



Basic

Outlet Damper
Control

Inlet Guide Vane
Control

VSD Speed
Control

Comparison of
Control

Application
Solution

Energy Saving

*by using Variable Speed Drives
for Air Compressor*



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Basics Air Compressor



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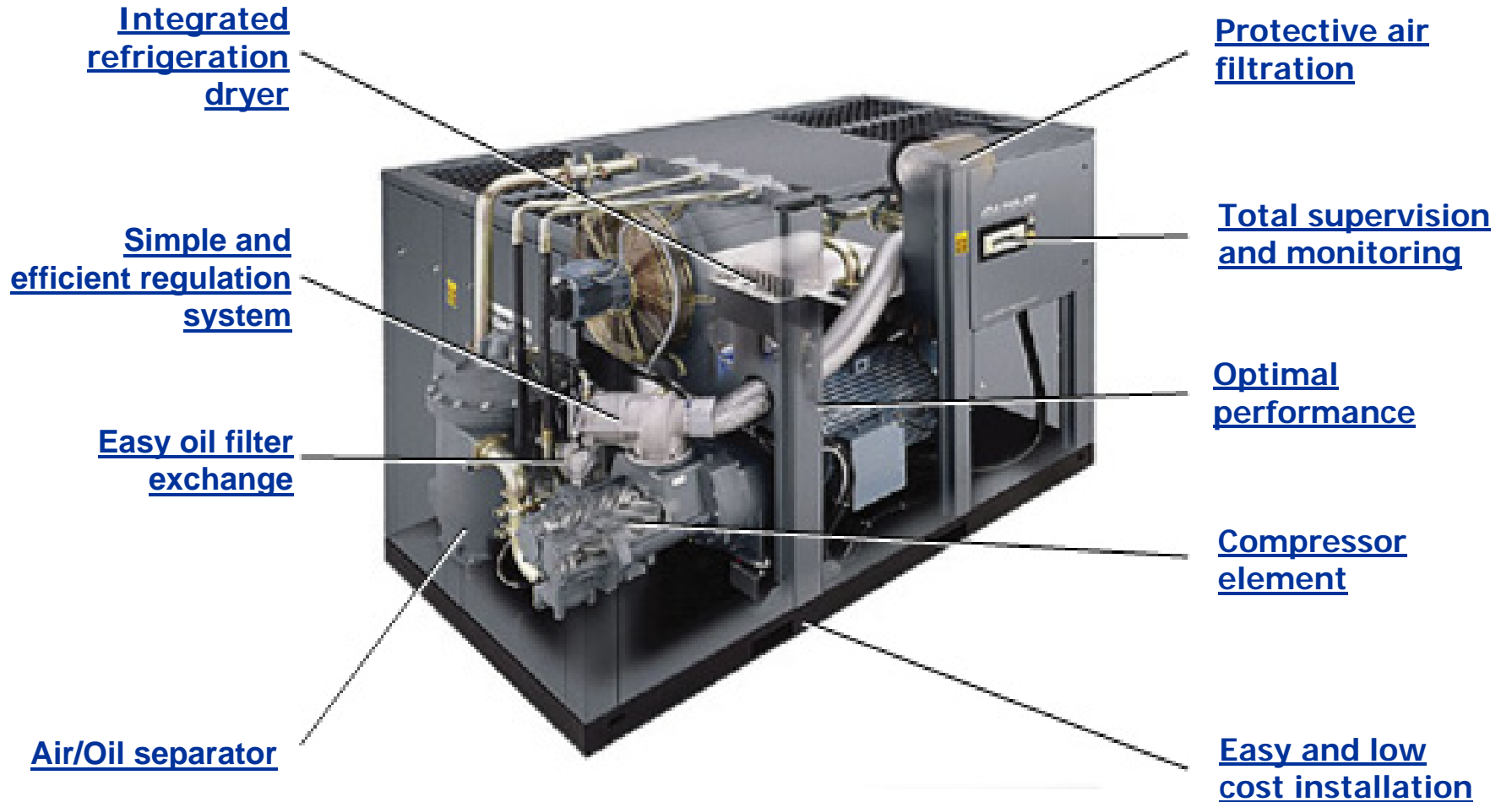
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Basics Air Compressor flow diagram

