



GET COMFORTABLE

A Thermo King publication for the mobile climate control industry.

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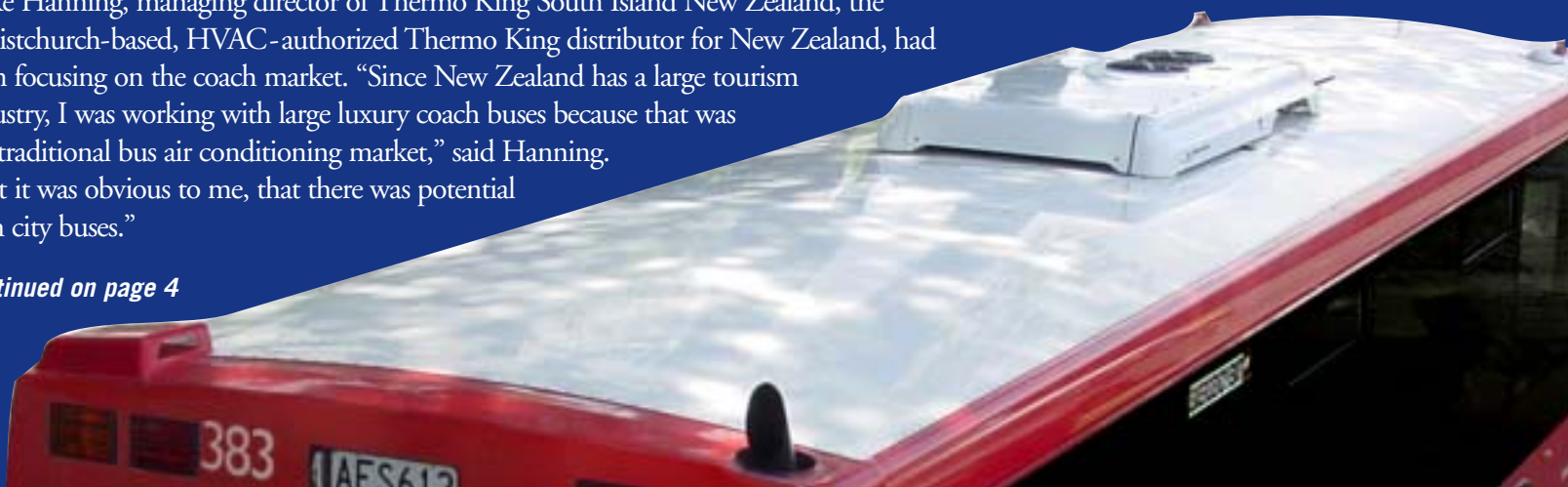
new zealand COOLS DOWN

Thermo King First in the City Bus Air Conditioning Market

New Zealand is blessed with an abundance of natural beauty from snow capped mountains to serene beaches. New Zealand also features a temperate climate. Although mostly temperate, the summers are quite humid.

Mike Hanning, managing director of Thermo King South Island New Zealand, the Christchurch-based, HVAC-authorized Thermo King distributor for New Zealand, had been focusing on the coach market. "Since New Zealand has a large tourism industry, I was working with large luxury coach buses because that was the traditional bus air conditioning market," said Hanning. "But it was obvious to me, that there was potential with city buses."

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Thermo King Introduces the New SR-70

The New SR-70 is designed for the Mid-Coach Market



Thermo King introduces a lightweight, high-capacity rooftop system designed for medium length coaches – the SR-70.

“Thermo King developed this product because there was a gap in many suppliers’ product lines. The products available were either too small or too big. The industry mix now includes more medium length coaches,” said Steve Johnson, Thermo King global product manager for large bus and rail HVAC.

The SR-70 is designed and engineered for the life of the coach. It has a one-piece design for easy installation. It can be used for transit and specialty transit. The SR-70 features the highest capacity of weight ratio available and runs on HFC R-134a refrigerant. It is supported by the industry’s largest worldwide service organization and runs on the new ClimaAIRE™ advanced control system.

There is a definite relationship between restricted airflow and performance. Air filters are used to keep lint and other fibrous debris from clogging up the evaporator coils of air conditioning units. The air filters also filter the air for better breathing by removing airborne particulants. Each air filter has an inherent resistance to the flow of air moving through it. That resistance is defined as static pressure drop and is measured in inches of water ("H₂O"). To better understand this issue we need to look at the entire fan/blower system.

