



HYBRID TURBOMOLECULAR PUMPS  
**ATH SERIES**



## Introduction

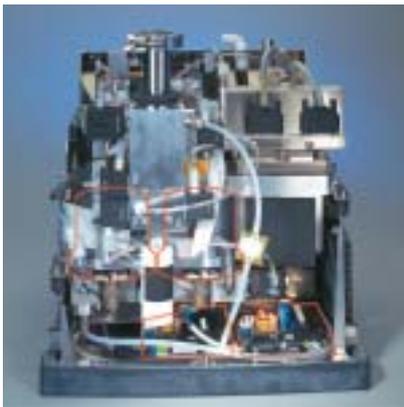
Alcatel offers the ATH series of hybrid turbomolecular pumps with pumping speeds ranging from 30 to 300 l/s. Some models have been optimized for instrumentation or R&D applications while others for heavy cycling applications.

Alcatel's knowledge of hybrid turbomolecular pumps has resulted in the design of the ATH series, optimizing vacuum performance, electronics functionality and reliability.

The ATH series also offers added value through features such as:

- Intermediate vacuum ports
- Efficient integration

To cover a wide range of application requirements, multiple pump monitoring options are available from OEM boards to complete user friendly controllers.



This mass spectrometer includes two ATH 31 (integrated nude version) and two mini-board controllers.



ATH series



ATH 31



ATH 200 I



ATH 300

### TECHNOLOGY

The ATH series hybrid turbomolecular pump incorporates turbomolecular stages with molecular drag stages, resulting in the following benefits:

- High pumping speed,
- High compression ratio, resulting in high exhaust pressure tolerance.

### ROBUSTNESS

The low rotational speed and the machined rotors of the ATH series make these pumps very robust against:

- Unexpected air inrushes,
- Shocks,
- Gyroscopic effects,
- Bearing failures.

### OTHER ADVANTAGES

The patented designs of the ATH 31 and 300 allow integration of the pumps closer to the application, saving space and money. Additionally, the ATH pumps can be equipped with intermediate vacuum ports to offer application flexibility such as:

- Additional pumping capacity,
- Management of a pressure set point,
- Venting.

### PUMP MONITORING

To control the pump, three types of electronics are available:

- A controller with minimum I/O interface: switches and logical interface,
- A sophisticated controller with a high level communication interface,
- Controller electronics that may be mounted on the pump or integrated into a system.

ATH SERIES

# ATH 31

## Exceptional performance

An ultimate pressure of  $10^{-10}$  mbar with a dry forepump

The ATH 31+ produces a  $10^{11}$  compression ratio for N<sub>2</sub> and a  $10^5$  compression ratio for H<sub>2</sub>.

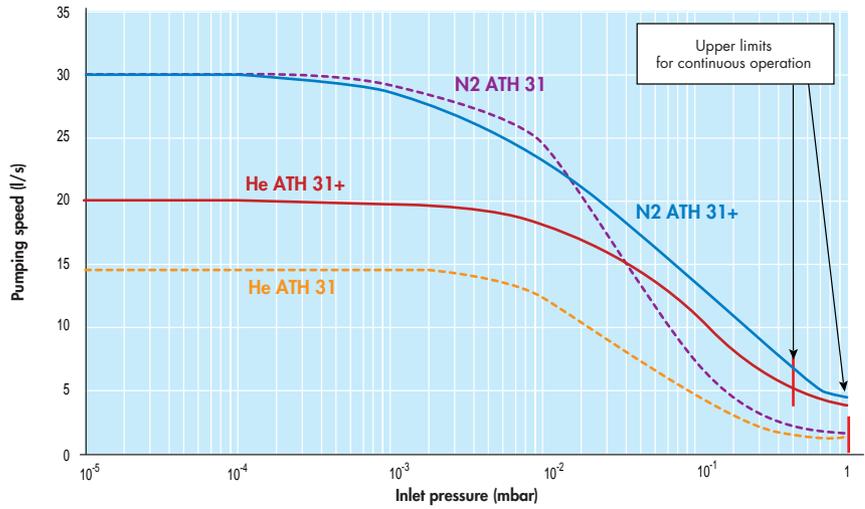
High compression ratios and high backing pressure tolerance (up to 45 mbar) produce very stable performance, ideal for analytical instruments.

