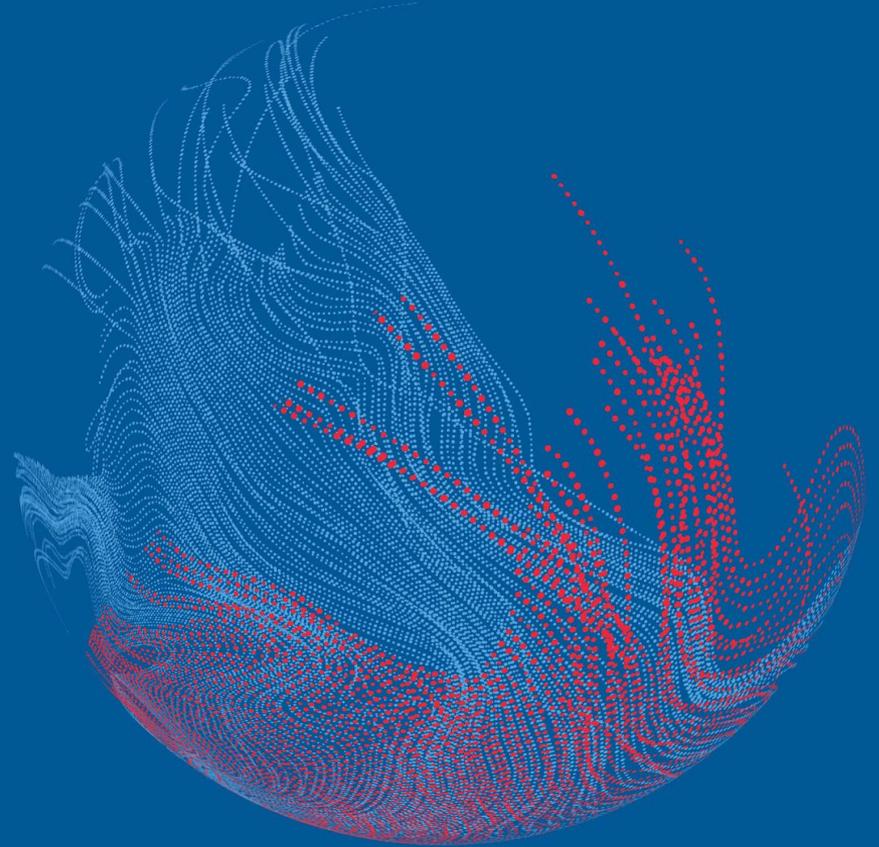




Business Case for
Natural Refrigerants

June 7-8, 2022
Washington D.C.





The Advantage of Variable Speed and Natural Refrigerants in Food Retail Applications

Embraco | Hussmann

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The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications

We are Nidec Global Appliance, a global partner for home and commercial appliances industries



HQs: Joinville (Brazil) and Pordenone (Italy).



12,000+ employees.



80+ countries served by our products.



12 manufacturing plants and 4 business offices across 9 countries.



7 R&D Centers worldwide and **500+ engineers**.



Annual production capacity of **80 million** motors and compressors.

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The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications

HUSSMANN® Promises to continuously provide the most customer-focused solutions in the Food Retailing Industry



HQ: Bridgeton, MO, USA;
Part of Panasonic



~6,000
employees.



11 manufacturing facilities
North America and APAC



Over 1,200 certified service
and installation technicians



7 R&D Centers worldwide



Over a century of
innovation and quality

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The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications

Scenario

New Legislation for Commercial Systems: requires sustainable solutions with high energy efficiency

Market Needs

Flexible and efficient solutions that meet new regulation requirements and sustainability goals

Proposed Solution



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The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications

Project Targets

- Baseline system used a fixed speed R290 compressor
- Cabinets were converted to variable speed R290 compressor
- New system still complied with the 150 gram limit

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The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications

Case Study Parameters

Application: Grab n Go cases

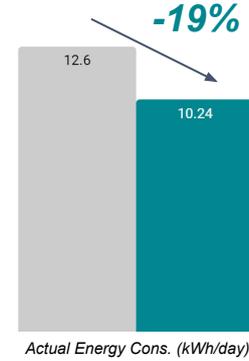


	VRL2B	VRL2B1A
Compressor	NT2180UV	FMFT413U
Refrigerant	R290	R290
Charge per circuit	150 g	110 g
Type	Fixed Speed	Variable Speed
Defrost	Electric	Hot Gas
Evaporator	Al / Al	Cu / Al
Condenser	Steel Tube	Microchannel
Input Power	208 - 230V 60 Hz	115V 60 Hz

Case Study Results

Energy Consumption

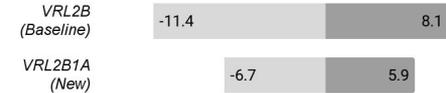
19% of energy consumption reduction.



