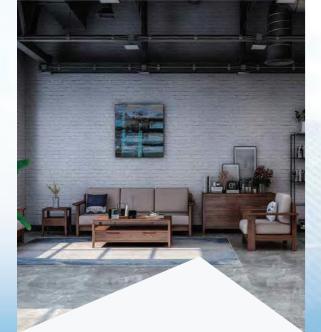
# Copeland Variable Speed Solutions





## Residential Air Conditioning

Our residential compressors include the latest advances in technology featuring major design improvements and breakthroughs in protection, reliability, efficiency, and sound.



### Commercial Air Conditioning

Copeland offers the most advanced compression solutions creating cost-effective and comfortable indoor environments that meet requirements for modern office buildings.



# Space Heating

Our comprehensive range of heating solutions provide precise and consistent comfort year-round while helping homes reduce their energy bills.



Copeland scroll compressors set industry standards for high reliability and outstanding performance for water heating, making them the preferred choice for hotels, restaurants, and hospitals.



### Commercial Refrigeration

From reducing food wastage in supermarkets, to boosting operational efficiency for cold storage facilities, Copeland technology enables refrigeration solutions to help extend the shelf life of perishables at every step of the lifecycle.

#### **About**



We are a global climate technologies company engineered for sustainability. Today, we are building on our 100-year legacy through industry-leading innovation, putting Copeland at the forefront of positive change. We create sustainable residential, commercial and industrial spaces through HVACR technologies. We maintain the integrity of goods throughout the cold chain. And we bring comfort to people globally.

# Center for World-Class Manufacturing Excellence

#### Dubai, United Arab Emirates (UAE)

Technology hub and gateway to Middle East and Africa.





#### Dammam, Saudi Arabia

State-of-the-art manufacturing facility serving the region's ever-growing market.



#### Karad Engineering Lab, India

The center showcases psychrometric and integrated variable speed laboratories for R32 and R290 refrigerants. Full range testing compressor systems include reliability, performance, energy efficiency and sound level tests.



#### Suzhou Research and Solutions Center, China

Founded in 2002, the center is instrumental in the development of new compressors and innovative HVACR solutions for the Asia Pacific region. Equipped with state-of-the-art simulation laboratories, the R&D center boasts of the largest reliability testing lab in Asia.





# Busan Climate Integrated Solutions Lab, Korea

The advanced facility provides a secure testing ground for customers aiming to maximize system performance and optimize energy efficiency.



#### Rayong, Thailand

Established In 1997, the Rayong facility is the first high-volume scroll compressor manufacturing plant in Asia.



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To achieve the goals of the Paris Agreement, countries and companies worldwide must halve their greenhouse gas emissions by 2030 and reach net zero emissions by 2050. Fulfilling these decarbonization objectives requires innovative solutions, collaboration, and stakeholder commitment. Sustainable infrastructure characterized by its superior energy efficiency and use of environmentally friendly refrigerants advances decarbonization efforts by supporting the requirements of green buildings.

Packaged Copeland solutions enables best-in-class sustainable solutions to solve the toughest heating and air conditioning challenges in an evolving HVAC industry. We help customers determine what upcoming changes mean for their business while helping them prepare for tomorrow's challenges today.

### Copeland Variable Speed Solutions



# Delivering up to 30% Energy Savings Unparalleled comfort with Precise Temperature and Humidity Control

With an unparalleled commitment to engineering excellence, innovative design, and an extensive range of modulated solutions, Copeland not only establishes the benchmark for compression technology but also pioneers its evolution. Each Copeland Variable Speed solution consists of a meticulously engineered Copeland variable speed scroll compressor seamlessly integrated with a perfectly matched inverter drive, accompanied with essential agency approvals. This comprehensive package significantly minimizes development efforts and accelerates time to market, empowering businesses to thrive in a rapidly evolving HVAC industry.

