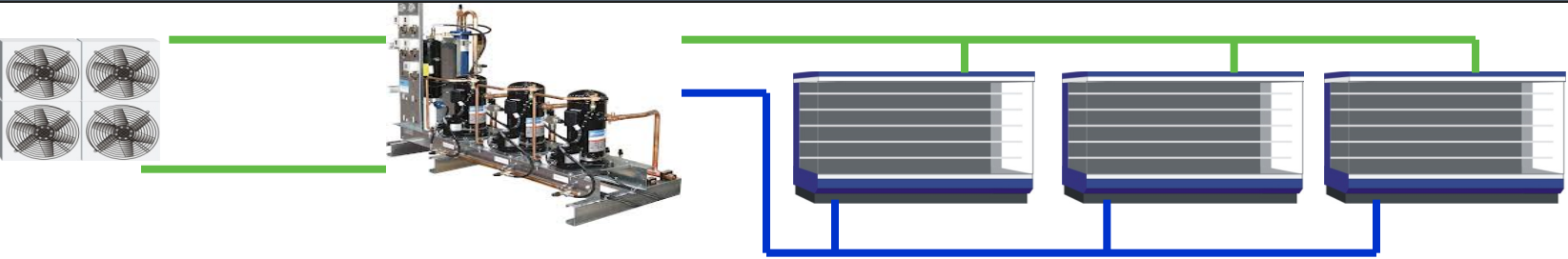


Natural Refrigeration with Hydrocarbons Emerson's R290 Solutions

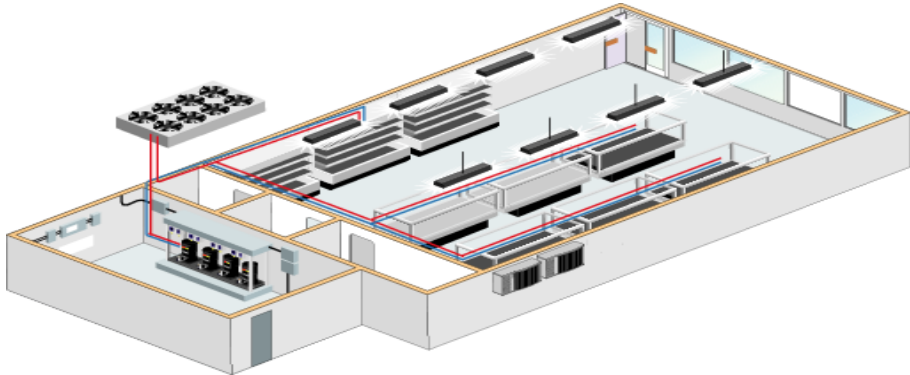
Atmosphere Conference 2016
20/04/2016, Barcelona

