; please refer to pump outline drawing.

301-AG ¼ rack controller



Dimensions: mm [inches]

301 Navigator on-Board controller:



Main cable must be specified (9699957 EU plug; 9699958 US plug); controller-to-pump cable is supplied. Please refer to the Instruction Manual for further technical details (accessories connections, vent valve driving, RS232 protocol, Eyesy Mini IMG or Full Range Gauge operation, etc).

Interconnection schematic:

Signal Description	**V141**	**301 Navigator**
Remote START/STOP	3-6	1(+) – 2(-)
Speed setting	(frequency setting) Only via RS232	5(+) – 6(-)
INTERLOCK	2-5	3(+) – 4(-)
FAULT	Only via RS232	13 open collector
OUTPUT SET POINT	1-4 24Vdc, 40mA programmable via RS232	11 24Vdc, 60mA programmable
Analog output 0-10Vcd	NA	14(+) – 15(-) prop.to frequency or power
START signal 24V, 60mA	Only via RS232	Only via RS232
SOFT START	Only via RS232	7(+) – 8(-)
+ 24 Vdc	NA	9 OUT
SPARE	NA	10 OUT
GROUND	4-5-6	15

V301-AG rack controller:

	301-AG rack
	On P1 connector:
Remote START/STOP	1-6
Remote LOW SPEED	2-7
INTERLOCK	3-8
SYSTEM OVERRIDE	4-9
SOFT START	5-9
	On J1 connector:
Analog output 2Vdc = 1A	1-2 (programmable)
R1 signal 24V, 60mA	4-11
LOW SPEED signal 24V, 60mA	5-12
START signal 24V, 60mA	6-13
R2 signal 24V, 60mA	7-14
FAULT signal 24V, 60mA	15-8
ANALOG OUTPUT (0-10V) frequency Analog output	1-9

For signal complete description, please refer to instruction manual.