

# VECTOR™ Series

Smarter Thinking



**10** YEAR  
**VECTOR**  
ANNIVERSARY



# SIMPLER, SMARTER TECHNOLOGY. SIMPLY SMARTER THINKING.

## CARRIER FIRST BROKE THE PERFORMANCE BARRIER IN 2006

with the introduction of Vector™, the first and only trailer refrigeration system powered by true hybrid technology.

Featuring patented E-Drive™ all-electric technology, the innovative Vector series offers advances in every key category that affects your business. Lower fuel consumption. Reduced maintenance cost. Cleaner emissions. Lower noise. And most important, total lower cost of ownership.

The Vector platform's truly innovative engineering presents a genuine opportunity to better manage your business.

## NOW CARRIER CROSSES THE NEXT THRESHOLD

with the Vector Tier 4-compliant trailer refrigeration platform.

By combining significant gains in overall efficiency with emissions compliance, Carrier transforms compliance with Tier 4 emissions standards into a comprehensive strategy for refrigerated fleets.

The result: outstanding reliability and remarkable efficiency that deliver peace of mind and an improved bottom line—all backed by a dealer network dedicated to exceeding your expectations.

The Carrier Vector series.  
Simply smarter thinking. Simply smarter decision.

# VECTOR™

## RELIABLE DESIGN. RESPONSIBLE CHOICE.

Proven reliable platforms, enhanced using a straightforward, practical approach to deliver compliance at a lower total cost of ownership.

## TURNING COMPLIANCE INTO OPPORTUNITY.

Different businesses require different solutions. That's why Carrier offers what you need, when you need it. Choose from a variety of innovative technologies that best suit *your* business.

## INNOVATIVE ENGINEERING. INTELLIGENT SOLUTION.

Patented high-efficiency designs deliver significant fuel savings *plus* other benefits including higher cooling capacity, faster pulldown, quieter operation, reduced weight, and less maintenance.

## SIMPLY BETTER.

Sustainable solutions to strengthen business intangibles such as driver comfort, technician familiarity, and greater uptime. All to improve *your* bottom line.

# TURNING TIER 4 COMPLIANCE INTO A BETTER BUSINESS MODEL.



Opportunity

Daily challenges and many intangibles affect your fleet's bottom line. Securing bottom-line results calls for more than highly efficient Tier 4 equipment platforms. It calls for highly intelligent Tier 4 business solutions.

In today's regulatory environment, our straightforward Tier 4 approach not only ensures compliance, it presents a real asset to help streamline your operation. And it's environmentally responsible to help meet your sustainability goals.

All to help you control intangibles. So you can manage more profitably.

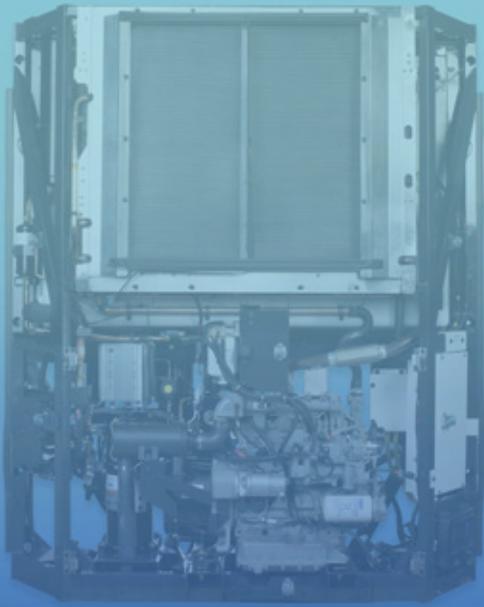
**EQUIPMENT UPTIME:** Practical, simple solutions based on proven platforms maximize reliability to help you run your fleet more efficiently and deliver on time, every time.

**DRIVER RETENTION:** Simple user interface aids driver familiarity and reduces training. Quieter running systems increase driver comfort.

**REDUCED OVERHEAD:** Powerful diagnostics speed troubleshooting, reduce technician training time, and increase efficiency. Standardized parts reduce inventory.

**UNMATCHED PRODUCT SUPPORT:** Rigorous factory-certified technician training, critical parts stocking at 180 locations, and 24/7 service. The Carrier dealer network is Tier 4-ready.

