



## Agilent TwisTorr FS-OS Turbo Pumps

### The new generation Turbo Pump with Agilent Floating Suspension for continuous operation

The Agilent TwisTorr FS-OS turbomolecular high-vacuum pumps combine TwisTorr drag stage technology and Agilent Floating Suspension, to provide high performance, reliability, and economy.

The FS-OS pumps are designed for applications in academia, research, and others that require long-term operation, where the pump is used continuously for extended periods of time.

Twistorr drag stages create high compression ratios for light gases such as hydrogen and helium to deliver high throughput and high tolerance of foreline pressure, thereby permitting the use of smaller and more economical backing pumps. This technology results in a compact rotor design that is energy-efficient and maintains a low operating temperature.

The Agilent Floating Suspension system reduces noise and vibration, and ensures optimal bearing operating conditions to extend operating life, minimize system downtime, and assure stability over time.

The unique TwisTorr FS bearing and dry lubrication eliminate oil and maintenance needs, and permit operation of the pump in any orientation.

The pump can be water cooled or air cooled: in the first case the customer can use the dedicated channels on the pump body, in the second case an external optional fan is available. A thermistor sensor is mounted near the upper bearing to prevent the pump from overheating.

The TwisTorr FS-OS medium-size turbo pumps are available in three standard versions:

- TwisTorr 404 FS-OS (with flanges ISO100K, CFF 6")
- TwisTorr 704 FS-OS (with flanges ISO160F, ISO160K, CFF8")
- TwisTorr 804 FS-OS (with flanges ISO200K, CFF 10")



## Technical Specifications

	TwisTorr 404 FS-OS	TwisTorr 704 FS-OS	TwisTorr 804 FS-OS
Inlet flange	ISO 100K, ISO 100F, CFF 6"	ISO 160K, ISO 160F, CFF 8"	ISO 200F / CFF 10"
Pumping speed (@714Hz)			
N <sub>2</sub>	330 L/s	570 L/s	620 L/s
He	435 L/s	550 L/s	570 L/s
H <sub>2</sub>	290 L/s	320 L/s	335 L/s
Ar	305 L/s	557 L/s	594 L/s
Max gas throughput (*)	Air cooling (25°C air temperature)		Water cooling (15 °C water temp. / 25 °C room temp.)
N <sub>2</sub>	4.3 mbar L/s - 255 SCCM		6.1 mbar L/s - 365 SCCM
He	7.9 mbar L/s - 467 SCCM		10.4 mbar L/s - 615 SCCM
Ar	1.5 mbar L/s - 88 SCCM		3.3 mbar L/s - 195 SCCM
(*) Backing pump 11.6 m <sup>3</sup> /h			
<b>Compression ratio</b>			
N <sub>2</sub>	> 1 x 10 <sup>10</sup>		
He	> 1 x 10 <sup>7</sup>		
H <sub>2</sub>	> 1 x 10 <sup>5</sup>		
Ar	> 1 x 10 <sup>10</sup>		
<b>Foreline tolerance (**)</b>			
N <sub>2</sub>	10 mbar		
He	10 mbar		
H <sub>2</sub>	> 4 mbar		
Ar	8.5 mbar		
(**) Foreline Tolerance defined as the pressure at which the turbopump still produces a compression of 100 and estimated in water cooling mode			
Base pressure with recommended forepump	< 1 x 10 <sup>-10</sup> mbar ( < 1 x 10 <sup>-10</sup> Torr)		
Foreline flange	NW25, NW40 depending on pump model. NW16 optional		
Rotational speed	42'840 RPM		
Start-up time	< 5 minutes		
Recommended forepump	Agilent DS302 Rotary Vane Pump Agilent IDP-10 Dry Scroll Pump Agilent IDP-15 Dry Scroll Pump		
Operating position	Any		
Operating ambient temperature	+5 °C to +35 °C		
Relative humidity of air	0 to 90% (not condensing)		
Bakeout temperature	ISO pump: 80°C at inlet flange CFF pump: 120°C at inlet flange		
Lubricant	Permanent lubrication		
<b>Cooling requirements:</b>			
Air cooling	Air temperature from +5°C to 35°C		
Water cooling	Water temperature from +15°C to +25°C		Water flow min. 100L/h
Noise pressure level (at 1m at full speed)	43dB(A)		
Storage temperature	-40 °C to +70 °C		
Max altitude	3000 m		
Weight	ISO100K 22.6 kg (49.8 lbs) ISO100F 23.7 kg (52.3 lbs) CFF 6" 23.5 kg (51.8 lbs)	ISO160K 20.6 kg (45.3 lbs) ISO160F 22.6 kg (49.7 lbs) CFF 8" 22 kg (48.4 lbs)	ISO 200F 23.6 kg (51.9 lbs) CFF 10" 22.1 kg (48.6 lbs)
<b>Conformity to norms</b>			
EMC (Control Units)	61326-1		
Safety (CE/CSA)	61010-1		
Machinery Directive	DIR 2006/42/CE		
Low Voltage Directive	DIR 2014/35/EU		
EMC Directive (Control Units)	DIR 2014/30/EU		
ROHS	DIR 2011/65/EU		



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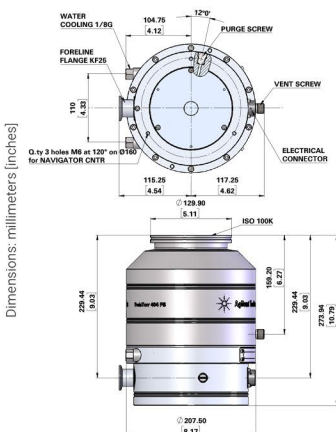
# Ordering Information

Pumps	Part Numbers
TwisTorr 404 FS-OS CFF6 KF25	X3511-64051
TwisTorr 404 FS-OS ISO100K KF25	X3511-64039
TwisTorr 704 FS-OS CFF8 KF25	X3511-64042
TwisTorr 704 FS-OS ISO160K KF25	X3511-64040
TwisTorr 704 FS-OS ISO160F KF25	X3511-64041
TwisTorr 804 FS-OS CFF10 KF25/40	X3511-64044
TwisTorr 804 FS-OS ISO200F KF25/40	X3511-64043
Controllers	Part Numbers
TwisTorr Medium-TMP-OS Rack Controller	X3501-64006
TwisTorr Medium-TMP-OS on board Controller	X3512-64006
Cables	Part Numbers
Mains cable NEMA plug 3 m long	9699958
Mains cable EU plug 3 m long	9699957
Mains cable UK plug 2.5 m long	X3501-68005
Serial Cable & A-PLUS Software	9699883
Medium-TMP Extension Cable	9699948M001 (5 m) 9699948M003 (10 m) 9699948M004 (15 m) 9699948M002 (20 m) 9699948M005 (30 m) 9699948M006 (50 m) 9699948M009 (75 m) 9699948M010 (100 m)
Inlet Screen	Part Numbers
Inlet Screen ISO100/CFF6	9699302
Inlet Screen ISO160/CFF8	9699304
Inlet screen ISO200/CFF10	9699316
Cooling	Part Numbers
Medium-TMP Air Cooling Kit for Rack Controller	X3501-68001
Medium-TMP Air Cooling Kit for on board Controller	9699297
Plastic Water cooling Kit	9699347
Metal Water cooling Kit	9699337
Air Cooling Kit Extension Cable 5m	X3501-68101

