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 & Development, 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 acknowledged 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 Taiwan (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 representatives 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.
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
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).

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Specifications and information are subject to change without notice by Alcatel Vacuum Technology France.
General contents
ACP Series User’s Manual

Chapter A
INTRODUCTION
A 10 - ACP Series dry primary pumps overview
A 20 - Operating principle
A 30 - Dry primary pump applications
A 40 - Technical characteristics - ACP 15
A 41 - Technical characteristics - ACP 28, ACP 40
A 50 - Accessories

Chapter B
INSTALLATION
B 00 - Safety instructions
B 10 - Installation of ACP Series pumps
B 20 - Mechanical connections
B 30 - Electrical connections
B 40 - Remote control connector wiring
B 41 - RS 485 serial link wiring
B 50 - Inert gas purge connection (G version)

Chapter C
OPERATION
C 10 - Pump operation
C 20 - Detailed description of RS 485 commands

Chapter D
MAINTENANCE - TROUBLESHOOTING
D 10 - Maintenance frequency

Chapter E
MAINTENANCE SHEETS
E 00 - Maintenance safety instructions

Chapter F
COMPONENTS
F - Non used

Chapter G
APPENDIX
G 10 - ACP 15 / 15 G - Pumping curves
G 11 - ACP 28 / 28 G - Pumping curves
G 12 - ACP 40 / 40 G - Pumping curves
G 100 - Declaration of Conformity
G 200 - Safety questionnaire

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).
### Detailed contents

#### A 10

**ACP Series dry pump overview**

- Superior technology
- Model ACP 15 / 15 G overview
- Model ACP 28 / 28 G / 40 / 40 G overview

#### A 20

**Operating principle**

- Multi-stage Roots principle

#### A 30

**Dry primary pump applications**

- Standard version for “clean vacuum” applications
- G version for pumping of corrosive gas traces or condensable gas

#### A 40

**Technical characteristics - ACP 15 model**

- Specifications
- Dimensional drawing

#### A 41

**Technical characteristics - ACP 28/40 models**

- Specifications
- Dimensional drawing

#### A 50

**Accessories**

- Inlet filters
- Exhaust silencer
- Sound inclosure
- Frequency converter interface plug
- Pump holding device
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.
ACP Series dry primary pump overview

Model ACP 15 / 15 G overview

- Identification label
- Clock-timer
- Remote control connector
- Start / Stop switch
- Electrical power supply
- Neutral gas connection (G version)
- Hoisting ring
- Gas ballast
- Inlet
- Exhaust
- Neutral gas connection (G version)
- Electrical power supply

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

- Identification label
- Clock-timer
- Remote control connector
- Start / Stop switch
- Electrical power supply
- Hoisting ring
- Gas ballast
- Inlet
- Exhaust
- Neutral gas connection (G version)
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.
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 tightness 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.
**Technical characteristics - ACP 15 / ACP 15 G**

