

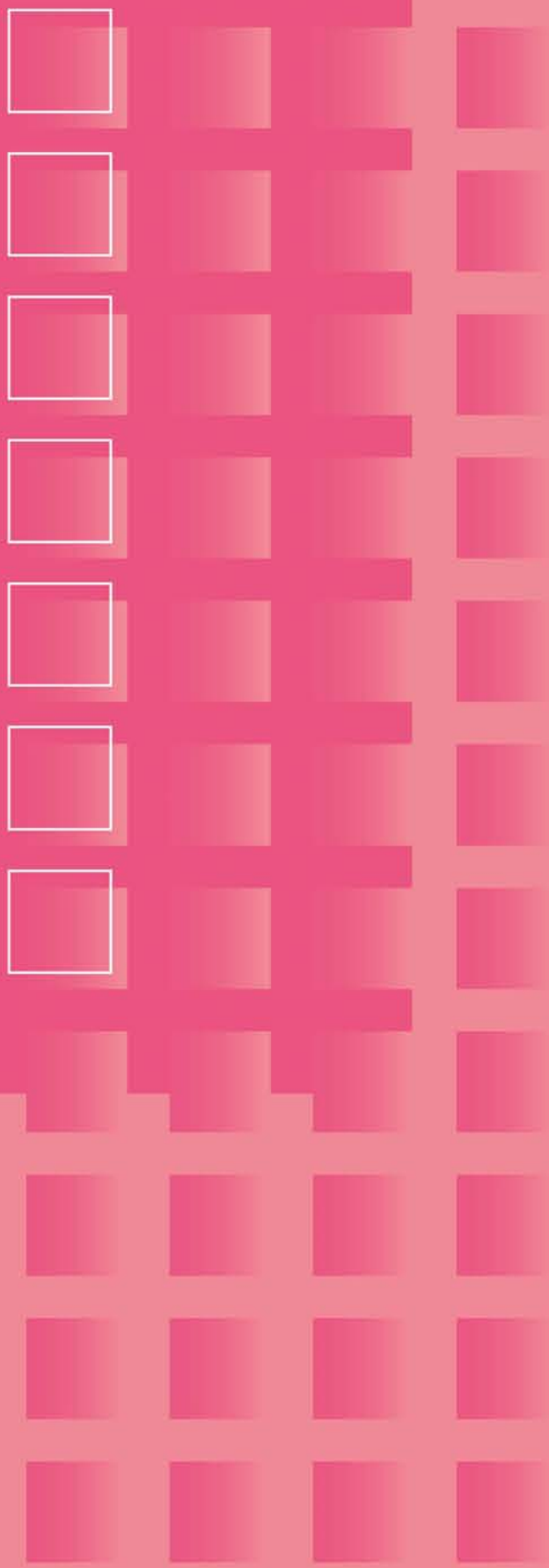
# SPECIAL APPLICATION

The VRV system offers excellent climate-control support for virtually any indoor environment, from movie theaters and historical edifices to churches and even stadiums. However the space is used, a comfortable indoor climate is essential. Moreover, the equipment must match the existing décor and provide economical performance for owners. For all of these needs, the VRV system can easily be adapted and fitted out to provide a perfect answer. Above all, users demand reliability. Air-conditioning systems must satisfy a wide range of conditions. Airflow should be kept even to avoid draughts, with minimal variations in indoor temperature. Remote controllers should be easy to use and placed in a convenient location, and the air conditioners should function quietly. To avoid spoiling the décor, configurations in which the system is hidden from view are preferable. The climate settings must be adjustable for each room and zone, and the air-conditioning equipment must be simple enough that users can manage it themselves. Because good economic performance is essential, owners should be able to maintain and upgrade systems at minimum cost, and they should consume as little energy as possible. After installation manufacturer and client contact should be friendly and enduring. Safety is a key consideration in any building, so the system must be free of any fire risks, water leakage or other hazards. Finally, in the event of a rare system failure, back-up equipment must be available, along with an emergency response facility.

Daikin's VRV system has extensive features that meet the customer's needs described above.

