

# 精密空调

Precision Air Conditioning



# 施耐德电气 善用其效 尽享其能



全球能效管理专家施耐德电气为100多个国家的能源及基础设施、工业、数据中心及网络、楼宇和住宅市场提供整体解决方案，其中在能源与基础设施、工业过程控制、楼宇自动化和数据中心与网络等市场处于世界领先地位，我们致力为客户提供更安全、更可靠、更经济、更高效、更环保的能源。

## 施耐德电气在中国

施耐德电气与中国的关系可以追溯到19世纪初期。中国改革开放的总设计师邓小平早年在法国留学时，就曾在施耐德电气前身的工厂工作过。

1987年施耐德电气在天津成立第一家合资厂，20余年的发展历程，让我们深深扎根中国，并且与中国经济发展的脉搏共同跳动，不仅见证了中国经济起跑、加速和起飞的各个历史阶段，更是以推动中国经济发展为己任，成为一个名副其实的卓越贡献者。

施耐德电气以先进的技术和产品，全面参与到中国能源和基础设施建设的方方面面，包括为三峡工程、西气东输、南水北调、岭澳核电站等重大工程提供设备和服务，参与2008年奥运会43个奥运场馆的建设，并提供奥运保障团队，实现全程0事故，为中国60华诞庆典提供稳定用电、安全用电的电力保障服务。

目前，施耐德电气在中国设有77个办事处、22家工厂、6个物流中心、1个研修学院、2个研发中心以及1个实验室，在全中国有近15,000名员工、500家分销商以及遍布全国的销售网络。2007年底，中国成为施耐德电气在全球的第二大市场。

## 施耐德电气与节能增效

能源压力已经成为全球关注的重点，日前，中国政府宣布到2020年单位国内生产总值二氧化碳排放比2005年下降40%-45%，节能开发利用领域更具广阔发展前景。

施耐德电气认为生产能源最好的方式就是节省能源，施耐德电气将节能理念贯穿于能源生产和使用的各个环节，使得节能效果持续化，并成为中国节能领域的重要参与者和推动者。

我们通过能源管理手段及节能降耗技术，实现为客户节省10%到30%的能源消耗的目标，并致力于成为客户的能源管家、能效专家和“绿色”伙伴。

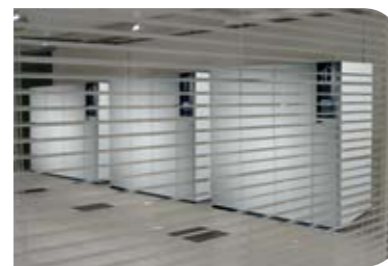
目前，施耐德电气在中国拥有100多套节能增效解决方案，以及300多种节能增效产品。在技术层面上为客户的节能项目提供有力保障。



1 Detail of a control room.  
控制室布局详图



2 Detail of a large computer room.  
大型计算机中心布局详图



3 Detail of Precision Conditioning units installed in a switching centre.  
安装有Precision Conditioning-精密空调组的交换中心布局详图

### Precision and Reliability

Many aspects of everyday life that we take for granted are now dependent on telecommunications and computer technology. The operation of airports, railway stations, banks, telephone exchanges and a whole host of other allied services such as the internet, cellular telephones and navigation systems, is fundamental to business and social life. The role of Precision Conditioning air conditioning equipment in ensuring the proper operation of these systems is therefore vital.

### Constant temperature and humidity

Modern electronic equipment may be able to operate under a relatively wide range of conditions but its longevity and reliability are greatly enhanced under constant conditions of temperature and humidity. All the heat produced must be removed to prevent catastrophic increases in temperature. Although electronic equipment produces only sensible heat, humidity must be monitored to prevent possible system faults.

Precision Conditioning air conditioning units are specifically designed to maintain temperature and humidity conditions within extremely tight tolerances, even when the heat load fluctuates.

### Total reliability

Painstaking design, stringent laboratory testing and Total Quality production processes ensure that Precision Conditioning units have the outstanding reliability which is a prerequisite for complex high technology installations.

### Active and passive safety

The UG40 microprocessor control constantly monitors the status of unit components and environmental parameters in order to ensure correct operation functioning during all modes of operation. Precision Conditioning also has intrinsic protection against abnormal or potentially damaging operating conditions.

### Operator safety

Precision Conditioning units conform to the relevant safety standards of most countries (as befits a manufacturer with Schneider Electric's global presence), and to those of the European Union in particular, and are CE-marked accordingly.

With all electrics in accordance with international IEC standards, Schneider Electric units offer maximum safety to users worldwide.

