

# Copeland R290 solutions for commercial refrigeration applications



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Many end-users and equipment manufacturers are investigating ways to minimize their impact on the environment while adapting and improving their system architecture. The F-Gas Regulation is accelerating the commercial refrigeration market transition to future-proof refrigerants and improved new system architectures.

R290 (Propane) is one of the most-discussed refrigerants which has long been known for its good performance. R290 is a future-proof refrigerant with excellent thermodynamic properties and it is becoming an attractive natural refrigerant choice for distributed system architectures such as integral display cases, cold room units and centralized systems like secondary systems or refrigeration medium temperature chillers with a glycol loop.



Cold room units

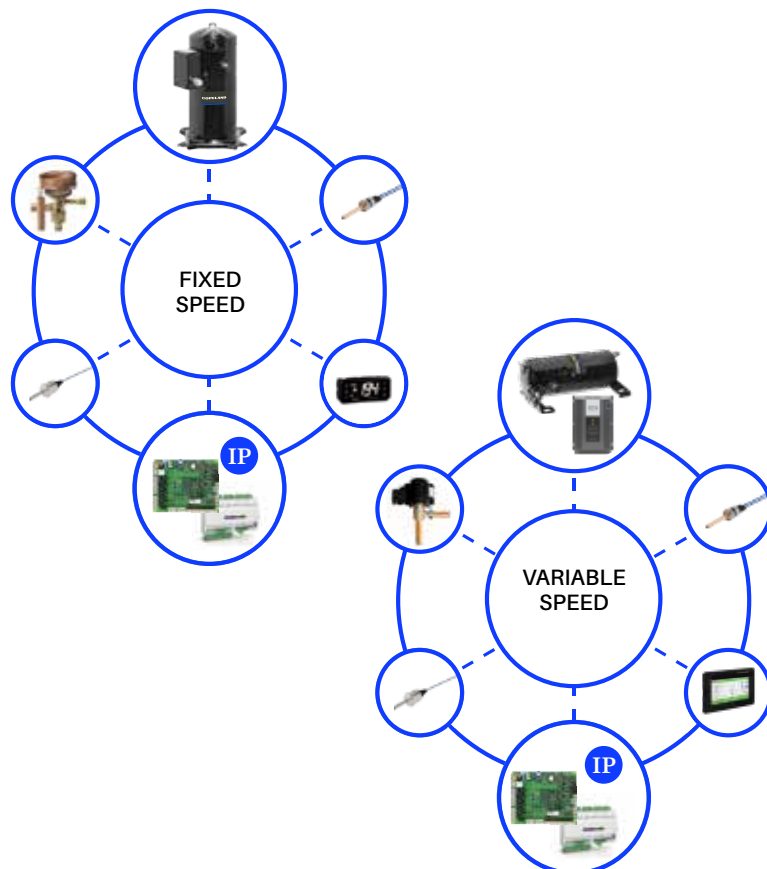


Integral display cases



Secondary systems

Copeland is investing in research and development activities in order to pro-actively support and guide the customers to go through the F-Gas transition phase. Copeland's complete R290 solutions with a broad portfolio of compressors, flow controls and system electronics address the needs of distributed system architectures and centralized systems.

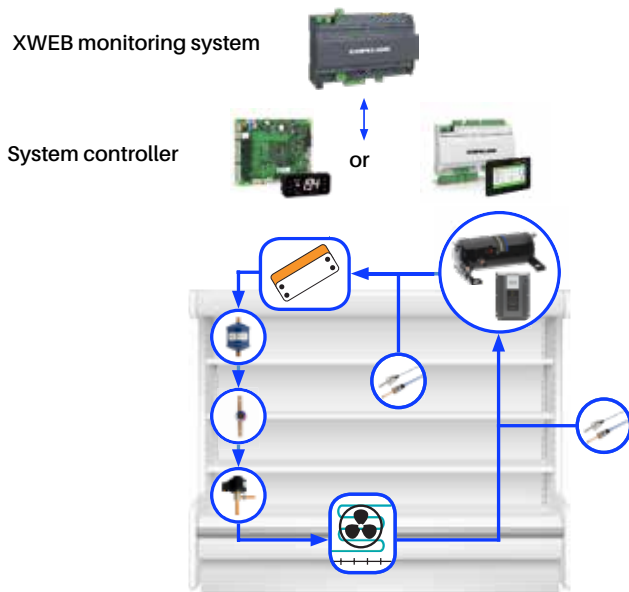


## Solutions for integral display cases

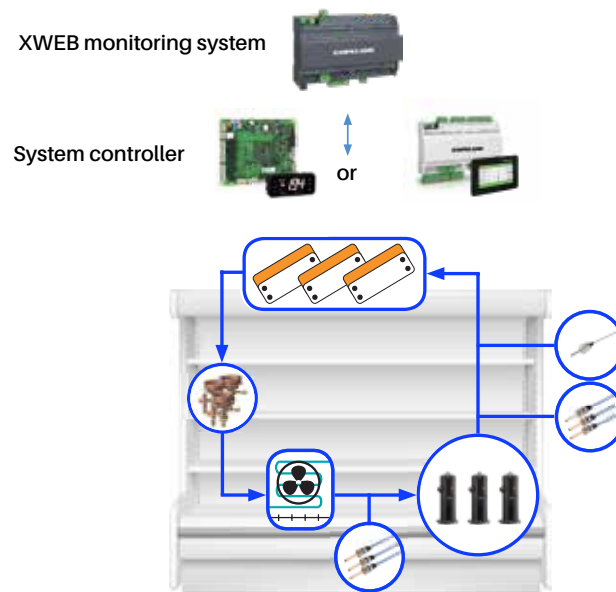
Integral display case system architecture provides several benefits such as flexibility due to plug and play type system design, reduced maintenance costs, lower environmental impact (low TEWI value) due to lower leakage rate and comparable or slightly better efficiency in comparison to centralized systems.

Integral display cases with hydrocarbons is a proven solution for low temperature applications. The self-contained display case application for medium temperature applications with hydrocarbons has also become an attractive solution.

The system design is possible using multiple circuit with below 150g charge per circuit and alternatively using single circuit with higher charge limit. Copeland R290 solutions address both applications with multiple circuit and single circuit applications.



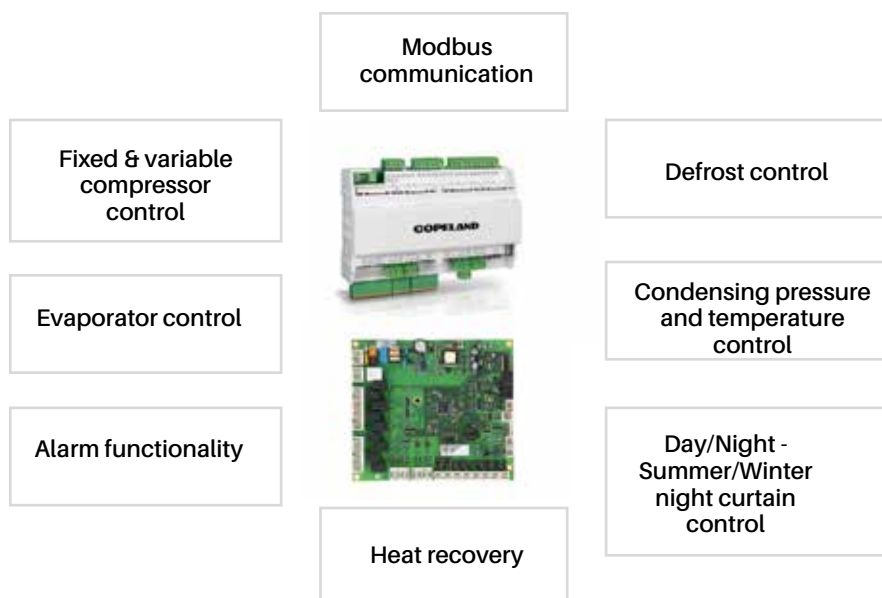
Single circuit design integral display case



Multiple circuit design integral display case

Scroll compressors offer the benefits of compactness ideal for this application and fully hermetic design guaranteeing the safety for flammable refrigerants. The ZBKAU range is suitable for integral display case medium and low temperature applications below 150g charge per limit. YBVH variable speed compressors are ideal for single circuit integral display case applications for medium temperature applications with high refrigerant charge. Copeland parametric and programmable system controllers are customized for integral display case applications in combination with flow controls, monitoring system and compressors provides the complete solution required.