The fan/blower system includes all of the component parts, which affect the air from the time it enters the unit until it leaves the bus ducting. The system airflow is dependent on the total sum of all the losses throughout that "fan system." Many parts of this system, such as the coils, are fixed as far as their resistance to airflow. Anything added to the system, such as a second filter, will increase this resistance.

Each blower has specific flow characteristics. That is, with no static losses imposed to the blower, inlet or outlet, it will move "X" amount of air at a given rotational speed. As static pressure is added to the inlet or outlet of the fan/blower the airflow will be reduced by some amount. When air conditioning systems are designed, the airflow is determined based on the package, or complete fan/blower system.

The typical blower has a performance curve that starts at a maximum flow, and has minimal flow loss as the resistance is first applied. At about 0.5 "H₂O" of resistance the rate of airflow reduction begins to increase. Somewhere beyond 1.0 "H₂O" resistance, the blower will enter what is termed a "stall point." The flow rate can vary greatly at that point, but will usually result in a loss of up to several hundred cfm of airflow.

Things like air filters, both clean and dirty, double filters,

duct size and design, transition and outlet ducts, all effect the overall performance of the HVAC system. Duct losses are checked for both the air transitions and the outlet ducts, and factored into the design. The goal is to maximize the cooling performance while maintaining the airflow at a point below the "stall point" in the fan curve. The intent is to maximize the operating envelope, and allow for factors, like items placed inside the air ducting, which we have no control over.

To combat the ever-changing grille and transition duct configuration we give guidelines to the OEM that outlines in general terms, transition shapes, duct sizing, and so on. Any major changes to these components will affect the fan or blower system; you can reference the Thermo King HVAC guidelines. These effects can be minimal or increase the likelihood of developing a severe problem.

By adding a second air filter to the fan/blower system we move the operational performance closer to the stall point. With clean filters this may not be a problem, but as dirt begins to build on the filter and on the coil surfaces, the system moves farther toward the side of the operating envelope. Cleaning the filter more often may help to reduce the effects, but may not fit well into the local maintenance program.

In any case, changes to the fan/blower system must always be done with the total system design in focus. As it stands now, and using the filter materials presently in use, we would strongly recommend that a single filter be used and cleaned or changed frequently. That filter can be located on the unit coil as supplied by Thermo King or on the inlet grille, but not in both locations.

Contributed by Dennis Haggerty

All about Air Filters

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continued from cover

City buses are very popular in New Zealand. New Zealand's largest city is Auckland with a population of 1.2 million. There are about 1,700 buses in the cities of Auckland, Wellington and Christchurch with 900 buses in the Auckland area alone. Traditionally, the city buses are operated by the city council, but due to reforms and the increase of privatization in all government sectors, city bus runs were put out to tender.

Hanning partnered with Stagecoach, a well-known Scottish company that specializes in mass transit. Stagecoach was undertaking a big fleet upgrade. He had approached them on previous occasions, and requested that they put together a joint proposal.

City buses in New Zealand haven't had air conditioning before. The city council did not receive extra funding for air conditioning, so the advantages of switching weren't there. There was no monetary benefit at the time.

INCREASE BUS RIDERSHIP

The directors of Stagecoach thought that if air conditioning were offered it would increase bus patronage. There was a monetary benefit available for bus companies that increased their ridership. Although it was a risky strategy, Stagecoach took a stand and introduced air conditioning into their offer. Their offer was accepted and Thermo King has become the standard in New Zealand city buses.

"New Zealand is a large importer of used Japanese cars. Most of these cars are fully equipped with all the bells and whistles, including air conditioning," said Hanning. "So people in New Zealand had become used to that service."