Hydrocarbons - Favouring Reduced Charge & Indirect Systems

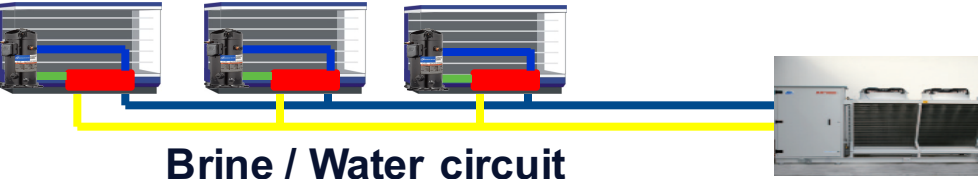
Traditional Rack Refrigeration Circuit



Refrigerants: HFC, CO2
Application: MT and LT



Self Contained Display Case Solution

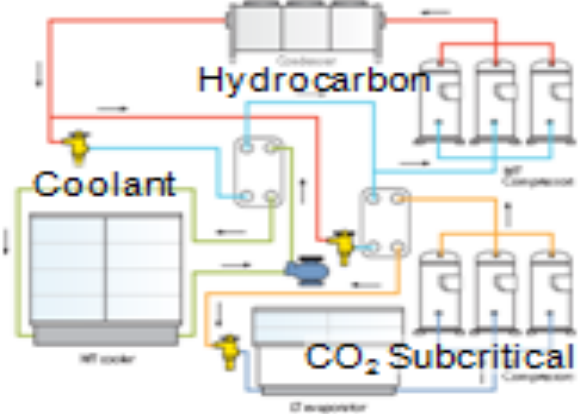


Refrigerants: Hydrocarbons (or HFO's)
Application: MT

All Display Case Manufacturers



Hydrocarbon Chiller Indirect

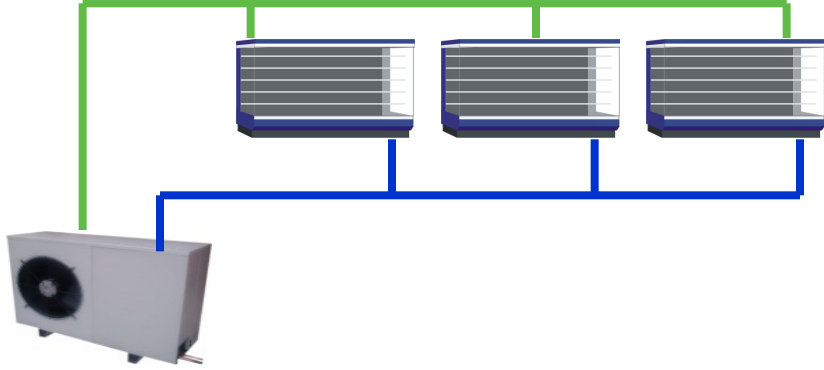


Refrigerants: Hydrocarbons & CO2
Application: MT (HC) & LT (CO2)

Chiller / Special Systems Manufacturers



Multi-Evaporator Concept Unit



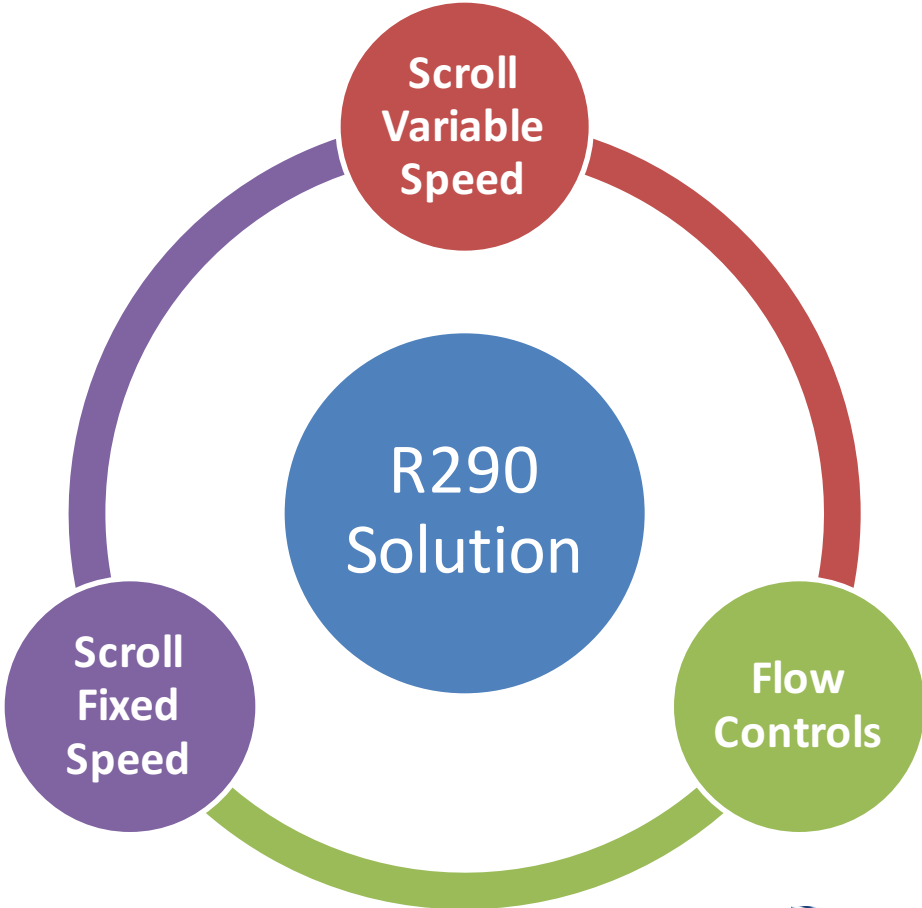
Refrigerants: Hydrocarbons, CO2
Application: MT (HC), LT (CO2, HC)