- Indoor units to suit any type of indoor environment
- Wired and wireless control systems, as well as centralized control system with full operation management features
- Indoor and outdoor units designed for low noise and vibration
- Compact-sized outdoor units
- Extra-long piping allowing installation flexibility of outdoor units
- Low operating load for exceptionally low annual energy consumption
- Easily configurable indoor and outdoor units to fit any detailed zoning plan
- Entire system available from Daikin, for convenient "one-stop shopping"
- Comprehensive service menu
- Compatibility with new refrigerants
- System using no thermal heat source and no indoor water piping

By providing a single, comprehensive, flexible and economical air-conditioning system for any building, the Daikin VRV system makes a significant contribution to the needs of modern society.



# SPECIALIZZAZIONE APPLICAZIONI



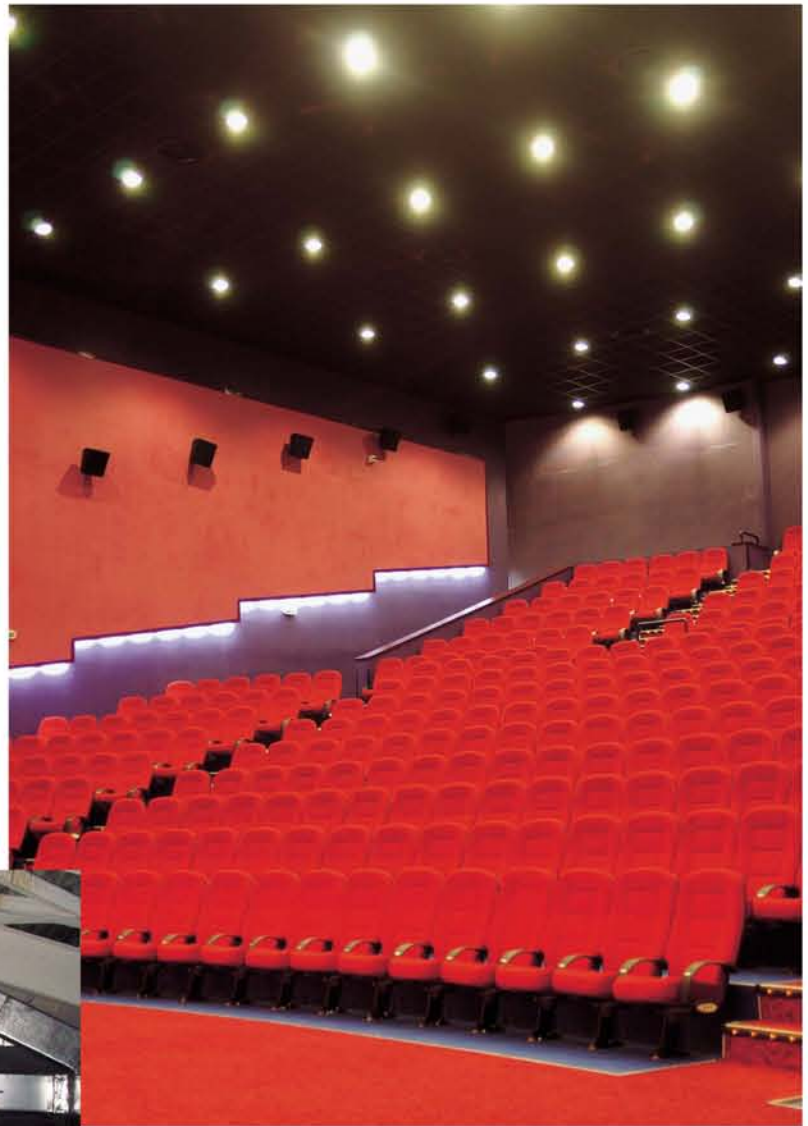
## Arena Multiplex Cinema in BULGARIA

Total floor area is 18,000 m<sup>2</sup>. This building is in Sofia. Construction was completed in 2003. Opened in 2003, the Arena 2001 multiplex cinema comprises no fewer than 15 auditoriums seating 3,000 persons, a VIP conference room, 11 restaurants and an on-site childcare center. The utilization of VRV air conditioning in a cinema — a European first — posed interesting design and installation problems.



## SPECIAL APPLICATION

The innovative solution featured large ducted indoor units located in the floor space of each auditorium which supply air at ceiling level via special adjustable blades and actuator controlled diffusers. Return air is via grilles beneath the seats. In fact, during designing this system for the arena, the main problem was "How to offer the best air distribution and guarantee maximum comfort?" The solution was to install FXYMP Concealed Ceiling Unit Large Type under the seats in a 'machinery room' and to have the air flow from the ceiling down to the seats. Special grilles were used in order to create a perfect climate in both heating and cooling modes. A fresh air supply is connected to the VRV indoor units.





