

COPELAND SCROLL™

COMPRESSOR
FIELD GUIDE



A quick reference guide
for everything you need to
#KNOWYOURSCROLL



EMERSON™

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Copeland Mobile

Copeland Mobile



Copeland™ Mobile App (July 31, 2014)

The Copeland Mobile smartphone app provides on-the-go access to Emerson Climate Technologies Online Product Information (OPI) database for Copeland compressor specifications. This database includes both air conditioning and refrigeration products used in a variety of HVACR applications.



Refrigerants & Oils

Refrigerants & Oils

Refrigerant overview

The following is a quick overview of the most common refrigerants used in the HVACR industry. Access to more detailed information can be obtained by visiting:

emersonclimate.com/en-us/resources/Refrigerants/Pages/Refrigerants.aspx



A common sense approach to servicing your system

Along with prohibiting the production of ozone-depleting refrigerants, the Clean Air Act also mandates the use of common sense in handling refrigerants. This includes recovering, recycling, and reclaiming, and by reducing leaks. The Clean Air Act outlines specific refrigerant containment and management practices for HVAC manufacturers, distributors, dealers and technicians.

Source: www.epa.gov/ozone/title6/phaseout/22phaseout.html



- Often referred to by a brand name, such as **Freon®**
- As of 2010, **R-22** was discontinued for use in new air conditioning systems
- By 2015, the use of **R-22** must be reduced by 90% in the U.S.
- **R-22** is a hydro-chlorofluorocarbon (HCFC) that contributes to ozone depletion

R-410a



- Often referred to by a brand name such as **Puron®**, **Suva® 9100**, or **Genetron® AZ-20®**
- Has been approved for use in new systems
- It is a hydro-fluorocarbon (HFC) that does not contribute to ozone depletion
- **R-410A** operating pressures are more than 50% higher than **R-22** and **R-410A** systems require components capable of working at these higher pressures
- **R-410A** has become the new standard for U.S. residential air conditioning systems and is the most common refrigerant for new light commercial unitary air conditioning systems

R-407c



- Often referred to by a brand name such as **Suva® 407C** or **Genetron® 407C**
- **407C** is a hydro-fluorocarbon (HFC) that does not contribute to ozone depletion
- Of the higher temperature HFC options, **407C** most closely matches the operating characteristics of **R-22**
- It is a high-glide refrigerant with lower efficiency, but provides the simplest conversion from **R-22** due to its similar pressures

R-134a



- Widely used in many commercial air conditioning and refrigeration systems globally
- It is a hydro-fluorocarbon (HFC) that does not contribute to ozone depletion; also the first non-ozone-depleting fluorocarbon refrigerant to be commercialized
- It is a single-component refrigerant with no glide, featured in many large commercial screw chillers

Important Dates

January 1, 2010: The Montreal Protocol does not allow manufacturers to produce new HVAC systems containing R-22.

January 1, 2015: The U.S. must reduce its consumption of R-22 by 90%.

January 1, 2020: Chemical companies will no longer be allowed to manufacture R-22 to service existing systems.

With the introduction of HFC refrigerants as alternatives to CFC and HCFC refrigerants, the question of the proper oil to use still comes up. The generally preferred oil for use with HFCs is a polyol ester (POE) that has an additive package for refrigeration applications. Mineral Oil (MO) is not recommended, because oil return is considered to be compromised.



Scan here to see our approved refrigerants and lubricants for Copeland™ compressors

Cope Support

Support

3

Scan the QR codes and easily source the information you need or find answers to questions.



Contractor Connection

Gateway to the latest products, tools and support you need to stay connected on the job.



Distributor Locator

Locate an authorized Emerson wholesaler in your area.



Climate Conversations

HVACR insights from Emerson industry experts



AC & Heating Connect

A website developed as an easy to understand resource for homeowners, commercial end-users and contractors that provides useful tools for improving business and communicating with customers.

