ACP Series

Pompes primaires sèches
Dry primary pumps
Trockenlaufende Vakuumpumpen

Manuel de l'Utilisateur
User's Manual
Benutzerhandbuch

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 for several years.
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.

CB 02834 - Edition 03 - June 05

User's manual
ACP series dry primary pumps

Welcome

Dear customer,

You have just purchased an Adixen dry primary pump. We would like to thank you and are proud to count among our customers.

This product benefits from Alcatel's many years of experience in producing vacuum products in many applications like Instrumentations, R & D, Semi-conductors process. In the last field, thousands of dry pumps, based on the ACP technology are currently running.

In order to guarantee performance and obtain full satisfaction from this equipment, we suggest that you study this manual, particularly chapter B devoted to installation and start-up, before installing or performing maintenance on your pump.

APPLICATIONS:

ACP 15, ACP 28 AND ACP 40 DRY PRIMARY PUMPS FOR «CLEAN» APPLICATIONS

- Instrumentation
- Research and Development
- Semi-conductors: Load lock - Transfer chamber

ACP 15 G, ACP 28 G, ACP 40 G DRY PRIMARY PUMPS FOR THE PUMPING OF CORROSIVE GAS TRACES.

FEATURES:

MULTI-STAGE ROOTS TECHNOLOGY
UNIVERSAL SINGLE PHASE ELECTRICAL SUPPLY
AIR COOLED

GB 00685 - Edition 08 - July 06

User's manual
ACP series dry primary pumps

This product complies with the requirements of European Directives, listed in the Declaration of Conformity contained in G100 of this manual. These Directives are amended by Directive 93/68/E.E.C (E.C. Marking).

GB 00685 - Edition 08 - July 06

MANUAL REFERENCE: **112369**
EDITION: **01 - July 2006**

General contents

ACP Series User's Manual

GB 03109 - Edition 01 - June 06

CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in property damage.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in moderate or minor injury. It may also be used to alert against unsafe practices.

MANUAL REFERENCE: **112369**
EDITION: **01 - July 2006**

General contents

ACP Series User's Manual

⚠ WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or severe injury.

⚠ DANGER

Indicates an imminently hazardous situation that, if not avoided, will result in death or severe injury (extreme situations).

GB 03109 - Edition 01 - June 06

A

Introduction

User's Manual ACP Series
Detailed contents

GB 03124 - Edition 01 - July 06

ACP Series dry primary pump overview

Superior technology

■ Type Multi-stage Roots primary pump
- frictionless technology
- reliability
- aluminium pump body

■ Dry and clean vacuum
- no particulate contamination
- residual gas spectrum free of traces of hydrocarbons

■ Sealed air-cooled motor
- permanent air cooling (built-in fan)
- safety: certified leaktight

■ Single-phase frequency converter
- multi-voltage, dual frequency 50/60 Hz

■ 2 pump models according to different applications
- standard version
- G version

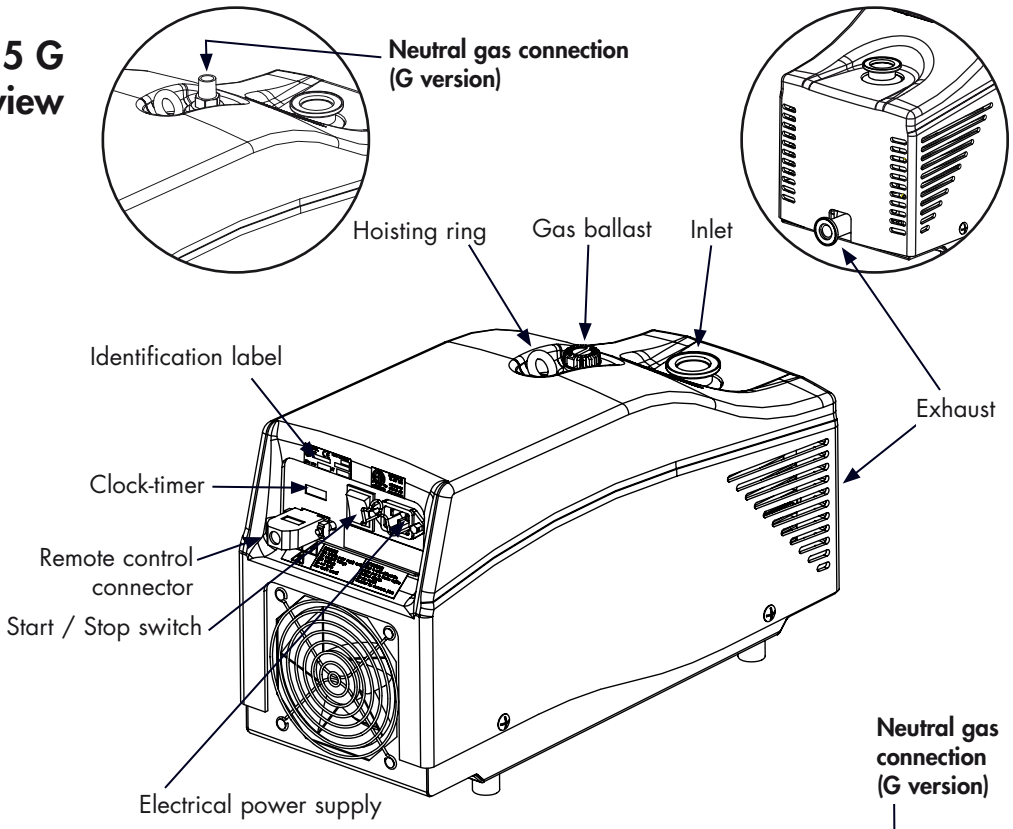
■ Thermal protection based on temperature sensors.

■ RS 485 Serial link.