Finally, the wide-ranging versatility of the VRV system convinced the consultant, the general contractor and the investor that it was right for this complex. There is no need for any additional heating system. Special air diffusers with adjustable blades and actuators were installed for the air supply to guarantee optimal air distribution and velocity in both cooling and heating modes. By the end of February 2003, with average outside temperatures at approximately  $-10^{\circ}\text{C}$ , the whole building was heated at  $28^{\circ}\text{C}$  for dehumidification as well as to protect the very sensitive projector screens.





## Olympic Horse Riding Centre and New Hippodrome of Athens in GREECE

Total floor area is 180,000 m<sup>2</sup>. Total air conditioning surface is 9,000 m<sup>2</sup>. This building is in Markopoulo Attikis. Construction was completed in 2003. The new Olympic Hippodrome and Equestrian Center were built to stage the equestrian event of the Athens 2004 Olympics. Located in the small town of Markopoulos, some 28 miles from Athens in the Eastern Attica region, the complex is architecturally sensitive to its natural surroundings and atmospheric environment. Capable of seating audiences of 10,000 for jumping, 8,000 for dressage and 15,000 for cross country events, the 700 m<sup>2</sup> stadium's enclosed public viewing areas are fully air-conditioned by VRV heat pump inverter systems. This installation was chosen by the consultants because of its reliability, individuality, low energy consumption and central control by BMS — all DAIKIN VRV features.





Air-conditioning capacity is 556 Hp, or 1616 kW, 460 USRT.

**Equipment**

Outdoor units:

24 units of 10 Hp heat pump type

12 units of 8 Hp heat pump type

44 units of 5 Hp heat pump type

Indoor units:

278 units of Wall Mounted Unit Type

171 units of Ceiling Mounted Built-in (or Concealed Ceiling Unit) Type

5 units of Ceiling Mounted Cassette Corner Type

5 units of Ceiling Suspended Unit Type

4 units of Ceiling Mounted Cassette Type <Multi (4) way flow>





## Hockenheim Grand Prix Circuit in GERMANY



The Hockenheim circuit was originally built by Mercedes for high-speed automobile tests. It achieved grand-prix status in 1977, when it first staged the German Grand Prix. The circuit became the permanent venue for the race in 1986, and to this day Formula One remains its main attraction. A project to upgrade Hockenheim's hospitality facilities was started in 2002, consisting of the addition of a 2500 seat extension to the South Grandstand and the construction of 16 new VIP lounges and the new Daimler Chrysler Grandstand. VRV II was mainly employed in this project due to its exceptionally high COP as well as its specification of high external static pressure, which enables the use of smaller bore piping.







VRV II is conveniently compact, and lightweight outdoor units can be moved into place without the need for craning. Furthermore, its unique backup function ensures improved system reliability. The most recent upgrade was carried out in early 2004.



#### Equipment

- Outdoor units: 3 units of 16 Hp heat pump type  
1 units of 24 Hp heat pump type  
1 units of 30 Hp heat pump type
- Indoor units: Ceiling Mounted Cassette Type <Multi (4) way flow>  
Ceiling Concealed Ducted





## Pasaz Pod Blekitnym Sloncem in POLAND



Total floor area is 3,573 m<sup>2</sup>. This building is in Wroclaw. Construction was completed in 2003. This historical building was built in 1830. Under the current renovation plan, the following rule is required to adopt the VRV system. Easy and clean installation works, indoor units goes with the rooms very much, small outdoor units installation space. Small and lightweight outdoor units, easy installation on the roof, other ways of installation were impossible (e.g. crane). After the installation, installers evaluates the system as "easy installation, no problems with starting up", and end users values as "low noisy indoor units".

Air-conditioning capacity is 28 Hp, or 81 kW, 23 USRT.

### Equipment

Outdoor units:

- 2 units of 10 Hp cooling only type
- 1 unit of 8 Hp cooling only type

Indoor units:

- 14 units of Ceiling Suspended Unit Type
  - 1 unit of Ceiling Mounted Cassette Type
- <Multi (4) way flow>





## Guangzhou Baiyun International Airport in CHINA



Work at Guangzhou Baiyun International Airport is divided into first-phase construction and second-phase construction. In the first-phase construction, the total floor area is 304,000 m<sup>2</sup> and the air conditioning area is 292,000 m<sup>2</sup>.