## System Controller



## Solutions for cold room units

Cold room units are typically equipped with piston hermetic compressors. Scroll compressors with 3 feet compact design and significant energy efficiency benefits compared to piston hermetic design is an ideal choice for cold room units applications.

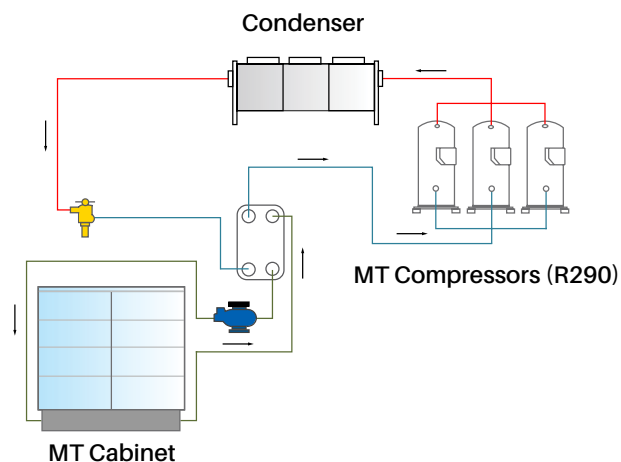
Copeland R290 scrolls with ZBKAU and ZBKCU series are suitable for both medium and low temperature applications below and above 150g applications. Compressors in combination with flow controls and monoblock controller completes the solution for cold room applications.



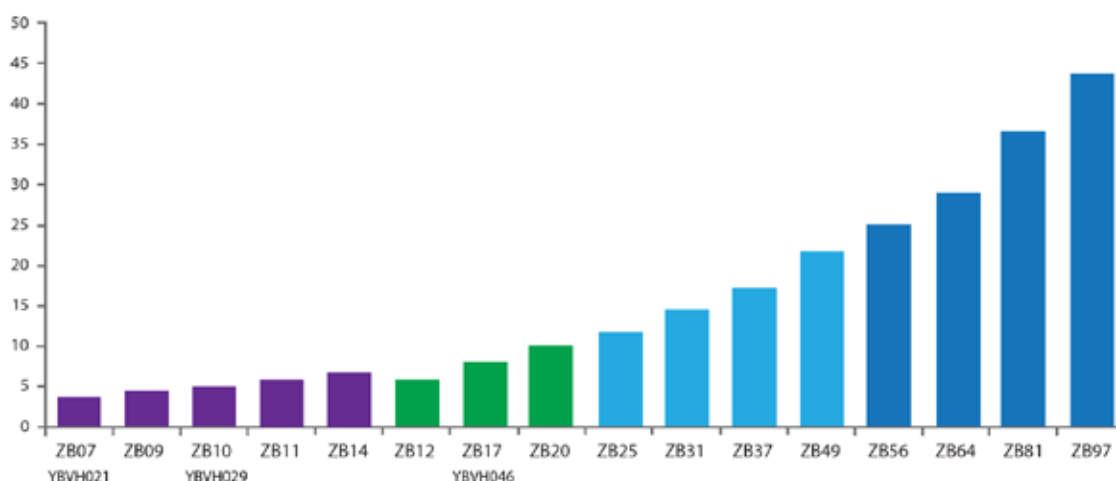
## Solutions for refrigeration secondary system

Propane is an attractive refrigerant on the high side of the secondary systems to make it completely natural. Summit range of Copeland R290 scrolls with fully hermetic scroll design is an ideal choice to avoid refrigerant leaks and safe choice for flammable refrigerants.

Summit range of compressors with 4 models provides cooling capacity range from 12 to 22kW. These compressors can be used in tandem configuration with passive oil management and also using OM3 for active oil management.