#### Breakthrough Performance

Copeland Variable Speed compressors are engineered to provide optimal cooling and heating efficiency precisely when it's needed. Whether it's improving split air conditioning systems for high ambient temperatures, developing a packaged air conditioner tailored for four seasoned regions, or designing a chiller suited for China's unique climate, our innovative variable speed technology enables system manufacturers and building owners to attain unparalleled performance and value.



Optimized scroll set with variable compression ratio valve technology



Enables best peak load and part load efficiency
 Expansive 1000-7800rpm with highly
 efficient Brushless Permanent Motor (BPM)



 Supports seamless capacity modulation and load matching, reducing inrush current Enhanced Vapor Injection



 Helps deliver +30% capacity and enhanced efficiency at extreme low ambient conditions



Low GWP Refrigerant

R32 environment friendly solutions



Based on simulation results tested in a hotel with a 130 kW chiller system in Nanjing, China

#### Expansive Control & Flexibility

Copeland Variable Speed compressors are designed to enable system manufacturers, building owners experience a new level of control and operational flexibility.



#### **Broad Operating Envelope**

 Supports flexibility to apply solutions for multiple applications



#### Pre-Qualified tandems

 Facilitates capacity extension and proves best applied cost



#### Available with a Perfectly matched Inverter Drive

 Reduces system development time and efforts, drive controls motor stator heating – eliminates the need for crankcase heater

# Built on Proven Copeland Scroll Platform

With a legacy of over 100 years in design and manufacture of energy-efficient and dependable compressors, Copeland takes pride in continuously innovating its products. By leveraging the power of variable speed technology, Copeland compressors are further optimized, helping ensure greater efficiencies and performance.



Low oil circulation rate and oil injection



Delivers best system performance
 Copeland tried and tested Axial
 and Radial compliance

 Enhanced liquid & debris handling capacity

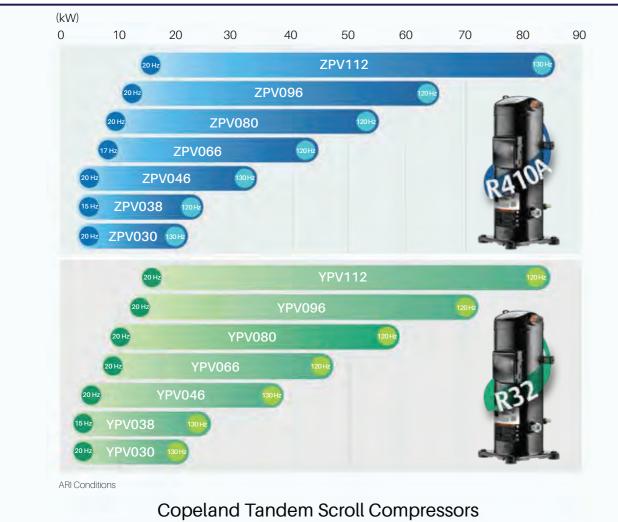


Rigorous and extensive development and manufacturing line testing

Ensures high quality and reliability

# Capacity Range

#### Copeland Variable Speed Scroll Compressor Capacity Range (kW)









For 30cc EVI option, please refer to the 46cc dimensions For 38cc (R32), please refer to Technical Data