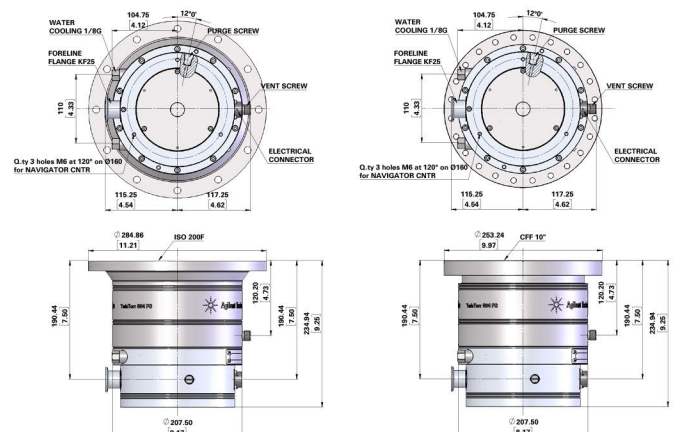
Air Cooling Kit Extension Cable 10m	X3501-68051
Air Cooling Kit Extension Cable 15m	X3501-68061
Air Cooling Kit Extension Cable 20m	X3501-68021
Air Cooling Kit Extension Cable 30m	X3501-68011
Air Cooling Kit Extension Cable 50m	X3501-68071
Air Cooling Kit Extension Cable 75m	X3501-68081
Air Cooling Kit Extension Cable 100m	X3501-68091
Venting	Part Numbers
Vent valve driven by Rack Controller, N.O., 1.2 mm orifice	X3501-68002
Vent valve driven by Onboard Controller, N.O., 1.2 mm orifice	9699834
Vent valve driven by Rack Controller, N.C., 1.2 mm orifice (Minimum HW revision required: A0006 for controller PN X3501-64006)	X3501-68022
Vent valve driven by Onboard Controller, N.C., 1.2 mm orifice (Minimum HW revision required: A003. Controller factory setting: N.O. - Switch to N.C. setting to operate the N.C. valve)	9699834M010
Vent flange, NW 10 KF / M8	9699108
Vent valve driven by Onboard Controller, N.C., 1.2 mm orifice (Minimum HW revision required: A003. Controller factory setting: N.O. - Switch to N.C. setting to operate the N.C. valve)	X3501-68004 (5 m) X3501-68054 (10 m) X3501-68064 (15 m) X3501-68074 (20 m) X3501-68084 (30 m) X3501-68034 (50 m) X3501-68094 (75 m) X3501-68104 (100 m)
Purge	Part Numbers
Purge 10SCCM M12-NW16KF	9699239
Purge 10SCCM M12-1/4 Swagelok	9699240
Purge 20SCCM M12-NW16KF	9699241
Purge 20SCCM M12-1/4 Swagelok	9699242
Spare Purge Screw	X3502-68004
Mounting	Part Numbers
Medium-TMP onboard controller side-mount. bracket	X3511-68003
Medium-TMP KF16 foreline flange	X3511-68004
Medium-TMP KF25 foreline flange	X3511-68001
Medium-TMP KF40 foreline flange	X3511-68002

