

## Agilent TwisTorr 304 FS



### The new generation Turbo Pump with Agilent Floating Suspension

The Agilent TwisTorr 304 FS turbomolecular high-vacuum pump combines TwisTorr drag stage technology and Agilent Floating Suspension to provide high performance, reliability, and economy.

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.

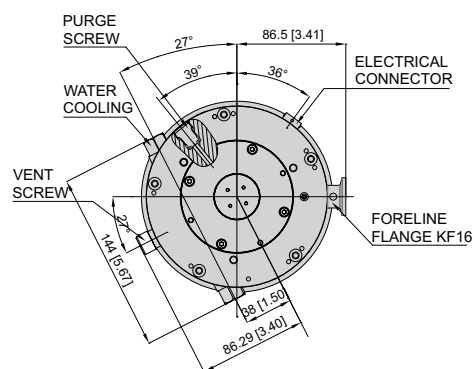
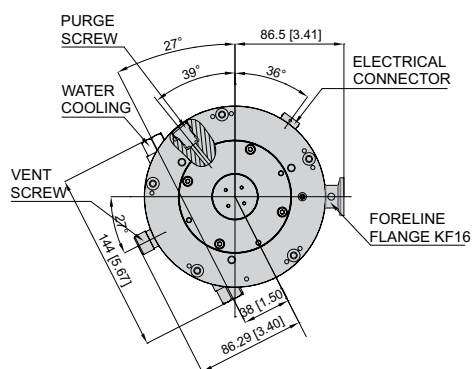
The unique bearing and dry lubrication in the TwisTorr 704 FS eliminate oil and maintenance, and permit operation of the pump in any orientation. Available with onboard or rack controllers.

## Technical Specification

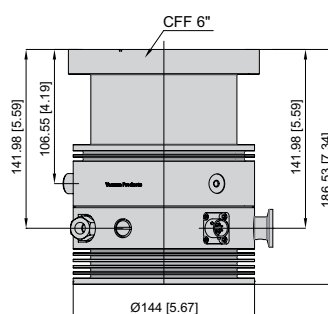
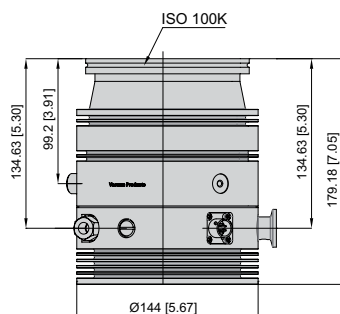
| Technical Specification  |   |                             |
|--|---|-----------------------------|
| <b>Pumping speed</b>   | ISO 100 / CF 6"   | ISO 160 / CF 8"             |
| N <sub>2</sub>   | 250 L/s   | 250 L/s                     |
| He   | 255 L/s   | 255 L/s                     |
| H <sub>2</sub>   | 220 L/s   | 220 L/s                     |
| Ar   | 250 L/s   | 250 L/s                     |
| <b>Gas throughput at full rotational speed (with recomm. forepump)</b> | Ambient Temp. (25 °C)                                       | Water Temp. (25 °C, 50 L/h) |
| N <sub>2</sub>   | 170 SCCM  | 170 SCCM                    |
| Ar   | 110 SCCM  | 110 SCCM                    |
| <b>Compression ratio and foreline tolerance</b>                        |   |                             |
| N <sub>2</sub>   | > 1 x 10 <sup>11</sup>                                      | >10 mbar                    |
| He   | > 1 x 10 <sup>8</sup>                                       | >10 mbar                    |
| H <sub>2</sub>   | 1.5 x 10 <sup>6</sup>                                       | >4 mbar                     |
| Ar   | > 1 x 10 <sup>11</sup>                                      | >10 mbar                    |
| <b>Base pressure with recommended forepump (5 m<sup>3</sup>/h)</b>     | < 1 x 10 <sup>-10</sup> mbar (< 1 x 10 <sup>-10</sup> Torr) |                             |
| <b>Foreline flange</b>   | KF16 NW (KF25 - optional)                                   |                             |
| <b>Rotational speed</b>  | 60000 rpm (1010 Hz driving frequency)                       |                             |
| <b>Start-up time</b>   | < 3 minutes   |                             |

