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MDP 5011

Molecular Pump



User's Manual

adixen
by Alcatel Vacuum Technology

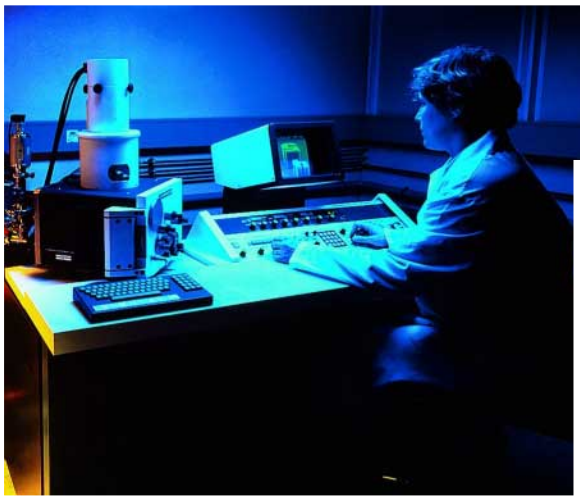


Alcatel Vacuum Technology, as part of the Alcatel Group, has been supplying vacuum pumps, leak detection systems, vacuum measurement and micro machining systems.
Thanks to its complete range of products, the company has become an essential player in multiple applications : instrumentation, Research & Developement, industry and semiconductors.

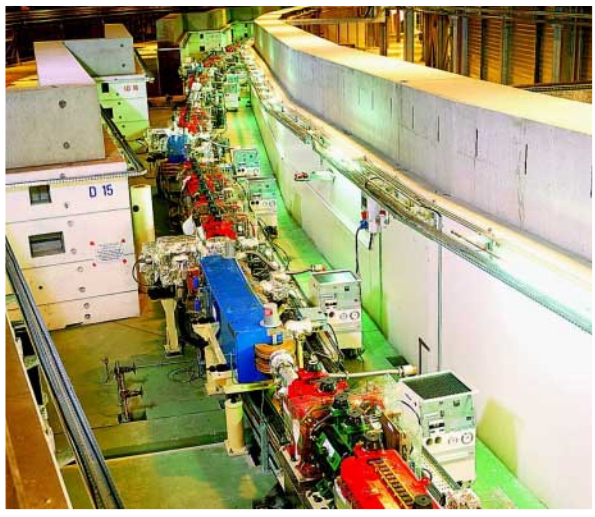
Alcatel Vacuum Technology has launched Adixen, its new brand name, in recognition of the company's international standing in vacuum position.
With both ISO 9001 and 14001 certifications, the French company is an acknowlegded expert in service and support, and Adixen products have the highest quality and environmental standards.

With 40 years of experience, AVT today has a worldwide presence, through its international network that includes a whole host of experienced subsidiaries, distributors and agents.
The first step was the founding of Alcatel Vacuum Products (Hingham- MA) in the United States, thirty years ago, reinforced today by 2 others US subsidiaries in Fremont (CA) and Tempe (AZ).
In Europe, AVTF-France headquarters and three of its subsidiaries, Alcatel Hochvakuumtechnik (Germany), Alcatel Vacuum Technology UK (Scotland) and Alcatel Vacuum Systems (Italy) form the foundation for the European partner network.
In Asia, our presence started in 1993 with Alcatel Vacuum Technology (Japan), and has been strengthened with Alcatel Vacuum Technology Korea (in 1995), Alcatel Vacuum Technology Taïwan (in 2001), Alcatel Vacuum Technology Singapore, and more recently with Alcatel Vacuum Technology Shanghai (China) (in 2004).
This organization is rounded off by more than 40 represensatives based in a variety of continents.





Thus, whatever the circumstances, the users of Adixen products can always rely on quick support of our specialists in Vacuum Technology.



GB 00779 – Ed 02 - March 04

Molecular pumps
MDP 5011

WELCOME

Dear customer,

You have just purchased an Adixen Molecular pump .
We would like to thank you and are proud to count you as one of our customers.

This product has benefited from Alcatel's many years of experience in the field of molecular pump design.

To guarantee high performances and full satisfaction from this equipment, we suggest that you study this manual before any intervention on your pump, particularly the chapter on installation and start-up.



Applications

- Fast evacuation of small volumes.
- Interseal pumping.
- Regeneration of cryopumps .
- Leak detection.
- Spectrometry.
- Production of electronic tubes.
- INSTRUMENTATION :
  Spectrometry, Surface analysis

Avantages

- The design of the MDP pump offers the reliable and the robustness with performances adapted to numerous applications.

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GB02594

REFERENCE DU MANUEL : 062199
EDITION : 12 **-** September 2004

Molecular pumps
MDP 5011

This product complies with requirements of European Directives, listed in the Declaration of Conformity contained in G 100 of this manual. These Directives are amended by Directive 93/68/E.E.C (E.C. Marking).

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A 10

Introduction to the MDP 5011 and ACT 100 controller

TWO PUMP VERSIONS

The standard version : MDP 5011 pump.

The version for corrosif gases: MDP 5011CP pump.

MAIN CHARACTERISTICS

The MDP 5011 molecular drag pump is a vacuum pump with a multiblade rotor.

- The rotational speed is 27.000 rpm.
- Very low noise and vibration levels.
- The ceramic ball bearings are lubricated with grease.

ACT 100 CONTROLLER (1/4 rack U format)

The ACT controller is equipped with :

- 4 leds:
  - power
  - fault
  - pump starting
  - pump at speed.
- Hour counter.

Available in:

110, 115, 200, 230 V (50/60 Hz)



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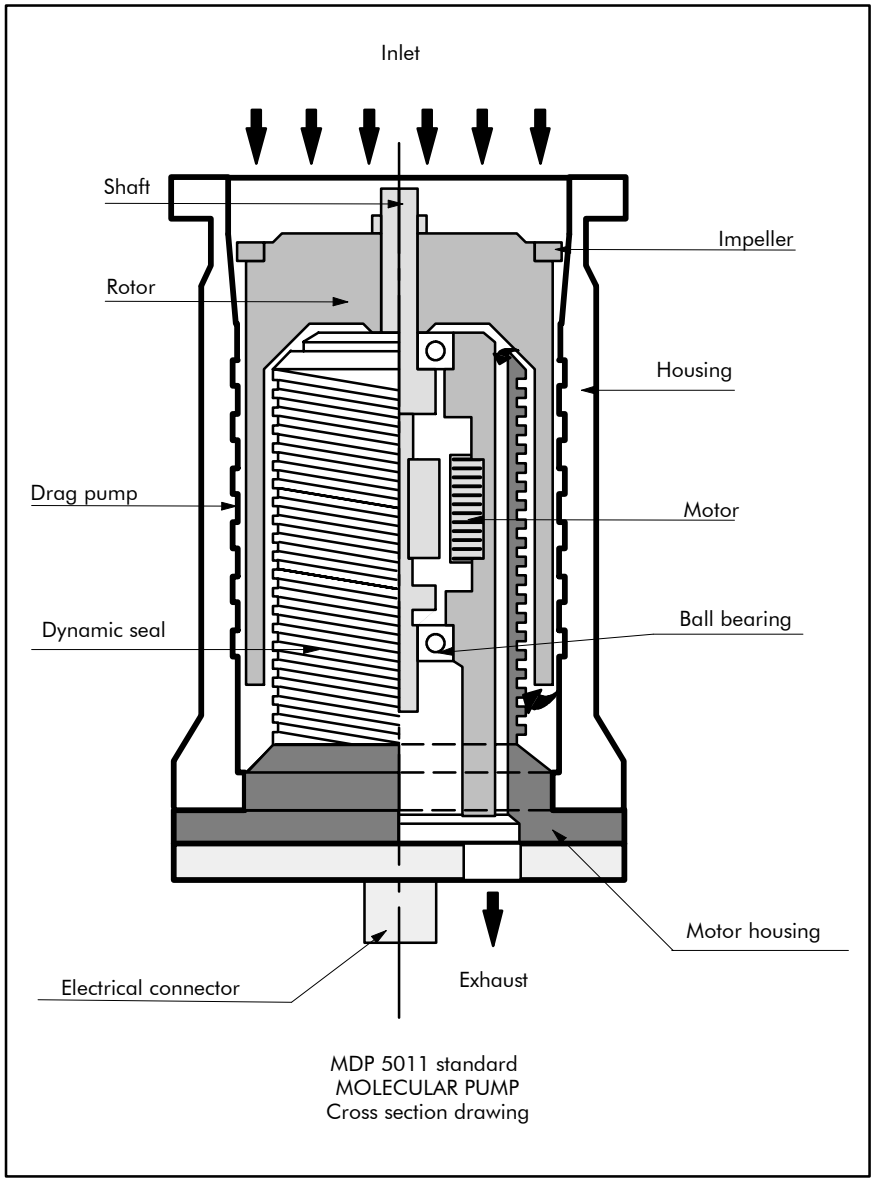
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The molecular pump operating principle

MDP 5011 MOLECULAR PUMP

The rotor, a smooth drum with a row of blades at the top, is mounted at the end of a shaft turning in two high-precision ball bearings lubricated with grease, and located in the low-vacuum area. All pumping elements are aluminium.

The pump is rotated by a single-phase electronically controlled electric motor. The rotor is mounted directly on the shaft, while the stator is attached to the pump body.

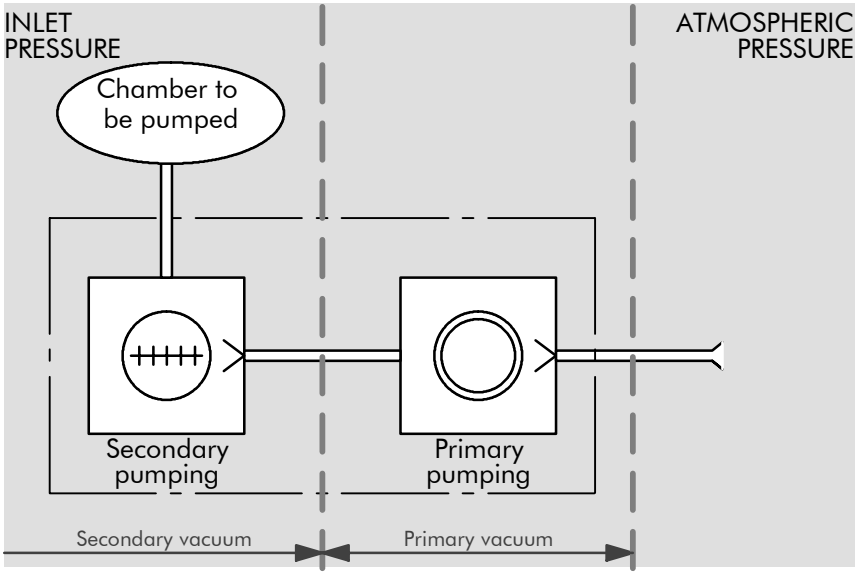


MDP 5011 standard
MOLECULAR PUMP
Cross section drawing

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The molecular pump operating principle

THE MOLECULAR PUMP IN AN INSTALLATION

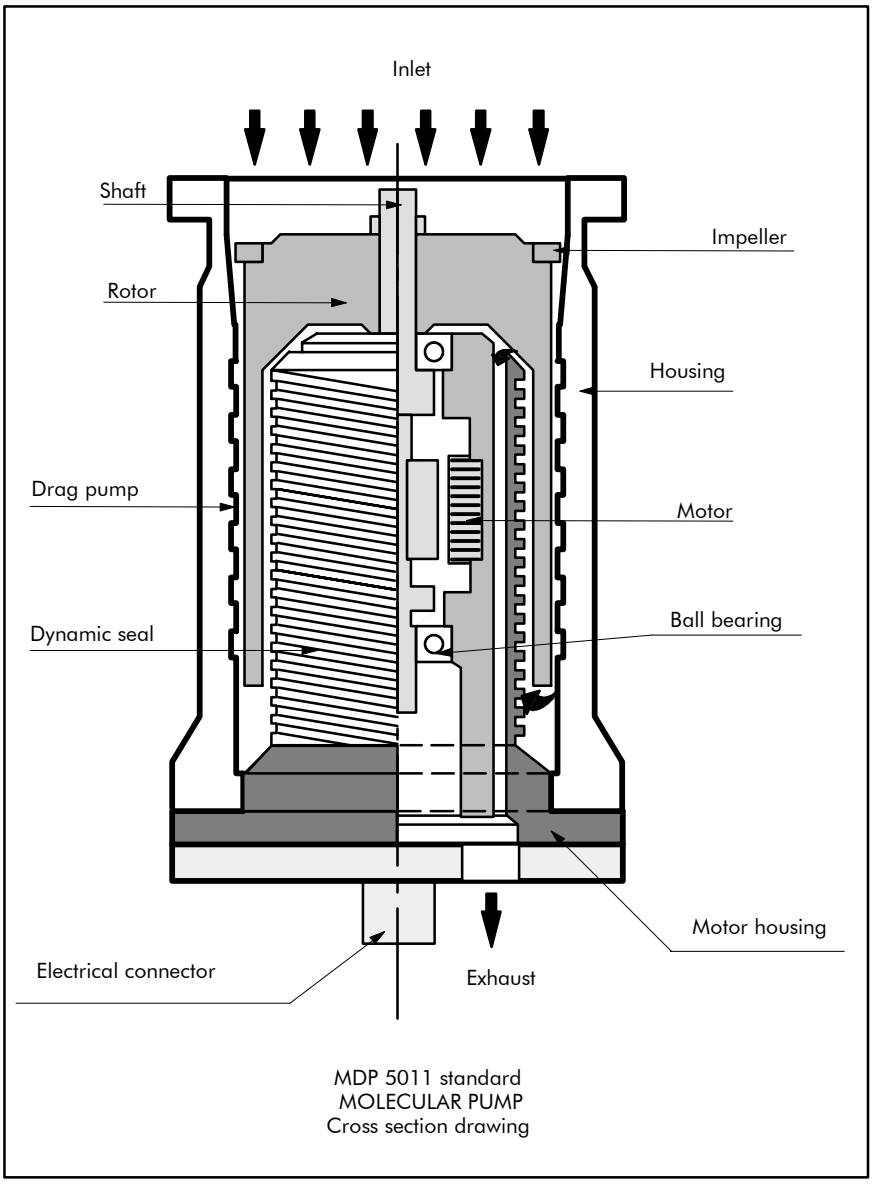


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The different versions

MPD 5011 STANDARD VERSION

Inlet flange : DN 63 ISO K-F
Inlet diameter : 76 mm
Exhaust flange : DN 16 ISO K-F