## Outline Drawings

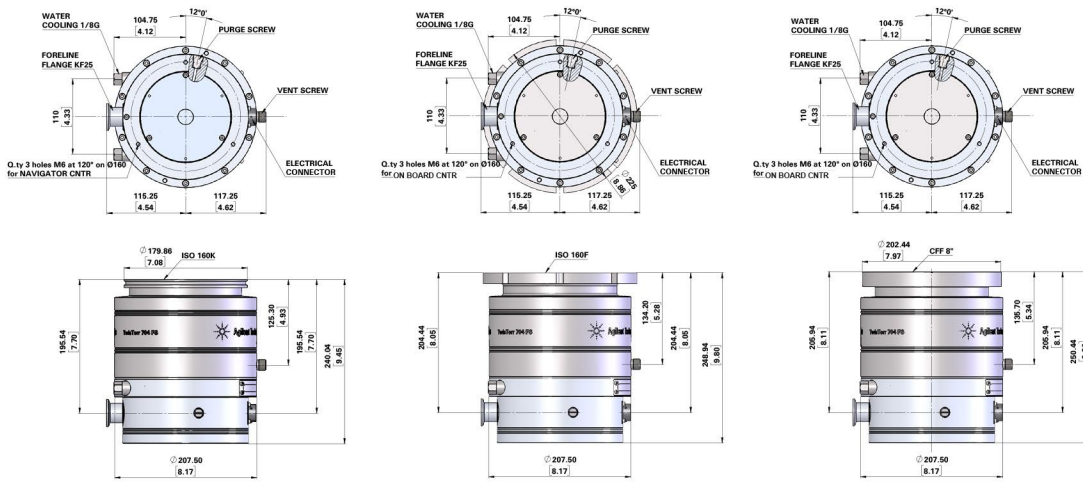
### TwisTorr 404 FS-OS



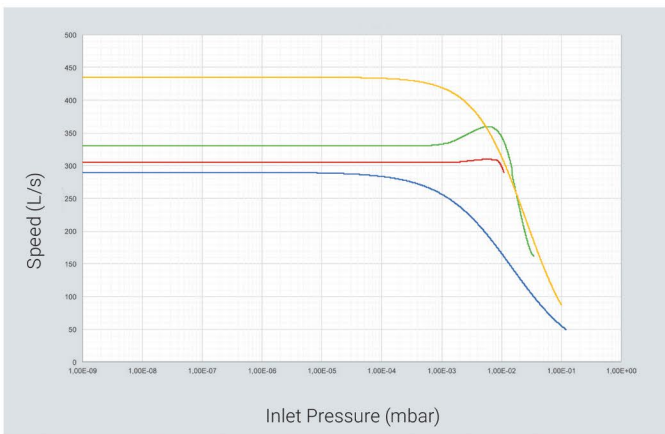
### TwisTorr 804 FS-OS



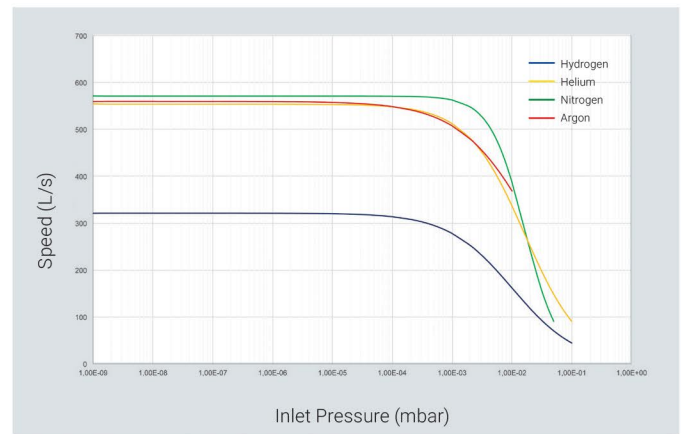
# Twistorr 704 FS-OS



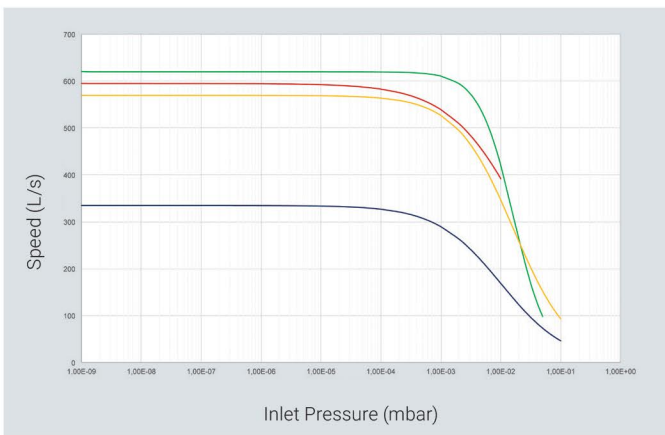
Pumping speed - Twistorr 404 FS-OS



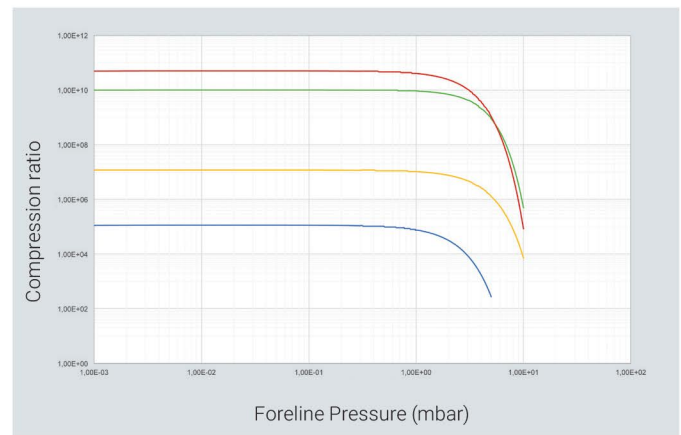
Pumping speed - Twistorr 704 FS-OS



Pumping speed - Twistorr 804 FS-OS



Compression Ratio (for all models)



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