

# ACT 250

TURBOMOLECULAR PUMP CONTROLLER  
FOR ATP 150 AND ATP 400



## ATP Series User's Manual addendum



## ACT 250 addendum

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## ACT 250 addendum

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## The ACT 250 controller

*Dear Customer,  
You have just bought an  
ACT 250 controller. In  
order to ensure the best  
possible performance of the  
equipment and your  
complete satisfaction in  
using it, we advise you to  
read this addendum  
carefully before attempting  
to service or use your  
controller.*



Insertable "box" version  
**Part No. 108320**



Integrable "OEM" version  
**Part No. 108151**

### **ACT 250 controller**

This controller drives **ATP 150** or **ATP 400** pumps, providing their power supply and enabling remote control.

The ACT 250 controller is available as:

- an insertable "box" version with case,
- an integrable "OEM" version without case.

This version can replace the "box" version when integrating the pump in a complex installation or device.

### **Main characteristics**

- Dry contact signal outputs
- Opto-isolated control inputs
- RS 232 / 485 serial links
- Operate at all voltages from 85 to 265 V, 50/60 Hz

**The ACT 250 controller is a new product, not described in Edition 09 of the ATP Series Pump User Manual.**

**This addendum provides the additional information needed to use the controller.**

## Accessories

### **Pump power supply cable**

The controller is connected to the pump using a corresponding power supply cable, ordered separately.

Cable length (m)	Part No.
1	105086
1.5	A458885
3.5	101812
5	101810
10	101811
15	105303
20	A458478

### **“End-user” kit**

This kit, ordered separately, is needed to use the ACT in local mode. It includes:

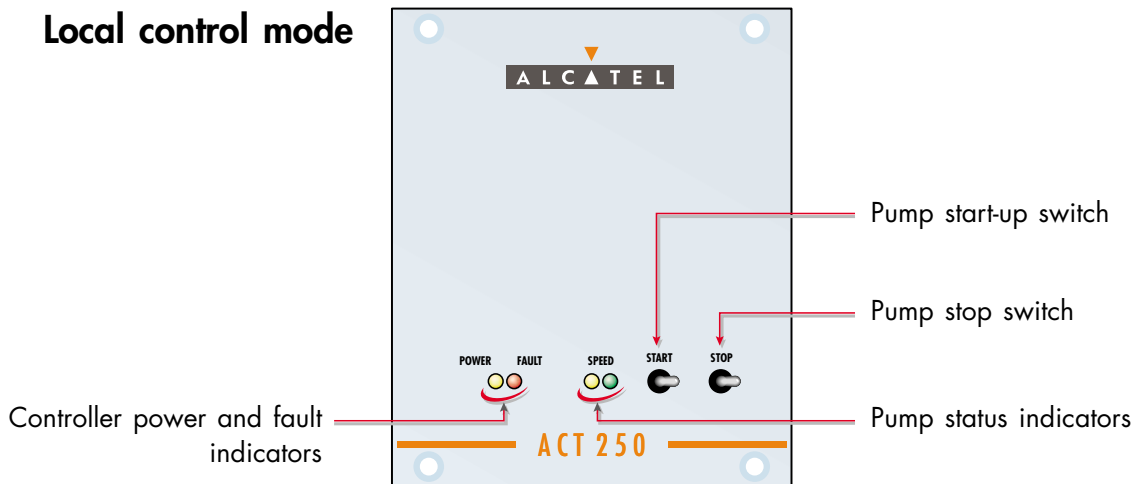
- 1 mains cable,
- 1 connector plug,
- 4 legs.

Kit	Part No.
USA	108935
Europe	108936
UK	108948

## ACT 250 "box" controller control modes

There are two possible control modes: local control and remote control.

### Local control mode



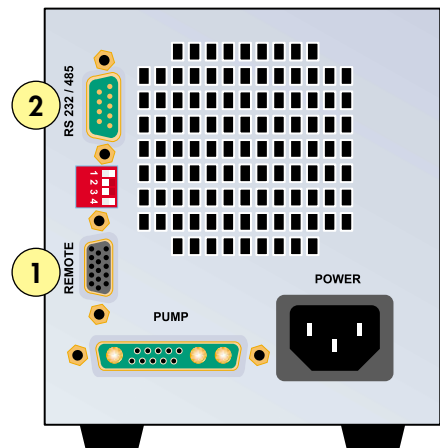
### Remote control

There are three possible remote control modes:

#### 1 The remote control

Established by the **REMOTE** connector which:

- provides remote control of the START, STOP, STANDBY, EXTERNAL SAFETY and MODE SELECT functions;
- replicate the available monitoring parameters (At speed / Starting / Fault) on dry contacts.



