



MAGLEV HYBRID  
TURBOMOLECULAR PUMPS  
**ATH-M SERIES**



## ATH-M: 400 l/s to 2100 l/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.



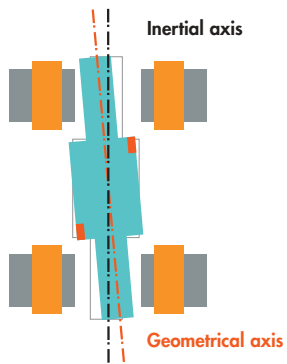
### THE ATH-M OFFERS THE BEST PERFORMANCE/SIZE RATIO ON THE MARKET

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.

## Rotor control

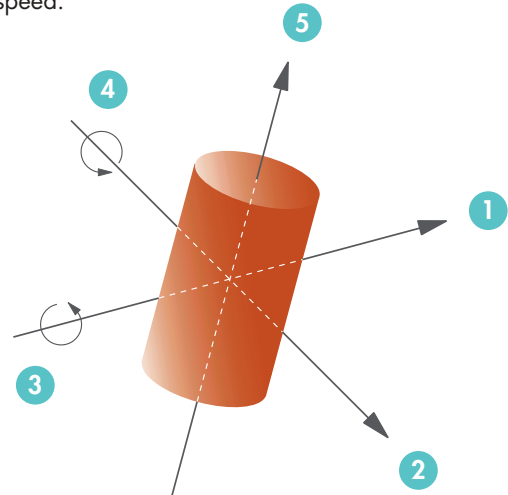
### Automatic balancing system

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.



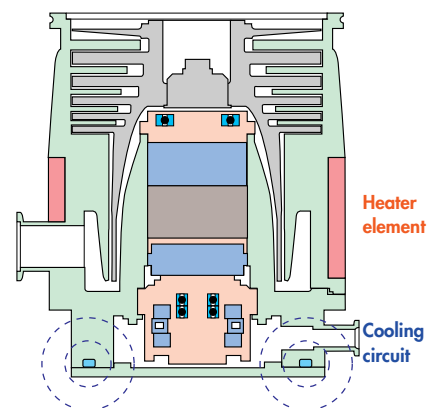
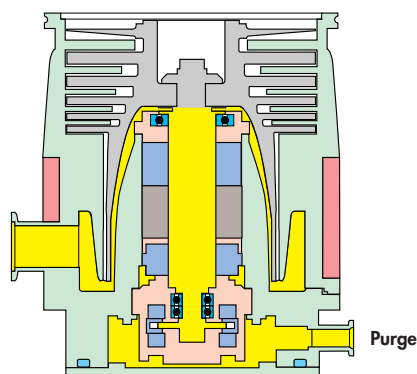
## Pump protection

### 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

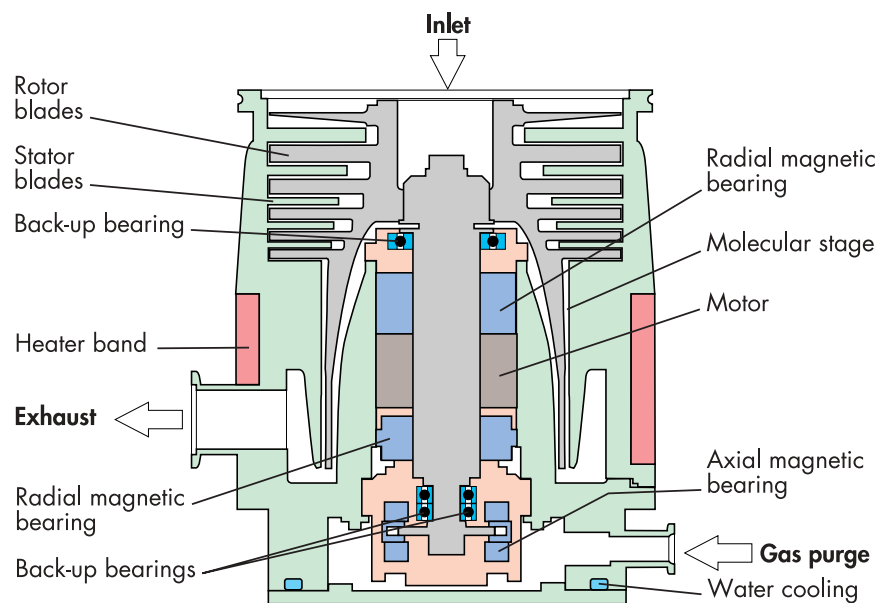
In the event of a power failure, the ATH-M motor acts as a generator to transform the rotor energy into electrical power to supply the controller. Thus, the rotor remains levitated and slows down, until gently landing on the back-up bearings. No battery is required.

