



# Professional Central Vacuum Systems



**BIG PROJECTS**

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# The ELEK – TRENDS central vacuum cleaning system

The ET central vacuum cleaning system offers a rational, economical and quiet solution for cleaning all types of floor covering. This is an sound investment will increase the life of the floor covering and reduce the time spent vacuuming, an even greater benefit when contract cleaners are used.

## Principle of operation

A central vacuum cleaner is installed in a service room and a simple network of pipes connects this central unit to a number of vacuum sockets, which are placed conveniently for the areas to be cleaned. When the end of a flexible hose is inserted into a vacuum socket, the vacuum unit is activated by means of a 12 volt remote control unit.

The 10 metre long flexible suction hose is provided with a fixed tube and a brush suitable for the type floor to be cleaned. The dust is deposited in a reusable plastic dust sack (100L.) which is transparent so that the level of dust is visible.

## Applications

- |                        |                     |
|------------------------|---------------------|
| ⇒ Private houses       | ⇒ Offices           |
| ⇒ Hotels & Restaurants | ⇒ Rest-homes        |
| ⇒ Factories            | ⇒ Laboratories, ... |

## WHY CENTRAL VACUUM CLEANING ?

Portable vacuum cleaners have well-known disadvantages for both private and communal areas :

- ◆ Noise nuisance
- ◆ Inefficient use of time owing to ineffective products/ poor suction
- ◆ Expensive dust filter-bags become progressively blocked thus reducing suction and requiring frequent replacement.
- ◆ Recirculation of fine dust (and smells) in the rooms being cleaned. (This is unpleasant for asthma sufferers and harmful to computer hardware, CD-drives, etc...)

The **ELEK–TRENDS central vacuum cleaning system** overcomes these disadvantages.

- ◆ **Low noise** : the noise of the motor can only be heard in the service room.
- ◆ **Powerful** : A large fixed motor produces the high power output necessary for excellent results.
- ◆ **Ease of use** : user only has a robust but lightweight (3kg) hose to handle. There is no portable machine to carry or damage furniture.
- ◆ **Low Maintenance** : The cyclone method of dust collection means that the dust is separated by centrifugal force and deposited in the dust container. Replaceable filter bags are no longer required.
- ◆ **Hygienic** : The virtually dust free air is exhausted outside and not into the room being cleaned. This important for allergy sufferers, computer suits and hospitals.
- ◆ **Economical** : The cleaning time is decreased by at least 30%. Also the life of the floor covering is increased as a thoroughly cleaned carpet lasts longer.
- ◆ **Durable** : With the correct maintenance, the system will last almost indefinitely

## **Vacuum units for different types of building**

For the best results from a central vacuum cleaning system and to optimise its value, it is necessary to take into account the following factors.

### ⇒ **Office buildings**

Cleaning usually occurs after office hours, during the evening or early morning. The potential users of the system usually work at the same time, which means that the following are required :

- Vacuum sockets (manual)
- One or two vacuum units
- Operation by means of conveniently placed time-switches.

### ⇒ **Hotels**

One operator per 15 rooms to be serviced. As the cleaning is mostly done by day, one should determine which is the most economical appliance to use. Therefore we advise this choice:

- Large hotels : (more than 50 rooms) : one unit ET 9200 in combination with an ET –electronic starter. Can be used by 4 persons at the same time..
- Hotels with less than 50 rooms : one unit ET 4500 or ET 9200.
- Hotels with less than 20 rooms : one unit ET 3100P (1 person)

The PVC pipe networks could be separate.

### ⇒ **Flats and apartments**

In a building with several occupants, it is possible that more than one occupant may wish to use the (central) vacuum unit at the same time. In this instance, we recommend:

1. One small central vacuum unit (**ET models 1210/1350/1510**) per flat. Each one is self-contained and easily positioned.

or

2. One larger **ET –filter 5011** which collects the dust for a number of flats and an **ET 9200** is placed in the service room of the building (e.g. 4 or 5 flats)

Also available – a new range of central vacuum units - the “Euroflow” (EF) especially for equipping complete blocks of flats at very competitive prices, but which has the same technical performance as the ET-range.

Recommended models : **EF 1220 and EF 1410.**

This is a very competitive when compared with the traditional type of vacuum cleaners.

There are the additional advantages of a central vacuum cleaning system (the quietness, the long life and a healthier environment).

The PVC vacuum sockets are similar to domestic electrical sockets in size and positioning .

### ⇒ **Rest-homes**

The system required depends on the frequency of and the number of simultaneous users.

### ⇒ **Laboratories and factories**

The ET design office can specify a suitable solution for buildings with special requirements.

## **NOTES**

Prior to each installation a survey should be carried out. The installation required will depend on how the cleaning is organised.

This must be specified before the survey.

Some examples will explain this :

- A building of 3000m<sup>2</sup> can be cleaned by 1 employee in 2 working-days using the smallest installation ( ET 5011 + 4600)
- The same space is cleaned at night by contractors with 4 or 5 persons in 3 hours which would require a larger (ET 5022 + ET 9200) and a larger diameter pipes.

## **Vacuum sockets**

Automatic sockets are usually placed in medium sized buildings ( up to 2.000m<sup>2</sup>).