A 200 sccm flow rate at 0.5 mbar

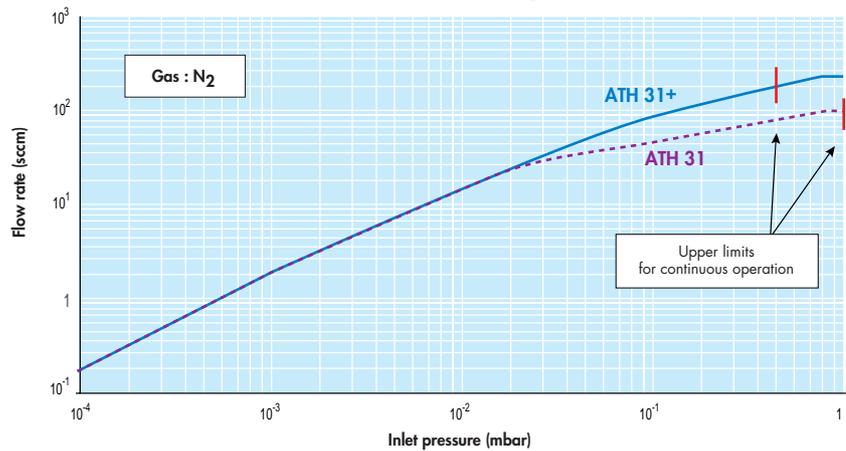
The ATH 31+ allows more than 200 sccm to be pumped continuously up to 0.5 mbar.



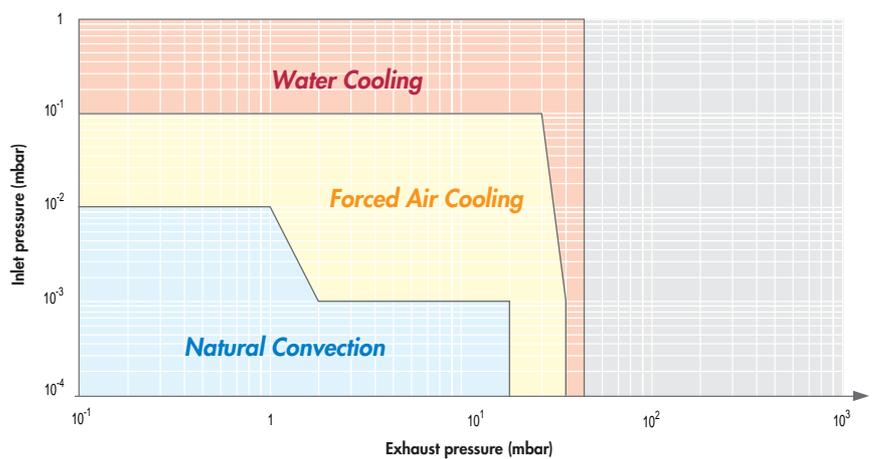
Pumping speed versus inlet pressure



Flow rate versus inlet pressure



Cooling requirements at (20°C ambient temperature)