#### 2 RS 232 serial link

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

#### 2 RS 485 serial link

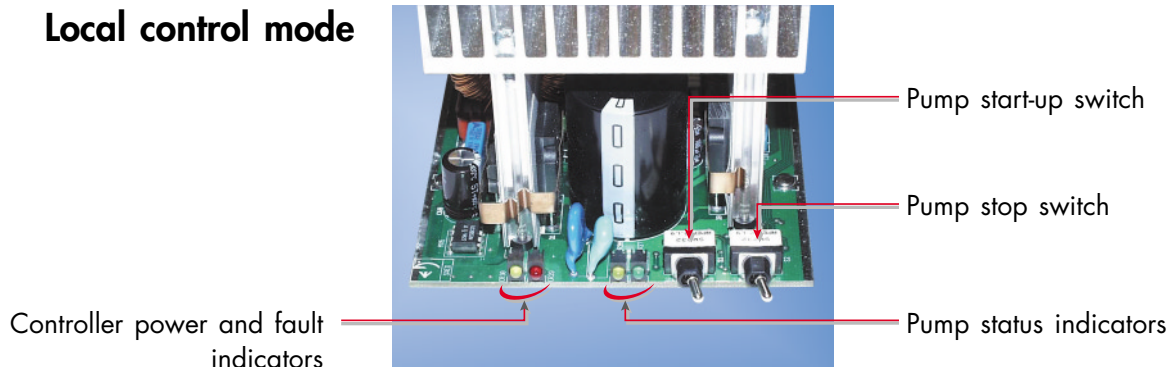
The RS485 serial link is used to connect several pumps **in a network**.

The wiring characteristics are given on [page 13](#)

## ACT 250 "OEM" controller control modes

There are two possible control modes: local control and remote control.

### Local control mode



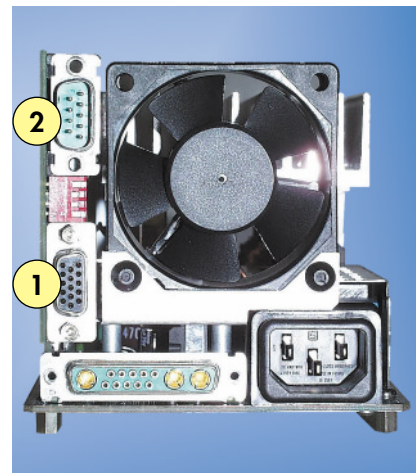
### Remote control

There are three possible remote control modes:

#### 1 The remote control

Established by the **REMOTE** connector which:

- provides remote control of the START, STOP, STANDBY, EXTERNAL SAFETY and MODE SELECT functions;
- replicate the available monitoring parameters (At speed / Starting / Fault) on dry contacts.



#### 2 RS 232 serial link

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

#### 2 RS 485 serial link

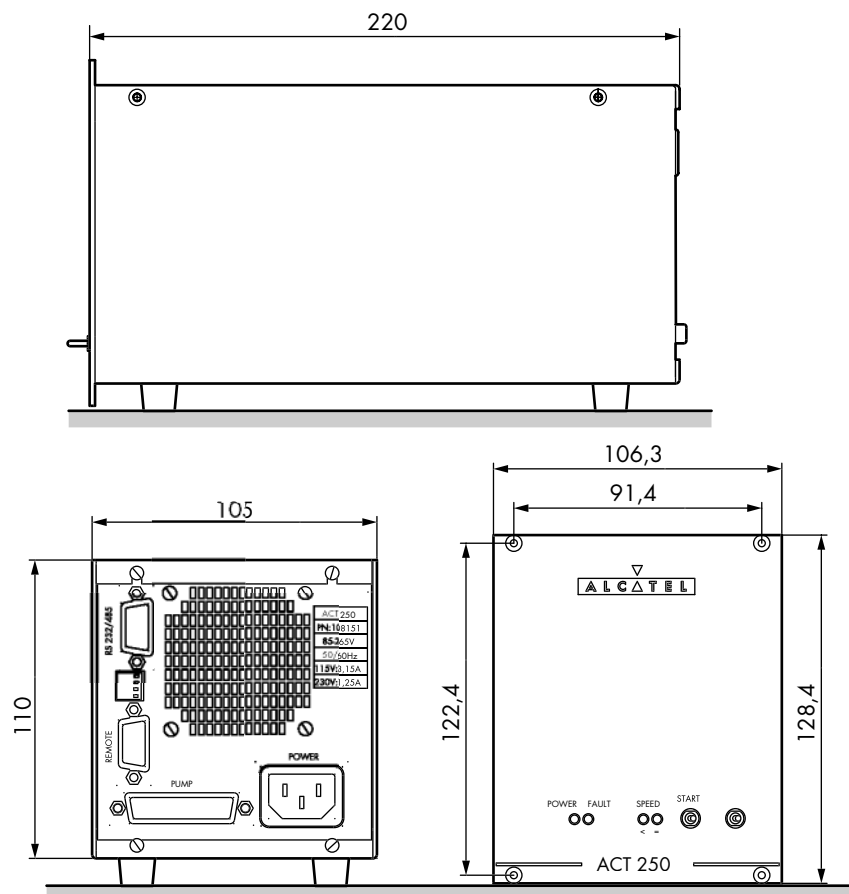
The RS485 serial link is used to connect several pumps **in a network**.