However a remote control system using the sockets should be avoided. This system is replaced by time switches . A common mistake is to install too many vacuum sockets. This increases costs without offering an additional advantage. One socket per 70m<sup>2</sup> is sufficient; and is best placed near the door. The maximum length of the hose is 10m. Room divisions and position of furniture should be taken into account.

## **The pipe system**

A pipe network connects the vacuum sockets to the dust container. The diameter of the pipes depends on the number of sockets, - more sockets require a larger pipe. The system moves the dust at about 19m per second, which is an ideal speed. A higher speed would decrease the carrying capacity and a lower speed could possibly cause a blockage in the pipes.

## **Installing the pipe system**

Horizontal pipes : in cellar ceilings, false ceilings, floor ceilings, attic ceiling, outside the building.

Vertical pipes : in electrical or plumbing service ducts, false walls, outside building.

The height of the building presents no problem because the efficiency increases if the vacuum unit is installed at the base of the building as the suction is aided by gravity.

## **Air exhaust**

A exhaust pipe is necessary to expel the air to the exterior of the building. This should be the same diameter as the tube that is connected to the dust container.

## **Choice of service pipes**

- A. **PVC** : can be installed easily and quickly and does not need painting.  
It also has a very low coefficient of friction. PVC pipe can now be fitted with anti-fire valves.
- B. **Steel**: Often used in large buildings. The only advantage is that it is fire-proof.

## Pipe diameter

This depends on the number of sockets that are used at the same time.

Number of simultaneous users	PVC	Steel
1	50	50
2-3	75	80
4-5	100	100

## Blockages

Used correctly, the pipe system will not block as it is in the form of an inverse funnel which has a diameter of 25mm at the beginning and becomes progressively larger.

However, incorrect use can cause an occasional blockage. This can be eliminated by a special anti-blockage fitting used behind each socket and by the control stops placed before the elbows on the tubes.

Blockages can be virtually eliminated by ensuring that pipe connections are made as shown below.

Recommended connections	Incorrect connections
HORIZONTAL TUBES	
VERTICAL TUBES	

Each bend is an angle of 45° or a large radius elbow.

Vertical pipes should not join a horizontal one from below. It must join from the side – see diagram above (bottom left).

## **THE VACUUM SOCKETS**

For commercial and professional installations, either stainless steel or PVC sockets can be used. For installations where heavy use is anticipated, aluminium or stainless steel (32 or 38mm) service sockets are recommended.

### **The EURO & Millennium vacuum sockets**

To meet changing needs, ELEK-TRENDS has developed the PVC Euro & Millennium vacuum socket for central vacuum cleaning systems.

Two factors influenced the design :

#### **1. The shape of electric points and switches for domestic electrical supply.**

In keeping with its policy of constant improvement and modern design, ELEK-TRENDS have developed the compact Euro socket, and more recently, the slimline Millennium socket with its more fluid lines. The shape of the vacuum very similar to electrical sockets, which means that they can be positioned together. The standard socket measurements are 8 x 8. The depth has been reduced by about 5mm for the Millennium socket. For the time being, production is limited to 5 standard colours : white, ivory, grey, brown and black.

#### **2. The technical progress in the use and the function of the central vacuum cleaning system.**

In response to customer demands, the **remote control suction** hose has been introduced. This comprises of a switch in the handle which allows the vacuum system to be turned off and on from the handle of the suction hose (whilst cleaning, it is sometimes necessary to move a piece of furniture, or to go to the front door etc.) Now that this hose is on the market, the creation of an adequate vacuum socket has become indispensable.

### **The "DESIGN VACUUM SOCKET"**

This was originally designed as a floor socket. When it is installed, it is virtually flush with the floor. However, the stylish design of this socket has meant that it has been increasingly used as a wall vacuum socket. It is available stainless steel, bronze, brass, and many other colours with marble effect finishes. Due to the robust construction in stainless steel, it is mechanically very strong.

## **The installation of vacuum sockets**

#### **A. In the wall or in the floor**

The sockets are installed in the wall at a height of 20 to 100 cm. When placed on the floor, stainless steel vacuum sockets with remote control are used.

#### **B. At about one socket per 70m<sup>2</sup>**

Too many sockets are to be avoided. The 10m flexible suction hose has a rigid tube of 1m at the end and is long enough to cover 60 to 80m<sup>2</sup> per socket, when obstacles and furniture taken into account.

## **Switching by remote control**

### **Automatically**

Each vacuum socket has two connections for the 12V system ( 2 x 0,75mm cable). When the end of the flexible hose is inserted into a vacuum socket, the 12V circuit is completed and the remote vacuum unit is started. The sockets are linked in parallel so that the cable runs along the outside of the PVC-tube from socket to socket. Use conduit for cable when in contact with masonry.

### **Manually**

In this case the vacuum unit is started by a timer or by push buttons that are placed conveniently in the building (e.g. 1 on each floor). The principle of starting by means of push buttons is identical to that of the automatic sockets.