MDP 5011 standard
MOLECULAR PUMP
Cross section drawing

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The different versions

MPD 5011CP VERSION FOR CORROSIVE GASES

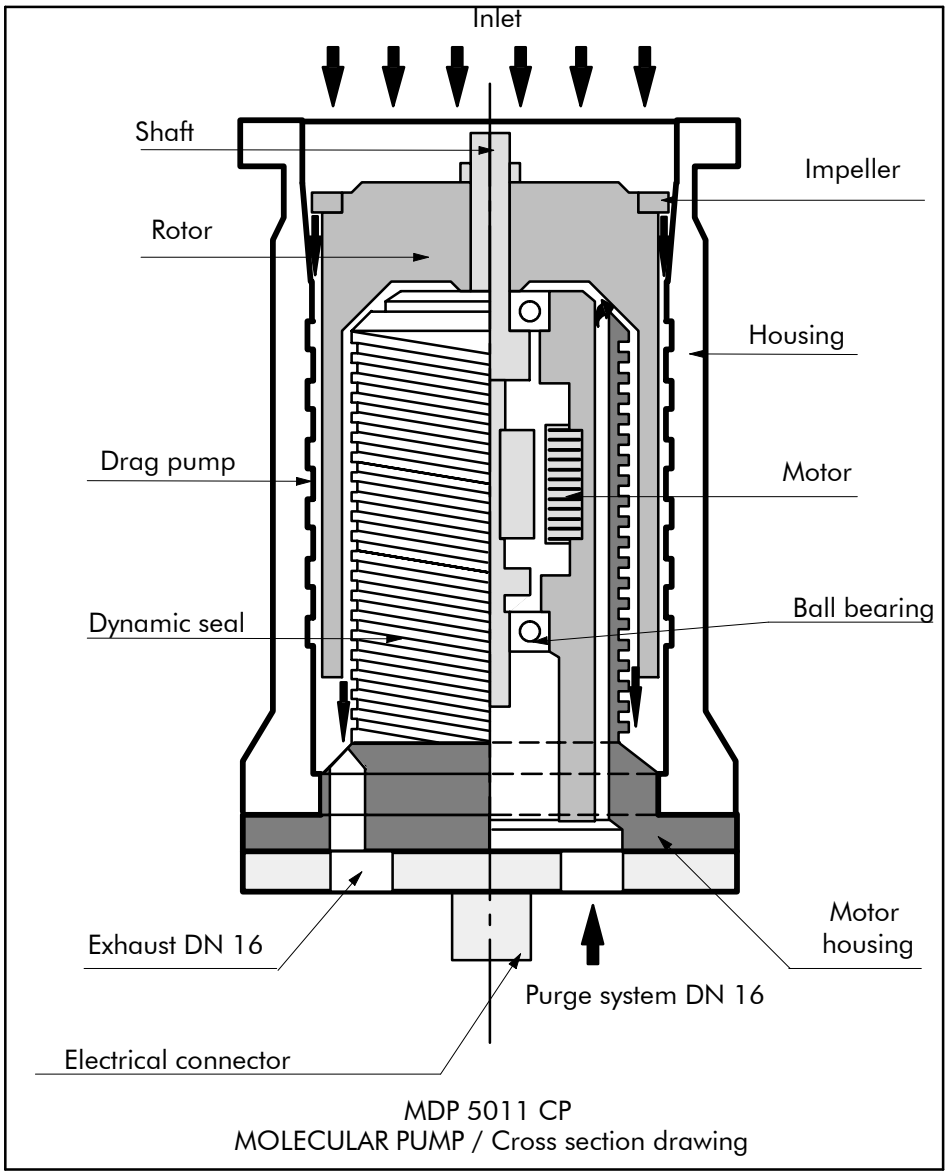
The MDP 5011 CP is specially designed for aggressive environments. Ball bearings and motor are isolated from process gases by a dynamic inert gas purge system.

MDP 5011 CP can operate with the same electronic frequency converter than the MDP 5011 standard.

Inlet flange : DN 63 ISO-K

Exhaust flange : DN 16 ISO-KF

Purge flange : DN 16 ISO-KF



MDP 5011 CP
MOLECULAR PUMP / Cross section drawing

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The different versions

INERT GAS PURGE SYSTEM

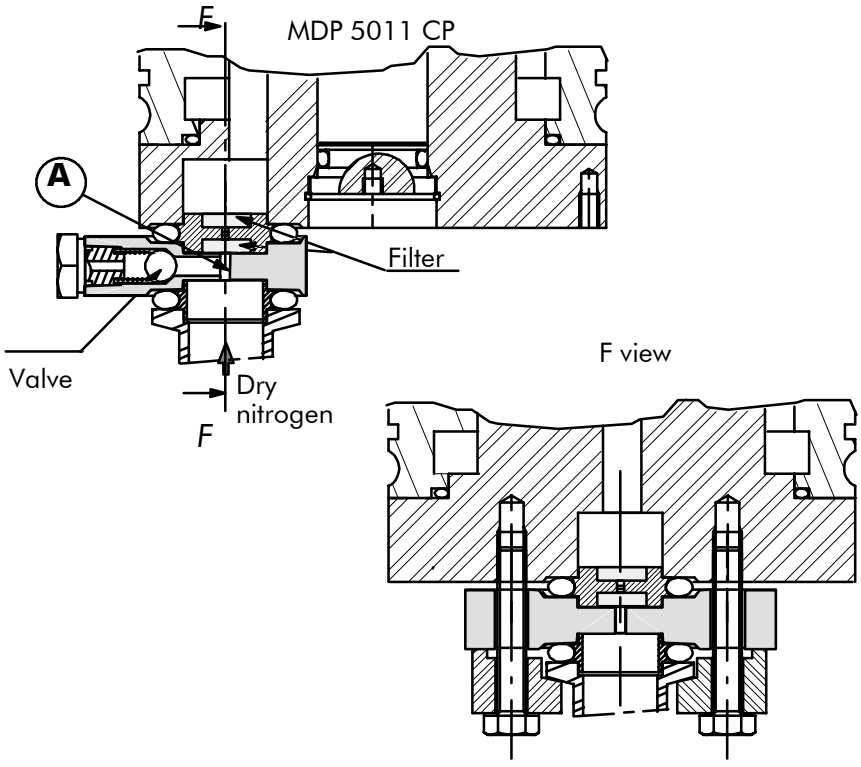
- For proper protection from reactive gases and particles the inert gas purge system must be used continuously.

We recommend a nitrogen source that is dry (dew point of 22 °C at atmospheric pressure), and properly filtered (particles < 1 µ and oil < 0,1 ppm).

- The cleanliness of the gas line must be correct.
- The purge gas line must have an DN16 ISO-KF fitting to connect it directly to the MDP with a centering ring and quick connect clamp.

Note : if the pressure in the purge gas line is greater than 1.4 bar (20.5 psi) absolute the check valve automatically opens in order to limit the flow into the MDP to 50 sccm.We recommend that the pressure of the purge line be set at 1 to 1.3 bar (15 to 19 psi) absolute to avoid wasting the purge gas.

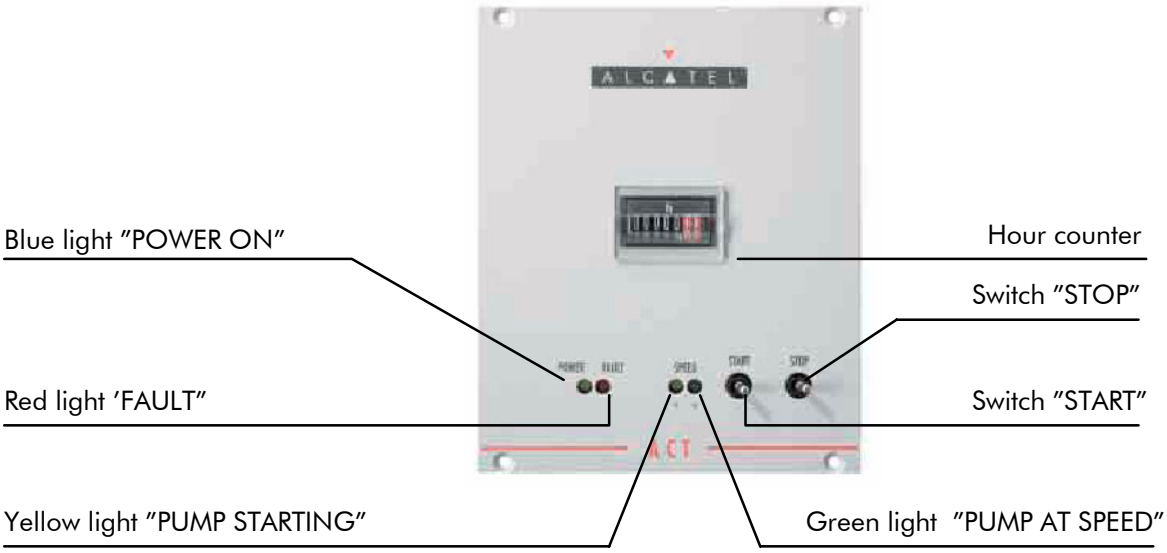
If the pressure of the purge line exceeds 1.3 bar (15 psi) absolute the performance of the pump will be affected.



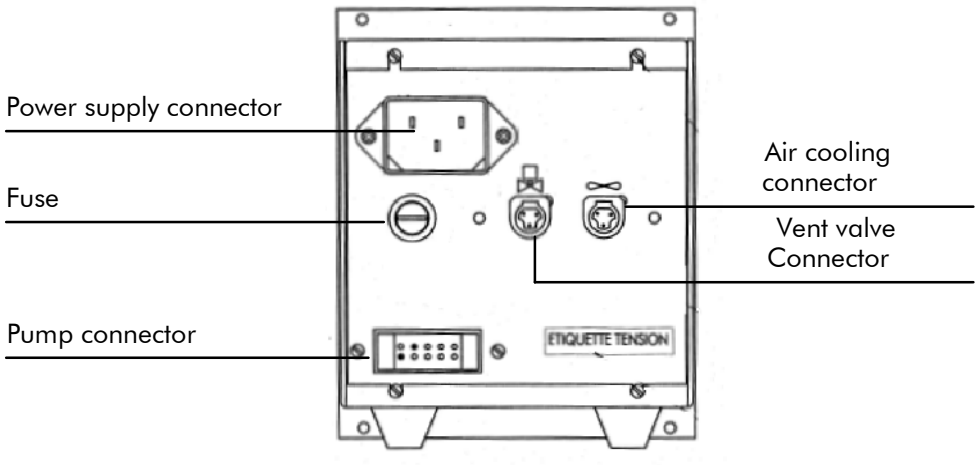
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The ACT 100 controller

FRONT PANEL



REAR PANEL



The electronic frequency controller is in the form of a 1/4 rack 19" 3 Unit module. It powers the pump motor and controls starting up to the nominal speed of 27.000 rpm.

A number of safety devices included in the controller and in the pump ensures proper function of the system.

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The accessories

MDP 5011 PUMP ACCESSORIES

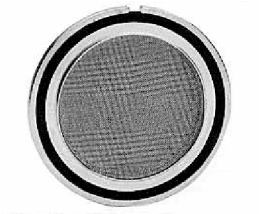
Screen filter: 2,5 mm



This filter protects the pump against solid particles ≥2.5 mm.

Inlet flange	P/N
DN 63 ISO-K	**063117**

Compact filter: 25 microns



The filter stops particles ≥ 25 microns and is used in the event of high densities of dust or risk of implosion when pumping tubes or lamps.

Inlet flange	P/N
DN 63 ISO-K	**062912**

Electrical venting valve



This valve is used to refill the pump with air after pump stopping or after a power failure. Valve DN 16 is powered by the mains.

Voltage	P/N DN 16 ISO-K1
100 V - 50/60 Hz	**063165**
115 V - 60 Hz	**063171**
200 V - 50/60 Hz	**063173**
220 V - 50 Hz	**063169**
240 V - 50/60 Hz	**063172**

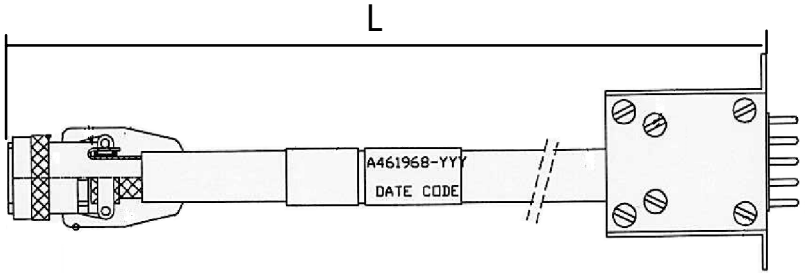
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The accessories

CONTROLLER ACCESSORIES

Interconnecting cables between the pump and controller MDP 5011 to ACT 100

Pump connection cables



Length L (m)	P/N
0,5	**A461868-005**
2,5	**A461868-025**
3,5	**A461868-035**
5	**A461868-050**
7	**A461868-070**
10	**A461868-100**

Power cords for ACT 100

	P/N
USA LV	**103567**
USA HV	**103898**
EUROPE	**103566**
JAPAN LV	**103567**
JAPAN HV	**104559**
U.K.	**104411**
SWITZERLAND	**A459212**

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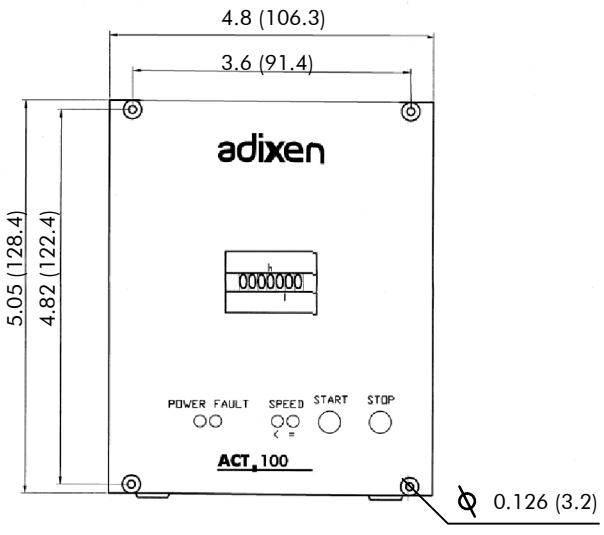
The technical characteristics