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Unit</th>
<th>ACP 15</th>
<th>ACP 15 G</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Utilization</strong></td>
<td></td>
<td>Indoor</td>
<td></td>
</tr>
<tr>
<td><strong>Functioning altitude</strong></td>
<td>m (ft)</td>
<td>&lt; 2000 (6561)</td>
<td></td>
</tr>
<tr>
<td><strong>Installation category</strong></td>
<td></td>
<td>II</td>
<td></td>
</tr>
<tr>
<td><strong>Pollution degree</strong></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Ultimate pressure(^1) - gas ballast closed</strong></td>
<td>mbar (Torr)</td>
<td>5 x 10^{-2} (3.8 x 10^{-2})</td>
<td>5 x 10^{-2} (3.8 x 10^{-2})</td>
</tr>
<tr>
<td><strong>Ultimate pressure(^1) - Standard model - with gas ballast opened</strong></td>
<td>mbar (Torr)</td>
<td>3 x 10^{-1} (2.25 x 10^{-1})</td>
<td>3 x 10^{-1} (2.25 x 10^{-1})</td>
</tr>
<tr>
<td><strong>Peak pumping speed</strong></td>
<td>m³/h (cfm)</td>
<td>14 (8.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum pressure at inlet (absolute)</strong></td>
<td>mbar (Torr)</td>
<td>1013 (760)</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum exhaust pressure (absolute)</strong></td>
<td>mbar (Torr)</td>
<td>1200 (900)</td>
<td></td>
</tr>
<tr>
<td><strong>Max. ambient operating temperature</strong></td>
<td>°C (°F)</td>
<td>+40 (+104)</td>
<td>+12 (+54)</td>
</tr>
<tr>
<td><strong>Leakage current</strong></td>
<td>mA</td>
<td>&lt; 5</td>
<td></td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>W</td>
<td>520</td>
<td>480</td>
</tr>
<tr>
<td><strong>Gas ballast flowrate(^2)</strong></td>
<td>m³/h</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td><strong>N₂ flowrate(^2)</strong></td>
<td>slm</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td><strong>Fan flow rate</strong></td>
<td>m³/h</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td><strong>Inlet port</strong></td>
<td></td>
<td>DN 25 ISO-KF</td>
<td></td>
</tr>
<tr>
<td><strong>Exhaust port</strong></td>
<td></td>
<td>DN 16 ISO-KF</td>
<td></td>
</tr>
<tr>
<td><strong>Oil capacity(^3)</strong></td>
<td>cm³</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Kg (lbs)</td>
<td>23 (50.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Storage temperature</strong></td>
<td>°C (°F)</td>
<td>min -10 (14) / max 60 (140)</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) 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**

- **Gas line supply**
- **Electrical power supply**
- **Hoisting ring**
- **Inlet DN 25 ISO-KF**
- **Exhaust DN 16 ISO-KF**

**Dimensions:**
- 85 mm (3.39"")
- 300 mm (11.81"")
- 95 mm (3.74"")
- 409 mm (16.14"")
- 480 mm (19.05"")
- 498 mm (19.77"")
- 207 mm (8.14")