## **Control panel**

A central vacuum system is supplied with a control panel containing the following:

- A Mainscircuit breaker with D-curve
- A Soft-starter for gradual starting of the motor
- Thermal protection of the motor
- Link-print for the low voltage remote control (12V-DC)
- A Mini-compressor for closing the cover of the dust separator

## **Regulator valve**

A minimum airflow is necessary through the vacuum unit in order to prevent the service room from overheating. The regulator valve does this and should be installed at the end of the suction pipe. It also provides an airflow in the larger diameter tube. This gives a stable negative pressure in the system. It makes it easier to open the vacuum socket.

## **Switching on of the vacuum unit(s)**

A push button is placed on each floor or zone to be serviced in an area of restricted access (e.g. in a cupboard). This serves a time clock which allows adjustment of the that the vacuum unit will run. After usage the same button turns the vacuum unit off.

## **Multiple users**

The ET-vacuum units can be used simultaneously by several people. The operational requirements should be studied carefully for optimum performance.

Recommendations

<b>Number of simultaneous users</b>	<b>Vacuum unit</b>	<b>Dust filter</b>
1	ET 3000S or 3100P	Monoblock
2	ET 4600	ET 5011
3-4	ET 9200P	ET 5022

Note. If there are more than 4 users the net should be divided and another vacuum unit should be installed.

## ELEK-TRENDS PROFESSIONAL VACUUM CLEANING SYSTEM

ELEK-TRENDS model	ET 4600	ET 9200P
Asynchronous motor	3ph – 400V	3ph – 400V
Power Kw	5.5	2 x 5.5
R.P.M. (Revolutions per minute)	2800	2800
Drive belts	2	2
Maximum airflow	500 139	1000 278
cu.m/Hr. l./ sec.		
Max. neg. pressure mm/WK	2600	2600
Inlet/outlet tube mm.	75	2 x 75

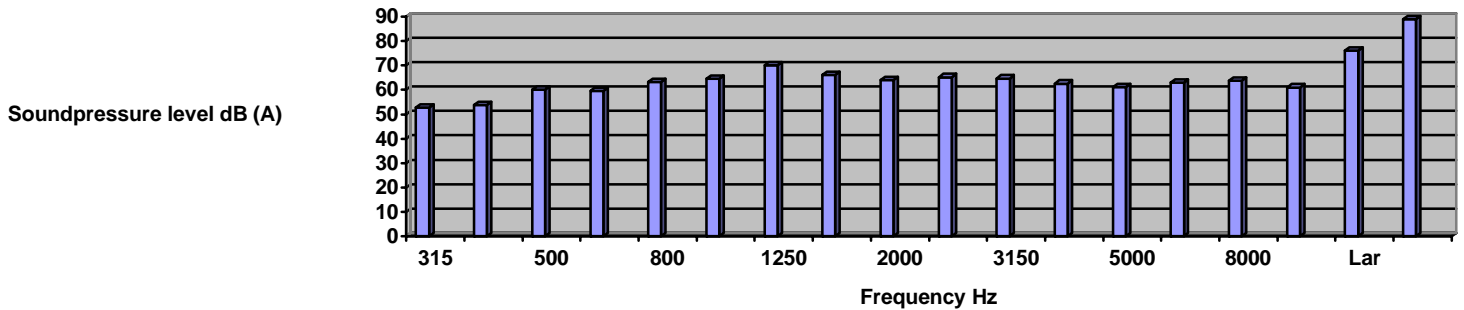
## PROFESSIONAL FILTER SYSTEM

Dust separator	ET 5011	ET 5022
Inlet tube dia. mm	75	2 x 75
No. of users (32mm hose)	2	3-4
Primary cyclonic separator	Yes	Yes
Fine dust filter – auto-cleaning	Yes	Yes
Plastic transparent rubbish bag	Yes	Yes
Total Height mm.	2185 mm.	2185 mm.
Montage in 3 phases	Yes	Yes
Area to be serviced – sq. m	1500	2500
Pneumatic cover-closing	Yes	Yes



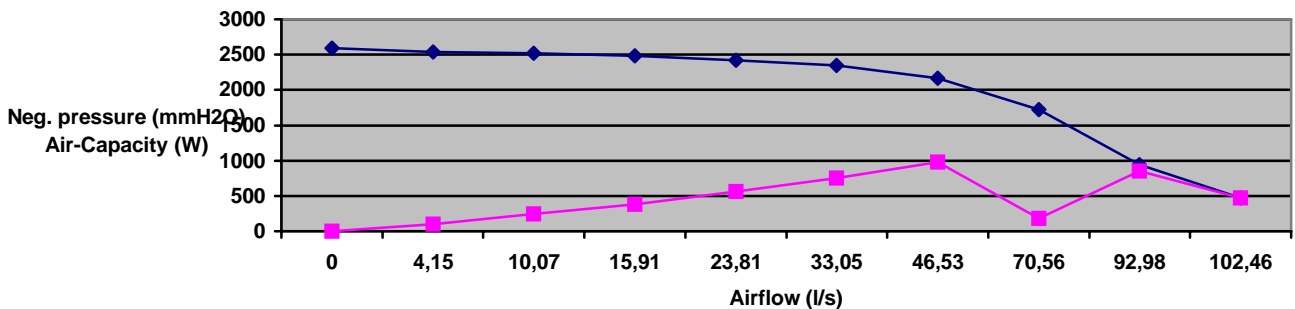
**VACUUMPUMP ET 4500 4-steps turbine with motor (5,5 Kw- 9550 U/min.)**