Prod Famini

Products

Residential and Light Commercial Compressor Line-up

Emerson Climate Technologies provides a full-line of Copeland Scroll™ residential compressors that are:

- R-410A ready
- Optimized for 13+ SEER applications
- Built around a unique technology that wears in and not out

They include the latest advances in Copeland Scroll technology featuring:

- 20 major design improvements
- Breakthroughs in protection
- Proven reliability
- Improved efficiency
- Low sound levels



Residential and Light Commercial Compressors

Modulation

Copeland Scroll™
Variable Speed

Modulation Range



Size (HP)

2 - 5

Applications

16+ SEER high efficiency
air conditioners and
heat pumps



Residential and Light Commercial Compressors

Modulation

Copeland Scroll™
Two-stage

Modulation Range



Size (HP)

1 - 5

Applications

15-16 SEER
systems and
heat pumps



Residential and Light Commercial Compressors

Fixed Capacity

Copeland Scroll™ (ZPK6)

Size (HP)

1 - 5

Applications

14+ SEER air conditioning
and heat pump



Product Family – Residential and Light Commercial

Residential and Light Commercial Compressors

Fixed Capacity

Copeland Scroll™ (ZPK5)

Size (HP)

1.5 - 5

Applications

13-14 SEER
air conditioning
and heat pump



Residential and Light Commercial Compressors

Fixed Capacity

Copeland Scroll™ (ZPKA)

Size (HP)

1.5 - 2

Applications

13-14 SEER

air conditioning



Product Family – Residential and Light Commercial

Scroll vs. Rotary

	Scroll	Rotary
Min Ambient (heat pumps)	-30 to -10F°	0 to 12F°
Recommendation: Use scroll for more reliable and efficient heat pump operation		

	Scroll	Rotary
Max Ambient (heat pumps)	120 to 125F°	115 to 120F°
Recommendation: Use scroll for areas that reach 100F° + degrees to avoid loss of AC service		

	Scroll	Rotary
Reliability Testing Under High Load (Drives can mitigate some of this concern)	Ran for 2,000+ hrs of extreme testing	Failed at 1,000 hrs of extreme testing
Recommendation: Use scroll to ensure reliable operation, especially in hot climates		

Line Set & Vertical Rise Limits	150/50 ft	100/50 ft
Recommendation: Use scroll for applications requiring long line sets and/or vertical rises		

Residential and Light Commercial Compressors

Fixed Capacity

Copeland™ CR Series

Size (HP)

1.5 - 5

Applications

Air conditioning
service, refrigeration
and export



Large Commercial Compressors

Our Copeland Scroll™ commercial compressors offer the most advanced scroll technology available to support your commercial air-conditioning needs, including:

- Widest R-410A selection available
- Model ranges from 2 - 60 HP in singles
- Tandems up to 80 HP



Large Commercial Compressors

Modulation

Copeland Scroll
Digital™

Modulation Range



Size (HP)

3 - 30

Applications

Commercial rooftop applications for schools, hospitals, theaters and restaurants with widely varying loads

Industrial air driers, chillers and precision cooling equipment

Available in tandem configurations



Large Commercial Compressors

Modulation

Copeland Scroll™
Variable Speed

Modulation Range



Size (HP)

7.5 - 15

Applications

Light commercial
and commercial air
conditioning, heat
pump, rooftop and
chiller applications