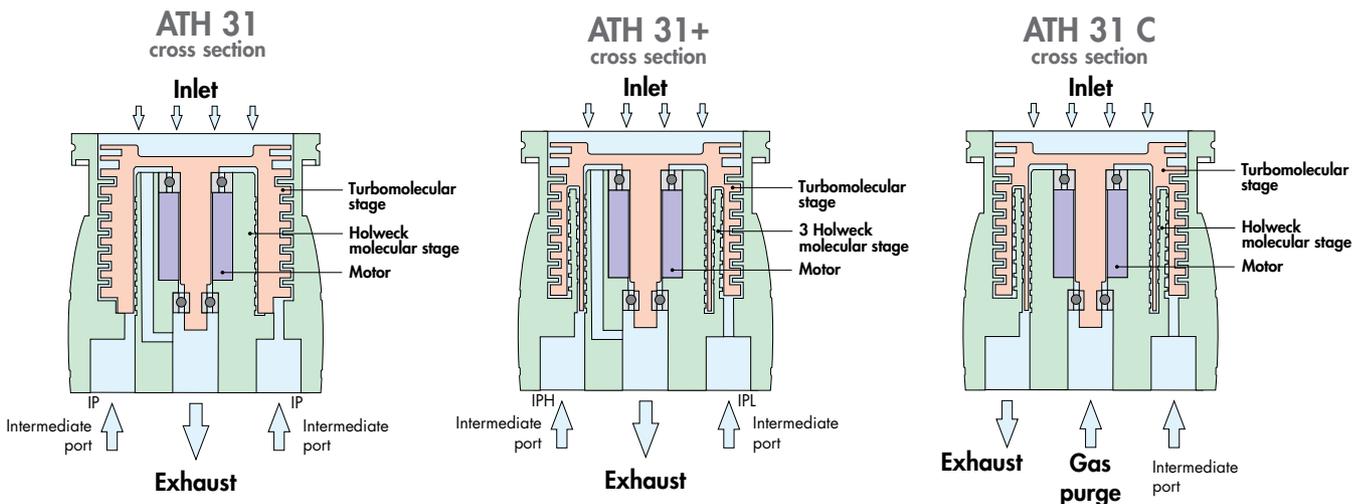


## ATH 31: Technical data (measured specifications per PNEUROP standards)

Characteristics		ATH 31			ATH 31+			ATH 31 C		
Inlet flange		Nude	DN 40	DN 63	Nude	DN 40	DN 63	Nude	DN 40	DN 63
Pumping speed	N <sub>2</sub> l/s	33	26	30	33	26	30	33	26	30
	He l/s	15	13	14	22	18	20	22	18	20
	H <sub>2</sub> l/s	7	6	6	15	14	14	15	14	14
Compression ratio	N <sub>2</sub>	10 <sup>8</sup>			10 <sup>11</sup>			2.10 <sup>9</sup>		
	He	6.10 <sup>3</sup>			2.10 <sup>7</sup>			2.10 <sup>6</sup>		
	H <sub>2</sub>	300			1.10 <sup>5</sup>			1.10 <sup>4</sup>		
Ultimate pressure (*)	mbar	< 10 <sup>-8</sup>			< 5.10 <sup>-10</sup>			< 5.10 <sup>-10</sup>		
Ultimate pressure with purge	mbar	-			-			1.10 <sup>-8</sup>		
Maximum N <sub>2</sub> purge flow rate	sccm	-			-			25		
Maximum inlet pressure (**)	mbar	1			0.5			1		
Maximum exhaust pressure	mbar	25			45			45		
Recommended fore pump type		RVP, ACP, Membrane Pump								
Mounting orientation		Any								
Rotational speed	rpm	42,000								
Noise level	dBA	45								
Vibration level	mm/s	0.1								
Starting power	VA	100								
Nominal power	W	150								
Start-up time	s	120								
Pump weight	kg (lb)	1.2 (2.7)								
Controllers		ACT 201 H								
Cooling		Standard: ambient								
		Forced air cooling: optional								
		Water cooling: optional								

(\*): measured following Pneurop standard (CFF flange, after 48 hours of baking with AMD primary pump).

(\*\*): with a 4 m<sup>3</sup>/h membrane pump



### ATH 31

The ATH 31 includes one turbo stage and one Holweck stage. With excellent compression ratios and a backing pressure tolerance of up to 25 mbar, it can be backed by a membrane pump. It features one intermediate pumping port.

### ATH 31+

The ATH 31+, with one turbo stage and three Holweck stages, offers outstanding compression ratios. It is the ideal version for pumping light gases. Its exceptional performance can be achieved with a membrane pump as a fore pump. It also features two intermediate ports.

### ATH 31 C

The ATH 31 C includes one turbo stage, and two Holweck stages. A purge offers protection against corrosive gases. It can be backed by a membrane pump. It features one intermediate pumping port.

