ATP SERIES

LES POMPES TURBOMOLECULAIRES
TURBOMOLECULAR PUMPS

Manuel de l’utilisat
User’s manual
Alcatel Vacuum Technology, as part of the Alcatel-Lucent Group, has been supplying vacuum pumps, helium and hydrogen leak detection systems, plasma sensors, vacuum measurement 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 45 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 its subsidiaries, Alcatel Hochvakuumtechnik (Germany), Alcatel Vacuum Technology UK (Scotland), Alcatel Vacuum Technology Benelux (Netherlands), Alcatel Vacuum Systems (Italy) and more recently Adixen Sensistor AB in Sweden (in 2007) 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, 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 Alcatel turbomolecular pump. We would like to thank you and are proud to count you as one of our customers.

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

In order to ensure the best possible performance of the equipment and your complete satisfaction in using it, we advise you to read this manual carefully before any intervention on your pump and to pay particular attention to the equipment installation and start-up section.

Applications:

• Industry
  Cryogenics, Freeze drying, Vacuum drying, etc.

• Instrumentation
  Mass spectrometry, surface analysis, etc.

• Research and Development
  Ultra-high vacuum systems, Particle accelerators, etc.

• Various semiconductor processes

Advantages:

The reliable and sturdy design of ATP pumps ensures performance suited to the fields of application concerned.

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<td>Detailed description of RS commands</td>
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<td>type Board and Brick</td>
<td>B 130</td>
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<tr>
<td>Functions of integrable controller</td>
<td></td>
</tr>
<tr>
<td>type OEM Board</td>
<td>B 140</td>
</tr>
</tbody>
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* These chapters are included into the ball bearing replacement manual delivered with the specific tool.
Chapter A

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Introduction to the ATP range and its associated ACT controllers

ATP turbomolecular pumps

- Ceramic ball bearings lubricated with grease;
- Adjustable rotation speed between 6000 and 27000 rpm;
- Natural convection, air or water cooling;
- "C" version for corrosive application with nitrogen purge;
- "HPC" high pressure version for semiconductor applications.

Main characteristics

ACT Controllers

- Alphanumeric display;
- Membran keyboard;
- Monitoring of testing and troubleshooting parameters;
- Dry contact interface for status signals;

The range of ACT controllers offers flexible use and interfacing:

- Optocoupled control inputs;
- RS 232/485 serial links;
- Operation at all voltages between 85 and 264 V, 50/60 Hz.

3 controller models type ACT
Introduction to the ATP range and its associated ACT controllers

The different products available

<table>
<thead>
<tr>
<th>The pumps</th>
<th>ATP 80 C</th>
<th>ATP 100 C</th>
<th>ATP 150 C</th>
<th>ATP 400 C</th>
<th>ATP 900 C</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 63 CF-F</td>
<td>DN 100 CF-F</td>
<td>DN 100 CF-F</td>
<td>DN 160 CF-F</td>
<td>DN 200 CF-F</td>
<td></td>
</tr>
<tr>
<td>Cooling type</td>
<td>natural convection</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>air</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>water</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The pumps</th>
<th>ATP 400 HPC</th>
<th>ATP 900 HPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake flange</td>
<td>DN 100 ISO-K</td>
<td>DN 100 ISO-K</td>
</tr>
<tr>
<td>DN 160 ISO-K</td>
<td>DN 200 ISO-K</td>
<td></td>
</tr>
<tr>
<td>DN 200 CF-F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water cooling</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The controllers</th>
<th>ACT 200 T</th>
<th>ACT 600 T</th>
<th>ACT 1000 T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable length</td>
<td>1 m / 1,5 m</td>
<td>1 m / 1,5 m</td>
<td>3.5 m / 5 m</td>
</tr>
<tr>
<td>3.5 m / 5 m</td>
<td>3.5 m / 5 m</td>
<td>3.5 m / 5 m</td>
<td></td>
</tr>
<tr>
<td>10 m / 20 m</td>
<td>10 m / 15 m / 20 m</td>
<td>10 m</td>
<td></td>
</tr>
<tr>
<td>Electronic boards to be inserted in a rack</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>
Turbomolecular pump operating principle

Functional diagram
In molecular operation, the gas molecules of the vacuum system arrive at the pump intake. They are trapped between the rotating disks of the rotor and the stationary disks of the stator and carried to the exhaust of the pump.

The ceramic ball bearings lubricated with grease enable the pump to be fitted in any position.

The turbomolecular pump in an installation
At the turbomolecular pump exhaust, the gases are evacuated to the atmosphere by a primary pump. Since the ATP compression rate is set by the design, the ATP limit pressure is given by that of the primary pump used.
The different versions:
Standard, "C" Corrosive, etc.

Standard Version
Pumping of clean, non-corrosive gases

As for the entire range, the pump rotation speed is adjustable, making it possible to produce the optimum pumping characteristics for the customer's application. There are two different types of speed:
- the nominal speed which corresponds to the maximum rotation speed of the pump, or 27000 rpm;
- the reduced speed, or STANDBY speed, adjustable between 6000 and 27000 rpm.

"C" Version
Corrosive applications

The inverted dynamic seal creates a high compression rate between the bearings and the pump exhaust and thus minimizes the quantity of corrosive gases in contact with the bearings.

When used with a gas purge for high flow rate applications, the dynamic seal can, on its own, provide excellent protection for ultravacuum applications.
The different versions:
"HPC" High Pressure Corrosive

"HPC" Version

Corrosive version for semiconductor applications

These pumps are specially designed for high flow rate applications in semiconductor applications. They provide:
- increased bearing protection;
- effective bearing protection when the purge is stopped during equipment calibration;
- a reduction in the purge gas flow rate;
- a long bearing service life in the presence of corrosive gases.

The pumps can be heated by the water circuit to prevent condensation of the process gases (water circuit temperature ≤ 65°C).
Local mode control

The front panel of the unit comprises:

- Parameter selection and configuration keys
- Manual control keys
- Parameter and message LCD display
- Pump status indicator lights

Remote controls

1. The remote control

   The remote control with the REMOTE CONTROL connector is used:
   - for the remote control of the START, STOP, STANDBY functions;
   - to replicate the monitoring parameters available in the form of dry contacts.

2. RS 232 serial link

   The RS232 serial link is used to control and monitor the pump using a computer.

3. RS 485 serial link

   The RS485 serial link allows many pump installation in a network.

   The wiring characteristics are given on B 110.
The ACT 600 T and ACT 1000 T controllers are 1/2 rack units.
Accessories

Pump accessories

Screen filter
This filter protects the pump against solid particles.
Mesh size 6 mm.

<table>
<thead>
<tr>
<th>Filter P/N</th>
<th>Inlet flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO-K</td>
<td>063000 056844 056942 063158</td>
</tr>
<tr>
<td>CF-F</td>
<td>063115 056845 056928 063159</td>
</tr>
</tbody>
</table>

Compact filter
This filter stops particles ≥ 20 microns and is used in the event of high densities of dust or risks of implosion when pumping tubes or lamps.

<table>
<thead>
<tr>
<th>Filter P/N</th>
<th>Inlet flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO-K</td>
<td>063214 063215 063216 062911</td>
</tr>
</tbody>
</table>

Bake-out collar
This accelerates degassing and reduces the pressure lowering times.

<table>
<thead>
<tr>
<th>P/N</th>
<th>Pump type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP 80</td>
<td>ATP 100  ATP 150 ATP 400 ATP 900</td>
</tr>
<tr>
<td>200/240V</td>
<td>056934 096934 063028 101926 063324</td>
</tr>
<tr>
<td>50/60Hz</td>
<td></td>
</tr>
<tr>
<td>ATP 80</td>
<td>ATP 100  ATP 150 ATP 400 ATP 900</td>
</tr>
<tr>
<td>200/240V</td>
<td>063180 063180 063181 101927 063323</td>
</tr>
<tr>
<td>50/60Hz</td>
<td></td>
</tr>
</tbody>
</table>

Air refill
This is used to refill the pump with air after stopping pumping or for a power supply cut.

<table>
<thead>
<tr>
<th>Venting valves</th>
<th>Exhaust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powered and controlled by the ACT</td>
<td>101923*</td>
</tr>
<tr>
<td>Powered by the mains and controlled by the ACT</td>
<td></td>
</tr>
<tr>
<td>240V 50/60Hz</td>
<td>063177 063478</td>
</tr>
<tr>
<td>220V 50/60Hz</td>
<td>056994 063191</td>
</tr>
<tr>
<td>200V 50/60Hz</td>
<td>063176 063480</td>
</tr>
<tr>
<td>115V 50/60Hz</td>
<td>063089 063099</td>
</tr>
<tr>
<td>100V 50/60Hz</td>
<td>063175 063479</td>
</tr>
</tbody>
</table>

* ATP 900 only
## Accessories

### Reduction flanges

<table>
<thead>
<tr>
<th>Flange DN 1 / DN 2</th>
<th>Material</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 ISO-K / 25 ISO-KF</td>
<td>●</td>
<td>063268</td>
</tr>
<tr>
<td>63 ISO-K / 40 ISO-KF</td>
<td>●</td>
<td>063269</td>
</tr>
<tr>
<td>63 ISO-K / 50 ISO-KF</td>
<td>●</td>
<td>063270</td>
</tr>
<tr>
<td>63 ISO-K / 63 C.F-F</td>
<td>●</td>
<td>063267</td>
</tr>
<tr>
<td>100 ISO-K / 40 ISO-KF</td>
<td>●</td>
<td>063268</td>
</tr>
<tr>
<td>100 ISO-K / 50 ISO-KF</td>
<td>●</td>
<td>068912</td>
</tr>
<tr>
<td>100 ISO-K / 63 ISO-K</td>
<td>●</td>
<td>063290</td>
</tr>
<tr>
<td>160 ISO-K / 50 ISO-KF</td>
<td>●</td>
<td>063290</td>
</tr>
<tr>
<td>160 ISO-K / 63 ISO-K</td>
<td>●</td>
<td>063290</td>
</tr>
<tr>
<td>160 ISO-K / 100 ISO-K</td>
<td>●</td>
<td>063290</td>
</tr>
<tr>
<td>160 C.F-F / 100 C.F-F</td>
<td>●</td>
<td>062903</td>
</tr>
<tr>
<td>200 ISO-K / 63 ISO-K</td>
<td>●</td>
<td>062725</td>
</tr>
<tr>
<td>200 ISO-K / 100 ISO-K</td>
<td>●</td>
<td>062907</td>
</tr>
<tr>
<td>200 ISO-K / 160 ISO-K</td>
<td>●</td>
<td>062909</td>
</tr>
<tr>
<td>200 ISO-K / 160 ISO-K</td>
<td>●</td>
<td>062908</td>
</tr>
<tr>
<td>200 ISO-K / 250 ISO-K</td>
<td>●</td>
<td>066659</td>
</tr>
<tr>
<td>200 C.F-F / 250 C.F-F</td>
<td>●</td>
<td>066660</td>
</tr>
</tbody>
</table>

*ALU: Aluminium  **S.S.: Stainless Steel

### Power supply cable

Connection cable between the pump and the controller.

<table>
<thead>
<tr>
<th>Cable length</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT 200 T</td>
<td>ACT 600 T</td>
</tr>
<tr>
<td>1 m</td>
<td>105185</td>
</tr>
<tr>
<td>1.5 m</td>
<td>A458759</td>
</tr>
<tr>
<td>3.5 m</td>
<td>101956</td>
</tr>
<tr>
<td>5 m</td>
<td>101957</td>
</tr>
<tr>
<td>10 m</td>
<td>101958</td>
</tr>
<tr>
<td>15 m</td>
<td>-</td>
</tr>
<tr>
<td>20 m</td>
<td>A458477</td>
</tr>
</tbody>
</table>
Integrable controllers

ACT 200 T Brick
ACT 200 T Board

Electronic boards can be substituted to the box version of the controller ACT 200 T when the pump has to be integrated in a complex installation or equipment. They provide the functions of speed variator, logic control (controlled by serial link or dry contacts) and power supply (ACT 200 T Brick only) and all the necessary securities. The Board version must be supplied with DC.

ACT 600 T Brick
ACT 600 T Board

Also, these electronic boards can be substituted to the box version of the controller ACT 600 T.

<table>
<thead>
<tr>
<th>Controller</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT 200 T</td>
<td>101933</td>
</tr>
<tr>
<td>ACT 200 T Brick</td>
<td>103517</td>
</tr>
<tr>
<td>ACT 600 T</td>
<td>102018</td>
</tr>
<tr>
<td>ACT 600 T Brick</td>
<td>103997</td>
</tr>
</tbody>
</table>

Connect the integrable controllers to the pump by ordering separately the connection cable (see A 50 page 2).
Integrable controllers

OEM Board

The integrable controller “OEM Board” (derivated from CFV 100 former controller range) is a simple PC Board which can easily integrated in an installation. It can drive both ATP 80 and ATP 100 pumps, in local or by remote control.

OEM Board: P/N. P0022E4

Power supply cable

To connect the PC Board, it is necessary to separately order specific connection cable.

<table>
<thead>
<tr>
<th>Cable length</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,5 m</td>
<td>A458755</td>
</tr>
<tr>
<td>2,5 m</td>
<td>A458369</td>
</tr>
<tr>
<td>3,5 m</td>
<td>A458425</td>
</tr>
<tr>
<td>5 m</td>
<td>A458423</td>
</tr>
<tr>
<td>10 m</td>
<td>A458424</td>
</tr>
</tbody>
</table>

Accessories

Some accessories can be connected to the OEM Board to extend some functions.