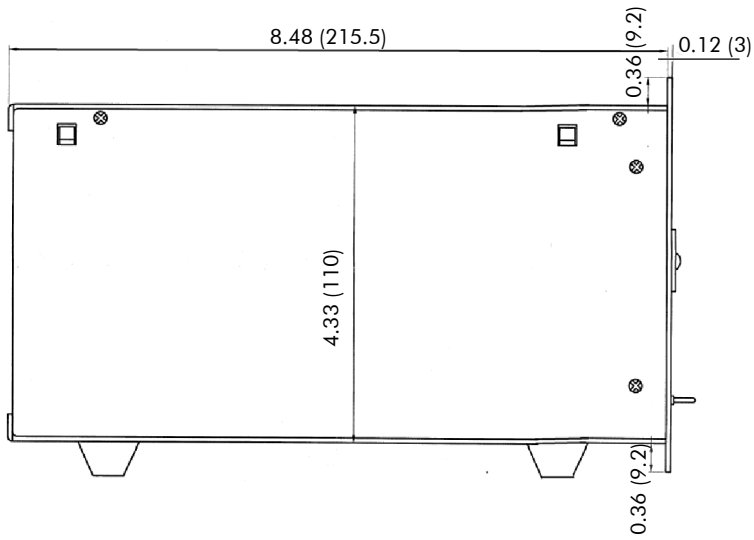
TECHNICAL CHARACTERISTICS OF THE ACT 100 CONTROLLER

Characteristics	Units	ACT 100
Weight	Kg	2
Dimensions H x L x P	mm	128,4 x 106,3 x 215,5
Voltages Frequency Maximum power	V HZ VA	100/115/200/230 50/60 75
Ambient temperature Storage temperature	°C °C	T < 50 -15 ≤ T ≤+70
Customer main breaker rating	A	T 10A

DIMENSIONS

inch (mm)





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TECHNICAL CARACTERISTICS OF THE PUMPS

Characteristics		Units	MPD 5011	MDP 5011CP
Inlet flange	DN		63 ISO-K	
Rotation speed		rpm	27 000	
Pumping speed	N2 He H2	l/s	7.5 4 3	
Compression rate	N2 He H2		1.10^9 2.10^4 1.10^3	1.10^6 250 50
Ultimate pressure (CP with purge 50 SCCM) *		mbar	1.10^{-6}	1.10^{-5}
Maximum pressure at inlet in continuous operation**	Natural convection Air cooling Water cooling	mbar	1.10^{-1} 10 10	
Maximum pressure at exhaust in continuous operation**	Natural convection Air cooling Water cooling	mbar	40	5
Weight	Natural convection Air cooling Water cooling	kg	2,3 3 2,5	
Recommanded primary pump			Ultimate pressure < 20 mbar	
Starting time (0 à 27000 rpm)		min	< 1	
Using ambient temperature	Natural convection Air cooling Water cooling	°C	35 35 50	
Operate position			indifferent	
Exhaust flange	DN		16 ISO-KF	

* According to Pneurop Specifications

** The 2 maximum pressures can not occur at the same time

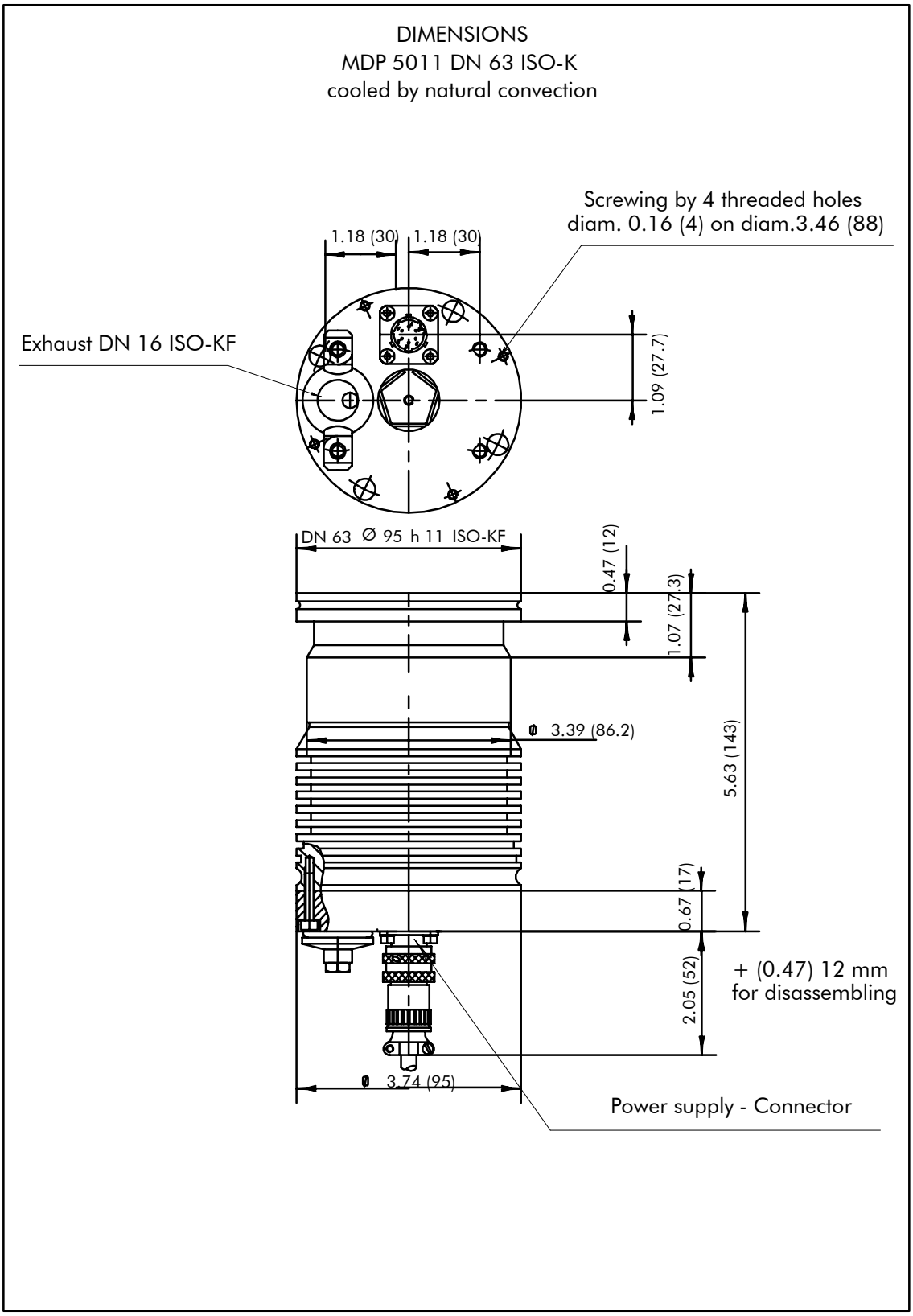
Note : the MDP 5011 pump must not be baked.

The compression rate of the MDP 5011 CP is lower than this of the standard MDP 5011 pump.

A part of the dynamic seal allows the protection against corrosion.

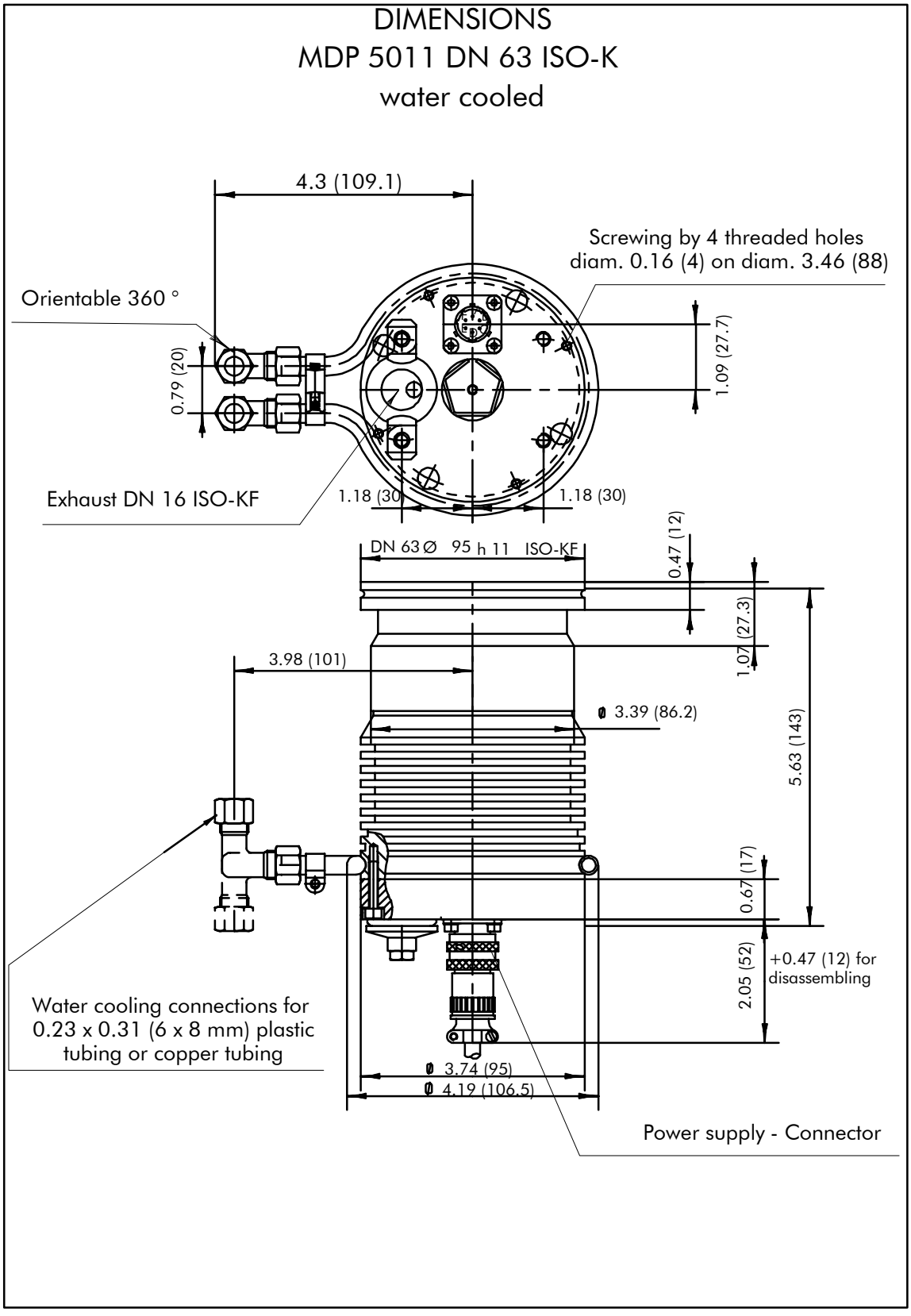
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Pump dimensions



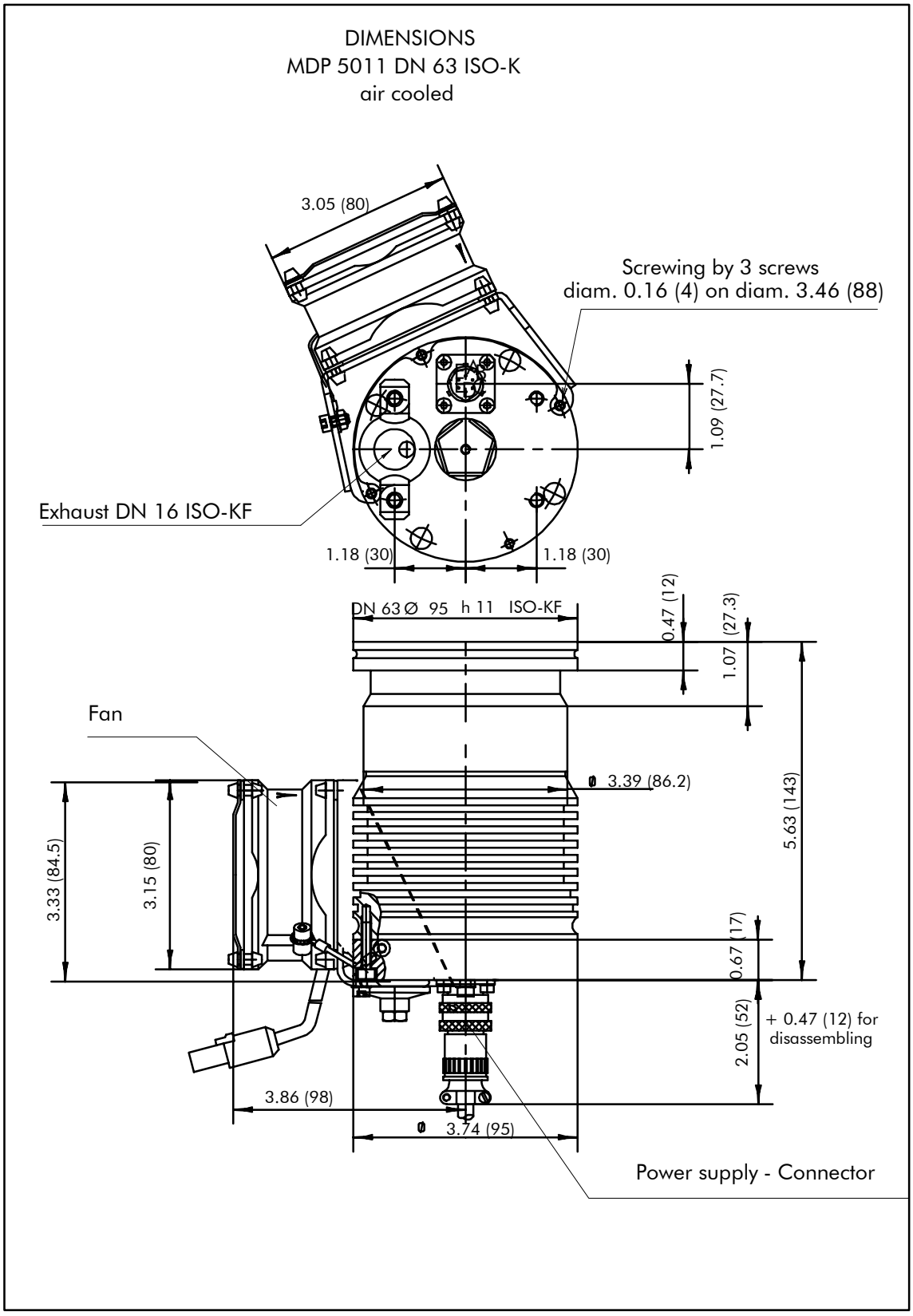
Gb 02560 Edition 01 - Sep 2004

Pump dimensions



Edition 01 - Sep 2004
GB 02560

Pump dimensions



GB 02560 Edition 01 - - Sep 2004

Safety instructions



WARNING

- **Before switching on the pump, the user should study the manual and follow the safety instructions listed in the compliance certificate in G100.**

UNPACKING

- To keep your product in the clean condition in which it left our factory, we recommend unpacking the pump at the site of installation.
- It is advisable to keep the packaging.