Air/oil flow diagram - single element design



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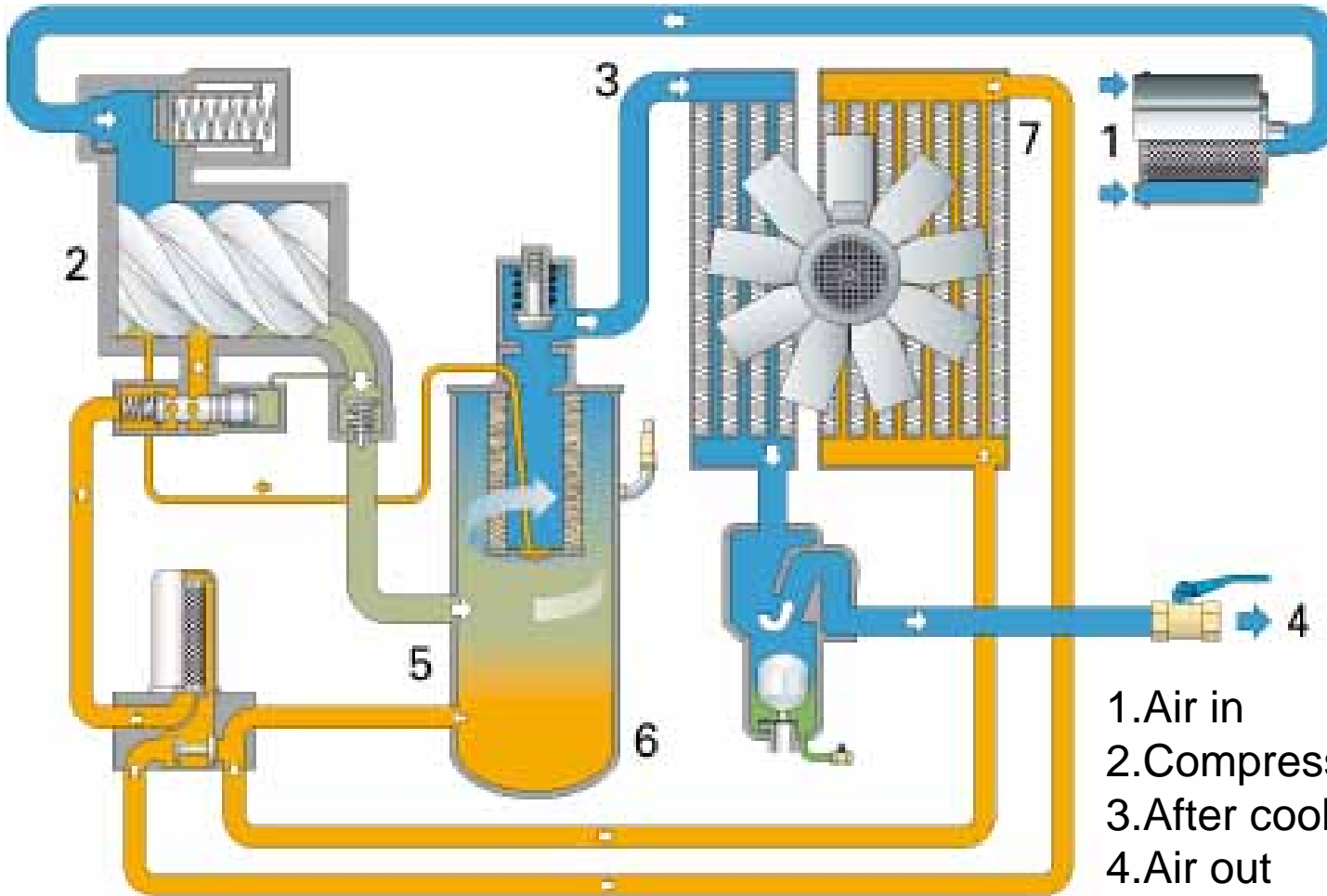
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- 1. Air in
- 2. Compressor
- 3. After cooler
- 4. Air out
- 5. Air/oil separator vessel
- 6. Oil sump
- 7. Oil cooler

