



Adixen by Alcatel Vacuum Technology

**➤ Maglev Hybrid  
Turbomolecular Pumps  
ATH-M series**

# Maglev Hybrid Turbomolecular Pumps

## ATH-M series

**ATH-M: 400 I/s to 2100 I/s**

**Magnetically levitated turbo pumps**

The ATH-M series are hybrid magnetically levitated turbo pumps.

These very sophisticated high performance and extremely robust pumps are recognized as the new reference in the world of large turbomolecular pumps.



**MY PROCESS REQUIRES  
A CLEAN, DRY TURBO PUMP**

**DO YOU OFFER MAINTENANCE  
FREE TURBO PUMPS ?**

**HOW RELIABLE ARE  
YOUR MAGLEV TURBO PUMPS ?**

**AND WHAT ABOUT  
PERFORMANCE ?**

### Maintenance-free, high-performance turbo pumps

These are some of the leading applications where our pumps are in use :

- Glass coating
- Micro machining systems
- Ion beam rectification
- Electron microscopy
- Space simulation chambers
- Particle accelerators
- Semiconductor processes (etch, CVD, ion implant)
- Coating and thin films deposition
- Ion milling
- R&D experiments



#### THE ATH-M ARE CLEAN, DRY PUMPS

The ATH-M magnetically levitated turbomolecular pumps are clean, dry pumps. The magnetic bearing is frictionless and does not require any grease.



#### THE ATH-M ARE MAINTENANCE FREE ON CLEAN PROCESSES

Because the magnetic bearing of the ATH-M series is maintenance free, the pumps can run for years without any interruption on a clean process. This gives the ATH-M series a significant cost of ownership advantage over ball bearing turbo pumps.



#### THE ATH-M ARE THE MOST RELIABLE TURBOS ON THE MARKET

The pumping cells of the ATH-M pumps are designed for minimal stress on difficult applications. Furthermore, the pump can accept up to 5 landings at full speed on the emergency dry, back-up bearings.



#### THE ATH-M OFFERS THE BEST PERFORMANCE/SIZE RATIO ON THE MARKET

Sophisticated software tools help us develop the highest performing pumps for a given size. The pumps offer either high flow at high pressure or very low ultimate pressures.

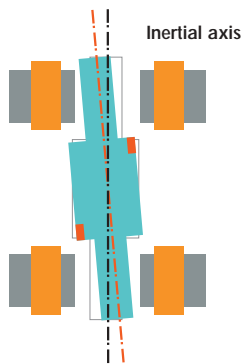
# Maglev Hybrid Turbomolecular Pumps

## ATH-M series

### Rotor control

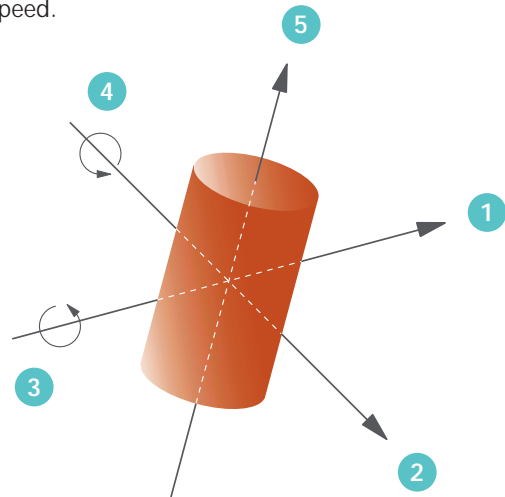
#### Automatic balancing system

This device compensates in real time for any imbalance of the rotor due to accumulation of deposits.



#### 5-axis control

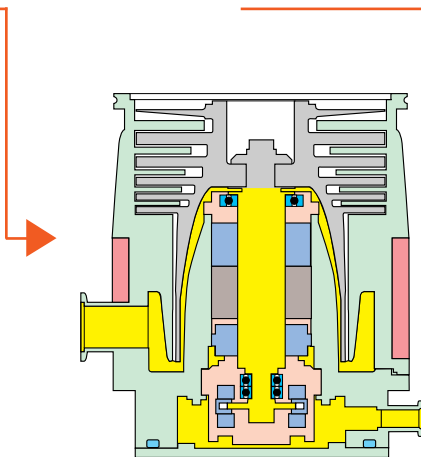
A 5-axis magnetic bearing provides control of the rotor at high speed.