---

**Alcatel Vacuum Technology France - ACP Series User's Manual**
## ACP 28 / 28 G / 40 / 40 G

### Technical Characteristics

**ACP 28 / 28 G / 40 / 40 G**

<table>
<thead>
<tr>
<th>Specification</th>
<th>ACP 28</th>
<th>ACP 28 G</th>
<th>ACP 40</th>
<th>ACP 40 G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functioning altitude m (ft)</td>
<td>&lt; 2000 (6561)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation category</td>
<td>II</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pollution degree</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultimate pressure (1) - gas ballast closed</td>
<td>3 x 10^-2 (Torr)</td>
<td></td>
<td>3 x 10^-2 (Torr)</td>
<td>3 x 10^-2 (Torr)</td>
</tr>
<tr>
<td>- Standard model: with gas ballast opened</td>
<td>2 x 10^-1 (Torr)</td>
<td>1.5 x 10^-1 (Torr)</td>
<td>2 x 10^-1 (Torr)</td>
<td>1.5 x 10^-1 (Torr)</td>
</tr>
<tr>
<td>- G model: without gas ballast opened</td>
<td>2 x 10^-1 (Torr)</td>
<td>1.5 x 10^-1 (Torr)</td>
<td>2 x 10^-1 (Torr)</td>
<td>1.5 x 10^-1 (Torr)</td>
</tr>
<tr>
<td>Peak pumping speed (rotation speed 4800 rpm)</td>
<td>m^3/h (cfm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- G model: with gas ballast opened</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Standard model: with gas ballast opened</td>
<td>27 (16)</td>
<td></td>
<td>37 (22)</td>
<td></td>
</tr>
<tr>
<td>Maximum pressure at inlet (absolute)</td>
<td>mbar (Torr)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- with gas ballast opened</td>
<td>1013 (760)</td>
<td></td>
<td>1013 (760)</td>
<td>1013 (760)</td>
</tr>
<tr>
<td>- without gas ballast opened</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum exhaust pressure (absolute)</td>
<td>mbar (Torr)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- with gas ballast opened</td>
<td>1200 (900)</td>
<td></td>
<td>1200 (900)</td>
<td>1200 (900)</td>
</tr>
<tr>
<td>- without gas ballast opened</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum ambient operating temperature °C (°F)</td>
<td>+ 40 (+ 104)</td>
<td>+ 40 (+ 104)</td>
<td>+ 40 (+ 104)</td>
<td>+ 40 (+ 104)</td>
</tr>
<tr>
<td>Min. ambient operating temperature °C (°F)</td>
<td>+ 16 (+ 32)</td>
<td>+ 16 (+ 32)</td>
<td>+ 16 (+ 32)</td>
<td>+ 16 (+ 32)</td>
</tr>
<tr>
<td>Leakage current mA</td>
<td>&lt; 5</td>
<td></td>
<td>&lt; 5</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- at ultimate pressure (gas ballast closed)</td>
<td>700</td>
<td>1000</td>
<td>700</td>
<td>1000</td>
</tr>
<tr>
<td>- at atmospheric pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas ballast flowrate m^3/h (cfm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 300 mbar (relative pressure)</td>
<td>1.2 _ 1.2</td>
<td></td>
<td>1.2 _ 1.2</td>
<td></td>
</tr>
<tr>
<td>N2 flowrate slm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 300 mbar (relative pressure)</td>
<td>1.65 _ 1.65</td>
<td></td>
<td>1.65 _ 1.65</td>
<td></td>
</tr>
<tr>
<td>Single phase power</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- with gas ballast opened</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- without gas ballast opened</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil capacity cm^3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 300 mbar (relative pressure)</td>
<td>25 _ 25</td>
<td></td>
<td>25 _ 25</td>
<td></td>
</tr>
<tr>
<td>Weight Kg (lbs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 300 mbar (relative pressure)</td>
<td>30 (66)</td>
<td>32 (70.5)</td>
<td>30 (66)</td>
<td>32 (70.5)</td>
</tr>
<tr>
<td>Storage temperature °C (°F)</td>
<td>+ 20 (+ 68)</td>
<td>+ 20 (+ 68)</td>
<td>+ 20 (+ 68)</td>
<td>+ 20 (+ 68)</td>
</tr>
<tr>
<td>- mini -10 (+ 14) / maxi 60 (+ 140)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exhaust port DN 25 ISO-KF</td>
<td>101 (3.97)</td>
<td>21.5 (0.84)</td>
<td>101 (3.97)</td>
<td>21.5 (0.84)</td>
</tr>
<tr>
<td>Inlet port DN 25 ISO-KF</td>
<td>150 (5.9)</td>
<td>5.9 (0.23)</td>
<td>150 (5.9)</td>
<td>5.9 (0.23)</td>
</tr>
<tr>
<td>Fan flowrate m^3/h</td>
<td>410</td>
<td>410</td>
<td>410</td>
<td>410</td>
</tr>
<tr>
<td>Exhaust DN 25 ISO-KF</td>
<td>278 (10.94)</td>
<td>278 (10.94)</td>
<td>278 (10.94)</td>
<td>278 (10.94)</td>
</tr>
<tr>
<td>R1A connector (Modele G)</td>
<td>110 (3.94)</td>
<td>21.5 (0.84)</td>
<td>110 (3.94)</td>
<td>21.5 (0.84)</td>
</tr>
<tr>
<td>Accessory</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Vacuum Technology France - ACP Series User’s Manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes

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.
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.).