Available in tandem
configurations



Large Commercial Compressors

Fixed capacity

Copeland Scroll™
30-60 HP

Applications

Large commercial
rooftop air
conditioning and
chiller applications

Available in tandem/
trio configurations



Large Commercial Compressors

Fixed capacity

Copeland Scroll™
20-25 HP

Applications

Commercial rooftop
air conditioning and
chiller applications

Available in tandem
configurations



Large Commercial Compressors

Fixed capacity

Copeland Scroll™
7-15 HP

Applications

Commercial rooftop
air conditioning and
chiller applications

Available in tandem/
trio configurations



Large Commercial Compressors

Fixed capacity

Copeland Scroll™
9-10 HP

Applications

Commercial rooftop air conditioning and chiller applications

Available in tandem configurations



Large Commercial Compressors

Fixed capacity

Copeland Scroll™
5-8 HP

Applications

Light commercial
rooftop air conditioning
and chiller applications

Available in tandem
configurations



CoreSense™ Technology for Air Conditioning



Residential and light commercial CoreSense™ Diagnostics

Applications

Residential and light
commercial air conditioning
and heat pumps

Benefits

Actively protects Copeland
Scroll compressors from
critical failure

Uses the compressor as a
sensor for system health

Five system alert codes

Data port for fault
history download

Reduces field failures
and warranty claims



CoreSense™ Technology for Air Conditioning

Residential and light commercial CoreSense™ Communications

Applications

Residential and light commercial
air conditioning and heat pumps
Superior replacement for single or
two pole contactors