### Pump protection

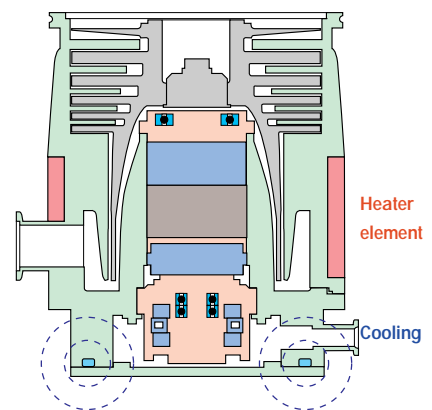
#### Purge

An inert gas purge is built into the pump. It may be used to prevent corrosive attack or deposition build-up inside the pumps.



#### Heating / Cooling

The MT model features a temperature management system which controls an integrated heater band. The heater band and water cooling maintain the pump internal surface at a constant temperature (up to 75°C) in order to minimize the condensation of by-products inside the pump.



### Pump safety

#### Power failure

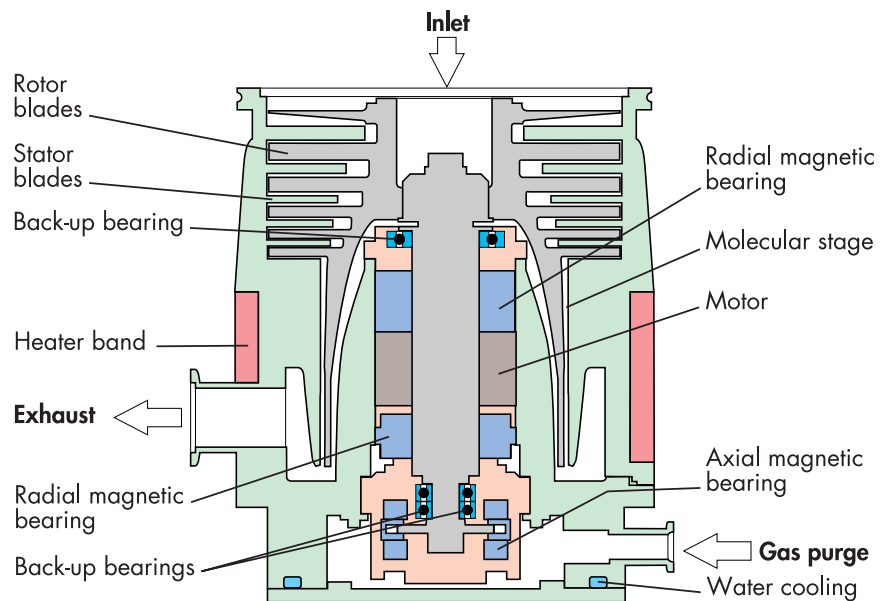
In the event of a power failure, the ATH-M motor acts as a generator to transform the rotor energy into electrical power to supply the controller. Thus, the rotor remains levitated and slows down, until gently landing on the back-up bearings. No battery is required.

#### Venting valve

The emergency venting valve opens in case of violent shocks or large air-inrushes. The valve brakes the rotor quickly and safely.

#### Landing

The pump emergency back-up bearings can withstand up to 5 landings at full speed in the exceptional event of an accidental cable disconnection, or a massive air inrush. The controller monitors the status of the back-up bearing life.



