Agilent Technologies

UPGRADE PROGRAM

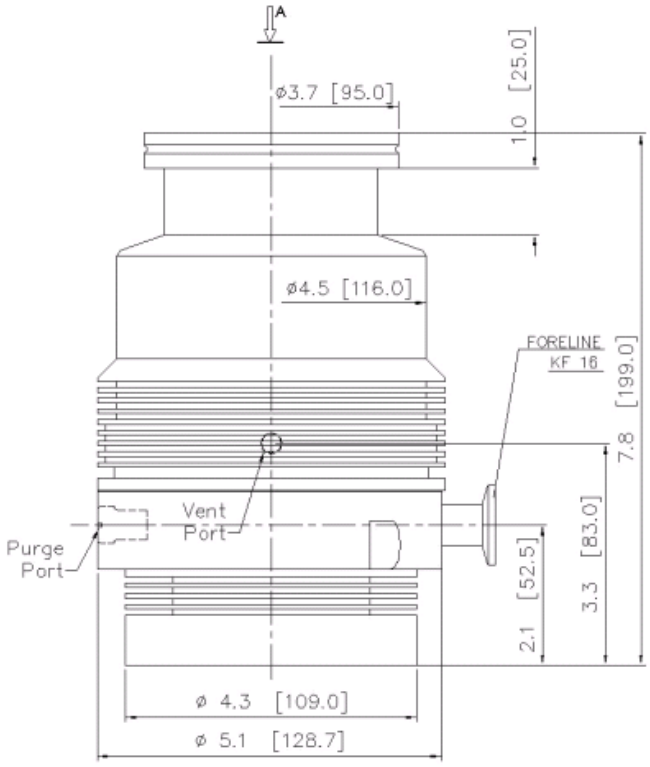
V150HT Series Pumps
vs
Turbo-301 Series Pumps