ATH SERIES

### ATH 200 - Optimized for low pressure applications

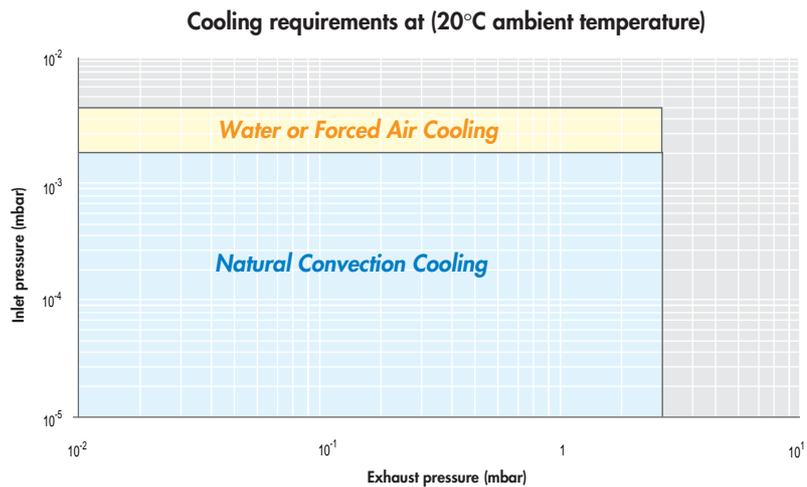
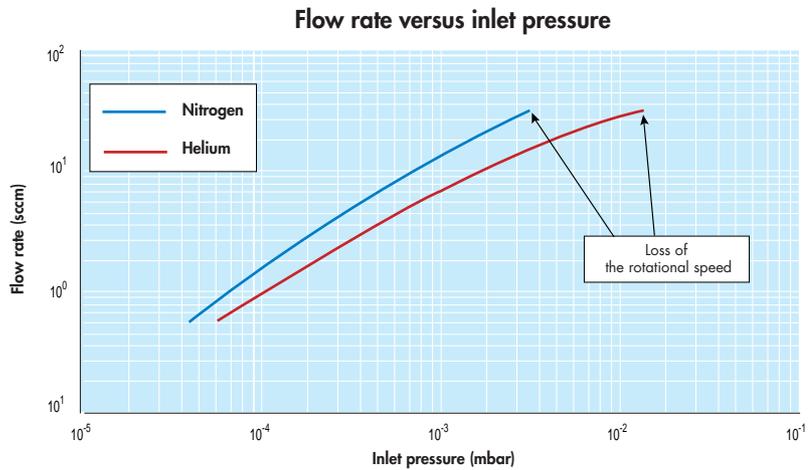
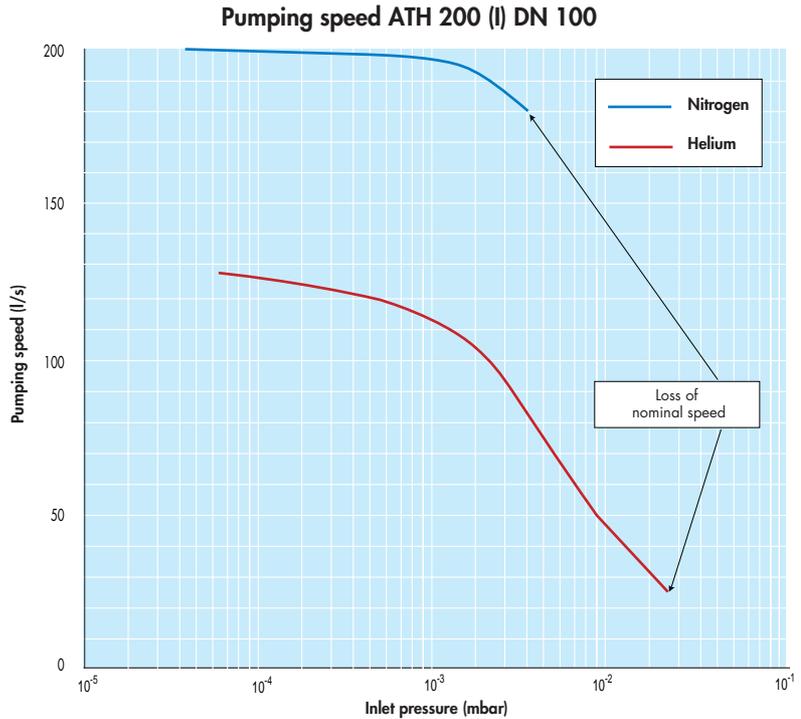
An ultimate pressure of  $10^{-10}$  mbar

The ATH 200 can be backed with dry or rotary vane pumps.

The pump may be equipped with nitride seals for better resistance in a radiative environment.

The ATH 200 is available with an intermediate pumping port - ATH 200 I

The pumping speed for Nitrogen at the intermediate port is 10 l/s.



## ATH 300 - Optimized for heavy duty applications

Wide operating pressure range from  $10^{-10}$  mbar (torr) up to 0.1 mbar (torr) with a wet or dry fore pump

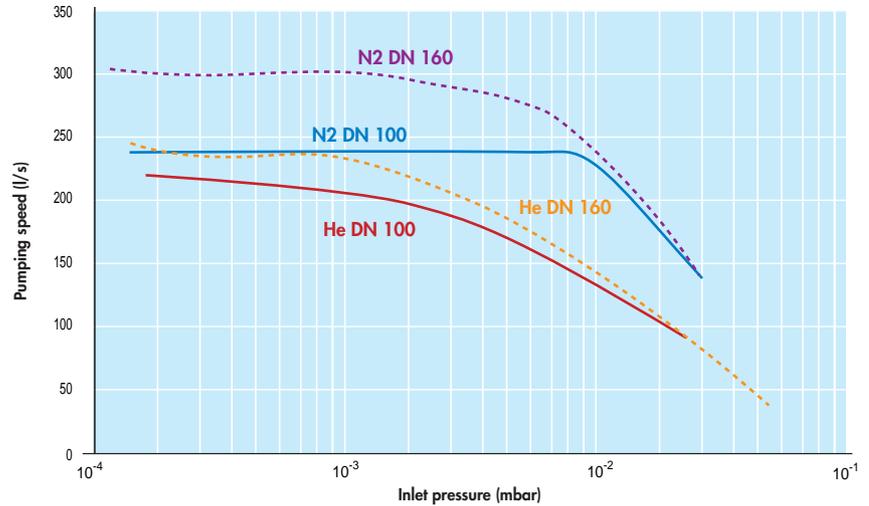
A chemical version equipped with a gas purge is available for pumping corrosive gases - ATH 300 CI.