Actual Energy Cons. (kWh/day)

Temperature performance

35% less variation in product temperatures, ensuring better food preservation and reducing energy consumption.



Cabinet met E-STAR certification requirements

The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications

Case Study Parameters

Application: Grab n Go cases

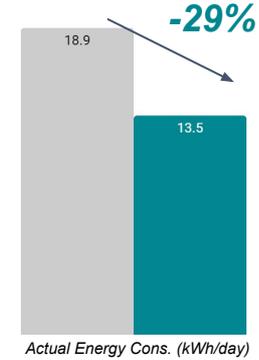


	VRL3B	VRL3B1A
Compressor	NT2160UV x 2	FMFT413U x 2
Refrigerant	R290	R290
Charge per circuit	150 g x 2	90 g x 2
Type	Fixed Speed	Variable Speed
Defrost	Electric	Hot Gas
Evaporator	Al / Al	Cu / Al
Condenser	Steel Tube	Microchannel
Input Power	208 - 230V 60 Hz	115V 60 Hz

Case Study Results

Energy Consumption

29% of energy consumption reduction.

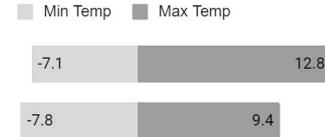


Temperature performance

13.5% less variation in product temperatures, ensuring better food preservation and reducing energy consumption.

VRL2B (Baseline)

VRL2B1A (New)



Cabinet met E-STAR certification requirements

The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications

Significant results even using the same refrigerant

Less than 2 years of payback considering the energy consumption reduction



Reduced
4,376 kg
of CO₂e per unit/ life cycle



Reduced
10,013 kg
of CO₂e per unit/ life cycle

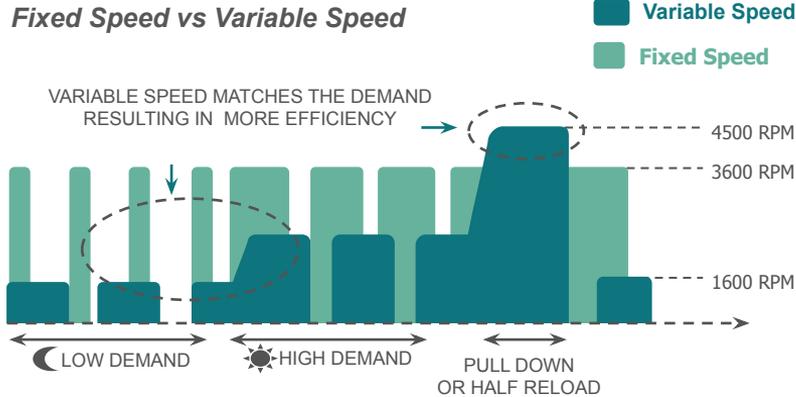
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Reducing energy consumption is the most effective way to reduce the greenhouse gas emissions from a refrigeration system

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The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications

The variable speed technology **adjusts to the demand required by the refrigerator**, resulting in considerable energy consumption reduction compared to single speed compressors



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Benefits



Energy Efficiency



Low noise & vibration



Wide Voltage range



Food Freshness



Temperature Stability

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The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications

EMBRACO Smart Drop-In

The right tool to leverage migration from fixed to variable speed technology



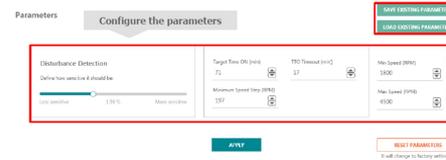
Smart Drop-in is an advanced inverter control logic which allows:

- Customization of the control routine according to the cabinet
- Specific parameters according to your needs
- Optimization of performance and energy saving
- Use of standard ON/OFF thermostats

Update your compressor

Use the standard Fixed Speed thermostats

Adjust the parameters according to your needs



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The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications

HUSSMANN® Variable Speed Portfolio



VRL



FNGSC-A



ISMGG2DAA



SHM-A



GSVM-A



MD4060DA



BNKR



VRM



MDN-BA/SA



MNGSC-A

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HUSSMANN® Propane for Variable Speed Consideration

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The Benefits of Variable Speed and Natural Refrigerants in Food Retail Applications



Future Proof Solutions to lower total cost of ownership in food retail applications



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**Thank you
for listening!**