<table>
<thead>
<tr>
<th>Model</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPF 25 (for ACP 15/28)</td>
<td>111 649</td>
</tr>
<tr>
<td>IPF 40 (for ACP 40)</td>
<td>111 647</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silencer ES25S</td>
<td>109 873</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRC 28-40 for ACP28/ACP40</td>
<td>112 637</td>
</tr>
<tr>
<td>NRC15 for pump ACP 15</td>
<td>111 968</td>
</tr>
<tr>
<td>Sound enclosure (-10 dBA) for ACP 15</td>
<td>112 779</td>
</tr>
</tbody>
</table>

**Frequency converter interface plug**
In order to recover the information «pump at speed» (B40)

<table>
<thead>
<tr>
<th>Model</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency converter interface plug</td>
<td>112 581</td>
</tr>
</tbody>
</table>
**Pump holding device**

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump holding device</td>
<td>112 846</td>
</tr>
</tbody>
</table>

Dimensions mm/(inch)

- 300 (11.8) [ACP 15]
- 450 (17.7) [ACP 28-40]
- 240 (9.45)
- 254 (10)

Holding plates
## Installation

### User’s Manual ACP Series

#### Detailed contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Subsections</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 00</td>
<td>Safety instructions</td>
<td>- Unpacking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Installation and start-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Operation</td>
</tr>
<tr>
<td>B 10</td>
<td>Installation of ACP Series pump</td>
<td>- Unpacking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Equipment storage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ventilation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Installation safety instructions</td>
</tr>
<tr>
<td>B 20</td>
<td>Mechanical connections</td>
<td>- Inlet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Exhaust</td>
</tr>
<tr>
<td>B 30</td>
<td>Electrical connections</td>
<td>- General</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Rear panel of the pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Circuit breaker</td>
</tr>
<tr>
<td>B 40</td>
<td>Remote control connector wiring</td>
<td>- Remote control principle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Wiring of the remote control plug</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Wiring of output S2</td>
</tr>
<tr>
<td>B 41</td>
<td>RS 485 serial link wiring</td>
<td>- Factory configuration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RS 485 connector wiring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RS 485 serial link</td>
</tr>
<tr>
<td>B 50</td>
<td>Inert gas purge connection (G version)</td>
<td>- Gas line connection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Nitrogen flowrate adjustment</td>
</tr>
</tbody>
</table>
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. If 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.
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 guaranteed (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.
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 appropriate 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.
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 threaded holes located on the top side of the pump.

<table>
<thead>
<tr>
<th>Model type</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP 15/15 G</td>
<td>23 kg</td>
</tr>
<tr>
<td>ACP 28/28G</td>
<td>30 kg</td>
</tr>
<tr>
<td>ACP 40/40G</td>
<td>32 kg</td>
</tr>
</tbody>
</table>

- 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.
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.

---

No relevant diagrams are attached to the text.
Mechanical connections

Inlet

Connect the pump inlet to the equipment with connecting accessories (see manufacturer’s catalog).

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

Exhaust

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.

WARNING
Remove the blank off blocking the inlet and exhaust ports: these components prevent foreign 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.

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 particles, 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.

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.
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 responsibility 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.).
Electrical connections

Rear panel of the pump

- In accordance with recommendations 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:

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage range</th>
<th>Current</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP 15</td>
<td>110 V / 230 V</td>
<td>10 A / 5 A</td>
<td>1150 VA</td>
</tr>
<tr>
<td>ACP 28 / 40</td>
<td>110 V / 230 V 50/60 Hz</td>
<td>10 A / 5 A</td>
<td>1150 VA</td>
</tr>
</tbody>
</table>

- 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).
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):

<table>
<thead>
<tr>
<th>Contact status</th>
<th>Contact status</th>
<th>Contact status</th>
<th>Hz</th>
<th>rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3 = 1</td>
<td>S4 = 0</td>
<td>S5 = 1</td>
<td>60</td>
<td>3 600</td>
</tr>
<tr>
<td>S3 = 1</td>
<td>S4 = 0</td>
<td>S5 = 0</td>
<td>70</td>
<td>4 200</td>
</tr>
<tr>
<td>S3 = 0</td>
<td>S4 = 1</td>
<td>S5 = 1</td>
<td>80</td>
<td>4 800</td>
</tr>
<tr>
<td>S3 = 0</td>
<td>S4 = 1</td>
<td>S5 = 0</td>
<td>90</td>
<td>5 400</td>
</tr>
<tr>
<td>S3 = 0</td>
<td>S4 = 0</td>
<td>S5 = 1</td>
<td>95</td>
<td>5 700</td>
</tr>
<tr>
<td>S3 = 0</td>
<td>S4 = 0</td>
<td>S5 = 0</td>
<td>100</td>
<td>6 000</td>
</tr>
</tbody>
</table>