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Basics Air Compressor flow diagram

Air/oil flow diagram - twin element design

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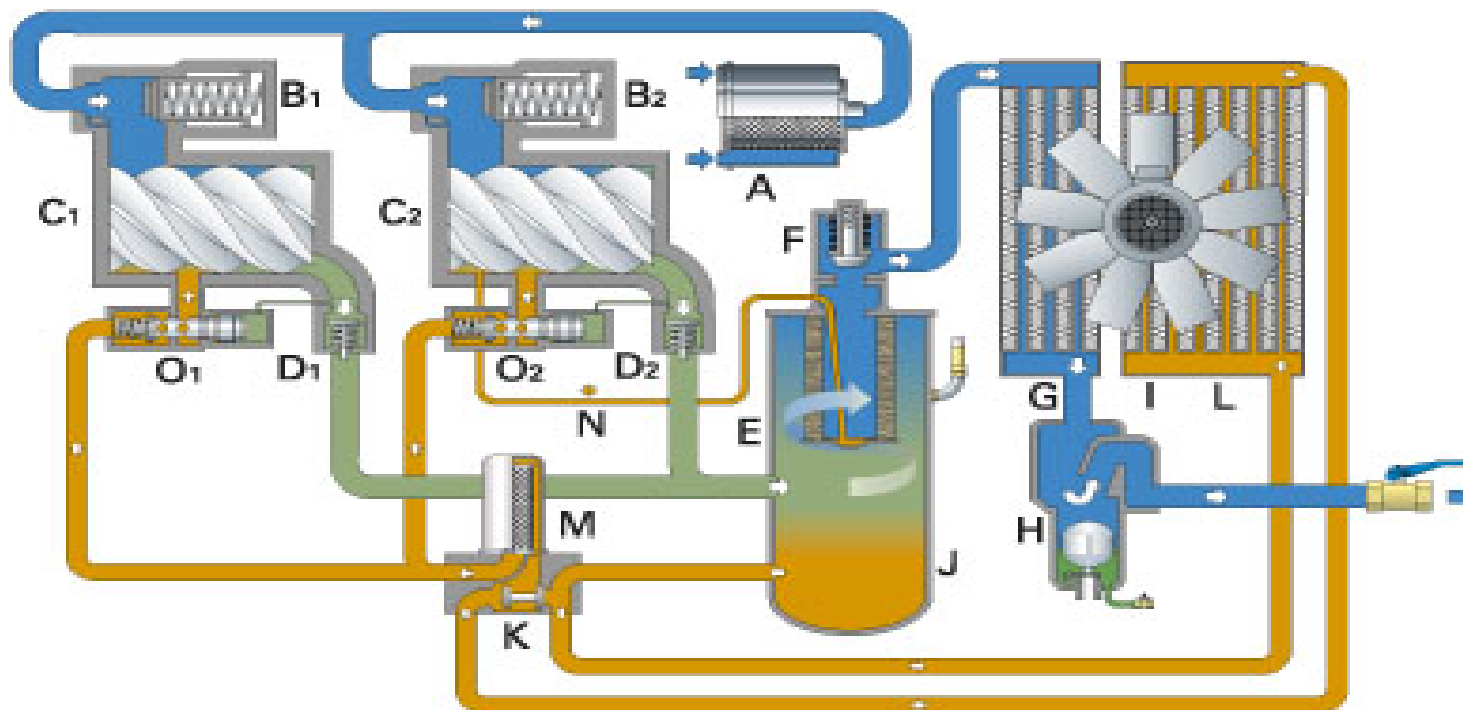
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■ Air
 ■ Air/Oil mixture
 ■ Oil
 ■ Water

