

# Copeland Scroll™ for R290 applications

Fixed and variable speed models

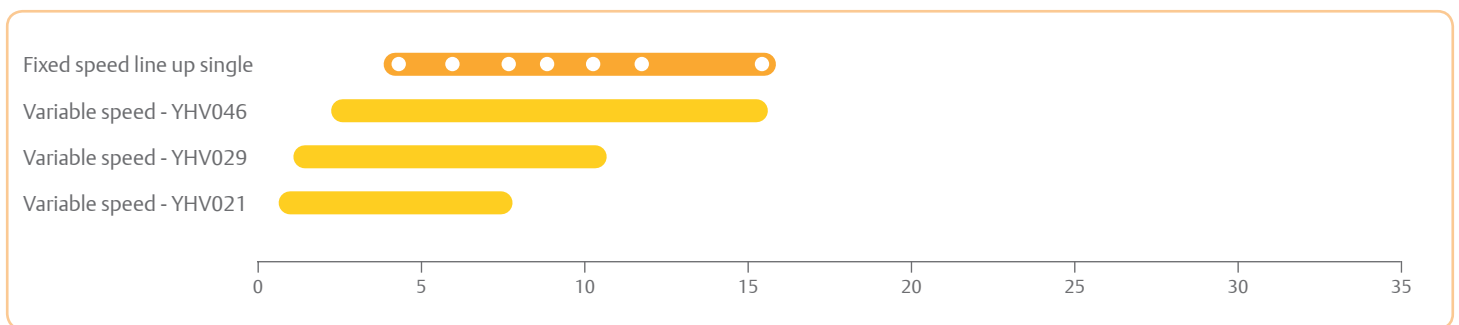
## The natural refrigerant for comfort applications

Propane (R290) is a flammable natural refrigerant which has long been known for its good performances. It has zero ozone depletion potential, negligible global warming potential, as well as excellent thermodynamic properties. R290 systems require in average half the charge of hydrofluorocarbons (HFCs). These features make R290 suitable for upcoming F-gas regulations.

Emerson is launching a full line-up of propane Copeland Scroll compressors designed for heat pump and chiller applications. This line-up meets Emerson reliability standards.



## R290 scroll compressor line-up



Heating conditions in kW: evaporating -7°C, condensing 50°C, superheat 10K, subcooling 4K

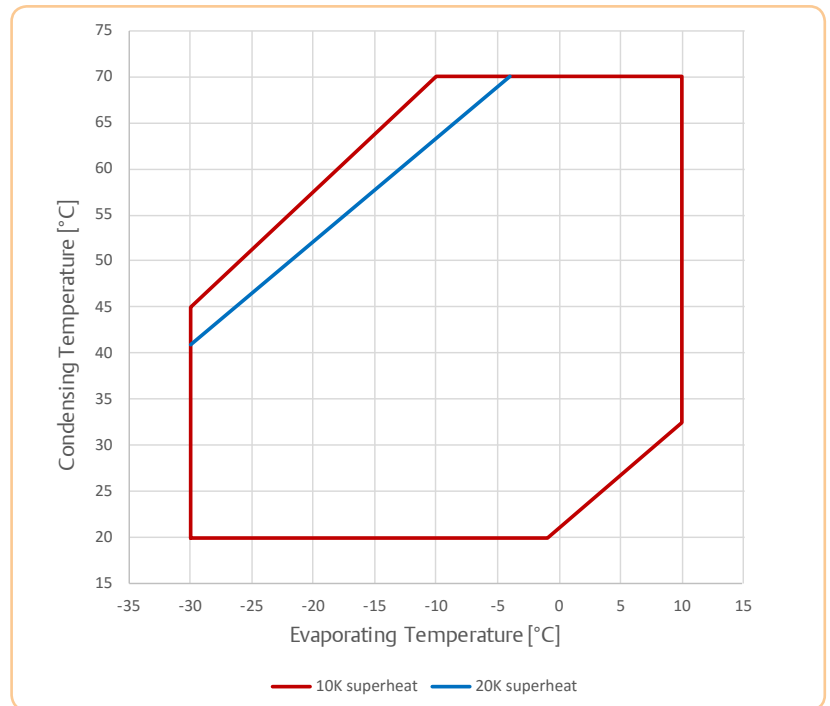
## ZH\* KCU fixed speed R290 models



### Features and benefits

- Axial and radial compliance
- Dedicated oil for propane
- IP65 (IEC 60529)
- No sight-glass, no Schrader valve
- Hermetic compressor
- Wide operating envelope