The wiring characteristics are given on **page 13**

## ACT 250 controller technical characteristics

Characteristic	Unit	ACT 250 "box"	ACT 250 "OEM"
Weight	kg	1.8	1.3
Dimensions H x W x D	mm	128.4 × 106.3 × 220 3U × 1/4 Rack	95 × 100 × 212
Nominal voltage	V	85 - 265	
Frequency	Hz	50/60	
Maximum power	W	300	
Maximum ambient temperature	° C	T ≤ 50	
Storage temperature	° C	-15/+70	
Customer mains circuit breaker rating	A	T10A	

### ACT 250 "box" dimensions (in mm)

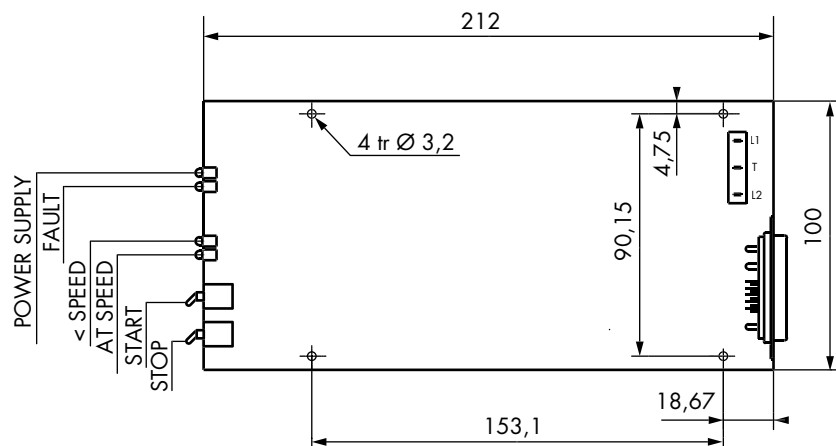
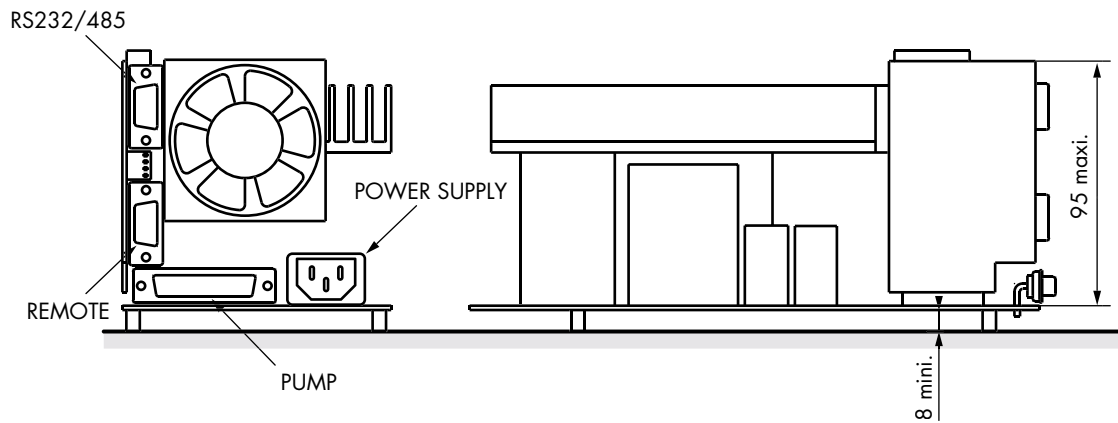




# Presentation

## ACT 250 controller technical characteristics

### ACT 250 "OEM" dimensions (in mm)



Attached using four M3 screws or mounted in an Alcatel cabinet

# Commissioning

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## Safety instructions



Before switching on the controller, the user should study the manual and follow the safety instructions listed in the compliance certificate booklet supplied with the pump.  
See sheet B10 in the ATP pump User Manual.