Units / Display Case Manufacturers

Emerson R290 Solution Offering

Fixed Speed Scroll

- 7 Displacements
- 3 to 11 kW at MT
- Fully Hermetic Design
- ATEX Zone 2 certified
- Single and Multiple



Variable Speed Scroll

- 2 Displacements
- 1 to 6 kW at MT
- Optimized Inverter
- 2000 to 7000 RPM Speed
- High versatility

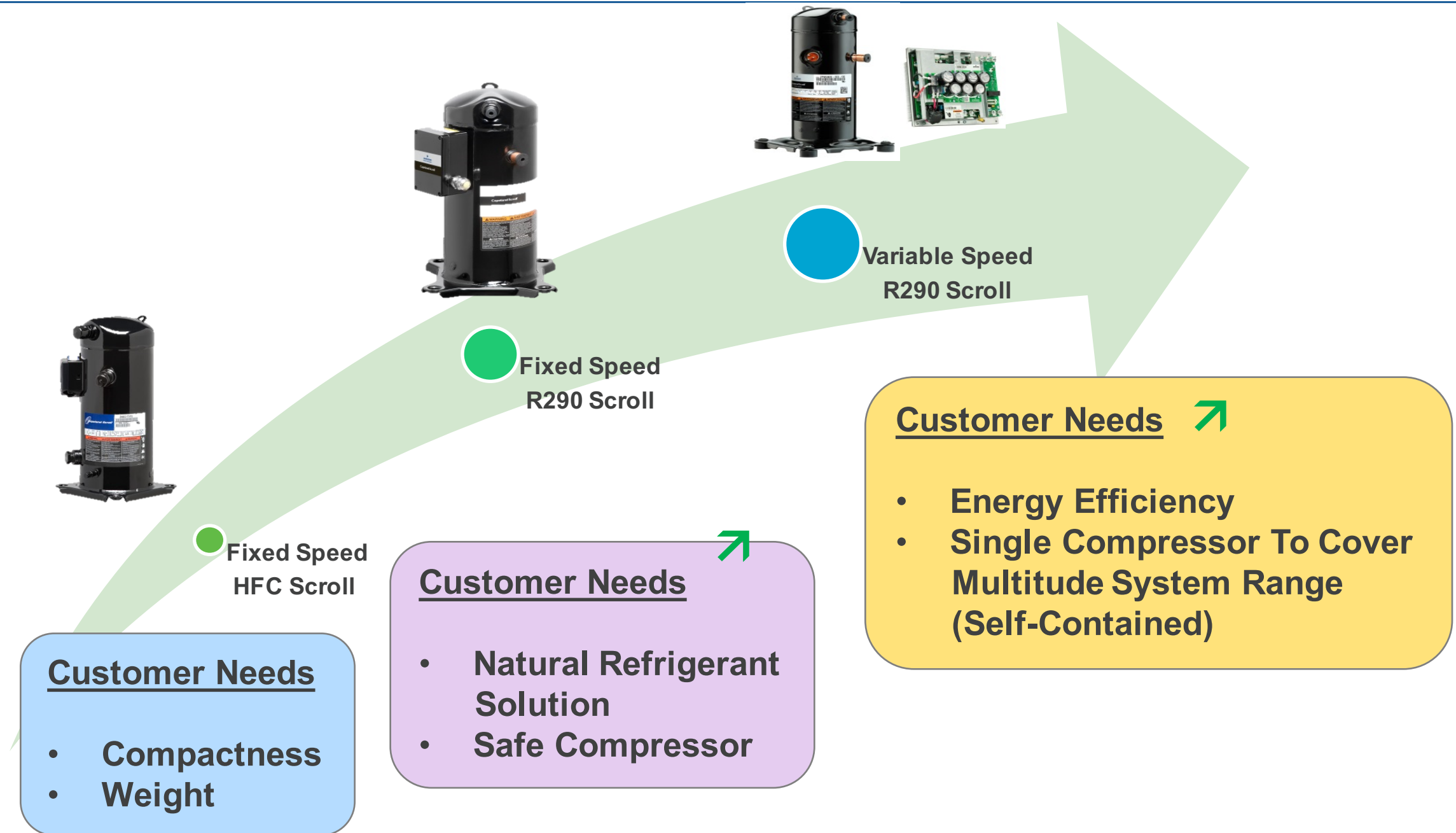


System Flow Controls & Electronics

- Full range of controls
- Expansion Valve, Pressure switches, Pressure transmitters



Customer Needs Are Evolving With F-Gas & Emerging New System Architectures



Key Benefits of R290 Scroll Compressors

**Compact And Less Weight
(Ideal For Self-Contained Cases And Refrigeration Chillers)**

**Full Hermetic Design –
(Best Choice For Flammable Refrigerants)**

IP65 Terminal Box
(Dedicated Design For R290)

Option For Tandem Configuration
(Cascade & Ref Chillers)

**Quiet Compressor
("Worry Free" Applications)**

Nameplate Location
(Ease Of Application)

Possibility To Mount OM3 Active
Oil Management
(Ref Chiller Applications)

Same Footprint
(Replacement Ease)

Dedicated Oil For Propane