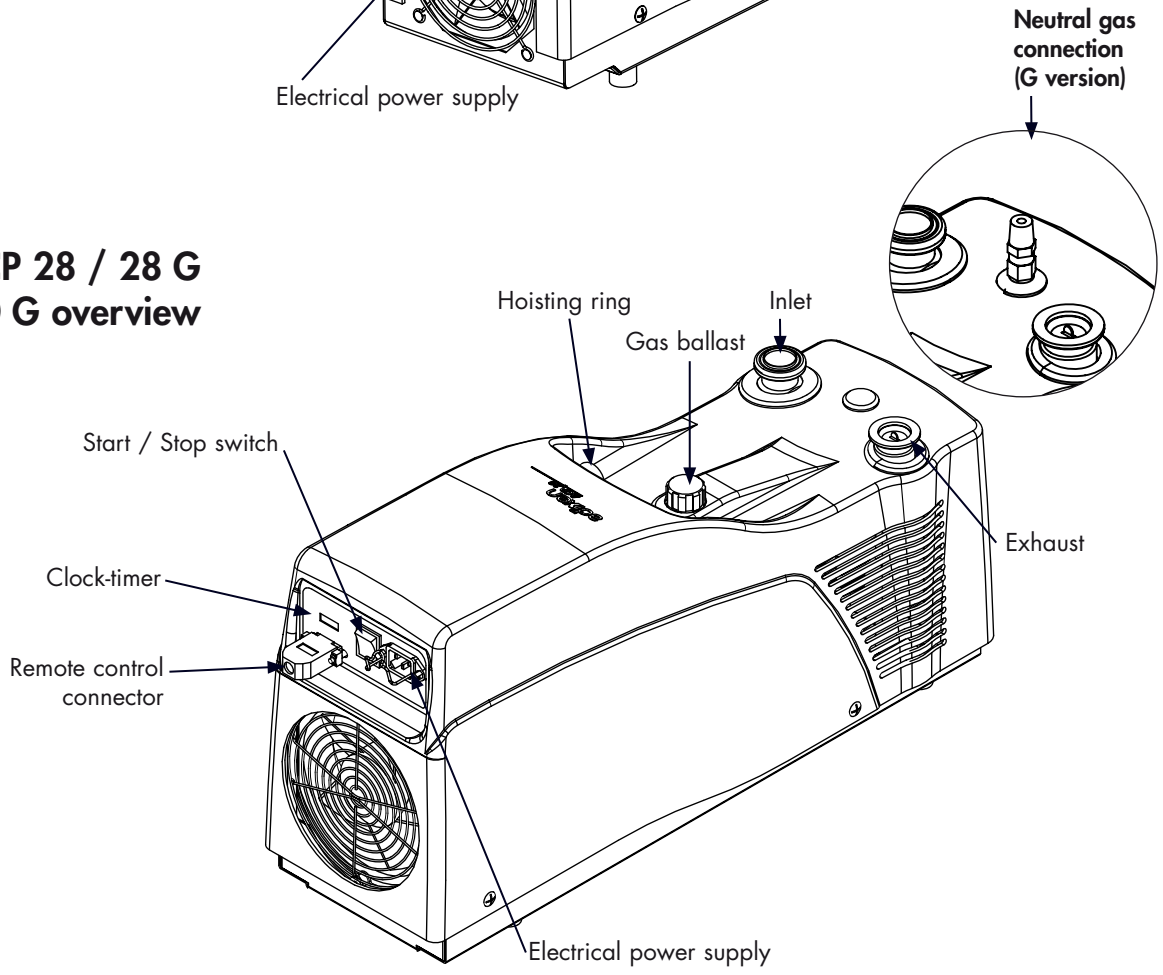
GB 03110 - Edition 01 - July 06

ACP Series dry primary pump overview

Model ACP 15 / 15 G overview



Model ACP 28 / 28 G / 40 / 40 G overview

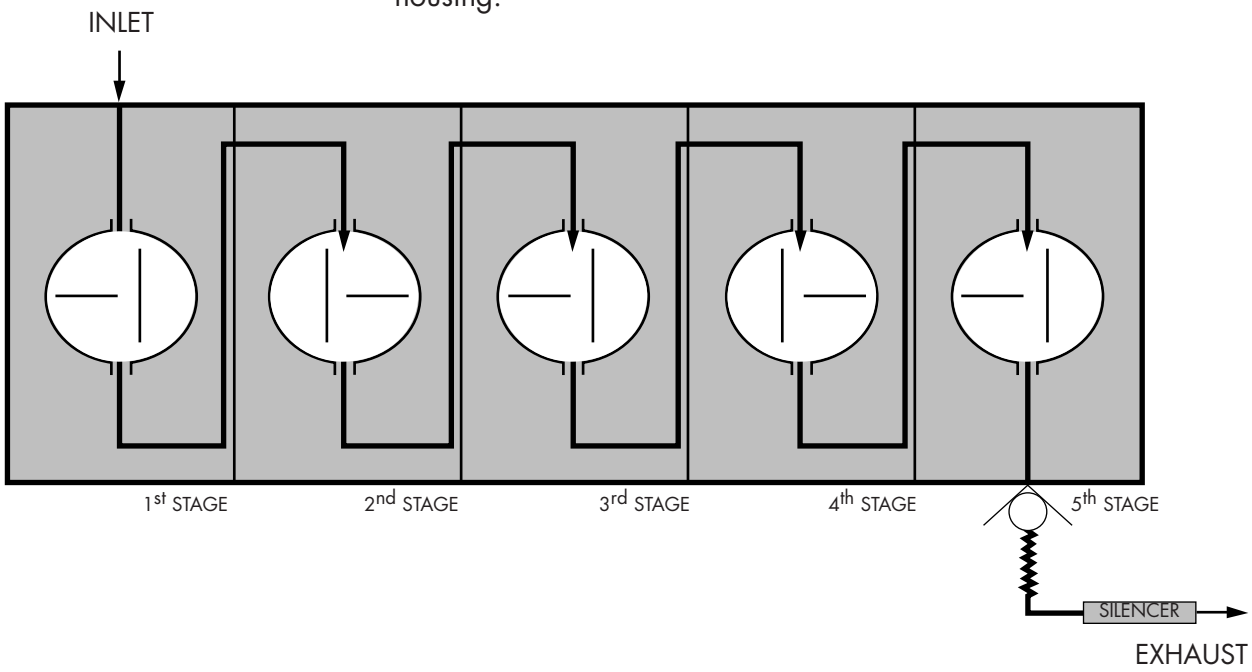


GB 03110 - Edition 01 - July 06

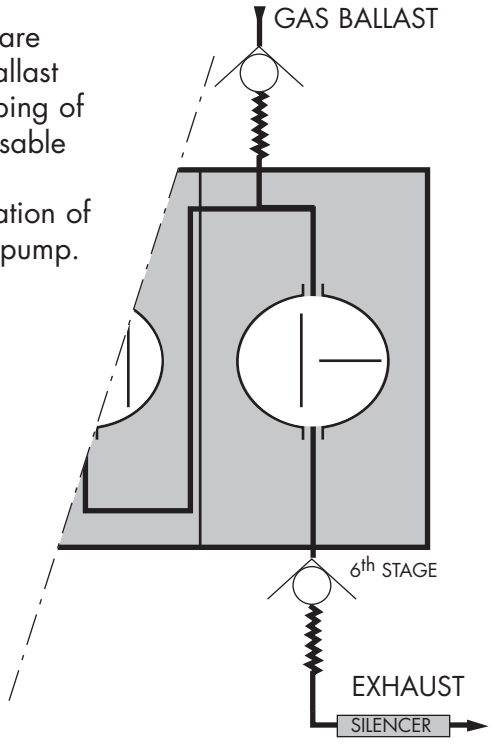
Operating principle

Multi-stage Roots principle

■ The ACP pumps are composed of 5 or 6 Roots type stages, connected in series.
■ No contact design. The rotors do not touch each other or the housing.



■ The standard pumps are equipped with a gas ballast device to improve pumping of light gases and condensable vapors.
Thus avoiding condensation of pumped gases into the pump.



GB 00689 - Edition 07 - July 06

Dry primary pump applications

Standard version for "clean vacuum" applications

The pump is designed for applications that require the pumping of clean (dust-free) and non-corrosive gases. Examples are:

■ Instrumentation:
- Gas analysis.
- Electronic microscope.
- X-ray spectrometer.
- Leak detection.
- Surface analyzer.

■ Research and Development

■ Semiconductor Fabrication:
- Load lock and transfer chamber pumping.
- Wafer back pumping.

G version for pumping of corrosive gas traces or condensable gas

G version pump is compatible with the pumping of corrosive **traces**. It is equipped with 3 gas purge circuits used to withstand gas traces, to protect the LP and HP ball bearings, and the pump thightness is reinforced. This pump model can be used in applications such as:
- Process monitoring.
- Load lock pumping.
- Transfer chamber pumping.
- Focused Ion Beams.

For corrosive gas pumping contact the manufacturer.

GB 00690 - Edition 06 - March 06

Technical characteristics - ACP 15 / ACP 15 G

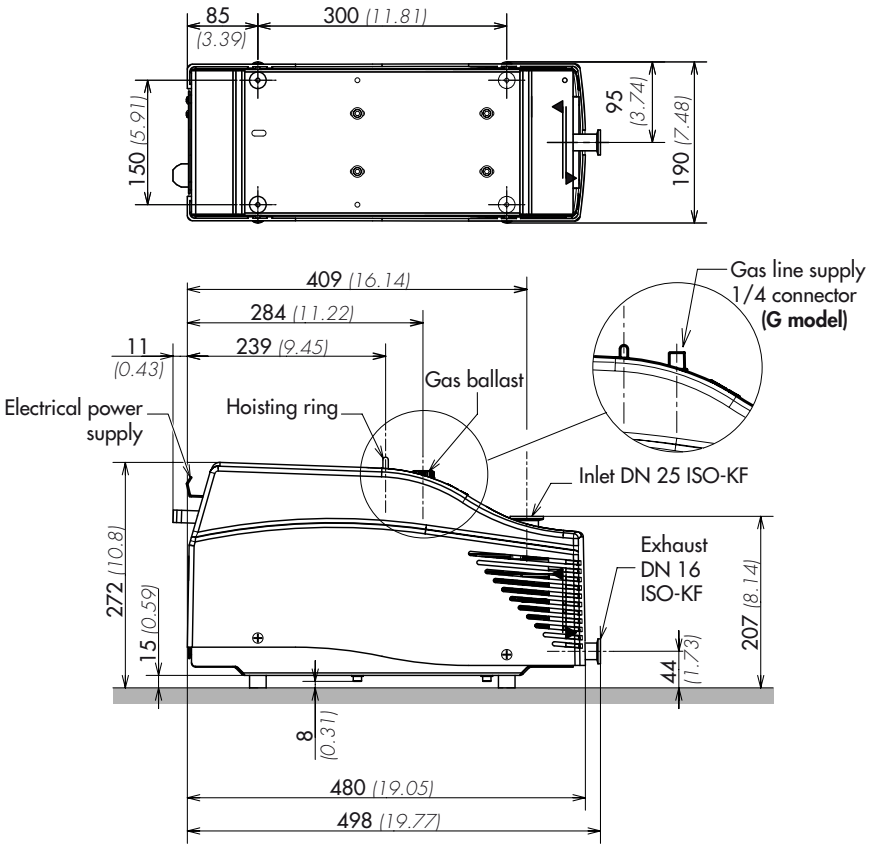
Specifications	Unit	ACP 15	ACP 15 G
Utilization		Indoor	
Functioning altitude	m (ft)	< 2000 (6561)	
Installation category		II	
Pollution degree		2	
Ultimate pressure[1] - gas ballast closed	mbar (Torr)	5×10^{-2} (3.8×10^{-2})	5×10^{-2} (3.8×10^{-2})
Ultimate pressure[1] - Standard model: with gas ballast opened - G model: with purge (300 mbar relative pressure)	mbar (Torr)	3×10^{-1} (2.25×10^{-1})	3×10^{-1} (2.25×10^{-1})
Peak pumping speed (rotation speed 6000 rpm)	m^3/h (cfm)	14 (8.2)	
Maximum pressure at inlet (absolute)	mbar (Torr)	1013 (760)	
Maximum exhaust pressure (absolute)	mbar (Torr)	1200 (900)	
Max. ambient operating temperature	°C (°F)	+ 40 (+ 104)	
Min. ambient operating temperature	°C (°F)	+ 12 (+ 54)	
Leakage current	mA	< 5	
Power consumption .....at ultimate pressure (gas ballast closed) .....at ultimate pressure (gas ballast opened) .....at atmospheric pressure	W	520 480 600	
Gas ballast flowrate	m^3/h	0.5	_
N_2 flowrate[2]	slm	_	5
Single phase power Automatic switch voltage (high or low)		110 / 230 V ± 10% - 50/60 Hz 10/15 A - 1150 VA	
Fan flow rate	m^3/h	180	
Inlet port		DN 25 ISO-KF	
Exhaust port		DN 16 ISO-KF	
Oil capacity[3]	cm^3	20	
Weight	Kg (lbs)	23 (50.7)	
Storage temperature	°C (°F)	mini -10 (14) / maxi 60 (140)	

(1) typical value

(2) relative nitrogen pressure 300 mbar

(3) oil charge has been introduced into oil casing at factory. Don't modify this oil level.