### To increase the pump flow capability,

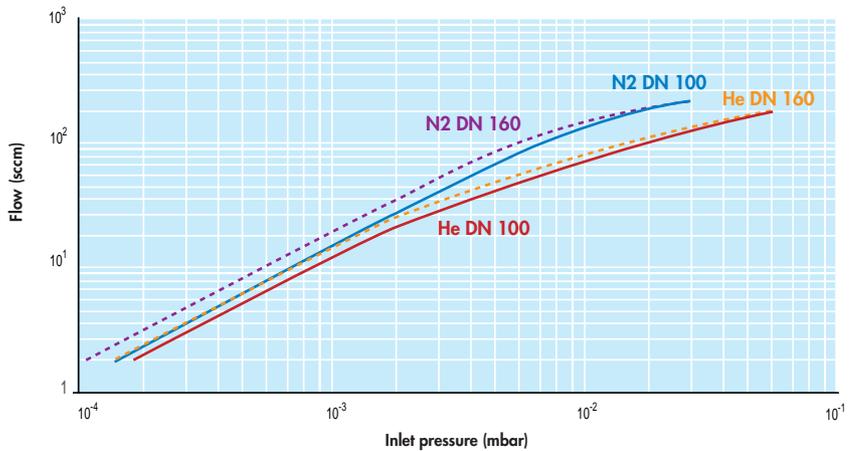
The ATH 300 is available with a DN160 flange or a nude configuration.



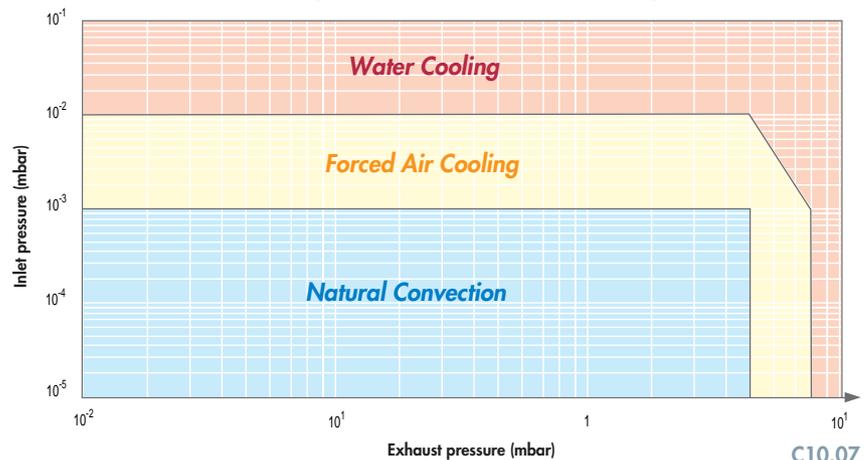
Pumping speed ATH 300 (CI)



Flow rate versus inlet pressure



Cooling requirements at (20°C ambient temperature)



## ATH 200 - ATH 300: Technical data

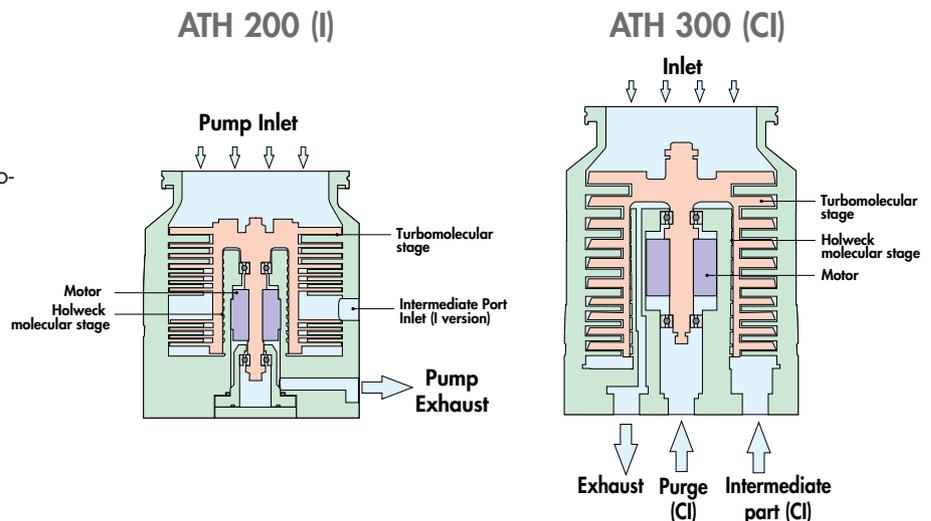
(measured specifications per PNEUROP standards)