**High Efficiency
(Low Running Costs)**

**Regulatory Compliance - ATEX Class II Certified
(Safe Compressor)**

Made Possible by EMERSON's Technologies

R290 Fixed Speed Scrolls for Different Applications

Model	Displacement (m3/h)	Cooling Capacity* (kW)	ATEX	Applications
ZB07KAU	3,7	1,6	No	<150g Cold Room, Display Cases, Food Service
ZB09KAU	4,3	2,0		
ZB10KAU	5,0	2,3		
ZB12KCU	5,8	2,8	Yes	>150g Display Cases, Small Chillers, Small Cascade
ZB17KCU	8,0	3,8		
ZB20KCU	10,0	4,8		
ZB25KCU	11,7	5,7	Yes	>150g Display Cases, Small Chillers, Small Cascade
ZB31KCU	14,4	7,0		
ZB37KCU	17,1	8,3		

* -10°C Evaporating, 45°C Condensing, 10K Superheat, 0K Subcooling

R290 Variable Speed Scroll Product Scope and Target Applications

• Product Scope

- 2 displacements 21cc and 29cc with a wide modulation range
 - ZBV021: 3kW @ 5000 RPM (86Hz), -10°C Evap , 45°C Cond, SGRT 20°C, Subcooling 0K
 - ZBV029: 4.2kW at 5000 RPM (86Hz), -10°C Evap, 45°C Cond, SGRT 20°C, Subcooling 0K
- Modulation Range 30 to 117Hz
- Tandem Ready or Active Oil Management With OM3
- Compressor and Drive solution