Dimensional drawing
mm (*inch*)



Technical characteristics - ACP 28 / 28 G / 40 / 40 G

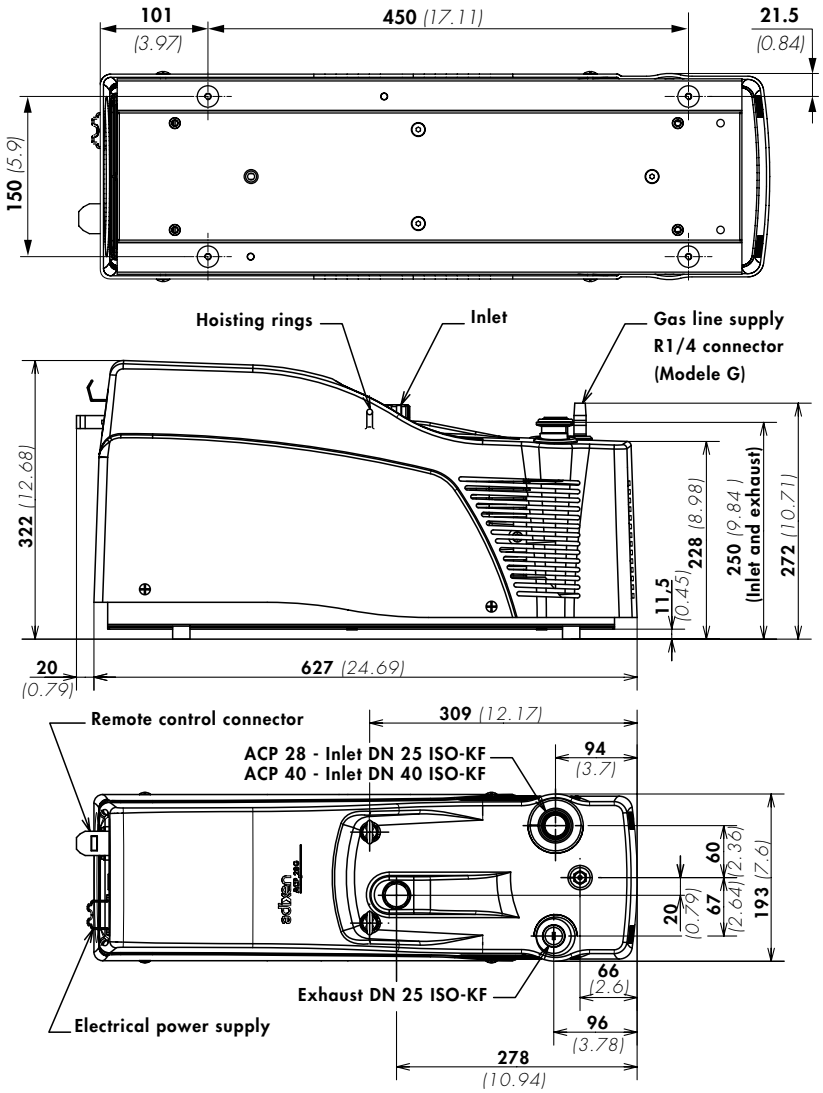
Specifications	Unit	ACP 28	ACP 28G	ACP 40	ACP 40G
Utilization		Indoor			
Functioning altitude	m (ft)	< 2000 (6561)			
Installation category		II			
Pollution degree		2			
Ultimate pressure[1] - gas ballast closed	mbar (Torr)	3 x 10^{-2} (2.25 x 10^{-2})		3 x 10^{-2} (2.25 x 10^{-2})	
Ultimate pressure[1] - Standard model : with gas ballast opened	mbar (Torr)	2 x 10^{-1} (1.5 x 10^{-1})	–	2 x 10^{-1} (1.5 x 10^{-1})	–
- G model : with purge (300 mbar relative pressure)	mbar (Torr)		1x10^{-1} (0.75x10^{-1})		1x10^{-1} (0.75x10^{-1})
Peak pumping speed (rotation speed 4800 rpm)	m^3/h (cfm)	27 (16)	–	37 (22)	–
Maximum pressure at inlet (absolute)	mbar (Torr)	1013 (760)			
Maximale exhaust pressure (absolute)	mbar (Torr)	1200 (900)			
Max. ambient operating temperature	°C (°F)	+ 40 (+ 104)			
Min. ambient operating temperature	°C (°F)	+ 12 (+ 54)			
Leakage current	mA	< 5			
Power consumption .....at ultimate pressure (gas ballast closed) .....at atmospheric pressure	W	700 1000			
Gas ballast flowrate	m^3/h	1.2	_	1.2	_
N2 flowrate[2]	slm	_	1.65	_	1.65
Single phase power Automatic switch voltage (high or low)		110 / 230 V ± 10% - 50/60 Hz 10/15 A - 1150 VA			
Fan flowrate	m^3/h	410			
Inlet port		DN 25 ISO-KF		DN 40 ISO-KF	
Exhaust port		DN 25 ISO-KF			
Oil capacity[3]	cm^3	25			
Weight	Kg (lbs)	30 (66)		32 (70.5)	
Storage temperature	°C (°F)	mini -10 (14) / maxi 60 (140)			

(1) typical value.

(2) relative nitrogen pressure 300 mbar.

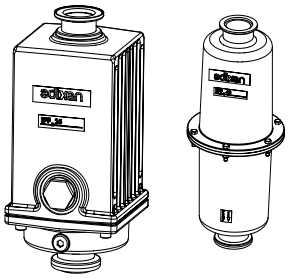
(3) oil charge has been introduced into oil casing at factory. Don't modify this oil level.

Dimensional drawing mm (inch)



Accessories

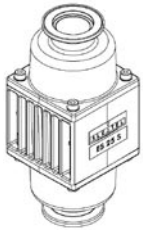
Inlet filter



The inlet filter is installed on the pump inlet and collects particles with a diameter greater than 25 microns (vacuum packing, metallurgy, lamp manufacture, evaporation, etc.).

Model	Part number
IPF 25 (for ACP 15/28)	**111 649**
IPF 40 (for ACP 40)	**111 647**

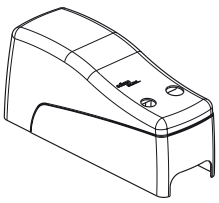
Exhaust silencer



In order to reduce noise level at the exhaust when the pump is operated at high pressures.

Model	Part number
Silencer ES25S	**109 873**

Sound inclosure



In order to reduce significantly noise level (- 5 dBA) in maximum ambiant temperature of 35 °C.

Model	Part number
NRC 28-40 for ACP28/ACP40	**112 637**
NRC15 for pump ACP 15	**111 968**
Sound enclosure (-10 dBA) for ACP 15	**112 779**

Frequency converter interface plug

In order to recover the information «pump at speed» (**B40)**

Model	Part number
Frequency converter interface plug	**112 581**

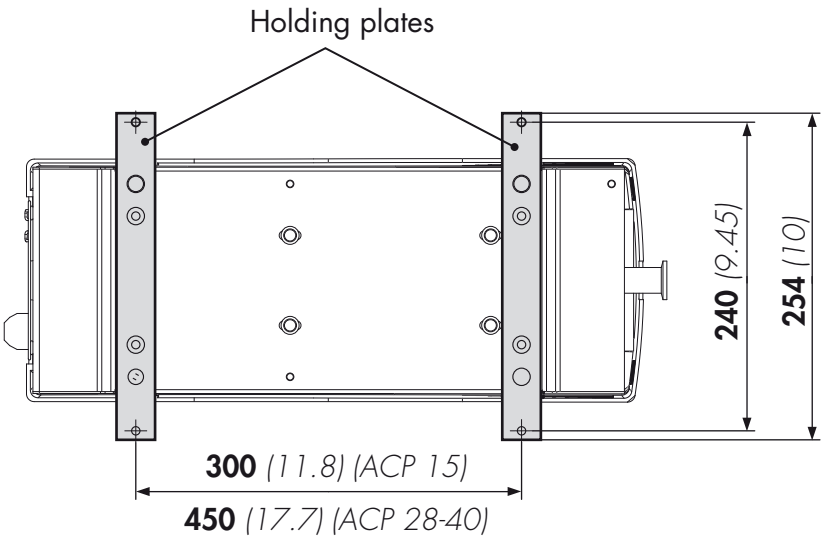
GB 03112 - Edition 01 - June 06

Accessories

Pump holding device

It includes holding plates to fasten to the pump body on the equipment (M6 screw customer supplied).

Model	Part number
Pump holding device	**112 846**



Dimensions mm/(inch)

GB 03112 - Edition 01 - June 06

B

Installation

User's Manual ACP Series

Detailed contents

GB 03119 - Edition 01 - July 06

Safety instructions

CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in property damage.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in moderate or minor injury. It may also be used to alert against unsafe practices.

⚠ WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or severe injury.

⚠ DANGER

Indicates an imminently hazardous situation that, if not avoided, will result in death or severe injury (extreme situations).

Before switching on the pump, the user should study the manual and follow the safety instructions listed in this manual.

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.

Make sure that the equipment has not been damaged during the transport. It it has been damaged, take the necessary steps with the carrier and inform the manufacturer if necessary. In all cases, we recommend that you keep the packaging (reprocessing material) to transport the equipment or for prolonged storage.

Installation - Start up

⚠ CAUTION

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 these regulations, or reduce the EMC (electromagnetic compatibility) performance and the safety of the product. The manufacturer declines any responsibility for such operations.

GB 00224 - Edition 04 - July 06

Safety instructions

Installation - Start up (ctd)

⚠ WARNING

Before performing any maintenance operations on the product, isolate the product from the various energy sources (electricity, compressed air, etc).

⚠ CAUTION

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,
- stabilize the power supply line with shielding from the power supply source to a distance of 3 m from the product inlet.

⚠ WARNING

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 line filter, frequency converter, monitoring unit, etc.). Wait 1 minute after pump switch off before operating on the product.

⚠ WARNING

Risk of tilting over: although compliance with EEC safety regulations is guaranted (normal range ± 10°), it is recommended to take precautions against the risk of tilting over during handling, installation and operation.

⚠ CAUTION

The performance and the operational safety of this product are guaranteed provided that it is used in normal operating conditions.

⚠ WARNING

The vacuum pump is also a compressor: incorrect use may be dangerous. Study the user manual before starting up the pump.

⚠ CAUTION

Make sure that the parts or chambers connected to the inlet of our pumps withstand a negative pressure of 1 bar in relation to the atmospheric pressure.

GB 00224 - Edition 04 - July 06

Safety instructions

Operation

WARNING

The air tightness 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.

WARNING

The ACP Series G version are made to pump on corrosive gas traces. The manufacturer has no control over the types of gases passing through this pump. Frequently, process gases are toxic, flammable, corrosive, explosive or otherwise reactive. Since these gases can cause serious injury or death, it is very important to plumb the exhaust of the pump to the facility's hazardous gas exhaust system which incorporates appropppriate filters, scrubbers, etc., to insure that the exhaust meets all air regulations. Check that pump is correctly connected to the equipment.

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).

DANGER

The ACP pumps must not be operated in an area with risk of explosion. Consult us to study a solution.