ACP 28 - ACP 40 Model

<table>
<thead>
<tr>
<th>Contact status</th>
<th>Contact status</th>
<th>Contact status</th>
<th>Hz</th>
<th>rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3 = 1</td>
<td>S4 = 1</td>
<td>S5 = 0</td>
<td>42</td>
<td>2 500</td>
</tr>
<tr>
<td>S3 = 1</td>
<td>S4 = 0</td>
<td>S5 = 0</td>
<td>50</td>
<td>3 000</td>
</tr>
<tr>
<td>S3 = 0</td>
<td>S4 = 1</td>
<td>S5 = 0</td>
<td>65</td>
<td>3 900</td>
</tr>
<tr>
<td>S3 = 0</td>
<td>S4 = 0</td>
<td>S5 = 0</td>
<td>80</td>
<td>4 800</td>
</tr>
</tbody>
</table>

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

The serial link allows to control and monitor several pumps in a network.
- Transmission speed: **9600 bauds**
- Data length: **8 bits**
- Parity: **none**
- Stop bit: **1**

**RS 485 connector wiring**

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.

**RS 485 serial link**

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

<table>
<thead>
<tr>
<th>Nitrogen flowrate adjustment</th>
<th>ACP 15</th>
<th>ACP 28/40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flowrate max (slm)</td>
<td>5</td>
<td>1.65</td>
</tr>
<tr>
<td>Ultimate pressure (mbar)</td>
<td>3 x 10^{-1}</td>
<td>1 x 10^{-1}</td>
</tr>
</tbody>
</table>

e.g: ACP 28 G

Gas line supply R 1/4 connector
C 10  
**Pump operation**
- Pump temperature for start-up condition
- Operation in local mode
- Operation in remote mode
- Pump start-up
- Pumping of condensable vapors
- Pump stop

C 20  
**Detailed description of RS 485 commands**
- Conventions applicable to the syntax of all commands
- The commands
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**

![Diagram of 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.
Pump operation

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

**CAUTION**
Neutral gas 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 (C20).
**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 (ascii 44)

**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

<table>
<thead>
<tr>
<th>ADR</th>
<th>Specifies the address of the device for networking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td><code>#adrADRaaa&lt;CR&gt;[LF]</code></td>
</tr>
<tr>
<td></td>
<td><code>adr</code> = product address before the command</td>
</tr>
<tr>
<td></td>
<td><code>aaa</code> = new address of the product</td>
</tr>
<tr>
<td></td>
<td>condition : $000 \leq \text{aaa} \leq 255$</td>
</tr>
<tr>
<td>Result</td>
<td><code>#aaa,ok</code> or <code>Err2</code></td>
</tr>
<tr>
<td></td>
<td>This command is used to allocate a specific number to each of the products making up a network.</td>
</tr>
<tr>
<td></td>
<td>It’s important to record each product address.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IDN</th>
<th>Identifies the device which is communicating and its software version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td><code>#adrIDN&lt;CR&gt;[LF]</code></td>
</tr>
<tr>
<td>Result</td>
<td><code>#adr, VPxxxxx – Vx.zz</code></td>
</tr>
<tr>
<td></td>
<td>Return the type of pump, ACP15, ACP28 or ACP 40 depending on the variator, the software version (x) and software release (zz).</td>
</tr>
<tr>
<td></td>
<td>Ex : <code>#004,ACP28– V1.03</code>: product address 004 controls ACP 28 with a software release V1.03.</td>
</tr>
</tbody>
</table>
### Detailed description of RS 485 commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Syntax</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NSP</strong></td>
<td>Switches the speed set point to the nominal speed value</td>
<td>#adrNSP&lt;CR&gt;[LF]</td>
<td>#adr, ok</td>
</tr>
<tr>
<td><strong>RPM</strong></td>
<td>Defines the speed set point in stand-by mode</td>
<td>#adrRPMnnnn&lt;CR&gt;[LF]</td>
<td>#adr, ok or #adr, Errx (x = 1) out of range, 2: parameter error, 3: context error.</td>
</tr>
<tr>
<td><strong>SBY</strong></td>
<td>Switches the speed set point to the stand-by value</td>
<td>#adrSBY&lt;CR&gt;[LF]</td>
<td>#adr, ok</td>
</tr>
</tbody>
</table>
| **ACP** | Defines the operating status of the pump | #adrACPON<CR>[LF] : start pump rotation  
#adr OFF<CR>[LF] : stop pump | #adr, ok or #adr, Err3 if the pump is already in the requested state (context error). |