Frequency	Average soundpressure level of the measuring points dB (A)	Frequency	Average noise level of the measuring points dB (A)
50 Hz	-	1000 HZ	64,5
63 Hz	-	1250 Hz	70,0
80 Hz	--	1600 Hz	66,2
100 Hz	-	2000 Hz	64,0
125 Hz	-	2500 Hz	65,2
160 Hz	-	3150 Hz	64,7
200 Hz	-	4000 Hz	62,6
250 Hz	-	5000 Hz	61,1
315 Hz	52,8	6300 Hz	62,9
400 Hz	53,7	8000 Hz	63,8
500 Hz	60,0	10000 Hz	61,0
630 Hz	59,5	Las	76,1
800 Hz	63,2	Law	89,0



**4 Steps Turbine -Motor 5,5 KW - vertical - 9860 U/min. according DIN 44956**

Measuring opening	Neg. pressure (mm H2O)	Airflow (l/s)	Air-Capacity (W)
0	2590	0	0
6,6	2540	4,15	102,37
10,3	2520	10,07	246,45
13	2480	15,91	383,2
16	2420	23,81	559,6
19	2345	33,05	752,69
23	2165	46,53	978,35
30	1720	70,56	1178,66
40	945	92,98	853,35
50	470	102,46	467,7



## Summary

- **Composition**
- **Warnings**
- **Applications**
- **Classification**
- **Choices**
- **Comments**

## Installation and assembly

### A. Dust separators

1. **General**
2. **Type ET 5011**
3. **Type ET 5022**
4. **Type ET 5012**

### B. Vacuum unit

1. **Type ET 4600**
2. **Type ET 9200P**

### C. Control panel

1. **Type ET 4903**
2. **Type ET 4904**
3. **Type ET 4911 – 4912**
4. **Other types by special request**

## **Central vacuum cleaner : installation – manual and illustrations**

A vacuum system consists of the following combinations :

- **Dust separators**
- Single ( 5011 – 5022 – 5012 \* pneumatic)
- **Vacuum unit**
- ET 4600
- ET 9200 ( 2 x 4600)
- **Control panel**
- Single ET 4903 ( for 1 x ET 4600)
- Dual ET 4904 ( for 2 x ET 4600)

### **Warning**

- Install only in dry, well ventilated rooms.
- The vacuum unit must only be run when connected to the dust separator before.
- Use the correct size of cable for the power requirements of the system.
- Local regulations must be taken into account.
- Always connect the earth (⊥) before connecting to the power supply.

### **Applicatons**

- For all types of domestic dust, **except** powder, cement and explosive types of dust.
- For houses, hotels, offices, rest-homes, hospitals, factories, kennels, stables, etc.
- Can be used by more than 1 person at the same time.
- Several hose diameters and hose lengths are available.

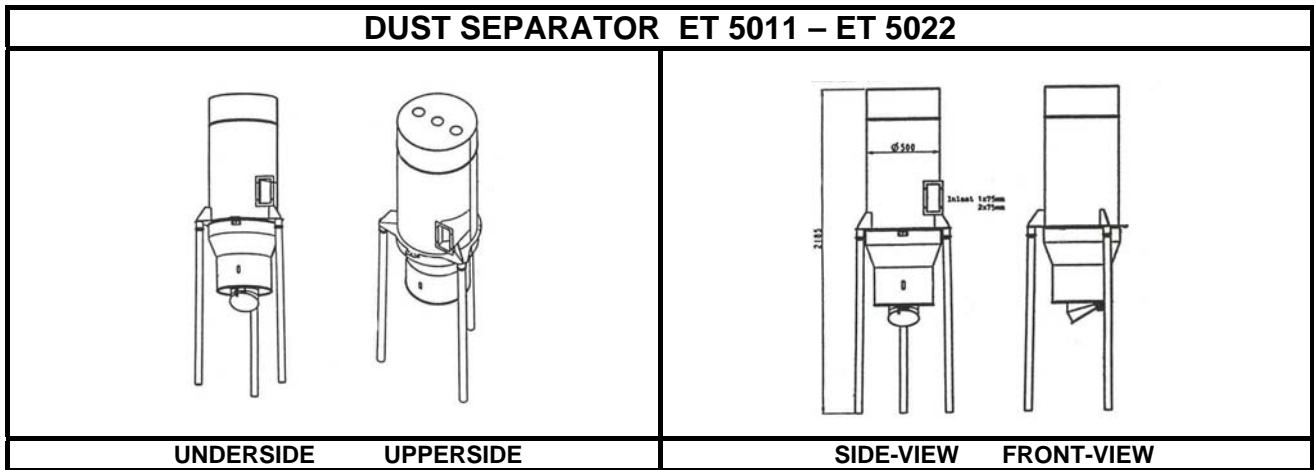
## **PROFESSIONAL VACUUM SYSTEMS**

### **Classification of dust separator**

5	pneumatic cover-closing
0	number typification
2	Number of exhausts dia.75
2	Number of inlets dia.75

Variations

ET 5011	- standard separator with auto-cleaning linen filter - pneumatic cover-closing - 1 inlet dia.75, 1 outlet dia.75
ET 5022	- standard separator with auto-cleaning linen filter - pneumatic cover-closing - 2 inlets dia.75, 2 outlets dia.75



## Installation and assembly

### A. Dust separators

#### 1. General

There are singular, double and triple dust separators according to the type of dust.