STORAGE

- Our equipment can be stored without special precautions (ambient temperature between 5 and 40 °C) **provided that the running-in procedure specified in the manual is observed for the first operation of the pump.**
- The seal kits must be stored away from heat and light (direct sunlight and ultra violet radiation) in order to prevent any hardening of the elastomer.

INSTALLATION - START UP

- The controllers are designed to guarantee safety under normal operating conditions (use in rack). In specific cases of use on tables, make sure that no objects enter the ventilation openings or block the openings when handling the units.
- Certain controllers can be configured to start up automatically after a power cut. It is the user's responsibility to take all the precautions necessary to prevent the risks resulting from this type of operation.
- Our products are designed to comply with current EEC regulations. **Any modification of the product made by the user** is liable to cause non-compliance with these regulations, or reduce the EMC (electromagnetic compatibility) performance and the safety of the product. The manufacturer declines any responsibility for such modifications.
- Before performing any maintenance operations on the product, isolate the product from the various energy sources (electricity, compressed air, etc.).

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Safety instructions

INSTALLATION - START UP (CTD)

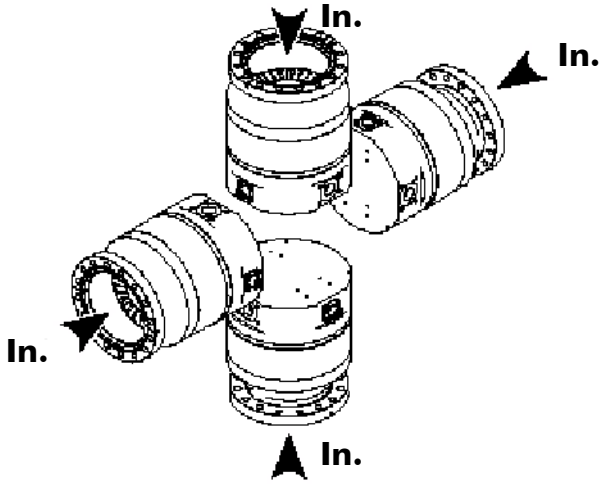
- The EMC performance of the product is obtained when the installation complies with EMC rules. In particular, **it is essential to:**
  - use shielded cables and connections for interfaces,
  - stabilise the power supply line with meshing from the power supply source to a distance of 3 m from the product inlet.
- When switching off an item of equipment containing loaded capacitors at over 60 VDC or 25 VAC, take precautions concerning the access to the connector pins (single-phase motors, equipment with mains filter, frequency converter, monitoring unit, etc.).
- Risk of toppling over: although compliance with EEC safety regulations is guaranteed (normal range ±10 °), it is recommended to take precautions against the risk of toppling over during handling, installation and operation.
- The performance and the operational safety of this product are guaranteed provided that it is used in normal operating conditions.
- The vacuum pump is also a compressor: incorrect use may be dangerous.
  Study the user manual before starting up the pump.
- The access to the rotor of a turbomolecular pump with an unconnected intake is dangerous. Similarly, if the pump is not switched on, its rotor may be rotate by a primary pump which is in operation.
- Make sure that the parts or chambers connected to the intake of our pumps withstand a negative pressure of 1 bar in relation to the atmospheric pressure.
- The airtightness of the products is guaranteed when they leave the factory for normal operating conditions. It is the user's responsibility to maintain the level of airtightness particularly when pumping dangerous gases.

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Pump connection to an installation

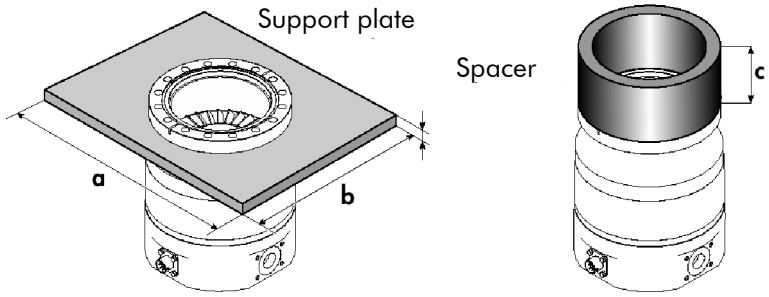
The pump can operate in any position



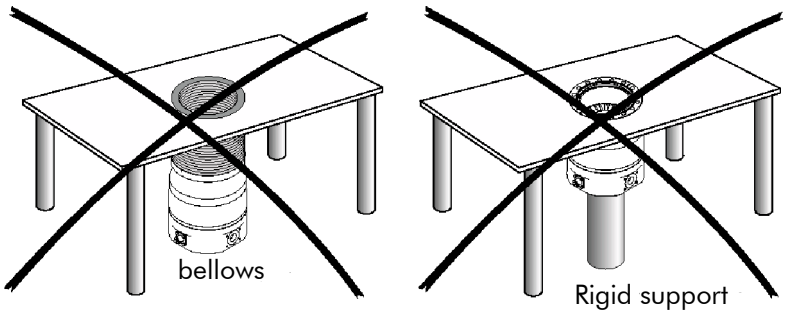
The connection of the pump to the installation must be sufficiently rigid

The dimensions of the connection parts should be study carefully: reduce the following as much as possible:

- dimensions **a** and **b** the flexibility of the connection plate
- the overhang **c** between the pump and its anchor point.



some examples of unrecommanded conncections



WARNING

The equipment attachment devices should be sufficiently rigid to prevent potential risks in the event of failure of a rotary component or a violent shock on the pump (exceptional phenomena). For this use the rotary flange attachment holes. If the inlet flange is attached with claw clamps, use 4 claw clamps.

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GB 02602

Pump connection to an installation

COOLING RECOMMENDATIONS AND TEMPERATURE LIMITS

Ambient operating temperature

T< 95 °F	Natural convection or air cooled
T< 122 °F	Water cooled

PUMPING CONDITIONS

In cases of high pressure pumping or frequent cycling, the pump temperature is higher, so water or air cooling are recommended.

PUMP LINE CONNECTIONS



WARNING

Remove the protective parts blocking the inlet, exhaust and, if applicable, purge openings; these components prevent foreign bodies from entering the pump during transport and storage. It is dangerous to leave them on the pump during operation.

Inlet

Install the screen filter or compact filter accessory on the pump; connect the pump to the installation (1).

Inlet flange

DN 63 ISO-KF

Exhaust

Connect the Air inlet valve accessory to the pump.
Connect the pump to primary pumping circuit (1).

Exhauxt flange

DN 16 ISO-KF

(1) Different connection accessories can be found in the Adixen- Alcatel Catalog.

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B 30
Water cooling circuit connection

CHARACTERISTICS OF WATER COOLING

In order to limit the corrosion and clogging of the cooling pipes, it is recommended to use cooling water with the following characteristics:
- treated soft water or non-corrosive industrial water.
- pH between 7.5 and 11.
- hardness <7 milli-équivalent/dm ^{3} .
- Resistivity >1500 Ω.cm.
- Solid pollution <100 mg/dm ^{3} .
- Max.pressure: 7 bars.
- Temperature: 50 °F< T <77°F

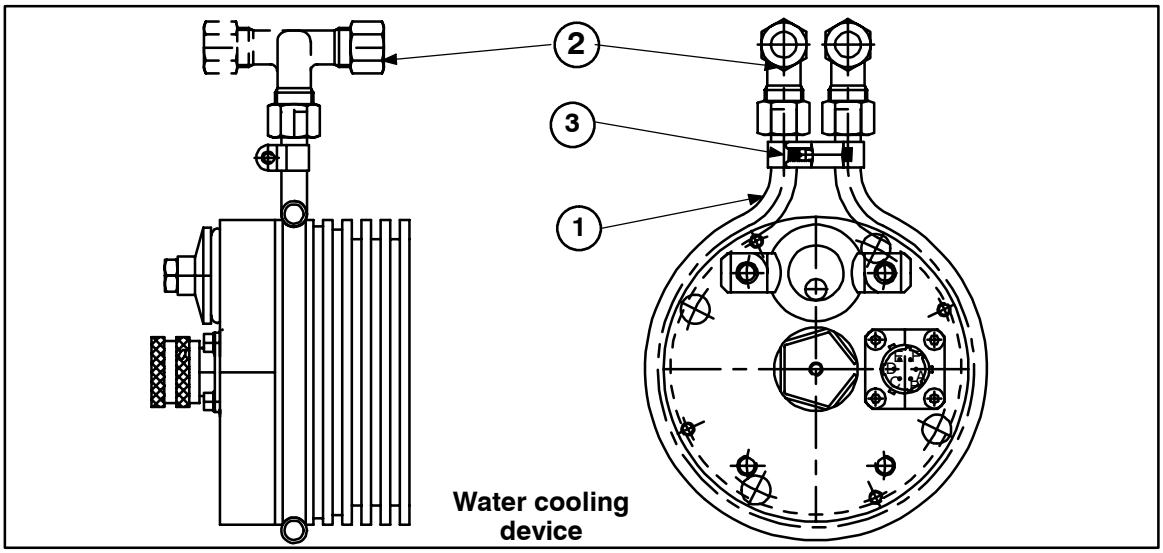
CONNECTION

Provide a water inlet pipe and a tap to adjust the flow rate.

It consists of a water circulator ring which can be equipped on the MDP housing.

It is recommended for use at ambient temperature between 95 and 122 °F, or in continuous use at high pressure.

When the air cooling device must be replaced by a water cooling device, proceed as follows:
- Install the cooling ring (1) on the MDP housing in the specific groove and put it facing the water line.
- Screw the 2 water fittings (2) to the cooling ring and orientate them.
- Secure the device by screwing the hose clamp (3) with a screwdriver : the cooling ring does not rotate.



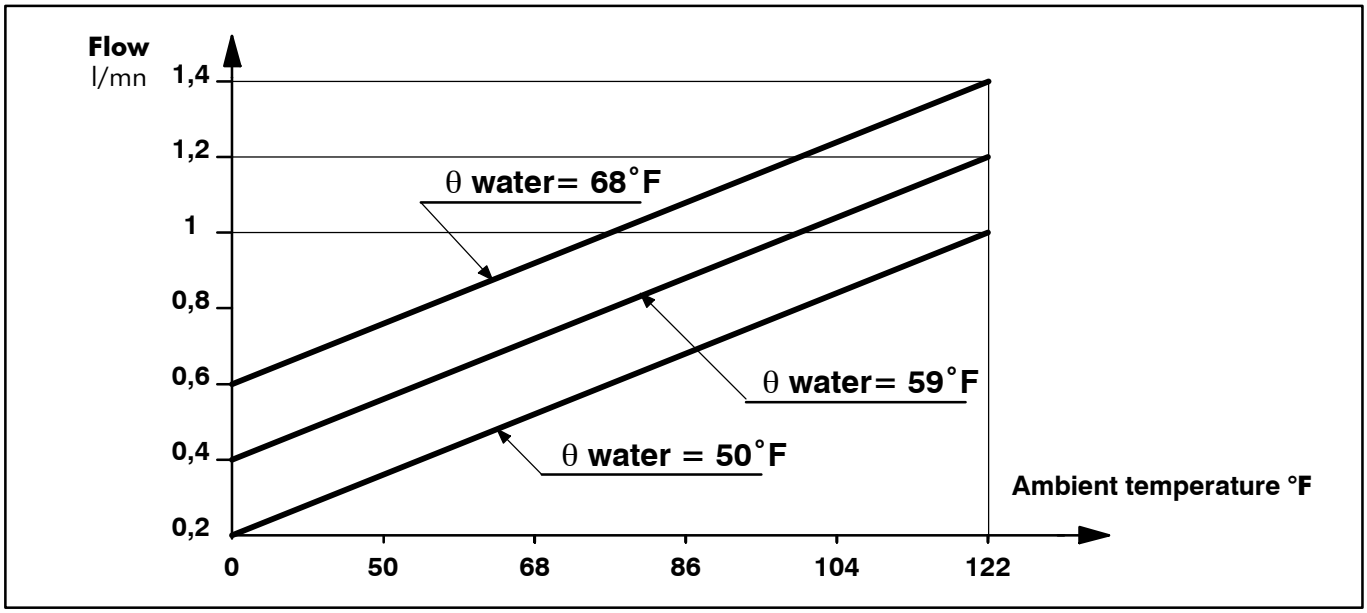
Water cooling device

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Water cooling circuit connection