Note: you must send the SBY command, before changing the pump rotational speed using RPM command.

Max. speed: ACP15: 6000 rpm (100 Hz); ACP 28/40 or RVP: 4800 rpm (80 Hz).

Syntax:
- #adrNSP: switches the speed set point to the nominal speed value
- #adrRPM: defines the speed set point in stand-by mode
- #adrSBY: switches the speed set point to the stand-by value
- #adrACPON: starts pump rotation
- #adr OFF: stops pump

Result:
- #adr, ok: success
- #adr, Errx: error
  - x = 1: out of range
  - x = 2: parameter error
  - x = 3: context error
Detailed description of RS 485 commands

STA Returns the state of the internal dynamic parameters

**Syntax**

```
#adrSTA<CR>[LF]
```

**Result**

```
#adr,xxxxxx,yyyyyy,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
```

*state bits*

```
x x x x x x
```

- 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)

*fault bits*

```
y y y y y y
```

- 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)

*alert bits*

```
z z z z z z
```

- 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)

*iii: Motor power in Watts, codified on 4 decimal figures*

(eg: power 450 W: iii = 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).
Maintenance - Troubleshooting

User’s Manual ACP Series

Detailed contents

D 10

Maintenance schedule
### Maintenance schedule

<table>
<thead>
<tr>
<th>Model</th>
<th>Timing (every...)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP 15</td>
<td>20,000 h or 4 years</td>
<td>Complete maintenance:</td>
</tr>
</tbody>
</table>
| ACP 28, ACP 40 | 22,000 h or 4 years | • oil draining  
• LP and HP bearing replacement  
• seal replacement |

* The manufacturer Center Service address 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.
Safety instructions related to maintenance

- Safety instructions
- Procedure for returning vaccum pumps
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.

**Recommendations**
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.
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 addresses 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 (available in manufacturer’s catalog):

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Centering ring with O-ring</td>
<td>068 193</td>
<td>068 189</td>
<td>068 194</td>
</tr>
<tr>
<td>Stainless steel blank flange</td>
<td>068 195</td>
<td>068 196</td>
<td>068 197</td>
</tr>
<tr>
<td>Clamp</td>
<td>083 333</td>
<td>083 264</td>
<td>087 163</td>
</tr>
</tbody>
</table>

How 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
## Appendix

**User’s Manual ACP Series**

**Detailed contents**

<table>
<thead>
<tr>
<th>G 10</th>
<th>ACP 15 / 15 G pumping curves</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 11</td>
<td>ACP 28 / 28 G pumping curves</td>
</tr>
<tr>
<td>G 12</td>
<td>ACP 40 / 40 G pumping curves</td>
</tr>
<tr>
<td>G 100</td>
<td>Declaration of conformity</td>
</tr>
<tr>
<td>G 200</td>
<td>Safety Questionnaire</td>
</tr>
</tbody>
</table>
ACP 15 / 15 G pumping curves

Inlet pressure (mbar)

Pumping speed (m³/h)

Pressure drop
volume = 1m³

Pressure (mbar)