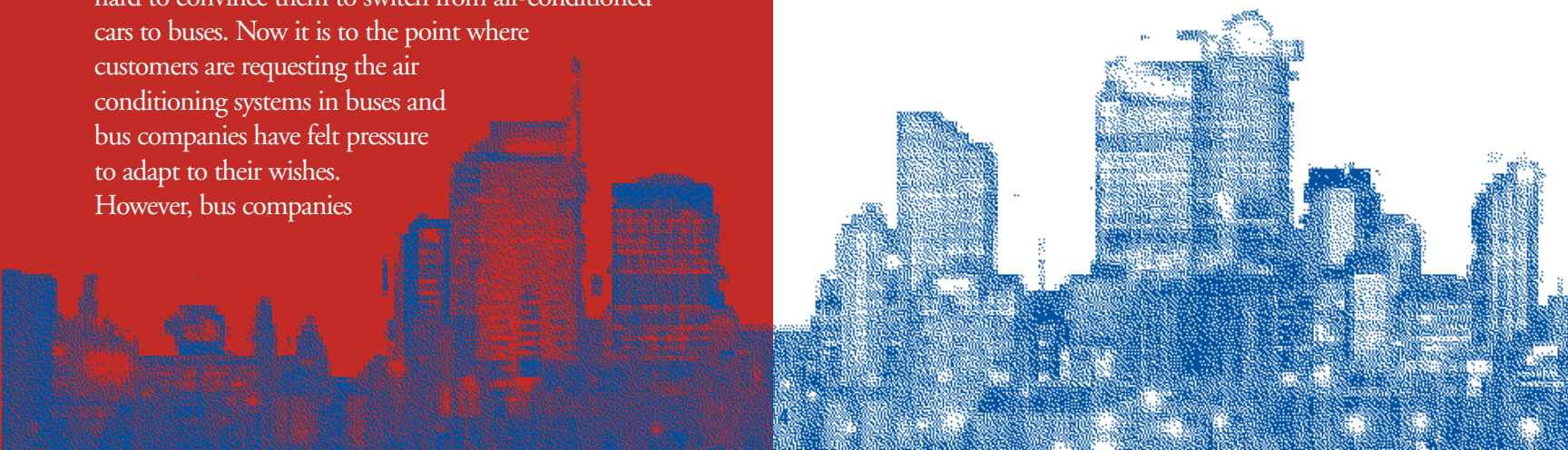
Cities are attempting to increase attendance on public transit. When people haven't used the bus system, it is hard to convince them to switch from air-conditioned cars to buses. Now it is to the point where customers are requesting the air conditioning systems in buses and bus companies have felt pressure to adapt to their wishes. However, bus companies

have found that when you install air conditioning there are actually cost savings. It eliminates the high cost of opening windows. And it eliminates the need for heaters. "With the heat/cool AC units, underseat heaters are no longer necessary," said Hanning.

BUSES WELL RECEIVED

The first air conditioned buses were greeted and accepted favorably by passengers and drivers. These buses were built by reputed local bodybuilder Designline (of Ashburton). They are 12.7 metre, 3-axle, super-low floor type with aluminum bodies on MAN 17.223 special chassis. Besides the temperature benefits, the air conditioning provides dehumidification which means clear, fog-free windows for drivers and passengers. City buses operate in a polluted environment. Air conditioning is recognized as a benefit because outside pollutants are not introduced inside the vehicle. So successful was the acceptance of bus air conditioning that other companies have followed suit by introducing bus air conditioning to 39 seat, 9 metre buses. And Thermo King just received an order for 40 more Thermo King Citi RT units from the same customers.

In addition to standard buses, Stagecoach recently introduced three hybrid electric vehicles (HEV). These new vehicles are equipped with Thermo King's SR-50-S. The Thermo King units feature the Copeland Scroll Compressor. The HEV is an electric vehicle that is environmentally friendly, energy-efficient and built locally in New Zealand. It's an exceptional vehicle with almost zero pollution. It operates on space-age type batteries and glides around the streets with no fumes and zero emissions. They operate in Auckland and Christchurch. Both the Citi RT and SR-50-S are a part of Thermo King's global product line. These products are manufactured and distributed in all the major markets.



Hanning works in a small office of four people, but has the global support of the Thermo King network. “When I recognized this potential, I worked with the Thermo King bus division to formulate the current product specifications.” He works with Gabriel Doyle at Thermo King Hong Kong as his day-to-day contact. The products that are used in New Zealand are made at the Thermo King plant in China. The typical transit time is 28 days. Since the schedule is always subject to change. One of the biggest challenges is forecasting and ordering to meet the body builder schedule.

NEW ZEALAND BUS MARKET GROWS

“There is much potential for growth here. One year ago the market was zero. And now we are rapidly expanding. It is the result of the hard work that we have done to maintain the market share in coach while working towards the city bus market. We are proud of what we have accomplished here by improving the passenger experience,” said Hanning.