<table>
<thead>
<tr>
<th>OEM Board accessories</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time meter 5 V</td>
<td>062761</td>
</tr>
<tr>
<td>Time meter 10 V</td>
<td>062320</td>
</tr>
<tr>
<td>Outside light kit</td>
<td>062939</td>
</tr>
<tr>
<td>Interface kit</td>
<td>062969</td>
</tr>
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</table>
## Technical characteristics of pumps

### Standard version

<table>
<thead>
<tr>
<th>Model characteristics</th>
<th>80</th>
<th>100</th>
<th>150</th>
<th>400</th>
<th>900</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inlet flange</strong></td>
<td>DN</td>
<td>63 ISO</td>
<td>63 CFF</td>
<td>100 ISO</td>
<td>100 CFF</td>
</tr>
<tr>
<td><strong>Pumping speed</strong></td>
<td></td>
<td>l/s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N₂</td>
<td>80</td>
<td>100</td>
<td>140</td>
<td>400</td>
<td>900</td>
</tr>
<tr>
<td>He</td>
<td>50</td>
<td>60</td>
<td>100</td>
<td>300</td>
<td>540</td>
</tr>
<tr>
<td><strong>Compression rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N₂</td>
<td>8x10⁻⁷</td>
<td>8x10⁻⁷</td>
<td>7x10⁻⁸</td>
<td>7x10⁻⁸</td>
<td>1x10⁻⁹</td>
</tr>
<tr>
<td>He</td>
<td>2500</td>
<td>2500</td>
<td>1.2x10⁻⁴</td>
<td>1.5x10⁻⁴</td>
<td>2x10⁻⁴</td>
</tr>
<tr>
<td>H₂</td>
<td>300</td>
<td>300</td>
<td>1x10⁻³</td>
<td>1x10⁻³</td>
<td>2x10⁻³</td>
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<tr>
<td><strong>Rotation speed</strong></td>
<td>rpm</td>
<td>27000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reduced speed</strong></td>
<td>rpm</td>
<td>from 6000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sound level</strong></td>
<td>dB</td>
<td>≤ 53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Start-up time</strong></td>
<td>min</td>
<td>1min45s</td>
<td>1min45s</td>
<td>2min</td>
<td>3min</td>
</tr>
<tr>
<td><strong>Exhaust flange</strong></td>
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<td>DN 25</td>
<td>DN 25</td>
<td>DN 25</td>
<td>DN 40</td>
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### Standard version characteristics

<table>
<thead>
<tr>
<th>ATP 80</th>
<th>ATP 100</th>
<th>ATP 150</th>
<th>ATP 400</th>
<th>ATP 900</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limit pressure</strong>* measured acc. to Pneurop standard**</td>
<td>mbar</td>
<td>5x10⁻⁹</td>
<td>5x10⁻⁹</td>
<td>5x10⁻¹⁰</td>
</tr>
<tr>
<td><strong>Maximum pressure at inlet in continuous operation</strong></td>
<td>mbar</td>
<td>1x10⁻¹</td>
<td>1x10⁻¹</td>
<td>1x10⁻¹</td>
</tr>
<tr>
<td><strong>Maximum permissible pressure at exhaust</strong></td>
<td>mbar</td>
<td>2x10⁻¹</td>
<td>3x10⁻¹</td>
<td>4x10⁻¹</td>
</tr>
<tr>
<td><strong>Maximum ambient temperature</strong></td>
<td>°C</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flange drying temperature</strong></td>
<td>°C</td>
<td>120</td>
<td>120</td>
<td>100</td>
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<tr>
<td><strong>natural cooling</strong></td>
<td>kg</td>
<td>3</td>
<td>4.3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>kg</td>
<td>4</td>
<td>5.3</td>
<td>4</td>
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<tr>
<td><strong>water cooling</strong></td>
<td>kg</td>
<td>3.4</td>
<td>4.4</td>
<td>3.5</td>
</tr>
<tr>
<td><strong>Recommended primary pump</strong></td>
<td>Pascal 2005</td>
<td>Pascal 2005</td>
<td>Pascal 2005</td>
<td>Pascal 2015</td>
</tr>
</tbody>
</table>

---

* For a water-cooled pump with CFF flange and exhaust pressure < 1.10⁻² mbar.

** The two maximum pressures cannot occur at the same time.
### Technical characteristics of pumps

#### Corrosive version «C»

<table>
<thead>
<tr>
<th>Model characteristics</th>
<th>80</th>
<th>100</th>
<th>150</th>
<th>400</th>
<th>900</th>
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<tr>
<td><strong>Inlet flange DN</strong></td>
<td>63 ISO</td>
<td>63 CF-F</td>
<td>100 ISO</td>
<td>100 CF-F</td>
<td>100 ISO</td>
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<td><strong>Pumping speed l/s</strong></td>
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</tr>
<tr>
<td>N₂</td>
<td>80</td>
<td>100</td>
<td>140</td>
<td>400</td>
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<tr>
<td>He</td>
<td>50</td>
<td>60</td>
<td>100</td>
<td>300</td>
<td>540</td>
</tr>
<tr>
<td>H₂</td>
<td>40</td>
<td>40</td>
<td>80</td>
<td>250</td>
<td>300</td>
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<td></td>
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</tr>
<tr>
<td>N₂</td>
<td>8x10⁷</td>
<td>8x10⁷</td>
<td>7x10⁸</td>
<td>7x10⁸</td>
<td>1x10⁹</td>
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<tr>
<td>He</td>
<td>2500</td>
<td>2500</td>
<td>1.2x10⁴</td>
<td>1.5x10⁴</td>
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<tr>
<td>H₂</td>
<td>300</td>
<td>300</td>
<td>1x10³</td>
<td>1x10³</td>
<td>2x10³</td>
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<tr>
<td><strong>Rotation speed rpm</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td><strong>Reduced speed rpm</strong></td>
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<td></td>
<td></td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sound level dBA</strong></td>
<td>≤ 53</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Start-up time (0 to 27000)</strong></td>
<td>1min45s</td>
<td>1min45s</td>
<td>2min</td>
<td>3min</td>
<td>3min</td>
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<tr>
<td><strong>Exhaust flange ISO-KF</strong></td>
<td>DN 25</td>
<td>DN 25</td>
<td>DN 25</td>
<td>DN 40</td>
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#### Corrosives versions Characteristics

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<tr>
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<th>ATP 80 C</th>
<th>ATP 100 C</th>
<th>ATP 150 C</th>
<th>ATP 400 C</th>
<th>ATP 900 C</th>
</tr>
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<tbody>
<tr>
<td>Limit pressure* without purge meas. according to Pneurop standard mbar</td>
<td>5x10⁹</td>
<td>5x10⁹</td>
<td>5x10¹⁰</td>
<td>8x10¹⁰</td>
<td>5x10¹⁰</td>
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<tr>
<td>Limit pressure* with purge meas. according to Pneurop standard mbar</td>
<td>5x10⁸</td>
<td>5x10⁸</td>
<td>1x10⁷</td>
<td>1x10⁷</td>
<td>1x10⁷</td>
</tr>
<tr>
<td>N₂ purge flow rate SCCM</td>
<td></td>
<td></td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum pressure at inlet in continuous operation** mbar</td>
<td>1x10⁻¹</td>
<td>1x10⁻¹</td>
<td>5x10⁻¹</td>
<td>2x10⁻²</td>
<td>1x10⁻²</td>
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<tr>
<td>Maximum permissible pressure at exhaust** mbar</td>
<td>2x10⁻¹</td>
<td>3x10⁻¹</td>
<td>4x10⁻¹</td>
<td>2x10⁻¹</td>
<td>1x10⁻¹</td>
</tr>
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<td>Maximum ambient temperature* °C</td>
<td>120</td>
<td>120</td>
<td>40</td>
<td>40</td>
<td>40 50</td>
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<tr>
<td>Flange drying temperature °C</td>
<td></td>
<td></td>
<td>120</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>N₂ purge flange ISO-KF</td>
<td></td>
<td>DN 16</td>
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<td></td>
<td></td>
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<tr>
<td>Weight kg</td>
<td>air cooling</td>
<td>4</td>
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<td>4.5</td>
<td>6.5</td>
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<tr>
<td></td>
<td>water cooling</td>
<td>3.4</td>
<td>4.4</td>
<td>3.5</td>
<td>4.7</td>
</tr>
</tbody>
</table>

* * For a water-cooled pump with CF-F flange and exhaust pressure < 1.10⁻² mbar.
** The two maximum pressures cannot occur at the same time.
## Technical characteristics of pumps

### «HPC» version

<table>
<thead>
<tr>
<th>HPC version characteristics</th>
<th>ATP 400 HPC</th>
<th>ATP 900 HPC</th>
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<tbody>
<tr>
<td><strong>Inlet flange</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N2 i/s</td>
<td>325 380</td>
<td>700</td>
</tr>
<tr>
<td>Ar i/s</td>
<td>365 430</td>
<td>785</td>
</tr>
<tr>
<td>SF6 i/s</td>
<td>365 430</td>
<td>785</td>
</tr>
<tr>
<td><strong>Pumping speed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N2 l/s</td>
<td>325 380</td>
<td>700</td>
</tr>
<tr>
<td>Ar l/s</td>
<td>365 430</td>
<td>785</td>
</tr>
<tr>
<td>SF6 l/s</td>
<td>365 430</td>
<td>785</td>
</tr>
<tr>
<td><strong>Compression rate</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N2</td>
<td>7x10^6</td>
<td>1x10^7</td>
</tr>
<tr>
<td>Ar</td>
<td>700</td>
<td>2x10^3</td>
</tr>
<tr>
<td>SF6</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td><strong>Limit pressure without purge meas. according to Pneurop standard mbar</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N2</td>
<td>5x10^-8</td>
<td>5x10^-8</td>
</tr>
<tr>
<td>Ar</td>
<td>5x10^-8</td>
<td>5x10^-8</td>
</tr>
<tr>
<td>SF6</td>
<td>5x10^-8</td>
<td>5x10^-8</td>
</tr>
<tr>
<td><strong>Limit pressure with purge meas. according to Pneurop standard mbar</strong></td>
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<td></td>
</tr>
<tr>
<td>N2</td>
<td>8x10^-6</td>
<td>5x10^-5</td>
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<td>Ar</td>
<td>8x10^-6</td>
<td>5x10^-5</td>
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<tr>
<td>SF6</td>
<td>8x10^-6</td>
<td>5x10^-5</td>
</tr>
<tr>
<td><strong>N2 purge flow rate SCCM</strong></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum pressure at inlet in continuous operation</strong> mbar</td>
<td>1x10^-1</td>
<td>2x10^-2</td>
</tr>
<tr>
<td><strong>Maximum permissible pressure at exhaust</strong> mbar</td>
<td>6x10^-1</td>
<td>4x10^-2</td>
</tr>
<tr>
<td><strong>Rotation speed rpm</strong></td>
<td>27000</td>
<td></td>
</tr>
<tr>
<td><strong>Reduced speed rpm</strong></td>
<td>from 6000</td>
<td></td>
</tr>
<tr>
<td><strong>Start-up time (0 to 27000)</strong></td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum ambient temperature °C</strong></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td><strong>Water circuit temperature °C</strong></td>
<td>≤ 65</td>
<td></td>
</tr>
<tr>
<td><strong>Noise level dBA</strong></td>
<td>≤ 53</td>
<td></td>
</tr>
<tr>
<td><strong>Weight kg</strong></td>
<td>9 8.5 17.7</td>
<td></td>
</tr>
<tr>
<td><strong>Recommended primary pump</strong></td>
<td>2063 C2 or ADP81</td>
<td></td>
</tr>
<tr>
<td><strong>Exhaust flange ISO-KF DN</strong></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td><strong>Purge flange ISO-KF DN</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Max N2 flux with 2063CP+ SCCM</strong></td>
<td>340 400 450</td>
<td></td>
</tr>
</tbody>
</table>

* The two maximum pressures cannot occur at the same time
Dimensions of pumps

**ATP 80, ATP 100**

- **Inlet flange**
  - DN 63 ISO-K: R = 130, H = 151.5, C = 102, F = 95, N = - , D = - , A° = -
  - DN 63 CF-F: R = 145, H = 166.5, C = 117, F = 113.5, N = 8, D = 92.1, A° = 7.5°
  - DN 100 ISO-K: R = 103, H = 124.5, C = 75, F = 130, N = - , D = - , A° = -
  - DN 100 CF-F: R = 123, H = 144.5, C = 95, F = 148.5, N = 16, D = 130.2, A° = 18.75°

- **Water Inlet/Outlet**
  - (Any direction)
  - For tube diam. 4/6

- **Electrical connector**

- **N₂ PURGE**
  - DN 16 ISO-KF

- **Dimensions**
  - ø 12, 95.4, 26.2, 24.1, 13, 72.6, 119.9, 55.8, 111, 129.5, 122, 118, 102
Dimensions of pumps

ATP 150

A 80

Water Inlet/Outlet
(Any direction)
For tube diam. 4/6

N₂ PURGE
DN 16 ISO-KF

DN 25 ISO-KF

DN 100 CF-F

DN 100 ISO-K

Water Inlet/Outlet
(Any direction)
For tube diam. 4/6

DN 25 ISO-KF

DN 100 ISO-K

N₂ PURGE
DN 16 ISO-KF

DN 25 ISO-KF

DN 100 ISO-K

N₂ PURGE
DN 16 ISO-KF

DN 25 ISO-KF

DN 100 ISO-K

N₂ PURGE
DN 16 ISO-KF

DN 25 ISO-KF

DN 100 ISO-K

N₂ PURGE
DN 16 ISO-KF

DN 25 ISO-KF

DN 100 ISO-K

N₂ PURGE
DN 16 ISO-KF
### Dimensions of pumps

**ATP 400**

**Inlet flange**

<table>
<thead>
<tr>
<th>Inlet Flange</th>
<th>R</th>
<th>H</th>
<th>C</th>
<th>F</th>
<th>E</th>
<th>N</th>
<th>T</th>
<th>D</th>
<th>A°</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 100 ISO-K</td>
<td>181,6</td>
<td>247,4</td>
<td>146,9</td>
<td>130</td>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DN 100 CF-F</td>
<td>183,1</td>
<td>248,9</td>
<td>148,4</td>
<td>148,5</td>
<td>16</td>
<td>16</td>
<td>8,6</td>
<td>130,2</td>
<td>3,75°</td>
</tr>
<tr>
<td>DN 160 ISO-K</td>
<td>151,1</td>
<td>216,9</td>
<td>116,4</td>
<td>180</td>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DN 160 CF-F</td>
<td>168,1</td>
<td>233,9</td>
<td>133,4</td>
<td>198</td>
<td>16</td>
<td>20</td>
<td>8,6</td>
<td>181,1</td>
<td>6°</td>
</tr>
<tr>
<td>ASA 6°</td>
<td>161,1</td>
<td>225,9</td>
<td>125,4</td>
<td>279,4</td>
<td>19</td>
<td>8</td>
<td>20,6</td>
<td>241,3</td>
<td>22,5°</td>
</tr>
</tbody>
</table>

**Water Inlet/Outlet (Any direction)**

For tube diam. 4/6

- Grease
- Ø 189,5
- Ø 12,1
- Ø 189,5
- Ø F
- ISO-K

**Note:**

- Inlet flange specifications include dimensions for DN 100, DN 160, ASA 6°.
- Water inlet/outlet (any direction) with Ø 189.5 and Ø F.
- Grease specifications.
Dimensions of pumps

