DAIKIN UNIVERSITY

Daikin Difference

Participant Guide

The Daikin Difference

Learning Objectives

- Understand how the following make Daikin the product and brand of choice:
  - Product innovation
  - Inverter technology
  - Compressors
- Be able to explain the Daikin difference to your customers
- Understand customer cues and how to best position Daikin's product line to satisfy those cues:
  - Energy efficiency
  - Individualized comfort
  - Quality

The Way

- Daikin's technological advantage
  - Inverter technology
  - Compressors
  - Neodymium magnets
  - Aero fans
  - Corrosion resistant coils
  - Electronic expansion valves
- Summary of Daikin difference

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Daikin HVAC Technological Advantage

1. Inverter Technology
2. Direct Digital Controls
3. Reluctance Digitally Commutated Compressor Motors
4. Neodymium Magnets
5. Aero Spiral Fan
6. DC Fan Motors
7. Corrosion Resistant Coated Fins
8. Galbarium Steel Base
9. Stepper Motor Electronic Expansion Valves
10. Swing Compressor

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Inverter Technology

An Inverter is:

- A variable frequency drive that changes the electrical frequency applied to an electric motor [VFD]
- Inverter drive technology is used to vary the HVAC system's operating capacity to match the Heating or Cooling load.
- The inverter drive controls compressor speed like a throttle controls an automobile's engine speed.
- The inverter varies the applied frequency to the compressor based on a number of system temperature sensors and the temperature set point.

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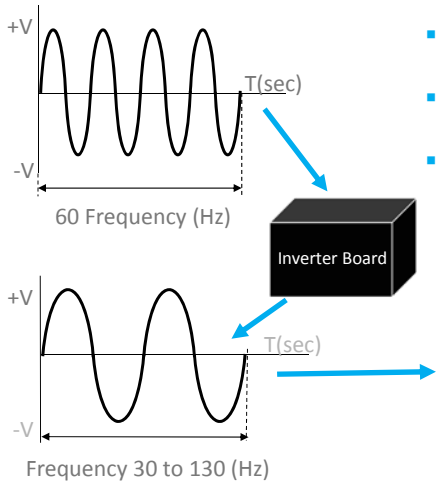
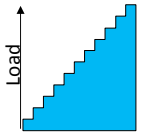
Inverter Drive



- The *Daikin* inverter control converts the incoming ac voltage to dc voltage
- The inverter then smoothes the sine wave to smooth motor rotation
- Reconverts the dc voltage to 3 phase ac voltage to the compressor
- Variable frequency is applied to the compressor motor to modulate the rotational speed which increases or decreases system capacity

Multi-Step Principle



Multiple capacity steps
Applied frequency

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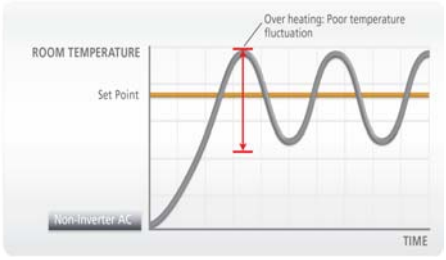
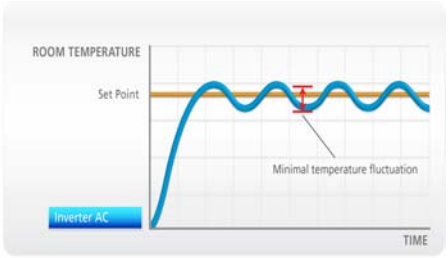
Inverter Benefits

Single or two stage compressor technology



Daikin inverter technology



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Inverter Benefits

- High efficiency in part-load conditions
- Very low startup amperage
- No locked rotor amps
- No stress on windings or compressor frame
- No “light flicker”
- Lubrication of bearings increases before speed increase
- System pressures increase gradually reducing noise and stress on piping
- Quiet compressor startup
- Fewer start/stop cycles
- As room temperature nears set point capacity is automatically “throttled down”