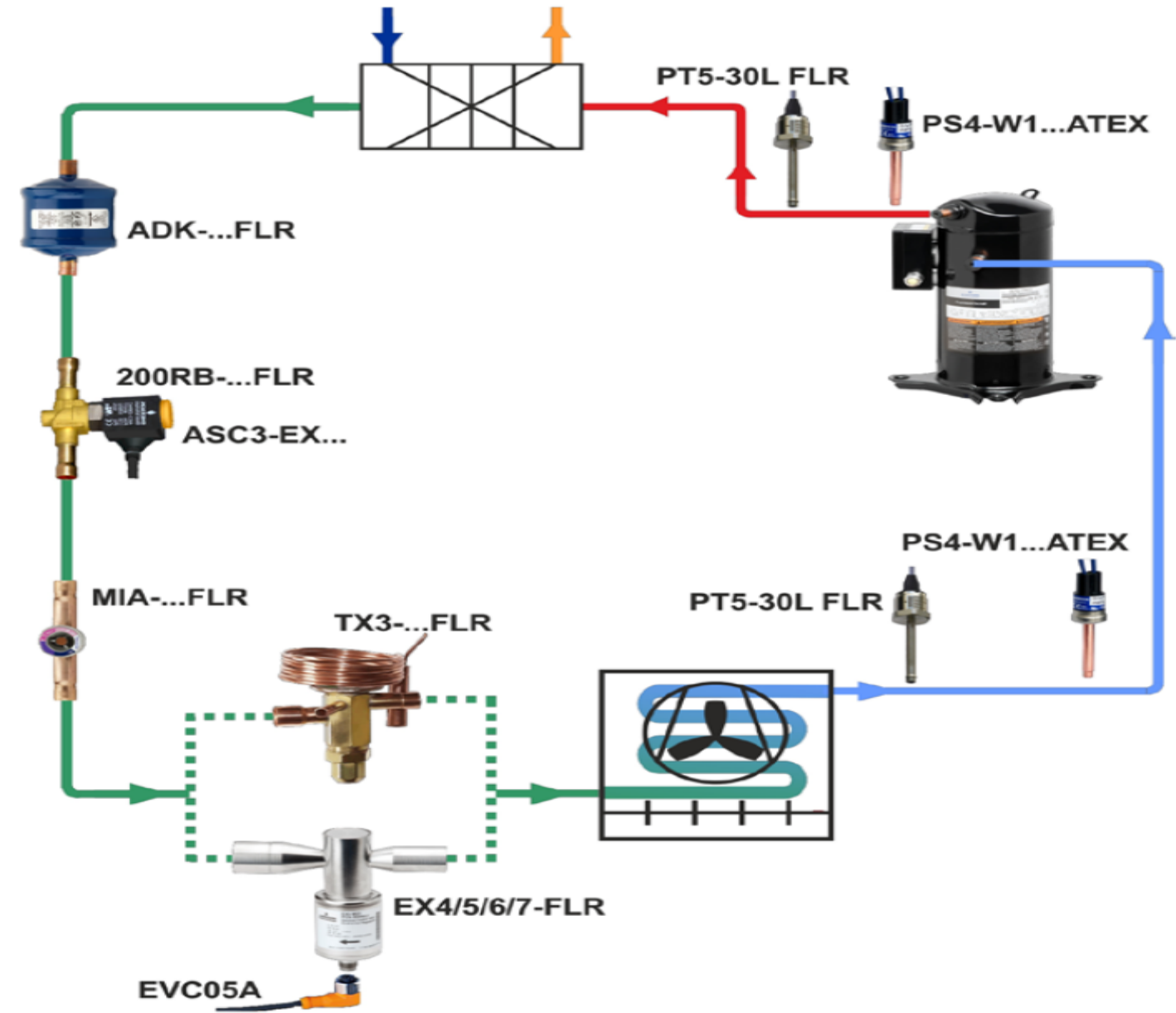


• Applications

- Self-contained display case applications
- Cascade systems & R290/Water-Glycol secondary systems
- Condensing units and Monoblocks

Flow Controls Product Offering for R290 Applications

Products for use in Zone 2 according to ATEX definition		
Product Description		Status
Electronic Expansion Valves	EX4-7-...FLR	Released
Electrical plug and cable assembly	EVC05A	Released
ThermoTM - Expansion Valves	TX3-...FLR	Released
Solenoid Valves	200RB-...-FLR	Released
Solenoid Valve Coil	ASC3-EX-24VAC ASC3-EX-230VAC	Released
Pressure Transmitter	PT5-...-FLR	Released
Pressure Switch	PS4-...ATEX	Released
Filter Driers	ADK-...FLR	Released
Moisture Indicator	MIA-...-FLR	Released
Products for non explosive environment		
Product Description		Status
Superheat Controller	EC3-P32 / -P33	Released
Oil Management TraxOil	OM3-020P	Released
Compressor Soft Starter	CSS-25U / CSS-32U / CSS-32W	Released
Electronic Expansion Valves	EXM/EXL	Released