ATP 900

Inlet flange

<table>
<thead>
<tr>
<th>Flange Type</th>
<th>R</th>
<th>H</th>
<th>C</th>
<th>F</th>
<th>E</th>
<th>N</th>
<th>T</th>
<th>D</th>
<th>A°</th>
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<tbody>
<tr>
<td>DN 200 ISO-K</td>
<td>145,8</td>
<td>211,5</td>
<td>118,5</td>
<td>240</td>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DN 200 CF-F</td>
<td>165,8</td>
<td>231,5</td>
<td>138,5</td>
<td>253,2</td>
<td>20</td>
<td>24</td>
<td>8,6</td>
<td>231,9</td>
<td>7,5°</td>
</tr>
<tr>
<td>ASA 6&quot;</td>
<td>177,8</td>
<td>243,5</td>
<td>150,4</td>
<td>279,4</td>
<td>19</td>
<td>8</td>
<td>20,6</td>
<td>241,3</td>
<td>22,5°</td>
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Dimensions of pumps

ATP 400 HPC

Inlet flange

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<tr>
<th></th>
<th>R</th>
<th>H</th>
<th>C</th>
<th>F</th>
<th>E</th>
<th>N</th>
<th>T</th>
<th>D</th>
<th>A°</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 100 ISO-K</td>
<td>181,6</td>
<td>247,4</td>
<td>148,4</td>
<td>130</td>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DN 100 CF-F</td>
<td>183,1</td>
<td>248,9</td>
<td>148,4</td>
<td>148,5</td>
<td>16</td>
<td>16</td>
<td>8,6</td>
<td>130,2</td>
<td>3,75°</td>
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<tr>
<td>DN 160 ISO-K</td>
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<td>116,4</td>
<td>180</td>
<td>12</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<tr>
<td>DN 160 CF-F</td>
<td>168,1</td>
<td>233,9</td>
<td>133,4</td>
<td>198</td>
<td>16</td>
<td>20</td>
<td>8,6</td>
<td>181,1</td>
<td>6°</td>
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<tr>
<td>ASA 6&quot;</td>
<td>161,1</td>
<td>225,9</td>
<td>125,4</td>
<td>279,4</td>
<td>19</td>
<td>8</td>
<td>20,6</td>
<td>241,3</td>
<td>37,5°</td>
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Dimensions of pumps

ATP 900 HPC

<table>
<thead>
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<th>Inlet flange</th>
<th>R</th>
<th>H</th>
<th>C</th>
<th>F</th>
<th>E</th>
<th>N</th>
<th>T</th>
<th>D</th>
<th>A'</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 200 ISO-K</td>
<td>145,8</td>
<td>211,5</td>
<td>118,5</td>
<td>240</td>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DN 200 CF-F</td>
<td>165,8</td>
<td>231,5</td>
<td>138,5</td>
<td>253,2</td>
<td>20</td>
<td>24</td>
<td>8,6</td>
<td>231,9</td>
<td>7,5'</td>
</tr>
<tr>
<td>ASA 6°</td>
<td>177,8</td>
<td>243,5</td>
<td>150,4</td>
<td>279,4</td>
<td>19</td>
<td>8</td>
<td>20,6</td>
<td>241,3</td>
<td>22,5'</td>
</tr>
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</table>

Water Inlet/Outlet
(Any direction)
For tube diam. 4/6

N equidistant holes diam. T on diam. D
Controller technical characteristics

### Electrical characteristics

**ACT 200T and ACT 600T**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>ACT 200T</th>
<th>ACT 600T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight kg</td>
<td>2.6</td>
<td>4</td>
</tr>
<tr>
<td>Dimensions HxLxP mm</td>
<td>128.4x107x220</td>
<td>128.4x213x245</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>85-132 V et170-264V</td>
<td>48/63 Hz</td>
</tr>
<tr>
<td>Maximum current</td>
<td>5.8 A / 3 A</td>
<td></td>
</tr>
<tr>
<td>Maximum power W</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>T ≤ 50°C</td>
<td></td>
</tr>
<tr>
<td>Customer mains circuit breaker rating</td>
<td>10 A</td>
<td></td>
</tr>
</tbody>
</table>

#### Dimensions

**ACT 200T**

- 128.4 mm x 122.4 mm x 217 mm
- Ø 3

**ACT 600T**

- 198.1 mm x 122.4 mm x 242 mm
- Ø 3

---

Alcatel Vacuum Technology France - ATP User’s Manual
Controller technical characteristics

### Electrical characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>ACT 1000T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight kg</td>
<td>8.5</td>
</tr>
<tr>
<td>Dimensions HxLxP mm</td>
<td>132.5x219x453</td>
</tr>
<tr>
<td>Power supply 100-120 V 200-240 V 50/60 Hz</td>
<td>800</td>
</tr>
<tr>
<td>Maximum power W</td>
<td>109.5</td>
</tr>
<tr>
<td>Ambient operating temperature T ≤ 50°C</td>
<td>16 A</td>
</tr>
<tr>
<td>Customer mains circuit breaker rating</td>
<td>122.4</td>
</tr>
</tbody>
</table>

### Dimensions

![Diagram of ACT 1000T dimensions]
Integrable Brick & Board controller
technical characteristics

ACT 200 T Brick

Dimensions
(Board + Power supplying)

Power supplying of
ACT 200 T Brick

Nominal voltage: 115/230 V - 48/63 Hz
Maximum current: 5.8 A / 3 A
Maximum power: 100 W
Integrable Brick & Board controller
technical characteristics

ACT 200 T Board

It can be installed in an Europe size rack:
Height: 100 mm - Depth: 180 mm
Outside depth: 210 mm

Power supplying of ACT 200 T Board

Connector: type Molex Series 30-69 P.N. 09 - 91 - 0700 equipped with 7 contacts P.N. 08 - 050 - 0106

DC voltage necessary to supply the board:
+ 72 V / 1.4 A ± 1 V
+ 15 V / 0.25 A ± 100 mV
+ 5 V / 0.4 + 50 mV / - 100 mV

Functions of these integrable controllers (see B 130).
Integrable Brick & Board controller

technical characteristics

ACT 600 T Brick

Dimensions
(Board + Power supplying)

Power supplying of ACT 600 T Brick

- Nominal voltage: 115/230 V - 48/63 Hz
- Maximum current: 5.8 A / 3 A
- Maximum power: 300 W
Integrable Brick & Board controller
technical characteristics

**ACT 600 T Board**

It can be installed in an Europe size rack:
- Height: 100 mm
- Depth: 180 mm
- Outside depth: 210 mm

**Connecting**

Input/Output connector

- J1
- J5 R 15
- S3 J4
- J10

**Power supply connection**

Connector: type Molex Series 30-69 P.N. 09 - 91 - 0700 equipped with 7 contacts P.N. 08 - 050 - 0106

Voltages delivered by the board:
- +72 V / 4 A ± 1 V
- +15 V / 0.25 A ± 100 mV
- +5 V / 0.4 A + 50 mV / -100 mV

Functions of these integrable controllers *(see B 130).*
Integrable OEM Board controller
technical characteristics

**OEM Board**

Installed with M3 screws x 6, or in sliding rail (in Alcatel unit):
Dimensions: 213 x 98 mm.

**Power supplying of OEM Board**

A terminal plug with 7 pins, allows to supply the board 110 - 115 - 200 - 220 - 240 V AC, 50/60 Hz.

Secure the power line with an external time-delay fuse depending on the power supply:
1 A for 100 / 115 V
0.5 A for 200 / 220 / 240 V

Functions of these integrable controllers *(see B 140)*.
Safety instructions

Before switching on the pump, the user should study the manual and follow the safety instructions listed in the compliance certificate booklet supplied with the pump.

Unpacking

To keep your product in the clean condition in which it left our factory, we recommend to unpack the pump only on its assembly site.

It is advisable to keep the packaging.

Storage

• Our equipment can be stored without special precautions (ambient temperature between 5 and 40° C) provided that the running-in procedure specified in the manual is observed for the first operation of the pump.

• The seal kits must be stored away from heat and light (direct sunlight and ultraviolet radiation) in order to prevent any hardening of the elastomers.

Installation

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

Start-up
Safety instructions

Installation
Start-up (continued)

• Before any maintenance operations on a product performed by a maintenance technician who has not received safety training (EMC, electrical safety, chemical pollution, etc.), isolate the product from the various energy sources (electricity, compressed air, etc.).

• The EMC performance of the product is obtained on the condition that the installation complies with EMC rules. In particular, in disturbed environments, it is essential to:
  - use shielded cables and connections for interfaces,
  - stabilize the power supply line with meshing from the power supply source to a distance of 3 m from the product inlet.

• The units containing control circuits are designed to guarantee normal safety conditions taking their normal operating environment into account (use in rack). In specific cases of use on tables, make sure that no objects enter the ventilation openings or block the openings when handling the units.

• Certain controllers can be configured to start up automatically after a power cut. In this case, it is the user’s responsibility to take all the precautions required to prevent the risks resulting from this type of operation.

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

• When handling the equipment, use the devices provided for this purpose (hoisting rings, handle, etc.).
Safety instructions

Installation
Start-up
(continued)

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

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

• The vacuum pump is also a compressor: incorrect use may be dangerous.

Study the user manual before starting up the pump.

• The access to the rotor of a turbomolecular pump with an unconnected intake is dangerous. Similarly, if the pump is not switched on, it may be driven by another pump in operation (risk of cuts).

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

• The leaktightness 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 leaktightness particularly when pumping dangerous gases.
The pump can operate in any position.

The connection of the pump to the installation must be sufficiently rigid. For this, reduce the following as much as possible:
- dimensions $a$ and $b$ and the flexibility of the connection plate;
- the overhang $c$ between the pump and its anchor point.

The dimensions of the connection parts should be studied carefully:

![Diagram showing pump connections]

Some examples of unrecommended connection:

- A support plate with bellows.
- A rigid support.

The equipment attachment devices should be sufficiently rigid to prevent potential risks in the event of failure of a rotary component or a violent shock on the pump (exceptional phenomena).

For this, use the rotary flange attachment holes. If the intake flange is attached with grips, use:
- at least 3 grips for secondary pump $\leq 150$ l/s;
- at least 6 grips for secondary pump $> 150$ l/s.
Connect the vent electrovalve accessory on the pump.
Connect the pump to primary pumping circuit*.

Exhaust

Connect the nitrogen pipe to the DN16 purge fitting*. A built-in safety valve controls the pressure and guarantees a flow rate of 50 SCCM.

Ambient operating temperature
Air or natural convection cooled ATP: 0°C < T < 35°C;
Water-cooled ATP: 0°C < T < 50°C.

Inlet
Install the screen filter or compact filter accessory on the pump; connect the pump to the installation*.

Purge
for C and HPC models
A filtered dry nitrogen supply with the following characteristics is required:
- Dew point < 22°C
- Dust < 1µm
- Oil < 0.1ppm
- Absolute pressure of 1 to 1.3 bar.

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

* Different connection accessories can be found in the ALCATEL catalog.
Water cooling connection

Water characteristics
It is recommended to use cooling water with the following characteristics:
- pH between 7.5 and 11
- Hardness < 7 milli-equivalent/dm³
- Resistivity > 1500 Ω.cm
- Solid pollution < 100 mg/dm³
- Max pressure = 7 bars
- Temperature:
  10 < T < 25°C (Std and C) and 0 < T ≤ 65°C (HPC).

Connection
Connect the cooling circuit with a rigid stainless steel or copper pipe (int. diam. 4 mm - ext. diam. 6 mm) (supplied by customer).

The water flow rate is 0.2 to 1 l/min for water at 15°C at an ambient temperature of 25°C.
If the controller is remote controlled, make the various connections on the **REMOTE CONTROL** connector (see **B 60**).

If the controller unit is used in **local mode**: the pump can only operate if the plug is connected to the **REMOTE CONTROL** connector. (Connector plug delivered with the controller).

---

Display contrast setting

Connect the **electrical venting valve** powered by the mains and driven by the controller. (voir **B 60**).

Connect the controller to the pump using the cable ordered.

Connect the fan (ATP air cooled)

Connect the controller to the mains using the cable supplied. (Mains with earth connection)

---

**Fuse access**

**Power supply**

**Remote control connector plug** (factory wiring)

Wiring viewed on soldered side

---

**Display contrast setting**

**Connect the RS232/485 serial link cable to the connector** (cable supplied by customer)

**Fuse access**

**Power supply**

**Remote control connector plug** (factory wiring)

Wiring viewed on soldered side

---

<table>
<thead>
<tr>
<th>Delayed fuses</th>
<th>ACT 200T</th>
<th>3.15 A</th>
<th>250 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT 600T</td>
<td>6.3 A</td>
<td>250 V</td>
<td></td>
</tr>
</tbody>
</table>

---

Alcatel Vacuum Technology France - ATP User’s Manual
When the units containing the control circuits are equipped with dry contact outputs, it is the customer’s responsibility to use the outputs in compliance with safety regulations.

**The control by voltage**

The inputs are considered to be activated if the AC or DC voltage applied is between 5 and 30 Volts:

(DB 44 contacts, female connector)

These inputs can be controlled by external contacts using the following wiring:

**Principle of the input controlled by voltage**

- **Ext. Safety 31 - 32**
  When a voltage is applied on these inputs, the pump is running (see terminal plug wiring). The wiring of an external contact allows to signal an external safety when the contact is opened (i.e. emergency stop).

- **REMOTE Mode 33 - 34**
  When a voltage is applied on these inputs, the Remote is validated. The opening of an external wired contact allows Local mode (pump control using front panel keypad).

- **STANDBY Mode 35 - 36**
  When a voltage is applied on these inputs, the pump rotates at reduced speed. The opening of an external wired contact allows pump rotation at nominal speed.

- **Start/Stop 37 - 38**
  When a voltage is applied on these inputs, the pump starts up and accelerates to reach its nominal or reduced speed (depending on set parameters). The opening of an external wired contact allows pump stopping.
ACT 200 T and 600 T
"Remote Control" connector wiring

Signaling using output contacts: These are dry contacts (250VAC-1A), their function is to replicate the data concerning the pump operating status.