Connection to the water line

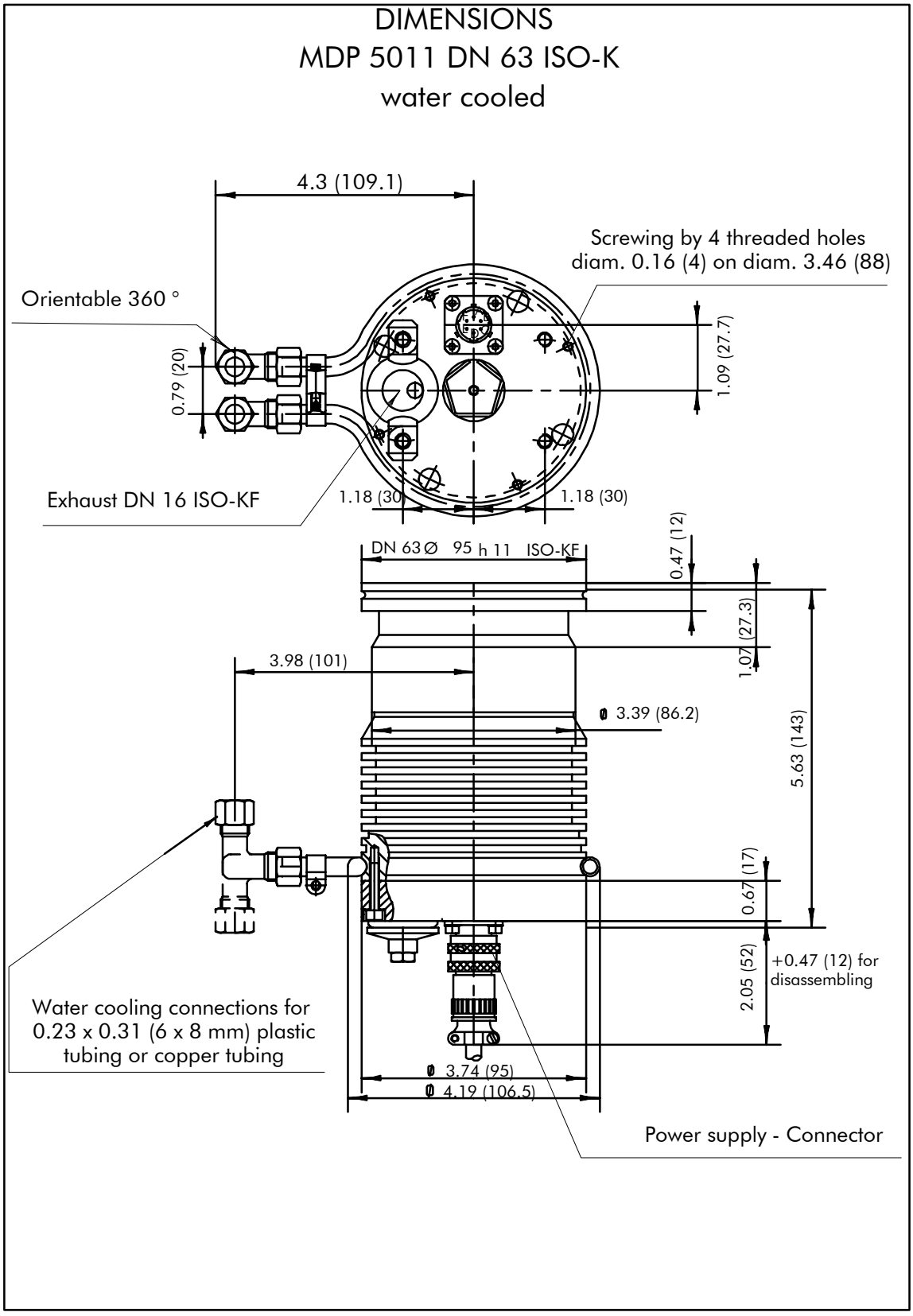
- Use a flexible or a rigid 6 x 8 mm hose to connect one of the water fittings to the water line. The user must provide some method of controlling water flow.
- Use a flexible or a rigid 6 x 8 mm hose to connect the other fitting to the drain.
- Control the flow of water depending on ambient temperature, and water temperature using the following graph.



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GB 02630

Water cooling circuit connection



Gb 02603 Edition 01 - - Sep 2004

Venting valve connection

Note : Check the solenoid valve voltage : it must be compatible with line voltage (see section A50).

It consists of :

A solenoïd valve normally open (NO) mounted on a DN 16 ISO-KF flanged fitting.

The fitting is installed between the outlet flange of the MDP and the foreline of the primary pump.

Connect the solenoïd valve cable to the J connector of the ACT 100 controller.

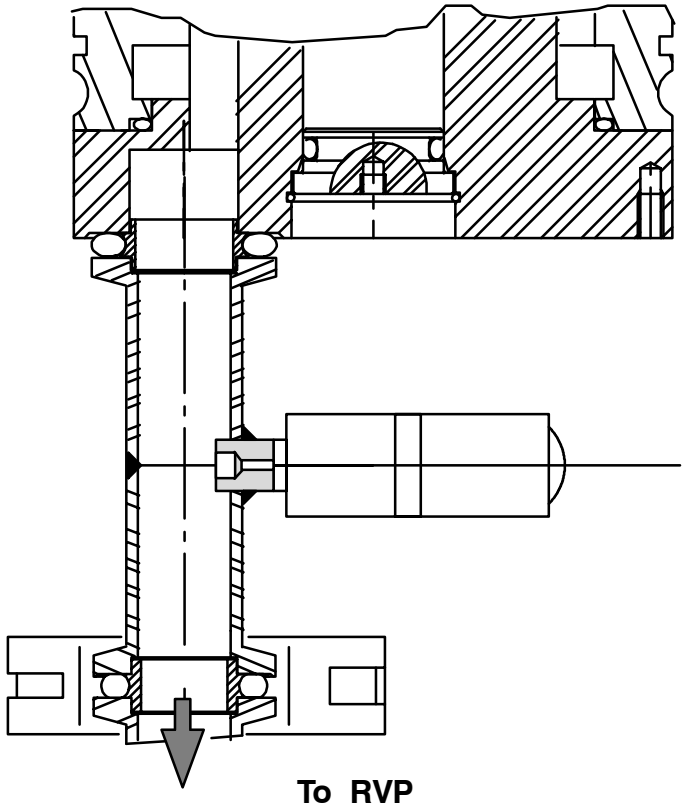
If there is a power failure, this device vents the MDP pump to atmosphere to prevent oil contamination from the roughing pump.

If the user want to make a venting, he must :

- press the "STOP" switch on the ACT 100 controller.
- Disconnect the power cable on the ACT 100 controller.

.

Venting valve system



Edition 01 - Sep 2004

GB 02604

Air cooling kit connection

Air cooling kit:

When the water cooling kit must be replaced by an air cooling device, proceed as follows :

- Install the fan on the pump housing by a bracket. This last is assembled on the pump rear tape with 3 screws M4 (see figure page 2/2).
- Connect the contact plug of the minus wire to a fan assembling screw.

Electrical connection

- Connect the fan cable to the K connector of the controller.

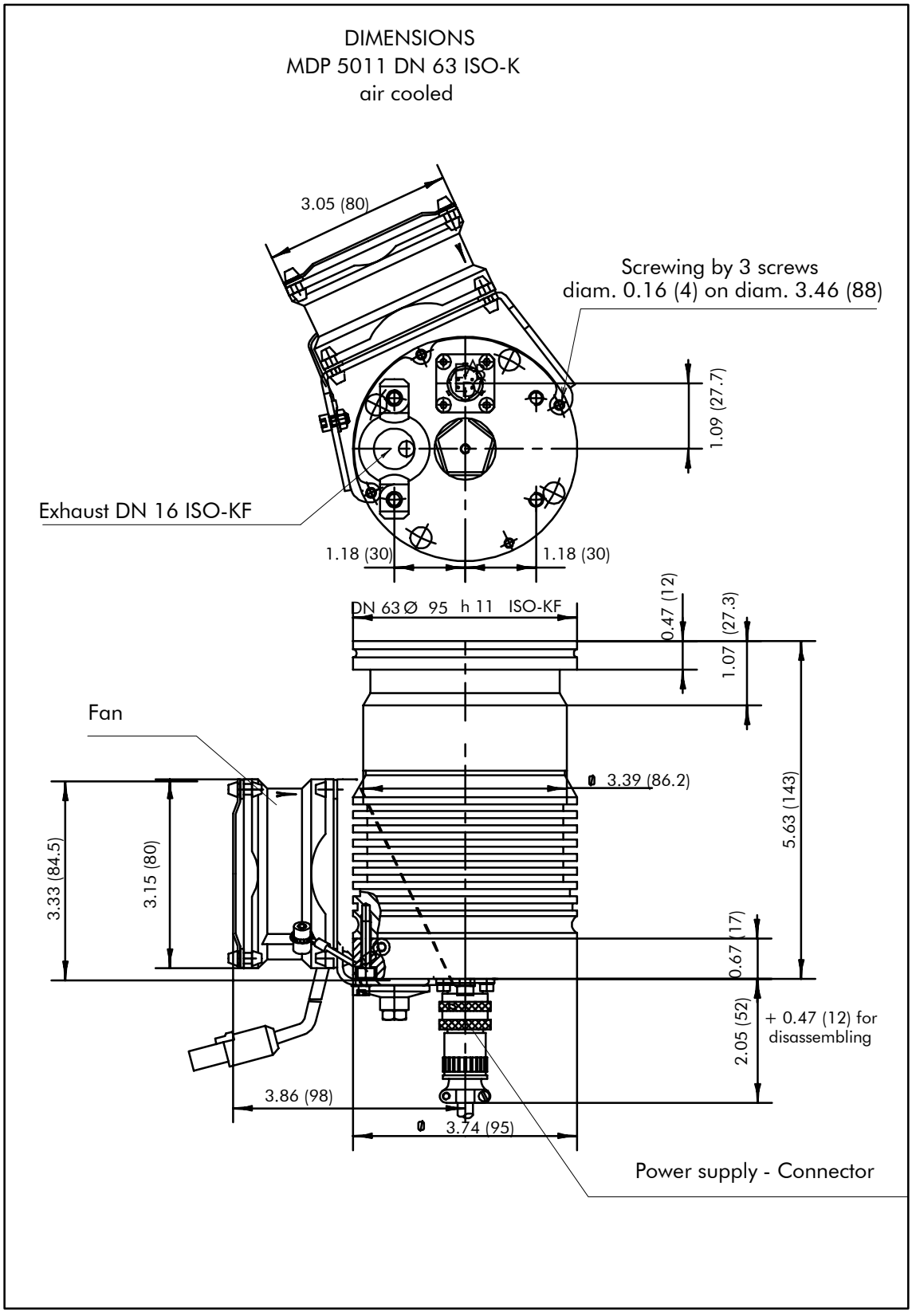
The fan provides sufficient cooling for ambient temperature up to 95 °F. If the ambient temperature is above 95 °F, the user should install a water cooling collar.

It is recommended for use at ambient temperature between 95 and 132 ° F, or in continuous use at high pressure.

Edition 01 Sep 2004

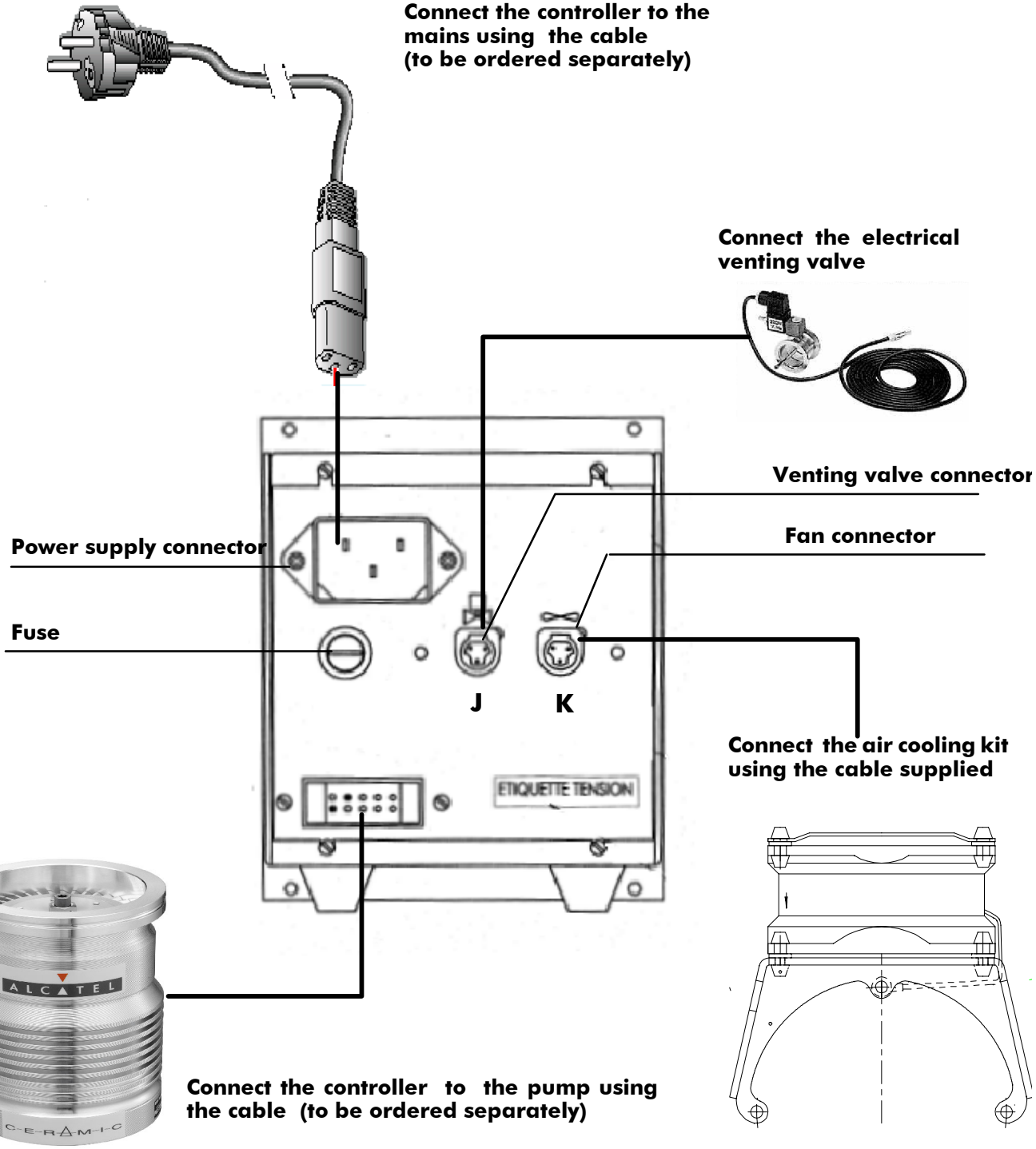
Gb 02605

Air cooling kit connection



Edition 01 - Sep 2004
GB 02605

ACT 100 electrical connections



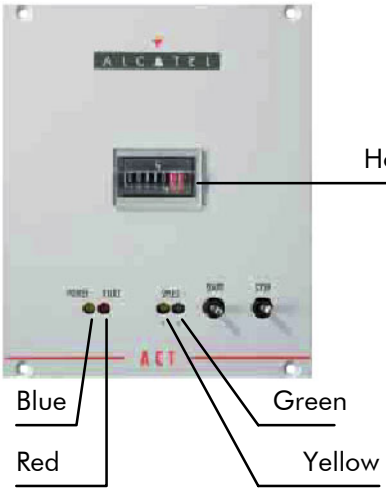
Edition 01 - -Sep 2004

gb 02606

Functions of ACT 100 controller

USING IN LOCAL MODE

"Start / Stop" functions are made using switches located on the front panel of the ACT100 controller.