Benefits

Actively shuts down the compressor
when critical system faults are
detected

Six diagnostic codes enable
greater speed and accuracy
of troubleshooting

Stores system and fault
history for download

Reduces callbacks and provides
homeowner peace-of-mind

Same wiring as traditional contactor



CoreSense™ Technology for Air Conditioning

Commercial

CoreSense™ Communications

Applications

Commercial rooftop air conditioning
and chillers

Available in tandem/trio configurations

Benefits

A first of its kind communicating
scroll compressor

Onboard Modbus®
communication

Integrated protection
and phase monitoring

Diagnostic fault history
over life of compressor

Featured on 13-60 HP
Copeland Scroll compressors



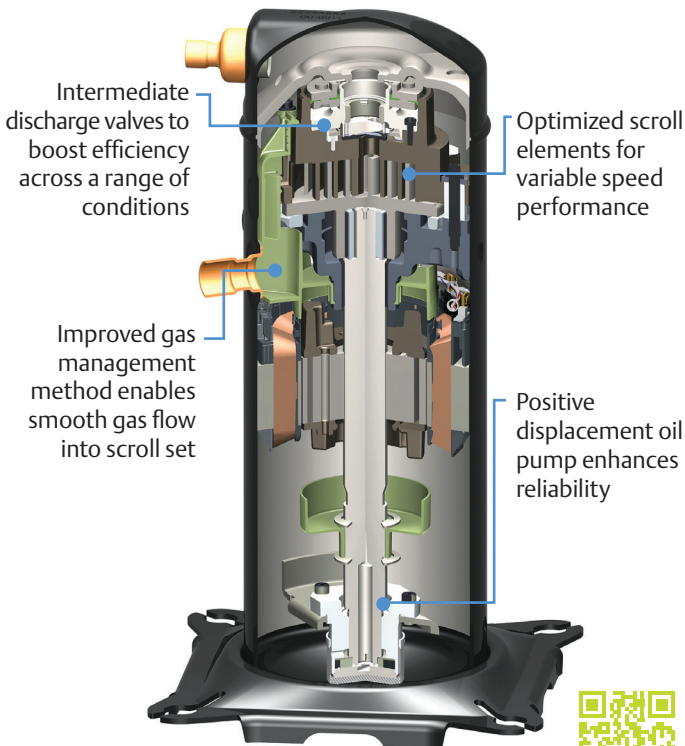
Compressor Cutaway Images and Info

Compressor Cutaway
Images and Information

Cutaway Images & Information

Residential Copeland Scroll™

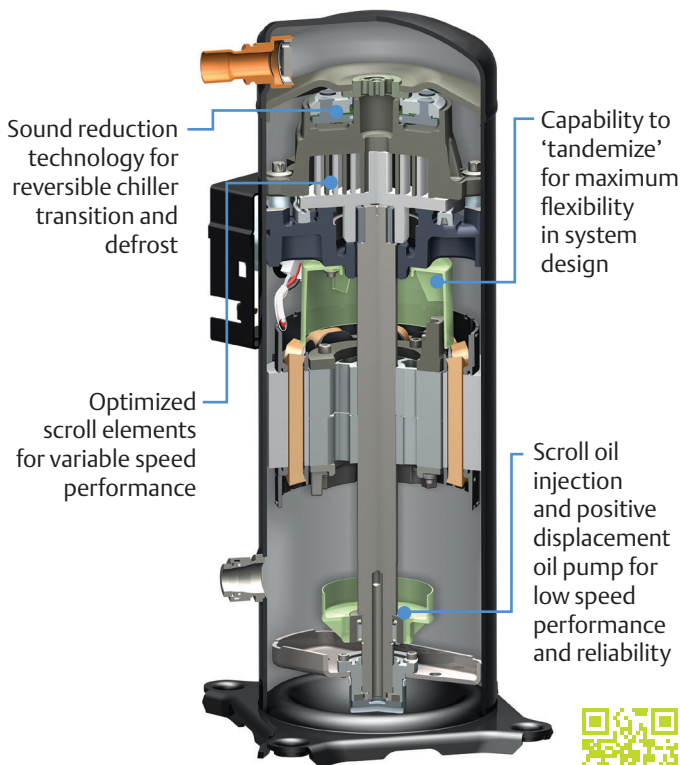
Variable Speed



Cutaway Images & Information

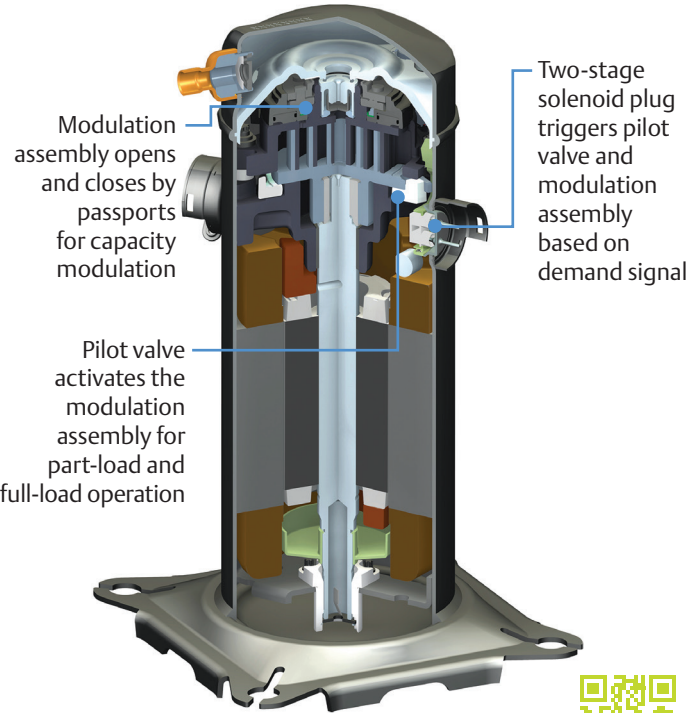
Commercial Copeland Scroll™

Variable Speed



