Air Conditioning for Passengers

**HVAC units for tramways, trains and metros**
Proven performance, high reliability and low life cycle cost

- Complete capacity range
- Self contained, hermetically sealed units
- Standard off the shelf units
- Customized to fit the application
- Easy maintenance
- Controlled via Microprocessor

IR
Ingersoll Rand
Climate Control Technologies
Travelling in air-conditioned, perfectly temperature controlled trains, tramways and metros is key to the travel comfort of today’s passengers and drivers.

The heating, ventilation and air-conditioning solutions for rail vehicles from Thermo King are highly reliable and deliver top performance while reducing operating costs.

Excellent quality service and maintenance support in every corner of the world is ensured by Thermo King’s second-to-none, global dealership network.

Since 1938 Thermo King has been a leader in climate control solutions. Through a culture of constant improvement and innovation we strive to provide total customer satisfaction in everything we do.
Tramway type of unit

LRV type of unit

Low profile saloon unit for metro applications

Tramway type of unit
## Specifications

### Roof mounted units
- Tramways, commuter trains, coaches, metros

### Performance

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling capacity</td>
<td>20 - 35 kW</td>
</tr>
<tr>
<td>Heating capacity</td>
<td>Up to 32 kW</td>
</tr>
<tr>
<td>Total air flow rate</td>
<td>3000 - 5300 m³/h</td>
</tr>
<tr>
<td>Fresh air flow rate</td>
<td>up to 1250 m³/h</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-30 to + 70 °C</td>
</tr>
<tr>
<td>Weight</td>
<td>up to 800kg</td>
</tr>
</tbody>
</table>

### Power Supply

- Unit power supply: 3x208V, 60Hz • 3x230V, 50/60Hz • 3x380/400V, 50Hz • 3x460/480V, 60Hz • 750V DC
- Heater power supply: AC; see Unit power supply • DC up to 750V nominal

### Control

- Control voltage: 24 to 110V
- Communication: CAN Open, MVB or Ethernet
- Control of external heaters: Yes
- Temperature and humidity control: Yes, by microprocessor
- Air distribution control by dampers: Yes, by fresh, return and supply air dampers

### Refrigerant

- Refrigerant circuit: Hermetic
- Refrigerant: R134a or R407C

### Norms & Regulations

- Shock and vibration: IEC 61373
- Fire and smoke per: NF F 16-101, 102 and 103 • DIN 5510 • NFPA 130
- EMC: EN 50121-3-2
- Electronic components: EN 50155
- Reliability: EN 50126
- Air filters: G2 to G4 per EN 779
- Comfort inside passenger compartment (together with car builder): EN 14750 • EN 13129 • UIC 553
- Environment: EN 50125-1
- Unit frame: Stainless steel • Aluminum
- Inverter duty

Specifications are subject to change without notice.
Research and Development

Ingersoll Rand’s R&D centre near Prague, Czech Republic, is a state-of-the-art facility using the latest technology to perform a wide range of tests on Thermo King equipment. These extensive tests ensure optimal performance, high quality and reliability of the Thermo King HVAC products. The facility includes:

- Multi-axial shaker table laboratory
- Endurance test rooms
- Climate chamber
- Two comparative test chambers
- Two single temperature calorimeters
- Vibration laboratory with climate chamber

Our R&D centre is also a place where new and disruptive technologies are being studied and is Ingersoll Rand’s Centre of Excellence in Central Europe.

Modal Analysis

The figure demonstrates results of unit frame design optimization using Finite Element Analysis (FEA). The presented results are modal analyses, which allow evaluation of the frequency and shape of frame natural frequencies. The optimization consists of “tuning” the natural frequencies away from excitations caused by rail operation.
Ingersoll Rand Climate Control Technologies provides equipment and services for:

HEATING, VENTILATION & AIR CONDITIONING
- Rail
- Bus

TRANSPORT REFRIGERATION
- Road Cargo
- Air Cargo
- Sea Cargo

STATIONARY REFRIGERATION
- Commercial Applications
- Industrial Applications

For further information please contact: