Copeland Scroll Digital™
For A Wide Variety Of Applications

Rooftops

Chillers

Packaged Air Conditioners

Heat Pumps

Single and Multi-split

Extended Product Range for Capacity Modulation

Single Model	Nominal Horsepower hp	Cooling Capacity @ 100% kW[1]	COP @ 100% Capacity	Shell - Diameter mm	Height mm	Net Weight kg	Power Supply V / Ph / Hz	Tandem capability
Copeland Scroll Digital™ - R410A ZPD Series								
ZPD 34 KSE	3,0	8,2	2,9	167	468	30	400 / 3 / 50 & 230 / 1 / 50	No
ZPD 42 KSE	3,5	9,1	3,0	167	468	31		
ZPD 54 KSE	4,6	11,7	3,0	167	468	33		
ZPD 61 KCE	5,0	13,2	3,0	186	494	40		400/3/50 Only
ZPD 72 KCE	6,0	15,3	3,0	186	494	41	400 / 3 / 50	Yes
ZPD 83 KCE	7,0	17,7	3,0	186	494	41		
ZPD 120 KCE	10,0	26,3	3,2	232	533	62		
ZPD 137 KCE	12,0	29,5	3,2	232	533	62		
ZPD 154 KCE	13,0	33,5	3,2	232	552	64		
ZPD 182 KCE	15,0	39,0	3,2	232	552	66		
Copeland Scroll Digital™ - R407C ZRD Series								
ZRD 42 KCE	3,5	8,9	3,2	166	468	31	400 / 3 / 50 & 230 / 1 / 50	No
ZRD 48 KCE	4,0	10,8	3,2	166	484	33		400/3/50 Only
ZRD 61 KCE	5,0	12,4	3,0	186	500	38	400 / 3 / 50	Yes
ZRD 72 KCE	6,0	15,5	3,0	186	500	40		
ZRD 81 KCE	6,5	17,0	3,1	186	500	41		
ZRD 94 KCE	7,5	21,0	3,3	232	495	58		No
ZRD 125 KCE	10,0	27,7	3,3	232	552	62		
Copeland Scroll Digital™ with EVI Technology - R410A ZPJ Series								
ZPJ 61 KCE	5,0	13,2	3,0	186	494	40	400 / 3 / 50	No
ZPJ 72 KCE	6,0	15,3	3,0	186	494	41		
ZPJ 83 KCE	7,0	17,7	3,0	186	494	41		
Copeland Scroll Digital™ High Efficiency - R410A ZPE Series								
ZPE 61 KCE	5,0	13,2	3,0	186	494	40	400 / 3 / 50 & 230 / 1 / 50	No
ZPE 72 KCE	6,0	15,3	3,0	186	494	41	400 / 3 / 50	
ZPE 83 KCE	7,0	17,7	3,0	186	494	41		

Tandem [2] R410A - Model	Nominal Horsepower hp	Cooling Capacity @ 100% kW[1]	Tandem [2] R407C - Model	Nominal Horsepower hp	Cooling Capacity @ 100% kW[1]
ZPDT 122 KCE	ZPD61+ZP61	26,0	ZRDT 96 KCE	ZRD48+ZR48	20,7
ZPDU 133 KCE	ZPD72+ZP61	28,0	ZRDT 122 KCE	ZRD61+ZR61	25,2
ZPDT 144 KCE	ZPD72+ZP72	30,2	ZRDU 133 KCE	ZRD72+ZR61	28,3
ZPDT 166 KCE	ZPD83+ZP83	35,0	ZRDT 144 KCE	ZRD72+ZR72	30,0
ZPDT 240 KCE	ZPD120+ZP120	52,4	ZRDT 162 KCE	ZRD81+ZR81	33,3
ZPDT 274 KCE	ZPD137+ZP137	58,8			
ZPDT 308 KCE	ZPD154+ZP154	66,3			
ZPDT 364 KCE	ZPD182+ZP182	77,8			

[1] EN 12900: Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

[2] Z*DT even capacity / Z*DU uneven capacity. Tandem assemblies by system manufacturers Emerson Climate Technologies can provide full technical support

New model or series - availability 2009

For more details, see www.emersonclimate.eu

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EMERSON Climate Technologies

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EMERSON. CONSIDER IT SOLVED.

Copeland® Scroll digital™

Copeland Scroll Digital™

A Broad Range of Solutions for Capacity Modulation in Air-Conditioning and Heat Pumps

EMERSON Climate Technologies

Emerson Climate Technologies is the world's leading compressor manufacturer, delivering comprehensive solutions to numerous residential and commercial applications. The new Copeland Scroll Digital™ range enables the design of reliable, energy-saving and simple capacity modulation systems for air-conditioning, heat pump and process cooling systems.

Wide Range of Solutions For Any Capacity Modulation Need

Copeland Scroll Digital™ Simple Technology, Easy Capacity Modulation.

Bringing Innovation to Air-Conditioning and Heat Pump Markets

In many cooling and heating systems the load varies over a wide range, thus requiring the use of capacity modulation. Traditional modulation schemes include variable speed drives, hot gas bypass, paralleling. Some of these solutions are often too complicated or imply reliability concerns. Some require high level technical skills or unaffordable first cost investments.

Now all these issues belong to the past.

Based on the unique Copeland Compliant Scroll® design, digital modulation is achieved by separating the scroll elements axially over a small period of time: it is a simple and reliable mechanical solution for precise temperature and humidity control and improved system seasonal efficiency.