When the output contact is closed, this indicates:

| 1 - 2 | The pump is in running-in mode. |
| 5 - 6 | The pump is operating. |
| 7 - 8 | Copy of Start command. This contact can be used to drive the roughing pump (see C 50). |
| 9 - 10 | The standby mode is selected. |
| 11 - 12 | No faults are signalled. |
| 13 - 14 | The pump has reached its nominal speed. |
| 15 - 30 | The venting valve fitted in the pump is closed (accessory). |

A 0-10V analog output is used to monitor variations in certain pump parameters (speed, temperature, etc.). This data can be used to plot curves.

| 44 - 43 | Used to monitor the selected parameter in the “Set Analog output” menu (see B 70). |
ACT 200 T and ACT 600 T controller start-up

Once the various electrical connections have been made, set the main switch on the rear panel to "I".

The controller performs a self-test and identifies the pumps to which it can be connected.

The initialization time is approximately 12 seconds.

Display initialization

Indicator light test: they are lit in succession.

The equipment is identified: the programs versions are displayed.

The pump operation time and the speed are displayed.

The parameter setting keys

Parameter setting access • used to access the parameter setting mode.
• used to exit the various menus without validating the functions.

Selection • used to move in the menus, or from one parameter to another.
• used to select or adjust the value of the selected parameter.

Validation • used to validate the selection of a menu, parameter or value.
• used to exit the menus and return to the pump parameter display (on ACT 600 T).

Configure the parameters for the application using the various menus

Enter the sub-menus by pressing

Access the parameter programming.

Display the monitored parameters. List the faults and the alerts.

Select a running-in cycle; Start the cycle.
ACT 200 T and ACT 600 T
controller start-up

Configuring the controller

Enter the access code

Configure the 0-10V output

Modify the STANDBY speed

Give the authorization to restart the pump after a power cut

Activate or disactivate the buzzer

Select the temperature measurement unit

Set the serial link parameters

Modify the time before starting up the pump

Modify the time before opening the venting valve

Modify the venting valve opening time

Program the maximum operating time before regreasing the bearings

Ball bearings life time counter

Modify the access code

ACCESS CODE

Enter the access code and validate

SPEED: 6.75V = 27000rpm
1 motor:
ATP 80/100: 2.5A / 10V
ATP 150/400: 5.1A / 10V
θ.PUMP: 0.1V per 1°C
θ.CONT: 0.1V per 1°C

STANDBY SPEED

6000 to 27000 rpm

AUTO-STARTING

YES or NO

BUZZER

ON or OFF

TEMPERATURE UNIT

°C or °F

SET SERIAL LINK

RS232/RS485/NETWORK
(see sub-menus folio 3 & 4)

SET START DELAY

0 to 240mn 59s

TIME TO VENTING

0 to 59mn 59s

VENTING TIME

0 to 59mn 59s

MAINTENANCE

M=0 (1000 to 15000 h)
M=1 (1000 to 30000 h)
M=2 (1000 to 45000 h)
(3 times the maintenance time)
(see E 80)

TIME BEARING

0 to 50000 hours

NEW CODING

0 to 65535

Factory configuration

0

Speed

12000

NO

ON

°C

RS232

0mn 0s

0mn 1s

0mn 1s

M=0

5000h

0 h

0
Serial link setting

**SET SERIAL LINK**

- **RS 232**
- **RS 485**
- **NETWORK**

**Serial link selection**

**Default values**

- **SPEED**
  - Transmission speed . . . .
  - 9600 bauds

- **PARITY**
  - Parity . . . . . . . . . . . . .
  - None

- **DATA-BITS**
  - Data length . . . .
  - 8 bits

- **STOP-BITS**
  - Number of STOP bits . . .
  - 1 bit

- **ECHO**
  - Authorizes or does not authorize the echo of characters received on the link
  - ON

- **SEPARATOR**
  - Data separating character . . . .
  - 44 (comma)

- **ADDRESS**
  - Number of controller in a multiple link . . . .
  - 0

- **SET DATA LOGGER**
  - Authorizes transmission at pre-set intervals on the serial link, if ON,
  - Set the transmission interval
  - OFF

**Setting values**

- **SPEED**
  - 1200 2400 4800 9600
  - None

- **PARITY**
  - None
  - None
  - Even
  - Odd

- **DATA-BITS**
  - 7 or 8
  - 1 or 2

- **STOP-BITS**
  - 1 bit
  - 1 or 2

- **SEPARATOR**
  - 44 (comma)
  - 0 to 255

- **ADDRESS**
  - 0
  - 0 to 255
  - ON
  - ON or OFF
  - OFF
  - ON or OFF

**Return to Temperature menu folio 2**
Serial link setting
(continued)

Number of controller in a sequence in the case of the multiple link . . . . . . . . . .

ADDRESS

Return to Temperature menu folio 2
Connect the **controller to the pump** using the cable (separately ordered).

Connect the **RS232 serial link cable** to the connector (cable supplied by customer).

If the unit is remote controlled, make the various connections on the **REMOTE CONTROL terminal block** (see B 90).

Connect the **controller to the mains** accessory using the cable supplied. (Mains with earth connection)

Connect the **venting valve accessory** (see B 90).

Connect the **fan (ATP air cooled)**.
The control contacts

<table>
<thead>
<tr>
<th>Contact</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ext. safety 1 - 2</td>
<td>When the contact is closed, an external safety device is signalled: the motor is stopped and the controller generates a fault. This contact must be opened for the pump to operate.</td>
</tr>
<tr>
<td>Start/Stop 3 - 4</td>
<td>When the contact is closed, the pump is started up and accelerates to reach its nominal or reduced speed (depending on parameter settings). If the contact is open, the pump is no longer powered.</td>
</tr>
<tr>
<td>REMOTE mode 5 - 6</td>
<td>When the contact is closed, the remote control mode is selected. If the contact is open, the local mode is selected (control using the front panel keypad).</td>
</tr>
<tr>
<td>STANDBY mode 7 - 8</td>
<td>When the contact is closed, the reduced speed rotation mode is selected.</td>
</tr>
<tr>
<td>Analog output 9 - 10</td>
<td>Used to monitor the selected parameter (see ANALOG OUT menus).</td>
</tr>
</tbody>
</table>

0 - 10 V analog output:
Signaling using output contacts

These are dry contacts: (250VAC-1A) their function is to copy the data concerning the pump operating status.

### Shut-off valve
11 - 12
The contact is opened when a functional fault appears or when the "STOP" control is activated. In the latter case, the pump is reset to atmospheric pressure.

The contact can be used to control a secondary shut-off valve in order to retain the pressure in the chamber when the pump is reset to atmospheric pressure.

### Air inlet valve
13 - 14
Venting valve control and power supply (12V).

### Speed
15 - 16
The contact is closed when the pump reaches the selected speed.

### Fault
17 - 18
The contact is open if a fault appears and the motor is stopped.

### Start
19 - 20
The contact is closed when the "START" control is activated.
The contact can used to control a primary shut-off valve.
ACT 1000 T controller start-up

Once the various electrical connections have been made, set the main switch on the rear panel to "I".

Display initialization

The controller performs a self-test and identifies the pump to which it is connected.

The initialization time is approximately 4 seconds.

Display initialization

The equipment is identified, the program version is displayed.

Indicator light test: they are lit in succession.

The working screen is displayed.

The parameter setting keys

The parameter setting keys are used to access the parameter setting mode, used to exit the various menus without validating the functions, used to move in the menus, or from one parameter to another, used to select or adjust the value of the selected parameter, used to validate the selection of a menu, parameter or value, used to exit the menus and return to the pump parameter display.

Configure the parameters for the application using the various menus.

Enter the sub-menus by pressing

Access the parameter programming (see folio 2).

Display and/or select the parameters to be monitored (see folio 4).
Programming the parameters

Modify the date
Modify the STANDBY speed
Modify the time before starting up the pump
Modify the maximum bearing operating time
Modify the RS232 serial link
Configure the 0-10V output

Return to the factory configuration (Alcatel reserved)

Modify the time before opening the air inlet valve
Modify the air inlet valve opening time
Change to storage mode (the timer is blocked).

* At power-up, the storage mode disappears automatically.
Serial link setting

**Transmission speed**
- 300, 600, 1200, 2400, 4800, 9600

**Data length**
- 7 or 8

**Parity**
- None, Even, Odd

**Number of STOP bits**
- 1 or 2

**Number of controller in a multiple link**
- 00 to 999

**Authorizes or does not authorize the echo of characters received on the link**
- ON or OFF

**Data separating character**
- 1 to 127

**Authorizes transmission at pre-set intervals on the serial link**
- 0 to 240mn 59 s

Return to AN.OUT menu folio 2
Configuring the display screen

- The date and time
- The rotation speed (in revolutions/minute)
- The motor current consumption (in mA)
- The temperature (°C)
- The operating time

Options:
- Date
- Speed
- Current
- Temp
- Θ1 Pump
- Θ Conv
- Service Bearings
- Controller

The display screen can be configured to show various parameters such as date, time, speed, current, temperature, operating time, and pump temperature. The options allow for the selection of what information is displayed and in what units.
At the first power-up, the user finds the default configuration. The serial link parameters can be modified by accessing the corresponding unit menu.

The default configuration of the serial link is as follows:
- **Type:** RS 232
- **Transmission speed:** 9600 baud
- **Data length:** 8 bits
- **Parity:** NONE
- **Stop bit:** 1

**RS232/485 connector wiring**

Connection examples:

**RS232 type serial link with a single controller**

**Multiple RS232 serial link:**
several units (up to 255) can be controlled on a single link.

**RS485 serial link connection:**

Connect terminals 7 and 8 when the controller is at the end of the line.

See **B 120** for the command and message reception syntax.
Detailed description of RS commands

(valid from V1.10 version variable drives)

Conventions applicable to the syntax of all commands:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>adr</td>
<td>address, from 000 to 255</td>
</tr>
<tr>
<td>&lt;CR&gt;</td>
<td>Carriage Return (ascii 13)</td>
</tr>
<tr>
<td>&lt;LF&gt;</td>
<td>Line Feed (ascii 10); between square brackets: this character is not compulsory.</td>
</tr>
</tbody>
</table>

Status values:

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ok</td>
<td>command executed correctly</td>
</tr>
</tbody>
</table>

Error messages:

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Err0</td>
<td>adjustment error (out of bounds)</td>
</tr>
<tr>
<td>Err1</td>
<td>command error (syntax)</td>
</tr>
<tr>
<td>Err2</td>
<td>parameter error (e.g. non-hexadecimal character)</td>
</tr>
<tr>
<td>Err3</td>
<td>context error</td>
</tr>
<tr>
<td>Err4</td>
<td>checksum error</td>
</tr>
</tbody>
</table>

ADR

Specifies the address of the device for networking.

Syntax

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

- **adr**: address of the device before the command
- **aaa**: new address of the device
- **condition**: $000 \leq aaa \leq 255$

Result

```
#aaa,ok or Err2
```

This command is used to allocate a specific number to each of the products making up a network (loop for RS 232 or parallel for RS 485).

Note: it is important to note down the number allocated to each device.

BRK

Stop the pump by braking (ATP 80/100 series only)

Syntax

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

Result

```
#adr,ok
```

This command is used to brake the motor electrically, which is particularly effective at high speed. It is currently only available for the variable drive unit of the ACT 200T Board or ACT 200T cabinet.
Detailed description of RS commands

<table>
<thead>
<tr>
<th>CKS</th>
<th>Enables or disables reply strings checksum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>#adrCKSON&lt;CR&gt;[&lt;LF&gt;]</td>
</tr>
<tr>
<td></td>
<td>Enables ascii character checksum at the end of a reply string</td>
</tr>
<tr>
<td>or</td>
<td>#adrCKSOFF&lt;CR&gt;[&lt;LF&gt;]</td>
</tr>
<tr>
<td></td>
<td>Enables ascii character checksum at the end of a reply string</td>
</tr>
<tr>
<td>Result</td>
<td>#adr,ok,$ for CKSON</td>
</tr>
<tr>
<td></td>
<td>#adr,ok for CKSOFF</td>
</tr>
</tbody>
</table>

This feature allows the user to test if there is any transmit error with a reply string. $S$ is a character whose ascii value is the checksum, on 7 bits, of all the character ascii values from the beginning of the reply string to the character before $S$. The 8th bit of $S$ (MSB, Most Significant Bit) is always 1.

<table>
<thead>
<tr>
<th>CYC</th>
<th>Starts the specified running-in cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>#adrCYC1&lt;CR&gt;[&lt;LF&gt;]</td>
</tr>
<tr>
<td></td>
<td>to start running-in program 1,</td>
</tr>
<tr>
<td></td>
<td>or</td>
</tr>
<tr>
<td></td>
<td>#adrCYC2&lt;CR&gt;[&lt;LF&gt;]</td>
</tr>
<tr>
<td></td>
<td>to start running-in program 2</td>
</tr>
<tr>
<td>Result</td>
<td>#adr,ok</td>
</tr>
</tbody>
</table>

Running-in program 1 should be executed after a pump maintenance operation (change of bearings). At the end of the program, the pump maintenance parameters are updated and the «maintenance requested» alert can be cleared. Program 2 is used after regreasing (ATP series only), or after prolonged storage (ATH 20/40 only).
## Detailed description of RS commands

### DLI

**Defines the DataLogger transmission interval**

**Syntax**

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

*xxx*: DataLogger send interval in seconds

*condition*: $001 \leq xxx \leq 255$

**Result**

```
#adr,ok or Err2
```

See also: DLR

Note: if ok, the interval sent is stored in user memory.

### DLR

**Enables DataLogger operation (only with RS232)**

**Syntax**

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

**Result**

```
#adr,sssss,nnnnn,iiii,ttttt,uuuu.o,wwww,ppp,vvv
```

Returns current values:

- **sssss**: current speed (in tr/mn)
- **nnnnn**: speed set point (in tr/mn)
- **iiii**: current (in mA)
- **ttttt**: pump working speed (in hours)
- **uuuu.o**: (reserved)
- **wwww**: pwm (reserved)
- **ppp**: pump temperature (°C)
- **vvv**: variator temperature (°C)

The main characteristics of the pump and its controller are sent over the RS link, at the rate defined by the DLI command.

See also: DLI, LNG, SEP, SHT

Note: any new characters arriving on the serial port (RS 232) will cancel the automatic DataLogger transmission.
Detailed description of RS commands

ECH  Enables or disables command echoing

**Syntax**
#adrECHON<CR>[<LF>]
enables all characters received to be echoed over the serial port (RS 232 only).
or
#adrECHOFF<CR>[<LF>]
disables all characters received from being echoed over the serial port.

**Result**
#adr,ok

Comments:
- This command is disabled in RS 485 operation, the value OFF is required.
- Using a loop-type RS 232 network requires «ECHON» operation.