The hour counter records pump operating time, from 0 to 100.000 hours.

The monitoring of the pump is possible with three indicator lights (green, yellow, red) which indicate the pump status
(light ON = 1; Light OFF = 0).

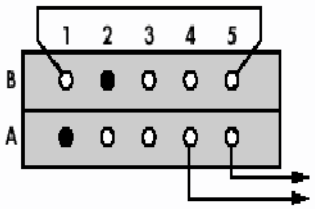
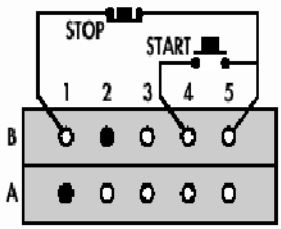
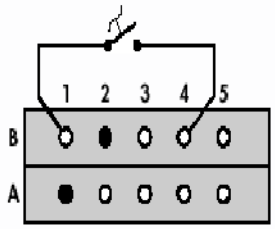
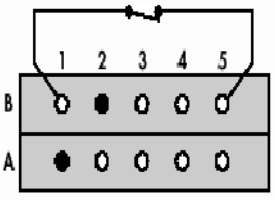
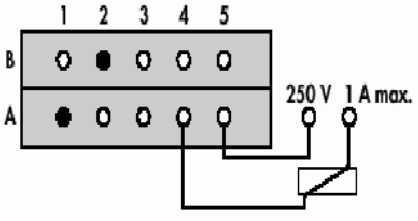
DETECTION OF ROTATION		Action on button		Pump motor powered	Pump rotation speed *	Leds		
		START	STOP			Yellow	Green	Red
1	Before starting	0	0	NO	0	o	o	o
2	Starting	1	0	YES	< 27000	☼	o	o
3	Pump at nominal speed	0	0	YES	= 27000	o	☼	o
4	Incident** Over heating due to pump or controller	0	0	NO	↘ 0	☼	o	☼
5	Over current	0	0	YES	< 27000	☼	o	o
6	Pumping stop	0	1	NO	↘ 0	o	o	o

* Pumping rotation speed in rpm.
** During the pump or controllercooling, the cycles 2,3 (or 5) will be happened again periodically until the user remedies the overheating.

Edition 01 - - Sep 2004
GB 02607

REMOTE CONTROL MODE

Depending on power supply cable connector wiring, the pump Start/Stop and an external safety can be remotely controlled.

REMOTE CONTROL	Description	connector wiring *
Without remote control Outer safeties	Standard wiring. **A4-A5** : output by contact ON/OFF	
Pump Start/Stop **remote control** (by impulse contacts)	Buttons command. The buttons of the front panel are operational.	
Pump Start/Stop **remote control** (by maintained contact)	Interrupter command. Closed contact: pump starts Opened contact: pump stops	
Outer safety switch wiring	Opened contact: pump stops No indication by the red led.	
Outer control	A4-A5 pins allows to switch 250 V - 1 A max.	

* soldering side view;
B2 and A1 in black are female pins, others are male pins.

Edition 01 - Sep 2004
GB 02607

FAULT MONITORING

The faults are indicated by the red light indicator which signals:
- controller temperature increasing;
- pump temperature increasing;
- incorrect connection between pump and controller.

When the fault light is “ON“, the motor is not supplied and the pump doesn’t run.

GB 02607 Edition 01 - Sep 2004

C 10
Molecular pump operation in a pumping application

FIRST PUMP START-UP

When the pump is new, or after a prolonged shut-down of 3 months or more (under normal storage conditions), it is recommended to operate the pump at atmospheric pressure for 10 minutes (inlet and exhaust open to atmosphere) in order to ensure a slow rotation and grease re-distribution in the pump ball-bearings.



WARNING

The access to the rotor of a molecular pump with an unconnected inlet is dangerous.

SAFETY INSTRUCTION FOR USE



WARNING

The pumps are designed so as not to present a thermal risk for the user's safety. However, specific operating conditions can generate temperatures which require particular care to be taken by the user (external surfaces >70 °C).



WARNING

Avoid moving or causing a shock on a pump in operation. There is a risk of seizure if the pump rotates in an axis perpendicular to its axis of rotation.

Edition 01 - - Sep 2004

Gb 02608

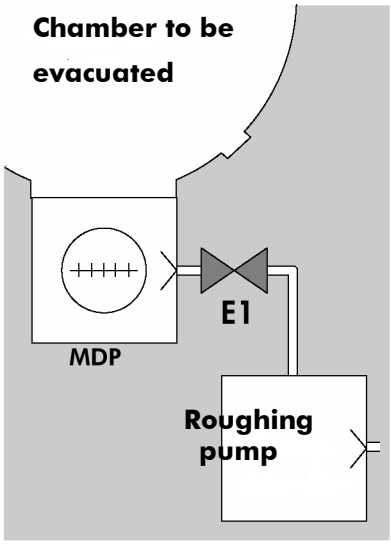
Molecular pump operation in a pumping application

EXAMPLE OF A SINGLE VALVE ASSEMBLY

The chamber and pipes are at atmospheric pressure, the pumps are switched off, the valves are closed

Start-up:
- start up the MDP cooling system
- open the E1 valve
- start up the primary pump
- start up the MDP pump.

Stop:
- close E1
- stop the primary pump
- stop the MDP pump
- stop the cooling system.

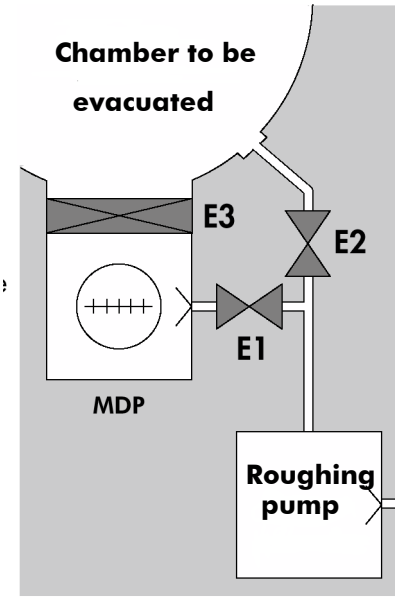


EXAMPLE OF A 3 VALVE ASSEMBLY (EXAMPLE 1)

The chamber and pipes are at atmospheric pressure, the pumps are off, the valves are closed.

Preevacuation of the chamber:
- start up the primary pump
- start up the MDP cooling system
- open the E2 valve.

When the pressure in the chamber is ≤1mbar, the secondary pumping can be started up:
- close E2
- start up the MDP pump
- open E1 and E3.



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Gb 02608

Molecular pump operation in a pumping application

EXAMPLE OF A 3 VALVE ASSEMBLY (EXAMPLE 2)

The chamber is at atmospheric pressure, the pumps are operating, the valves E2 and E3 are closed, the cooling circuit is operating.

Preevacuation of the chamber:
- close E1 and open E2.

The pressure in the chamber is ≤ 1mbar :
- close E2
- open E1 and E3.

TO REFILL THE CHAMBER WITH AIR

Close the E3 valve (E1 remains open) and open an air inlet on the chamber.

TO STOP PUMPING

Pumps are isolated by closing the valves.
- close the E3 valve

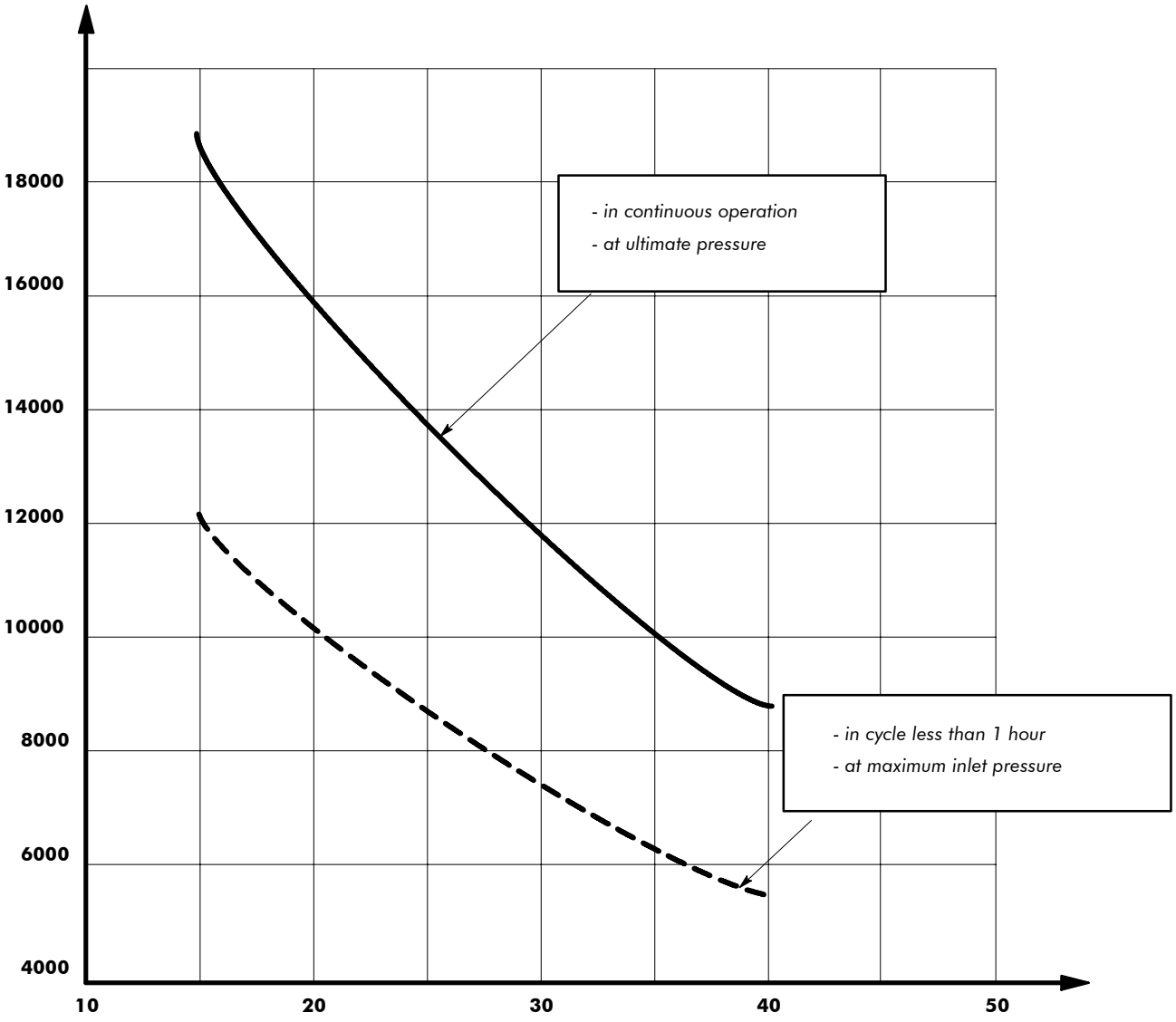
MDP pump and primary pump rotating
- stop the MDP pump
- close the E1 valve
- stop the primary pump.
- stop the cooling circuit.

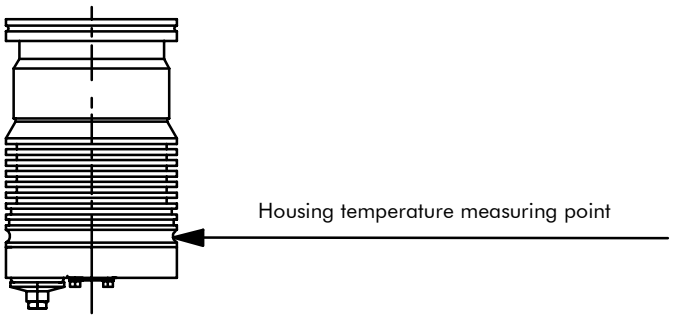
GB 02608 Edition 01 - - Sep 2004

MDP 5011 pump maintenance frequency

Example : for use at 20 °C housing temperature, in continuous operation, at ultimate pressure :
- **16000 h :** 1st lubrication
- **32000 h :** 2nd lubrication
- **48000 h :** disassemble the MDP, replace the ball bearings.

Relubrication schedule (hours)





GB 02609 Edition 01 - - Sep 2004

E 10
Precautions before maintenance



WARNING

It is important to isolate the machine from the electrical power supply source before any intervention inside the equipment (for maintenance reasons).

Before any maintenance operation, Check the pumping conditions of the installation: toxicity, possible corrosion of the pumped gases. Depending on the case, we recommend:

- to purge the pumping installation with dry nitrogen before any intervention

- to wear gloves, goggles and breathing masks, if necessary

- to ventilate the room well and disassemble the equipment under a fume hood.

After a complete maintenance operation, it is recommended to perform a helium airtightness test.

Similarly, follow all the safety instructions concerning start-up.

Edition 01 - Sep 2004

GB 02610

E 20

MDP 5011 pump lubrication

The first lubrication required for the correct operation of MDP pumps is performed in the factory. Subsequent lubrications should be performed according to the procedure below and according to a frequency defined as a function of processes used (see section D10).

Only use the grease recommended by the manufacturer and contained in the lubrication syringe (see section F10).



WARNING

Avoid introducing foreign matter into the pump during these operations. Lubrication must be performed with the pump switched off.

Use of the lubrication syringe

The ATH contains two bearings which must both be reloaded with grease at each relubrication period.

The syringe is equipped with two jumpers with different widths and colours (red and black) **used to proportion the grease accurately for each pump bearing** (see figure page 2/3).