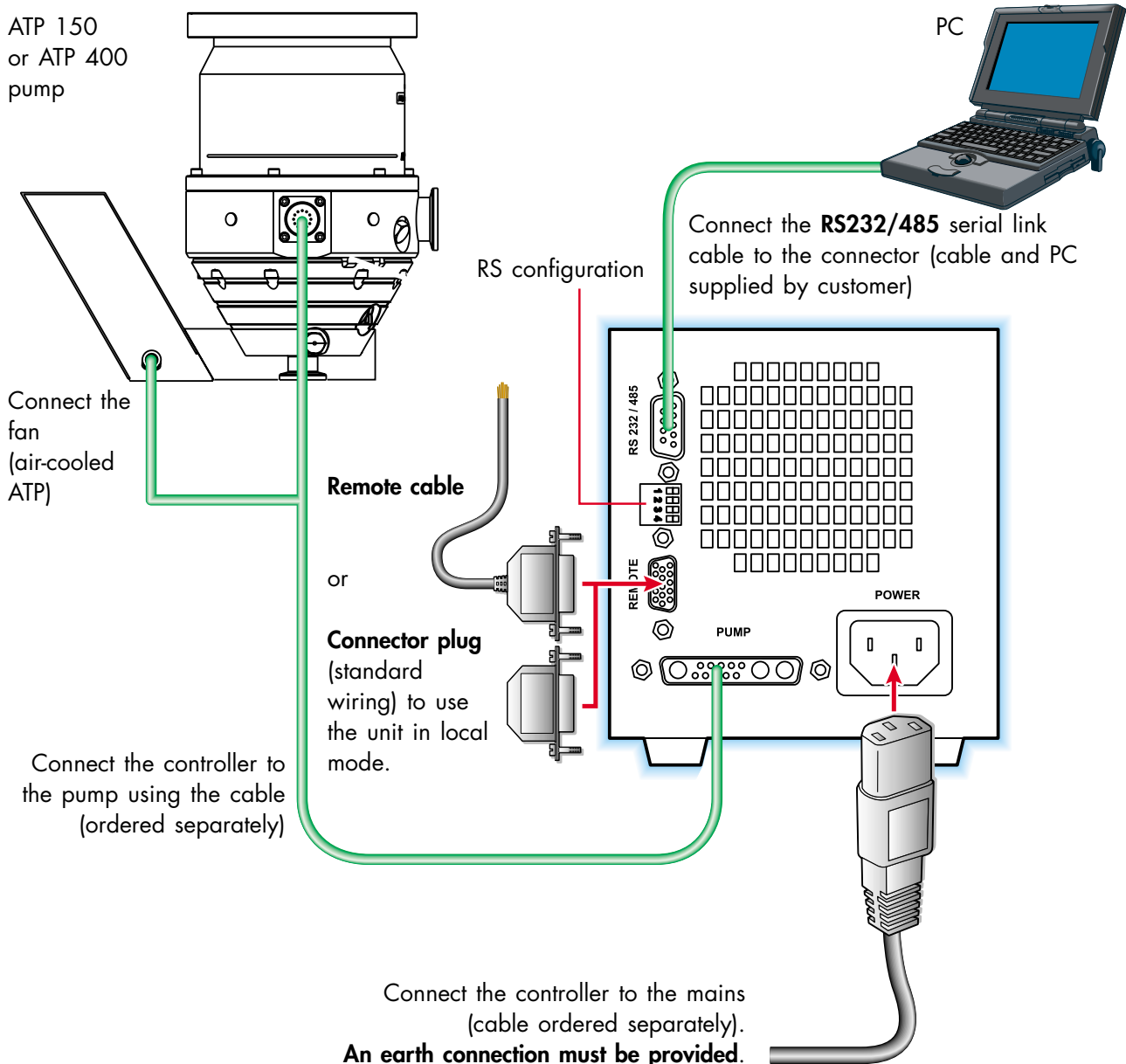
# Commissioning

## ACT 250 controller electrical connections

■ If the controller is remote controlled, make the various connections on the **REMOTE** connector (see [page 13](#) for wiring details).



■ If the controller is used in **local mode**, the pump can **only operate if the connector plug** (ordered separately) is connected to the **REMOTE connector** (see [page 13](#) for wiring details).



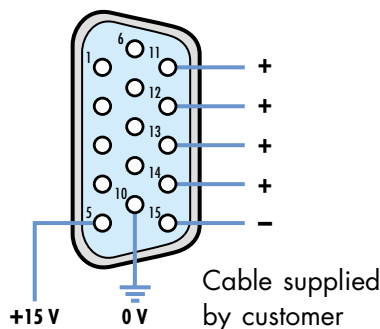
# Commissioning

## ACT 250 remote connector characteristics



When 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.

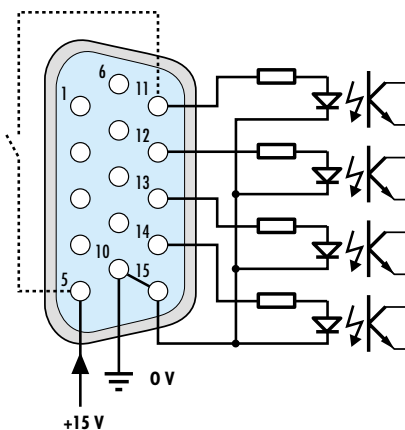
### Voltage control mode



The inputs are activated when an AC or DC voltage is applied. The voltage should be between 15 and 24 Volts. (15-pin Sub-D female connector).