HDR  Defines the start character for a command reply string

**Syntax**
#adrHDRnnn<CR>[<LF>]
nnn: 3-digit decimal value of the ascii code of the corresponding character (with leading zeros).
condition: 020 ≤ nnn ≤ 255

**Result**
?adr,ok    ? is the desired character.
#adr,ErrX  if error

Allows the user to distinguish between the first character in a «command» string (for which # cannot be changed) and the first character of a «reply» string.
Affects the first character of ALL replies.
Default value: the hash sign, # (ascii code = 035)
If ok, the selected value is automatically stored in user memory.

IDN  Identifies the device which is communicating, and its software version

**Syntax**
#adrIDN<CR>[<LF>]

**Result**
#adr, VS.... - Vx.zz'
or
#adr, VS.... - Vx.zz for Alcatel pump type

Returns the type of Variable drive Supervisor, the software version (x), the software edition (zz), and the type of pump for which this variable drive is set up.
Detailed description of RS commands

**LEV**

Returns the state of the parameters defined by SET

**Syntax**

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

**Result**

```
#adr,nnnnn,sssss,aaaa,hhhhh or
#adr,nnnnn rpm,sssss rpm,aaaa mA,hhhhh hours
```

Returns the current values:

- **nnnnn**: speed set point
- **sssss**: stand-by speed set point
- **aaaa**: current set point
- **hhhhh**: alert level for pump bearing maintenance

**Complete cabinet only:**

**Syntax**

```
#adrLEV10<CR>[<LF>]
```

**Result**

```
#adr,nnnnn,sssss,hhhhh,g,ccccc,eeeee,ddddd,pppp,qqqq
```

Returns current values:

- **nnnnn**: nominal speed set point (in rpm)
- **sssss**: stand-by speed set point (in rpm)
- **hhhhh**: alert level for pump bearing maintenance (in hours)
- **g**: regreasing counter
- **ccccc**: pump working time (in hours)
- **eeeee**: electronic working time (in hours)
- **ddddd**: start delay (max 14459 s, that is 240 mn 59 s)
- **pppp**: time to venting (max 3599 s, that is 59 mn 59 s)
- **qqqq**: venting time (max 3599 s, that is 59 mn 59 s)

See also: LNG, SEP, SHT

**LNG**

Returns the strings sent with the identification sub-strings

**Syntax**

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

**Result**

```
#adr,ok
CIT>
```

Allows the parameters returned by the DLR, LEV and SPD commands to be identified with sub-strings.

Also generates the «CIT>» prompt each time a <CR> character is received.

See also: SHT
Detailed description of RS commands

**NSP**
Switches the speed set point to the nominal speed value

**Syntax**
#adrNSP\[<CR>]<LF>

**Result**
#adr,ok

The speed set point for the pump is set to its nominal value. This configuration is automatically saved in user memory.

See also: RPM, SBY

This mode of operation prevents the use of the "RPM" command.

**OPT**
Used to select possible user choices

**Syntax**
#adrOPT1 n\[<CR>]<LF>
choice of parameters on the analog output:
- n = 0 : real pump speed
- n = 1 : pump current
- n = 2 : temperature of pump body
- n = 3 : temperature of internal electronics

#adrOPT2 n\[<CR>]<LF>
choice of temperature unit:
- n = 0 : degrees Centigrade
- n = 1 : degrees Fahrenheit

**Complete cabinet only:**
#adrOPT10 n\[<CR>]<LF>
auto-starting:
- n = 0 : yes
- n = 1 : no

#adrOPT11 n\[CR]<LF>
buzzer:
- n = 0 : without
- n = 1 : with

**Result**
#adr,ok

See also: SEL

Comment: The choice of the temperature unit affects the results of the DLR and STA strings and the display (if cabinet fitted).
## Detailed description of RS commands

### RPM

**Defines the speed set point in stand-by mode**

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Result</th>
</tr>
</thead>
</table>
| #adrRPM nnnnn<CR>[<LF>] or #adrRPMnnnn<CR>[<LF>] | #adr,ok or #adr,ErrX  
1, out of range; 2, parameters ; 3, context (not in Stand-by mode) |

See also: NSP, SBY  
Comment: if ok, the new speed is automatically stored in user memory.

### SAV

**Saves the internal parameters in user’s memory**

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>#adrSAV&lt;CR&gt;[&lt;LF&gt;]</td>
<td>#adr,ok</td>
</tr>
</tbody>
</table>

Saves the current context (except for running-in cycles). If this command is sent when the pump is being supplied, it can for example allow automatic re-start in the event of a power cut.

### SBY

**Switches the speed set point to the stand-by value**

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>#adrSBY&lt;CR&gt;[&lt;LF&gt;]</td>
<td>#adr,ok</td>
</tr>
</tbody>
</table>

Resets the stand-by speed to its last stored value, and allows it to be modified if an «RPM» command is sent.  
This configuration is automatically stored in user memory.

See also: NSP, RPM
# Detailed description of RS commands

## SEL

**Returns the state of the parameters defined by OPT**

**Syntax**

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

**Result**

`#adr,a,u`

- `a`: Returns choice of parameters on the analog output:
  - `a = 0`: real pump speed
  - `a = 1`: pump current
  - `a = 2`: temperature of pump body
  - `a = 3`: temperature of internal electronics
- `u`: Returns the choice of temperature unit:
  - `u = 0`: degrees Centigrade
  - `u = 1`: degrees Fahrenheit

**Complete cabinet only**

**Syntax**

`#adrSEL10<CR>[<LF>]`

**Result**

`#adr,a,u,s,b`

- `a`: Returns choice of parameters on the analog output:
  - `a = 0`: real pump speed
  - `a = 1`: pump current
  - `a = 2`: temperature of pump body
  - `a = 3`: temperature of internal electronics
- `u`: Returns the choice of temperature unit:
  - `u = 0`: degrees Centigrade
  - `u = 1`: degrees Fahrenheit
- `s`: Returns auto-starting choice:
  - `s = 0`: no
  - `s = 1`: yes
- `b`: Returns buzzer choice:
  - `b = 0`: without
  - `b = 1`: with

## SEP

**Defines the character which separates the parameters in a reply**

**Syntax**

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

- `nnn`: 3-digit decimal value of the ascii code of the desired character (with leading zeros).

**Result**

`#adr,ok` or `#adr,ErrX` if error

Allows the user to select the character which separates the parameters returned by the DLR, STA and LEV commands. Default value: comma «,» ascii code = 044

If ok, the selected value is automatically stored in user memory.
Detailed description of RS commands

### SET

**Definition:** Defines the internal operating parameters

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>#adrSET1 hhhhh&lt;CR&gt;[&lt;LF&gt;]</td>
<td>maintenance time</td>
<td>#adr,ok or #adr,ErrX</td>
</tr>
<tr>
<td>#adrSET2 sssss&lt;CR&gt;[&lt;LF&gt;]</td>
<td>maximum time for start-up</td>
<td></td>
</tr>
</tbody>
</table>

**Complete cabinet only:**

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>#adrSET10 ccccc&lt;CR&gt;[&lt;LF&gt;]</td>
<td>pump working time (in hours)</td>
<td></td>
</tr>
<tr>
<td>#adrSET11 eeeeee&lt;CR&gt;[&lt;LF&gt;]</td>
<td>electronic working time (in hours)</td>
<td></td>
</tr>
<tr>
<td>#adrSET12 g&lt;CR&gt;[&lt;LF&gt;]</td>
<td>regreasing counter (0 to 2 max)</td>
<td></td>
</tr>
<tr>
<td>#adrSET13 ddddd&lt;CR&gt;[&lt;LF&gt;]</td>
<td>start delay (max 14459s, that is 240mn 59s)</td>
<td></td>
</tr>
<tr>
<td>#adrSET14 pppp&lt;CR&gt;[&lt;LF&gt;]</td>
<td>time to venting (max 3599s, that is 59mn 59s)</td>
<td></td>
</tr>
<tr>
<td>#adrSET15 qqqq&lt;CR&gt;[&lt;LF&gt;]</td>
<td>venting time (max 3599s, that is 59mn 59s)</td>
<td></td>
</tr>
</tbody>
</table>

**See also:** LEV

### SHT

**Definition:** Returns the transmitted string without the identification sub-string

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>#adrSHT&lt;CR&gt;[&lt;LF&gt;]</td>
<td></td>
<td>#adr,ok</td>
</tr>
</tbody>
</table>

The strings sent following DLR, LEV and SPD commands will now be sent without the parameter identification sub-strings (e.g.; without the units).

**See also:** LNG

### SPD

**Definition:** Returns the current speed

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>#adrSPD&lt;CR&gt;[&lt;LF&gt;]</td>
<td></td>
<td>#adr,nnnnn rpm</td>
</tr>
</tbody>
</table>

**See also:** LNG, SHT
## Detailed description of RS commands

### STA

**Returns the status of the internal dynamic parameters**

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>#adrSTA&lt;CR&gt;[&lt;LF&gt;]</td>
<td>#adr,xxxxxx,yyyyyy,zzzzzz,ssss,i,www,ppp,tttt&lt;CR&gt;&lt;LF&gt;</td>
</tr>
</tbody>
</table>

**adr**: address

<table>
<thead>
<tr>
<th>status bits:</th>
<th>fault bits:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - RS echo (1-&gt;off)</td>
<td>5 - variable drive temperature</td>
</tr>
<tr>
<td>4 - String long (0) / short (1)</td>
<td>4 - motor temperature</td>
</tr>
<tr>
<td>3 - On (1) / Off (0)</td>
<td>3 - excess current</td>
</tr>
<tr>
<td>2 - reduced or nominal speed reached(1)</td>
<td>2 - sensors or start-up</td>
</tr>
<tr>
<td>1 - standby (1)</td>
<td>1 - external</td>
</tr>
<tr>
<td>0 - running-in (1)</td>
<td>0 - pump not connected</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>alert bits:</th>
<th>current speed value in rpm</th>
<th>current value in mA</th>
<th>reserved (pwm value)</th>
<th>pump temperature value</th>
<th>variable drive temperature</th>
<th>pump operating time value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - reserved (future use)</td>
<td>sssss</td>
<td>iiii</td>
<td>www</td>
<td>ppp</td>
<td>vvv</td>
<td>tttt</td>
</tr>
<tr>
<td>4 - reserved (future use)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 - variable drive temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 - motor temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - start-up time exceeded (future)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - operating time exceeded</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reminder: The «#» character at the start of the reply string can be set with the «HDR» command. The «,» character which separates the parameters in the reply string can be modified with the «SEP» command.

### TMP

**Defines the operating state of the turbomolecular pump**

<table>
<thead>
<tr>
<th>Syntax</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>#adrTMPON&lt;CR&gt;[&lt;LF&gt;]</td>
<td>start pump rotation</td>
</tr>
<tr>
<td>#adrTMPOFF&lt;CR&gt;[&lt;LF&gt;]</td>
<td>stop pump</td>
</tr>
</tbody>
</table>

**Result**

#adr,ok or #adr,Err3 if the pump is already in the state requested (context error)
Functions of integrable controllers
Brick and Board type

Warning

Electronic boards have been designed to comply with the electrical safety and electromagnetic compatibility rules but they cannot be the purpose of a certification as soon as they are sold alone. It is the user responsibility to ensure the externals shields which are necessary to be in compliance with ECM and electrical safety rules.

Serial link

RS 232/485

Setting

Using the switch S3:

Factory configuration:
- 9600 Bauds, WITHOUT Parity, 8 bits, 1 Stop bit, RS232.

<table>
<thead>
<tr>
<th>Switch</th>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 bit</td>
<td>2 bits</td>
</tr>
<tr>
<td>2</td>
<td>7 bits</td>
<td>8 bits</td>
</tr>
<tr>
<td>3</td>
<td>ODD</td>
<td>EVEN</td>
</tr>
<tr>
<td>4</td>
<td>SANS</td>
<td>AVEC</td>
</tr>
<tr>
<td>8</td>
<td>RS 485</td>
<td>RS 232</td>
</tr>
</tbody>
</table>

Operation

Refer to the Commands details sheet (**B 120**).

Rotation speed setting

The potentiometer R15 (See folio 4) has to be set to a position such as not to exceed the 1/5 of its full excursion to allow the speed programming from the serial link.
Inputs/Outputs connector

This remote control allows to command START, STOP, STANDBY at distance, and the copy of the monitoring parameters.

The connection is done on a female connector 3M He 10 P.N. 34-52-6000 (Not supplied).

Output contacts signalisation:

They are open collector type outputs (Iimax 100mA; Vmax 30V) whose function is to copy the information related to the pump status.

The light indicator is on when the corresponding output is valid (low level).

<table>
<thead>
<tr>
<th>Light</th>
<th>Contact</th>
<th>Description</th>
<th>Light indicator status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green 🟢</td>
<td>Speed</td>
<td>Nominal speed has been reached by the pump.</td>
<td>Flashing: The speed is higher than the one selected. Lit: The selected speed is reached.</td>
</tr>
<tr>
<td>Yellow 🟢</td>
<td>Start</td>
<td>The pump is starting up.</td>
<td>Lit: The speed is lower than the one selected.</td>
</tr>
</tbody>
</table>
**Functions of integrable controllers**

**Brick and Board type**

**Command inputs**

The input is regarded as valid when the external contact which is connected is closed (Low level: ground connected) and not valid if the contact is open (High level).

<table>
<thead>
<tr>
<th>Contact</th>
<th>Input status</th>
</tr>
</thead>
<tbody>
<tr>
<td>External safety</td>
<td>10</td>
</tr>
</tbody>
</table>
| **High:** There is an external safety. The LED Fault is lit on, the pump doesn't start.  
**Low:** Contact connected to ground, necessary for pump's starting. |
| Mode | 11 |
| **High:** "Status" mode selected.  
**Low:** "Impulse" mode selected.  
This mode is valid for the two following commands. |
| Stand-by | 12 |
| "Status" mode:  
**High:** Nominal rotation speed mode.  
**Low:** Reduced rotation speed mode selected.  
(stand-by) |
| **Nominal speed** |
| Start/Stop | 13 |
| "Status" mode:  
**High:** The pump is no longer powered.  
**Low:** The pump starts and accelerates. |
| **Start** | **Stop** |
| **Impulse" mode: A temporary closing of the contact allows to alternate the reduced and nominal speeds.** |
| **Nominal speed** |

**One analog output**

<table>
<thead>
<tr>
<th>Analog output</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>This output allows to monitor the evolution of some pump parameters (Speed, température...).</td>
<td></td>
</tr>
<tr>
<td>The output parameter selection is done through the RS 232 <em>(See B120)</em>. The speed, the current, the temperatures are available on this output (Factory configuration «Speed»).</td>
<td></td>
</tr>
</tbody>
</table>
Functions of integrable controllers
Brick and Board type

Rotation speed setting
The potentiometer R 15 allows to set the rotation speed as long as its position is further than 1/5 of the full excursion.

