

# Energy Saving Products Company - Energy-saving Products



## ESE-KYJ Series Air Compressor Energy Saving System

### **About the Product:**

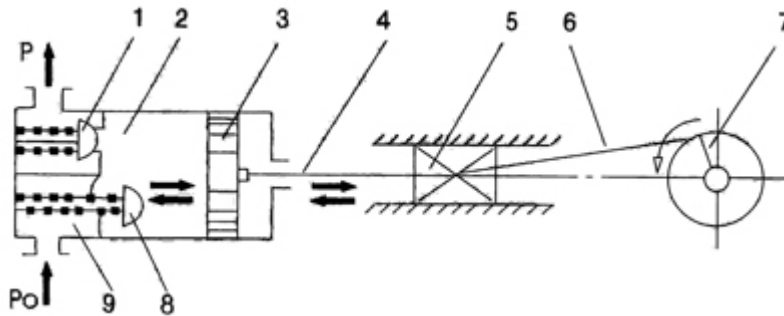
ESE-KYJ Series Air Compressor Energy Saving System is specially tailored for constant torque load to provide a real constant voltage control system. It can alter the original pressure section control into target control with a stable electricity saving rate at 15%~40% which can extend the life span of the air compressor.

### **Electricity Saving Theory**

#### **Air Compressor Theory**

There are set discharge type and kinetic energy type air compressors. The common features of the former one lie in that it compress the air by imposing mechanical power of certain volume sealed air and raise the pressure. This type air conditioner is represented by Reciprocating and Rotary Screw.

Set the piston type air compressor as an example. Its working principle is illustrated in the following chart. In a reciprocating movement within the cylinder, when the piston moves to the right, the left chamber pressure of the cylinder piston is below atmospheric pressure. If the suction valves are open, it will inhale the outside air into the cylinder. It is known as the compression. If the pressure is higher than that of the air output channel, the air discharge valve will open to compress the air into the channel. This is so called discharge process. The reciprocating of the piston is driven by the crank slider of the motor. The rotary movement of the crank turns into sliding. Working Principle Chart of Piston Air Compressor is as follow:



1 discharge valve 2 cylinder 3 piston 4 piston bar 5 slider 6 connection handle  
8 suction valve 9 valve gate spring

In terms of modes of control, the air compressor can be categorized into unload type and pressure type. The former refers to that when the pressure of the air collector reached a preset value, the air compressor would not stop running but turn into non-compression running by opening the security valve. This is called unload running. However, it will stop running automatically under the latter control mode.

#### Frequency velocity modulation energy saving principle

The air compressor is generally constant torque load, which adjusts the air amount by unload control mode. That is: when the pressure of the air collector reaches preset value, the air compressor would not stop running but turn into non-compression running by opening the security valve.

In terms of energy conservation, the output power of the motor is more or less in proportion with the pressure difference of the air compressor and the air output amount. That is:

$$P_w = k \cdot (P - P_o) \cdot Q$$

$P_w$  - shaft power,  $P$  - compressed air pressure,  $P_o$  - atmospheric pressure,  $Q$  - capacity,  $K$  - Constant

The piston compressor: The capacity is proportional to the times of piston trip, which is directly reflected on the J-Shanghai, which is proportional to the motor speed:

$$Q = K_1 \cdot N \cdot T$$

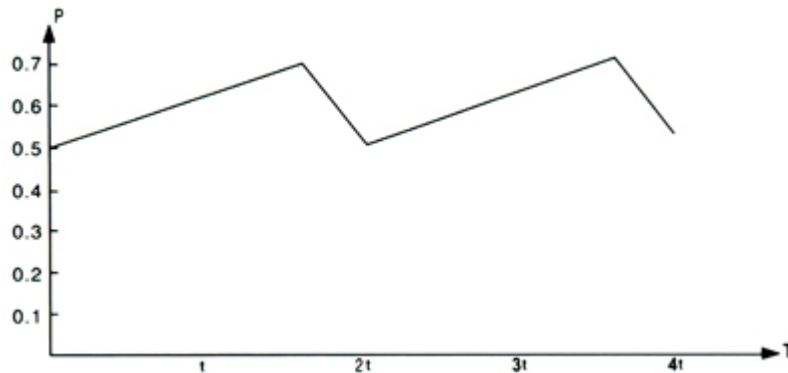
$N$  - Speed,  $T$  - running time,  $K_1$  - compression amount of one process

$$\text{Therefore: } P_w = k \cdot k_1 \cdot (P - P_o) \cdot N \cdot T$$

Thus, the output power of the air compressor is proportional to the output pressure and speed.