System Electronic Controllers

Market Trend – New Gases and Energy Efficiency



Market Applications

Vertical and horizontal
plug-in & service
counters

Market Trends

Energy Efficiency
Increased use of R290
and R600a
Variable speed
compressor solutions
New label classifications

Our Proposal

XRi77CH
XWi70K



XRi77CH



XWi70K





XRi77CH & XWi70K

Plug-In and Service Counters Solutions

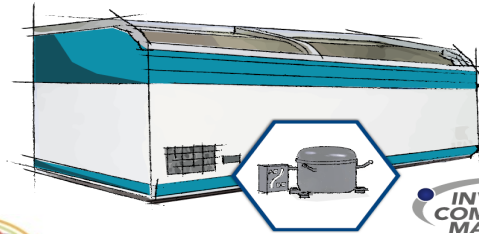
Controllers for Bottle Cooler Applications

- Static Coolers
- Ventilated Coolers
- Open or Night Curtain Coolers
- Street Coolers



Controllers for Cabinets with Variable Speed Compressor

- Service Over Counter
- Vertical Open or Closed
- Horizontal Open or Closed



INVERTER COMPRESSOR MANAGEMENT



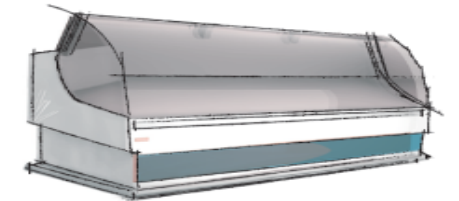
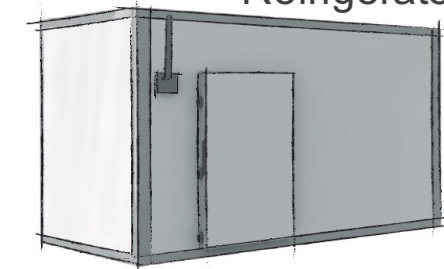
Frequency and Serial Control



Frequency Control

Controllers for Refrigerated Applications

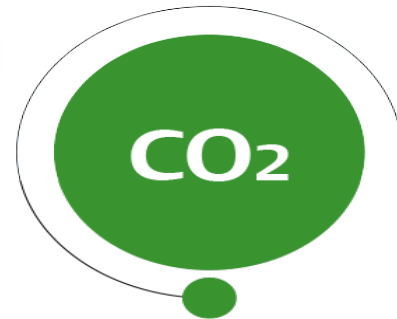
- Ice Cream Freezers
- Pastry Refrigerators
- Cold Rooms
- Warming Cabinets
- Refrigerated Cabinets
- Wine Cellars
- Showcases
- Refrigerated Counters



XRB Enhanced



Bottle, Beer and Wine Coolers



- XRB30CH (2 relays)
- XRB60CH (3 relays)
- XRB70CH (4 relays)

FEATURES & BENEFITS

- Advanced energy algorithms
- Autotuning algorithm
- Defrost optimization
- CO2 cabinet support
- Multiple configurations (maps)
- Automatic extra cooling
- Real Time Clock (optional)
- Service counters (relay activation, working hours)
- Upgradable firmware
- Serial communication (Modbus)

HARDWARE

- 2 to 4 configurable relay
- 20 AMP relay available
- 1 Serial TTL port
- Up to 4 temperature probes
- Up to 2 digital inputs
- 3 digit display (red, blue or white)
- 6 buttons



XC Series for Racks - XM600 Series for Cases

Retail solution



Thank You