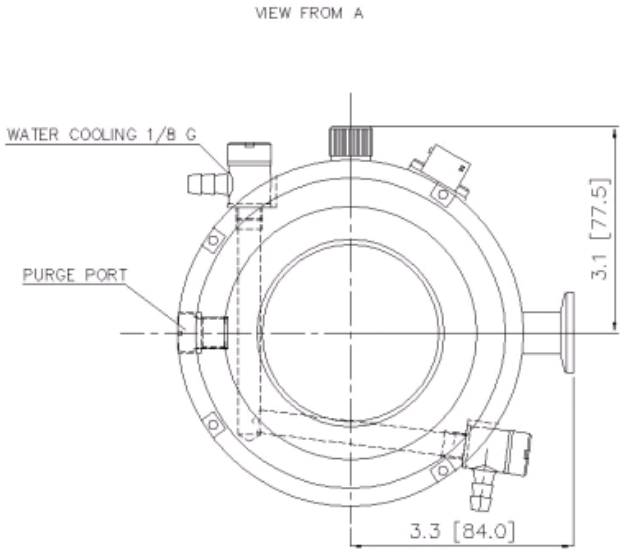
Technical Memo

INDEX

Outline Drawing

V150HT ISO63 9699370

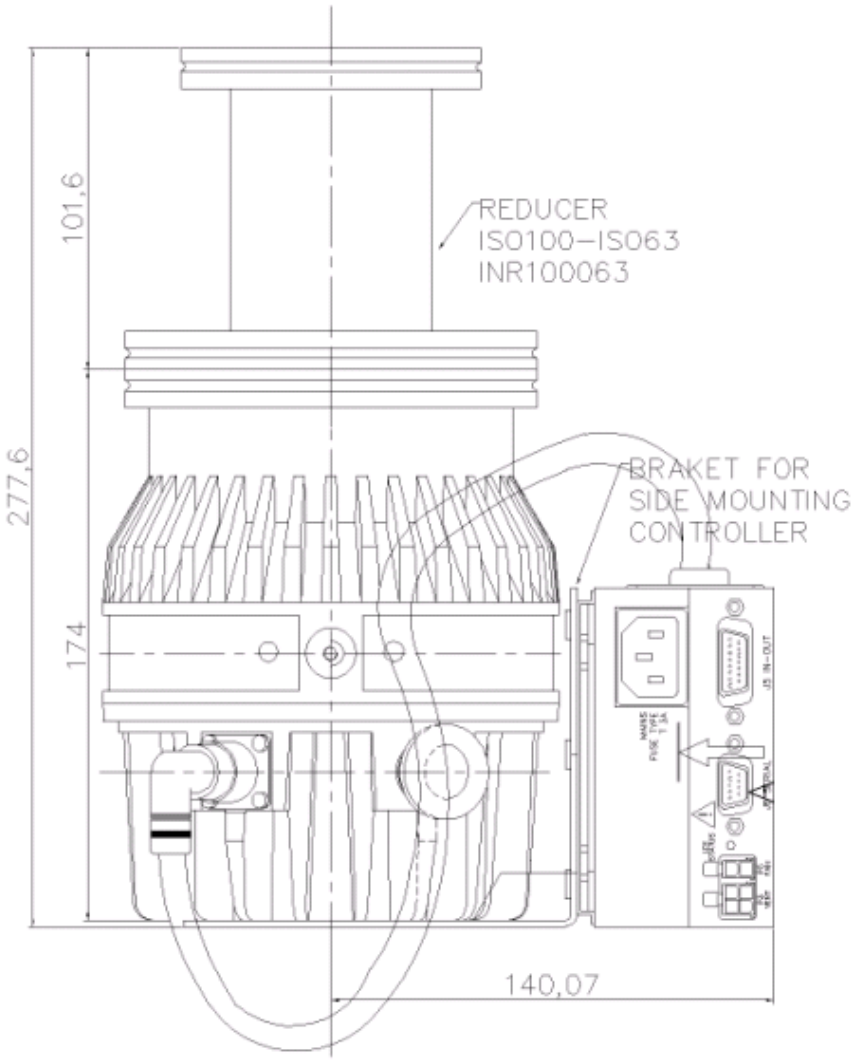




Replacement Suggested

Turbo-301 ISO100 EX9698918

with reducer IRC100063 and on-Board controller



Technical Table

	V150HT ISO63	301 ISO100 w. reducer
Total height	199.0	277.6
Vent port height from bottom	83.0	85.0
Foreline port height fm. bottom	52.5	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	90°	On the right 153°
Purge port position referring to Foreline Flange	180°	On the left 83°

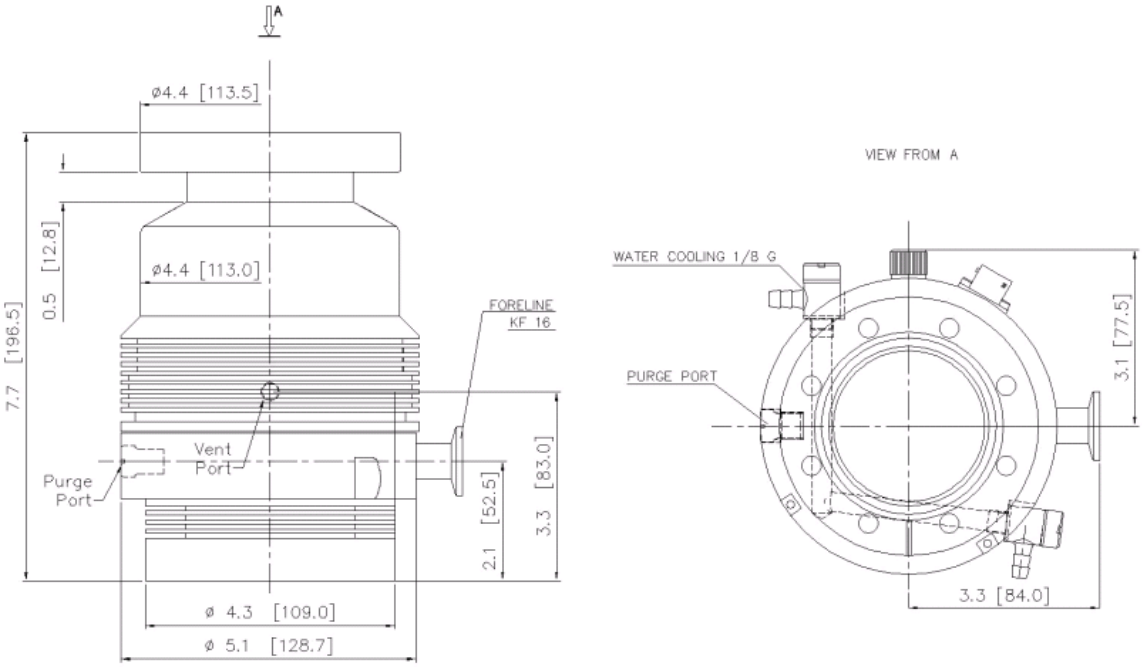
Pumping Speed Curve:
V150HT ISO63
Curve is not avalable; anyway the pumping speed is as follows:

Nitrogen:	100 l/s
Helium	105 l/s
Hidrogen	100 l/s

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

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

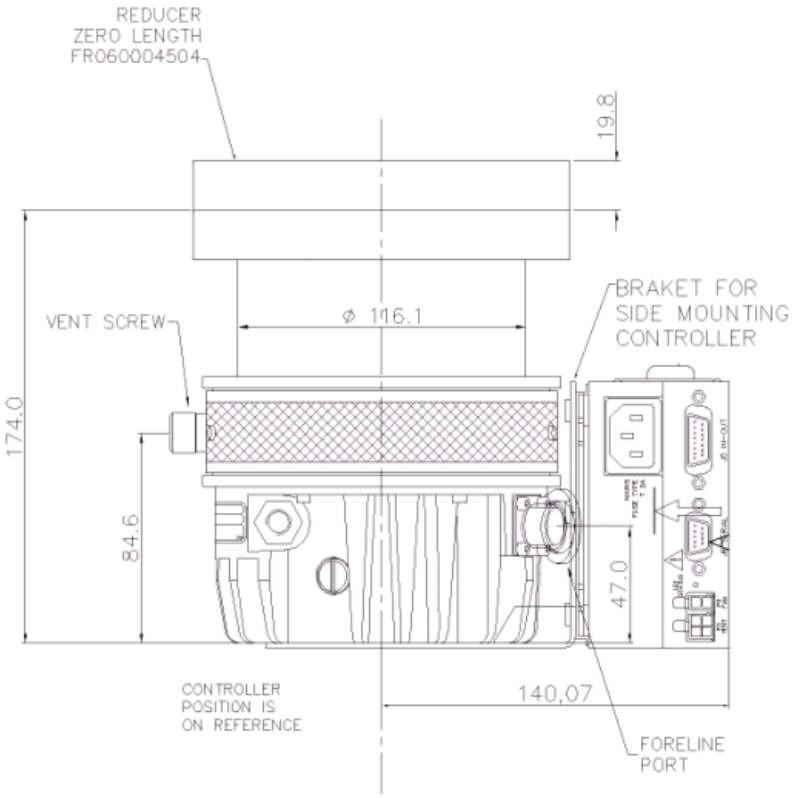
V150HT CFF 4-½ 9699372



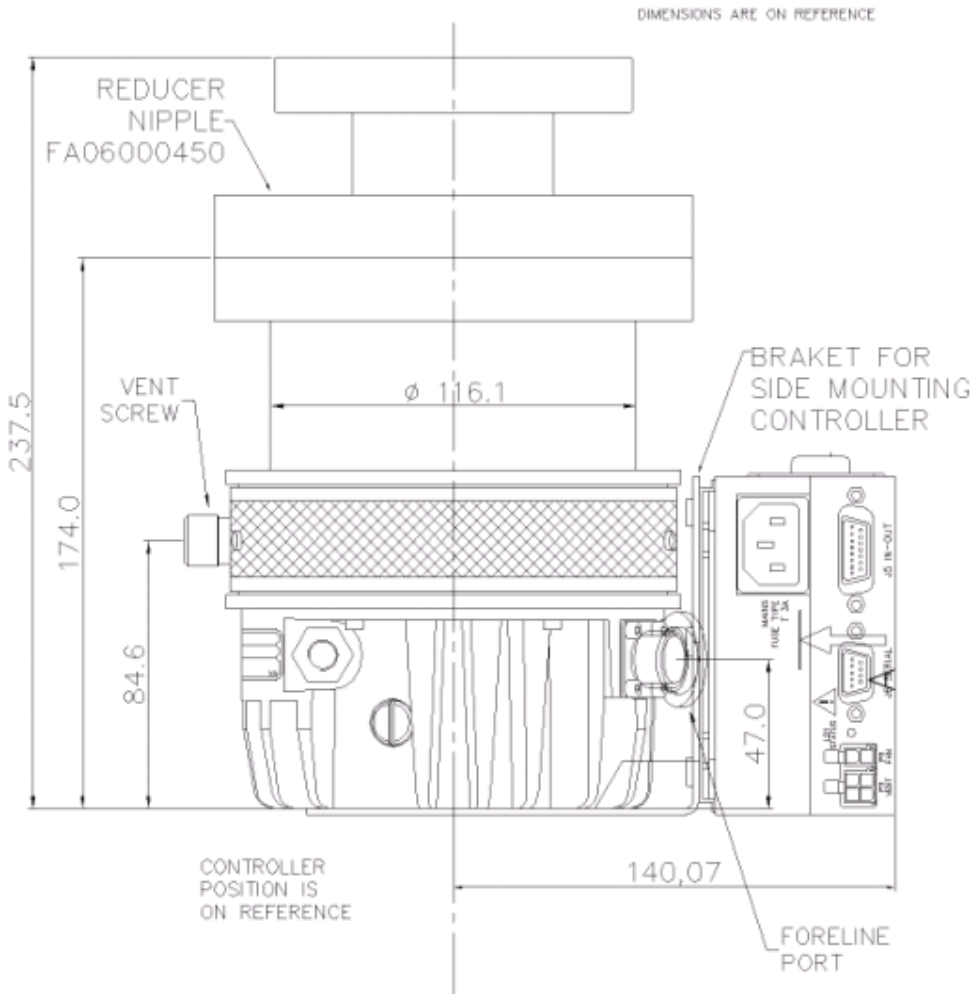
Replacement Suggested

Turbo-301 CFF 6 EX9698919

with reducer zero length and on-Board Controller



Or with reducing nipple:

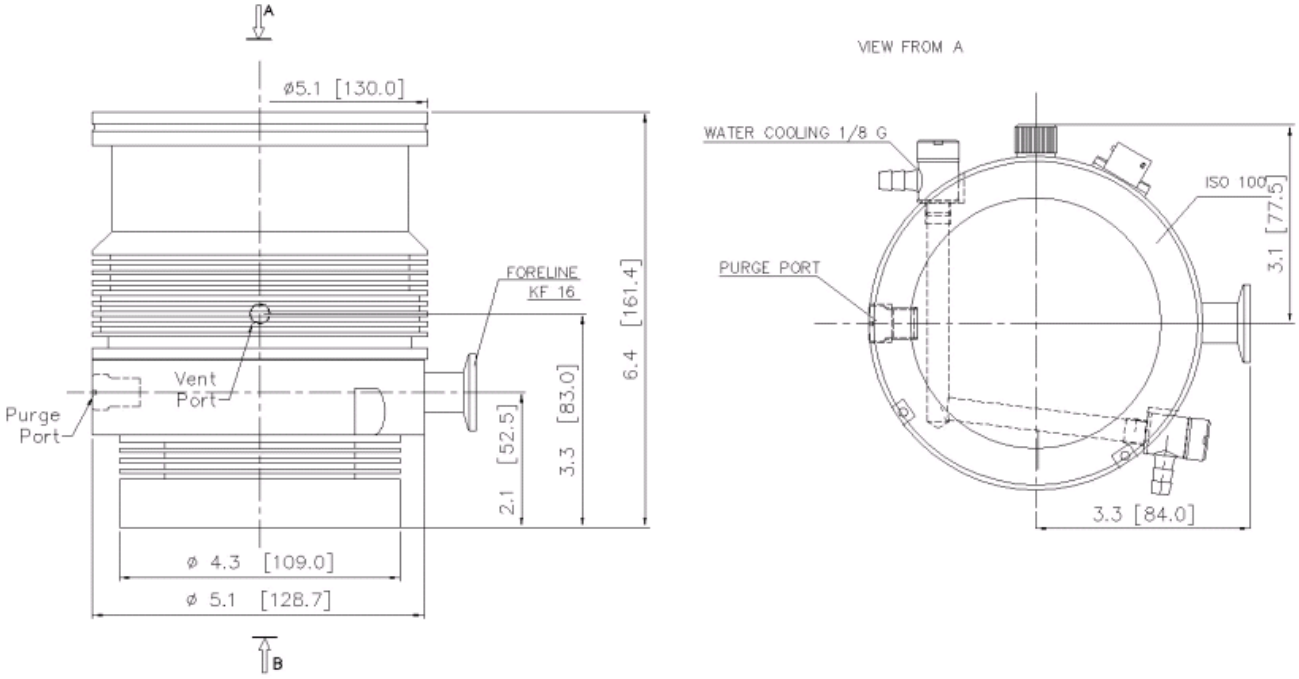


Technical Tables

	V150HT CFF4½	301 CFF6 w. Ø length reduc.	301 CFF6 w. nipple reduc.
Total height	196.5	193.8	237.5
Vent port height from bottom	83.0	84.6	84.6
Foreline port height fm. bottom	52.5	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	90°	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

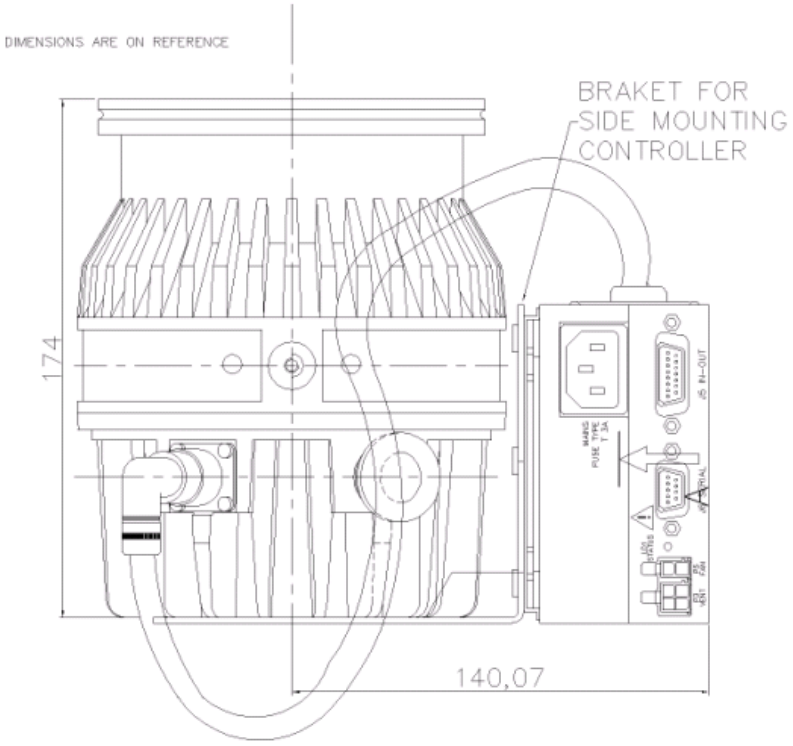
V150HT ISO100 9699369



Replacement suggested

Turbo-301 ISO100 EX9698918

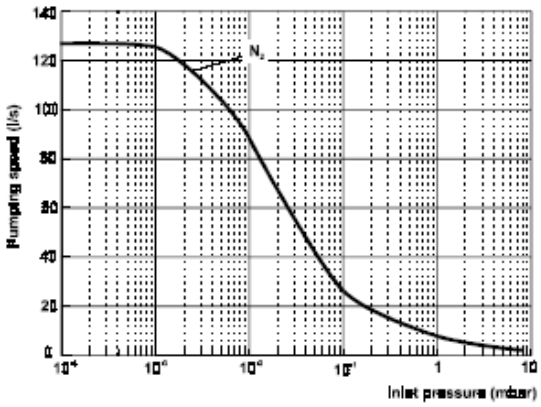
with on-Board controller



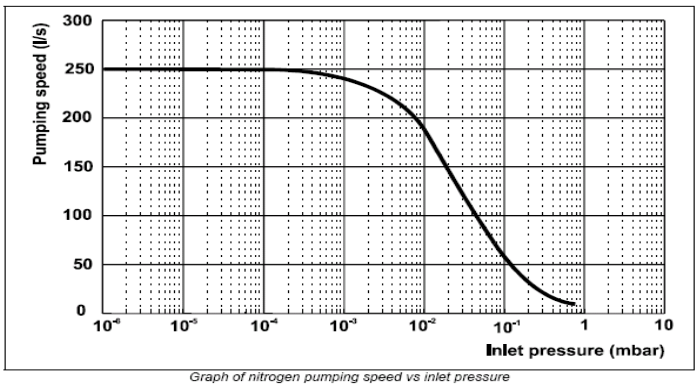
Technical Table:

	V150HT ISO100	301 ISO100
Total height	161.4	174.0
Vent port height from bottom	83.0	84.6
Foreline port height fm. bottom	52.5	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	90°	On the right 153°
Purge port position referring to Foreline Flange	180°	On the left 83°

Pumping speed curve for N2
V150HT ISO100

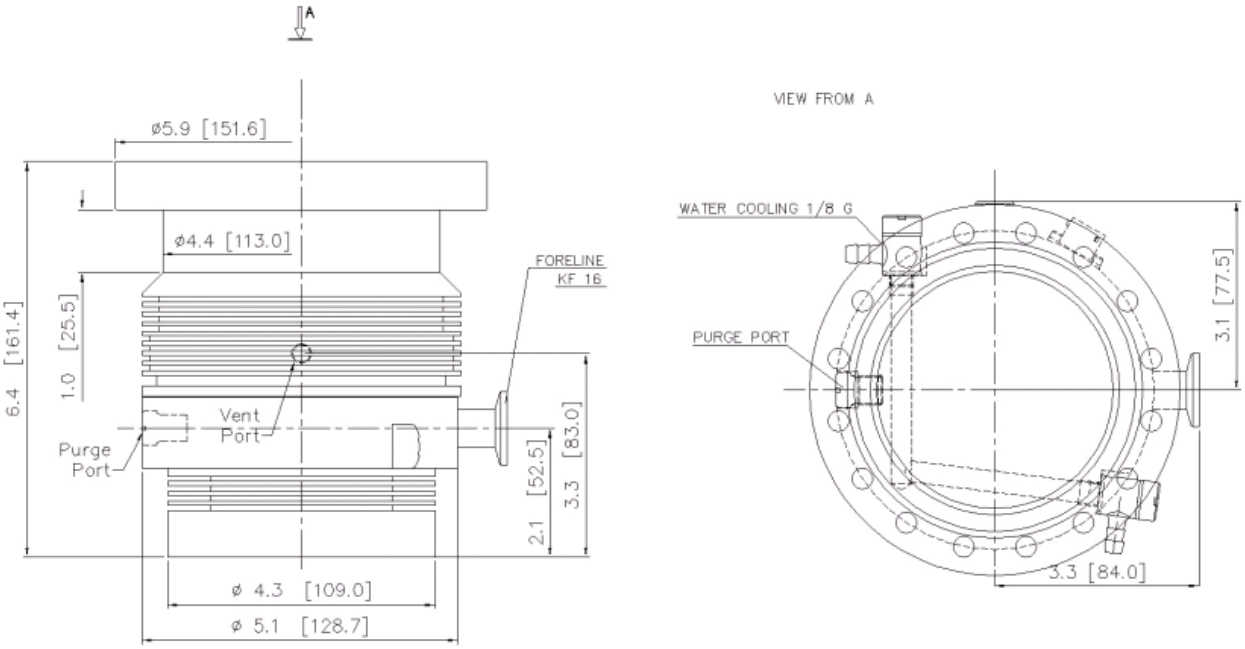


Turbo-301 ISO100



Graph of nitrogen pumping speed vs inlet pressure

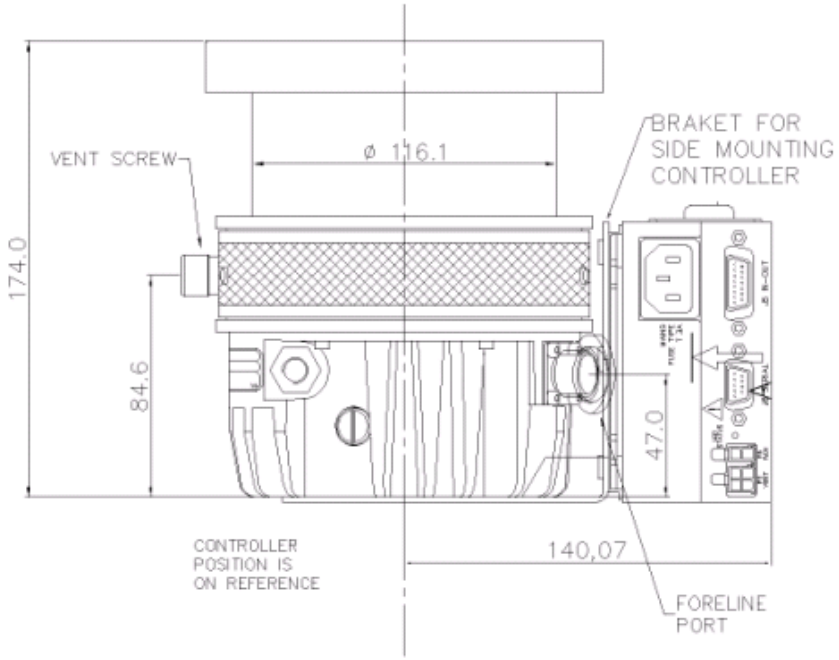
V150HT CFF 6 9699371



Replacement suggested:

Turbo-301 CFF 6 EX9698919

with on-Board controller

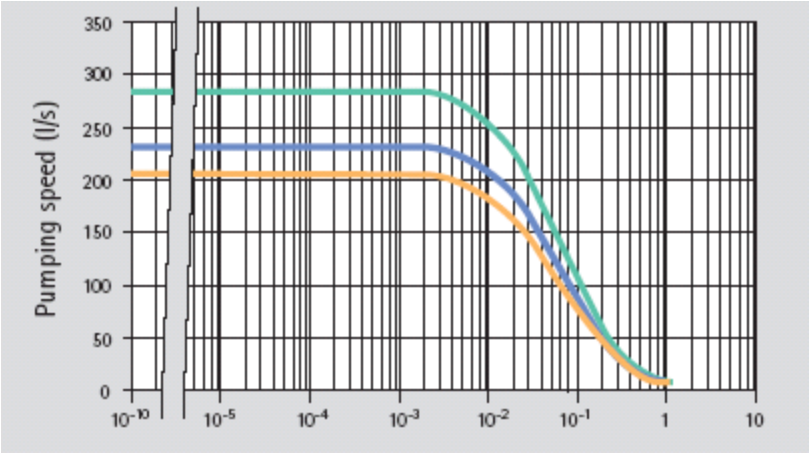


Technical Table

	V150HT CFF6	301 CFF6
Total height	161.4	174.0
Vent port height from bottom	83.0	84.6
Foreline port height fm. bottom	52.5	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	90°	On the right 153°
Purge port position referring to Foreline Flange	180°	On the left 83°

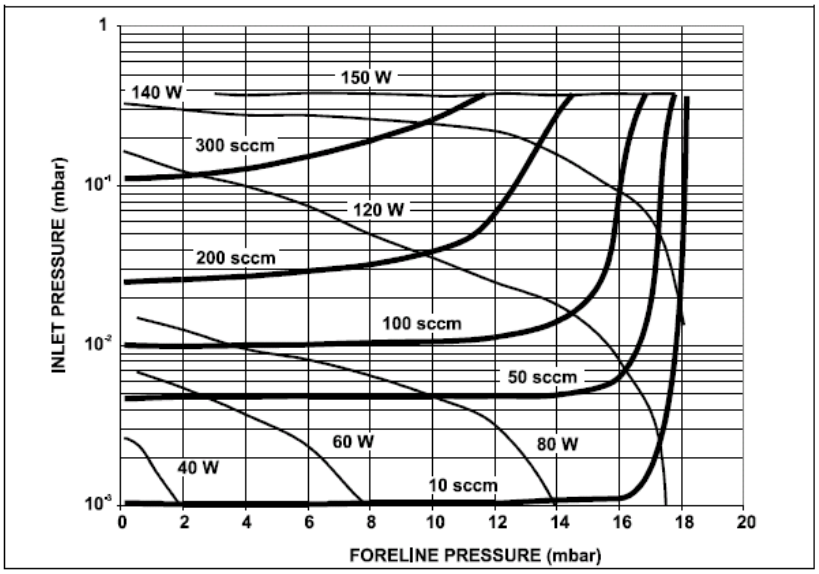
Pumping speed curve:
For V150HT CFF6, refer to curves for ISO100 pumps

For Turbo-301 CFF6,



(green = Nitrogen)

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



Technical Specification

	V150HT		V301	
Connection nominal diameter Inlet Outlet	ISO100 CFF6 ISO63 CFF4½ NW16KF		ISO100 CFF6 ISO100 + adapter CFF6 + adapter NW16KF	
Pumping speed l/s	DN63	DN100	DN63	DN100
N2 He H2	100 105 100	160 120 110	170 180 165	250 220 200
Compression ration for N2 He H2	3x10e+8 8x10e+5 9x10e+4		7x10e+8 1x10e+5 1x10e+4	
Max Forevacuum pressure mbar N2 He H2	32		18 16 10	
Gas Throughput mbar.l/s N2 He H2	No limit No limit No limit		No limit No limit No limit	
Recommended baking pump Diaphragm Rotary Dry	MD12 SD40		DS102 SH100	

Ultimate pressure mbar With rotary With diaphragm With dry	 2x10e-10 2x10e-8	 <5x10e-10 <5x10e-9
Rotational speed	62000	56000
Run up time min.	<1.5	2.5
Cooling	Air (optional) Optional Water	Air Optional water
Coolant water	flow: 200 l/h (0.89 GPM) temperature: + 10° C to + 30° C pressure: 3 to 5 bar	flow: 200 l/h (0.89 GPM) temperature: + 10° C to + 30° C pressure: 3 to 5 bar
Power consumption W	150 with ¼ Rack controller 230 / 90 with ½ Rack controller	150
Vibration level (displacement)	< 0.01 µm at inlet flange	< 0.01 µm at inlet flange
Noise level	45 dB (A) at 1 meter	45 dB (A) at 1 meter
Motor technology	Asynchronus	Asynchronous
input	120 Vac, three phases, 1050 Hz	75 Vac, three phase, 963 Hz
Weight Kg	ISO 3.6 CFF 5.6	ISO 4.5 CFF 8

Technical Advantages

The major technical advantage of the V301 is a higher pumping speed and a relative good discharge at high foreline pressure that in general allows a good upgrade of the system from the existing V150HT to a new style V301.

The V301 pump has a low power consumption for improved performances, it has a better thermal dissipation with the consequence of a better reliability and longer bearings life. The pump can work in presence of high gas flow.