Characteristics		ATH 200 (I)	ATH 300 (CI)	ATH 300 (CI)
Inlet flange		DN 100	DN 100	DN 160
Pumping speed	N <sub>2</sub> l/s	200	250	300
	He l/s	130	215	240
Compression ratio	N <sub>2</sub>	> 10 <sup>9</sup>	> 10 <sup>9</sup>	> 10 <sup>9</sup>
	He	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>5</sup>
Ultimate pressure (*)	mbar	< 5.10 <sup>-10</sup>	< 5.10 <sup>-10</sup>	< 5.10 <sup>-10</sup>
Maximum inlet pressure	mbar	4.10 <sup>-3</sup>	0.1	0.1
Maximum exhaust pressure	mbar	4	10	10
Intermediate port flange		DN 25 (I version)		DN 16
Intermediate port pumping speed	N <sub>2</sub> l/s	10 (I)	2 - 5 (CI)	2 - 5 (CI)
	He l/s	8 (I)	3 - 5 (CI)	3 - 5 (CI)
Recommended fore pump		RVP, ACP, AMD	RVP, ACP, AMD	RVP, ACP, AMD
Exhaust port flange		DN 16		DN 25
Mounting orientation		Any		Any
Rotational speed	RPM	36000		42000
Noise level	dB(A)	< 53		< 53
Vibration level	mm/s	0.3		0.3
Starting power	VA	100		250
Nominal power	W	150		300
Start-up time	mn	< 6		< 3.5
Pump weight ISO-K/CF-F	kg (lb)	5.5 / 9.7 (12.2 / 21.4)		6.5 / 10.5 (14.4 / 23.2)
Controllers		ACT 202 H		ACT 250, ACT 600 TH
Cooling		Natural, air, water		Natural, air, water

(\*) Measured following Pneuop Standards (CFF flange, after 48 hours of baking with a RVP primary pump).

## Applications

Mass spectrometry, leak detectors, electron microscopes, R&D, general low inlet pressure requirements, deposition.



## Controller

### ACT 250 designed with logical I/O interface

Controller	Pump
ACT 250	ATH 300

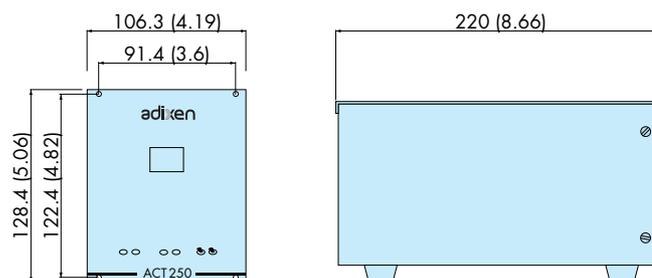
#### ACT 250

- 1/4 Rack 3U format
- Pump start - stop switches
- 4 leds :
  - power
  - pump starting
  - pump at speed
  - fault
- Hour counter
- Remote control: start, stop, standby, external safety, mode select
- Outputs dry contacts
  - pump starting
  - pump at speed
  - fault
- Automatic power supply detection:  
100 - 240 V (50/60 Hz)
- PC/PLC controlled processes  
via RS 232/RS 485



## Controller dimensions

mm (inches)



## ACT 201 H, ACT 202 H, ACT 600 TH designed with a high level communication interface

Controller	Pump
ACT 201 H	ATH 31
ACT 202 H	ATH 200
ACT 600 TH	ATH 300

### Convenient interface

- Automatic power supply detection from 100 to 240 Volts 50/60 Hz single phase
- Menu operation



ACT 201 H, ACT 202 H

### Sophisticated pump monitoring

#### Display of:

- Rotational speed
- Pump current consumption
- Pump and controller temperature
- Total running time
- Pump fault detection
- Diagnostic mode with last ten alarm codes

#### Control of:

- Rotational speed
- Venting
- Auto start
- Start delay
- Maintenance schedule

### Multiple interfaces

- PC/PLC controlled processes RS 232/R5485 (configurable)
- Remote control

#### Inputs:

- Remote start/stop
- Remote stand-by
- External safety

#### Outputs:

- Pump starting
- Pump at speed
- Stand-by on
- Vent valve on/off
- Power supply for air cooling kit
- Selectable 0 - 10 Volts output (speed/pump current/temperatures)