### 精密可靠

以前，我们对没有电子通讯和计算机的日常生活习以为常，但现在我们变得越来越依赖它们。

机场、铁路、银行、电话交换的运作以及一大堆相关服务比如互联网、手机、导航系统等已经成为商业、社会生活的基础。而扮演着“确保这些系统正常运转”角色的精密空调也就相应地变得十分重要。

### 恒温恒湿

现代化电子设备虽然也可在相对宽泛的环境条件下正常运行，但是稳定的温度和湿度环境将大大延长其使用寿命，提高其可靠性。所有的热量都必须被排出以避免温度剧烈上升。尽管电子设备只产生显热，但为了避免可能的当机，也必须进行湿度监控。

精密空调就是为了即使在热负荷波动的情况下，也可以将温度和湿度控制在一个极其狭小的范围内而专门设计的。

### 绝对可靠

卓越的可靠性是保障复杂高科技设备所必备的先决条件，而精心的设计，严格的实验室测试和全面质量监控的生产程序保证了精密空调系列产品拥有卓越的可靠性。

### 主被动安全系统

UG40微处理器控制器持续不断地监控机组组件的状态和环境的参数，以保证在各种模式下机组的正常运行。此外，针对反常的或潜在的损害性运行条件，精密空调系列机组设计还有自我保护功能。

### 操作安全

精密空调机组符合绝大多数国家相关得安全质量标准（也符合施耐德电气作为一个国际生产商的身份），特别是欧盟成员国标准，并获得欧洲标准质量认证。

施耐德电气空调机组的所有电器部件都符合国际电工委员会标准，为全球用户提供了最大限度的安全保障。





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## High energy efficiency

The minimising of operating costs in high-tech installations is becoming ever more an imperative in a competitive market-place.

Combined with the ever-greater emphasis on respect for the environment, this means that high energy efficiency is now a key factor in precision air conditioning. Precision Conditioning units have been designed with this objective at the top of the agenda.

Their low energy consumption is the result of an exhaustive analysis covering everything from the choice of components to the constant refinement of design solutions:

- SCROLL compressors are used throughout the range
- Electronic expansion valves (EEV) are standard throughout the range
- High efficiency Back-ward curved fans available with electronically commutated motor or with traditional asynchronous motor
- Optimised air flow pattern to reduce pressure drops both internally and at the discharge
- Energy-Saving (ES) versions which maximise free cooling time and thus minimise compressor operation.
- Effective integration in mixed systems that use high capacity chillers with Free-cooling coils designed for these applications
- Control strategies ensure optimum operation of system components under all operating conditions
- Control software that operates energy-saving cycles to maximum effect
- Tandem compressor versions for very high part-load efficiency

## SHR close to 1



The primary objective of precision air conditioning must be to dissipate the real heat load in the space. Electronic equipment produces only sensible heat. Any unwanted latent cooling (dehumidification) provides no useful service to the equipment being cooled and is a considerable waste of energy in itself and in the extra energy that may then need to be expended to put humidity back into the space.

For this reason Precision Conditioning units have been designed to provide a very high ratio of sensible to total cooling (Sensible Heat Ratio).

## Net sensible cooling capacity

Efficiency is a philosophy that is expressed through clear choices within which the real contributions to the equipment cooling capacity must be clearly identified. Schneider Electric has made technical choices for the product aimed at solutions that optimise the real contribution to removing heat from the space: the net sensible capacity (sensible cooling - fan motor heat gains).

## 高能效

在一个竞争激烈的市场，最小化高技术设备的运营成本势在必行。当前对环保的前所未有的强调也表明：高能效已经成为精密空调竞争力的一大关键因素。因此精密空调机组在设计时即将高能效这个目标放在首位。其低耗能是建立在详尽的分析研究工作基础之上的。这样的分析包括了从部件的选择到涉及方案的精益求精等各个方面。

- 整个系列所有机组均采用涡旋式压缩机。
- 电子膨胀阀使用于整个系列的标准配置
- 配有电子换向发动机或传统异步马达的高效的后曲风扇
- 采用优化的气流模式减少了内部和出风口压降。
- 采用节能方案，将自由节能制冷时间最大化，压缩机运行时间最少化。
- 配备了自由节能冷却盘管的大容量水冷机组提高了系统综合效率
- 完美的控制方案确保系统部件在任何操作条件下都处于最佳状态。
- 操控软件令节能循环系统发挥最大效率。
- 采用前后双压缩机方案创造了相当高的部分负载能量使用效率。

## 接近100%的显热比

精密空调的首要目标就是必须驱散受控空间中的实际热荷。由于电子设备只产生显热，因此对设备进行的任何潜在冷却（除湿）都是不需要的和无效的，对其自身消耗的能源和用来补回湿度的能源都是一个巨大的浪费。为此精密空调的显冷在总冷量中占有相当高的比例（显热比）。

## 净显冷量

制冷学意义上的效率是指制冷量对负载制冷的实际贡献。为了实现最佳的散热结构，施耐德电气为其产品进行了理智的技术选择-净显冷量（总显冷量减风扇电机的热能）。



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## Versatile configurations

Precision Conditioning equipment is the flexible solution to the precision air conditioning requirements of even the most complex of high-tech applications.

A wide range of configurations has been developed in order to give building services engineers maximum design freedom without the need for expensive bespoke solutions. Versatility is at the heart of the Precision Conditioning concept:

- Different fan configurations to cover a wide range of requirements
- A range of filter types and grades can be specified
- Different acoustic linings for the panels of the unit casing
- Adaptable to a variety of plant configurations
- Versions available with one or two independent refrigerant circuits
- Minimal footprint with frontal access for all maintenance
- Service clearance cut to the minimum
- Adaptability to a wide range of supervision and network languages and protocols
- Flexibility in the simple on-site implementation of a variety of configurations

## 灵活多变的组合

即使对于最复杂的高科技设备而言，精密空调也是实现精密环境控制的最灵活手段。

多种多样的配置方式给予楼宇装修工程师最大的设计空间，不必预定昂贵的设备来解决装修问题。

灵活性是精密空调设计的核心思想。

- 多种风扇配置满足了各种不同的需求。
- 有不同类型和等级的过滤器供选择。
- 不同类型的机箱板隔音内衬可供选择
- 能使用于多样化的配置模式
- 可提供一个单制冷回路或两个独立制冷回路
- 占用空间小，所有的维护可从正面完成。
- 维护空间最小
- 与多种监控、网络语言和协议兼容。
- 多种配置方式使现场操作方案简单而灵活

1 Direct expansion unit with scroll compressor.  
涡旋式压缩机直接膨胀机组

2 Cooling circuit with EEV (Electronic Expansion Valve - detail).  
电子膨胀阀冷却循环

3 EU4 air filter with metallic frame.  
金属框架EU4 空气过滤网

1 Downflow unit with backward curved blades fans.  
Unità downflow con  
配有后曲叶片风扇的下送风机组

2 Backward curved blades fan with EC motor.  
带有电发发电机组的后曲叶片风扇



## Air Flow Configurations

Both Downflow and Upflow applications use high efficiency air filters up to category EU8 (EUROVENT 4-5 or ASHRAE 52-76 classification).

### 气流配置

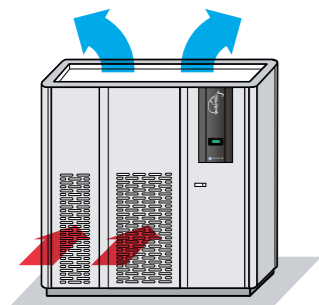
下送风机组和上送风机组都可以提供高效式空滤器，最高可达EU8级。(EUROVENT4-5或ASHRAE 52-76)

## Upflow Units

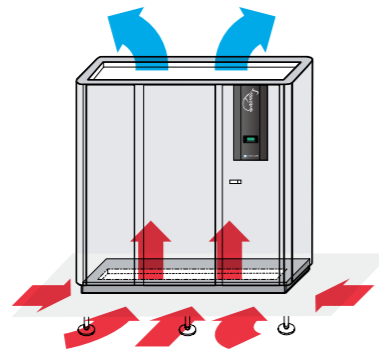
Upflow units (with air discharge from the top) are designed to distribute the conditioned air by means of a free-blow plenum, through a system of ducts or via a suspended ceiling. Air intake is normally through the front of the unit but versions are also available with air return through the rear or via the base.

### 上送风机组

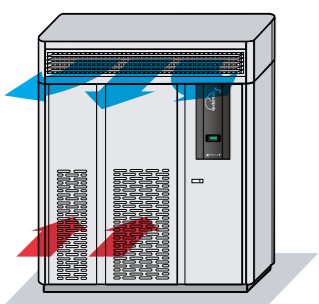
上送风机组(冷空气从顶部送出)采用无栅风口的方法，通过管道系统或吊顶天花将冷气送出。其回风通常在机组正面，但亦可在机组底部或后部。



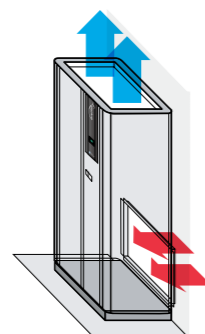
Upflow unit with suction from the front.  
从前部进风的上送风机组