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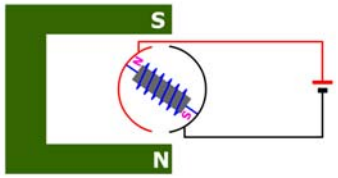
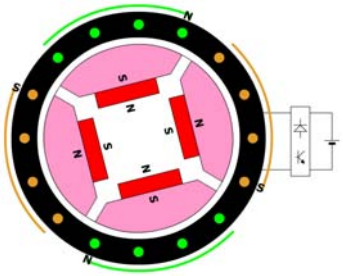
Compressors

Digitally Commutated (DC) Motors in both Swing and Scroll Compressors



Swing Compressors



Scroll Compressors

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Digitally Commutated (DC) Compressor

Digitally Commutated (DC) Motor

- Neodymium magnet in the rotor – 7 times stronger than ferrite
- Increased power & decreased energy usage

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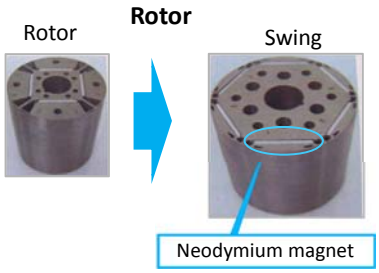
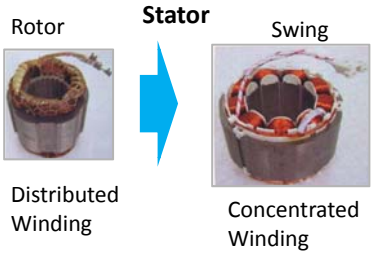
Reluctance Digitally Commutated (DC) Motor



Neodymium magnet: Increased to 6 pieces.

Rotation of motor is smoother for energy savings.



Heat transfer coil: Distributed Winding.

Concentrated winding The heat is reduced.

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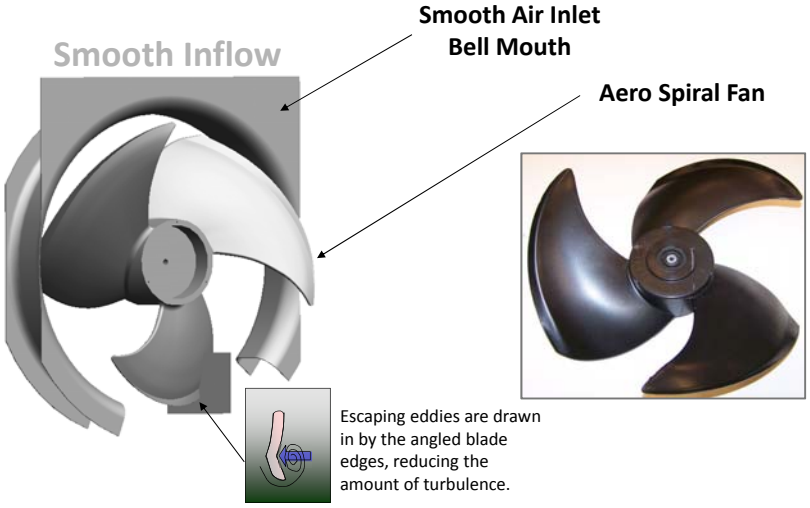
Aero Fan



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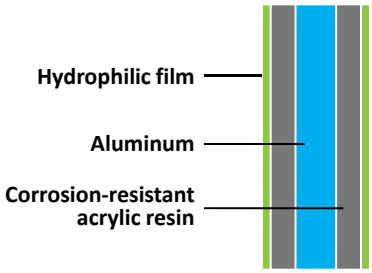
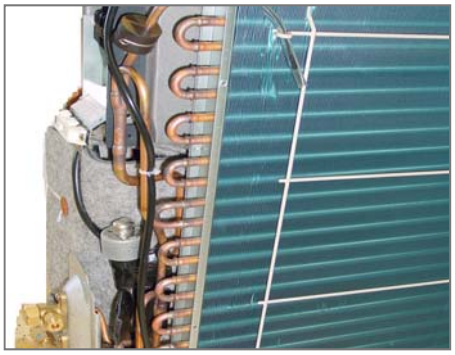
Corrosion Resistant Coil Fins

Corrosion Resistance Rating		
	Non-Treated	Anticorrosion Treated
Salt Corrosion	**1**	**5 to 6**
Acid Rain	1	5 to 6