ATH-M cross section

# Maglev Hybrid Turbomolecular Pumps

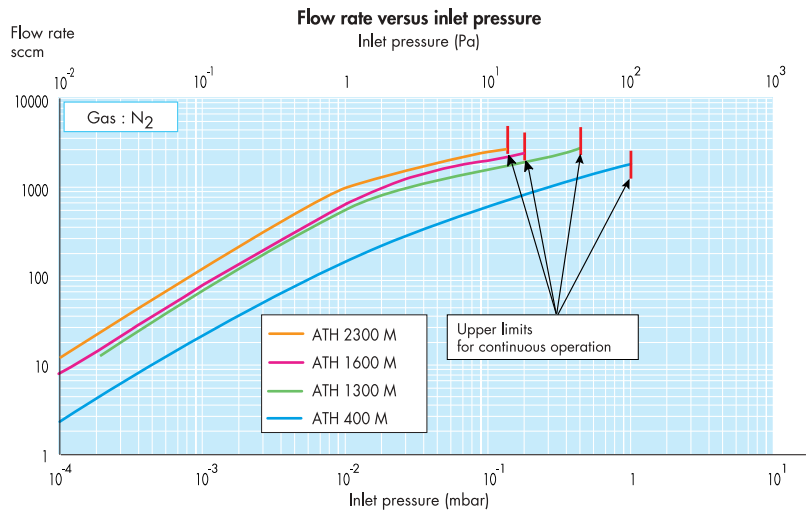
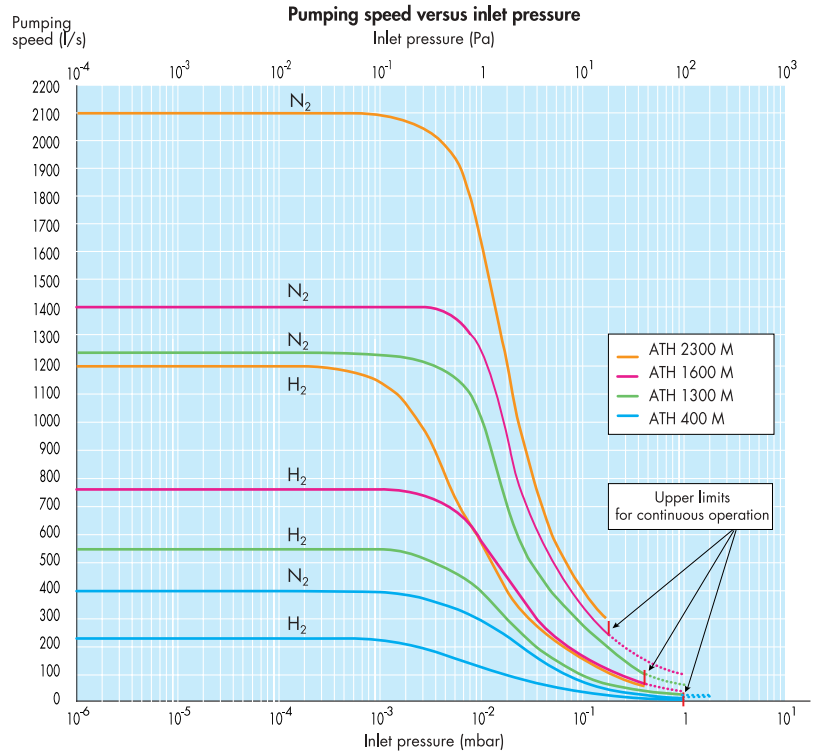
## ATH-M series

### High throughput at high inlet pressure

The ATH-M are designed for high pressure and high throughput, but also provide a low ultimate pressure.

### Adjustable rotational speed

The ATH-M series features adjustable rotational speed control, optimizing the pumping parameters. For instance, at high pressure, the throughput can be increased if the rotational speed is decreased.