### 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

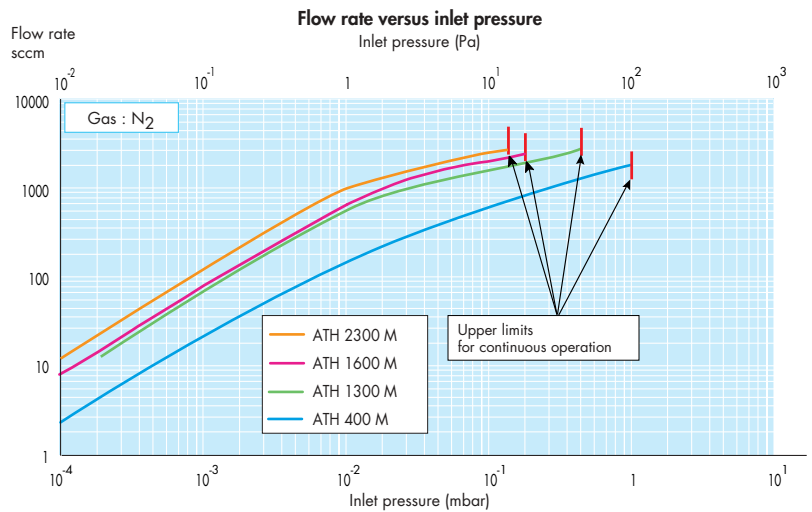
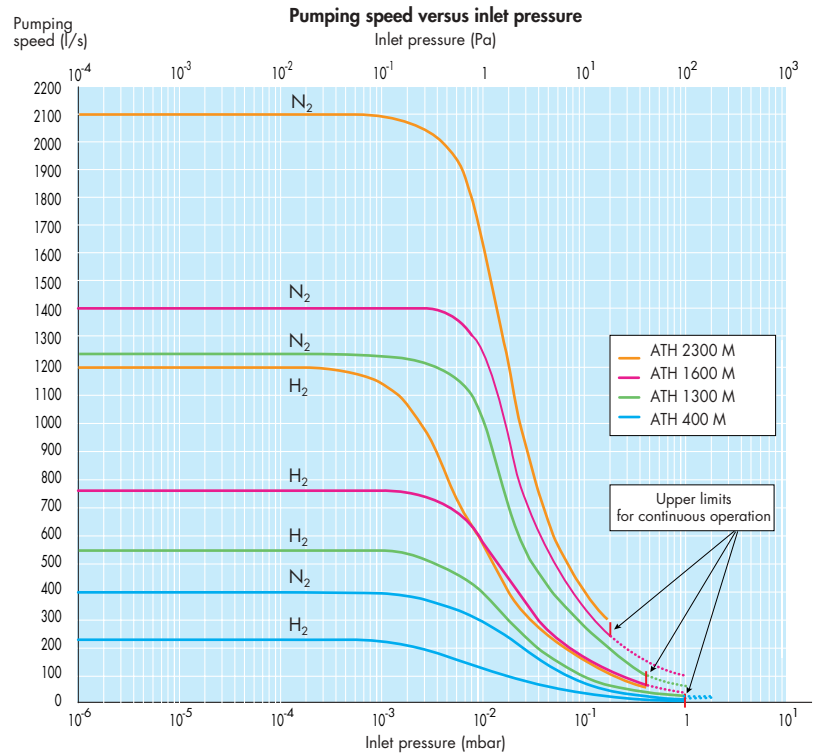
ATH-M SERIES

### 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.



## 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 30			
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

The RS 232 serial link is used to control and monitor the pump using a computer.

### 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.





## Ordering information

**ATH 400 M** (unheated pump)

**ATH 400 MT** (heated 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

### 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 MT models.

**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 valve**

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**

(pump heater and water valve to controller)

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

## Ordering information

**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>	<b>Heater voltage 100-240 V - 50/60 Hz Single phase</b>
160 ISO-K	<b>M2412100</b>	<b>M6412100</b>
160 ISO-F	<b>M2462100</b>	<b>M6462100</b>
160 CF-F	<b>M2422100</b>	<b>M6422100</b>
6" ASA	<b>M2832100</b>	<b>M6832100</b>
200 ISO-K	<b>M2512100</b>	<b>M6512100</b>
200 ISO-F	<b>M2562100</b>	<b>M6562100</b>
200 CF-F	<b>M2522100</b>	<b>M6522100</b>
250 ISO-K	<b>M2612100</b>	<b>M6612100</b>