### Principle of voltage-controlled optocoupled inputs

Example : Ext. safety activated



External contact supplied by customer

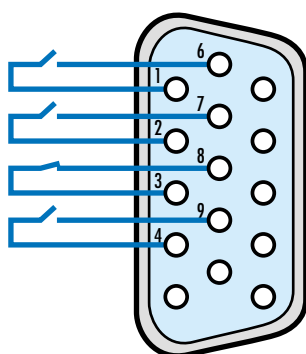
Ext. safety <b>11</b>	Inactive = the external safety device is activated (e.g. an emergency stop) Active = pump operation authorised
Select Mode <b>12</b>	Select "status" or "pulse" command mode. This affects the START/STOP and STANDBY commands. <ul style="list-style-type: none"> <li>■ 12 - inactive = "status" mode               <div style="display: flex; align-items: center;"> <div style="margin-left: 20px;">Ex. pin 14</div> </div> </li> <li>■ 12 - active = "pulse" mode               <div style="display: flex; align-items: center;"> <div style="margin-left: 20px;">Ex. pin 14</div> </div> </li> </ul>
Standby Mode <b>13</b>	Inactive = operation at nominal speed Active = operation at reduced speed
Start/Stop <b>14</b>	Inactive = Stop Active = Start
<b>15</b>	Common for inputs

# Commissioning

## ACT 250 remote connector characteristics

### Signalling on output contacts

These are dry contacts (**48 V AC - 1 A**) which replicate pump status information.



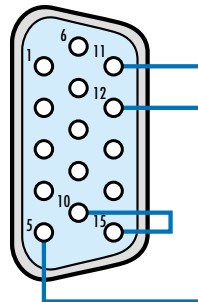
When the output contact is closed:

<b>1 - 6</b>	<b>The pump has reached the selected speed</b>
<b>2 - 7</b>	<b>The pump is accelerating</b>
<b>3 - 8</b>	<b>No fault signal</b>
<b>4 - 9</b>	<b>Not used</b>

# Commissioning

## ACT 250 remote connector wiring

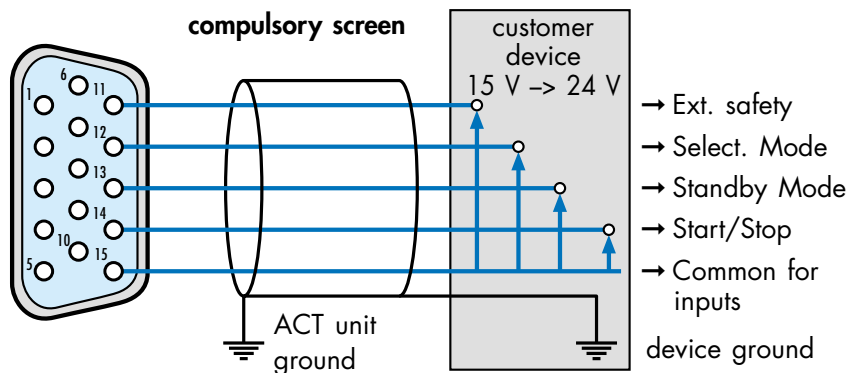
Use in local mode ■ Standard connector plug (factory wired)



Wiring seen from solder side

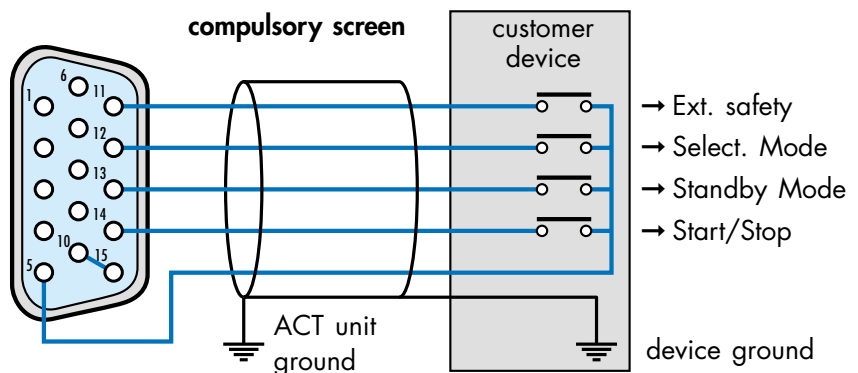
Use in remote control mode ■ With galvanic isolation (recommended)

Wiring seen from solder side.



■ Without galvanic isolation (not recommended)

Wiring seen from solder side.



The voltage used to power the contacts is supplied by the ACT 250 (terminal 5). The disadvantage of this method is the risk of exposing this voltage to external interference (see also diagrams on [page 11](#)).