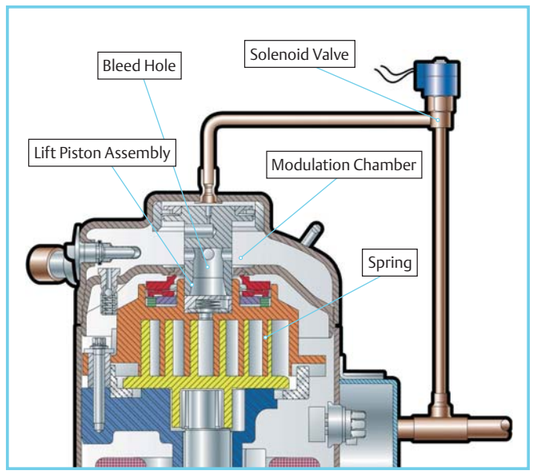

Figure 1: Digital Mechanism

Copeland Scroll Digital™

Best Applied Cost for Capacity Modulation

The standard ZPD and ZRD Digital Scroll™ compressors are the simple modulation solution that can be dropped into any existing system. Quick and easy to implement, it does not require any additional components.

Precise Control and Efficiency

Digital Scroll™ technology provides continuous, stepless modulation over a wide range (from 10% to 100%), with no operating envelope restriction. As a result, ambient temperature and humidity can be tightly controlled for superior comfort and load variations can be rapidly followed for improved seasonal efficiency.

Reliability

Thanks to modulation, the compressor cycling is reduced to a minimum. Moreover, the Digital Scroll™ compressor runs at full speed at all times, never slowing down the oil flow to the compressor itself. Its reliability level is as high as in all standard Copeland Scroll™ compressors. Most important, digital modulation does not cause motor overheating or resonance vibrations in the equipment.

Digital Mechanism

As shown in figure 1, modulation is achieved with a cycle time based on Pulse Width Modulation (PWM) control of a solenoid valve that operates a piston fitted rigidly to the upper scroll. This piston is actuated by gas pressure. The solenoid opens to allow the modulation chamber to communicate with suction via the external tube. Discharge pressure on the lower side of the piston forces it upwards, bringing with it the upper scroll – there is no compression. When the solenoid closes, pressure builds up in the modulation chamber. A small bleed hole allows the pressure build up in the chamber. The upper scroll moves down to its normal contact position – compression resumes.

Copeland Scroll Digital™ Enhanced Vapour Injection

Optimized for Reversible Application

The new ZPJ compressors feature both digital modulation and Enhanced Vapour Injection (EVI) technologies.

Vapour Injection

Conventional air source heat pumps show limited capacity and application range at low ambient conditions. The compressor motor would have enough power to pump more refrigerant, but the mass flow rate becomes too low. Also the liquid to the heat exchanger gets too warm. The solution is the Enhanced Vapour Injection technology that Emerson Climate Technologies provides to improve gas mass flow and liquid subcooling. Performance gains:

- up to 7% efficiency increase
- up to 20% more heating capacity and up to 10% cooling capacity
- extended operating envelope for higher domestic hot water temperature at low evaporating temperature

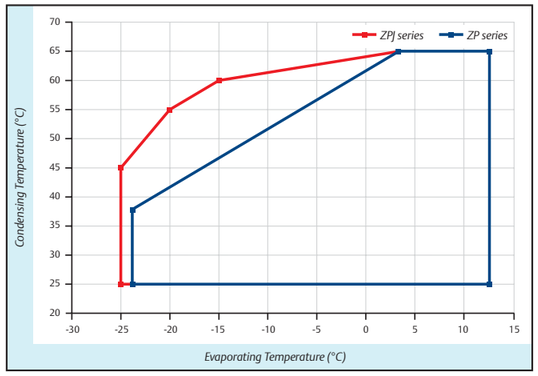

Figure 2: Extended operating envelope for ZPJ series vs. standard ZP series

Copeland Scroll Digital™ High Efficiency

Best-in-Class Seasonal Efficiency

The new ZPE compressors feature high part load efficiency due to a unique technology combination: digital modulation and high efficiency dual speed motor.

High Part Load Efficiency

Energy efficiency at full load (EER or COP) is for a number of applications not an adequate index to rank the real energy consumption of air-conditioning and heat pump equipments. The energy consumption is largely dependent on weather conditions, moreover equipments are often oversized to cover the most critical periods of the year and therefore run at part load operations for most of their total running time. With the increasing focus on part load operations and the new Seasonal Efficiency (ESEER) indicator, the ZPE compressors represent the best option available in the market to achieve high ESEER ratings due to improved part load efficiencies up to 25-30%.

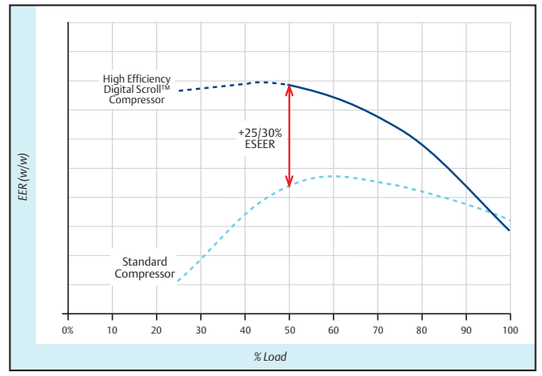

Figure 3: Improved part load efficiencies for ZPE series vs. standard ZP series

Benefits of Copeland Scroll Digital™

- Highest performance at full load (EER/COP)
- Unmatched modulation range (10% to 100%)
- Less complicated system architecture
- Superior reliability
- Precise control and flexible load matching
- Improved system seasonal efficiency
- Differentiating technology positioning