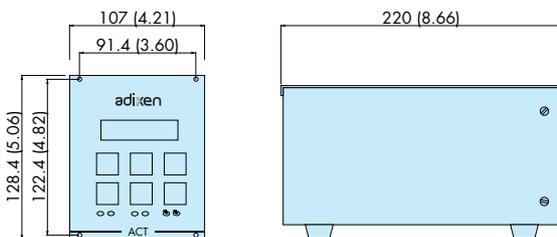


ACT 600 TH

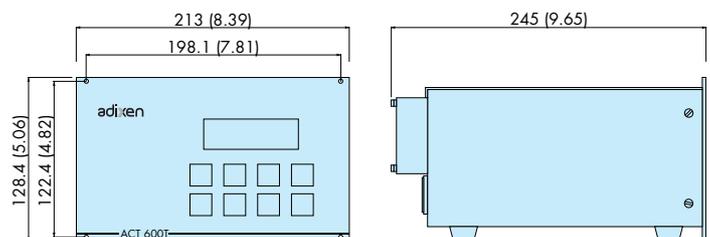
## Dimensions

mm (inches)

ACT 201 H / ACT 202 H



ACT 600 TH



## OEM controller electronics

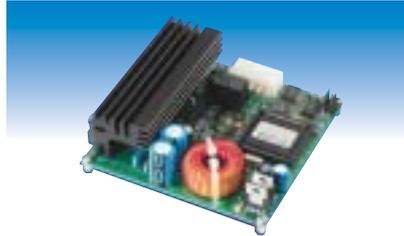
Alcatel has developed electronics and pumps designed specifically for integration into OEM equipment. For further information, please contact us.

### ACT 250 brick



This electronic is a compact powerful controller for driving the ATP 150, ATP 400 or ATH 300.

### ACT 201 H miniboard



This miniboard controls the ATH 31 or ATH 200.

### EOB



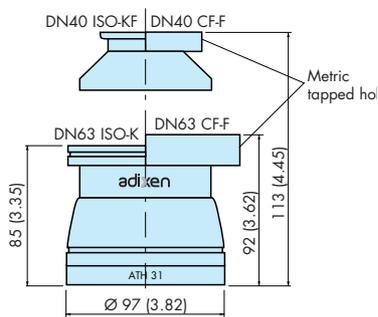
This EOB controls the ATH 31 or ATH 200.

## Pump dimensions

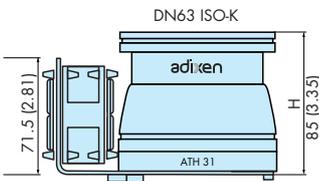
mm (inches)

### ATH 31

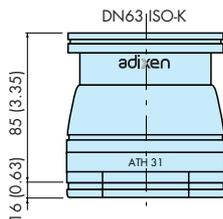
#### ATH 31 natural convection



#### ATH 31 with radial air cooling kit

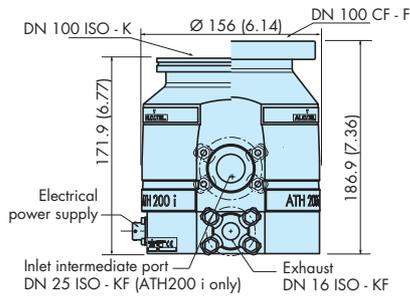


#### ATH 31 water cooled

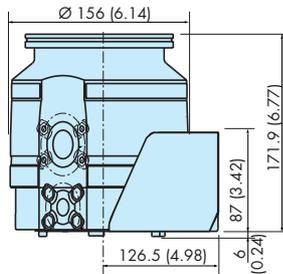


### ATH 200

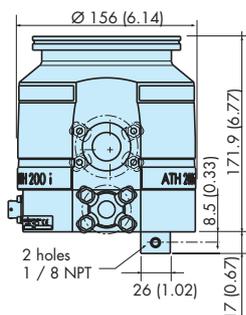
#### ATH 200 natural convection



#### ATH 200 with radial air cooling kit

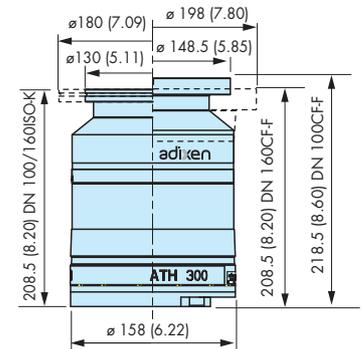


#### ATH 200 water cooled

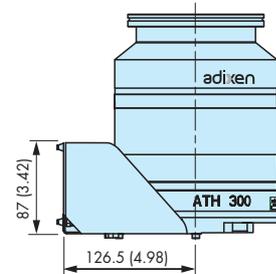


### ATH 300

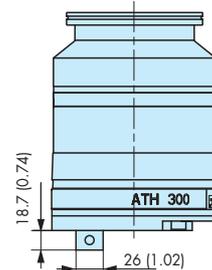
#### ATH 300 natural convection



#### ATH 300 with radial air cooling kit



#### ATH 300 water cooled



ATH SERIES

Ordering information

**ATH 31 pump**

(order controller, inlet screen and interconnecting cable separately)

