



Danfoss solutions for Bus Air Conditioning

## On Indian roads, in Indian weather Keep your passengers in comfort

A high level of comfort is one of the most important requirements of passengers when travelling and commuting. Therefore, it is essential to ensure that buses and coaches are equipped with the most reliable air conditioning systems designed with the right components to suit Indian road and weather conditions.

With Danfoss solutions for bus air conditioning you can overcome most of the problems caused by factors such as poor road conditions, dust, congestion, and environmental conditions among many others. With components designed to eliminate refrigerant leaks, your refrigeration system is guaranteed to provide a more efficient and reliable operation.



2.5

times

lighter weight comparing  
Danfoss TU expansion valves  
with competitors.

4x

comfort and savings

For OEMs – easy to get components.  
For maintenance and service personnel  
– easy and fast change of components.  
For bus owners – faster service and  
lower service cost. For passengers – full  
A/C performance and comfort.

## Expansion Valves



### TGE thermostatic expansion valve:

- Wide capacity range
- Balanced port design
- Adjustable superheat setting
- Laser welded diaphragm housing resulting in strong stainless steel power element
- Bulb and strap technology that ensures stable and responsive superheat control



### TU or TC thermostatic expansion valve:

- Stainless steel hermetic expansion valve
- Bulb and strap technology that ensures stable and responsive superheat control
- Bimetallic connection helps reduce installation time
- Laser welded diaphragm housing resulting in strong stainless steel power element
- Customised capillary tube



### ETS electronic expansion valve:

- Increased fuel economy, more cost saving every day
- Maintain setpoints, adapt quickly to changing conditions
- More precise superheat control
- Better evaporator efficiency - implies saving compression energy
- Improved overall system performance

## Pressure Regulating Valves



### KVL crankcase pressure regulating valve:

- Limits the maximum crankcase pressure
- Refrigeration system can operate under large load variations
- Very easy adjustment of the set point
- Product quality is maintained throughout a long operating life time
- Pulsation damping design reduces vibrations



### KVR condenser pressure regulating valve:

- Maintains a constant and sufficiently high condensing pressure even in low ambient and low load conditions
- Ensures constant room temperature as required
- Stainless steel bellows for very long operating life
- Easy and accurate adjustment with Allen key
- Pressure gauge for adjustment or indication



### KVP condenser pressure regulating valve:

- Constant surface temperature on the evaporator
- Controls humidity in the room
- Space saving design, can be installed in any position
- Low pressure drop over the seat under normal load conditions

## Check Valves and Ball Valves



### GBC ball valve:

- Connects indoor and outdoor units with high Kv value
- Low internal leakage when closed avoiding refrigerant loss and faster vacuum during service
- A service valve is also useful to replace the filter drier and for other service related activities



### NRV check valve:

- Straightway and angleway versions
- Prevents back-condensation from warm to cold evaporator
- Built-in damping piston for easy installation in lines where pulsation can occur



## Solenoid Valves

### EVR 10 liquid line solenoid valve:

- Safeguards the compressor against liquid migration and slugging
- Provides the proper system balancing after shutdown

## Sight Glasses and Filter Driers



### SG sight glass:

- Shows the health of the refrigerant inside the system
- Shows refrigerant status which can be useful input for right diagnosis of the system



### DMC, DCL/DML filter drier:

- DMC filter drier / receiver combination eliminates the need for an additional receiver component
- Effective filtration and absorption of moisture – essential for long life time of the system
- Solid core guarantees a faster water adsorption



## Cartridge Switches

### Cartridge switch:

- -0.5 to 45 bar pressure range
- Low pressure control: operates the clutch to start and stop the compressor
- High pressure control: controls the condenser fans and can be used to open the clutch to stop the compressor for high pressure protection
- Automatic or manual reset

## Connectors

### Connectors:

- Alternate transport friendly connections are needed in transport air conditioning applications due to the harsh conditions
- Minimises various vibration related leakages
- Allows easy and fast product installation when needed and reduces downtime during breakdown

# Designed to last under any condition

## Road conditions

Vibrations and sudden jerks may **reduce the life time of the system** – a few things are leading to this. First of all, **refrigerant leakage** leading to low charge, causing poor system performance (inability to reach the required temperature as well as higher fuel consumption) resulting in future lost sales for the OEM. Secondly, **fatigue failure of joints** can cause the system to become non-operational resulting in claims to the OEM. And last, **service costs** to the operator including charge of refrigerant will increase.

## Dust and corrosive atmosphere

Our cities today are full of pollutants which can cause corrosion in parts of the system. To prevent corrosion from damaging the system, it is important to ensure material compatibility throughout the system and to **choose components able to cope with corrosive environments**. Danfoss filter driers, for example, are coated to withstand more than 500 hours of salt spray tests.

## Weight and resilience

Transport and mobile applications require light components and the ability to take stress. Danfoss thermostatic expansion valves, types TU and TGE, both have stainless steel capillary tube, making them **extremely light and capable of withstanding vibrations much longer**.

## Crowded busses

Busses are crowded in peak hours and empty during lean times. Hence cooling load management is critical to secure fuel efficiency. Components like **expansion valves, fan speed controllers and pressure regulators help achieve higher overall efficiencies** of the air conditioning system.

If you would like to know more about our solutions for bus air conditioning please don't hesitate to contact your Danfoss sales representative, who will be ready with the right solution for your system. Your business will benefit of the high quality components, while providing your customers the greatest comfort.



## Thinking about Climate Sustainability

Danfoss encourages the industry to continue to speed up its contribution to a cleaner environment and a cleaner image! We are committed to improving the climate by providing the world of refrigeration and air conditioning with greener technology.

For many years, Danfoss has focused on natural refrigerants (Low GWP) for many years and today boasts a broad product range for NH<sub>3</sub>, HC and CO<sub>2</sub> refrigerant applications. Many of the already available technologies, products and services from Danfoss Refrigeration and Air Conditioning can save energy and minimise the Green House Gasses (GHG) emissions. And we continue to develop new components suitable for natural refrigerants.