GB 00224 - Edition 04 - July 06

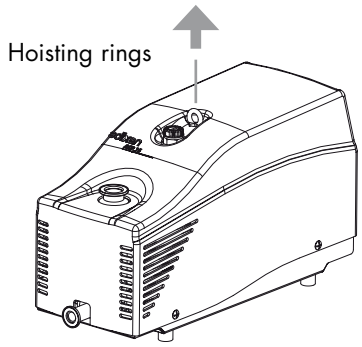
Installation of ACP Series pumps

Unpacking

When you receive the equipment, unpack it carefully; do not discard the packaging until you have ensured that the pump has not been damaged during transport. Otherwise, take the necessary measures with the transporting company and, if necessary, notify the manufacturer.

⚠ WARNING

For all handling of the equipment, it is highly recommended to use a lifting device. Use the hoisting rings delivered with the pump by screwing them in the threated holes located on the top side of the pump.



Model type	Weight
ACP 15/15 G	23 kg
ACP 28/28G	30 kg
ACP 40/40G	32 kg

■ If necessary the hoisting rings can be removed from the housing.

Equipment storage

■ If the new pump is to be stored, the plugs on the inlet and exhaust ports must remain in position.
The storage temperature must not be below -10 °C.

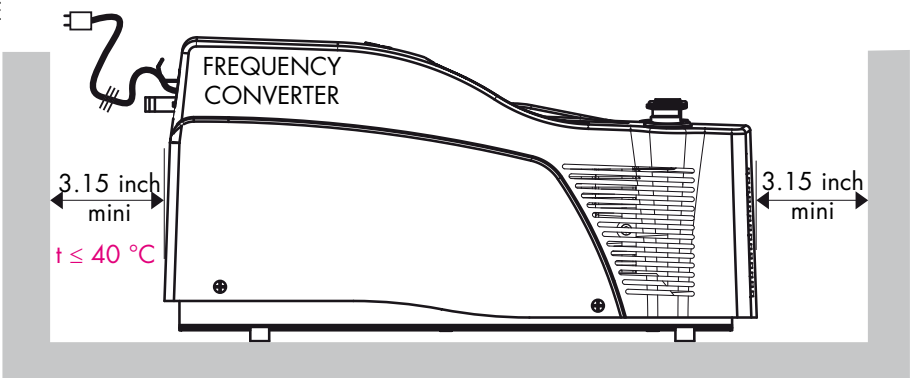
Ventilation

Vents at both ends of the pump.

Place the pump at least 80 mm from the stationary section.

The ambient air temperature particularly near the fan must be less than 40 °C.

SINGLE-PHASE



GB 03113 - Edition 01 - July 06

Installation of ACP Series pumps

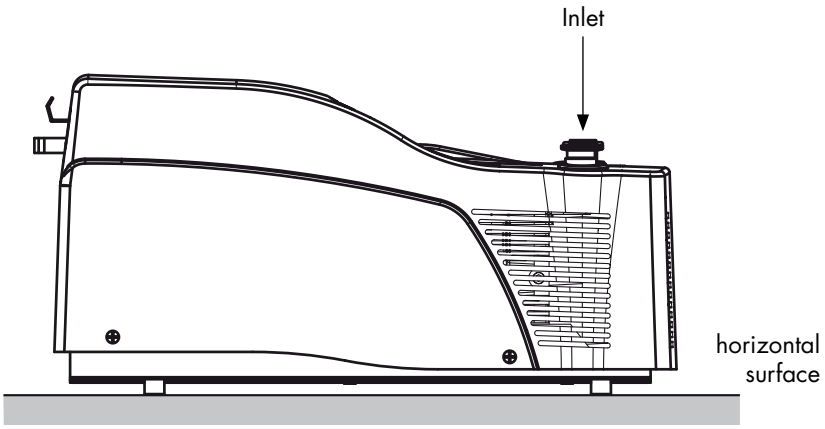
Installation safety instructions

The performance of the pump depends on the type of accessories used and the quality of the mechanical connection.

■ Determine where the pump will be placed. Refer to dimensional diagram in section **A 40** or **A 41**.
■ Install the pump in a way that the Start/Stop switch of the pump is accessible for the operator.
■ After pump connection, it is necessary to perform an helium leak tightness test.

⚠ CAUTION

The pump must be operated in the horizontal position with the pumping axis vertical and the inlet operating upwards.



GB 03113 - Edition 01 - July 06

Mechanical connections

⚠ WARNING

Remove the blanck offs blocking the inlet and exhaust ports: these components prevent foreing bodies from entering the pump during transport and storage. It is dangerous to leave them on a pump in operation.

⚠ WARNING

For safety reasons, use accessories on the inlet and exhaust lines whose materials and sealing properties are compatible with the gases being used.

Inlet

Connect the pump inlet to the equipment with connecting accessories (see manufactrer's catalog).

Connection type

- ACP 15 / 28 model: DN 25 ISO-KF.
- ACP 40 model: DN 40 ISO-KF.

⚠ CAUTION

The maximum inlet pressure is the absolute atmospheric pressure. A pressure too high can damage the pump.

⚠ CAUTION

In case of applications involving dust or solid particules, we recommend to use appropriate inlet filters in order to protect the pump (📖 section A 50). Also, we advise to use clean fittings and pipings for connecting the pump to the installation.

Exhaust

⚠ WARNING

When pumping on corrosive gas traces, or aggressive gases (pump G version), the gas can cause injury or death. The exhaust of the pump must be connected to an exhaust stack or an evacuation duct.

⚠ CAUTION

Make sure that the exhaust pressure does not exceed 1200 mbar (absolute pressure). A pressure too high can damage the pump.

Connection type

- ACP 15 model: **DN 16 ISO-KF**.
- ACP 28 / 40 model: **DN 25 ISO-KF**.

Several fitting accessories are available in the manufacturer's catalog.

GB 00823 - Edition 06 - July 06

Electrical connections

General

⚠ CAUTION

Our products are designed to comply with current EC regulations. Any modification of the product made by the user is liable to lead to non-compliance with these regulations, or to reduce the EMC (ElectroMagnetic Compatibility) performance and the safety of the product. The manufacturer declines any responsability for such operations.

⚠ CAUTION

The performance and the operational safety of this product is guaranteed provided that it is used in normal operating parameters defined in this manual.
Any modification of the pump not improved by the manufacturer can compromise the protection ensured by the pump.

⚠ CAUTION

The EMC performance of the product is obtained on the condition that the installation complies with the EMC rules. In particular, in disturbed environments, it is essential to:

- use shielded cables and connections for interfaces,

- stabilize the power supply line with meshing from the power supply source to a distance of 3m from the pump inlet.

⚠ WARNING

When switching off an item of equipment containing capacitors loaded at over 60 VDC or 25 VAC, take precautions concerning the access to the connector pins (single-phase motors, fitting with line filter, frequency converter, monitoring system, etc.).

GB 00695 - Edition 05 - July 06

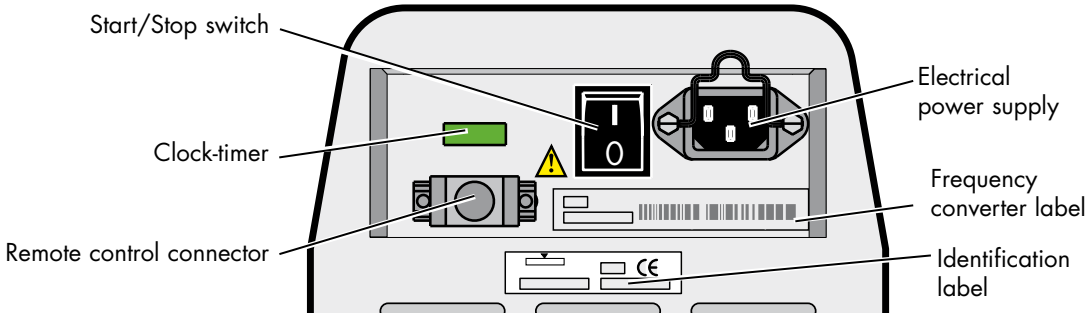
Electrical connections

Rear panel of the pump

■ In accordance with recommandations of EN 61010-1+ A2, the following warning symbol is on the variator inside the pump.

⚠ DANGER

Warning: risk of electrical shock.
Voltage or current hazard sufficient to cause shock. Disconnect and lockout power before servicing. Any intervention must be done by trained personnel only.



■ Electrical motor is in accordance with CE standards offers the following voltage range:

Model	Voltage range		
ACP 15	110 V / 230 V 50/60 Hz	10 A / 5 A	1150 VA
ACP 28 / 40			

■ The motor is equipped with an electrical frequency converter which allows automatically low or high voltage pump running, according to range voltage 110 V to 230 V, 50/60 Hz.

■ The pump supplying cable is provided with the pump delivered. The earthing of the pump (frequency converter, covers, body of the pump) is realized by the cable connected with the network customer. The network customer should have himself a connection in the ground.

Circuit breaker

■ An 6 A circuit breaker is recommended for high voltage, 230 VAC + 10 %.
■ A 12 A circuit breaker is recommended for low voltage, 110 VAC + 10 %.

The pump is equipped with thermal sensors which stops pump starting-up depending on the temperature *(📖 C 10).*

GB 00695 - Edition 05 - July 06

Remote control connector wiring

In accordance with advice of EN 61010-1+A2 the following warning symbol is near the remote control connector:

⚠ WARNING

Before switching on the pump, the user should study the manual and follow the safety instructions listed in this manual.

Remote control principle

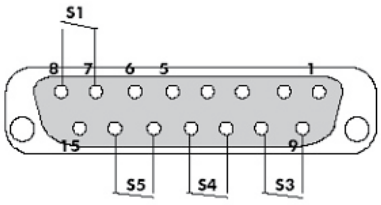
The pump can be used in remote mode using the "Sub-D" connector at the rear of the pump.

Used by means of dry contacts:

- The remote control of the "Start / Stop" function (S1).
S1 = 0 ➔ Stop S1 = 1 ➔ Start.