## R290 scroll overview



## ZBKAU compressors

Applications:

- Ideal for integral display case with multiple circuit design
- Packaged units for cold room applications
- Suitable for applications with low R290 refrigerant charge

Key features and benefits:

- 3-feet design with compactness and less weight
- Reduced internal free volume for below 150g applications
- High efficiency and low sound level

Compressor	Displacement (m³/h)	Cooling Capacity (kW)*
"ZB07KAU"	3.7	1.7
"ZB09KAU"	4.4	2.0
"ZB10KAU"	5.0	2.3
"ZB11KAU"	5.9	"2.8 MT / 0.9 LT **"
"ZB14KAU"	6.7	"3.3 MT / 1.1 LT **"

\* MT Conditions: -10°C Evaporating, 45°C Condensing, 10K Superheat, 0K Subcooling

\*\* LT Conditions: -35°C Evaporating, 40°C Condensing, 5K Superheat, 0K Subcooling



ZBKAU



## **ZBKCU compressors**

Applications:

- Ideal for small cascade and secondary systems
- Packaged condensing units for cold room applications
- Suitable for applications for high R290 refrigerant charge

Key features and benefits:

- Fully hermetic scroll design – safe for flammable refrigerants
- ATEX compliance
- Flexibility to use for medium and low temperature applications

Compressor	Displacement (m³/h)	Cooling Capacity (kW)*
ZB12KCU	5.8	2.9
ZB17KCU	8.0	4.0
ZB20KCU	10.0	5.0
ZB25KCU	11.7	5.9
ZB31KCU	14.4	7.3
ZB37KCU	17.1	8.6
ZB49KCU	21.4	10.8

\* MT Conditions: -10°C Evaporating, 45°C Condensing, 10K Superheat, 0K Subcooling



**ZBKCU**

## **YH1G compressors**

Applications:

- Ideal for R290 secondary systems and refrigeration chillers
- Suitable for cascade systems

Key features and benefits:

- Compactness and less weight
- Single compressor and multiple compressor applications
- High efficiency and reduced noise

Compressor	Displacement (m³/h)	Cooling Capacity (kW)*
YH23K1G	29.2	14.2
YH28K1G	35.4	17.3
YH33K1G	42.4	20.9
YH38K1G	48.3	23.9

\* MT Conditions: -10°C Evaporating, 45°C Condensing, 10K Superheat, 0K Subcooling



**YH1G**

## YBVH compressors

Applications:

- Ideal for integral display case with single circuit design
- Packaged condensing units for cold room applications
- Suitable for applications with high R290 refrigerant charge

Key features and benefits:

- Compact and lightweight
- Extremely low height - less than 190 mm
- High efficiency and low sound level
- Plug and play inverter with large inverter modulation range



YBVH and ED3 Drive

Compressor	Displacement (m³/h)	Cooling Capacity (kW)*
YBVH021	21	2.3 kW @ 86Hz
YBVH029	29	4.7 kW @ 86Hz
YBVH046	46	7.0 kW @ 86Hz

\* MT Conditions: -5°C Evaporating, 45°C Condensing, 10K Superheat, 0K Subcooling

## Flow controls for R290 applications

Products for use in Zone 2 according to ATEX definition	
Product Description	Model
Electronic Expansion Valves	EX4-7...FLR
Electrical plug and cable assembly for EX Valves	EXV-M06 FLR
Pressure Transmitter	PT5N...FLR
Pressure Switch	PS4...ATEX
Coil for Solenoid Valve	ESC-EX24VAC ATEX ESC-EX230VAC ATEX
Additional Products for Non ATEX environment	
Product Description	Model
Electronic Expansion Valves	EXM / EXL
Superheat Controller with EX Valves	EC3-P32 / -P33
Superheat Controller with EXM/L Valves	EXD-HP1
Non-electrical operating device without potential of electrostatic charge	
Product Description	Model
Thermo Expansion Valves	TIH-P...FLR
Solenoid Valves (without coil)	200RB...FLR
Filter Driers	ADK...FLR
Moisture Indicator	MIA...FLR



For more details, see [copeland.com/en-gb](https://copeland.com/en-gb)

Copeland Europe GmbH  
Pascalstrasse 65 - 52076 Aachen, Germany  
Tel. +49 (0) 2408 929 0 - Fax: +49 (0) 2408 929 570 - Internet: [copeland.com/en-gb](https://copeland.com/en-gb)  
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