ST - Stub Tube

# Technical Data

Refrigerant				R410A							R32			
Compressor Models	ZPV 030HE	ZPV 038DE	ZPV 046HE	ZPV 0662E	ZPV 0802E	ZPV 0962E	ZPV 112AE	YPV 030HT	YPV 038LT	YPV 046HT	YPV 0662T	YPV 0802T	YPV 0962T	YPV 112AT
Displacement (cm³/rev)	30	38	46	66	80	96	110	30	38	46	66	80	96	110
Speed Range (RPM)	1200 - 7800	900 - 7200	1200 - 7800	1000 - 7200	1200 - 7200	1200 - 7200	1200 - 7800	1200 - 7800	900 - 7200	1200 - 7800	1200 - 7200	1200 - 7200	1200 - 7200	1200 - 7200
Speed Range (Hz)	20 - 130	15 - 120	20 - 130	17 - 120	20 - 120	20 - 120	20 - 130	20 - 130	15 - 120	20 - 130	20 - 120	20 - 120	20 - 120	20 - 120
Max Cooling Capacity (kW @ Max RPM)	21.4	25.3	34	44.1	54.1	65.9	82.6	23	27.8	37.9	47.3	58.9	70.7	83.3
Cooling Capacity* (kW)	12.2	16.1	19.3	27.5	34.2	41.1	47.6	13.1	17.1	20.9	29.6	36.7	44.1	51.7
COP* (without drive)	3.4	3.4	3.3	3.3	3.4	3.4	3.4	3.4	3.4	3.3	3.4	3.5	3.5	3.5
Power Input* (kW)	3.8	4.8	6.2	8.4	10.2	12.3	14.3	4	5	6.4	8.9	10.7	12.8	15.2
EVI Option	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Electricals	3X9 4X9	3X9 4X9	4X9 <u>5X9</u>	4X9 5X9 7X9	4X9 7X9	4X9 5X9 7X9	4X9	3X9 4X9	3X9 4X9	4X9 <u>5X9</u>	4X9 5X9	4X9	4X9 5X9	4X9
Height (mm)	379**	424	392		559		585	379**	379	392		559		585
Width (mm)	194**	198	194		246		246	194**	194	194		246		246
Diameter (mm)	141**	141	141		186		187	141**	141	141		186		187
Suction Dia. (ST)	19	9 mm / 0.75	in.	29	29 mm / 1.14 in.		35 mm / 1.38 in.	19	mm / 0.75	in.	29	9 mm / 1.14	4 in.	35 mm / 1.38 in.
Discharge Dia. (ST)	13	3 mm / 0.51	in.	22	! mm / 0.87	<sup>7</sup> in.	29 mm / 1.14 in.	19 mm / 0.75 in.	13 mm / 0.51 in.	19 mm / 0.75 in.	22	2 mm / 0.82	7 in.	29 mm / 1.14 in.

Notes:

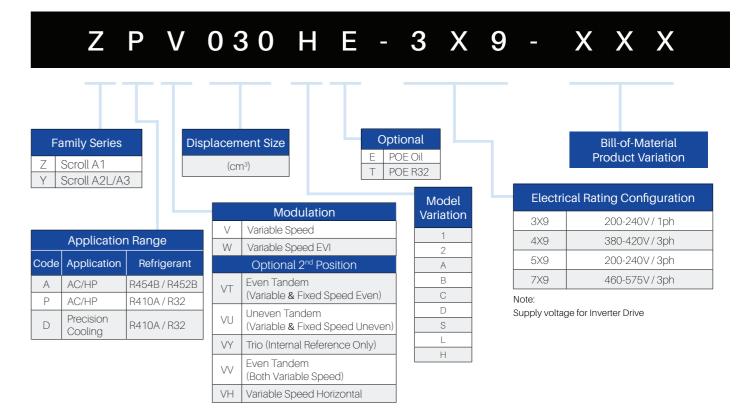
\*ARI Condition @75Hz

\*\*For 30cc EVI option, please refer to the 46cc dimensions

5X9 - Under development

ST - Stub Tube

### Nomenclature



#### **BOM Selection**

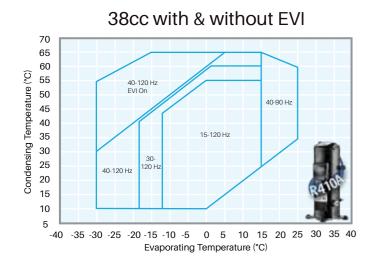
Refrigerant	Models	519	522 /*EBK	550 /*EBR	571 /*EBK	576
	ZPV030HE		İ		X	
	ZPV038DE				X	
	ZPV046HE				X	
R410A	ZPV0662E	X	X	X		
	ZPV0802E		X	X		
	ZPV0962E	X	X	X		
	ZPV112AE	X	X	X		X
	YPV030HT				X	
	YPV038LT				X	
	YPV046HT				X	
R32	YPV0662T		X	X		
	YPV0802T		X	X		
	YPV0962T		X	X		
	YPV112AT		X	X		
	Stub Tube	X	X	X	X	Х
	Terminal Block	X	X	X	X	Χ
	Grounding	X	X	Х	X	Х
	T-Box/Cover (IP21)		X	Х	X	
Configuration	T-Box/Cover (IP54)	X				Х
	Sight Glass	Х		Х		
	Schrader Valve	X		Х		
	OEL Fitting	X		X		
	Mounting Parts	X	X	X	X	

Note:

\*For R32 Models

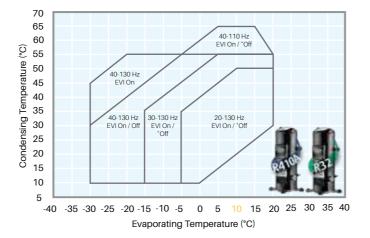
# **Operating Envelopes**

#### 30cc & 46cc 70 65 60 55 40-110 Hz 50 45 40 35 gr 30 30-130 H 25 20 -40 -35 -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30 35 40 Evaporating Temperature (°C)



- Minimum Speed for EVI ON = 40Hz (2400rpm)

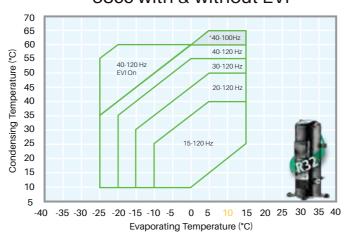
#### 30cc & 46cc with EVI



Notes: - \*ET > 10°C, EVI must be OFF

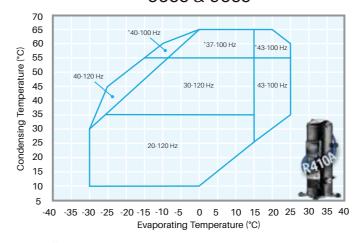
- Minimum Speed for EVI ON = 40Hz (2400rpm)
- Preliminary data

#### 38cc with & without EVI



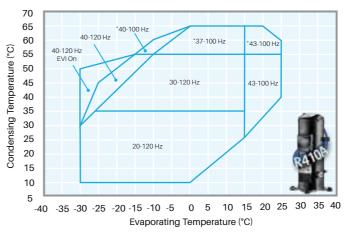
- \*Limited operation 800 hours ET > 10°C, EVI must be OFF

#### 66cc & 96cc



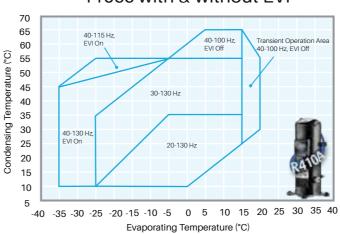
\*Contact an applications engineer for operations beyond 250 hours / year

#### 80cc with & without EVI



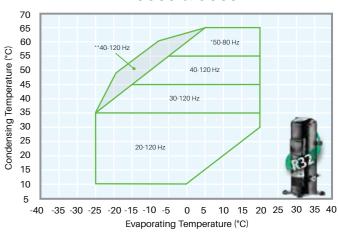
- \*Contact an applications engineer for operations beyond 250 hours / year

#### 110cc with & without EVI



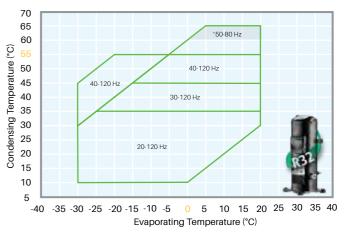
- Transient operation area total running time is no more than 300 hours
- Minimum Speed for EVI ON = 40Hz (2400rpm)

#### 66cc & 96cc



- \*Maximum of 260 operating hours / year \*\*Limited operations to 20 hours / year