Upflow unit with suction from the base.  
从底部进风的上送风机组



Upflow unit with front discharge plenum and suction from the front.  
带有风帽从前部进风的上送风机组



Upflow unit with suction from the rear.  
从背面进风的上送风机组



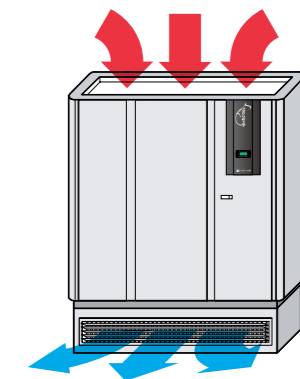
## Downflow Units

Downflow units (with air discharge through the base) handle large volumes of air that are distributed into the space via the void under a raised access floor. Air enters the top of the unit directly from the space, via ductwork or through a ventilated ceiling.

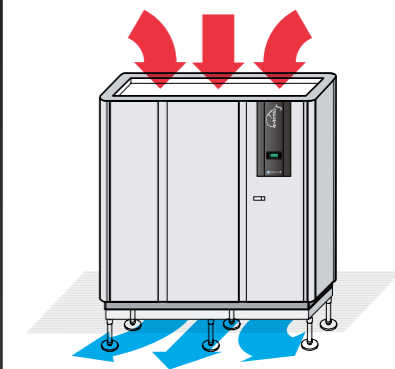
### 下送风机组

下送风机组(冷气从底部送出)通过高架地板下的空间将大量冷风送入室内空间。

室内空气通过通风管道或者吊顶天花直接送入机组顶部。



Downflow unit with enclosed floor stand and front discharge.  
Unità Downflow con zoccolo di mandata frontale.

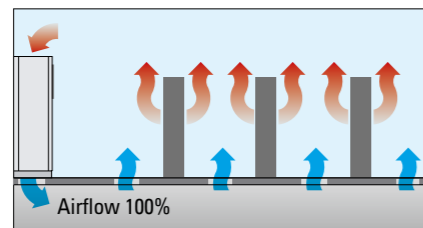


Downflow unit installed on access floor.  
Unità Downflow installato sul pavimento sopraelevato.

### Intelligent dehumidification

One important characteristic of Precision Conditioning units is that the dehumidification function operates only when actually required. This is achieved without a reduction in the airflow rate, ensuring continuous and uniform air distribution in the space and avoiding any sudden variations in discharge and space air temperature.

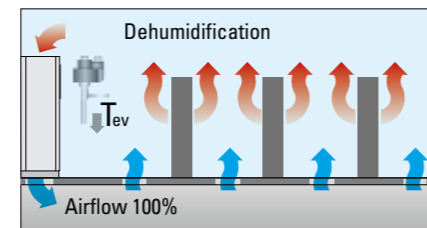
Direct expansion Precision Conditioning units use an innovative system of dehumidification by means of the electronic expansion valve and Schneider Electric's exclusive control software.



### 智能除湿

精密空调机组的一个重要特性就是除湿功能只有在环境真正需要的情况下才运行。实现这一目的并不需要牺牲气流速度，向室内送风的持续性和均衡性得到保障并避免了任何送风和环境气温的变化。

直接膨胀式精密空调机组配有采用电子膨胀阀和施耐德电气高级控制软件的最新除湿系统。



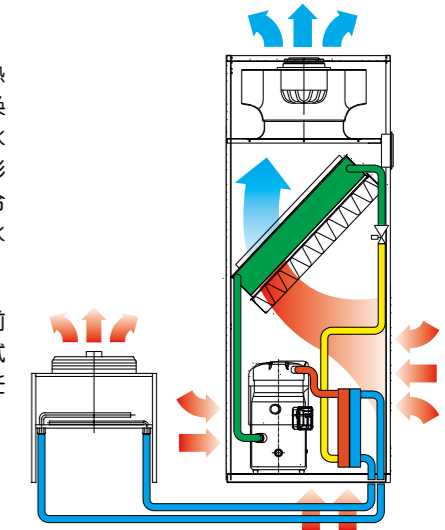
### DXW series water-cooled direct expansion units

In water-cooled units the heat extracted from the room is transferred to water via stainless steel brazed-plate heat exchangers within the unit. The cooling water may be fed from the mains supply (where permitted), a cooling tower or a well (ie: open circuit), or circulated in a closed loop cooled by external dry-coolers. In the latter case an anti-freeze mixture of water and ethylene glycol is normally used. Water-cooled units have the advantage that the refrigerant circuits are pre-charged and sealed in the factory. This makes system installation extremely simple, eliminating the need for any site-installed refrigerant pipework.