The water cooling channels are made of Stainless Steel, that prevents water corrosion and clogging.

From the vacuum connection point of view, 2 version of the V141 can be easily replaced by the V301, the ISO100 and CFF6; for the other 2 types, CFF4½ and ISO63 a reducer is needed.

The controller is not compatible and must be exchanges as well.

Accessories

1. The V150HT didn't need the air cooling kit; anyway if an air cooling was used, this must be replaced by the 9699299.
2. The vent valve (9699843) has not changed if Rack controller will be used; it has changed if the V301 on board controller will be used (9699834).
3. Inlet screen has not changed (DN63 9699300 or DN100 9699302)
4. damper has not changed (ISO100 pn 9699344, CFF6 pn 9699334)
5. purge port thread has not changed.
6. For controllers, please refer to following section.

Controller Comparison

The V150HT controller is not compatible with the Turbo-301 Series Pump

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

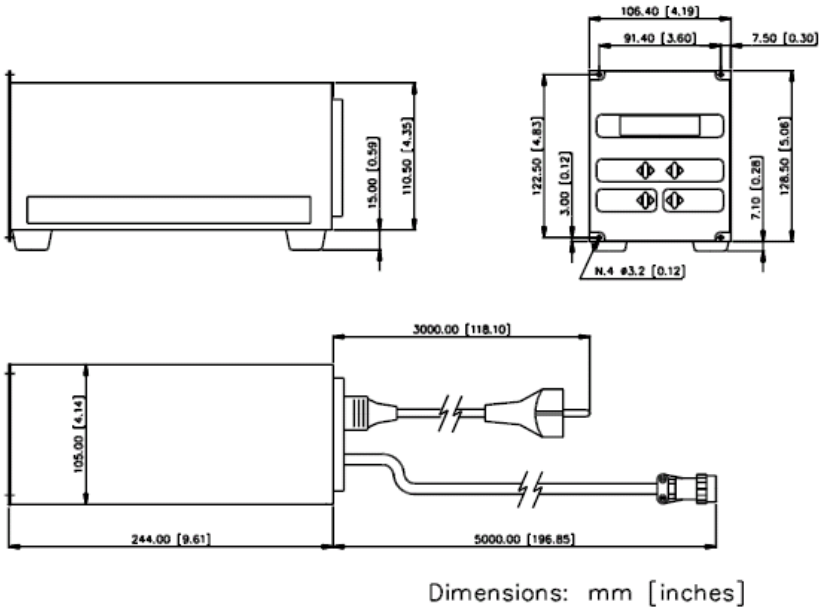
The 301 Navigator on-board controller is in general more compact than the V141 controller; furthermore, it can be easily installed and disinstalled from the pump; it can be either mounted on the bottom or on the side of the turbo pump using the dedicated bracket.; it offers as std both serial communication 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.

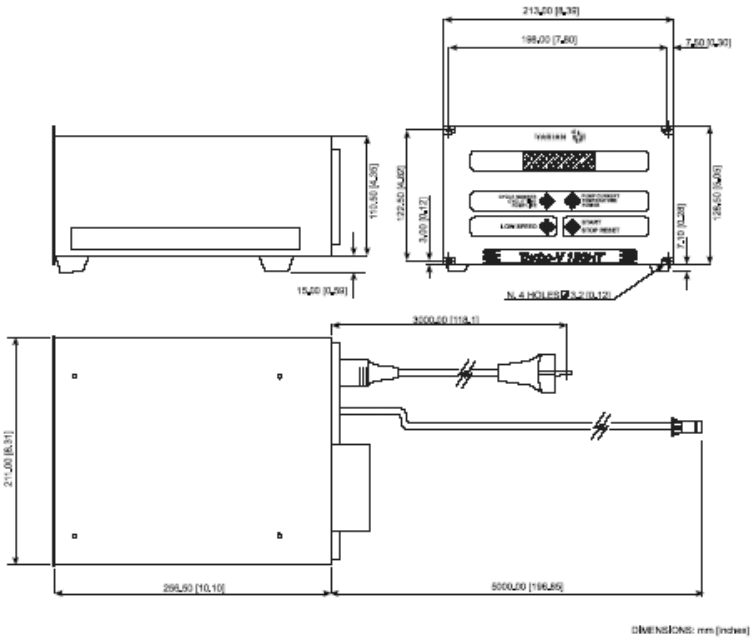
Controller outline:

V150HT controller was available in 2 versions, either ½ Rack (pn 9699435 and 9699535) or ¼ Rack (pn 9699436 and 9699536).