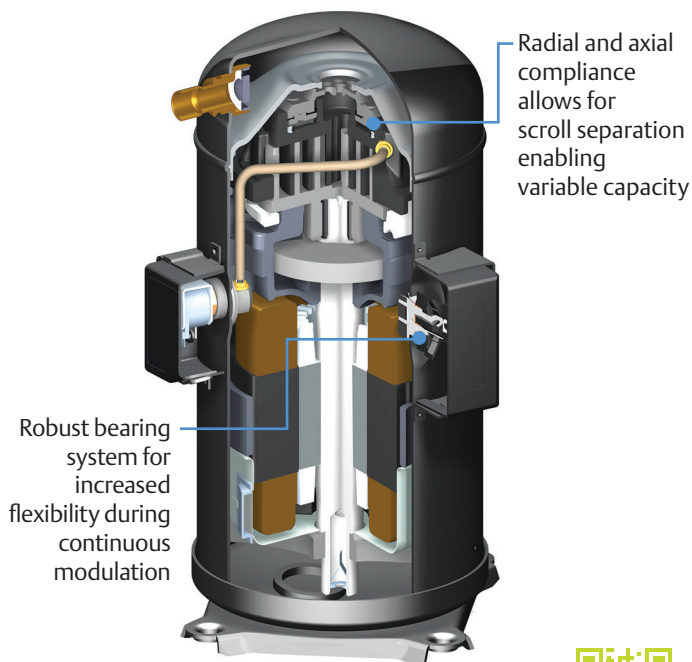
Cutaway Images & Information

Copeland Scroll™ Two-stage



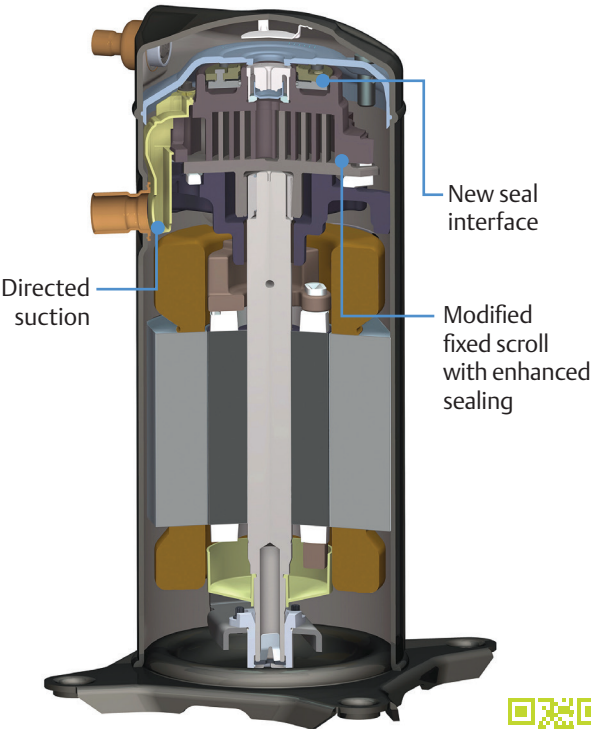
Cutaway Images & Information

Copeland Scroll Digital™



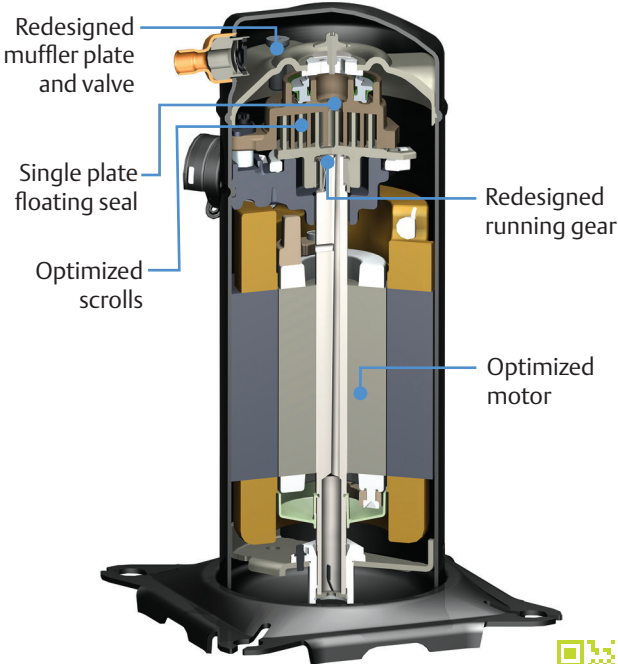
Cutaway Images & Information

Copeland Scroll™ ZPK6



Cutaway Images & Information

Copeland Scroll™ ZPKA



Volume Name

Nomenclature/Nameplates

Nomenclature

Copeland Scroll™ Label

Model number breakdown

Details modulation, range, capacity, electric codes and more.

Serial & Customer number

Unique to each compressor for registration and tracking purposes



Copeland Scroll™

MODEL **ZF00KVE – TFD – 000**

SERIAL **000000000**

CUSTOMER **000 00000 0000**

OIL		V	PH	HZ	LRA	I-BLOCK	I-OPER MAX	V (m³/h)	n (min⁻¹)	BOX	MAX OPER PRES	RLA	
QZ	L									IP	N/L BARS		
40	1.18	208-230	1	60	NA	NA	33.5	0.32	3500	54	43.3 / 28.0	NA	
3MA-PDE		MADE IN USA & IMPORTED PARTS					90560-011			UB0630	E/T	NI	THERMALLY PROTECTED



⚠ WARNING

Service should be performed by trained personnel only. Failure to follow these safety warnings could result in serious injury or death.