### DXW 系列水冷式直接膨胀机组

在这个系列产品中，水冷式机组从房间吸取的热量散发到安装在机组内的铜焊接不锈钢热交换器—冷凝器流通的冷却水中。冷却水可从主供水管道接入(如果场地允许)冷却塔或水井(这样形成一个开路)，也可以与外部的干冷器组成闭合回路。在这种闭合回路情况下，通常需要使用水和乙二醇的混合物以防结冰。

水冷式机组由此具备了一个优点，由于出厂前制冷剂已经预先灌装，制冷管路已被密封、测试好。这使机组的安装非常简单，现场不再需要任何的冷媒管道安装工作。



Note: The configuration which is shown is only an example  
此配置仅作为范例。

### DXA series air-cooled direct expansion units

Air-cooled direct expansion units extract heat from the room and transfer it to the outside air using air-cooled refrigerant heat exchangers (condensers). Once installed, the room unit and external condenser form an autonomous sealed circuit.

The Schneider Electric remote condensers used with Precision Conditioning units include precise electronic fan-speed condensing pressure control to ensure trouble-free operation of the unit throughout the year under a very wide range of external air temperatures. Special attention has been paid to the acoustic design of the condensers to minimise noise levels. A wide range of combinations is available to meet different site requirements.

### DXA系列风冷式直接膨胀机组

风冷式直接膨胀机组从房间吸取热量通过风冷式热交换器(即冷凝器)传递到室外空气中。机组安装完毕，室内机组与室外冷凝器即构成闭合回路。施耐德电气在精密空调机组上使用的远程冷凝器上设置了精密的电子风扇调速器及冷凝器上设置了精密的电子风扇调速器及冷凝压力控制器来保证机组在室外温度变化较大的情况下也能常年无故障运行。

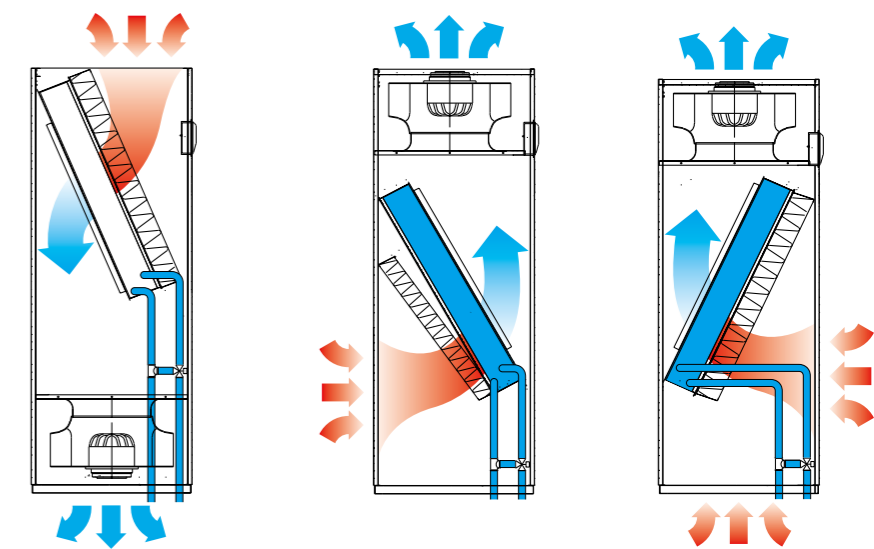
为了将噪音最小化，机组特别重视冷凝器消音设计。多种配置方式可以满足不同场地的要求。

### CW chilled water units

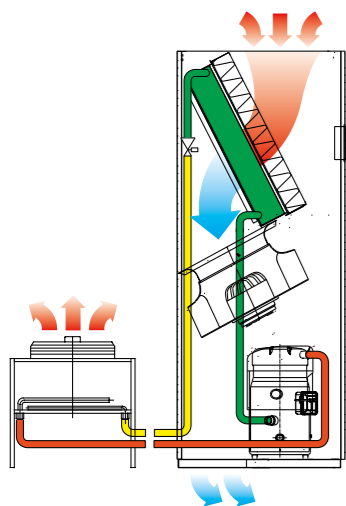
CW units use the availability of chilled water to control room conditions. This version of Precision Conditioning has a relatively simple construction and outstanding reliability. The microprocessor controls the modulating action of the 3-way (or optional 2-way) chilled water valve to give accurate capacity control. Careful sizing of the heat exchanger coils yields a high sensible-to-total cooling ratio under most operating conditions at the appropriate chilled water temperatures.