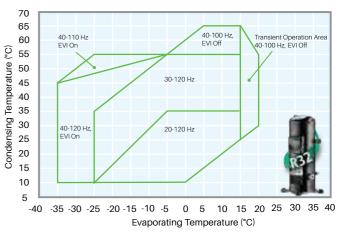
#### 80cc with & without EVI



- -\*Limited operation to 200hrs (grey area)
   Minimum Speed for EVI ON = 40Hz (2400rpm)

- EVI ON when ET < 0°C EVI OFF when ET > 0°C & CT > 55°C

#### 110cc with & without EVI



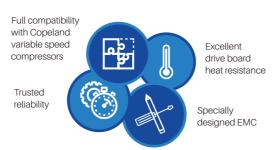
- Transient operation area total running time is no more than 300 hours
- Minimum Speed for EVI ON = 40Hz (2400rpm

# Variable Speed Drives

#### **EVD Drive** Features and Benefits

- · Fully optimized drive and motor design
- · Improved reliability through protection and control features
- Reduced system design time and effort
- Communication set up Baud rate 2400
- · Full compressor compatibility, plug and play capability

#### Copeland Variable Speed Drive Advantage

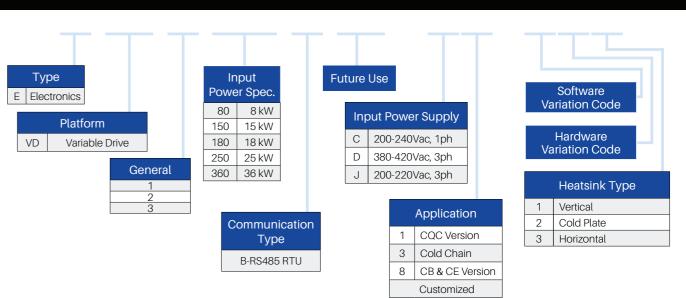


#### Specification

Details		Operational C	Max. Input	Max. Output	
Inverter Drive Model	Rating (kW)	Voltage / Phase	Frequency (Hz)	Current (A)	Current (A)
EVD1080B-JX-111	8	170V ~ 250V/3ph	50/60	22	22
EVD2080B-D1-11X	8	340V ~ 440V/3ph	50/60	17	21
EVD3080B-C8-111	8	160V ~ 265V/1ph	50/60	35	25
EVD1110B-JX-111	11	170V ~ 250V/3ph	50/60	32	32
EVD2110B-DX-11X	11	340V ~ 440V/3ph	50/60	21	21
EVD2150B-DX-111	15	340V ~ 440V/3ph	50/60	27	27
EVD2180B-DX-111	18	340V ~ 440V/3ph	50/60	38	38
EVD3250B-DB-111	25	340V ~ 440V/3ph	50/60	38	49
EVD1360B-D1-112	36	340V ~ 440V/3ph	50/60	58	58

#### Nomenclature





#### **Drive Selection**

System Capacity (kW)	16 - 20	20 - 28	28 - 36	36 - 45	45 - 54		54 - 65
Compressor Displacement (cc)	30/38	46	66	80	96		110
Drive Input Power (kW)	8	11	1	5	18	25	36
Drive Platform		Air Cooled Air Cooled					Refrigerant Cooled

Agency Approvals:







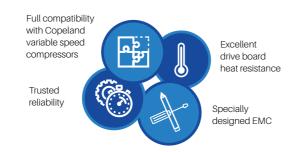
Please contact Application Engineering for Drive selection and matching.