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	Model		
	ATH 31	ATH 31+	ATH 31 C
Code	8	1	2

	Flange Size		
	Nude	DN 40	DN 63
Code	0	1	2

	Flange Type		
	Nude	ISO-K	CF-F
Code	0	1	2

	Cooling	
	Ambient / Air	Water
Code	0	2

**ATH 200 pump**

(order controller, inlet screen and interconnecting cable separately)

S 1 [ ] [ ] [ ] 00

	ATH 200 I		ATH 200		
	DN100 ISO-K	DN100 CF-F	DN100 ISO-K	DN100 CF-F	DN63 ISO-K
Code	3C	3D	31	32	21

	Cooling		
	Natural	Air	Water
Code	0	1	2

	Seals material	
	FPM	Nitrile
Code	1	2

## ATH 300 pump

(order controller, inlet screen and interconnecting cable separately)

C				00
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ATH 300		
	SD	CI
Code	1	2

Housing					
	DN100 ISO-K	DN100 CF-F	DN160 ISO-K	DN160 CF-F	nude
Code	31	32	41	42	00

Cooling			
	Natural	Air	Water
Code	0	1	2

Seals material		
	FPM	Nitrile
Code	1	2

## Controllers

Controller / Pump	PART NUMBER			
	100 V 50/60 Hz	115 V 50/60 Hz	200 V 50/60 Hz	230 V 50/60 Hz
ACT 250 / ATH 300	108320			

Model	Pump	PART NUMBER
ACT 201 H	ATH 31	108916
ACT 202 H	ATH 200	110787
ACT 600 TH	ATH 300	111692

## Power cords

The ACT 201 H, ACT 202 H and ACT 600 TH controllers are supplied with one European power cord and one US low voltage power cord.

For ACT 250 controllers please order the convenient P/N below.

Designation	P/N
A USA low voltage USA high voltage	103567 103898
E Europe	103566
J Japan low voltage Japan high voltage	103567 104559
K United Kingdom	104411
S Switzerland	A459212

## ATH SERIES

## Interconnecting cables (pump to controller)

## ATH 31

	PART NUMBER
<b>Cable length</b>	<b>ACT 201 H straight connector</b>
1 m	A460422-010
3 m	A460422-030
5 m	A460422-050
10 m	A460422-100
20 m	A460422-200

## ATH 200

	PART NUMBER
<b>Cable length</b>	<b>ACT 202 H straight connector</b>
1 m	A460422-010
3 m	A460422-030
5 m	A460422-050
10 m	A460422-100
20 m	A460422-200

## ATH 300

	PART NUMBER
<b>Cable length</b>	<b>to ACT 250 or ACT 600 TH straight connector</b>
1 m	A461237-010
3.5 m	A461237-035
5 m	A461237-050
10 m	A461237-100
20 m	A461237-200

## Accessories

### Inlet screens and dense mesh dust filters

For pumps	Inlet flange	Mesh size		PART NUMBER
		2.5 mm	20 µm	
ATH 31	DN 40 ISO-KF	●		102670
			●	103078
	DN 40 CF-F	●		102644
			●	102635
	DN 63 ISO-K	●		063117
			●	062912
	DN 63 CF-F	●		102662
			●	102664
ATH 200, ATH 300	DN 100 ISO-K	●		056844
			●	063215
	DN 100 CF-F	●		056845
			●	102680
ATH 300	DN 160 ISO-K	●		056942
			●	063216
	DN 160 CF-F	●		056928
			●	102685



Dense mesh filters



Inlet screen



Electrical venting valve

### Electrical venting valves

Voltage	For ATH 31, ATH 200, ATH 300	For ATH 300
	DN 16	DN 25 ISO-K
24 VDC	108347	108348
100V - 50/60 Hz	063165	063175
115V - 50/60 Hz	063171	063089
200V - 50/60 Hz	063173	063176
220V - 50/60 Hz	063169	056994
240V - 50/60 Hz	063172	063177



Water cooling

### Cooling kit

For pumps	Type	PART NUMBER
ATH 31	Air	107605
	Water	107593
ATH 200	Air	109258
	Water	109259
ATH 300	Air	109258
	Water	109259



Air cooling

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