Air flow

- A : Air intake filter
- B1-2 : Air intake valve
- C1-2 : Compression element
- D1-2 : Non return valve
- E : Air/oil separator vessel

- F : Minimum pressure valve
- G : After cooler
- H : Water separator with automatic drain
- I : Cooling fan

Oil flow

- J : Oil sump
- K : Thermostatic bypass valve
- L : Oil cooler
- M : Oil filter
- N : Oil scavenge line
- O₁₋₂ : Oil stop valve

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Basics Air Compressor Flow Chart

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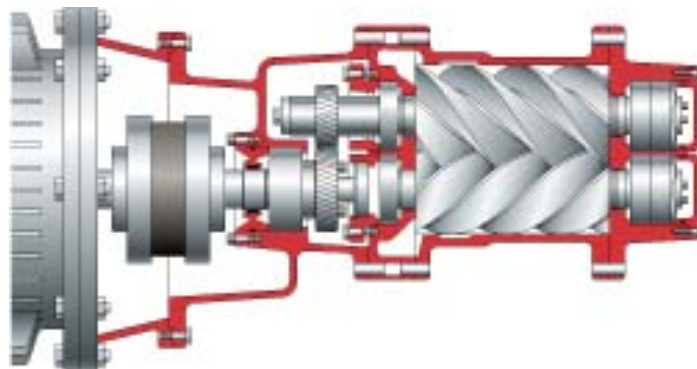
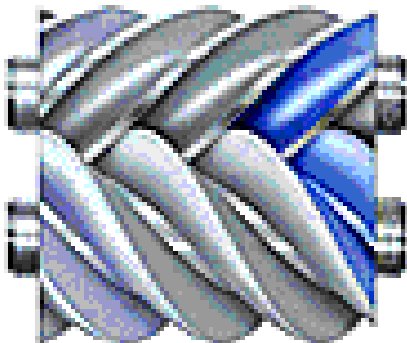
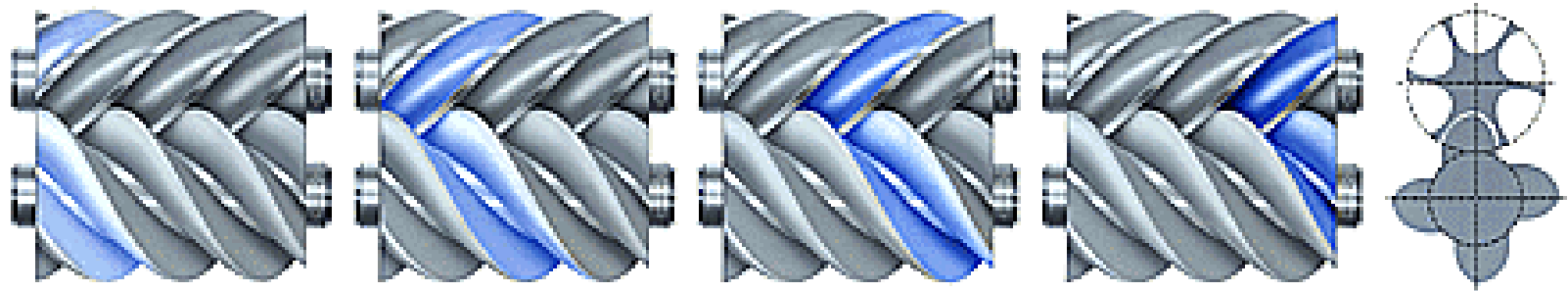
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1. The ends of the rotors uncover the inlet and air enters the compression chamber.
2. The air is entrapped in the 'compartment' formed by a male lobe and a female flute.
3. As the rotors turn, the compartment becomes progressively smaller, thereby compressing the entrapped air.
4. Compressed air leaves through the outlet port

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Energy Saving Application for Compressor by using VSD

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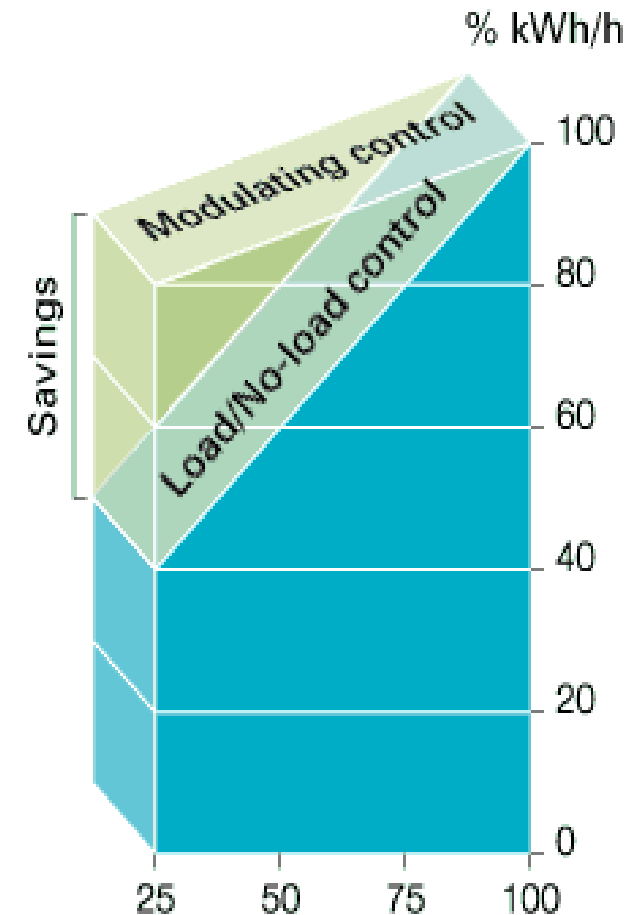
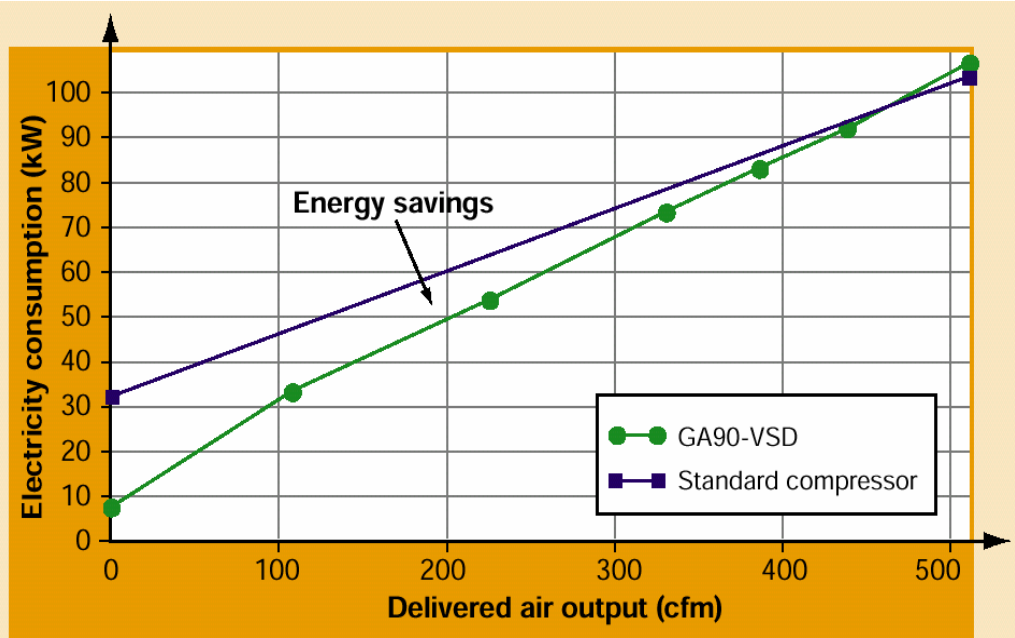
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Other Advantages From VSDs



- Basic
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Energy Savings comparison with Traditional systems



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Because there is no unnecessary power generated, the VSD can reduce energy costs by 35% or more. Cost reductions can average 22% over the entire lifecycle of the compressor. In general, the extra cost of a VSD compressor compared to a fixed speed one is earned back after just one to two years.