### ZH\* KCU operating envelope R290



## Fixed speed models - technical overview

Compressor		Displacement (m <sup>3</sup> /h)	Heating capacity (kW)	COP	Sound pressure @1 m (dBA) *	Length / width / height (mm)	Net weight (kg)
1 Ph	3 Ph						
ZH04KCU-PFZN	ZH04KCU-TFMN	5.8	4.4	3.2	61	243/242/364	23
ZH06KCU-PFZN	ZH06KCU-TFMN	8.0	6.2	3.2	61	243/242/406	27
ZH08KCU-PFZN	ZH08KCU-TFMN	10.0	7.7	3.3	64	243/242/419	28
ZH09KCU-PFZN	ZH09KCU-TFMN	11.7	9.0	3.2	65	247/241/438	38
ZH11KCU-PFZN	ZH11KCU-TFMN	14.4	10.9	3.3	65	247/241/438	38
	ZH13KCU-TFMN	17.1	13.0	3.3	67	250/246/450	40
	ZH16KCU-TFMN	21.4	16.0	3.3	71	250/246/450	40

\* @1m: sound pressure level at 1m distance from the compressor, free field condition

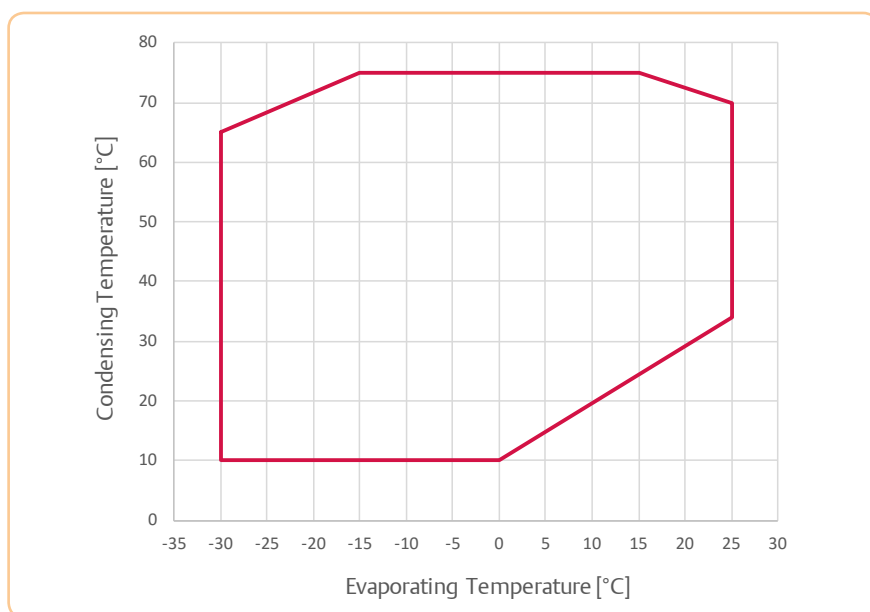
## YHV variable speed R290 models



### Features and benefits

- Axial and radial compliance as well as dedicated oil for propane for outstanding reliability
- 3 foot mounted for compactness in the unit
- Hermetic compressor, no sight-glass, no Schrader valve to reduce risk of leakage
- Wide operating envelope to cover all applications
- Compressor connection is not considered as source of ignition

### YHV operating envelope R290 (max. speed)



## Variable speed models - technical overview

Compressor									
R290	Heating capacity (kW)		COP*	Displacement (cm <sup>3</sup> )	Stub suction (inch)	Stub discharge (inch)	Oil quantity (l)	Length / width / height (mm)	Net weight (kg)
	Min	Max							
YHV0211U	1.4	7.3	3.1	21	3/4	1/2	0.7	207/198/334	14
YHV0291U	1.9	10.0	3.1	29	3/4	1/2	0.7	207/198/334	15
YHV0461U	3.4	15.7	3.2	46	3/4	1/2	1.2	207/198/384	16

Conditions: Heating kW (-7/50)

\*@nominal Speed (90Hz)