# DEPENDABILITY IS BUILT IN BECAUSE OF WHAT IT'S BUILT ON.



Reliability

Running any business involves taking risks. Operating your reefer equipment shouldn't be one of them. Our design philosophy puts reliability above all else.

For years, Carrier has driven innovation by introducing efficient, forward-thinking platforms. So we didn't need to start over. Instead, our engineers chose to leap ahead.

The Vector system's exclusive architecture uses a high-output generator to power all-electric components. The system can turn individual components — such as the compressor and fans — on and off. It runs only what it needs to run, only when it needs to — so components run fewer hours and last longer.

What's more, the unique all-electric architecture eliminates most maintenance items that can nickel-and-dime a fleet, or worse, cause extended downtime and expensive repairs.

Put another way, if a part isn't there, it can't break. And if it can't break, you never have to fix it.





**E-DRIVE™**

# ALL-ELECTRIC EFFICIENCY DEFINED. NOW REFINED.

One main switch doesn't turn on every light in your house. That would waste energy. And increase cost. That's no way to run your reefer system either.

With E-Drive™ all-electric technology, the Vector system has the unique ability to turn individual components on and off—including the compressor. It's a system that defines efficiency.

For example, Vector units use electric heat. So, during the heating mode, the unit shuts off the compressor and lightens the load on the engine. That saves 25% to 40% on fuel compared to other platforms.

Electric standby is another way to save. It's designed into the Vector platform as a standard feature. When plugged in, fleets can also save up to 70% on operating costs versus diesel operation.

By introducing a highly efficient, fully hermetic scroll compressor, the new Vector series features a higher performance-to-power ratio. Vector also includes the Carrier APX™ Control System, which uses enhanced power-management algorithms to communicate with a smarter engine. This ensures that components work in harmony instead of isolation, for maximum efficiency.

Vector with E-Drive technology. It defines efficiency to the letter.

## Vector series delivers:

**20% lower**  
required engine power.

**25% to 40% less**  
fuel used in heat mode.

**Up to 70% lower**  
operating cost using  
electric standby.

Performance data compared to the Carrier Transcold models they replace and dependent on a range of operational settings, environmental conditions, and model type.



**210 pounds**  
lighter unit weight.



*Previous Design*



**VECTOR** Series

**5% to 30%**  
higher BTU-per-  
gallon efficiency.



# REDUCED HORSEPOWER. UNBRIDLED COOLING PERFORMANCE.

The Vector series is designed to surpass other platforms while using less engine power. Its patented all-electric architecture gives it the unique capability to turn individual components on and off to deliver enhanced performance and greater fuel efficiency.

The Vector Tier 4 platform features a smarter large-displacement 2.2-liter engine equipped with enhanced sensors and an electronic control module. The engine continually communicates with the APX Control System to optimize performance and eliminate wasted power.

The result is a paradigm shift in transport refrigeration: the first ultra-high-efficiency platform that generates higher performance while using significantly less power. Vector's engine operates using fewer run hours at lower speeds, increasing durability and reliability.



# VECTOR FUEL SAVINGS\*



- Up to **26%** lower fuel consumption over a full range of operating conditions.

\*Based on: 2,000 hours/year • 0.75 gallons/hour • \$4.00/gallon • 15% efficiency gain

## Vector series also delivers:

- Up to **4%** higher cooling capacity.
- Up to **14%** less engine run time during automatic start/stop operation.

Performance data compared to the Carrier Transcold models they replace and dependent on a range of operational settings, environmental conditions, and model type.





## WHAT MAKES VECTOR DIFFERENT MAKES A REAL DIFFERENCE.

The Vector platform offers many exclusive features and firsts, starting with a true all-electric architecture.

### VECTOR'S FIRSTS, DESIGNED TO MAKE IT LAST.

- First to eliminate maintenance parts such as vibrasorbers, clutches, shaft seals, alternators, and most belts and pulleys — reducing maintenance and saving money.
- First with extremely efficient cool-only refrigeration cycle that uses electric heat. This simple system has no compressor shaft seal and relatively few refrigerant connections.
- First to offer a fully hermetic, high-efficiency scroll compressor.
- First with integrated electric standby, not an add-on adopted design, maximizing efficiency and reducing operating costs up to 70%.

### COMPLIANCE SHOULDN'T BE A ONE-WAY STREET.

There's rarely a one-size-fits-all solution to any business challenge. Compliance is no exception. Carrier gives you choices that allow you to customize your equipment — and overall cost structure — to best suit your business plan.