From the maximum position (Fully clockwise screwed), the speed is defined:
- by the orders comming from serial link during the 4 first turns (counterclockwise unscrewing);
- manually within the limits of stand-by speed range (See characteristics table), this after the 5th turn (Speed increases when unscrewing).

Faults monitoring
The alerts are indicated by:
- The flashing of the red light indicator;
- The alternation of HIGH and LOW levels of the output «FAULT».

The faults are indicated by:
- The lighting of the red light indicator;
- The switching to the Low level of output «FAULT».

They can be identified using the serial link (See B120, command STA).

Note: Alcatel can provide upon request, a communication software which allows pump control and monitoring using a micro-computer (see C 61).

Refer to Diagnosis and Troubleshooting of the manual.
Functions of integrable controller
OEM Board type

Warning

Electronic boards have been designed to comply with the electrical safety and electromagnetic compatibility rules but they cannot be the purpose of a certification as soon as they are sold alone. It is the user responsibility to ensure the externals shields which are necessary to be in compliance with ECM and electrical safety rules.

Local mode operation

Power “ON” and pump “Start/Stop” functions are made using switches located on the PC Board.

The detection of the pump operation is materialized by three indicator lights (green, yellow, red) which indicate the pump status (light ON = 1; Light OFF = 0).

Detection of rotation

<table>
<thead>
<tr>
<th>Action on button</th>
<th>Pump motor powered</th>
<th>Pump rotation speed*</th>
<th>Pilot lights</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>START</strong></td>
<td><strong>YES</strong></td>
<td>&lt; 27000</td>
<td><strong>Yellow</strong></td>
</tr>
<tr>
<td><strong>STOP</strong></td>
<td><strong>YES</strong></td>
<td>= 27000</td>
<td><strong>Green</strong></td>
</tr>
</tbody>
</table>

* Pump rotation speed in rpm.
** During the pump or converter cooling, the cycles 2,3 (or 5) will be happened again periodically until the user remedies the overheating.
## Functions of integrable controller

### OEM Board type

#### Remote control mode

Depending on P2 power supply cable connector wiring, the pump Start/Stop and an external safety can be remote controlled.

J3 connector allows the copy of the pump status data (equivalent to light indicators green-red-yellow) *(voir folio 1)*.

<table>
<thead>
<tr>
<th>Description</th>
<th>P2 connector wiring*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without remote control outer safeties</td>
<td><img src="#" alt="Diagram" /></td>
</tr>
<tr>
<td>Pump Start/Stop remote control (by impulse contacts)</td>
<td><img src="#" alt="Diagram" /></td>
</tr>
<tr>
<td>Pump Start/Stop remote control (by maintained contact)</td>
<td><img src="#" alt="Diagram" /></td>
</tr>
<tr>
<td>Outer safety switch wiring</td>
<td><img src="#" alt="Diagram" /></td>
</tr>
<tr>
<td>Outer control</td>
<td><img src="#" alt="Diagram" /></td>
</tr>
</tbody>
</table>

* P2 soldering side view; B2 and A1 in black are female pins, others are male pins.
Functions of integrable controller
OEM Board type

Fault monitoring

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

When it is “ON”, the motor is not supplied and the pump doesn’t run.
Operation

- First pump start-up / Safety instructions ........................................ C 10
- Turbomolecular pump operation in a pumping application .................. C 20
- Controlling the pump using the controller front panel ........................ C 30
- Displaying the data concerning ACT 200 T and 600 T pumping .......... C 40
- ACT 200 T and 600 T «Remote Control» connector «Ext. safety» input operation .................................................. C 50
- Controlling the pump using communication software ..................... C 61
First pump start-up

Safety instructions

First pump start-up

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

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

Safety instruction for use

⚠️ 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).

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

Start-up:
- start up ATP water cooling system;
- open the E1 valve;
- start up the primary pump (PPM);
- start up the ATP, when the pressure in the chamber is $\leq 1$ mbar.

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

Example of a 1 valve assembly

The chamber and pipes are at atmospheric pressure, the pumps are switched off, the valves are closed.
Turbomolecular pump operation in a pumping application

Example of a 3 valve assembly

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

Pre-evacuation of the chamber:
- start up the PPM (primary pump);
- start up the ATP water cooling system;
- open the E2 valve.

The pressure in the chamber ≤ 1mbar, the secondary pumping can be started up:
- close E2;
- open E1 and E3;
- start up the nitrogen purge*;
- start up the ATP.

The chamber is at atmospheric pressure, the pumps are operating, the valves E2 and E3 are closed, the purge and water circuits are operating.

Pre-evacuation of the chamber:
- close E1;
- open E2.

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

*N2 purge only for "C" and "HPC" models
C 20

Turbomolecular pump operation in a pumping application

Refill the chamber with air
Shut off the pumps by closing the E3 valve (E1 remains open) and open an air inlet on the chamber.

Stop pumping
The pumps are shut off by closing the valves.
- close the E3 valve;
- with the ATP and PPM rotating, allow the N2 purge* to flow approximately 1 hour after pumping corrosive gases*;
- Stop the ATP;
- Close the E1 valve;
- Stop the PPM. The ATP will be refilled with air if the accessory is fitted and the relevant menus are programmed (see B 70 or B 100);
- stop the water cooling circuit.

Bake-out collar (accessory) operation:
To reach the vacuum limit quickly, the ATP can be baked. In this case, the temperature on the pump inlet flange must be monitored: \( T < 120 \degree \text{C} \).
Controlling the pump using the controller front panel

Rotation indicator lights:

Orange lit
The pump rotation speed is lower than the selected speed.

Red lit
The pump is faulty. This fault is accompanied by an audible signal (if it is programmed).

Green flashing
The pump rotation speed is higher than the selected speed (decrease of the selected speed during operation).

Orange lit
Standby mode selected

Orange flashing
Running-in procedure activated

Start-up the pump by pressing START
The pump is started up to reach the selected speed.

The orange rising speed indicator light comes on. When the pump reaches its selected speed, the orange indicator light goes off and the green indicator light comes on.

Select the reduced speed rotation mode by pressing STAND BY
The speed selection indicator light comes on. The pump regulates its speed to reach the value of the programmed reduced speed (see B 70 or B 100).

Stop the pump by pressing STOP
The rotation speed monitoring indicator lights go off. The pump motor is no longer powered, the pump decelerates.
### Controlling the pump using the controller front panel

**Air inlet valve accessory**

The valve is automatically controlled during a voluntary stoppage of the pump if a value other than zero has been programmed in the "Venting Time" menu. During the entry of air, the pump can be started up but the valve will be closed beforehand.

In the event of a power cut, the valve is opened immediately, without delay, even if it has been programmed at a value other than zero.

**Delayed start-up**

It is possible to control the start-up of another pump before the start-up of the turbomolecular pump. Simply program a time other than zero in the "SET START DELAY" menu. When START is pressed, the backing pump is started up and the ATP is controlled after the delay.
Displaying the data concerning the pumping

Pump and controller status
- pump temperature
- pump motor current
- controller temperature
- pump rotation speed

Display of the equipment and the program version

Successive display of last 10 faults
- number of hours of operation when the fault appeared
- record number (1 to 10)
- fault title

Successive display of last 10 alerts
- number of hours of operation when the alert appeared
- record number (1 to 10)
- alert title

Bearing data
- operating time passed
- maximum number of hours authorized before regreasing or replacing the bearings
ACT 200 T and ACT 600 T
"Remote Control" connector
"Ext. safety" input operation

This input, which can be used to control an external contact safety device for the ACT controllers, is controlled in 2 different ways depending on the value given to the SET START DELAY parameter accessible in the configuration menus.

If SET START DELAY = 0
The external safety input is controlled continuously. If the "external safety" contact is open, it displays the fault "EXTERNAL SAFETY", lights up the red fault indicator light and inhibits the pump start-up. The output contact 7-8 is kept open.

If SET START DELAY ≠ 0

- Before pressing on "START", the external safety input is not controlled.

- After pressing on "START" and during a delay - of 4 seconds if SET START DELAY > 4 s - or between 1 and 4 s if SET START DELAY ≤ 4 s the external safety input is not controlled.

- After this delay, this input is handled by the ACT. If the "external safety" contact is open, it displays the fault "EXTERNAL SAFETY", lights up the red fault indicator light, opens the output contact 7-8 and inhibits the pump start-up.
  This contact can be used to control the roughing pump (see wiring example, following page).

Note: In "REMOTE" mode, after an external fault, the pump must be set to the "STOP" status before starting up again.
Wiring example to control a roughing pump
Controlling the pump
using communication software

These instructions are validated for ACT 200/200T/600T, cabinet, Board and Brick version.

Connect the controller
to the micro-computer
(or terminal)

Realize the necessary connections (see B 110).

PC system requirements

Communication software is compatible with Windows 3.11, 95 et Windows NT (™ Microsoft).
It require 2 Mo RAM. Communication ports 1 to 4 must be available.

This application is available on CDRom or Floppy disk 3”1/2.
Consult us.
Chapter D

ATP User’s Manual

Maintenance

- Diagnosis and troubleshooting
  ACT 200 T and 600 T ......................... D 10

- Diagnosis and troubleshooting ACT 1000 T .... D 20

- ATP 80/100/150/400
  Maintenance frequency ....................... D 30

- ATP 900 Maintenance frequency ............. D 40
## Diagnosis and troubleshooting

ACT 200 T and ACT 600 T

### Default type:

**"Warning" Wxx**  
The "FAULT" signal flashes;  
If the buzzer is selected "ON", it is activated;  
The controller doesn't stop the pump.

**"Fault" Dxx**  
The "FAULT" signal lights on;  
If the buzzer is selected "ON", it is activated;  
The controller stops the pump.

<table>
<thead>
<tr>
<th>INCIDENT</th>
<th>CAUSE</th>
<th>CONSEQUENCE</th>
<th>REMEDY</th>
</tr>
</thead>
</table>
| No event occurs after power on:  
• No display;  
• Indicators does not light. | • No mains current in the unit.  
• Defective power cable.  
• Fuses. | The controller is not powered. | • Change the power cable.  
• Check the fuses.  
• Call the ALCATEL Customer Service. |
| Incoherent display  
Inoperative Keyboard  
(At starting or during the pumping) | | The display is different from «Ready to start !» | • Call the ALCATEL Customer Service. |
| No light switches on | Defective lights. | The pump can be used without indicators. | • Call the ALCATEL Customer Service. |
| The pump isn’t running  
(pump seizing)  
No messages | Cell seizing. | No message. Check the pump status.  
200T : Imax = 1.2 A  
600T : Imax = 0.8 A  
Rotation speed : 0 rpm  
The controller temperature is increasing and the warning «ACT TEMP» can appear (65°C) | • Check the pump rotation (manually).  
• Make the pump maintenance.  
• Call the ALCATEL Customer Service. |
### Diagnosis and troubleshooting

**ACT 200 T and ACT 600 T**

<table>
<thead>
<tr>
<th>INCIDENT</th>
<th>CAUSE</th>
<th>CONSEQUENCE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WO1: GREASING</td>
<td>The authorized limit for ball bearing maintenance time has been reached. (M=0 or M=1)</td>
<td></td>
<td>• Regrease the pump and initialize the maintenance counter (see E 80).</td>
</tr>
<tr>
<td>WO2: PUMP MAINTEN.</td>
<td>Pump maintenance time will be reached.</td>
<td>Bearing must be changed.</td>
<td>• Call the ALCATEL Customer Service.</td>
</tr>
<tr>
<td>WO3: ACT TEMP.</td>
<td>The controller temperature is high between: - 60 and 70°C for ACT 600 T; - 65 and 75°C for ACT 200 T; but does not exceed the authorized limit.</td>
<td></td>
<td>• Check the controller cooling circuit: - Internal fan for ACT 600T; - Ventilation for ACT 200T.</td>
</tr>
<tr>
<td>WO4: PUMP TEMP.</td>
<td>Pump temperature is between 75 and 85°C.</td>
<td></td>
<td>• Check the pump ventilation.</td>
</tr>
</tbody>
</table>
## Diagnosis and troubleshooting
### ACT 200 T and ACT 600 T

<table>
<thead>
<tr>
<th>INCIDENT</th>
<th>CAUSE</th>
<th>CONSEQUENCE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>D01 : EXT SAFETY</td>
<td>The external security contact on the REMOTE CONTROL connector is activated.</td>
<td>The controller stops the motor. The pump can’t restart.</td>
<td>• Test the external safety devices (contact 31 - 32);&lt;br&gt;• Repair the fault and press START to restart (see B 60)</td>
</tr>
<tr>
<td>D02 : DLY SOFTWARE</td>
<td>Soft counter default.</td>
<td></td>
<td>• Reinitialize the controller with the main switch (0/1);&lt;br&gt;• If the fault happens again, call the ALCATEL Customer Service.</td>
</tr>
<tr>
<td>D03 : ACT TEMP.</td>
<td>Controller temperature exceeds the authorized limit 70°C for ACT 600T or 75°C for ACT 200T</td>
<td></td>
<td>• Check that the cooling circuit is operating correctly:&lt;br&gt;- Internal fan for ACT 600T;&lt;br&gt;- Ventilation for ACT 200T.</td>
</tr>
<tr>
<td>D04 : PUMP TEMP.</td>
<td>The pump motor temperature exceeds the authorized limit 85°C.</td>
<td></td>
<td>• Check that the cooling circuit is operating correctly;&lt;br&gt;• Reduce the working pressure or the flowrate;&lt;br&gt;• If the fault happens again, call the ALCATEL Customer Service.</td>
</tr>
<tr>
<td>D05 : HALL SENSORS</td>
<td>Not used.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D06 : START FAULT</td>
<td>Not used.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D07 : PUMP CURRENT</td>
<td>Motor overcurrent or Hall sensor default.</td>
<td>Starting current too high.</td>
<td>• Reinitialize the controller with the main switch (0/1);&lt;br&gt;• If the fault happens again, call the ALCATEL Customer Service.</td>
</tr>
<tr>
<td>D08 : NO CONNECT</td>
<td>Pump not connected.</td>
<td>The pump can’t start up.</td>
<td>• Check the cable connection.</td>
</tr>
<tr>
<td>D09 : HIGH PRESS.</td>
<td>Not used.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The "FAULT" indicator lights, the air inlet valve and/or the "FAULT" contact on the "Remote Control" connector are activated.