# Maglev Hybrid Turbomolecular Pumps

## ATH-M series

### Technical data (measured specifications per PNEUROP standards)

		ATH 400 M ATH 400 MT	ATH 1300 M ATH 1300 MT	ATH 1600 M ATH 1600 MT	ATH 2300 M ATH 2300 MT
Rotational speed	rpm	39000	34000	39000	31000
Inlet flange		DN100 ISO-K	DN160 ISO-K	DN160 ISO-F	DN200 ISO-F
Pumping speed	N <sub>2</sub> l/s	320	410	920	1250
	He l/s	290	360	810	850
	H <sub>2</sub> l/s	180	230	490	550
Compression ratio	N <sub>2</sub>	1x10 <sup>7</sup>	1x10 <sup>7</sup>	6x10 <sup>7</sup>	> 10 <sup>9</sup>
	He	2x10 <sup>3</sup>	2x10 <sup>3</sup>	8x10 <sup>3</sup>	3x10 <sup>4</sup>
	H <sub>2</sub>	1x10 <sup>2</sup>	1x10 <sup>2</sup>	3x10 <sup>2</sup>	3x10 <sup>3</sup>
Ultimate pressure	mbar	8x10 <sup>-9</sup>	8x10 <sup>-9</sup>	6x10 <sup>-9</sup>	4x10 <sup>-9</sup>
Purging nitrogen flow rate	sccm	50	50	50	50
Maximum continuous inlet pressure N <sub>2</sub>	mbar	1	0.5	0.2	0.15
Maximum continuous exhaust pressure N <sub>2</sub>	mbar	2	1.5	1.5	1.5
Maximum throughput N <sub>2</sub>	sccm	2000	3000	2500	2500
Maximum heating temperature (MT version)	°C	75	75	75	75
Maximum Baking temperature	°C	120	120	120	120
Power supply required for the heater band (MT version)		100 to 120V - 50/60Hz or 200 to 240V - 50/60 Hz			
Vibration level	µm	0.01	0.01	0.01	0.01
Recommended Alcatel backing pump		ADP/ADS	ADP/ADS	ADP/ADS	ADP/ADS
Cooling water flow rate	l/min	< 1			
Cooling water temperature	°C	from 15 to 25			
Mounting orientation		Any			
Exhaust flange		DN40 ISO-KF			
N <sub>2</sub> purge flange		DN16 ISO-KF			
Start-up time	min	<3	<5	<6	<10
Pump weight	kg (lb)	19 (41.8)	34 (75.5)	35.5 (78.3)	46 (102)
Controller		ACT 600 M	ACT 1300 M	ACT 1300 M	ACT 2300 M
Controller weight	kg (lb)	8 (18)	8 (18)	8 (18)	8 (18)
Start-up power	VA	650	650	650	650
Nominal power	W	300	300	300	350
Power supply		100-240 V - 50/60 Hz Single phase		200-240 V - 50/60 Hz - Single phase	

### ACT 600 M, ACT 1300 M and ACT 2300 M: compact and highly effective electronic monitoring



#### Especially designed for maglev turbopumps

- Very compact: only 1/2 Rack
- Very light: only 8 kg (18 lb)
- All functions for monitoring the ATH-M are integrated into the controllers
- Battery free: built-in generator
- ACT 600 M compatible with ATH 400 M
- ACT 1300 M compatible with ATH 1300 M and ATH 1600 M
- ACT 2300 M compatible with ATH 2300 M

#### Convenient interface

- Handy keyboard
- Convenient menu with back lit display of:
  - rotational speed
  - pump current
  - pump and controller temperatures

#### Modern pump monitoring

- Microprocessor controlled
- Adjustable low speed mode
- Pump and controller monitoring
- Pump fault detection
- Standard RS 232 / RS 485

#### Inputs

- remote start-stop
- remote stand-by
- remote interlock

#### Outputs

- pump starting
- pump at speed
- stand-by on
- venting valve on/off
- selectable 0 - 10 volts output for speed, pump current or temperature

#### Full interchangeability: no pump to controller matching

Any controller may be used with any ALCATEL maglev pump, without the need for tuning or adjustment.

#### Built-in heating device to 75°C

All the ACT controllers are equipped with heater band control output and pump temperature sensor inputs. A simple interconnection between the controller and the ATH 2300 MT, ATH 1600 MT, ATH 1300 MT or ATH 400 MT is necessary to monitor and control the heater band.



# Maglev Hybrid Turbomolecular Pumps

## ATH-M series

### Ordering information

#### Note

In order to operate the ATH 400 M/MT pumps, the following accessories have to be ordered: Inlet screen, Interconnecting cable, ACT controller and heater cable for

#### ATH 400 M (unheated pump)

Model	ATH 400 M	ATH 400 MT	
Inlet flange DN	PART NUMBER	PART NUMBER	
		Heater voltage (50/60 Hz)	
		100-120 V	200-240 V
100 ISO-K	D23121	D43121	D53121
100 CF-F	D23221	D43221	D53221
160 ISO-K	D24121	D44121	D54121
160 CF-F	D24221	D44221	D54221
6" ASA	D28321	D48321	D58321

Note: Air inlet braking valve, 1 m. valve cable and purge flow restrictor included with the ATH 400 M/MT

#### ACT Controller (power supply 100-240 V / 50-60 Hz)

Model	For pump	PART NUMBER
ACT 600 M	ATH 400 M/MT	102539

Note: Power cord is included with ACT 600 M

#### Interconnecting cables (pump to controller)

Length	PART NUMBER
1 m	104624
3.5 m	103719
5 m	103720
10 m	103721
15 m	104587
20 m	A214574