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Outlet Damper Control

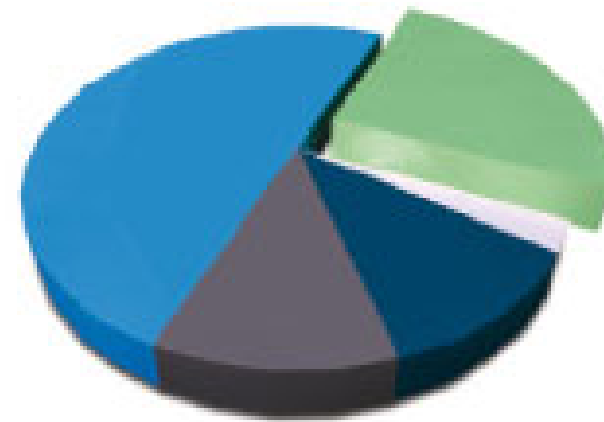
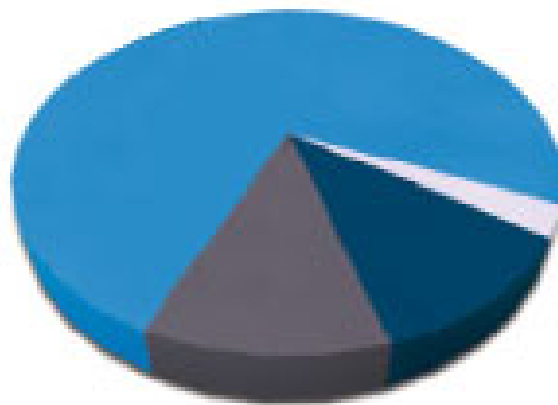
Inlet Guide Vane Control

VSD Speed Control

Comparison of Control

Application Solution

- a. Energy Consumption ■ a
- b. Investment ■ b
- c. Maintenance ■ c
- d. Installation ■ d
- e. Average 35% ■ e



Standard Compressor **VS** Control by VSD Compressor

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The VSD reduces energy costs by:



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- Eliminating the inefficient transition period from full to no load power.
- Avoiding operation at no load power compared with conventional compressors at light load.
- Maintaining the net pressure band to within 0.10 bar, 1.5 psi.
- Reducing overall average working pressure.
- Minimizing system leakage due to a lower system pressure.
- Increasing flexibility with soft starting gradual motor ramp-up to avoid electricity surges.
- Offering flexible pressure selection from 4 to 13 bar with electronic gearing to ensure lowered electricity costs.

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Other Advantages From VSDs



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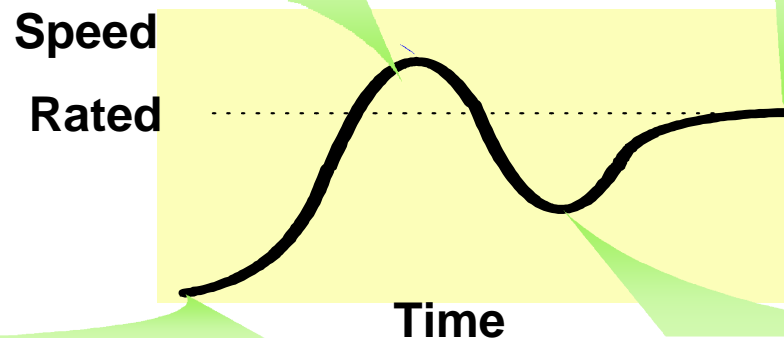
VSD Speed Control

Comparison of Control

Application Solution

High speed when high capacity is required.
Maximum capacity of the system and the best productivity.

Accurate and optimal speed in various process conditions. The best quality of the final product



Soft start of the motor every time
Minimal maintenance cost of both mechanical and electrical systems.

Low speed when low capacity is required. The best energy efficiency and the lowest energy cost.

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