Vector systems are EPA-compliant in all 50 states. Electric standby, standard on Vector units, is a CARB in-use compliance option for equipment that will operate in California beyond the initial seven-year period.

Another CARB in-use choice, Carrier Transcold's Engine Emissions System (EES) is a CARB-verified Level 3+ VDEC that also enables fleets to operate indefinitely in California beyond the initial seven years allowed.

Choose the Carrier solution that offers the lowest cost of ownership for your business. Vector. Smart choice.



# SINGLE-TEMP PERFORMANCE, IN SINGLE OR MULTIPLE COMPARTMENTS.

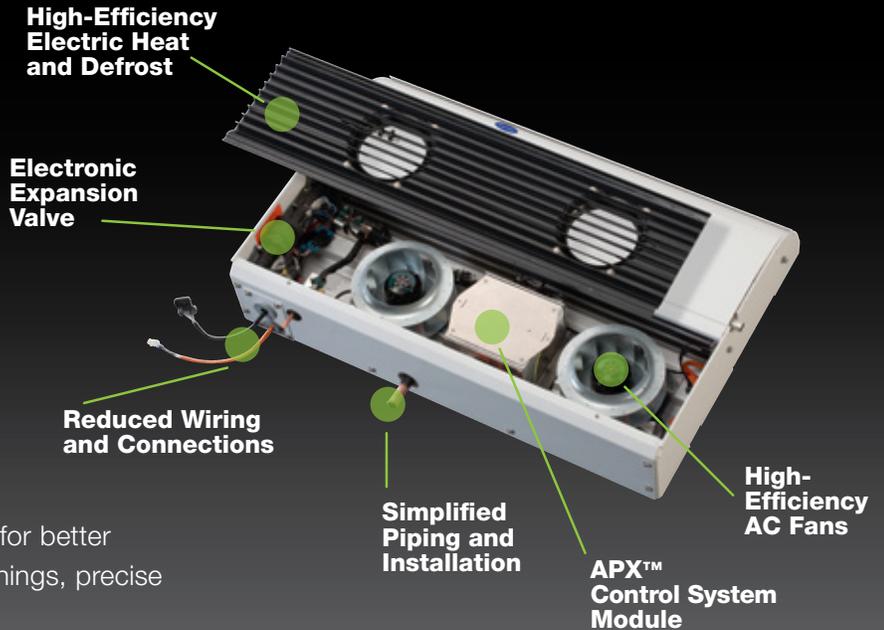
The Vector Tier 4 platform comes in your choice of either a single temp model, Model 8500, or a multi-temp system, Model 8600MT. Each platform has a host unit that is virtually identical in design and features the same performance advantages.

## SMART REMOTE EVAPORATORS. SMARTER COOLING.

As part of the APX Control System's distributed electronics strategy, the control modules — the brain controlling each compartment — are now located in the remote evaporator. Not only does this eliminate complex wiring, it delivers ultra-high-efficiency performance in each compartment, for full application flexibility.

Features include:

- A Carrier-exclusive electronic expansion valve for better capacity, temperature recovery after door openings, precise temperature control, and lower fuel use.
- Flexibility to easily add a second or third multi-temp compartment to an existing multi-temp host unit.



Discharge Gas Out 1

Suction Gas In 2

Fixed Scroll 3

High-Efficiency Motor 4



5 Orbiting Scroll

6 Low-Vibration Counter-Weighting

7 Oil Sump

8 Straddle Bearing System

## THE VECTOR ALL-ELECTRIC SCROLL COMPRESSOR.

Vector is the first trailer refrigeration system to include a fully hermetic scroll compressor, an exclusive Carrier design proven over years of demanding use in Carrier's seagoing container refrigeration systems. Not only is the simplified scroll compressor measurably more efficient, it also has 70% fewer moving parts than conventional reciprocating compressor, making it more reliable, lighter weight, and virtually leak-free.

# Operation: **HIGH-EFFICIENCY TECHNOLOGY**

- 1 DuraShell™ 2 Doors** offer a great look for your fleet, combined with the latest composite materials that repel dirt, resist damage, and integrate noise-reduction features to provide quiet operation.



- 2 Electronic Expansion Valve (EXV).** Exclusive to Carrier's ultra-high-efficiency designs, the EXV provides optimal fuel efficiency, temperature control, and compressor protection compared to conventional mechanical expansion valves.