| Technical Specification                                 |  |                                |
|---|--|--------------------------------|
| <b>Recommended forepump</b>                             | mechanical: Agilent DS 102<br>dry pump: Agilent IDP-7  |                                |
| <b>Operating position</b>                               | Any  |                                |
| <b>Oper. ambient temperature</b>                        | +5 °C to +35 °C  |                                |
| <b>Rel. humidity of air</b>                             | 0 to 90% (not condensing)  |                                |
| <b>Bakeout temperature</b>                              | 80 °C at inlet flange max (ISO flange)<br>120 °C at inlet flange max (CFF flange)  |                                |
| <b>Lubricant</b>  | Permanent grease lubrication   |                                |
| <b>Cooling requirements</b>                             | Forced air (5- 35 °C ambient temperature)<br>Water (mandatory if ambient temp. > 35 °C)<br>Water temperature from +15°C to +25°C<br>Water flow min. 100L/h |                                |
| <b>Coolant water</b>                                    | Minimum flow: 50 L/h (0.89 GPM)<br>Temperature: +15 °C to +30°C<br>Pressure: 3 to 5 bar (45 to 75 psi)   |                                |
| <b>Noise Pressure level</b>                             | < 50 dB(A) at 1 meter  |                                |
| <b>Max altitude</b>                                     | 3000 m   |                                |
| <b>Weight kg (lbs)</b>                                  | Pump ISO 100<br>Pump CFF 6"  | 5.5 kg (12.3)<br>7.5 kg (16.5) |
|   | Pump ISO 160<br>Pump CFF 8"  | 5.7 kg (12.6)<br>9.7 kg (20.9) |
| Conformity to norms                                     |  |                                |
| <b>EMC (Control Units)<br/>Safety (CE/CSA)<br/>ROHS</b> | 61326-1<br>DIR 2006/42/CE<br>DIR 2011/65/EU  |                                |

Outline Drawing



Dimensions: millimeters [inches]