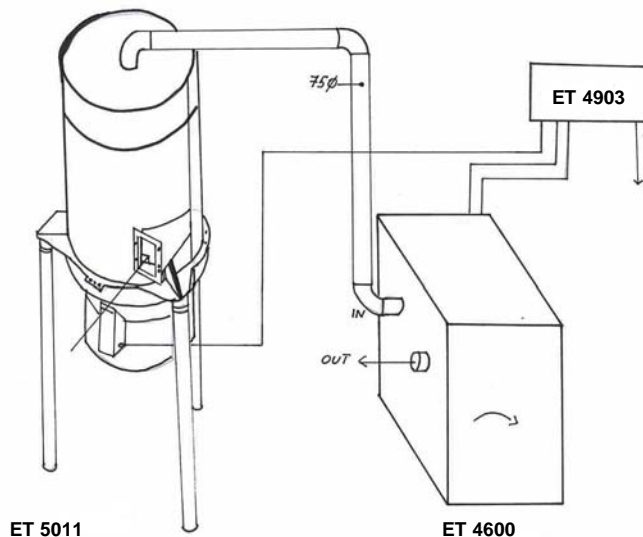
The primary separation is always by the cyclone method. This removes 95% to 98% of domestic dust.

The next fine-dust filtration can be done in 1 or more steps.

#### 2. Type ET 5011

Space requirements : H = 2,45 m  
 Ø = 0,85 m

Total weight : kg



Inlet 1 x dia. 75

Outlet 1 x dia.75 to the vacuum unit

Pneumatically operated dust flap

Wall fastening

The dust is collected in a transparent plastic sack.

Can be connected with vacuum unit ET 4600 and control panel 4903

Furnished in epoxy white

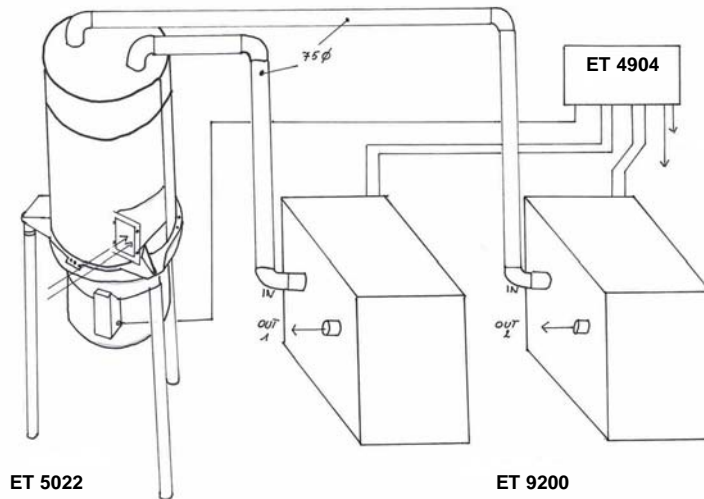
Final filter : removable textile filter.

### 3. Type ET 5022

As 5011, but with

- 2 x inlet dia.75
- 2 x outlet dia.75

Can be connected to vacuum unit ET 9200 and control panel 4904



### 4. Type ET 5012

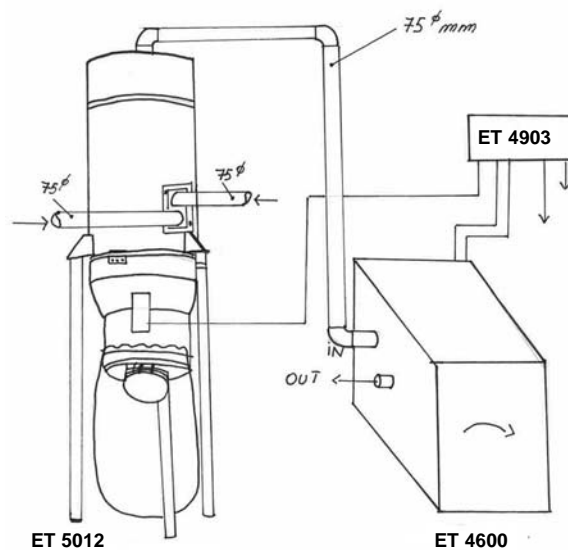
As 5011, but with

- 2 x inlet dia.75
- 1 x outlet dia.75

Can be connected to vacuum unit ET 4600 with control panel 4903.

There are 2 inlets on the separator.

NB. One outlet faces to the left of the separator and one to the right.



## B. The vacuum unit ET 4600

This powerful vacuum unit has 4 stages and is operated by an asynchronous, 3-phase 5,5 Kw motor. It must be started by a current restrictive procedure (Soft-starter) as a direct start on the national power supply is not permitted for this size of motor. The maximum load is protected by a thermal motor security system and is set at 11,5A (in the ET 4903 control panel). The maximum negative pressure is 260 mbar (2600mm/wk → 26 Kpascal).