In the following table, we use the signs:

- **Y** Relay contact open;
- **N** Relay contact closed;
- □ "FAULT" indicator lit on;
- ■ "FAULT" indicator lit off.

### INCIDENT CAUSE CONSEQUENCE REMEDY

<table>
<thead>
<tr>
<th>INCIDENT</th>
<th>CAUSE</th>
<th>17-18</th>
<th>13-14 &amp; 11-12</th>
<th>FAULT</th>
<th>CONSEQUENCE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>No event occurs after power on: • No display; • Indicators does not light.</td>
<td>• No mains current in the unit. • Defective power cable. • Fuses.</td>
<td>N</td>
<td></td>
<td>Y</td>
<td>The controller is not powered.</td>
<td>• Change the power cable. • Check the fuses. • Call the Alcatel Customer Service.</td>
</tr>
<tr>
<td>D00 : SEIZED PUMP</td>
<td>Cell seized.</td>
<td>Y</td>
<td></td>
<td>N</td>
<td>Check the pump status: 0RPM.</td>
<td>• Check the pump rotation (manually). • Make the pump maintenance. • Call the Alcatel Customer Service.</td>
</tr>
<tr>
<td>D01 : POWER OVERHEAT</td>
<td>Overheat signal by the «powered» sensor in the unit.</td>
<td>Y</td>
<td></td>
<td>N</td>
<td>The controller stops temporarily the motor. Valves are not affected.</td>
<td>• Check the controller cooling circuit (Air admissions and fan). • Call the Alcatel Customer Service.</td>
</tr>
<tr>
<td>D03 : MOTOR CONTROL OVERHEAT</td>
<td>Overheat signal by the «dimmer switch» sensor in the unit.</td>
<td>Y</td>
<td></td>
<td>N</td>
<td>The controller stops temporarily the motor. Valves are not affected.</td>
<td>• Check the controller cooling circuit (Air admissions and fan). • Reduce the working pressure or the flowrate. • Call the Alcatel Customer Service.</td>
</tr>
<tr>
<td>D04 : HALL SENSOR</td>
<td>• Hall sensor default. • Motor out of order. • Pump no connected.</td>
<td>Y</td>
<td></td>
<td></td>
<td>The controller stops the motor. Valves are affected and the pump can’t restart.</td>
<td>• Check the cable connection. • Call the Alcatel Customer Service.</td>
</tr>
</tbody>
</table>
### Diagnosis and troubleshooting

#### ACT 1000 T

<table>
<thead>
<tr>
<th>INCIDENT</th>
<th>CAUSE</th>
<th>17-18</th>
<th>19-22</th>
<th>CONSEQUENCE</th>
<th>REMEDY</th>
</tr>
</thead>
</table>
| **D05 : OVERCURRENT OR SENSOR** | • Motor overcurrent or hall sensors default.  
• Motor out of order.  
Pump no connected. | Y     | Y     | The controller stops the motor.  
Valves are affected and pump can’t restart. | • Check the cable connection.  
• Call the Alcatel Customer Service. |
| **D06 : EXT. SAFETY** | The external security contact on the connector is activated. | Y     | Y     | The controller stops the motor.  
Valves are affected and pump can’t restart. | • Test the external safety devices (contact 1 - 2);  
• Repair the fault and press START to restart. |
| **D21 : PUMP OVERHEAT** | Pump overheat. | Y     | N     | The controller stops the motor.  
Valves are not affected. | • Check the pump cooling.  
• Reduce the working pressure or the flowrate. |
| **D22 : CONTROLLER OVERHEAT** | Overheat signal by the «management» sensor in the unit.  
T > 60°C. | Y     | N     | The controller stops the motor.  
Valves are not affected. | • Check the controller cooling circuit (Air admissions and fan).  
• Reduce the working pressure or the flowrate.  
• Call the Alcatel Customer Service. |
| **D23 : HOT PUMP** | Pump temperature exceeds 75°C. | N     | N     | Fault is displayed (message). | • Check the pump cooling.  
• Reduce the pressure or the flow.  
• If the default is still present the D21 appears. |
| **D24 : BEARINGS MUST BE CHANGED** | The bearing life time has been reached. | N     | N     | The «fault» signal flashes. | • Change the emergency bearings;  
• Call the Alcatel Customer Service. |
| **D26 : NO CONNECT** | • Temperature probe failure.  
• Pump no connected.  
• Sensor no connected. | Y     | Y     | The controller stops the motor.  
Valves are not affected. | • Check the cable controller electrical connection.  
• Call the Alcatel Customer Service. |
## Diagnosis and troubleshooting

### ACT 1000 T

<table>
<thead>
<tr>
<th>INCIDENT</th>
<th>CAUSE</th>
<th>17-18</th>
<th>11-11-12</th>
<th>CONSEQUENCE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>D27 : DATE AND TIME</td>
<td>• Converter memory problem. • STOCK Parameter activated.</td>
<td>N</td>
<td>N</td>
<td>The controller supplies power to the pump but the display is incorrect.</td>
<td>Access the DATE menu and update the new date. • Reinitialize the controller with the main switch (0/1) • Call the Alcatel Customer Service.</td>
</tr>
<tr>
<td>D28 : DISABLE EEPROM WRITE</td>
<td>Writing memory problem on the management card.</td>
<td>N</td>
<td>N</td>
<td>The controller supplies power to the pump but the data are not saved.</td>
<td>Reinitialize the controller with the main switch (0/1) • Call the Alcatel Customer Service. • Contacter le Service Client.</td>
</tr>
<tr>
<td>D29 : INPUT POWER</td>
<td>• Mains power failure. • Problem on the 72V power supply.</td>
<td>N</td>
<td>Y</td>
<td>The pump is not powered and generate power to the controller. The defect appears briefly before the power cut.</td>
<td>Check the cable connection to the pump and controller. • Check the fuses. • Call the Alcatel Customer Service.</td>
</tr>
<tr>
<td>D37 : GREASING BEARING</td>
<td>The bearing relubricated time has been reached.</td>
<td>N</td>
<td>N</td>
<td>The «fault» signal flashes.</td>
<td>Make the relubrication and reinitialize the maintenance counter.</td>
</tr>
</tbody>
</table>
## Diagnosis and troubleshooting

### ACT 1000 T

<table>
<thead>
<tr>
<th>INCIDENT</th>
<th>CAUSE</th>
<th>CONSEQUENCE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT 1000 T V2.X ----------- PUMP MEMORY FAULT</td>
<td>When the controller is started up, the pump cannot be identified.</td>
<td>The controller is help up.</td>
<td>• Call the ALCATEL Customer Service.</td>
</tr>
<tr>
<td>Converter power supply problem.</td>
<td>The controller is blocked.</td>
<td></td>
<td>• Call the ALCATEL Customer Service.</td>
</tr>
<tr>
<td>The micro board is not working.</td>
<td>The controller is not working.</td>
<td></td>
<td>• Call the ALCATEL Customer Service.</td>
</tr>
<tr>
<td>ACT 1000 T V2.X ----------- WDOG CONVERTER</td>
<td>The microprocessor is running on itself: it is not able to control the operating sequency.</td>
<td>Momentaneaously, the controller is not working.</td>
<td>• If the speed is zero when the message appears, wait for the message disappears and try again the starting procedure. • If the speed is not zero, wait for running stops and start again the pump. • If the message continues, call the ALCATEL Customer Service.</td>
</tr>
</tbody>
</table>
ATP 80, ATP 100, ATP 150, ATP 400

Maintenance frequency

Intervals for relubrication and the ball bearings replacement depend on the type of process used.

**Use of the pump**

- In continuous operation, at ultimate pressure, no process.
- In cycle less than 1 hour, at maximum inlet pressure, no process.
- In cycle less than 1 hour, at maximum inlet pressure, with chlorinated or fluorine process.

**Pump curve:**

- ATP 80 - ATP 80 C
- ATP 100 - ATP 100 C
- ATP 150 - ATP 150 C
- ATP 400 - ATP 400 C
- ATP 400 HPC

**Relubrication schedule (hours)**

<table>
<thead>
<tr>
<th>Housing temperature (°C)</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example**

For use at 20°C housing temperature, in continuous operation, at ultimate pressure, the maintenance frequency is 13000h (t).

<table>
<thead>
<tr>
<th>t</th>
<th>13000h</th>
<th>1st lubrication</th>
<th>M* = 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>t x 2</td>
<td>26000h</td>
<td>2nd lubrication</td>
<td>M* = 1</td>
</tr>
<tr>
<td>t x 3</td>
<td>39000h</td>
<td>Disassemble the pump, replace and condition the ball bearings</td>
<td>M* = 2</td>
</tr>
</tbody>
</table>
Intervals for relubrication and the ball bearings replacement depend on the type of process used.

**Use of the pump**
- In continuous operation, at ultimate pressure, no process.
- In cycle less than 1 hour, at maximum inlet pressure, no process.
- In cycle less than 1 hour, at maximum inlet pressure, with chlorinated or fluorine process.

**Example**
For use at 20°C housing temperature, in continuous operation, at ultimate pressure, the maintenance frequency is 8000h (t).

<table>
<thead>
<tr>
<th>t</th>
<th>8000h</th>
<th>1st lubrication</th>
<th>M*=0</th>
</tr>
</thead>
<tbody>
<tr>
<td>t x 2</td>
<td>16000h</td>
<td>2nd lubrication</td>
<td>M*=1</td>
</tr>
<tr>
<td>t x 3</td>
<td>24000h</td>
<td>Disassemble the pump, replace and condition the ball bearings</td>
<td>M*=2</td>
</tr>
</tbody>
</table>

*Maintenance counter*
Chapter E

ATP User’s Manual

Operation sheets

- Precautions before maintenance ........................................... E 10
- ATP 80/100 Pumps lubrication ............................................. E 20
- ATP 150/400/900 Pumps lubrication ...................................... E 30
- ATP 80/100 bearing replacement .......................................... E 40*
- ATP 150/400/900 bearing replacement ................................. E 50*
- Cleaning parts ................................................................. E 60*
- Pump running-in for ATP 80/100/150/400 ............................. E 70
- Maintenance counters for ACT 200 T and 600 T controllers ... E 80
- ATP 900 pump running-in .................................................. E 90
- Maintenance counters for ACT 1000 T controllers ................. E 100

* These chapters are included into the ball bearing replacement manual delivered with the specific tool.
It is important to isolate the machine from the electrical power supply source before any intervention inside the equipment (for maintenance reasons).

Before any maintenance operation, check the pumping conditions of the installation: toxicity, possible corrosion of the pumped gases. Depending on the case, we recommend:
- to purge the pumping installation with dry nitrogen before any intervention;
- to wear gloves, goggles and breathing masks, if necessary;
- to ventilate the room well and disassemble the equipment under a fume hood.

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

Similarly, follow all the safety instructions concerning start-up.
The first lubrication required for the correct operation of ATP pumps is performed in the factory. Subsequent lubrications should be performed according to the procedure below and according to a frequency defined as a function of processes used (see scales D 30).

**Only use the ALCATEL grease contained in the lubrication syringe** (refer to the maintenance component references F 10).

---

**Use of the lubrication syringe**

The ATP contains two bearings which must both be reloaded with grease at each relubrication period. The syringe is equipped with two jumpers with different widths and colours (red and black) used to proportion the grease accurately for each pump bearing.

---

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

Lubrication of bearing opposite the pumping cell side: **red jumper.**
Disconnect the pump from the installation.

**Bearing lubrication**
- Remove the end cap by removing the two attachment screws. Remove the compression spring and the adjustment sleeve (asymmetrical part, mark the direction for assembly).

**Bearing opposite the pumping cell**
- Introduce the syringe equipped with its needle into the bearing and remove the red jumper.
- Always position the syringe needle between two balls of the bearing so as not to damage the bearing.
- Distribute the dose of grease in 2 diametrically opposed points, until the syringe plunger comes to a stop against the black jumper.

**Bearing on pumping cell side**
- Introduce the lubrication syringe needle into the drilled screw located at the center of the rotor until it comes to a stop against the screw head. Keep the syringe pressed down to the bottom of its housing throughout the operation.
- Remove the black jumper from the syringe and introduce the grease until the plunger comes to a stop.
- Remove the syringe.
- Reassemble the adjustment sleeve (taking care with the direction), the spring and the end cap with its o-ring.

The relubrication operation is complete.

Execute the pump running-in: see **E 70**.
The first lubrication required for the correct operation of ATP pumps is performed in the factory. Subsequent lubrications should be performed according to the procedure below and according to a frequency defined as a function of processes used (see scales D 30 and D 40).

*Only use the ALCATEL grease contained in the lubrication syringe* (refer to the maintenance component references F 10).

---

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

---

**Use of the lubrication syringe**

The ATP contains two bearings which must both be reloaded with grease at each relubrication period. The syringe is equipped with two jumpers with different widths and colours (red and black) *used to proportion the grease accurately for each pump bearing.*

---

**Lubrication of bearing on the pumping cell side:**

- **black jumper.**

**Lubrication of bearing opposite the pumping cell side:**

- **red jumper.**
The pump can remain connected to the installation during lubrication.

Unfasten the lubricating plug on the end cap side.

Introduce the syringe equipped with its needle to the bottom of the housing and **remove the red jumper**.
While keeping the syringe needle at the bottom of its housing, introduce the grease until the plunger comes to a stop. Remove the syringe.

Replace the lubricating plug after replacing its o-ring, contained in the syringe packaging.

Unfasten the lubricating plug on the pumping cell side.

Repeat the same operations, this time removing the black jumper from the syringe (keep the syringe at the bottom of its housing throughout the operation).

Remove the syringe and reassemble the lubricating plug equipped with its new o-ring.

The relubrication operation is complete.

Execute the pump running-in:
see **E 70** for ATP 150 and ATP 400, and
see **E 90** for ATP 900.
Pump running-in for
ATP 80, ATP 100, ATP 150, ATP 400

The pump must undergo a running-in operation

It consists of pump operation cycles at different speeds to distribute gradually and regularly the grease through the ball bearings.

Running-in after ball bearing replacement

Running-in program No. 1 duration ≈ 20 hours
This operation is used to obtain the pump's initial performance in terms of reliability, noise level, vibration and power consumption.

Running-in after pump lubrication

Running-in program No. 2 duration ≈ 2 h 30
This operation is used to fine-tune the distribution of the grease in the bearings.