#### Optional cables for 12 VDC air inlet braking

Length	PART NUMBER
3.5 m	105172
5 m	105173
10 m	105174
15 m	105175
20 m	A459362

#### Inlet screen for ATH 400 M

Inlet flange DN	PART NUMBER
100 ISO-K	056844
100 CF-F	056845
160 ISO-K	056942
160 CF-F	056928
6" ASA	102933

#### Heater cables for ATH 400 MT

Length	VOLTAGE/PART NUMBER	
	110-120 V - 50/60 Hz	200-240 V - 50/60 Hz
1 m	104627	105206
3.5 m	103728	103729
5 m	103730	103731
10 m	103732	103733
15 m	105202	105204
20 m	On request	On request

# Maglev Hybrid Turbomolecular Pumps

## ATH-M series

### Ordering information

#### Note

In order to operate the ATH 1300 M/MT and ATH 1600 M/MT pumps, the following accessories have to be ordered: Inlet screen, Interconnecting cable, ACT controller, optional air inlet braking valve and cable,

#### ATH 1300 M (unheated pump)

#### ATH 1300 MT (heated pump)

Model	ATH 1300 M	ATH 1300 MT
		<b>PART NUMBER</b>
<b>Inlet flange DN</b>	<b>PART NUMBER</b>	Heater voltage 100-240 V - 50/60 Hz Single phase
160 ISO-K	M2412100	M6412100
160 ISO-F	M2462100	M6462100
160 CF-F	M2422100	M6422100
6" ASA	M2832100	M6832100
200 ISO-K	M2512100	M6512100
200 ISO-F	M2562100	M6562100
200 CF-F	M2522100	M6522100
250 ISO-K	M2612100	M6612100

#### ATH 1600 M (unheated pump)

#### ATH 1600 MT (heated pump)

Model	ATH 1600 M	ATH 1600 MT
		<b>PART NUMBER</b>
<b>Inlet flange DN</b>	<b>PART NUMBER</b>	Heater voltage 100-240 V - 50/60 Hz Single phase
6" ASA	P2832100	P6832100
200 ISO-K	P2512100	P6512100
200 ISO-F	P2562100	P6562100
200 CF-F	P2522100	P6522100
250 ISO-K	P2612100	P6612100
250 ISO-F	P2662100	P6662100
250 CF-F	P2622100	P6622100

Note: Purge flow restrictor is included with the ATH 1300 M/MT and ATH 1600 M/MT pumps.

### ACT Controller and power cords for ATH 1300 M/MT and ATH 1600 M/MT

Item	PART NUMBER
Controller ACT 1300 M 200-240 V*	109575
Power cord 2.5 m for EUROPE 200-240 V	A328405
Power cord 2.5 m for USA 200-240 V	802366

\* ACT 1300 M Low voltage controller and power cord available upon request

### Interconnecting cables (pump to controller)

Length	PART NUMBER
1 m	104624
3.5 m	103719
5 m	103720
10 m	103721
15 m	104587
20 m	A214574

### Mounting Bolts for ATH 1300 M/MT and ATH 1600 M/MT DN 200 and DN 250 flanges\*\*

Pump mounting configuration	Item	PART NUMBER
ISO-F flange - Without Centering Ring	Set of 12 ea. M10*30 Grade 12-9 bolts and washers	110675
ISO-F flange - With Centering Ring	Set of 12 ea. M10*35 Grade 12-9 bolts and washers	110676
ISO-K - With Rotatable Flange	Set of 12 ea. M10*50 Grade 12-9 bolts, nuts and washers	802415

\*\* For DN 160 ISO-K / ISO-F / CFF and DN 160 / DN 200 / DN 250 CFF flanges, consult factory

### Ordering information

#### Heater cables for ATH 1300 MT and ATH 1600 MT

Length	PART NUMBER			
	110-120 V - 50/60 Hz		200-240 V - 50/60 Hz	
	For use on Pumps ordered		For use on Pumps ordered	
	Before Oct 99	After Oct 99	Before Oct 99	After Oct 99
1 m	A328394A	A328698A	A328395A	A328697A
3.5 m	A328394B	A328698B	A328395B	A328697B
5 m	A328394C	A328698C	A328395C	A328697C
10 m	A328394D	A328698D	A328395D	A328697D
15 m	A328394E	A328698E	A328395E	A328697E
20 m				