See picture next page.

The fan of the vacuum unit is driven by a motor using 2 V-belts. The speed of the motor is  $\pm 2.800$  rpm and the speed of the vacuum fan is 10.000 rpm.

The V-belts must have tension of 10kg tractive power.- this must be checked and adjusted periodically. If the tension is too great, it will damage the vacuum unit.

The vacuum unit can be removed for inspection. When this cover is loosened, a safety switch operates and the electrical supply to the motor is automatically disconnected .The motor cannot be started without the cover. ( See procedure under “control panel”).

Check the rotation of the fan (as shown by an arrow on the front of the cover.)The fan always produces a vacuum whatever the direction of rotation, but it is more efficient when rotating in the direction indicated. However, the wrong direction of rotation can damage the vacuum unit irrevocably if allowed for any length of time. The direction of rotation is also important as the pulleys are tightened on the shaft of the vacuum unit with a nut that tightens itself when rotating in the correct direction.

The inlet (green) and the outlet (red) dia.75 are indicated on the control panel by the respective gap.

The vacuum unit must never be run with the inlet disconnected from the filter. This is dangerous because unit has such a powerful suction, that an object could be sucked in through an open inlet and cause serious damage to the fan. Parts of the body or clothes can also be sucked in and cause serious injuries.

Ensure that the fan is supported by 4 rubber feet in order to avoid vibration and noise in the building. The height of the rubber feet can be adjusted.

The vacuum pump should be provided with a silencer.

Do not glue the 75mm dia. Connecting pipes to the inlet of the vacuum unit. If necessary, hold the parts together with a clamp or tape and make them air-tight.

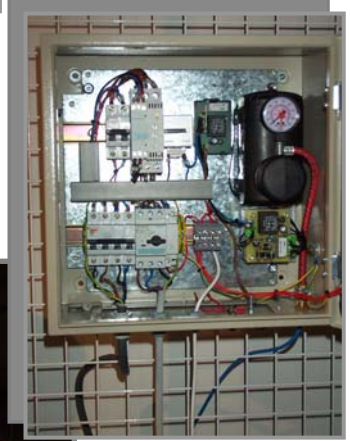
A silencer is recommended on the exhaust side, as the exhaust air carries the sound of the turbine. A silencer should be made of non-flammable material as the exhaust air is at a high temperature. As the exhaust air also contains unpleasant smells and fine dust, and the motor needs fresh air for cooling, the vacuum unit should be placed in a well ventilated room.



Dust separator



Control Panel



Dust release flap

Vacuum pump



silencer

# Industrial Central Vacuum Cleaner Components



### C. **The control panel**

This unit contains all the components required to permit proper and safe operation of the system.

All power is switched off when the 4 pole 16A circuit breaker is open.

When the 2 pole 6A circuit breaker is open, the control circuit is disconnected.

When all the circuit breakers are closed , the safety switches on the motor can be operated.

A no-voltage coil makes it impossible for the safety switch to operate when the cover of the fan is opened or the emergency-stop is used. This also applies when there is no electricity supply.

Method of operation :

When the low voltage circuit (12V-DC) is completed the flap on the bottom of the dust separator is closed by means of a small pneumatic cylinder. A mini-compressor mounted in the control panel provides the required air pressure. This compressor is operated by a time-switch (adjustable from 15 to 30 sec.). The motor starts, using the Softstarter, which is also activated by the completion of the low voltage circuit.

In the control panel with 2 soft-starters, the 2nd Softstarter switches on  $\pm 10$  sec. after the first , and is also timer operated.

When the low voltage circuit is broken, the motor stops. When the vacuum in the system has disappeared, the flap on the bottom of the dust separator opens and allows the dirt fall into the dust collection bag.