Preliminary data

Inverter drive												
Model	Matched compressor	Power input (kW)	Amps (A)	Cooling	Frequency (Hz)		Net weight* (kg)	1Ph 230V	3Ph 400V	Comm.	Length / width / height (mm)	Avail.
		Nominal	Nominal		Min	Max						
ED3011AU	YHV021	2.6	11	Air/Liquid	15	120	2.9	✓	n.a.	Modbus	205/244/143	End of 2018
ED3015AU	YHV029	3.8	15		15	120	2.9	✓	n.a.		205/244/143	
ED3020AU	YHV046	5.5	20		15	120	3.7	✓	n.a.		205/250/180	
ED3018BU	YHV029-46	6.0	18		15	120	4.5	n.a.	✓		205/250/183	

Conditions: Suction Superheat 5K, Subcooling 4K

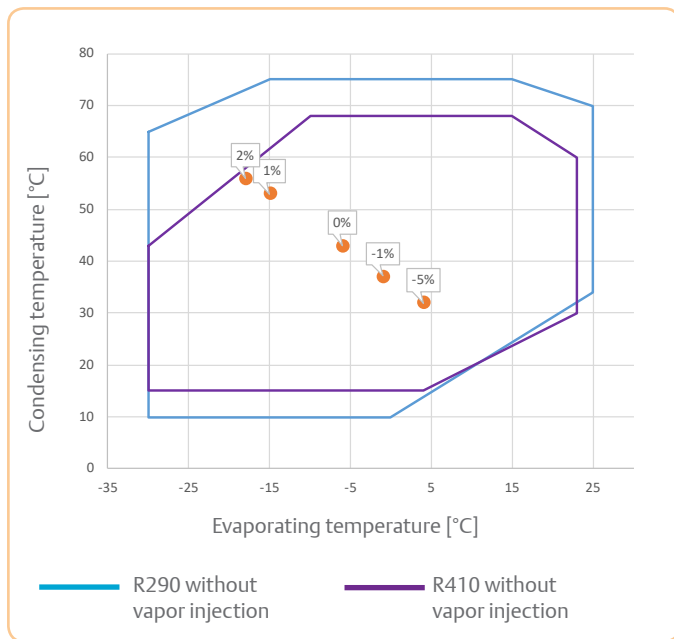
\*Air-cooled version including fins

## Comparison of R290 and R410A

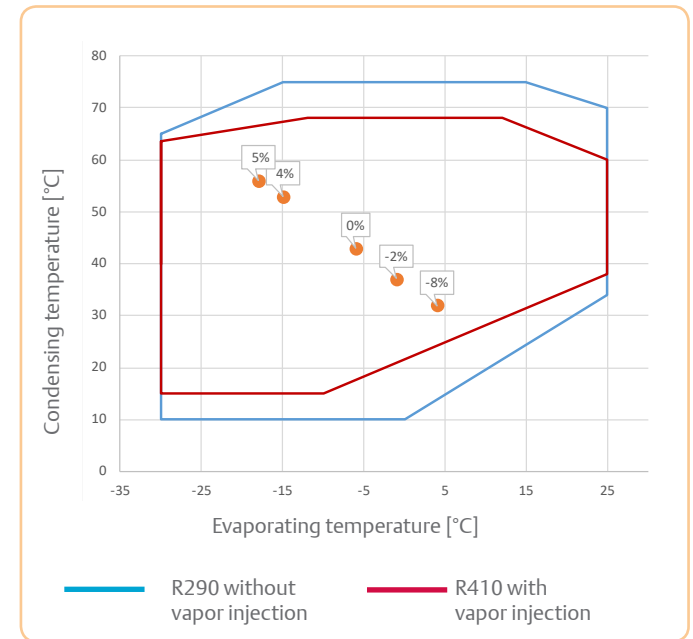
Compressors with R290 show very promising performances versus compressors with R410A, both with EVI and without. Thanks to its properties, R290 demonstrates better performances versus hydrofluorocarbons (HFCs) at higher pressure ratio. At lower pressure ratio, R290 is less efficient compared to standard HFCs. The excellent properties of R290 at high pressure ratio nearly compensate the effect of enhanced vapor injection on COP.

### Heating COP comparison

#### Comparison of R290 and R410A envelope



#### Comparison of R290 envelope (no injection) and R410A (with injection)



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