ELECTRICAL SHOCK HAZARD

Turn off power before servicing. Discharge all capacitors. Use this equipment in a grounded system only. System contents are under pressure. Do not use torch. Replace terminal cover, if applicable, before applying power. Use only manufacturer authorized refrigerants, lubricants and electrical components.

⚠ AVERTISSEMENT

Service doit être effectuée par du personnel qualifié. Le non respect de ces consignes de sécurité peut entraîner des blessures graves ou la mort.

RISQUE DE CHOC ÉLECTRIQUE

Coupez l'alimentation électrique avant d'intervenir. Déchargez tous les condensateurs. Utilisez cet appareil dans un système de mise à la terre. Le contenu du système sont sous pression. Ne pas utiliser le chalumeau. Remplacer le couvercle du terminal, le cas échéant, avant la mise sous tension. Utilisez des fluides frigorigènes seul fabricant autorisé, des lubrifiants et des composants électriques.

⚠ ADVERTENCIA

Únicamente personal capacitado deberá efectuar el servicio del equipo. El no seguir estas advertencias de seguridad podrá ser causa de lesiones graves o la muerte.

PELIGRO DE DESCARGA ELÉCTRICA

Desconecte la corriente eléctrica antes de dar servicio. Descargue todos los capacitores. Este equipo debe usarse únicamente en un sistema conectado a tierra. Contenido del sistema bajo presión. Antes de dar corriente, vuelva a colocar la cubierta del terminal, si 0 lubricantes y componentes eléctricos autorizados por el fabricante.

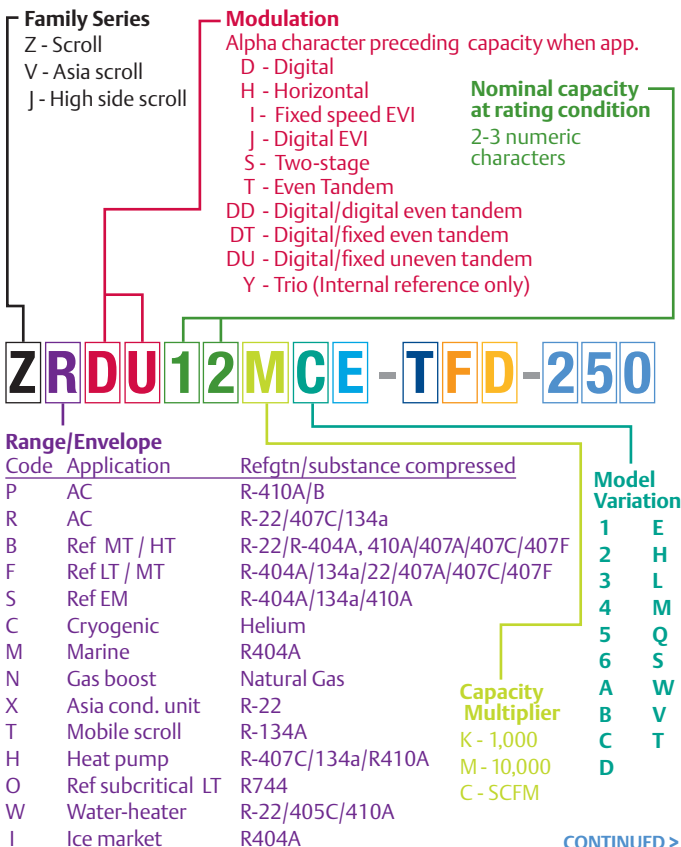


Compressor specs

Lists multiple specs such as oil, volts, phase, hertz, operating pressure, etc.