#### **Advantages of the control panel with soft-starter**

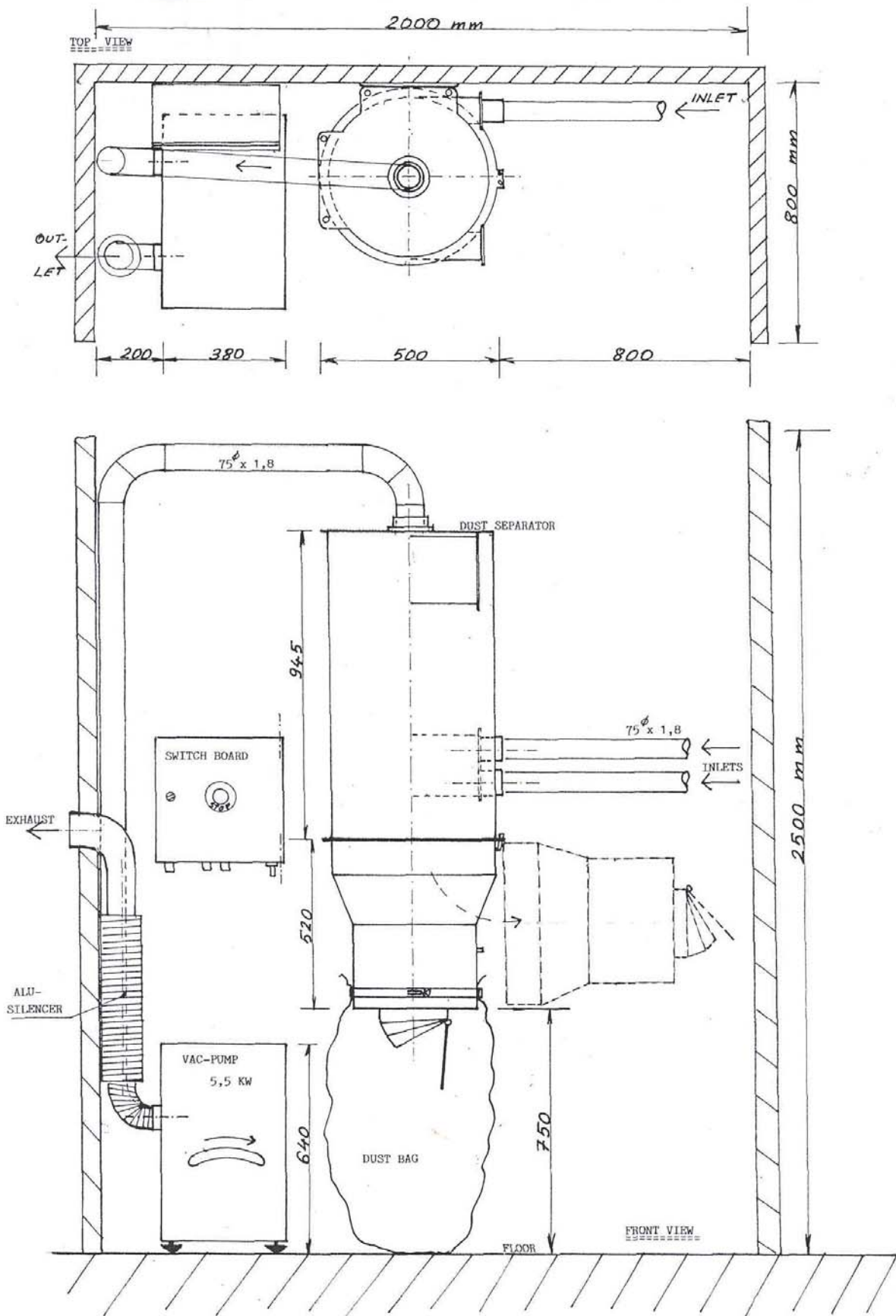
- 1) It provides a lower starting current which results in a smaller load on the main electricity supply\*.
- 2) The electric motor starts more slowly, resulting in less wear and tear on mechanical parts during startup.

The use of a system without a SoftStarter is the users responsibility.

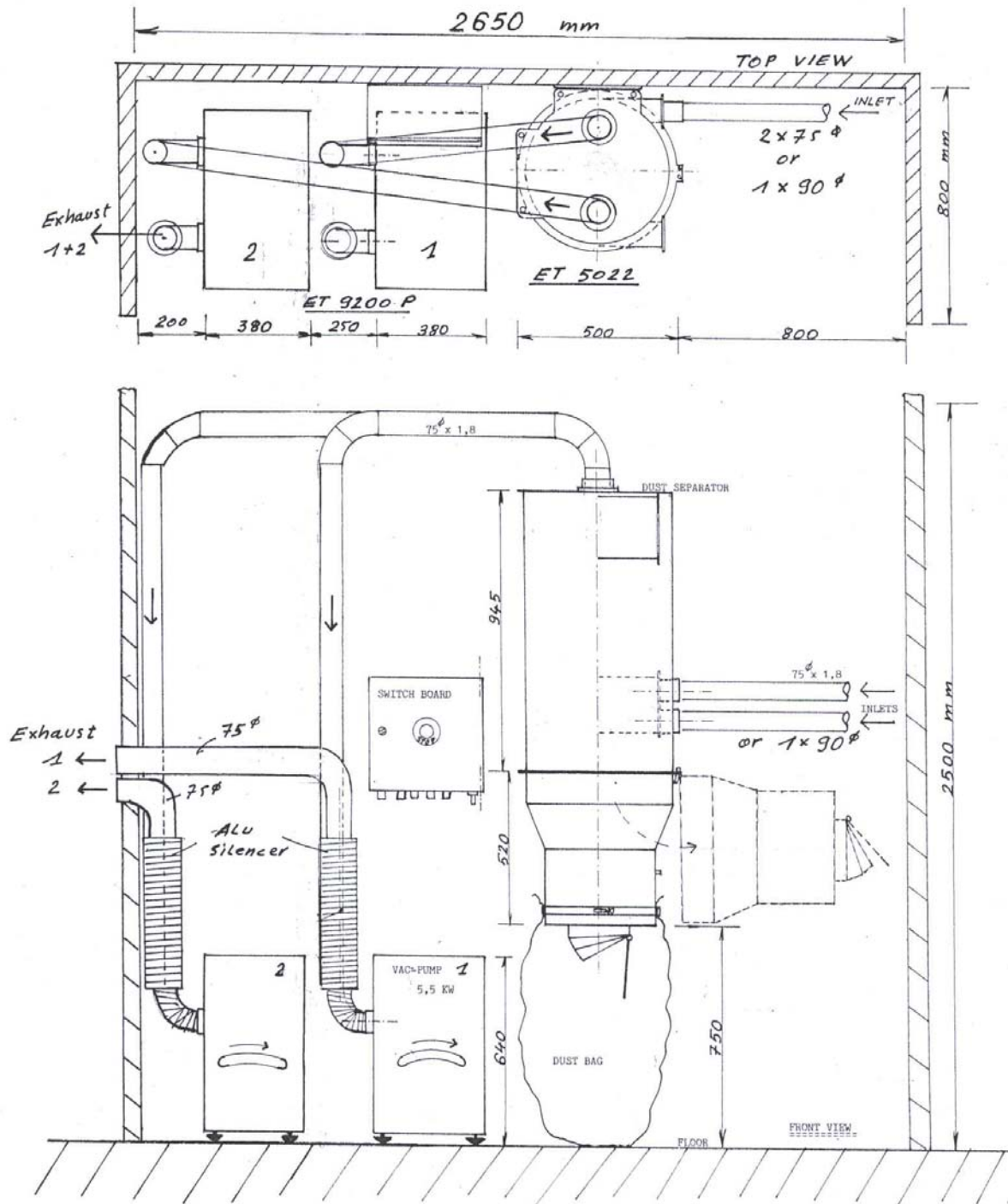
\* This is compulsory with certain electricity suppliers. Consult the local electricity supplier.