# Commissioning

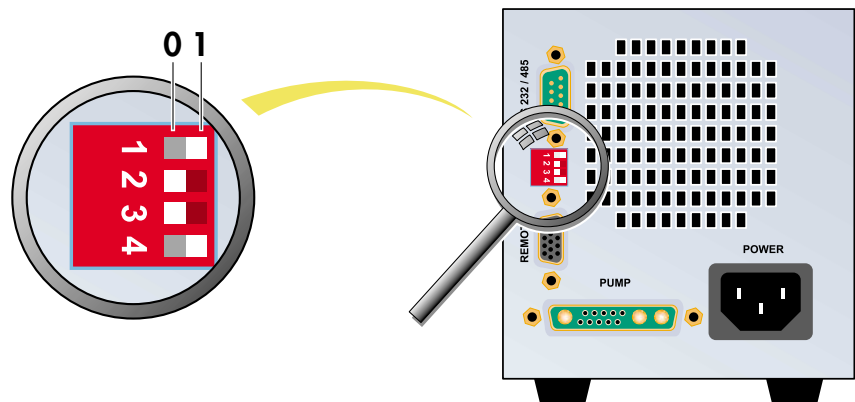
## RS 232 / 485 serial link

### Wiring the RS 232 or RS 485 serial link

See sheet **B 110** in the ATP Series Pump User Manual.

### Configuring the RS 232 or RS 485 serial link

The link is configured using switches on the rear panel of the controller.



Switch	description	0	1
1	parity type	odd	even
2	parity	no	yes
3	baud rate	9600	4800
4	RS type	RS 485	RS 232

Factory configuration: **9600 baud, NO parity, RS 232**

**Use** See the detailed list of commands on [page 15](#)

# Commissioning

## Detailed description of RS commands

### Syntax conventions applicable to all commands

**adr** = address, from 000 to 255  
**<CR>** Carriage Return (ascii 13)  
**<LF>** Line Feed (ascii 10); shown in brackets as it is not compulsory.

**Status values** **ok** : command executed correctly

**Error messages** **Err0** : adjustment error (out of bounds)  
**Err1** : command error (syntax)  
**Err2** : parameter error (e.g. non-hexadecimal character)  
**Err3** : context error  
**Err4** : checksum error

---

### **ADR** Specifies the address of the device for networking

---

**Syntax** #adr**ADR**aaa<CR>[<LF>]  
adr = address of device before this command  
aaa = new address of device  
condition :  $000 \leq aaa \leq 255$

**Result** #aaa,ok or Err2

This command is used to allocate a specific number to each device on the network (loop for RS232 or parallel for RS485).

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



# Commissioning

## Detailed description of RS commands

---

### CKS Enables or disables checksums on reply strings

---

**Syntax** #adr**CKSON**<CR>[<LF>]  
Enables the ASCII checksum character at the end of a reply string

or

#adr**CKSOFF**<CR>[<LF>]  
Disables the ASCII checksum character at the end of a reply string

**Result** #adr,ok,**S** for CKSON  
#adr,ok for CKSOFF

This feature enables the user to test whether a transmission error has occurred for the reply string.

**S** is a character whose ASCII value is the 7-bit checksum of all ASCII character values from the start of the reply string to the character preceding the **S**. The 8th bit of **S** (most significant bit) is always 1.

---

### CYC Starts the specified running-in cycle

---

**Syntax** #adr**CYC1**<CR>[<LF>] to start running-in program 1,  
or  
#adr**CYC2**<CR>[<LF>] to start running-in program 2

**Result** #adr,ok

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).

# Commissioning

## Detailed description of RS commands

---

### **DLI** Defines the DataLogger transmission interval

---

**Syntax** #adr**DLI**xxx<CR>[<LF>]  
xxx: DataLogger transmission 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 (RS232 only)

---

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

**Result** #adr,sssss,nnnnn,iiii,tttt,uuuu.o,www,ppp,vvv

Returns current values :

**sssss** : current speed (rpm)  
**nnnnn** : speed set point (rpm)  
**iiii** : current value (mA)  
**tttt** : pump operating time (hours)  
**uuuu.o** : (reserved)  
**www** : 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.

# Commissioning

## Detailed description of RS commands

---

### ECH Enables or disables command echoing

---

**Syntax** #adr**ECHON**<CR>[<LF>]  
enables all characters received to be echoed over the serial port  
or  
#adr**ECHOFF**<CR>[<LF>]  
disables 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".

---

### HDR Defines the start character for a command reply string

---

**Syntax** #adr**HDR**nnn<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** #adr**IDN**<CR>[<LF>]

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

Returns the type of Variator Supervisor, the software version (x), the software edition (zz), and the type of pump for which this variator is set up.

# Commissioning

## 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

**aaaa** : max. current set point

**hhhhh** : alert level for pump bearing maintenance

---

### LNG Returns the strings sent with the identification sub-strings

---

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

**Result** #adr,ok  
AVT>

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

Also generates the "AVT>" prompt each time a <CR> character is received.

See also: **SHT**

---

### 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.

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

See also: **RPM**, **SBY**

# Commissioning

---

## Detailed description of RS commands

---

### **OPT** Used to select possible user choices

---

**Syntax** #adr**OPT2** n<CR>[<LF>  
choice of temperature unit:  
n = 0 : degrees Centigrade  
n = 1 : degrees Fahrenheit

**Result** #adr,ok

See also: **SEL** Comment: The choice of the temperature unit affects the results of the **DLR** and **STA** strings.