“As I tell my customers, now we can turn Auckland air into alpine air for a cost of a bus fare.”

“Throughout Asia Pacific, Mike Hanning has always been held in high esteem as one of the most knowledgeable men to talk to when it comes to comfort cooling of coaches. His is a family-run business with a long history of servicing the transport industry,” said Gabriel Doyle, Thermo King Asia Pacific, director, service and product development.

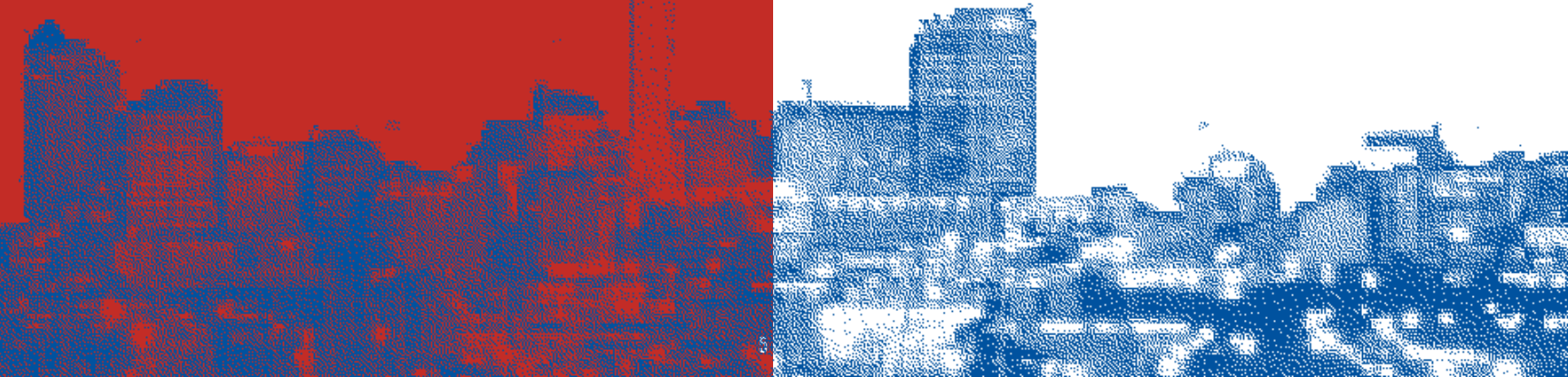
“Mike approached us in late 2001 to work with him on the proposed application and selection of equipment for city bus in New Zealand. We knew it was an exciting opportunity to work closely with Mike, his son Anthony and the rest of their strong technical crew to penetrate this hitherto untapped market.

They had already enjoyed great success in the coach sector but this was a new departure,” said Doyle.

THE ADVANTAGES OF THERMO KING'S GLOBAL NETWORK

According to Doyle, after careful study of the application and conditions, the Citi RT range Heat/Cool/Reheat unit was a natural choice for the project. It is a high-performance, compact, light-weight unit that offers great versatility to suit any condition in city bus or route buses up to 13 metres in length. In the industry, it is unmatched in terms of kcal cooling /kg weight ratio. The Citi RT 1000 basic weighs in at 170 kg only on the roof. It's available with Wide/Narrow, 7.5m or flat to suit roof radii, choice of S391 Screw or X430 compressor, choice of 134a or 407c refrigerants, choice of 2 controllers and finally choice of long life brush or brushless option fan motors. “We settled on the Citi RT 134a 1004 X430 reciprocating compressor, ClimaAire controller and long life brush motors. We knew that it would have ample heating and cooling capacity with high airflow to handle toughest conditions it would encounter in New Zealand cities.” said Doyle.

“In undertaking this project,” continued Doyle, “we enjoyed close co-operation with the management and engineering teams at Designline. As it was a new vehicle type, we worked hand-in-hand on all interface aspects of both the Thermo King unit and the bus, including air duct design, louvers and reliefs, the compressor mount bracket, piping and wiring. This is a critical but sometimes overlooked aspect of transport HVAC application. Working closely with Thermo King design engineers in the Czech Republic, we were able to optimize the controller on site to suit the testing conditions of Auckland where you sometimes experience all 4 seasons in a single day. The successful outcome is what one delighted passenger termed ‘a placid comfortable environment’ in which to commute.”