### CW系列冷冻水机组

CW冷冻水机组运用冷冻水来控制室内温度。精密空调这类型的机组结构非常的简单，并且性能卓越。微处理器通过控制可调三通或二通电动阀门，精确地控制室内空气条件。精心设计的热交换盘管尺寸，在大多数条件下以适当的冷冻水温度提供非常高的显冷比。



Note: The configuration which is shown is only an example  
此配置仅作为范例。



Note: The configuration which is shown is only an example  
Nota: La configurazione illustrata è a titolo esemplificativo



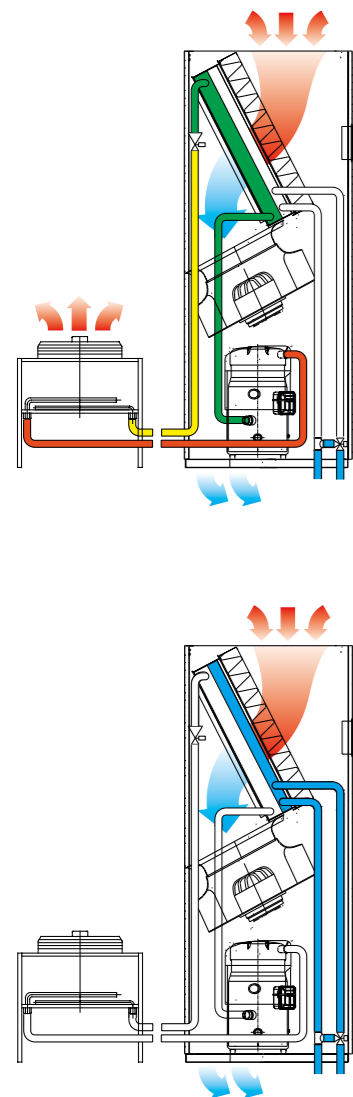
### Twin-Cool units

Precision Conditioning Twin-Cool units are fitted with two completely independent cooling circuits:

- Chilled water
- Air-cooled or water-cooled direct expansion

This unit is usually used where an installation has a chilled water source which cannot be relied on to guarantee continuous service. In this case function priority is given to the chilled water circuit, with the microprocessor control automatically starting direct expansion operation if the chilled water supply fails or if the water is not cold enough to dissipate the entire heat load. Alternatively the unit controls can be set to prioritise direct expansion cooling, activating chilled water operation only in the event of a compressor malfunction.

Twin-Cool units therefore provide a very high level of security; ensuring continuous system operation at all times and with the flexibility to manage the cooling resources in the best way for the particular installation.



Note: The configuration which is shown is only an example  
此配置仅作为范例

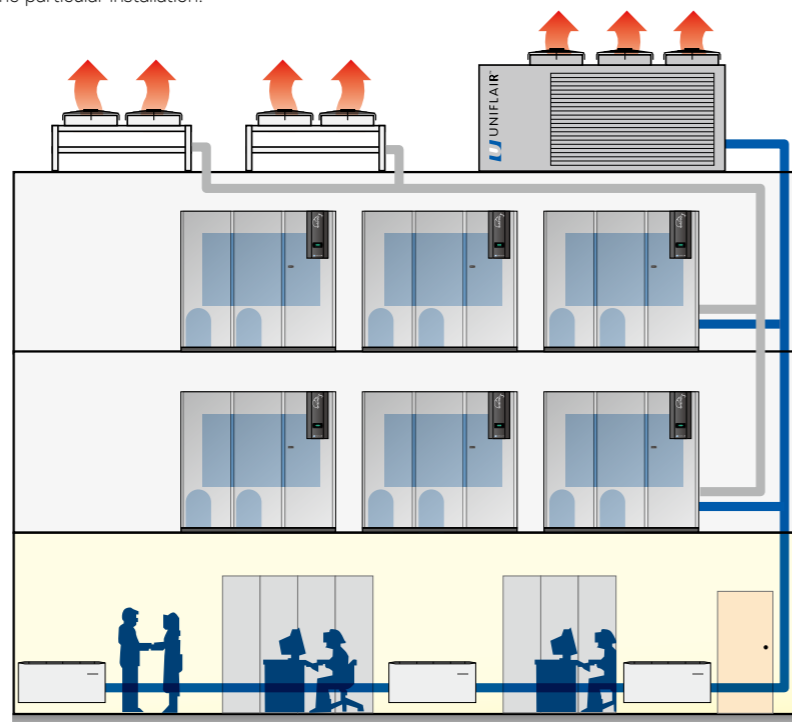
### 双冷源机组

精密空调双冷源机组具有两路完全独立的制冷系统:

- 冷冻水系统
- 风冷或水冷式直接膨胀系统

这种机组通常用在主楼系统可提供冷冻水源却不能保证全年中持续供应的场地。机组设定优先使用冷冻水制冷系统, 在不能提供冷冻水或当冷冻水不能够满足全负荷要求时, 微处理器控制器将自动启动直接膨胀制冷系统。

双冷源机组具有较高的安全性。它能保证制冷系统的运转在任何时候都不间断, 而且可以根据不同的环境灵活地选择最佳的制冷资源利用方式。



### Energy-saving units

Precision Conditioning Energy-Saving units represent the ultimate energy-efficient solution in cool or temperate climates.

The operating principle exploits the “free-cooling” effect available when the outside air temperature is lower than that in the conditioned space: the lower the outside temperature, the greater is the energy saving. The sophisticated microprocessor control manages operation of the unit automatically in three different situations. In summer the unit operates as a normal closed circuit glycol-cooled system (diagram A). As the external temperature falls, the coolant can be used directly for the free-cooling of the air. In this case the coolant is circulated in the coil inside the unit (diagram B) and both the refrigerant circuit and the glycol circuit contribute to cooling, thus reducing the energy used by the compressor.

If the outside temperature falls further to a level where the coolant can dissipate the entire heat load from the room then the refrigerant circuit is shut down completely and the unit functions as a traditional chilled water unit with modulating valve (diagram C).

With this technology Precision Conditioning Energy-Saving units provide significant reductions in operating costs and payback periods.

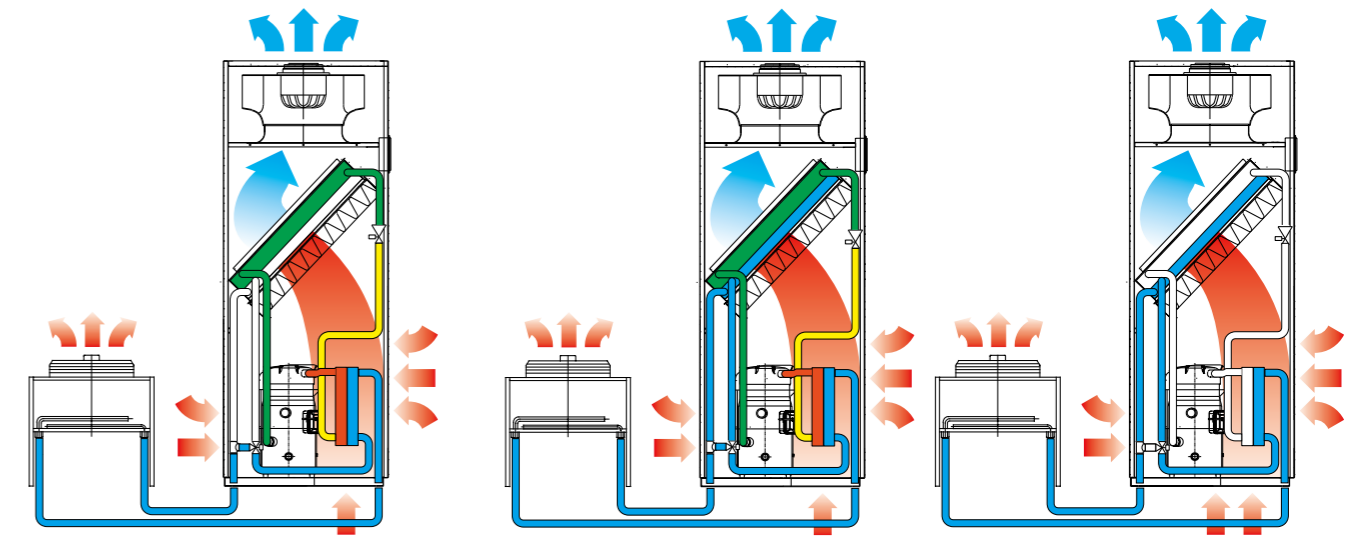


Fig. A

Mechanical cooling operation  
单一机械制冷

Fig. B

Mixed cooling operation  
混合制冷

Fig. C

Free-cooling operation  
自由节能制冷

Note: The configuration which is shown is only an example  
此配置仅作为范例。

### 节能型机组

精密空调节能型机组所采用的制冷方式代表了低温或温和气候下的最佳节能方式。

根据制冷学相关原理: 当室外温度低于受控环境温度时, 自由节能制冷是可以实现的, 并且室外温度越低, 节能效果越好。优秀的施耐德电气微处理控制系统能在三种不同气候条件下自动地管理机组的运行。

