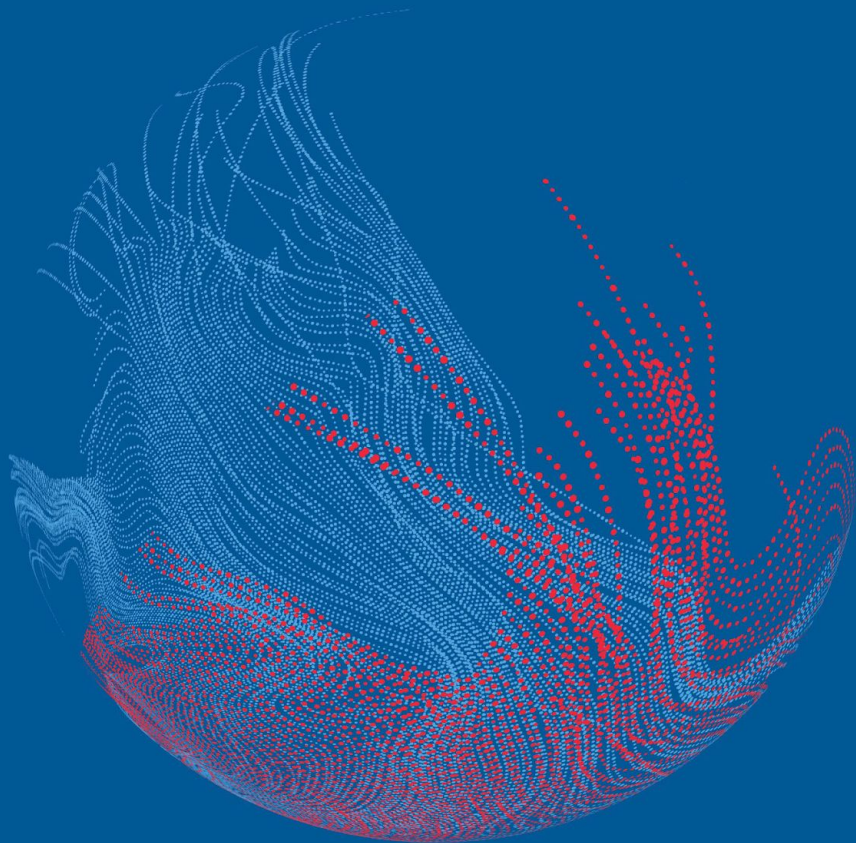




Business Case for
Natural Refrigerants

June 7-8, 2022
Washington D.C.





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

Embraco | Hussmann

#GoNatRefs



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

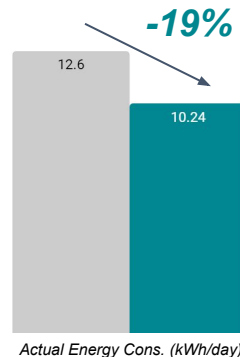


	VRL2B	VRL2B1A
Compressor	NT2180UV	FMFT413U
Refrigerant	R290	R290
Charge per circuit	150 g	110 g
Type	Fixed Speed	Variable Speed
Defrost	Electric	Hot Gas
Evaporator	Al / Al	Cu / Al
Condenser	Steel Tube	Microchannel
Input Power	208 - 230V 60 Hz	115V 60 Hz

Case Study Results

Energy Consumption

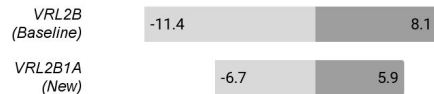
19% of energy
consumption reduction.



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

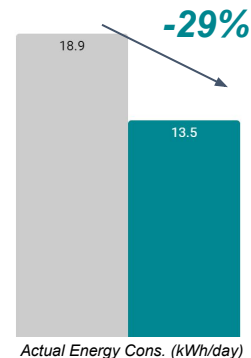


	VRL3B	VRL3B1A
Compressor	NT2160UV x 2	FMFT413U x 2
Refrigerant	R290	R290
Charge per circuit	150 g x 2	90 g x 2
Type	Fixed Speed	Variable Speed
Defrost	Electric	Hot Gas
Evaporator	Al / Al	Cu / Al
Condenser	Steel Tube	Microchannel
Input Power	208 - 230V 60 Hz	115V 60 Hz

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.



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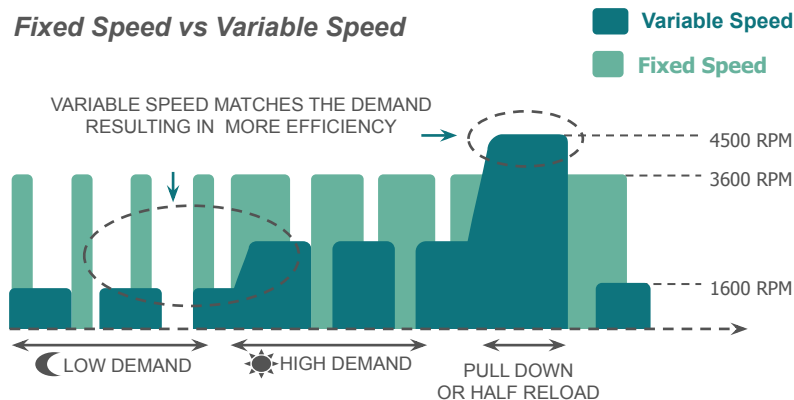
Reducing energy consumption is the most effective way to reduce the greenhouse gas emissions from a refrigeration system

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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

Fixed Speed vs Variable Speed



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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

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

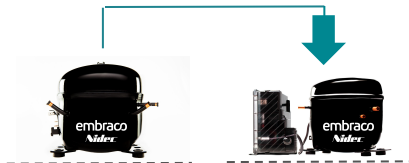


EMBRACO Smart Drop-In

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

Parameters

Configure the parameters

Save existing parameters
Load existing parameters

Disturbance Detection Define how severe it should be 100% (factory) 1.00% (factory) More sensitive	Target Box On (min) 75	TSD Timeout (min) 17	Min Speed (RPM) 1800
	Minimum Speed (RPM) 1800	Max Speed (RPM) 4000	

Apply

Reset parameters
It will change to factory settings

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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

embraco
Nidec



HUSSMANN®



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



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Thank you for listening!