## ET 4600 Arrangement with 1 vacuum pump



# ET 9200P Arrangement with 2 vacuum pumps



**List of accessories – Separators**

<u>No.</u>	<u>SERIES 5000</u>	<u>Stock code</u>
1	Separator barrel	2-0030-1001
2	Funnel	2-0030-1002
3	Flap for dust release	2-0030-1003
6	Pneumatic cylinder for flap	2-0030-1006
7	Pneumatic distributor 24V	2-0030-1007
9	Inlet single dia.75	2-0030-1009
10	Inlet double dia.75	2-0030-1010
11	Funnel/cyclone seal	2-0030-1011
12	Closing cover	2-0030-1012
13	Hinge cover	2-0030-1013
14	Funnel closing	2-0030-1014
15	Textile filter	2-0030-1015
18	Wall mounting plate	2-0030-1018
19	Compressed air pipe 6mm x 3m	2-0030-1019

**List of accessories - vacuum pump ET 4600**

<u>No.</u>	<u>Name</u>	<u>Stock code</u>
50	Pump enclosure with 3 sides	2-0110-1050
51	Cover 2 sides	2-0110-1051
52	Enclosure frame	2-0110-1052
53	Frame for pump	2-0110-1053
54	Pump	2-0110-1054
55	Motor 5,5 Kw	2-0110-1055
56	Pulley SPZ – 2 – dia.250	2-0110-1056
57	Pulley SPZ – 2 – dia.71	2-0110-1057
58	Jagged strap SPZ 1000	2-0110-1058
59	Screws MS	2-0110-1059
60	Swivel input PG 22	2-0110-1060
61	Swivel input PG 16	2-0110-1061
62	Micro Switch	2-0110-1062
63	Rubberfeet 4 pc.	2-0110-1063
64	Cable 4 x 2,5 – 4m	2-0110-1064
65	Cable 3 x 1,5 – 4m	2-0110-1065

**List of accessories – Control panel ET 4903 – ET 4904**

<u>No.</u>	<u>Name</u>	<u>4903</u>	<u>4904</u>	<u>Stock codes</u>
76	Circuit breaker D-Curve 4pole-16A	1	/	2-0210-1076
77	Circuit breaker D-Curve 4pole-32A	/	1	2-0210-1077
78	Circuit breaker C-Curve 2pole-6A	1	1	2-0210-1078
80	Soft-Starter Siemens	1	2	2-0210-1080
81	Thermal security system motor	1	2	2-0210-1081
82	Zero-voltage security system	1	2	2-0210-1082
85	Printed circuit board 12V	1	1	2-0210-1085
86	Terminal 10mm <sup>2</sup> - 1P – earth	2	3	2-0210-1086
87	Terminal 4mm <sup>2</sup>	4	4	2-0210-1087
88	Emergency handle complete	1	1	2-0210-1088
89	Plate emergency handle NL*	1	1	2-0210-1089
90	Plate emergency handle FR*	1	1	2-0210-1090
91	Plate emergency handle D*	1	1	2-0210-1091
92	Plate emergency handle GB*	1	1	2-0210-1092
93	Swivel input PG 22	1	1	2-0210-1093
94	Swivel input PG 16	1	2	2-0210-1094
95	Swivel input PG 13	1	2	2-0210-1095
96	Plug boxes 12V	2	2	2-0210-1096
101	Cupboard 400 x 400 x 210	1	/	2-0210-1101
102	Cupboard 400 x 500 x 210	/	1	2-0210-1102
103	Timer ET on print	1	1	2-0210-1103
104	Transformer 230V/12V	1	1	2-0210-1104
105	Mini-compressor 12V	1	1	2-0210-1105
106	Hours counter + base	1	1	2-0210-1106