---

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

---

**Syntax** #adr**RPM** nnnnn<CR>[<LF>] or #adr**RPM**nnnnn<CR>[<LF>]

**Result** #adr,ok or #adr,ErrX  
X = 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 memory

---

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

**Result** #adr,ok

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

January 2001

# Commissioning

## Detailed description of RS commands

---

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

---

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

**Result** #adr,ok

Resets the stand-by speed to its last stored value, and allows it to be modified if an "**RPM**" command is sent.

See also: **NSP**, **RPM**

This configuration is automatically stored in user memory.

---

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

---

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

**Result** #adr,a,u

a: Reserved

u: Returns the choice of temperature unit::

u = 0: degrees Centigrade      u = 1: degrees Fahrenheit

---

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

---

**Syntax** #adr**SEP**nnn<CR>[<LF>]

3-digit decimal value of the ASCII code of the desired character (with leading zeros if necessary).

condition:  $000 \leq nnn \leq 255$

**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.

# Commissioning

---

## Detailed description of RS commands

---

### **SET** Defines the internal operating parameters

---

**Syntax** #adr**SET**1 hhhh<CR>[<LF>] : maintenance time limit  
000<hhhhh<65535

**Result** #adr,ok or #adr,ErrX  
See also: **LEV**

---

### **SHT** Return the DataLogger string without the identification sub-string

---

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

**Result** #adr,ok

The strings sent following **DLR**, **LEV** and **SPD** commands are sent without parameter identification sub-strings (e.g. without units).  
See also: **LNG**

---

### **SPD** Returns the current speed

---

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

**Result** #adr,nnnnn  
See also: **LNG**, **SHT** #adr,nnnnn rpm

# Commissioning

## Detailed description of RS commands

---

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

---

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

**Result** #adr,xxxxxx,yyyyyy,zzzzzz,sssss,iiii,www,ppp,vvv,tttt<CR><LF>

adr: address

543210

xxxxxx status bits:

5 - RS echo (1->off)  
4 - String long (0) / short (1)  
3 - On (1) / Off (0)  
2 - reduced or nominal  
speed reached(1)  
1 - standby (1)  
0 - running-in (1)

yyyyyy fault bits:

5 - variator temperature  
4 - motor temperature  
3 - excess current  
2 - sensors or start-up  
1 - external  
0 - pump not connected

zzzzzz alert bits:

5 - reserved (future use)  
4 - reserved (future use)  
3 - variator temperature  
2 - motor temperature  
1 - start-up time exceeded (future)  
0 - operating time exceeded

sssss current speed value in rpm

iiii current value in mA

www reserved (pwm value)

ppp pump temperature value

vvv variator temperature

tttt pump operating time value



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 turbomolecular pump operating state

---

**Syntax** #adr**TMPON**<CR>[<LF>]: start pump rotation

#adr**TMPOFF**<CR>[<LF>]: stop pump

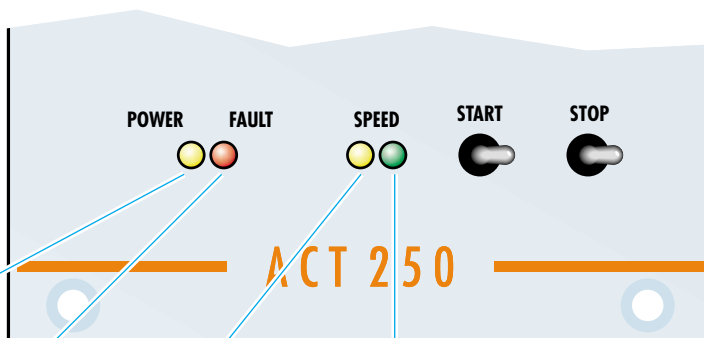
**Result** #adr,ok or #adr,Err3 if the pump is already in the state requested (context error)



## Controlling the pump from the ACT 250 controller

Once all connections are complete, plug the controller into the mains.

### Indicator lights "box" version



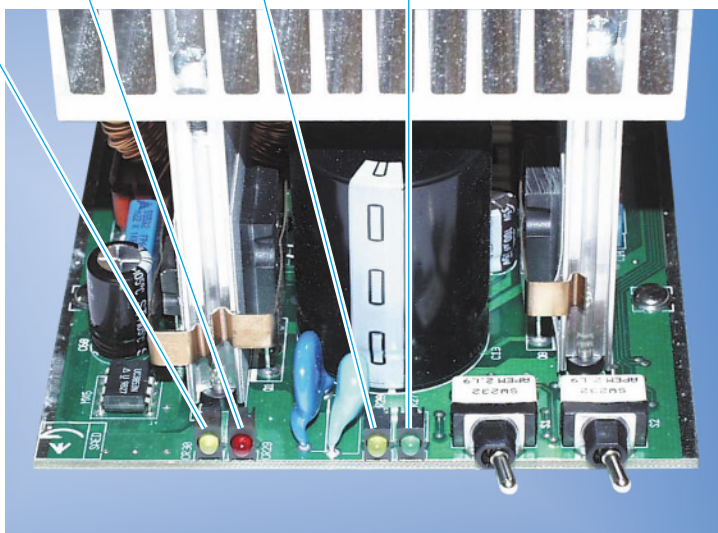
**Yellow lit**  
Controller on

**Red lit**  
Controller fault  
**Red flashing**  
Controller alert

**Yellow lit**  
pump rotation  
speed **accelerating**

**Green flashing**  
The pump rotation speed is  
**greater** than the selected  
speed (speed reduction during  
operation)  
**Green lit**  
The pump has attained the  
selected speed.