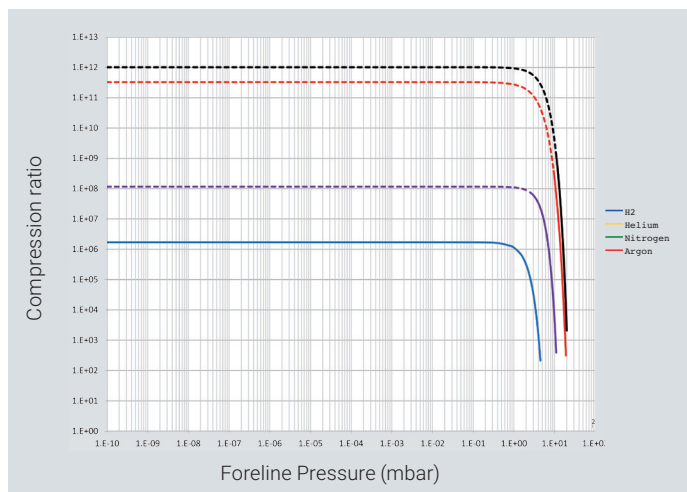
3D Drawings available for download

## Ordering Information

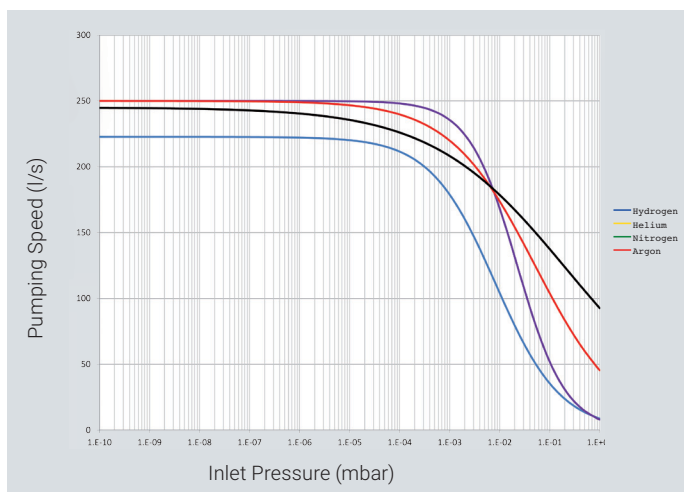
| Pumps   | Configuration Options   |
|---|---|
| TwisTorr 304 FS ISO 100 water cooling             | X3511-64007   |
| TwisTorr 304 FS CFF 6" water cooling              | X3500-64001   |
| TwisTorr 304 FS ISO 160 water cooling             | X3500-64002   |
| TwisTorr 304 FS CFF 8" water cooling              | X3500-64003   |
| TwisTorr 304 FS ISO100 air cooling                | X3500-64004   |
| TwisTorr 304 FS CFF 6" air cooling                | X3500-64005   |
| TwisTorr 304 FS ISO 160 air cooling               | X3500-64006   |
| TwisTorr 304 FS CFF 8" air cooling                | X3500-64007   |
| TwisTorr 304 FS ISO 100 SF water cooling          | X3500-64010   |
| Controllers                                       | Part Numbers  |
| TwisTorr 304 FS AG rack controller with RS232/485 | X3506-64002   |
| TwisTorr 304 FS AG rack controller with Profibus  | X3506-64003   |
| TwisTorr 304 FS onboard controller 24 Vdc         | X3507-64002   |
| TwisTorr 304 FS onboard controller 100-240 Vac    | X3507-64003   |
| Cables  | Part Numbers  |
| Mains cable NEMA plug, 3 m long                   | 9699958   |
| Mains cable European plug, 3 m long               | 9699957   |
| Serial cable and A-plus Software                  | 9699883   |
| Serial Cable & T-plus Software                    | 9699883   |
| Extension cable                                   | 9699948M007 (5 m)<br>9699948M006 (10 m)<br>9699948M005 (15 m)<br>9699948M004 (20 m) |
| Inlet Screen                                      | Part Numbers  |
| Inlet Screen ISO 100                              | X3500-68000   |
| Inlet Screen CFF 6"                               | 9699302   |
| Inlet Screen ISO 160                              | X3500-68001   |
| Inlet Screen CFF 8"                               | 9699304   |
| Cooling   | Part Numbers  |
| Water cooling kit                                 | 9699337   |
| Plastic water cooling kit                         | 9699347   |

| Air cooling kit for onboard controller          | X3500-68010             |
|---|-------------------------|
| Fan extension cable for onboard controller      | 9699949                 |
| Air cooling kit for rack AG controller          | X3500-68011             |
| Fan extension cable for rack AG controller      | 9699940                 |
| Vibration isolator                              | Part Numbers            |
| Vibration isolator ISO 100                      | 9699344                 |
| Vibration isolator CF 6"                        | 9699334                 |
| Vibration isolator ISO 160                      | 9699345                 |
| Vibration isolator CF 8"                        | 9699335                 |
| Vibration isolator ISO 100 IDX                  | 9699396                 |
| Vent flange, NW 10 KF / M8                      | 9699108                 |
| Venting   | Part Numbers            |
| Delay vent valve 1.2 mm orifice                 | X3505-68000             |
| Delay vent valve 0.5 mm orifice                 | X3505-68001             |
| Vent valve N.O. for rack AG controller (0.5 mm) | 9699844                 |
| Vent valve for onboard controller (1.2 mm)      | 9699834                 |
| Vent valve for onboard controller (0.5 mm)      | 9699834M006             |
| Purge   | Part Numbers            |
| Purge valve 10 SCCM NW16KF - M12                | 9699239                 |
| Purge valve 10 SCCM ¼ Swagelok - M12            | 9699240                 |
| Purge valve 20 SCCM NW16KF - M12                | 9699241                 |
| Purge valve 20 SCCM ¼ Swagelok - M12            | 9699242                 |
| Purge valve 10 SCCM ¼ Swagelok - ¼ Swagelok     | 9699232                 |
| Purge valve 20 SCCM ¼ Swagelok - ¼ Swagelok     | 9699236                 |
| Mounting  | Part Numbers            |
| Bracket for onboard controller side mounting    | X3500-68012             |
| Foreline flange KF25                            | X3500-68002             |
| Active Gauges                                   | Part Numbers            |
| FRG 700 Full Range Gauge                        | Ask Agilent for details |
| PVG 500 Pirani Vacuum Gauge                     | Ask Agilent for details |
| PCG 750 Pirani Capacitance Gauge                | Ask Agilent for details |
| CDG-500 Capacitance Diaphragm Gauge             | Ask Agilent for details |

Compression Ratio



Pumping Speed



[www.agilent.com/chem/vacuum](http://www.agilent.com/chem/vacuum)

**United States**

Agilent Technologies  
121 Hartwell Avenue, Lexington MA 02421, USA  
Tel: +1 781 861 7200  
Toll free: +1 800 882 7426  
vpl-customer@agilent.com

**Europe and other countries**

Agilent Technologies Italia SpA  
via F.lli Varian 54, 10040 Leini, (Torino), Italy  
Tel: +39 011 9979 111  
Toll free: 00 800 234 234 00  
vpt-customer@agilent.com

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