#### Optional air inlet braking valve for ATH 1300 M/MT and ATH 1600 M/MT

Item	PART NUMBER
Air inlet valve assembly 12 VDC/DN 16	106866

#### Cables for 12 VDC air inlet braking valve

Length	PART NUMBER
1 m	106052
3.5 m	105172
5 m	105173
10 m	105174
15 m	105175
20 m	A459362

#### Inlet screen for ATH 1300 M/MT and ATH 1600 M/MT

Inlet flange DN	PART NUMBER**
6" ASA	107820
160 ISO-K/ISO-F/CF-F	
200 ISO-K/ISO-F/CF-F	109200
250 ISO-K/ISO-F/CF-F	

# Maglev Hybrid Turbomolecular Pumps

## ATH-M series

### Ordering information

#### Note

In order to operate the ATH 2300 M/MT pumps, the following accessories have to be ordered: Inlet screen, Interconnecting cable, ACT controller, optional air inlet braking valve and cable, and heater cable for

**ATH 2300 M** (unheated pump)

**ATH 2300 MT** (heated pump)

Model	ATH 2300 M	ATH 2300 MT
Inlet flange DN	<b>PART NUMBER</b>	<b>PART NUMBER</b> Heater voltage 100-240 V - 50/60 Hz Single phase
200 CF-F	Q2522100	Q6522100
200 ISO-K	Q2512100	Q6512100
200 ISO-F	Q2562100	Q6562100
250 CF-F	Q2622100	Q6622100
250 ISO-K	Q2612100	Q6612100
250 ISO-F	Q2662100	Q6662100

**Heater cables for ATH 2300 MT**

Length	PART NUMBER	
	110-120 V 50/60 Hz	200-240 V 50/60 Hz
1 m	A328698A	A328697A
3.5 m	A328698B	A328697B
5 m	A328698C	A328697C
10 m	A328698D	A328697D
15 m	A328698E	A328697E
20 m		

**ACT Controller for ATH 2300 M/MT**

(Order controller and power cord, USA/EUROPE, separately)

Item	PART NUMBER
Controller ACT 2300 M 200-240V	109015
Power cord 2.5 m for EUROPE 200-240 V	A328405
Power cord 2.5 m for USA 200-240 V	802366

**Interconnecting cables**

(pump to controller)

Length	PART NUMBER
1 m	104624
3.5 m	103719
5 m	103720
10 m	103721
15 m	104587
20 m	A214574

### Ordering information

#### Optional air inlet braking valve

Item	PART NUMBER
Air inlet valve assembly 12 VDC/DN 16	106866

#### Cables for 12 VDC air inlet braking valve

Length	PART NUMBER
1 m	106052
3.5 m	105172
5 m	105173
10 m	105174
15 m	105175
20 m	A459362

#### Inlet screen - Aluminum

Inlet flange DN	PART NUMBER
200 ISO-K/ISO-F/CF-F	109200
250 ISO-K/ISO-F/CF-F	

#### Mounting Bolts for ATH 2300 M/MT DN 250 flanges\*

For safety reasons we recommend ordering the high strength bolts and washers specified below

Pump mounting configuration	Item	PART NUMBER
ISO-F flange - Without Centering Ring	Set of 12 ea. M10*30 RDS Grade 12-9 bolts and washers	110034
ISO-F flange - With Centering Ring	Set of 12 ea. M10*35 Grade 12-9 bolts and washers	110676
ISO-K - With Rotatable Flange	Set of 12 ea. M10*50 Grade 12-9 bolts, nuts and washers	802415

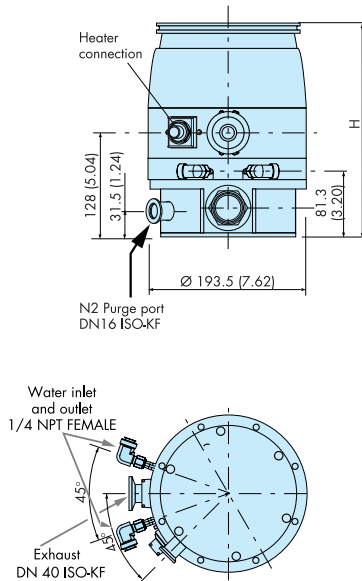
\* For DN 200 ISO-K / ISO-F / CFF and DN 250 CFF flanges: consult factory.