- 3 V-Force™ AC Fans** are engineered with ultra-efficient vortex-suppression blades. The fan is specially designed to pair with microchannel coils to reduce power requirements and noise, while providing more airflow and ensuring operation in the hottest environments.



- 4 High-Capacity Generator.** Industry-proven ultra-high-efficiency design lowers engine power and fuel use. It also eliminates many of the unit's mechanical maintenance items.



- 5 Fully Hermetic Electric Scroll Compressor.** A highly reliable and efficient design proven in Carrier seagoing containers. It has 70% fewer moving parts, is over 200 pounds lighter, and reduces unit vibration and noise.



# SYNCHRONIZED BY POWERFUL CONTROL.

NOVATION  
HEAT EXCHANGER TECHNOLOGY

**7 Novation™ Heat Exchanger Technology.** By being the first to apply this technology to trailer units, Carrier has optimized a light, damage-resistant, ultra-high-efficiency coil that lowers pressures, saves fuel, and keeps the system running in the harshest conditions.



**8 Distributed Electronics.** The control system uses automotive-style distributed electronics to place operating modules more efficiently within the unit. The result is higher reliability due to shorter, more efficient wire routing and fewer electrical connections. CAN-bus communication provides easy “plug-and-play” modularity to upgrade units or provide additional functionality.



**9 Suction Modulation Valve (SMV).** The next-generation SMV better controls the flow of refrigerant gas into the compressor, providing better temperature control and compressor power regulation. Operating the compressor at or near its functional design “sweet spot” means it is always running at peak efficiency, reducing engine power, fuel use, and emissions.



**10 APX™ Control System** provides the ideal balance between technology and convenience, combining future-forward sophistication with a people-friendly design. The APX Control System unites a variety of advanced electronics and efficient components to continually balance optimum fuel efficiency and performance. This ensures ultra-high-efficiency operation and precise temperature control.



**6 Next-Generation Large-Displacement 2.2-Liter Engine** has become “smarter” with the addition of an engine control module, CAN-bus communication, and the powerful APX Control System. Compliant with EPA Tier 4 Final regulations for engines less than 25 HP.



Intelligence

# POWERFUL CONTROL FOR REFRIGERATION. AMAZING SIMPLICITY FOR PEOPLE.



**Power Control  
Module**



**Expansion  
Modules**



**Main Micro  
Module**



**Display Module**

As technology becomes more powerful, it can become more complex, at a time when your business needs it to be faster and easier to use.

Enter the APX Control System from Carrier Transicold.

Our APX Control System helps you realize the ideal balance between technology and convenience. It combines future-forward technology with a people-friendly design. The result is remarkable control intelligence and system reliability with amazingly simple operation.

The APX Control System is based on a unique approach: It uses distributed electronics in a completely modular system, similar to passenger vehicles and heavy-duty trucks.

### HARDWARE: RELIABILITY.

The industry's first decentralized control system, the APX Control System eliminates the single, large control box and replaces it with automotive-style compact modules using CAN-bus communication.

Strategic and efficient hardware placement dramatically reduces the size of the electrical system. A simplified system design with fewer components means higher reliability, which helps keep your equipment on the road.

### SOFTWARE: INTELLIGENCE.

Sophisticated software and temperature control algorithms maintain an ideal environment inside the trailer, so you can focus on delivering the highest-quality products on time.

New Carrier Transicold Reefer Apps™ offer expanded functionality and value-added features to streamline your operations. Because more than ever, you have to deliver goods at the optimum temperature, in the most fuel-efficient and cost-effective manner.

### HUMANWARE: SIMPLICITY.

The power of the APX Control System is amazingly simple and intuitive for drivers, warehouse personnel, and service technicians.

## EVERYTHING YOU NEED. WHERE YOU CAN SEE IT.



A large dashboard-style display shows all key operating information, providing an at-a-glance visual indicator of both unit operation and conditions inside the trailer.

An ATM-style interface and exclusive message center walk users through unit operation in their choice of language.

The thoughtful design, display, and ATM-style menu system simplify operation and deliver five times more information with up to 80% fewer keystrokes.



# GREEN TECHNOLOGY TO KEEP FLEETS IN THE BLACK.



## Sustainability

Carrier believes industry leadership and environmental leadership go hand-in-hand. Sustainability is a focal point of our culture. Carrier is proud to help integrate sustainable practices into your operation by continuing to apply ecoForward™ technologies to develop cleaner, higher-performing platforms that take a practical approach to compliance.