### 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, and heater cable for MT models.

**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>	<b>Heater voltage 100-240 V - 50/60 Hz Single phase</b>
6" ASA	<b>P2832100</b>	<b>P6832100</b>
200 ISO-K	<b>P2512100</b>	<b>P6512100</b>
200 ISO-F	<b>P2562100</b>	<b>P6562100</b>
200 CF-F	<b>P2522100</b>	<b>P6522100</b>
250 ISO-K	<b>P2612100</b>	<b>P6612100</b>
250 ISO-F	<b>P2662100</b>	<b>P6662100</b>
250 CF-F	<b>P2622100</b>	<b>P6622100</b>

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

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

Item	PART NUMBER
Controller ACT 1300 M 100-240 V	<b>112123</b>
Power cord 2.5 m for EUROPE 100-240 V	<b>A328405</b>
Power cord 2.5 m for USA 100-240 V	<b>802366</b>

## Interconnecting cables

(pump to controller)

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

## Mounting Bolts

for ATH 1300 M/MT and ATH 1600 M/MT DN 200 and 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 Grade 12-9 bolts and washers	<b>110675</b>
ISO-F flange - With Centering Ring	Set of 12 ea. M10*35 Grade 12-9 bolts and washers	<b>110676</b>
ISO-K - With Rotatable Flange	Set of 12 ea. M10*50 Grade 12-9 bolts, nuts and washers	<b>802415</b>

\*\* 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
1 m	A328698A	A328697A
3.5 m	A328698B	A328697B
5 m	A328698C	A328697C
10 m	A328698D	A328697D
15 m	A328698E	A328697E
20 m	A328698F	A328697F

For the pumps built before Oct. 99, consult factory.

### 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	
	Stainless Steel	Aluminium
6" ASA	107820	-
160 ISO-K/ISO-F/CF-F	107747	-
200 ISO-K/ISO-F/CF-F	108872	109200
250 ISO-K/ISO-F/CF-F	108762	109199

## Ordering information

**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	<b>Q2522100</b>	<b>Q6522100</b>
200 ISO-K	<b>Q2512100</b>	<b>Q6512100</b>
200 ISO-F	<b>Q2562100</b>	<b>Q6562100</b>
250 CF-F	<b>Q2622100</b>	<b>Q6622100</b>
250 ISO-K	<b>Q2612100</b>	<b>Q6612100</b>
250 ISO-F	<b>Q2662100</b>	<b>Q6662100</b>

### 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 MT models.

### Heater cables for ATH 2300 MT

Length	PART NUMBER	
	110-120 V 50/60 Hz	200-240 V 50/60 Hz
1 m	<b>A328698A</b>	<b>A328697A</b>
3.5 m	<b>A328698B</b>	<b>A328697B</b>
5 m	<b>A328698C</b>	<b>A328697C</b>
10 m	<b>A328698D</b>	<b>A328697D</b>
15 m	<b>A328698E</b>	<b>A328697E</b>
20 m	<b>A328698F</b>	<b>A328697F</b>

### ACT Controller for ATH 2300 M/MT

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

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

### Interconnecting cables

(pump to controller)

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

## Ordering information

### Optional air inlet braking valve for ATH 2300 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 - Aluminum for ATH 2300 M/MT

Inlet flange DN	PART NUMBER	
	Aluminium	Stainless Steel
200 ISO-K/ISO-F/CF-F	109200	108872
250 ISO-K/ISO-F/CF-F	109199	108762

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

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

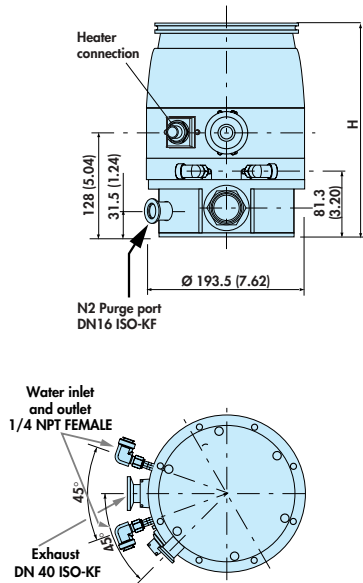
Pump mounting configuration	Item	PART NUMBER
ISO-F flange - Without Centering Ring	Set of 12 ea. M10*30 RDS Grade 12-9 bolts and washers	110034
ISO-F flange - With Centering Ring	Set of 12 ea. M10*35 Grade 12-9 bolts and washers	110676
ISO-K - With Rotatable Flange	Set of 12 ea. M10*50 Grade 12-9 bolts,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