Nomenclature

Copeland Scroll™



CONTINUED >

Nomenclature

Copeland Scroll™ (cont.)

Optional

- A - PAO Oil
- B - POE R134A Ref Products
- E - POE Oil - AK/DA or 3MA
- G - PAG Oil
- P - POE R410A Ref Products

Motor Protection

Type	Code
Internal inherent protection	- F
External electronic protection	- W
External enhanced	- E
No internal protection or TW*+TF*	- X
Tandem/Trio TE*+TW*	- Y
Tandem/Trio TE*+TF*	- Z

Z R D U 1 2 M C E - T F D - 2 5 0

Typical Electrical Codes

60 Hz	50 Hz	Code
208-230-3	200-3	C
460-3	380-420-3	D
575-3	---	E
265-1	220-240-1	J
---	380-420-3	M
---	380-3	P
265-1	---	Q
	220-240-3	R
	220-1	S
208-230-1	200-1*	V
---	200-220-3	W
Misc AC Voltages		
---	220-240-1	Z
200-230-3	200-220-3	5
380-3	---	7
---	415-3	0
220-1	220-1	3

*Model specific

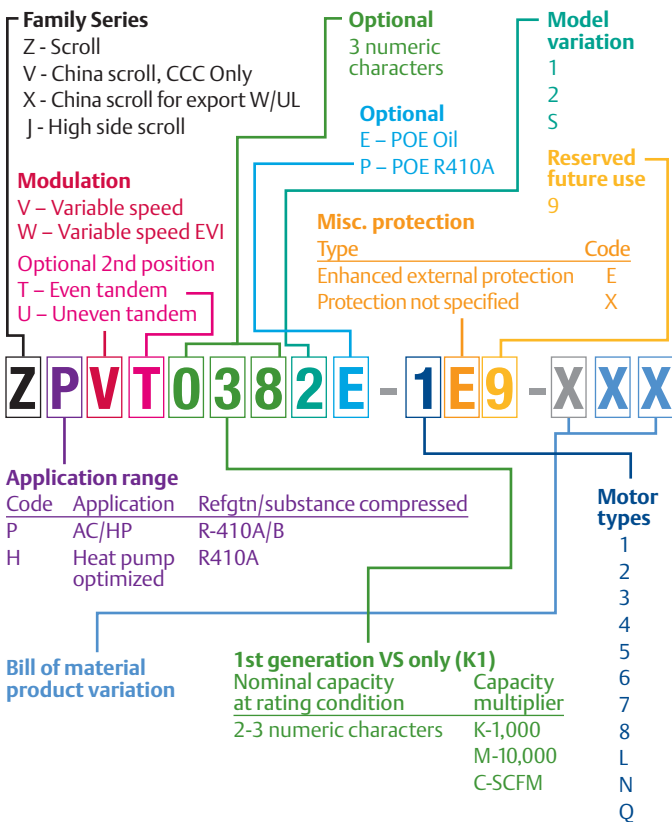
Motor Descriptions

Phase	Code
1	P
3	T
BPM	B
3 PWS 50/50	F
3 Encapsulated Stator	K
Multiple Speed	M

Bill of material
product variation

Nomenclature

Copeland Scroll™ Variable Speed



Manufacturing Facilities

Manufacturing Facilities

Global Scroll Manufacturing Overview

North America

Sidney, Ohio
Lebanon, Missouri
Ava, Missouri
Natchitoches, Louisiana
Reynosa, Mexico

International

Cookstown, N. Ireland
Welkenreadt, Belgium
Suzhou, China
Rayong, Thailand

- High volume scroll manufacturing on three continents
- Over \$1 billion invested in global scroll manufacturing capacity
- Integrated supply chain for global cost savings and risk reduction
- In depth audit process to share best practices and ensure quality

Global Scroll Manufacturing

North America



Location	Scroll Assembly	Reciprocating Assembly	Scroll Machining
Sidney, OH	●		●
Lebanon, MO	●		●
Natchitoches, LA	●		●
Ava, MO			●
Reynosa, Mexico	●	●	



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