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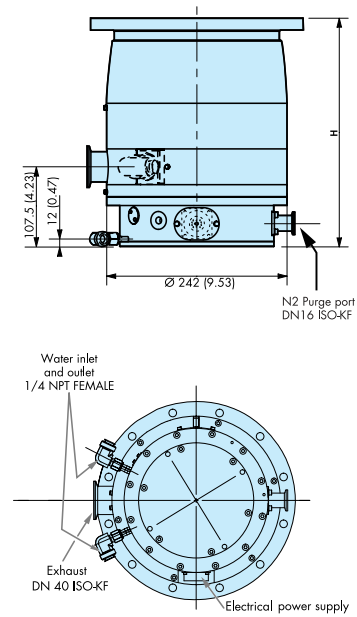
## ATH-M series

### Dimensions mm (inches)

ATH 400 M/MT



ATH 1300 M/MT



Inlet flange	H
DN 100 ISO-K	292.5 (11.52)
DN 160 ISO-K	272.8 (10.74)
DN 100 CF-F	298.9 (11.77)
DN 160 CF-F	294.5 (11.59)
ASA - 6	279.8 (11.02)

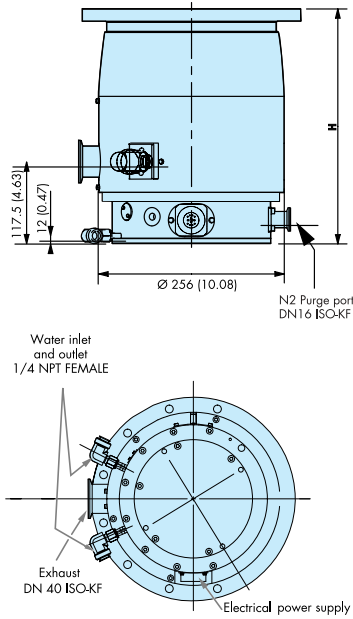
Inlet flange	H
DN 200 ISO-K	306.9 (12.08)
DN 200 CF-F	316.9 (12.48)
ASA - 6	346.9 (13.66)
DN 250 ISO-K	309.9 (12.20)
DN 200 ISO-F	306.9 (12.08)
DN 160 ISO-K	352.7 (13.89)
DN 160 ISO-F	342.7 (13.49)
DN 160 CF-F	365.1 (14.37)

# Maglev Hybrid Turbomolecular Pumps

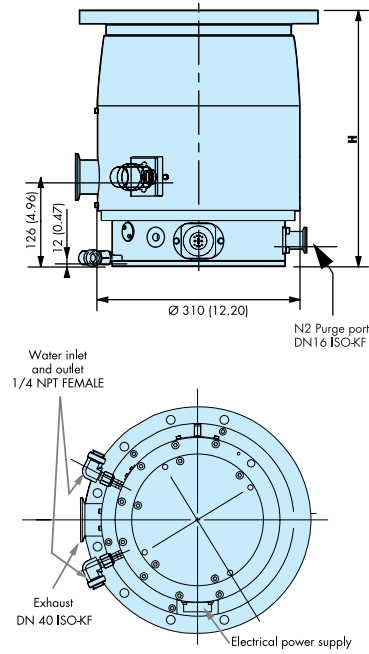
## ATH-M series

### Dimensions mm (inches)

ATH 1600 M/MT



ATH 2300 M/MT



Inlet flange	H
DN 200 ISO-K	316.9 (12.48)
DN 200 CF-F	343.4 (13.52)
DN 200 ISO-F	316.9 (12.48)
ASA - 6	356.9 (14.05)
DN 250 ISO-K	316.9 (12.48)
DN 250 ISO-F	316.9 (12.48)
DN 250 CF-F	328.9 (12.95)

Inlet flange	H
DN 250 ISO-F	358.5 (14.11)
DN 250 ISO-K	358.5 (14.11)
DN 250 CF-F	402.5 (15.85)
DN 200 ISO-F	402.5 (15.85)
DN 200 ISO-K	402.5 (15.85)

### ACT Controllers