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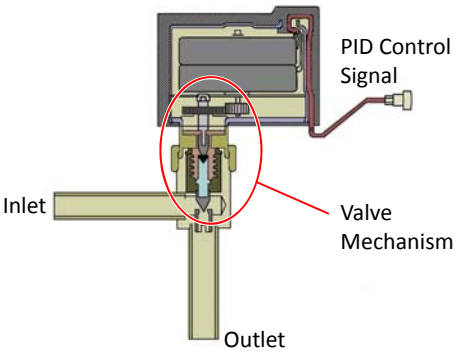
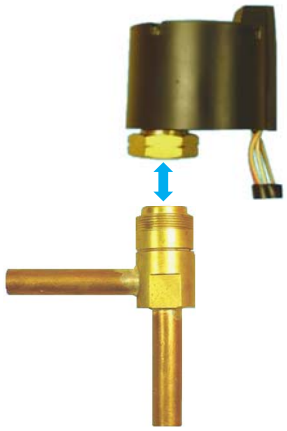
Electronic Expansion Valve

- Allows precision metering and you can change the head without reclaiming the refrigerant.





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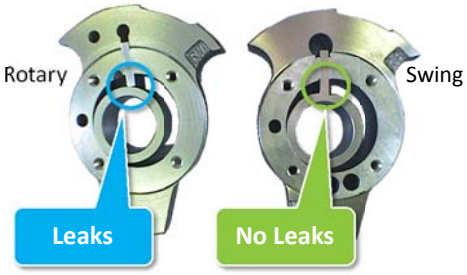
Daikin Swing Compressor

Adopted cylinder structure is less susceptible to heat-transfer and deformation.

Single swing for size 9,000-12,000 Btu/hr
Double swing for size 15,000-32,000 Btu/hr

"Piston" with an integrated roller and blade reduces refrigerant leakage and increases efficiency.



Features	Benefits
▪ Smooth rotation, little friction	▪ High operation efficiency, energy savings
▪ Smooth piston motion	▪ Low vibrations, low sound levels
▪ Few parts rubbing each other	▪ High performance, high reliability

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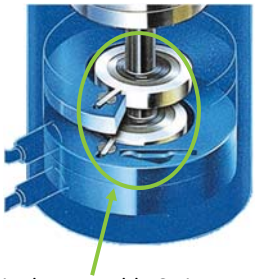
Daikin Swing Compressor

- Large energy savings
- Smooth rotation with little friction and refrigerant gas compression with low loss, allowing for high operation efficiency
- Low vibrations and low noise
- High durability
- Fewer moving parts during operation, achieving high performance and reliability



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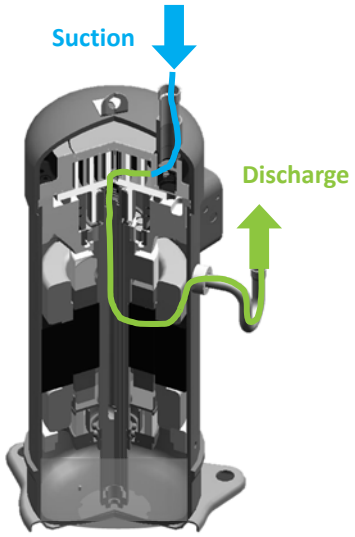
Scroll Compressor Technology



- Reluctance DC motor
- Optimized scroll (R-410A)
- High pressure shell
- Stronger shell material
- Improved sealing
- Stable oil temperature
- Improved efficiency
- Improved reliability
- Discharge gas cooled windings prevent heat-shock
- Less heat transfer to suction gas

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The Daikin Difference

Through Prod/Tech:	Superior:	Customer Cues:
Inverter Technology	Technology	Energy Efficiency
Direct Digital Control	Flexibility	Individualized Comfort
R-410A	Humidity control	Quality
Reluctance DC Motors	Comfort control	
Neodymium magnets	Energy savings	

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Check for Understanding

1. What does “DC” refer to with regard to Daikin Inverter driven compressors?
2. What type of magnets do we use in Daikin compressor motors?
3. The magnets from question 2 above increase _____ and produce a higher power output to electrical input.
4. What color are the Daikin outdoor coils? Why?
5. List the three customer cues.

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Closing & Review

- Understand how the following make Daikin the product and brand of choice:
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