Time (mn)
ACP 28 / 28 G pumping curves

![Graph showing pumping curves for ACP 28 and ACP 28 G, with specific pressure drop and volume details.](image-url)
ACP 40 / 40 G pumping curves

Pumping speed $[m^3/h]$

- ACP 40
- ACP 40 G, purge 300 mbar

Inlet pressure $[mbar]$

Pressure drop
volume $= 1 m^3$

Inlet pressure $[mbar]$

- ACP 40
- ACP 40 G, purge 300 mbar

Time $[mn]$
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
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, induced 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
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 safety 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.
**QUESTIONNAIRE DE SECURITE**  
SAFETY QUESTIONNAIRE

*Procédure de retour des Pompes à Vides et Détecteur de Fuite à Hélium ADIXEN*  
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

<table>
<thead>
<tr>
<th>Nom Société - Name of company:</th>
<th>Nom personne - Name of person:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Qui remplit ce formulaire) - [Who has filled in questionnaire)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fonction - Position:</th>
<th>N° Tél. - Tel. no:</th>
</tr>
</thead>
<tbody>
<tr>
<td>N° Fax - Fax no:</td>
<td>[Pour renseignements-éventuels sur les produits utilisés] - [For any information on products used)</td>
</tr>
</tbody>
</table>

**EQUIPEMENT - EQUIPEMENT**

<table>
<thead>
<tr>
<th>Description:</th>
<th>N° Série - Serial no:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type de procédé - type of process:</td>
<td>[Pour lequel l'équipement est utilisé] - [For which equipment is used)</td>
</tr>
<tr>
<td>Date de l'expédition - Date of consignment:</td>
<td></td>
</tr>
</tbody>
</table>

### INTERVENTION - SERVICE

<table>
<thead>
<tr>
<th>Intervention souhaitée (Révision, réparation,...) - Service required(overhaul, repair, etc.):</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Type d'anomalie constatée - Type of anomaly observed:</th>
</tr>
</thead>
</table>

### PROCEDE CUIVRE - COPPER PROCESS

Produit utilisé sur un procédé Cuivre - Product used on a Copper process

<table>
<thead>
<tr>
<th>Oui – Yes</th>
<th>Non – No</th>
</tr>
</thead>
</table>

### 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:

<table>
<thead>
<tr>
<th>Ces produits présentent un risque de nature</th>
<th>These substances present the following risks</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Chimique - Chemical</th>
<th>Explication détaillée - Detailed explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxique - Toxic</td>
<td>Si &quot;Oui&quot; risque de nature - IF &quot;Yes&quot;, what type of risk</td>
</tr>
<tr>
<td>Cancérogène - Carcinogenic</td>
<td></td>
</tr>
<tr>
<td>Combustible - Combustible</td>
<td></td>
</tr>
<tr>
<td>Corrosive - Corrosive</td>
<td></td>
</tr>
<tr>
<td>Explosif - Explosive</td>
<td></td>
</tr>
<tr>
<td>Biologique - Biological</td>
<td></td>
</tr>
<tr>
<td>Radioactif - Radioactive</td>
<td></td>
</tr>
<tr>
<td>Autre - Other</td>
<td></td>
</tr>
</tbody>
</table>

(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 précitées 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.

Réponse "Oui" (fermeture étanche de l'aspiration et du refoulement) - Reply "Yes" (seal inlet and outlet ports with blank flanges)

<table>
<thead>
<tr>
<th>Nom - Name:</th>
<th>Fonction - Position:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>Signature autorisée - Authorised signature:</td>
</tr>
</tbody>
</table>

Réponse "Non" (sans risque) - Reply "No" (no risk)

<table>
<thead>
<tr>
<th>Nom - Name:</th>
<th>Fonction - Position:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
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Tampon / Cachet - Stamp / Seal

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*ALCATEL Vacuum Technology France – 98, avenue de Brogny – B.P. 2069 – 74099 ANNECY CEDEX*  
*Tél. (33) 4 50 65 77 77 – Fax (33) 4 50 65 75 77 – Web site: www.adixen.com*