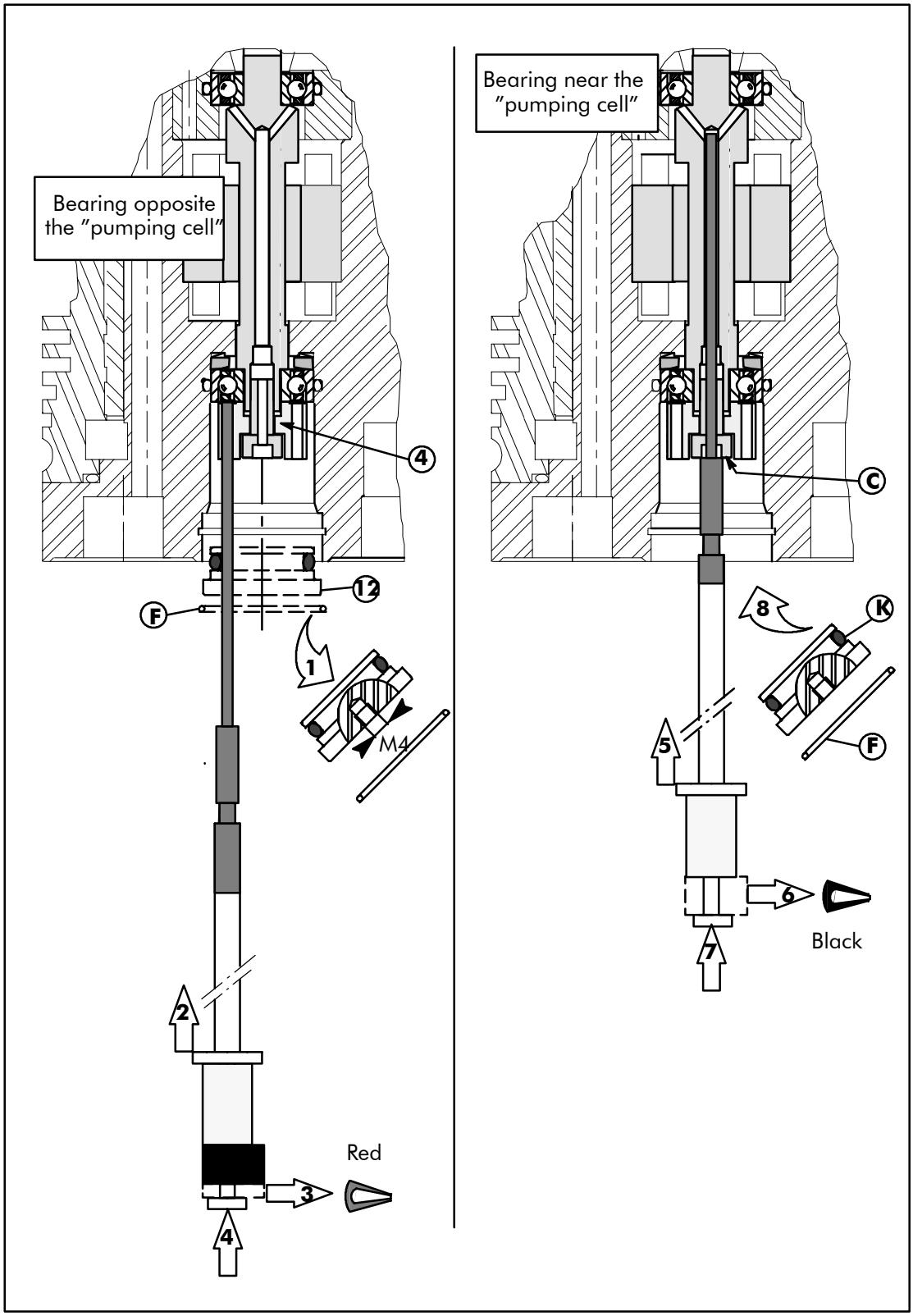
- Lubrication of bearing on the pumping cell side: **black jumper.**
- Lubrication of bearing opposite the pumping cell side: **red jumper.**

Edition 01 - Sep 2004

GB 02611

MDP 5011 pump lubrication

RELUBRICATION PROCESS



Edition 01 - Sep 2004
GB 02611

MDP 5011 pump lubrication

BEARING LUBRICATION

- Stop the MDP pump and the primary pump.
- Vent the MDP pump to atmospheric pressure.
- Remove the lock pin (F).
- Tighten a screw M4 in the thread of the end cap (12) and remove it.

Bearing opposite the pumping cell

- Introduce the syringe equipped with its needle into a hole of the ring (4) and remove the red jumper.
- Distribute the dose of grease in 2 diametrically opposed points, until the syringe plunger comes to a stop against the black jumper.

Bearing on pumping cell side

- Introduce the lubrication syringe needle into the drilled screw located at the center of the rotor until it comes to a stop against the screw head.
- Keep the syringe pressed down to the bottom of its housing throughout the operation.
- Remove the black jumper from the syringe and introduce the grease until the plunger comes to a stop.
- Remove the syringe.
- Reassemble the end cap (12) and the lock pin (F) .

The relubrication operation is complete.

Execute the pump running-in (See section E 30).

Edition 01 - Sep 2004

Gb 02611

MPD 5011 running-in using ACT 100 controller

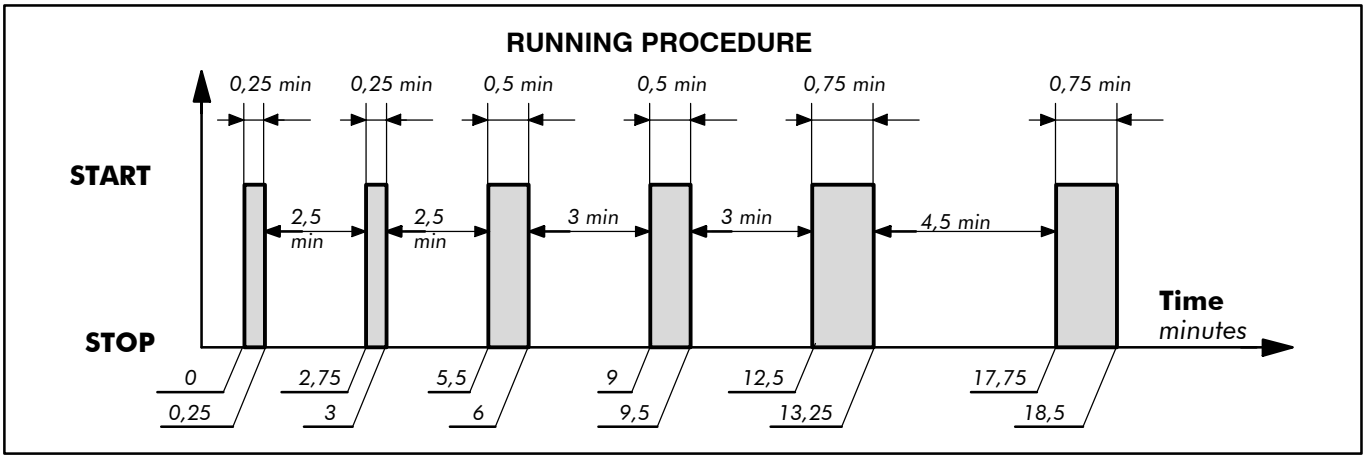
Start the MDP to atmospheric pressure for 6 min. as follows .

Disconnect the primary pump from MDP (vacuum connection).

at time t = 0, press "start" button
at time t = 3 min, press "stop" button
1st cycle

at time t = 6 min, press "start" button
at time t = 9 min, press "stop" button
2nd cycle

Complete the running-in with the following cycles, after first having connected and started up the primary pump :



Edition 01 - - Sep 2004
GB 02612

Spare parts - Instructions of use

REPLACEMENT OF PARTS AND USE OF NON GENUINE PARTS

Our products are designed to comply with current EC regulations and guarantee optimal operating conditions with maximum safety conditions for the user.

Any modification of the product made by the user is liable to lead to non-compliance with the regulations, or even to put into doubt the performance of the product and the user's safety.

Replacement of defective components by other parts than genuine parts, and use of these parts, jeopardize the initial safety conditions of the equipment.

In such case, the EC declaration of conformity becomes null : AVTF withdraws his responsability for such operations.

Besides, counterfeiting and unfair trading of parts are condemned under the civil and criminal laws.

AVTF urges users not to take parts in the use of "imitations", in the misappropriation and pirating of intellectual property performed by some dishonest operators.

AVTF supplies maintenance components, spare parts or kits to perform the maintenance of its products (**see chapter F**).

GB 01390 Edition 01 - January 02

Spare parts for first level of maintenance

LUBRICATION SYRINGE

Ready-to-use, it contains the grease load required for a regreasing operation on the 2 bearings.



P/N : 056993

FUSES FOR ACT 100 CONTROLLER

Description	Quantity	P/N
Fuse 5 x 20 1 A T	1	**083473**
Fuse 5 X 20 0.5 A T	1	**060519**

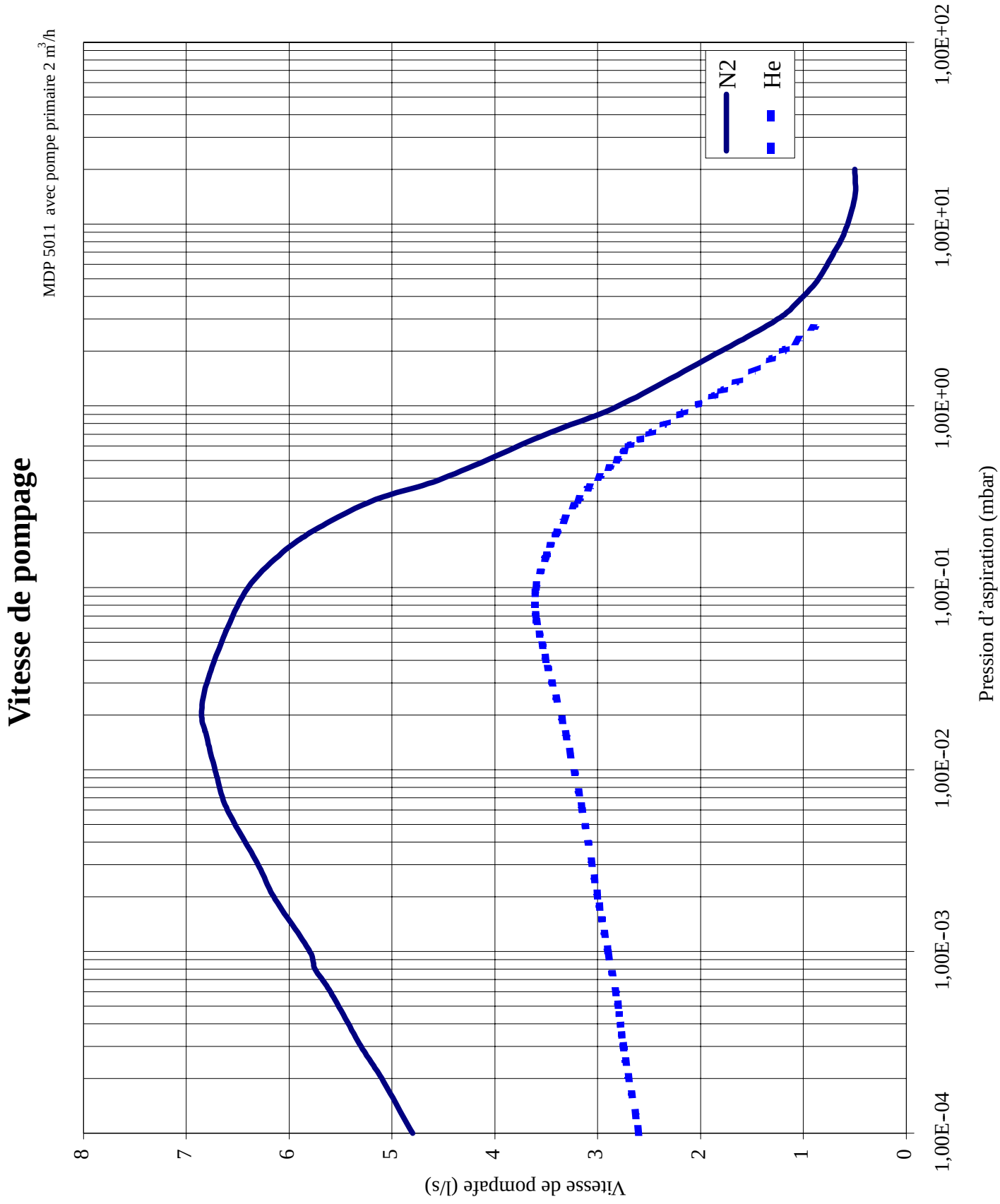
AIR INLET ELECTROVALVES ACCESSORIES

Description	P/N
Electrovalve coil 240 V 50/60 Hz	**038124**
Electrovalve coil 220 V 50 Hz	**038121**
Electrovalve coil 200 V 50/60 Hz	**038125**
Electrovalve coil 115 V 60 Hz	**038122**
Electrovalve coil 100 V 50/60 Hz	**038126**
Electrovalve operator	**038102**
Silencer	**075990**