- Rotation speed remote control according to the table below:
(O = open, 1 = closed):

DB 15 pins, male connector



ACP 15 Model				
S3	S4	S5	Rotation speed	
Contact status	Contact status	Contact status	Hz	rpm
S3 = 1	S4 = 0	S5 = 1	60	3 600
S3 = 1	S4 = 0	S5 = 0	70	4 200
S3 = 0	S4 = 1	S5 = 1	80	4 800
S3 = 0	S4 = 1	S5 = 0	90	5 400
S3 = 0	S4 = 0	S5 = 1	95	5 700
S3 = 0	S4 = 0	S5 = 0	100	6 000

ACP 28 - ACP 40 Model				
S3	S4	S5	Rotation speed	
Contact status	Contact status	Contact status	Hz	rpm
S3 = 1	S4 = 1	S5 = 0	42	2 500
S3 = 1	S4 = 0	S5 = 0	50	3 000
S3 = 0	S4 = 1	S5 = 0	65	3 900
S3 = 0	S4 = 0	S5 = 0	80	4 800

CAUTION

For pump safety, do not exceed the maximum frequency:
➔100 Hz for ACP 15 models,
➔ 80 Hz for ACP 28/40 models.

Note: Changing the rotational speed will affect the pumping speed and the ultimate pressure.

GB 03114 - Edition 01 - July 06

Remote control connector wiring

Wiring of the remote control plug

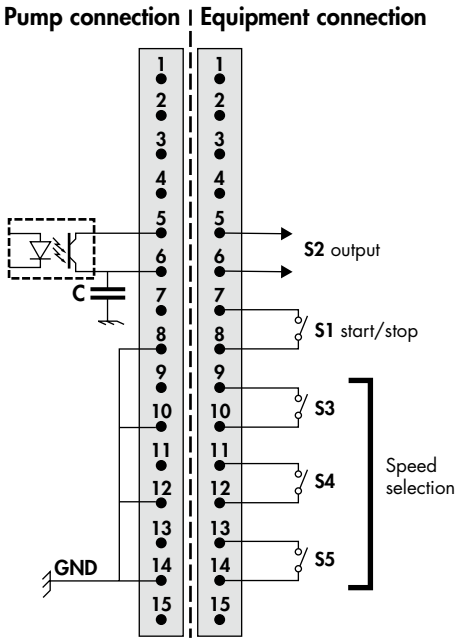
S1, S3, S4 and S5 are inputs.
S2 is an output (open collector).

S1: start/stop

S2 closed:
pump at speed

S3, S4, S5:
rotational speed selection

Pin 8, 10, 12 and 14 are connected to the ground of the control unit.



CAUTION

Do not add any strap except S1, S3, S4 and S5.

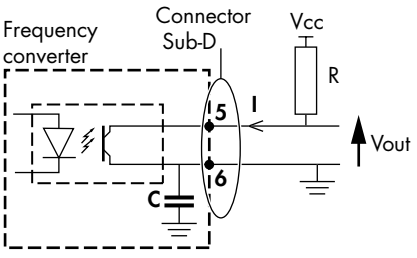
CAUTION

Output S2:
Do not connect a relay between the pins 5 and 6.
The relay coil induces a current which may result in damage of the frequency converter unit.
Wiring of output S2:
The maximum value of the current in the output must be of 35 mA.

Wiring of output S2

S2 is an open collector output and must be wired as shown below.

Vcc is a direct voltage (between 7 and 30VDC) supplied by the user.
The value of the resistance **R** depends on the customer installation.



GB 03114 - Edition 01 - July 06

Remote control connector wiring

CAUTION

Vcc and R values must be calculated so as not to exceed a current value of 35 mA. Higher current will damage the frequency converter.

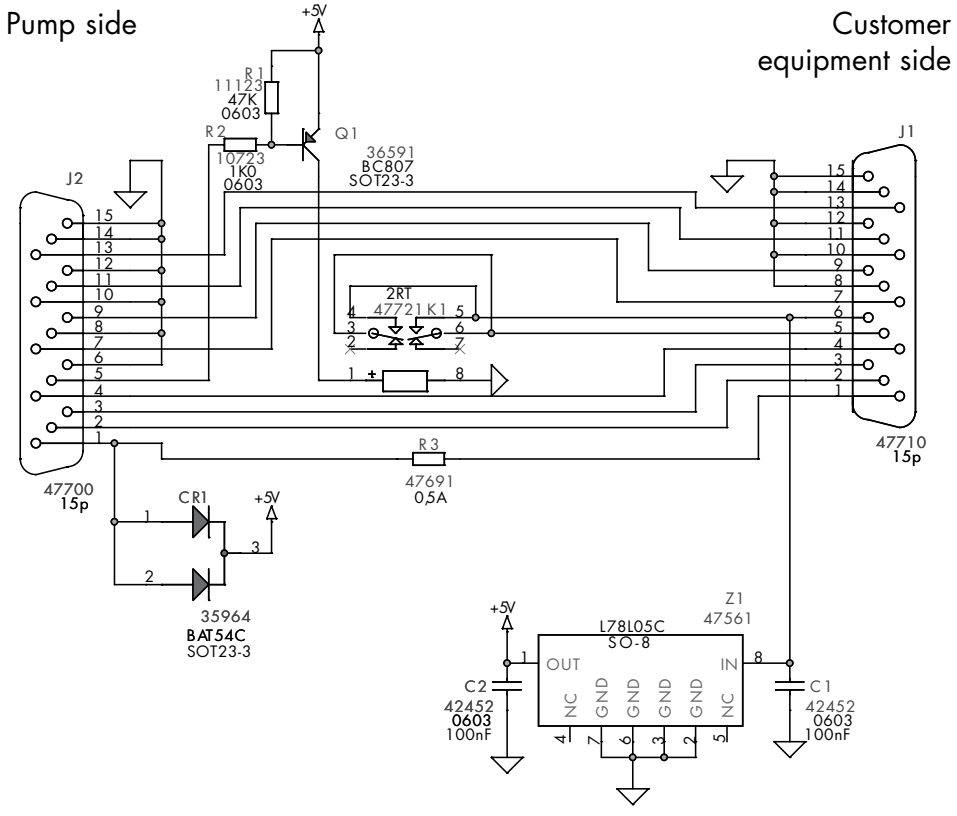
When the nominal speed is reached, the transistor becomes conductive («on-state») and Vout = 0 V.

As long as the nominal speed is not reached, the transistor is blocked («off-state») and Vout = Vcc.

This circuit can not be used for power transfer. For switching of power circuits an amplification stage is required.

Wiring example

This is an example that correspond to the remote interface plug available as an accessory (**A50**). It allow to use output S2 as a relay (dry contact).



GB 03114 - Edition 01 - July 06

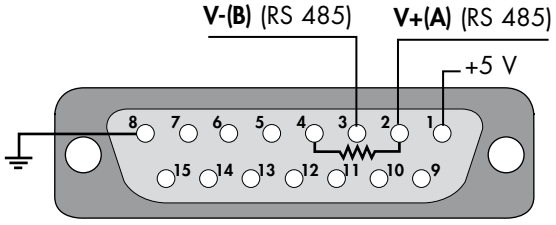
RS 485 serial link wiring

Factory configuration

The serial link allows to control and monitor several pump in a network.

- Transmission speed: **9600 bauds**
- Data lenght: **8 bits**
- Parity: **none**
- Stop bit: **1**

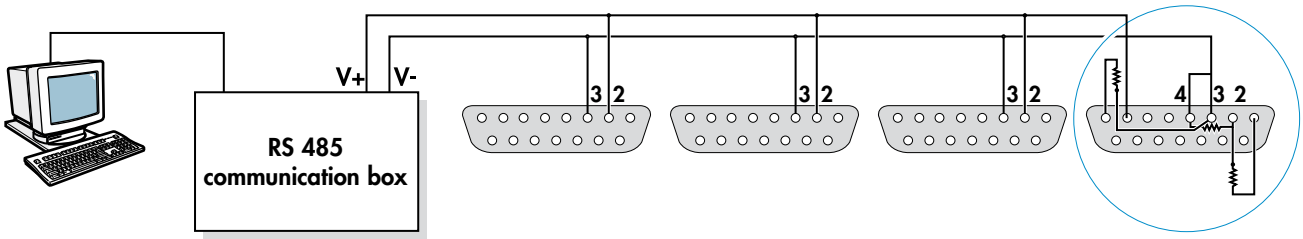
RS 485 connector wiring



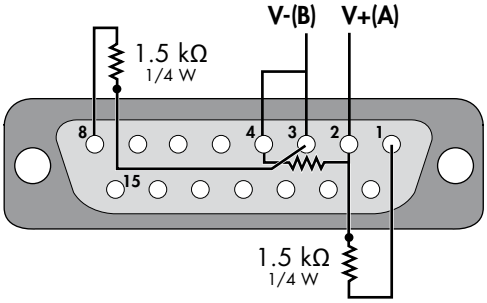
DB 15 pins, male connector (soldered view)

RS 485 serial link

Several units (up to 255) can be controlled on a single link. It's a parallel type connection which allows communication in the network even if a pump is disconnected.



Wiring of the unit at the end of the line ,
or
when there is one and only unit in the link.



G 03115 - Edition 01 - July 06

Inert gas purge connection (G version)

Gas line connection

■ For optimum performances -ball bearing protection-, the nitrogen supply should have the following characteristics:
- Maximum moisture rate: 5 ppm of water
- Dust < 1µm
- Oil < 0.1 ppm
- Pressure:1.5 bar absolute (before the gas pressure reducing valve, customer supply)

■ Connect the gas line supply to the R 1/4 connector provides on purpose with flexible or stainless steel pipe (customer supply).