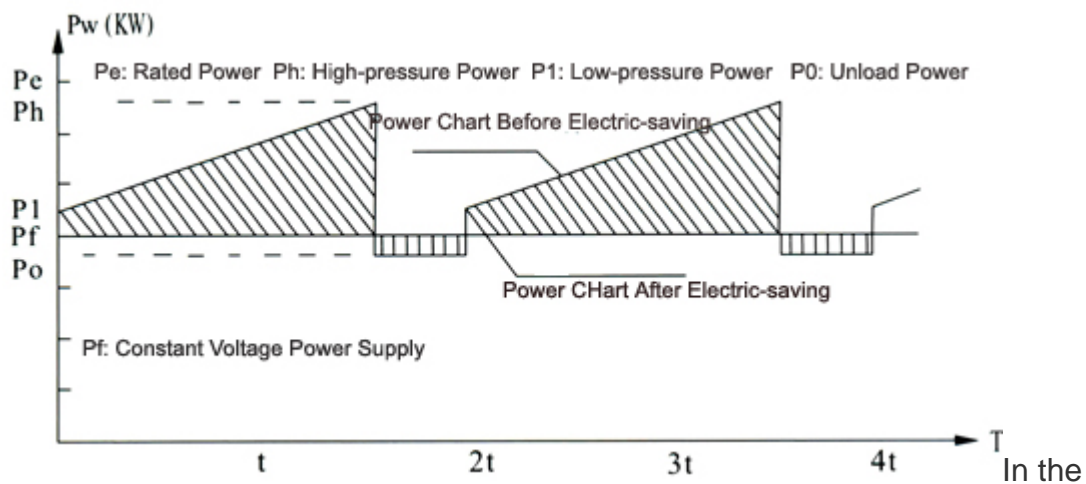
Suppose the unload rate of the air compressor is 20% and the air usage

is balanced. The pressure-time chart is as



follows:

Air compressor outlet pressure-time chart Power-time chart:



chart, the ramp shadow stands for the saved energy of energy saving operation versus the original one in corresponding time. The linear shadow is extra power consumption of energy saving operation versus to unload one. It is clear to see the energy saving effect of the overall trend.

### System Features

- The first to use similar products procedure software development with full realization of synchronous dynamic response.
- It adopts unique advanced vector control technology and electromagnetic compatibility for overall design.
- With RS-485 communication protocol, built-in Simple PLC, PI regulator
- Dual-circuit design to ensure trouble-free of the system. It is with electrical parameters self-learning function and super overload capability.
- Major parts adopt imported components which are products of good quality and high stability.
- The failure alarm function can facilitate timely found and maintenance.
- Smooth start and smooth stopping can eliminate the impacts of current and activate mechanical shock.
- Improved air supply accuracy can avoid pressure fluctuations and further improve the production technique.

- Avoid the frequent movement of the valve control of the air compressor to extend the life of the valve.
  - Adjustable energy saving rate and significant energy-saving effect can reach energy-saving rate of more than 15 percent.
  - Improve the power factor of the grid to 0.95 and above.
- Save the production cost and increase the competitiveness of the enterprises.

### **Technical Parameters**

- rated input voltage: three-phase 380VAC , 50Hz
- allowed working scope of the voltage: 380V±15%
- allowed voltage fluctuations: 380V±15% frequency: 50Hz±5%
- output voltage: 0~380V
- overload capability: 5.5KW~132KW: 120% rated current 1 minute
- 160KW and above: 110% rated current 1 minute
- 150% rated current 1s
- terms of use: indoor; not exposed to the sun light; no corrosion gas, flammable gas, oil mist or steam.
- altitude: lower than 1000m
- environmental temperature: -10 ~+40 ( please reduce use frequency at the temperature of 40 -50 ) .
- Temperature: 20~90%RH (without dew)
- protection rank: IP20~IP44
- control mode: automatic, manual remote control
- cooling: forced wind cooling, fan control, water cooling on explosive occasions System