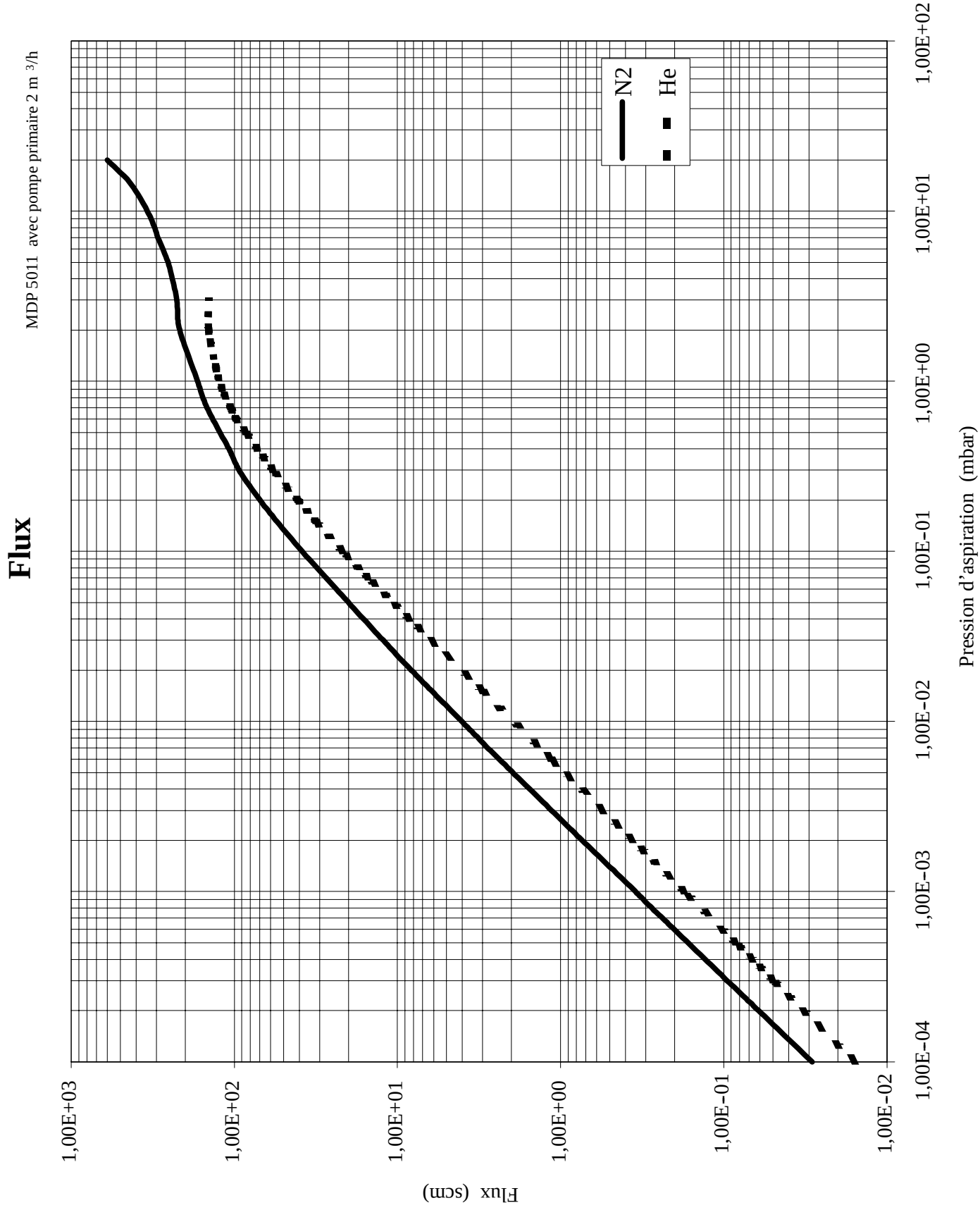
Edition 01 - Sep 2004

Gb 02613

Courbes de pompage



Courbes de pompage



F 02623

Edition 01 - Sep 2004

Safety questionnaire

Procedure for returning ALCATEL vacuum pumps and helium leak detectors

You wish to return an Alcatel vacuum pump or helium leak detector for maintenance. The equipment will be dismantled and possibly cleaned by a technican from our Service Centre.
In order to ensure the effective safety of our staff and protection of the environment, we need to know the types of gas or substances with which the pump or leak detector has been used.
This will enable us to take the appropriate safety measures.

The following page contains a questionnaire that you can use for this purpose. This procedure complies with the European Community's L360 directives and articles L231 and R231 of the French Labour Code.

We wish to draw your attention to the following points:

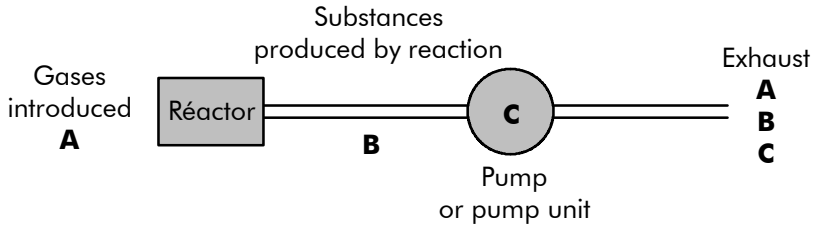
- **The risk may be of the following nature:**

  Chemical: Danger to health, risks of explosion, fire, risks for the environment. Please indicate the chemical formula and name of the gases or substances that have been in contact with the equipment (pump or helium detector).

  Biological: Pathogenic germs, micro-organisms (bacteria, viruses, etc.) classes 1 to 4 and group E. We are currently unable to deal with contamination of this sort without risk to the safery of our staff. If your equipment has been contaminated in this way, contact us so that we can try to find a solution together.

  Radioactive: Contact us in this case.

ATTENTION **In the event of chemical contamination, please indicate the following gases or substances:**



- Gases (or substances) introduced into the reactor and which may be found at the exhaust (A).
- Gases (or substances) resulting from the reaction or process (B).
- Gases (or substances) that may possibly be formed inside the pump (due to a thermodynamic or chemical reaction, condensation, deposition, precipitation, etc.) (C).

- **Precautions need to be taken** before transferring contaminated pumps.
  Please contact customer service for recommendations.

Edition 02 - Nov 03
GB 00893

Safety questionnaire

Procédure de retour des pompes à Vide et Détecteur de Fuite à Hélium ALCATEL
Procedure for returning ALCATEL Vaccum Pumps and Helium Leak Detectors

(Ce formulaire ne peut être rempli et signé que par une personne habilitée)
(This questionnaire is only to be filled in and signed by an authorized person)

SOCIETE - COMPANY	**EQUIPEMENT - EQUIPEMENT**
Nom Société – Name of company :	Description : . . . . .
Nom personne – Name of person :	
(Qui rempli ce formulaire) – (Wha has filed in questionnaire)	
Fonction – Position :	N° de Série – Serial no : . . . . .
N° Tél. – Tel. no :	Type de procédé – type of process : . . . . .
N° Fax – fax no:	(Pour lequel léquipement est utilisé) – (for which equipement is used)
(Pour renseignements éventuels sur les produits utilisés) – (for any information on products used)	Date de l'expédition – Date of consignment : . . . . .

INTERVENTION - SERVICE

Intervention souhaitée (Révision, réparation,...) – Service required (overhaul, repair, etc.) :
Type d'anomalie constatée – Type of anomaly observed :

PROCEDE CUIVRE - COPPER PROCESS

Produit utilisé sur un procédé Cuivre - Product used on a Copper process Oui - Yes Non - no
Si "Oui" emballage étanche et étiquette spécifique sont requis - If "Yes", sealed package and specific label are required

ASPECT SECURITE – SAFETY ASPECT

L'équipement mentionné ci-dessus a été en contact avec les produits suivants – The above equipment has been in contact with the following substances :
(nom et formule chimique) – name and chemical formulo)

Ces produits présentent un risque de nature
These susbstances present the following risks

			Explication détaillée – Detailed explanation
Chimique – Chemical			Si "Oui" risque de nature – If "Yes", what type of risk
Toxique – Toxic	Oui – Yes	Non – No	
Carcinogénique - Carcinogenic	Oui – Yes	Non – No	
Combustible - Combustible	Oui – Yes	Non – No	
Corrosive - Corrosive	Oui – Yes	Non – No	
Explosive - Explosive	Oui – Yes	Non – No	
Biologique – Biological	Oui – Yes	Non – No	
Radioactive – Radioactive	Oui – Yes	Non – No	
Autre – Other			
(Vous reporter éventuellement à la page précédente) – (See preceding page if necessary)			

SIGNATURE

Vous avez répondu "Oui" à une des questions précédentes :
Je confirme que seules les substances précisées ont été en contact avec l'équipement sus-mentionné, et que les procédures de préparation, d'emballage, et de transport ont été respectées.

You have replied "yes" to one of the above questions:
I confirm that only the substances mentioned have been in contact with the above equipment and that the preparation, packing and transport procedures have been complied with.

Je confirme que le matériel sus-mentionné n'a été en contact avec aucune substance dangereuse, et a été vidé de son huile. (Si applicable)

I confirm that the above equipment has not been in contact with any dangerous substance and has been emptied of oil. (if applicable)

Réponse "Oui" (nécessite une protection) Reply "Yes" (requires protection)	Réponse "Non" (sans risque) Reply "No" (no risk)
Nom - Name :	Nom - Name : . . . . .
Fonction - Position :	Fonction - Position : . . . . .
Date :	Date : . . . . .
Signature autorisée – Authorised signature :	Signature autorisée – Authorised signature :
Tampon / Cachet Stamp / Seal	Tampon / Cachet Stamp / Seal

ALCATEL Vacuum Technology France – 98, avenue de Brogny – B.P. 2069 – 74009 ANNECY CEDEX
Tél. (33) 4 50 65 77 85 - Fax (33) 4 50 67 23 34

Edition 02 - Nov 03
GB 0893

ALCATEL

DECLARATION OF CONFORMITY

We, Alcatel Vacuum Technology France,
98, Avenue de Brogny, BP 2069
74009 ANNECY FRANCE

ISO 9001 CERTIFIED

declare under our sole responsibility that the following products

MDP 5011 / MDP 5011 CP both with ACT 100

to which this declaration relates are in conformity with the following European Directives

73 / 023 / EEC	Low Voltage Directive
89 / 392/ EEC	Machinery Directive
89 / 336 / EEC	Electromagnetic Compatibility Directive

The standards, normative documents, and/or specifications to which the products comply are :

NF EN 60204-1	Safety of machinery / Electrical equipment of machinery
NF EN 292-1	Safety of machinery / Basics
NF EN 292-2	Safety of machinery / General principles for design
IEC 34 PARTIE 1, 5, 11	General requirements for rotating Electrical Machines
NF EN 55011 Lim B	EMC / Limits for electromagnetical conducted and radiated interferences
NF EN 61000-4-2	EMC / Immunity to electrostatic discharges
NF EN 61000-4-4	EMC / Immunity to transient burst
CEI 801-3	EMC / Immunity to radiated electromagnetic field

Mr J.Y. GUEGAN, Président Directeur Général — Made in Annecy, 08/09/04

LANGUE : ANGLAIS

SAFETY INSTRUCTIONS CONCERNING PRODUCT INSTALLATION, OPERATION AND MAINTENANCE

Our ALCATEL products are designed and tested to provide maximum safety.However, in order to obtain the best level of safety, the following must be observed:
. - the user manual during product transport, installation, operation and maintenance.
- the safety instructions below.

Our products are designed to comply with current EEC regulations. **Any modification of the product made by the user**. is liable to lead to non-compliance with the regulations, or even to put into doubt the EMC (electromagnetic compatibility) performance and the safety of the product. ALCATEL declines any responsibility for such operations.

- Before any maintenance operations on a product performed by a maintenance technician who has not received safety training (EMC, electrical safety, chemical pollution, etc.), isolate the product from the various energy sources (electricity, compressed air, etc.).
- The EMC performance of the product is obtained on the condition that the installation complies with EMC rules. In particular, in disturbed environments, **it is essential** to:
  - use shielded cables and connections for interfaces,
  - stabilise the power supply line with meshing from the power supply source to a distance of 3 m from the product inlet.
- Units containing control circuits are designed to guarantee normal safety conditions taking into account their usual operating environment (use in cabinet). In specific cases of use on a table, take care not to insert objects in the ventilation louvers when handling units.
- Certain machines can be configured for automatic restart-up after a power failure. In this case, it is the responsibility of the user to take all the measures required to prevent risks resulting from this type of operation.
- When units containing control circuits are equipped with dry contact outputs, it is the responsibility of the customer to use these outputs in compliance with safety standards.
- When switching off an item of equipment containing capacitors loaded with over 60 VDC or 25 VAC, take precautions at the access to the connector pins (single-phase motors, fitting with mains filter, frequency converter, monitoring system, etc.)
- Equipment storage: our equipment can be stored without particular storage precautions (ambient temperature between 5 and 40°C) provided that the running-in procedure specified in the manual is observed for the first rotation of the pump.
- For all equipment handling, use the devices provided for this purpose (lifting rings, handle, etc.).
- Risk of tilting: Even when compliance with EEC safety rules is guaranteed (normal range ± 10°), it is recommended to take precautions as regards the risk of tilting during product handling, installation and operation.
- The performance and the operational safety of this product are guaranteed provided that it is used in normal operating conditions.
- The vacuum pump is also a compressor: incorrect use may be dangerous. Study the user manual before commissioning the pump.
- Remove the guards blocking the intake and exhaust (and, if applicable, purge) holes; these components prevent foreign bodies from entering the pump during transport and storage. **It is dangerous to leave them on the pump in operation.**
- The access to the rotor of a turbomolecular pump with an unconnected intake is dangerous. Similarly, if the pump is not powered, it can be driven by another pump in operation (danger due to rotating blades).
- Make sure that the parts or containments connected to the intake of our pumps withstand a negative pressure of 1 bar with reference to the atmospheric pressure.
- The attachment devices should be sufficiently rigid to prevent any risks in the event of a rupture of a rotary component or a violent shock on the pump (exceptional phenomena).
  For this, use all the attachment holes of the rotary flanges .
  If the intake flange is attached with grips, use:
  - at least 3 grips for secondary pump ≤ 150 l/s:
  - at least 6 grips for secondary pump ≥150 l/s.
- The machines are designed so as to prevent any thermal risk to the user's safety. However, specific operating conditions may generate temperatures justifying particular attention on the part of the user (external surfaces > 70°C).
- Product tightness is guaranteed upon leaving the factory for normal operating conditions. It is the responsibility of the user to ensure that the level of tightness is maintained when pumping dangerous gases.
- After a complete maintenance operation, it is recommended to perform a tightness test with helium.
- Avoid moving or causing an impact on a secondary pump in operation.
- A brutal rotation of the pump in an axis perpendicular to its axis of rotation can cause seizure of the pump

Before any maintenance operation, check the installation's pumping conditions: toxicity, corrosion, any radioactivity of the pumped gases. Depending on the case, we recommend:
- to purge the pumping installation with dry nitrogen before any intervention;
- to wear gloves, protective goggles and a breathing mask, if necessary;
- to air the room well and disassemble the equipment under a suction hood;
-not to discharge used oils and residues in the usual system and, if necessary, to have them destroyed by a competent organisation.

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