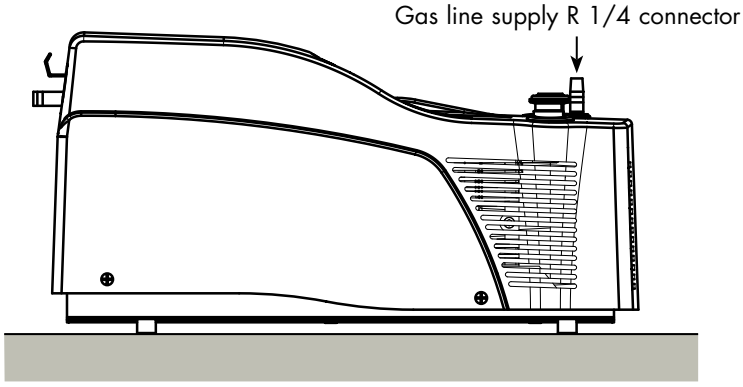
Note : we recommend to install an isolation valve on the gas supply line, nearest the inlet gas port to allow pump performance recovering when the gas line is not used (**A 40**, **A 41**).

■ For optimum ball bearing protection, the neutral gas pressure must be set to 0.3 bar (relative pressure) according to the flowrate value given in the table below:

Nitrogen flowrate adjustment

	ACP 15	ACP 28/40
Flowrate max (slm)	5	1.65
Ultimate pressure (mbar)	3×10^{-1}	1×10^{-1}

e.g: ACP 28 G



GB 00697 - Edition 05 - July 06

User's Manual ACP Series
Detailed contents

GB 03120 - Edition 01 - July 06

Pump operation

CAUTION

The ACP Series uses a specific gear oil. The amount required for pump operation is set at in the factory.
Do not modify this oil level.

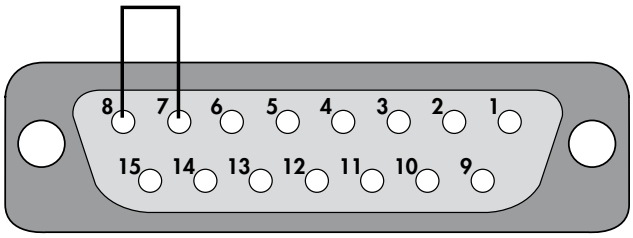
Pump temperature for start-up condition

The pump is equipped with thermal sensors.
When switching on the pump, if the temperature is:
- less than 12 °C,
- or over than 40 °C,
the pump doesn't start, but the fan is energized. The pump will start automatically when the ambient temperature is back in the authorized temperature range.

Operation in local mode

In local mode, the pump can run only if the cover plug (delivered with the pump) is fitted on the remote control connector.

Wiring of the Remote cover plug



DB 15 pins, male connector (soldered side view). Factory wired with appropriate jumper for local operation.

Operation in remote mode

The pump can be used in remote mode:
- if the Remote control plus is wired according to instructions given in **B40**.
- if the RS485 serial link is wired (**B 41**).

Note

It's the origin of **Start/Stop** control which has priority on the speed selection:
- when the Start/Stop is made by the remote control cover plug, the selected speed corresponds to the dry contact setting,
- when the Start/Stop is made by RS485 serial link, the speed corresponds to the speed set point defined on serial link.

Pump start-up

Pump is equipped with a main power switch. The pump starts up when the power line cord is connected, and main switch is on "**1**" position.
A time counter displays the pump running time in hour.

GB 03116 - Edition 01 - July 06

Pump operation

CAUTION

Avoid sudden changes in ambient temperature when the pump is running.

⚠ CAUTION

Neutral gaz purging is imperative for the pumping of corrosive gas traces.

⚠ WARNING

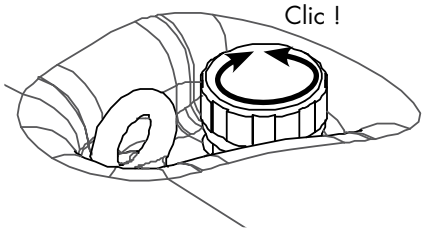
The pumps are designed so as not to present a thermal risk for the user's safety. However, specific operating conditions can generate temperatures which require particular care to be taken by the user (external surfaces > 70°C).

Pumping of condensable vapours

In order to better handle condensable vapours, it is necessary to pump with a hot pump. It is recommended to isolate the pump from the installation and let the pump run for at least 1 hour, with gas ballast opened.
Then open the isolation valve, the pump will operate in optimized conditions, thus reducing the risk of condensation inside the pumping module.

Operation of gas ballast

- Knob screwed: gas ballast closed.
- Knob unscrewed: gas ballast opened.



Pump stop

Before switching off, isolate the pump from the installation and let it run for 1 hour with gas ballast opened.

Put the main switch on « **O** » position or press the circuit breaker of the customer's installation.

When the pump is remote controlled, the pump will be stopped by opening the « Start/Stop » contact (**B40**).
When the pump is controlled by RS 485 serial link, the pump will be stopped by sending the appropriate command (**C 20**).

GB 03116 - Edition 01 - July 06

Detailed description of RS 485 commands

Conventions applicable to the syntax of all commands	Adr = address, from 000 to 255 <CR> Carriage return (ascii 13) <LF> line Feed (ascii 10), between square brackets ; this character is not compulsory # hash sign (ascii 35) , comma (ascii44)
Status values	Ok : command executed correctly
Error messages	Err0: adjustment error (out of bounds) Err1: command error (syntax) Err2: parameter error (eg. Non-hexadecimal character.) Err3: context error
ADR	**Specifies the address of the device for networking**

Syntax	#adr**ADR**aaa<CR>[LF]
	adr = product address before the command
	aaa = new address of the product
	condition : 000 ≤aaa ≤255

Result	#aaa,ok or Err2 This command is used to allocate a specific number to each of the products making up a network. It's important to record each product address. When the address of the product is unknown, it's possible to recover the product address using ADR command but only this pump must be connected on the link RS 485.
Syntax	# ???**ADR** <CR>[LF] ??? chain of three ascii characters.
Result	#adr,ok OK means command received, adr is the product address.
IDN	**Identifies the device which is communicating and its software version**
Syntax	#adr**IDN**<CR>[LF]
Result	#adr, VPxxxxx – Vx.zz Return the type of pump, ACP15, ACP28 or ACP 40 depending on the variator, the software version (x) and software release (zz). Ex : #004,ACP28– V1.03: product address 004 controls ACP 28 with a software release V1.03.

GB 03117 - Edition 01 - July 06

Detailed description of RS 485 commands

NSP	**Switches the speed set point to the nominal speed value**
Syntax	#adr**NSP**<CR>[LF] This command allows to restore the nominal speed to the default value : (80 Hz for ACP 28/40 and 100 Hz for ACP 15).
Result	#adr,ok
RPM	**Defines the speed set point in stand-by mode**
Syntax	#adr**RPM**nnnn<CR>[LF] nnnn speed value in rpm Set point speed from 2100 rpm (35 Hz) (to maximum speed by step of 10 rpm. Max. speed : ACP15: 6000rpm (100 Hz) ; ACP 28/40 or RVP : 4800 rpm (80 Hz). **Note: you must send the SBY command, before changing the pump rotational speed using RPM command.**

Result	#adr, ok or #adr, Errx
	x = 1 out of range, 2: parameter error , 3: context error.

SBY	**Switches the speed set point to the stand-by value**
Syntax	#adr**SBY**<CR>[LF] Resets the stand-by speed to the default value (35Hz for all pump models).
Result	#adr, ok **Note : you must send the SBY command before changing the pump rotational speed using the RPM command.**
ACP	**Defines the operating status of the pump**
Syntax	#adr**ACP**ON<CR>[LF] : start pump rotation #adr OFF<CR>[LF] : stop pump
Result	#adr, ok or #adr, Err3 if the pump is already in the requested state (context error).

GB 03117 - Edition 01 - July 06

Detailed description of RS 485 commands

STA	Returns the state of the internal dynamic parameters

Syntax #adr**STA**<CR>[LF]

Result #adr,xxxxxx,yyyyyyy,zzzzzz,sssss,iii,www,ppp,vvv,tttt<CR>[LF]
adr: address

xxxxxx,yyyyyy,zzzzzz codified information under 6 decimal figures (0 or 1 depending on conditions:
5 4 3 2 1 0

x x x x x x state bits
5 - reserved (0)
4 - reserved (0)
3 - Pump running (1), pump stopped (0)
2 - standby speed (1), nominal speed reached (0)
1 - standby mode (1), other (0)

y y y y y y fault bits
5 - power transistor non controlled (copy of red LED =1), otherwise (0)
4 - motor temperature too high (1)
3 - motor current too high (1)
2 - reserved (0)
1 - reserved (0)
0 - reserved (0)

z z z z z z alert bits
5 - reserved (0) ; 4 - reserved (0) ; 3- reserved (0) ; 2 - reserved (0) ; 1- reserved (0) ; 0 - reserved (0)

sssss: current speed value in rpm, codified on 5 decimal figures (eg: speed 05600 rpm: sssss = 05600)

iiii: Motor power in Watts, codified on 4 decimal figures (eg: power 450 W: iiii = 0450)

www: reserved

ppp: variator temperature codified on 3 decimal figures (eg:variator temperature 56 °C: ppp = 056)

vvv: reserved

tttt: pump operating time value (since first start up), codified on 4 decimal figures (eg: operating time 4568 hours: tttt = 4568).

GB 03117 - Edition 01 - July 06

User's Manual ACP Series

Detailed contents

GB 03121 - Edition 01 - July 06

Maintenance schedule

MODEL	TIMING (EVERY...)	DESCRIPTION	
ACP 15	20 000 h or 4 years	Complete maintenance:	M — Call customer Service*
ACP 28 ACP 40	22 000 h or 4 years	• oil draining • LP and HP bearing replacement • seal replacement	

* The manufacturer Center Service adress list at the back of the cover Manual.

Maintenance frequencies are typical values for non corrosive applications. For applications using G pump versions, these values can be reduced. Contact us.

GB 00702 - Edition 05 - March 06

M Performed by the manufacturer

User's Manual ACP Series
Detailed contents

GB 03122 - Edition 01 - July 06

Safety instructions related to maintenance

Safety instructions

⚠ WARNING

Hazardous voltage enclosed. Voltage or current hazard sufficient to cause shock. Disconnect and lockout power before servicing. Any intervention must be done by trained personnel only.

⚠ DANGER

"G" version
Remaining process gases in the pump may cause severe injury or death.
Before removing the pump, continue N2 flow from the process tool for 30 min.
Nitrogen pressure and flow rate should be identical to the programmed values during process.