# Variable Speed Drives

# EV2 and EV3 Drive Features and Benefits

- Designed for Copeland Variable Speed Scroll (ZPV) Compressors
- Predefined selection for compressor protection, functionality and reliability
- · Controllable via RS485 & Modbus protocols
- Designed to meet EN 60335-1 and UL 60730

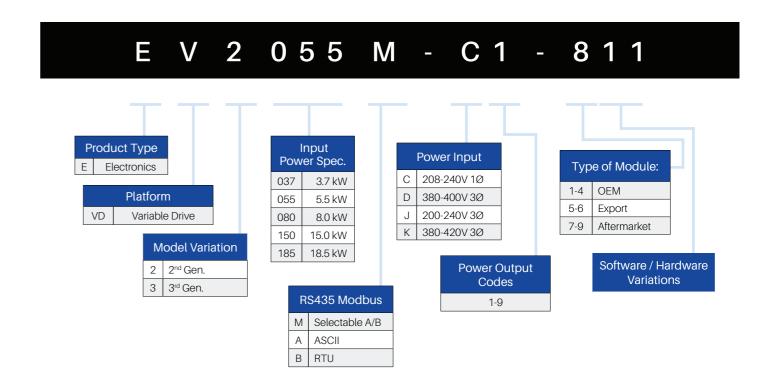
#### Copeland Variable Speed Drive Advantage



#### Specification

Details		Operational C	Max. Input	Max. Output	
Inverter Drive Model	Rating (kW)	Voltage / Phase	Frequency (Hz)	Current (A)	Current (A)
EV2055M-K8-XXX	5.5	380V ~ 420V / 3ph	50/60	10	17
EV2080M-C8-XXX	8	208V ~ 240V / 1ph	50/60	35	24
EV2080M-K8-XXX	8	380V ~ 420V / 3ph	50/60	14	24
EV2080M-J8-XXX	8	200V ~ 240V / 3ph	50/60	22	24
EV3150B-K9-294	15	380V ~ 420V / 3ph	50/60	27	27
EV3185B-K9-294	18.5	380V ~ 420V / 3ph	50/60	38	38

#### Nomenclature



#### **Drive Selection**

System Capacity (kW)	16 - 20	28 - 36	36 - 45	45 - 54
Compressor Displacement (cc)	38	66	80	96
Drive Input Power (kW)	8		15	18
Drive Platform	Air Cooled		Air Cooled	

**(€ (4)** 

Certification:

Notes:

Please contact Application Engineering for Drive selection and matching.

# Integrated Solutions

#### Controller

- Modular design, flexible and scalable
- Various options for a host of different applications
- Parametric controller for standard application
- Programmable PLC controller for customized applications

#### HMI

- Standard HMI for residential applications
- 4.3"/7" touch HMI for customization applications
- Standard firmware for programmable HMI



# Technical advantages of Copeland integrated solutions for commercial chillers

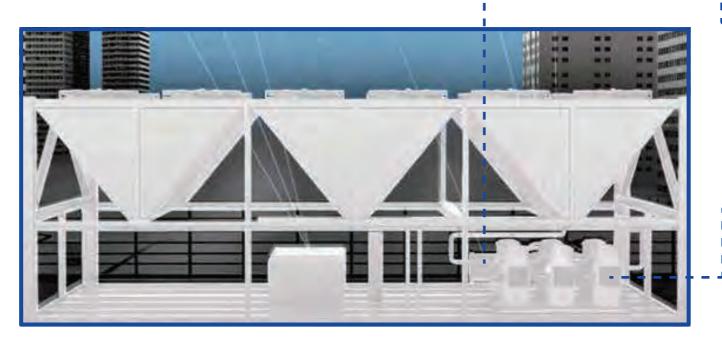
- Full range of core components designed and developed by Copeland engineers
- Equipped with a full range of Copeland variable speed, fixed speed scroll compressors and tandem configurations for effortless cooling capacity expansion.
- Dynamic controller hardware platform, rich expansion modules, programmable technology to meet various needs of customers.
- Optimized system control logic for maximum energy efficiency and reliability of IPLV systems.
- Highly skilled technical team with comprehensive lab testing facilities to support system development – saving time and effort.