The running-in consist to run Start/Stop cycles at different speeds until a pre-defined rotational speed is reached.

A phase is made of a chain of identical cycles.

![Cycle diagram](image)

During the running-in, cycle and phase counters are decremented to display

<table>
<thead>
<tr>
<th>PROG:1</th>
<th>END</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH:0</td>
<td>CYCLE:0</td>
</tr>
</tbody>
</table>

The running-in is ended.
Pump running-in for ATP 80, ATP 100, ATP 150, ATP 400

Running-in procedure

- Let the pump operate 10 minutes at atmospheric pressure.
- Then, connect the primary pump and operate at ultimate pressure (the cooling has been started up).
- Start the running-in operation as follows:

Running-in program "2" is selected. The screen displays the phases and cycles corresponding to the successive running-in sequences. The standby indicator flashes.

Displaying the data concerning the cycle in progress on the running-in screen:

Number of hour of operation
Current message RUNNING
Running-in speed which alternates depending on the sequences
Pump running-in for ATP 80, ATP 100, ATP 150, ATP 400

If a problem occurs during running-in

The controller displays:

- PROG 2 FAULT
- PH 1 CYCLE 2

and the program is stopped. Remedy to the problem and start again the running-in operation.

During the running-in cycles:
- the START / STOP / STANDBY keys are deactivated;
- access to the SETUP menu is impossible;
- access to the DISPLAY menu is possible.

We advise you against stopping the running-in procedure.

If a power failure occurs during running-in

The controller displays:

- $5600H ORPM
- READY TO START !

and the Standby indicator light is lit on. The running-in operation has been stopped and it must be started again.
**Maintenance counters**

for ACT 200T and ACT 600T controllers

**Principle**
The ball bearings can be regreased 2 times before to be changed.
The maintenance counter allows to account for these different operations (0-1-2) and to set their frequency limits (in hours).

When leaving the factory, the «MAINTENANCE» counter is reset at «0» and the frequency fixed at 5000h: this can be modified depending on the defined values in the greasing schedule *(see D 30)* or on the acquired know-how.

Maintenance operations are automatically displayed by the controller since this reset.
The user will have to perform the regreasings or ball bearing replacement and to increase the maintenance counter.

Example of operation with a maintenance frequency fixed to 5000h*.

<table>
<thead>
<tr>
<th>&quot;MAINTENANCE&quot; Counter</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;LIMIT&quot; (period in h)</td>
<td>5000</td>
<td>10000</td>
<td>15000</td>
<td>5000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&quot;TIME BEARINGS&quot; Counter</th>
<th>0</th>
<th>5000</th>
<th>10000</th>
<th>15000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message</td>
<td>New bearings</td>
<td>W01</td>
<td>W01</td>
<td>W02</td>
</tr>
<tr>
<td>Maintenance operation</td>
<td>1st lubrication + Increase &quot;MAINTENANCE&quot; counter to 1 + Start the running-in program N° 2**</td>
<td>2nd lubrication + Increase &quot;MAINTENANCE&quot; counter to 2 + Start the running-in program N° 2**</td>
<td>Bearings replacement + Increase &quot;MAINTENANCE&quot; counter to 0 + Start the running-in program N° 1**</td>
<td></td>
</tr>
</tbody>
</table>

*The maintenance frequency for regreasing or ball bearing replacement could be modified along the life time of the bearings: it could be justified by a process evolution, or the user’s know-how.

**In all the cases, wait for the display of running-in «END».
Maintenance counters
for ACT 200T and ACT 600T controllers

Increasing of the «MAINTENANCE» counter after regreasing

Display of the «W01: GREASING» message and lighting of «Fault» light.

Enter the access code and valid by ENTER.

Access to MAINTENANCE menu by pressing on key +

Choice of maintenance frequency:
- 1 after 1st lubrication.
- 2 after 2nd lubrication.

The frequency has been increased of 5000h. However, it is possible to change the frequency by pressing on + –.

«W01» message erasing and «Fault» light extinction.
Counter resetting after ball bearing replacement

Display of the «W02 : ATP MAINTENANCE» message and lighting of «Fault» light.

Enter the access code and valid by ENTER.

Access to MAINTENANCE menu by pressing on key +

Reset of the counter.

Possibility to change the value of frequency to validate.

Start the running-in program No 1 and wait for the display of Running-in «END»

TIME BEARINGS counter is automatically reset to «0» after program 1 running-in.

«W02» message erasing and «Fault» light extinction.
Maintenance counters for ACT 200T and ACT 600T controllers

After a ball bearing replacement in our Service Centers, it is necessary to reset the **TIME BEARINGS** counter as follows:

1. Enter the access code and validate by **ENTER**.
2. Access to **TIME BEARINGS** menu by pressing on key **+**.
3. Reset of the counter.
4. To validate.

Diagram:

- **DISPLAY SETUP** → **ENTER** → **ACCESS CODE** → **0** → **SET ANALOG OUT** → **+** → **TIME BEARINGS** → **ACTUAL : 45000** → **ENTER** → **TIME BEARINGS** → **ACTUAL : 45000** → **-** → **TIME BEARINGS** → **ACTUAL : 0** → **ENTER** → **TIME BEARINGS** → **ACTUAL : 0** → **PREVIOUS**
ATP 900 pump running-in

The pump must undergo a running-in operation

It consists of pump operation cycles at different speeds to distribute gradually and regularly the grease through the ball bearings.

Cycles and phases

The running-in consist to run Start/Stop cycles at different speeds until a pre-defined rotational speed is reached. A phase is made of a chain of identical cycles.

Running-in procedure

- Let the pump operate 10 minutes at atmospheric pressure.
- Then, connect the primary pump and operate at ultimate pressure (the cooling has been started up).
- Then, do the following cycles:

### Running-in after lubrication of the ball bearing

<table>
<thead>
<tr>
<th>Phase</th>
<th>Cycles</th>
<th>Start/Stop</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>6</td>
<td>START/STOP</td>
<td>6000 RPM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and leave running for 30mn</td>
<td>6000 RPM</td>
</tr>
<tr>
<td>2nd</td>
<td>2</td>
<td>START/STOP</td>
<td>10000 RPM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and leave running for 30mn</td>
<td>10000 RPM</td>
</tr>
<tr>
<td>3rd</td>
<td>2</td>
<td>START/STOP</td>
<td>16000 RPM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and leave running for 30mn</td>
<td>16000 RPM</td>
</tr>
<tr>
<td>4th</td>
<td>1</td>
<td>START/STOP</td>
<td>23000 RPM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and leave running for 30mn</td>
<td>23000 RPM</td>
</tr>
</tbody>
</table>

STANDBY menu allows speed adjustment.
Running-in after ball bearing replacement

1st phase: 6 cycles START/STOP to 6000 RPM and leave running for 4h to 6000 RPM
2nd phase: 2 cycles START/STOP to 10000 RPM and leave running for 4h to 10000 RPM
3rd phase: 2 cycles START/STOP to 16500 RPM and leave running for 5h to 16500 RPM
4th phase: 1 cycle START/STOP to 23000 RPM and leave running for 3h to 23000 RPM then for 1h to 27000 RPM
Maintenance counters for ACT 1000T controller

**Principle**

The ball bearings can be regreased 2 times before to be changed.
The maintenance counter allows to account for these different operations (0-1-2) and to set their frequency limits (in hours).

When leaving the factory, the «BEARING MAINT.» counter is reset at «0» and the frequency fixed at 5000h: this can be modified depending on the defined values in the greasing schedule (see D 40) or on the acquired know-how.

Maintenance operations are automatically displayed by the controller since this reset.

The user will have to perform the regreasings or ball bearing replacement and to increase the «BEARING MAINT.» and «BEARING LIMIT» counters.

Example of operation with a maintenance frequency fixed to 5000h*.

<table>
<thead>
<tr>
<th>&quot;BEARING MAINT&quot; Counter</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;LIMIT&quot; (period in h)</td>
<td>5000</td>
<td>10000</td>
<td>15000</td>
<td>5000</td>
</tr>
<tr>
<td>&quot;BEARING LIMIT&quot; Counter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Message</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New bearings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st lubrication + Increase &quot;BEARING MAINT&quot; counter to 1 and &quot;BEARING LIMIT&quot; counter to 10000</td>
<td>D37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd lubrication + Increase &quot;BEARING MAINT&quot; counter to 2 and &quot;BEARING LIMIT&quot; counter to 15000</td>
<td>D37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bearings replacement + Increase &quot;BEARING MAINT&quot; counter to 0 and &quot;BEARING LIMIT&quot; counter to 5000</td>
<td>D24</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The maintenance frequency for regreasing or ball bearing replacement could be modified along the life time of the bearings: it could be justified by a process evolution, or the user’s know-how.*
Maintenance counters for ACT 1000T controller

Increasing of the «BEARING MAINT» counter after regreasing


Access to BEARING MAINT. menu by pressing on key +

Choice of maintenance frequency:
- 1 after 1st lubrication.
- 2 after 2nd lubrication.

Increase the limit counter for frequency maintenance (i.e. 5000h)

«D37» message erasing and «Fault» light extinction.
Maintenance counters for ACT 1000T controller

«BEARING MAINT» counter resetting after ball bearing replacement

Display of the «D24» message and lighting of «Fault» light.

Access to BEARING MAINT. menu by pressing on key +

Reset of the maintenance counter.

Possibility to change the value of frequency (i.e. 5000h).

Reset of the bearing counter.

«D24» message erasing and «Fault» light extinction.
Chapter F

ATP User’s Manual

Maintenance components

Maintenance parts

F 10
**Maintenance parts**

**Lubrication syringe**  Ready-to-use, it contains the grease load required for a regreasing operation on the 2 bearings and two BS rings.

<table>
<thead>
<tr>
<th>Pump type</th>
<th>P.N.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP 80/100</td>
<td>056993</td>
</tr>
<tr>
<td>ATP 150</td>
<td>101924</td>
</tr>
<tr>
<td>ATP 400/900</td>
<td></td>
</tr>
</tbody>
</table>

**Necessary tools for pump overhaul (1 + 2 + 3)**

1 - **Seal kit**  It includes all the seals which must be replaced during the maintenance of the pump with a change of bearings.

<table>
<thead>
<tr>
<th>Pump type</th>
<th>P.N.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP 80/100</td>
<td>062698</td>
</tr>
<tr>
<td>ATP 150</td>
<td>063078</td>
</tr>
<tr>
<td>ATP 400</td>
<td>063076</td>
</tr>
<tr>
<td>ATP 900</td>
<td>062992</td>
</tr>
</tbody>
</table>

2 - **Tool kit**  It enables the user to replace bearings easily. It includes the ball bearing replacement manual.

<table>
<thead>
<tr>
<th>Pump type</th>
<th>P.N.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP 80/100</td>
<td>101930</td>
</tr>
<tr>
<td>ATP 150</td>
<td></td>
</tr>
<tr>
<td>ATP 400/900</td>
<td></td>
</tr>
</tbody>
</table>
3 - Ceramic bearing kit

The kit contains 1 bearing and a pre-load washer (not used in the ATP)

Choose the bearings according to the 2 figures marked on the identification plate, after the pump serial number and in compliance with the table below, in order to obtain a correct assembly set.

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Reference on identification plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP 80</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>066671 066672 066673 066674 066675</td>
</tr>
<tr>
<td>100</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>066691 066692 066693 066694 066695</td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
<tr>
<td>900</td>
<td></td>
</tr>
</tbody>
</table>

Example of ATP 80 model pump:

First figure 2: For the bearing on the pumping cell side, the choice of kit is reference 066672;
Second figure 3: For the bearing on the side opposite the cell, the choice of kit is reference 066673.
Maintenance parts

Copper seals for pumps with CF-F flanges

<table>
<thead>
<tr>
<th>Flange type</th>
<th>Sets of 10 parts</th>
<th>10 sets of 1 part (Unit packaged)</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 CF-F</td>
<td>303283</td>
<td>303290</td>
</tr>
<tr>
<td>100 CF-F</td>
<td>303284</td>
<td>303291</td>
</tr>
<tr>
<td>160 CF-F</td>
<td>303285</td>
<td>303292</td>
</tr>
<tr>
<td>200 CF-F</td>
<td>303286</td>
<td>303293</td>
</tr>
</tbody>
</table>

Fuses for controllers

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>ACT 200T</th>
<th>ACT 600T</th>
<th>ACT 1000T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse 5 x 20 T 250V</td>
<td>2</td>
<td></td>
<td>3.15A</td>
<td></td>
</tr>
<tr>
<td>Fuse 5 x 20 T 250V</td>
<td>2</td>
<td></td>
<td>6.3A</td>
<td></td>
</tr>
<tr>
<td>Fuse 6 x 32 T 250V</td>
<td>2</td>
<td></td>
<td></td>
<td>16A</td>
</tr>
</tbody>
</table>

Air inlet electrovalves

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Num.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrovalve coil</td>
<td>240V 50/60 HZ</td>
</tr>
<tr>
<td>Electrovalve coil</td>
<td>220V 50/60 HZ</td>
</tr>
<tr>
<td>Electrovalve coil</td>
<td>200V 50/60 HZ</td>
</tr>
<tr>
<td>Electrovalve coil</td>
<td>115V 50/60 HZ</td>
</tr>
<tr>
<td>Electrovalve coil</td>
<td>100V 50/60 HZ</td>
</tr>
<tr>
<td>Electrovalve coil</td>
<td>12V DC</td>
</tr>
<tr>
<td>Electrovalve operator</td>
<td></td>
</tr>
<tr>
<td>Silencer</td>
<td></td>
</tr>
</tbody>
</table>
Chapter G
ATP User’s Manual

Appendix

Pumping curves

G10
Pumping curves

Pumping speed versus inlet pressure

Inlet pressure (Pa)

Inlet pressure (mbar)

Pumping speed (l/s)

Upper limits for continuous operation (Water cooled pump).

Gas: N\textsubscript{2}
Pumping curves

Inlet pressure (Pa)

Pumping speed (l/s)

Gas : N₂

Upper limits for continuous operation (Water cooled pump).
Pumping curves

Pumping speed versus inlet pressure

- Gas: N₂
- Ar/SF₆

Upper limits for continuous operation

ATP900 HPC
ATP400 HPC
Pumping curves

Flow rate versus inlet pressure

Inlet pressure (Pa)

Flow rate (sccm)

Inlet pressure (mbar)

Gas: N₂

Upper limits for continuous operation

ATP900 HPC
ATP400 HPC