The first-phase construction includes the main terminal building, west access way to the main terminal building, east access way to the main terminal building, access way to the gates, air traffic control tower and boarding bridge.

In the second-phase construction, the west access way to the main terminal building and east access way to the main terminal building are being extended. After completion of the second-phase construction, Guangzhou Baiyun will become one of the largest airports in the world.

The VRV II series and VRV series were selected for this project. A total of 37 units of the VRV II series are installed in the main terminal building, east access way to the main terminal building and west access way to the main terminal building. A total of 92 units of the VRV series are installed in the boarding bridge. The main terminal building, east access way to the main terminal building and west access way to the main terminal building house important areas, such as the central supervision room, computer rooms, service center and VIP rooms. VRV II was adopted for these rooms due to its high reliability.





## Equipment

Outdoor units: 1 unit of 8 Hp heat pump type  
4 units of 10 Hp heat pump type  
94 units of 16 Hp heat pump type  
5 units of 20 Hp heat pump type  
25 units of 30 Hp heat pump type

Indoor units: 769 units of Ceiling Mounted Cassette Type  
<Multi (4) way flow>  
6 units of Ceiling Mounted Cassette Type  
<Multi (2) way flow>  
95 units of Ceiling Mounted Built-in Type





## Sister of St. Joseph SA in AUSTRALIA



This building is in Kensington, South Australia. Construction was completed in April 2004.



### Equipment

Outdoor units: 10 units of 12 Hp heat pump type

Indoor units: 10 units of Ceiling Mounted Duct Type

17 units of Wall Mounted Type

18 units of Floor Standing Type

26 units of Ceiling Mounted Built-in Type



## National Historical Museum in KUWAIT

This building is in Kuwait.  
Total floor area is 850 m<sup>2</sup> and total  
air conditioning capacity is 54 Hp.



### Equipment

Outdoor units: 1 units of 26 Hp heat pump type  
1 units of 28 Hp heat pump type  
Indoor units: 31 units of Floor Standing Type





## Immaculate Heart of Mary in SINGAPORE

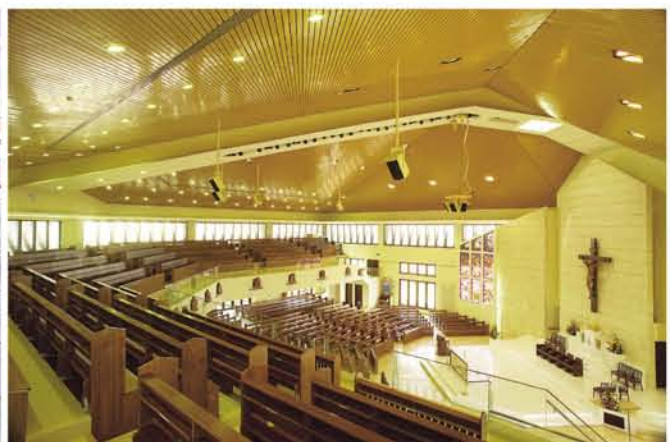
Total floor area is 6,500 m<sup>2</sup> and 2 stories. Construction was completed in 2002. Premises are a place of worship. For easy use and energy savings, the VRV system is ideal. Long pipe lengths have always to be considered by consultants and VRV can supply every need.



### Equipment

Outdoor units: 42 units

Indoor units: 91 units of Ceiling Mounted Cassette Type <Multi (4) way flow>  
& Ceiling Mounted Built-in (or Concealed Ceiling Unit) Type  
& Ceiling Mounted Duct (or Concealed Ceiling Unit Large) Type





## Emmanuel Cathedral Presbytery Church in SOUTH AFRICA



This building is in South Africa. The project was completed in December 2004. This church is one of South Africa's national monuments, and great care had to be taken to not damage the existing building structure. The project was refurbishment of an existing building having an already installed chiller system. The main reasons for VRV II selection was easy installation, individual control and energy savings. VRV II was seen as the only way an air conditioning system could be installed that would not be detrimental to this historic church.

### Equipment

Outdoor units: 1 units of 42 Hp heat pump type  
Indoor units: 26 units of Ceiling Mounted Duct Type