#### Electronic expansion valves

- DX1/DX3 series cover capacity range from 5 kW ~ 100 kW
- Highly reliable under extreme applications, qualified for over 100k full cycles
- Precise expansion process control helps maintain stable system super heat
- Bi-directional flow characteristics applicable for heat pump systems
- Optimum wide modulation range helps deliver higher integrated part load efficiency
- DX1: Compact and lightweight with hermetic valve body design
- DX3: Take-apart design, easy for field troubleshooting



- Linear flow control features, precise control from 10% to 90% opening range
- Two-way maximum working pressure difference up to 35 bar, ideal for low ambient temperature environments
- 250,000 times (full on and off) cycle, IP65/67 protection, high reliability and long product life span



#### Compressors

- Optimized design of variable speed drive compressors are based on permanent magnet DC brushless motor
- 1000 ~ 7200RPM wide speed range for improved partial load energy efficiency
- Tandem installation provides maximum flexibility for system design







#### IPG215D

Power supply	24V AC/DC
Analog input	10 channels available - NTC
Digital input	20 channels are availablew
Relay output	15°5A
Analog output	4 channels 0 ~ 10V signal 2 channels can be equipped with 0 ~ 10V/4 ~ 20mA signal
	Remote Display Control Panel (2*VGIPG) RS485 bus,
Other Output	RS485 slave (Modbus RTU) USB, Ethernet, CAN bus
	RS485 slave (Modbus RTU)
Other	RTC Real Time, Clock Internal Modem (optional analog
Otilei	cat) BACnet protocol (optional), LON protocol (optional)



#### EO1AVNB-CJ (HPC)

Power supply	220V AC			
Analog input	10 channels available - NTC /0 ~ 5V/DI			
Digital input	3 channels are available			
Relay output	5*5A			
Angles output	0 ~ 10V signal 1 channel			
Analog output	PWM signal 2 channels			
	RS485 Master			
Other output	RS485 Slave *2			
	EEV drive (Unipolars) 2			
Insulation class	Double insulation			
Storage temperature	-25 ~ 60°C			
Operating temperature	-25 ~ 60°C			
Index of protection	IP00			
Category of resistance to heat and fire	Category D (UL94-V0)			



#### IPX206D

Power supply	24V AC/DC
Analog input	7 channels are available - NTC/PTC/0 ~ 1V/0 ~ 5V/0 ~ 10V/4 ~ 20mA/DI
Digital input	3 channels can be matched
Relay output	5*5A + 1*8A
Analog output	3 channels 0 ~ 10V signal
Other Output	CAN Bus
Other	DIP switch configuration address



#### EO2AVNB-CJ (DHC)

220V AC
20 channels available - NTC /0 ~ 5V/DI
6 channels are available
9*5A,4*16A
RS485 Master
RS485 Slave *2
EEV drive (Unipolars) *4
Double insulation
-40 ~ 80°C
-25 ~ 60°C
IP00
Category D (UL94-V0)



#### XEV20D

Power supply	24V AC/DC
	Total 4 channels
Analog input	2 channels are available for NTC/PTC/Pt1000
	2 channels are available for 4 ~ 20mA/0 ~ 5V/Pt1000
Support EEV	Bipolar or Unipolar
EEV Output	2 Ports
Power consumption	Max 40VA
Operating temperature:	-10 ~ 60 °C
Storage temperature:	-30 ~ 85 °C
Communication	CAN Bus
Other	DIP switch configuration address



#### IPLT212K

Power supply	220V AC			
Analog input	20 channels available - NTC /0 ~ 5V/DI			
Digital input	6 channels are available			
Relayoutput	9*5A,4*16A			
	RS485 Master			
Other output	RS485 Slave *2			
	EEV drive (Unipolars) *4			
Insulation class	Double insulation			
Storage temperature	-40 ~ 80°C			
Operating temperature	-25 ~ 60°C			
Index of protection	IP00			
Category of resistance to heat and fire	Category D (UL94-V0)			





#### **HMI Module**

Part number	543-0303-00		
Power supply	12Vdc		
Communication	RS485		
Index of protection	IP20		
Power consumption	<2w		
Function:	Temperature Setting/Display		
	Mode Selection		
	System Status Monitory		
	Timer		
	Alarm Code Display		
	Fan Speed Selection		
Dimensions	86 x 86 mm		



#### HMI 4.3" RS485

Part number	543-0339-00
Power supply	4.5 ~ 30Vdc
TFT	4.3"
Resolution	480 x 272px
Touch:	Resistive
Index of protection	Rear IP20; Front IP65
Power consumption	<2W
Colors	65k, 16 bits
Operating temperature:	-20 ~ 70 °C
Storage temperature:	-30 ~ 80 °C
Communication	RS485
Dimensions	139 x 87 mm (130 x 78.1 hole size)

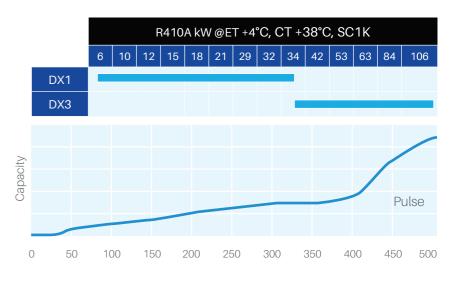


#### HMI 7" Display Ethernet Port

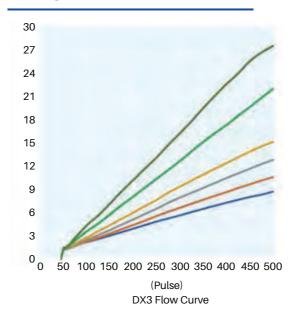
HIVII / DISPLAY ELHETHEL POIL				
543-0326-00				
12 ~ 28Vdc				
7"				
800 x 480 px				
Resistive				
Front IP65				
<8w				
16000k,24bits				
-10 ~ 60 °C				
-20 ~ 70 °C				
RS485/Enthernet				
272 x 192 mm (260 x 179 hole size)				

#### DX1

- Compact and lightweight with hermetic valve body design
- Precise expansion process control helps maintain stable system super heat
- Bi-directional flow characteristics applicable for heat pump systems
- Optimum wide modulation range enables higher integrated part load efficiency
- Optimum wide modulation range helps deliver higher integrated part load efficiency



#### DX3



#### • Two-way application design

- Two-way MOPD of 35 bar, stable control at low opening
- Low internal leakage rate, support for pump down, reduces refrigerant migration, no solenoid valve required
- Minimal forward and reverse flow backlash to avoid malignant out-of-step

#### Simple control

- Fully linear flow for easy implementation of multiple control objectives
- Qualified for a wide variety of control solutions
- Single pole motor, compatible with mainstream controllers
- High reliability design for harsh environments
- Operating temperature: 50°C ~ +70°C
- Long lifespan, high reliability: 250k cycles' reliability test

27

- Take-apart valve body

#### Sensors

Temperature	sensor	Temperature range	Standard resistance (25°C)	Cable type	Temperature sensing component packaging material	Protection grade
0	Low temperature sensor TS-110	-40 ~ 110°C	10KΩ ±1%	24AWG black	Chainless shoot	IP67
0	High temperature sensor TS-150	Sensor TS-150 -50 ~ 150°C	50KΩ ±1%	22AWG blue	Stainless steel	

Pressure	Pressure sensor		Operating voltage	Output signal	Suitable refrigerant	Full error band	Protection grade
0	Low temperature sensor PRS-30	0 ~ 30barG	- 5.0 ± 0.5 VDC	0.5 ~ 4.5 VDC	R410a, R134a, R404a, R407c, R507	±2.5% FS	IP67
0	High temperature sensor PRS-46	0 ~ 46barG					

# **Solution Packages**









Solution Packages are application sample recommendations only.

For more inquiries on
Copeland Integrated Solutions,

scan the QR code:



#### **Contact lists**

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