Vector series sustainability initiatives include:

- Up to **26%** lower greenhouse gas emissions.
- Zero Ozone Depletion Potential refrigerant.
- No compressor shaft seal.
- 5% to **30%** higher BTU-per-gallon efficiency.
- Up to **14%** less engine run time in auto start/stop operation.
- Lower noise.
- Weighs 210 pounds less, or over **10%** lighter.
- Equipped with **electric standby, standard**; for lower emissions, noise, and operating cost.
- **98%** less particulate matter and **93%** less carbon monoxide and hydrocarbons when equipped with the Engine Emissions System option.

Performance data compared to the Carrier Transcold models they replace and dependent on a range of operational settings, environmental conditions, and model type.





# COMMITTING THE RESOURCES TO FIND A SMARTER WAY.

Carrier Transicold is a part of UTC Climate, Controls & Security, a unit of United Technologies Corporation (UTC). As the 45th largest U.S.-based company,\* UTC is comprised of a family of companies that also include Otis, Pratt & Whitney, and UTC Aerospace Systems. UTC companies manufacture high-tech products, and each ranks as a leader in its respective industry—making UTC the 19th largest U.S. manufacturer.

Most important, UTC commits more than \$4 billion a year to R&D spending.\*\*

Carrier Transicold clearly benefits from this commitment to developing innovative technologies, components, and products. And it is key to helping refrigerated fleets lead their industries and improve their businesses.

\*Fortune magazine annual 2015 rankings of America's largest companies.

\*\*2014 reported annual UTC and customer-funded development spending.

# SKILLED MANUFACTURING DEPENDS ON MORE THAN MACHINES.



Carrier units are manufactured by a specialized workforce in a high-tech, ISO-certified facility. Our plant uses a variety of advanced manufacturing technologies and processes that are tightly controlled and designed for maximum productivity. Our Vector platforms are proudly assembled in the USA, in the community of Athens, Georgia. Our home for more than 27 years.

Carrier's manufacturing philosophy is centered on safety, sustainability, and state-of-the-art technology, with the ultimate goal of delivering the highest-quality product at the best price.

- ISO 9001 and ISO 14001 Process Certification.
- OSHA Voluntary Protection Program Star Status.
- Over 7.5 million hours without a lost-time injury.
- Automated processes and Lean Manufacturing.
- Sustainable operations in our Athens facility have reduced water usage by 38%, industrial process waste by 70%, non-recycled waste by 85%, and greenhouse gas footprint by 32% since 2006.



2015 Best Plants Winner





# Network

## DEALER SUPPORT, THE ESSENTIAL LINK IN THE COLD CHAIN.

A product is only as good as the people behind it. The industry-leading Vector series is backed by customer-focused dealer support. No other network is better trained or better equipped to provide the professional personnel and superior technical support that you depend on to keep the Carrier units in your fleet on the road, operating at peak efficiency.

- **180** locations across North America.
- **24/7** service access.
- Rigorous factory training for technicians.
- Comprehensive critical parts stocking.
- Expert refrigeration maintenance and repairs, bumper-to-bumper, coast-to-coast.

Trust us to handle your maintenance and service so you can focus on your customers. Choose from a variety of customizable product support agreements to help you achieve optimum productivity:

- Comprehensive maintenance and repair agreements.
- Fixed hourly rate or prepaid maintenance packages.
- Customized billing and reporting.
- Flexible extended warranty programs.

Most important, the Carrier dealer network is fully Tier 4-trained and ready to support your investment, whenever and wherever you need it.



# VECTOR™ Series

## Strength in numbers. And a number of strengths.

- Requires **20%** less engine power.
- Delivers up to **4%** higher-rated cooling capacity.
- Consumes up to **26%** less fuel.
- Reduces engine run time up to **14%** during automatic start/stop operation.
- Weighs 210 pounds less, or over **10%** lighter.
- Provides 5% to **30%** higher BTU-per-gallon efficiency.

The Vector Series. **Smarter Thinking.** Smarter Business Decision.

Performance data compared to the Carrier Transicold models they replace and dependent on a range of operational settings, environmental conditions, and model type. Specifications are subject to change without notice. Form 62-11689 REV. B.

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