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

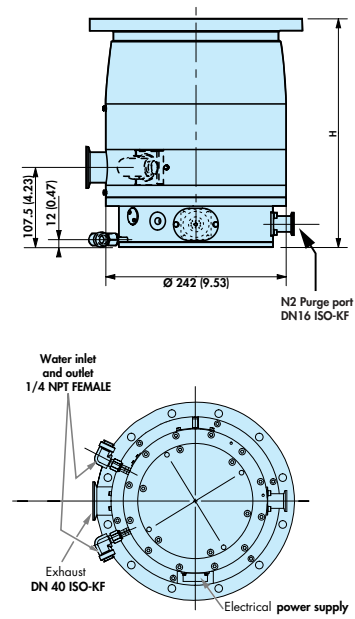
ATH-M SERIES

Dimensions mm (inches)

ATH 400 M/MT



ATH 1300 M/MT

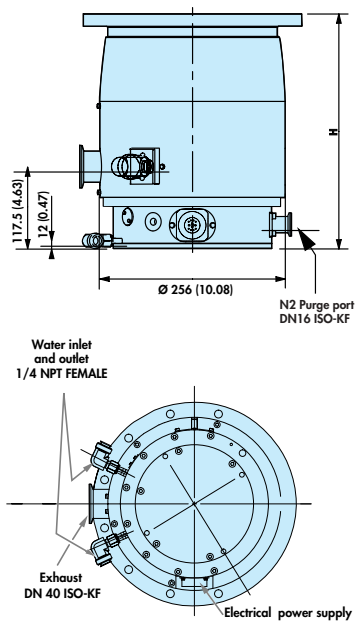


Inlet flange	H
DN 100 ISO-K	292.5 (11.52)
DN 160 ISO-K	272.8 (10.74)
DN 100 CF-F	298.9 (11.77)
DN 160 CF-F	294.5 (11.59)
ASA - 6"	279.8 (11.02)

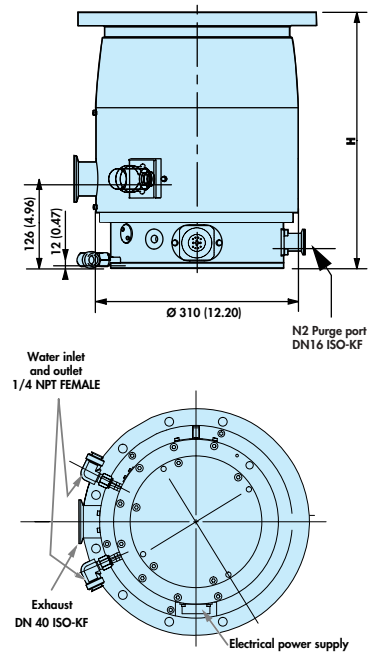
Inlet flange	H
DN 200 ISO-K	306.9 (12.08)
DN 200 CF-F	316.9 (12.48)
ASA - 6"	346.9 (13.66)
DN 250 ISO-K	309.9 (12.20)
DN 200 ISO-F	306.9 (12.08)
DN 160 ISO-K	352.7 (13.89)
DN 160 ISO-F	342.7 (13.49)
DN 160 CF-F	365.1 (14.37)

## Dimensions mm (inches)

### ATH 1600 M/MT



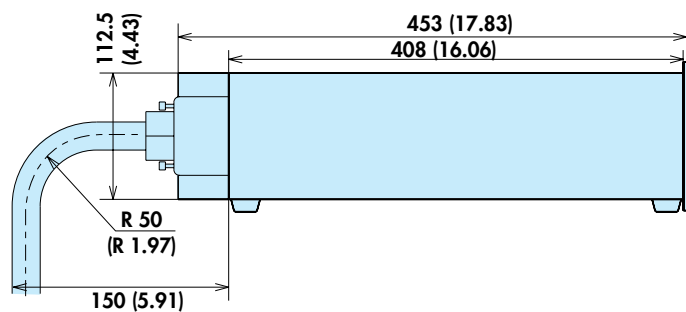
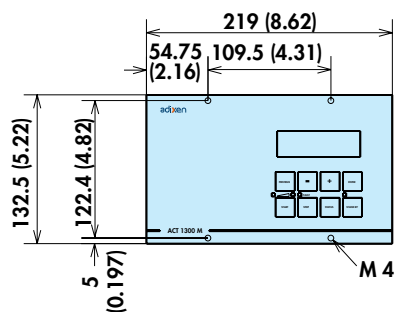
### ATH 2300 M/MT



Inlet flange	H
ASA - 6"	356.9 (14.05)
DN 200 ISO-K	316.9 (12.48)
DN 200 CF-F	343.4 (13.52)
DN 200 ISO-F	316.9 (12.48)
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 200 ISO-F	402.5 (15.85)
DN 200 ISO-K	402.5 (15.85)
DN 250 ISO-F	358.5 (14.11)
DN 250 ISO-K	358.5 (14.11)
DN 250 CF-F	402.5 (15.85)

### ACT Controllers



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