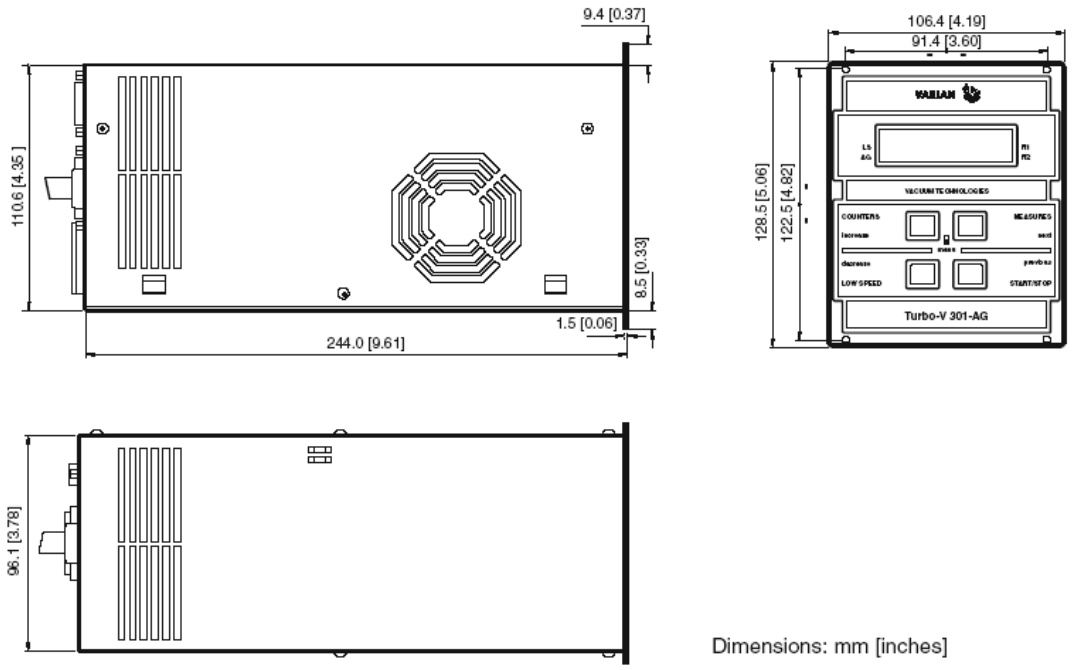
Outline 9699435-9699535:



Outline 9699436-9699536:

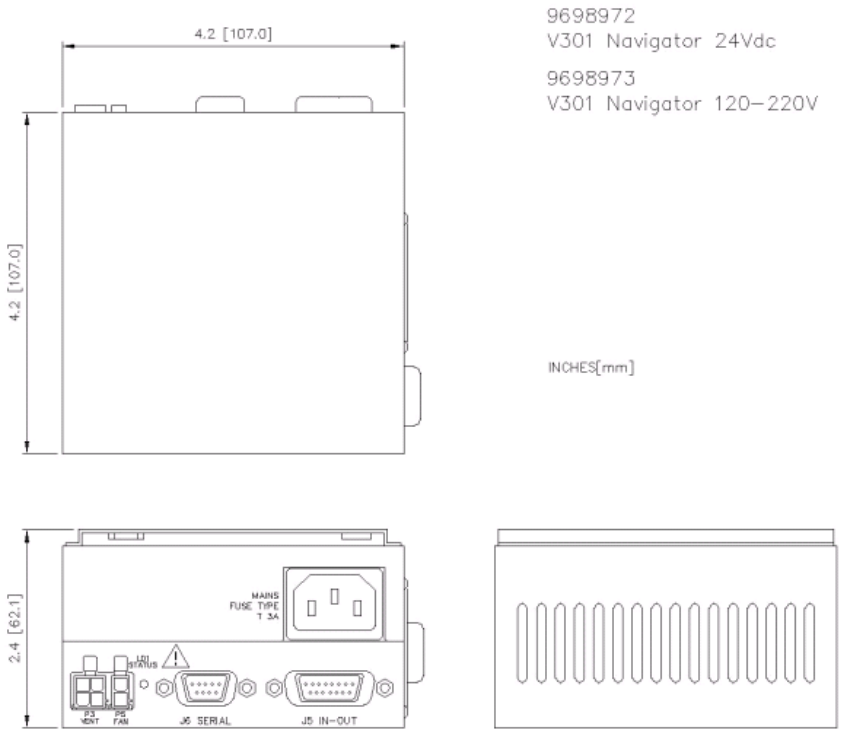


301-AG ¼ rack controller



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 on 301 Navigator on-Board controller:

1	START/STOP (+)	IN
2	START/STOP (-)	IN
3	INTERLOCK (+)	IN
4	INTERLOCK (-)	IN
5	SPEED SETTING (+)	IN
6	SPEED SETTING (-)	IN
7	SOFT START(+)	IN
8	SOFT START(-)	IN
9	+ 24 Vdc	OUT
10	SPARE	OUT
11	PROGRAMMABLE SET POINT	OUT
12	SPARE	OUT
13	FAULT	OUT
14	PROGRAMMABLE ANALOG SIGNAL (+)	OUT
15	• GROUND • PROGRAMMABLE ANALOG SIGNAL (-)	OUT

V301-AG rack controller:

Signal Description	**V150HT ½ Rack**	**V150HT ¼ Rack**	**V301 ¼ Rack**
	On P1 connector:		
Remote START/STOP	1-6	1-6	1-6
Remote LOW SPEED	2-7	2-7	2-7
INTERLOCK	3-8	3-8	3-8
SYSTEM OVERRIDE	4-9	4-9	4-9
	On P2 connector:		
Analog output 2Vdc = 1A	1-2	1-2	1-2*
R1 signal 24V, 60mA	4-11	4-11	4-11
LOW SPEED signal 24Vdc, 60mA	5-12	5-12	5-12
START signal 24V, 60mA	6-13	6-13	6-13
R2 signal 24V, 60mA	7-14	7-14	7-14
FAULT signal 24V, 60mA	8-15	5-18	5-18
Analog output 0-10 V proportional to speed	1-9	N.A.	1-2*

* For signal complete description, please refer to instruction manual.