⚠ DANGER

During pump removal, operator could be in contact with process residues on the exhaust which could cause severe injury or death.
Ask your safety department for instructions according to the local statements.

Recommandations

Purge the installation with dry nitrogen.
Wear gloves, protective glasses and, if necessary, a breathing mask.
Ventilate the premises well.
Do not dispose of residue, if necessary, have it destroyed by a qualified organization.

CAUTION

Oil drain.
The oil drain is performed during pump overhaul by manufacturer's trained personnel.

GB 03118 - Edition 01 - July 06

Safety instructions related to maintenance

Procedure for returning vacuum pumps

Fill in the safety questionnaire (**G 200**) and return it with the product to the service center (see adresses at the back of the manual).

No contaminated pump

■ Close the inlet and exhaust pipe with black plastique cap, supply with the pump.

Contaminated pump

Refer to safety instructions listed on page 1.
■ Close the inlet and exhaust pipe of the pump with the following connecting accessories (avalaible in manufacturer's catalog):

Accessories	DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF
Centering ring with O-ring	068 193	068 189	068 194
Stainless steel blank flange	068 195	068 196	068 197
Clamp	083 333	083 264	087 163

How us to contact

The full overhaul must be performed by manufacturer trained personnel. Contact manufacturer nearest service center or the service support at the following e-mail address:

support.service@adixen.fr

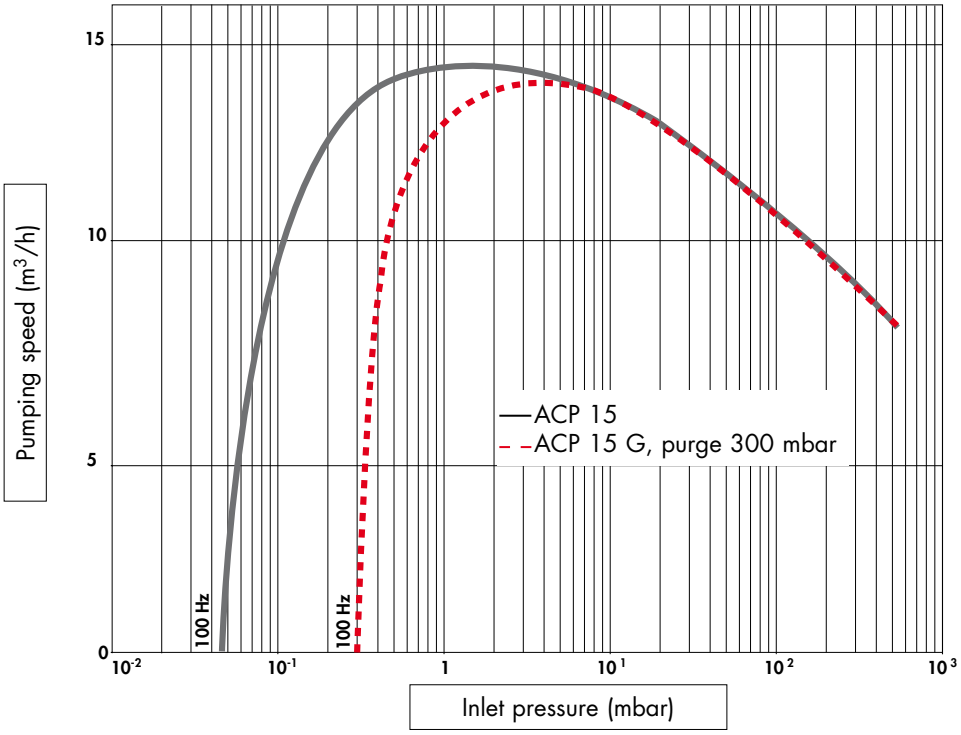
GB 03118 - Edition 01 - July 06

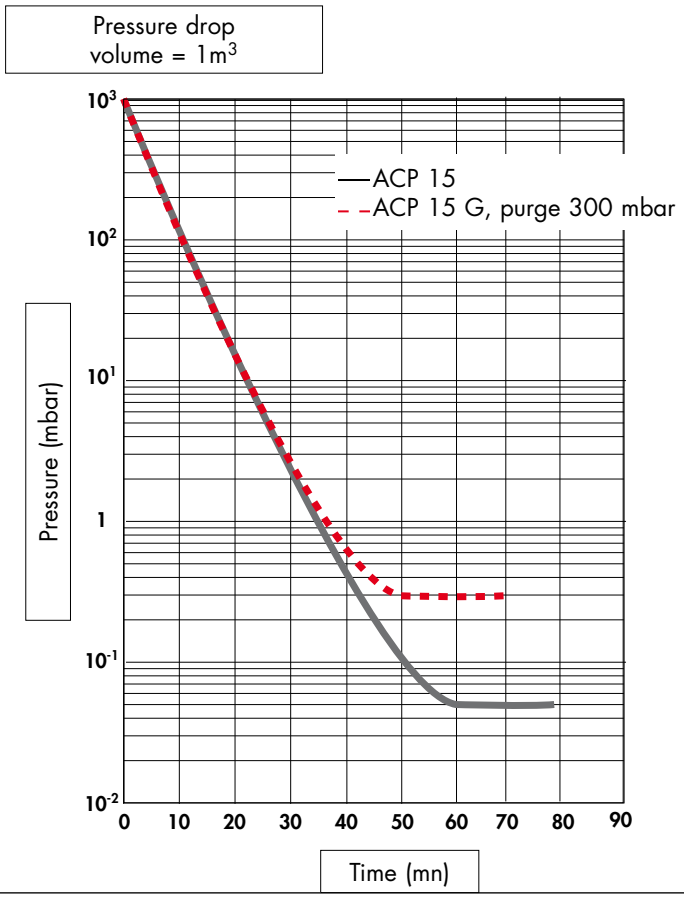
Appendix

User's Manual ACP Series
Detailed contents

GB 03123 - Edition 01 - July 06

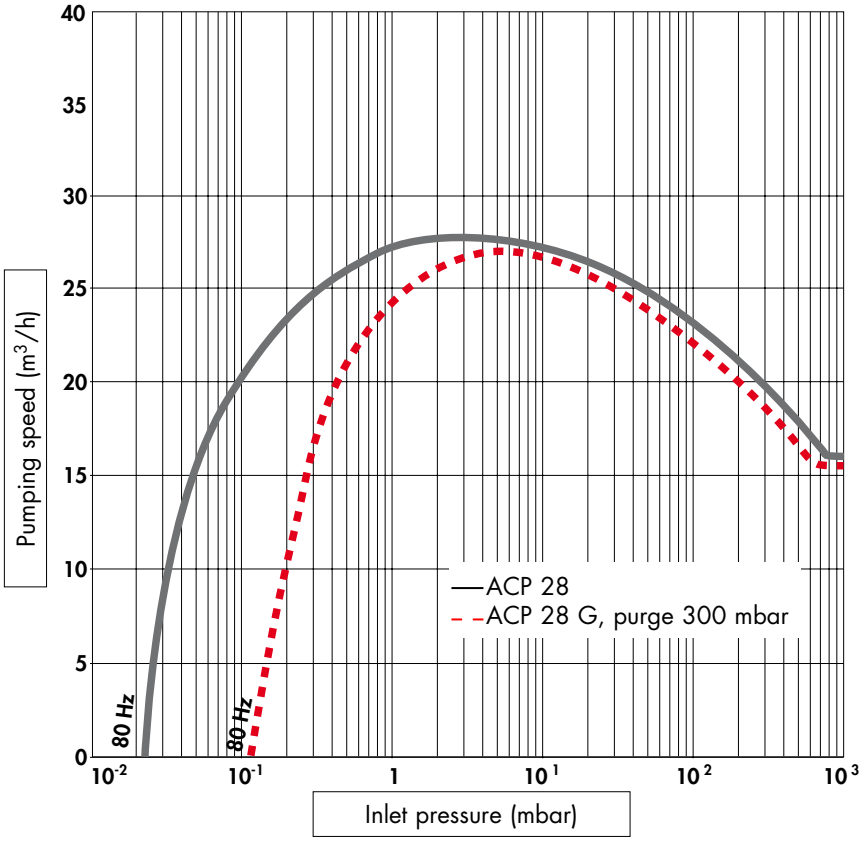
ACP 15 / 15 G pumping curves

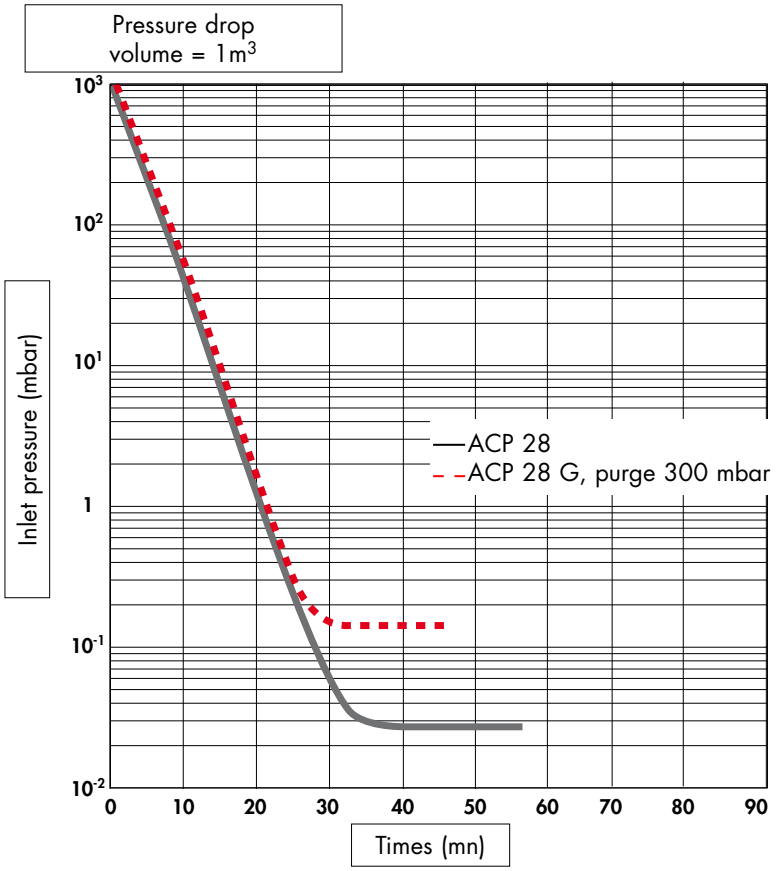




GB 02225 - Edition 04 - July 06

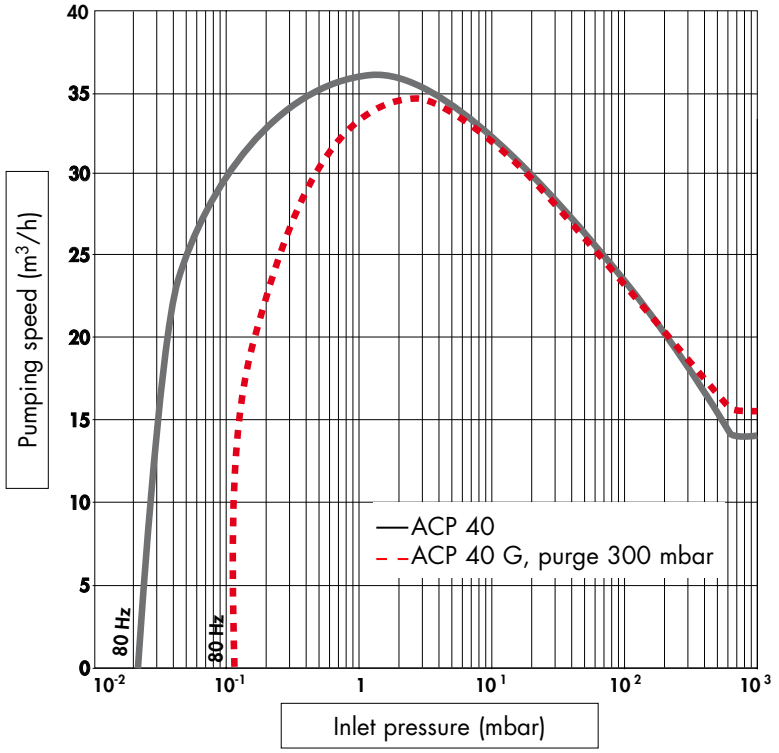
ACP 28 / 28 G pumping curves

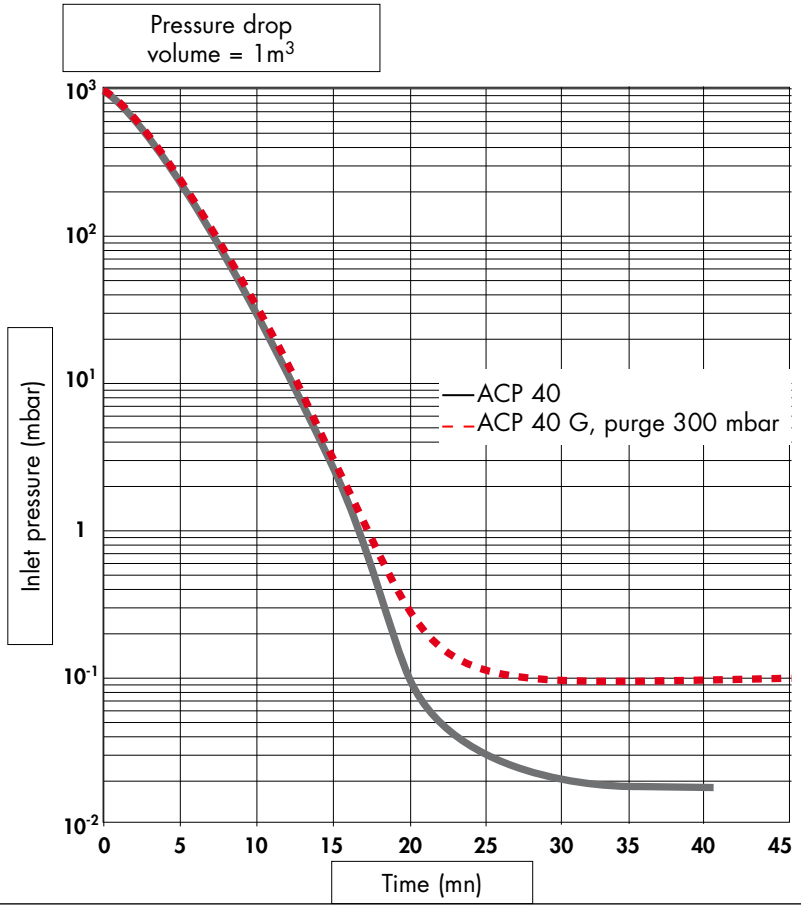




GB 00958 - Edition 06 - July 06

ACP 40 / 40 G pumping curves





GB 02226 - Edition 04 - July 06

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 :

ACP 15 - ACP 15G
ACP 28 – ACP 28G
ACP 40 – ACP 40G

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

73 / 023 / EEC	Low Voltage Directive
89 / 336 / EEC	Electromagnetic Compatibility Directive
93 / 68 / EEC	Council Directive (EC Marking)
98 / 37 / EEC	Machinery Directive

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

ENV 50204	Immunity to radiated electromagnetic field from digital radio telephones
NF EN 55011 class A	EMC / Radio disturbance characteristics
NF EN 61000-3-2	EMC / Harmonic current emissions
NF EN 61000-3-3	EMC / Limitation of voltage changes in public low-voltage supply
NF EN 61000-4-2	EMC / Immunity to electrostatic discharge
NF EN 61000-4-3	EMC / Immunity to radiated, radio-frequency, electromagnetic field
NF EN 61000-4-4	EMC / Immunity to electrical fast transient / burst
NF EN 61000-4-5	EMC / Immunity to surge
NF EN 61000-4-6	EMC / Immunity to conducted disturbances, inducted by radio-frequency fields
NF EN 61000-4-11	EMC / Immunity to short interruptions and voltage variations
NF EN 61000-6-2	EMC / Generic immunity standard - Industrial environments
NF EN 61000-6-4	EMC/ Generic emission standard / Industrial environment
NF EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use
NF EN 1012-2	Safety requirements for vacuum pumps
NF EN 563	Safety of machinery – Temperatures of touchable surfaces
UL 61010A-1-	General requirements – Electrical equipment for laboratory use
CSA-C22.2 No 1010.1-92	Safety requirements for electrical equipment for measurement, control and Laboratory use

Mr J.Y. GUEGAN, Président Directeur Général

Annecy, 10/05/06

GB 00950 - Edition 06 - July 06

Safety questionnaire

Procedure for returning ADIXEN 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 technician from our Service Centre.
In compliance with European Community's L360 directives, French labor code L231 - R231 and Federal OSHA Safety Standard 1910-1200, Alcatel Vacuum Technology requires this form to be completed to preclude the potential health risk to its service personnel that can occur when receiving, disassembling, or repairing potentially contaminated products.

Equipment returned without this form completed and secured to outside of package will be returned to customer unprocessed.
Equipment must be drained of fluids and residue, securely packaged and shipped prepaid.
Concerning the closing of the ports (inlet & outlets of the product), metallic airtight blank flanges should be used if toxic or copper gases have been pumped.

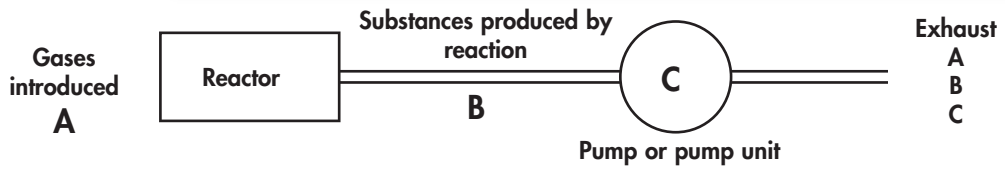
We wish to draw your attention to the following points:

- **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.
  - **Copper contamination:** Copper based by products formed in sputtering or etching processes are considered as a poison in some semi-conductor processes.

⚠ WARNING

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.

GB 00956 - Edition 03 - April 06

QUESTIONNAIRE DE SECURITE *SAFETY QUESTIONNAIRE*

Ce questionnaire est téléchargeable sur le site : www.adixen.com
This questionnaire can be downloaded from: www.adixen.com

G 200

Procédure de retour des Pompes à Vides et Détecteur de Fuite à Hélium ADIXEN
(Ce formulaire ne peut être rempli et signé que par une personne habilitée)
Procedure for returning ADIXEN Vacuum Pumps and Helium Leak Detectors
(This questionnaire is only to be filled in and signed by an authorized person)

SOCIETE - *COMPANY*

Nom Société – *Name of company :* .....

Nom personne – *Name of person:* .....
(Qui remplit ce formulaire) – *(Who has filled in questionnaire)*

Fonction – *Position* : .....

N° Tél. – *Tel. no* : .....

N° Fax – *fax no*: .....
(Pour renseignements éventuels sur les produits utilisés) – *(for any information on products used)*

EQUIPEMENT - *EQUIPEMENT*

Description : .....

.....

.....

N° de Série – *Serial no* : .....

Type de procédé – *type of process* : .....
(Pour lequel l'équipement est utilisé) – *(for which equipment is 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*

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 formula)*

Ces produits présentent un risque de nature			***These susbstances present the following risks***
Chimique – *Chemical*			Explication détaillée – *Detailed explanation*
Toxique – *Toxic*	Oui – *Yes*	Non – *No*	Si "Oui" risque de nature – *If "Yes", what type of risk*
Cancérigène - *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" (fermeture étanche de l'aspiration et du refoulement) Reply «Yes« (seal inlet and outlet ports with blank flanges)	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*

GB 00956 - Edition 03 - April 06

ALCATEL Vacuum Technology France – 98, avenue de Brogny – B.P. 2069 – 74009 ANNECY CEDEX
Tél. (33) 4 50 65 77 77 – Fax (33) 4 50 65 75 77 Web site: www.adixen.com

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