Technician Training That Comes to You

The Thermo King Learning Center began offering regional training sessions for bus technicians last year. These sessions are not only open to Thermo King dealer technicians, but to customers and end-users. While there is no arguing the importance of ongoing technician training, it's important to occasionally review the real benefits this training provides – for it goes well beyond the gaining of product, diagnosis and repair knowledge.

Improves Technician Retention

Professional growth is a key element in an individual's job satisfaction and commitment levels. Ongoing training challenges technicians, allows them to develop skills and confidence, keeps them motivated, and demonstrates to them that their company believes in them.

Increases Profits

Better-trained technicians translate into faster, more efficient repairs and reduced misdiagnoses, unnecessary parts usage and costly comebacks, improving your bottom line.

Benefits Your Customers

The more qualified your technician, the faster the diagnoses, and the faster your equipment is back in service. Bottom line: you save time and money. Now that's a value-add everyone understands and appreciates.

Check out the 2003 training schedules to find out when a regional training session will be held near you. It is recommended that you send at least one technician to training once a year to stay on top of product and technology updates. Sign up today and start reaping the rewards.





“I enjoy working with Thermo King because of the simplicity of their product,” said Wesley Campbell, maintenance trainer for Greyhound. “As a technician, I can view the functionality of the system while sitting at the Driver’s Display Module (DDM). It shows me what I need to fix.”

The IntelligAIRE® II controller features an enhanced diagnostic system monitor that allows the technician to see important test information. It also provides advanced diagnostic features and troubleshooting information. The enhanced diagnostic system performs a system test that allows the technician to see important test information as the tests are performed.

Dallas and IntelligAIRE II



“Everything is at your fingertips. At first glance, the DDM looks complicated, but then you quickly find out how easy it is to use. It took me about five minutes to figure it out using the instruction manual,” said Campbell.

“What I like best about Thermo King is that everything is incorporated into one module. Most tests can be performed using the DDM. They also have a remote software system called SMART-Pac that works with your computer,” said Campbell.

The SMART-Pac diagnostic software is loaded onto a personal computer and communicates with the IntelligAIRE II controller through an RS-232 port. This gives the technician the capacity to view over 100 potential alarm codes, view temperatures at sensor and check pressure reading from transducers, which are being monitored. The IntelligAIRE® SMART-Pac software allows technicians to diagnose problems through their computer and type notes directly into the alarm history file for future reference. These technological advancements allow for easier and more effective maintenance.

“Our transition to Thermo King was easy,” said Campbell. “We have a super Thermo King technician here in Dallas. We would call and he would come over right away if we had any problems. He always took the time to explain what was happening or had happened with the system. It was a win-win situation for us.”

Greyhound has maintenance trainers located across the United States and Canada. Thermo King met with these trainers in Dallas to provide system training. Each trainer then returned to their locations with information to provide training to their technicians.

Although summer is our busiest season, “Thermo King has remained constant and has gotten us through the heat,” said Campbell.

PM Tip

Preventing Connector Corrosion

Corrosion results in poor electrical connections and can cause the malfunction or failure of electrical components. Generally, corrosion is caused when the electrical connections are exposed to road salts, ice-dissolving agents and dirt buildup. Also, the harsh bus wash detergents and cleaning chemicals can have a corrosive effect.

To prevent corrosion, apply Super Lube to all exposed connectors, input studs and bus wiring power lugs. This provides a protective barrier for the connectors and prevents direct exposure from potential corrosion risks. Preventive action helps avoid electrical malfunctions that can result in bus downtime, and extends the life of electrical assemblies. Applying Super Lube also helps to protect the input studs and bus wiring power lugs from moisture resulting from cleaning procedures and/or exposure to dirt and debris buildup.

Super Lube must be applied with a clean, dry brush. The Super Lube must completely encapsulate the terminals on electric connectors. It is very important to coat BOTH the top and the exposed metal underside of the bus wiring power lugs. Apply twice a year under normal conditions. Also apply when the electrical assemblies are replaced or serviced, and when terminals or nuts have been loosened for any reason. Make sure to remove all coatings, dirt and corrosion before applying. This preventative step will result in longer equipment life and better performance of the HVAC equipment during the life of the bus.



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