### "OEM" version



---

## Controlling the pump from the ACT 250 controller

### Starting the pump with the START switch



The pump is started up to reach the selected speed. The yellow rising speed indicator light comes on. When the pump reaches its selected speed, the yellow indicator light goes off and the green indicator light comes on.

### Stopping the pump with the STOP switch



The rotation speed monitoring indicator lights go off. The pump motor is no longer powered, the pump decelerates.

## Controller functions

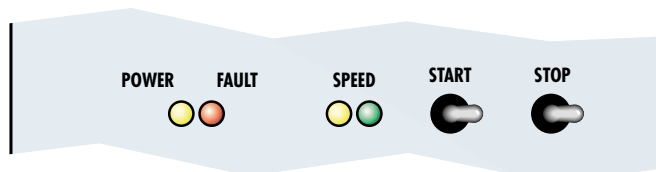
### Precautions



The "OEM" version of the ACT 250 has been designed with electrical safety and electromagnetic compatibility standards in mind. It is the user's responsibility to provide external shielding to comply with EMC and electrical safety standards.

### Local mode operation

The Start and Stop functions use switches located on the front panel of the "box" version and on the board for the "OEM" version.



The pump's operating status is shown by the state of the "POWER" indicator (yellow) and the three "FAULT" (red) and "SPEED" (yellow and green) indicators.

### Indication of rotation during operation (controller on)

	Press button		Pump motor on	Pump rotation speed	State of indicators			
	START	STOP			Power Yellow	Fault Red	Speed Yellow	Green
1	Before start-up		NO	0				
2	During start-up		YES	< selected speed				
3	Pump at nominal speed		YES	= selected speed				
4	Alert or fault triggered (see page 27)	Alert	YES	≤ selected speed				
		Fault	NO	↘ 0				
5	Overload		YES	< selected speed				
6	Speed set point lowered		YES	> selected speed				
7	Pumping stopped		NO	↘ 0				

○ indicator off    indicator on    indicator flashing

---

## Controller functions

### Fault monitoring

■ **Alerts** are indicated by:

- flashing red indicator. The pump power supply is maintained.

■ **Faults** are indicated by:

- lit red indicator. The pump is stopped as soon as a fault is detected.

Alerts and faults shown by the indicator light include:

- controller overheating,
- pump motor overheating,
- cable disconnected (pump / controller)
- external safety device open,
- overcurrent on speed variator.

Alerts and faults can be identified using the serial link (see [page 23](#), **STA** command).

## France

Alcatel Vacuum Technology - France  
98, avenue de Brogny - BP 2069  
74009 ANNECY - Cedex  
Tel : (33) 4 50 65 77 77  
Fax : (33) 4 50 65 77 89

## Germany

Alcatel Hochvakuum Technik GmbH  
Am Kreuzeck 10  
D - 97877 WERTHEIM  
Tel: (49) 9342 96100  
Fax: (49) 9342 961030

## Italy

Alcatel Vacuum Systems S.p.A  
Via Trento, 30  
20059 VIMERCATE (MI)  
Tel : (39) 039 686 3855  
Fax : (39) 039 667 125

## Japan

Alcatel Japan LTD  
13 fl. Dai Tokyo - Kasai Shinjuku bldg  
3 - 25 - 3 - Yoyogi, Shibuya - ku  
TOKYO 1510053 - JAPAN  
Tel : (81) 3 5302 4350  
Fax : (81) 3 5302 4332

## Korea

Alcatel Vacuum Technology Korea  
5<sup>th</sup> Floor, Sunghyun B/D  
10-5, Karak-Dong, Songpa-Ku  
Seoul - SOUTH KOREA  
Tel : (82) 2 409 6277  
Fax : (82) 2 409 6279

## United Kingdom

Alcatel Vacuum Technology UK Ltd  
8 Bain Square  
Kirkton Campus  
Livingstone - WEST LOTHIAN  
EH - 547 DQ - SCOTLAND  
United Kingdom  
Tel. (44) 1 506 418 000  
Fax. (44) 1 506 418 002

## USA

Alcatel Vacuum Products  
67 Sharp Street  
HINGHAM, MA. 02043  
USA  
Tel : 1(781) 331 4200  
Fax : 1(781) 331 4230