夏季, 机组采用普通的乙二醇制冷系统运行制冷。当室外温度降低时, 乙二醇制冷剂可以直接用于自由节能制冷。此时, 乙二醇在制冷盘管中循环, 制冷剂回路和乙二醇回路同时制冷, 这样就减少了压缩机的能量消耗。

当室外温度远低于临界温度—单独使用(节能型)乙二醇制冷系统就足以驱散室内的全部热荷时, 压缩制冷系统就会完全关闭, 整个机组运行起来就相当于—台加装了电动阀的传统冷冻水机组。

利用这种技术, 精密空调节能型机组可大大降低运行成本, 缩短投资成本的回收期。

### Electronic Expansion Valve (EEV)

The very latest proven technologies have been applied in the new generation of Precision Conditioning units, including the use of electronic expansion valves as standard in all models. This innovation provides highly efficient electronic control of the flow of refrigerant in a precise and stable fashion unmatched by any traditional mechanical expansion valve. Under the control of the Schneider Electric Control System, the EEV provides accurate control of the refrigerant superheat in order to ensure an increase in the COP at low external temperatures because it enables the unit to operate at much lower condensing pressures than would be possible with a traditional mechanical valve. The dehumidification function is also controlled through the operation of the EEV. In this way dehumidification is achieved without a reduction in the airflow rate, ensuring continuous and uniform air distribution in the space and avoiding any sudden variations in discharge air temperature.

### 电子膨胀阀(EEV)

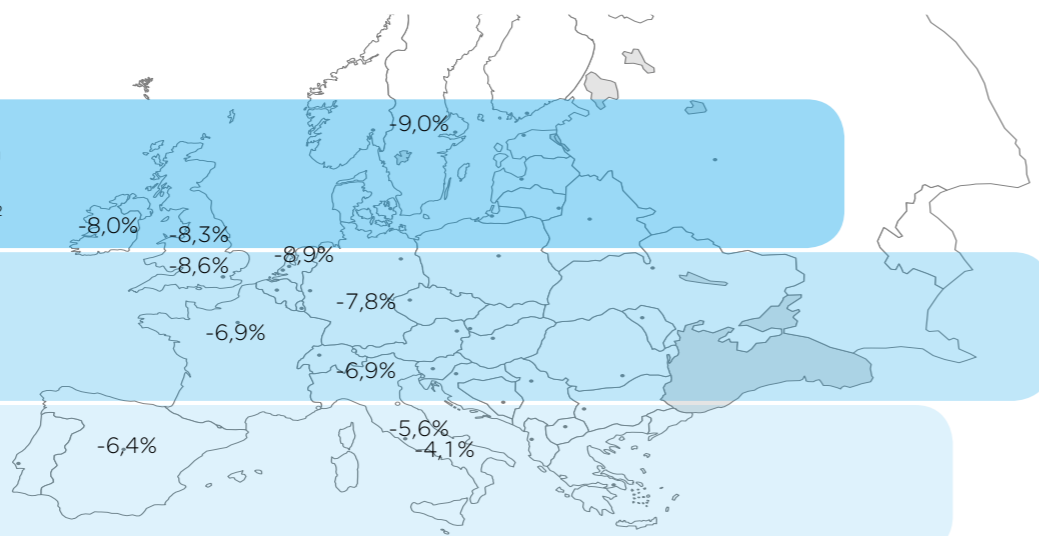
新一代精密空调机组应用了一大批最新科技成果, 电子膨胀阀便是其中之一。

电子膨胀阀能大大提高制冷剂流电子控制的效率, 传统机械膨胀阀无法与之匹敌。

施耐德电气控制系统通过电子膨胀阀对制冷剂温度进行了精确的控制以防止过热并确保制冷系数在较低室外温度下有所提升, 这使得施耐德电气机组能够在相较于使用传统机械阀的机组之所需冷凝压力更低的冷凝压下工作。

通过电子膨胀阀还可以实现免除湿功能。在不减小风量的情况下, 确保室内空气持续而均衡, 避免任何突然的温度变化。

Percentage annual reduction in energy consumption of a unit fitted with EEV compared to a traditional version (cooling capacity: 60 kW, Space conditions: 24° C, 50% RH at constant load, TDAV1822A + 2 x CAL0801).



采用电子膨胀阀的机组与传统机组年度能量消耗对比 (TDAV1822A+2XCAL0801机组, 制冷60KW, 稳定负载状况下, 环境温度24度, 50%RH.时的数据-测试地点阿姆斯特丹)

### EC Fans

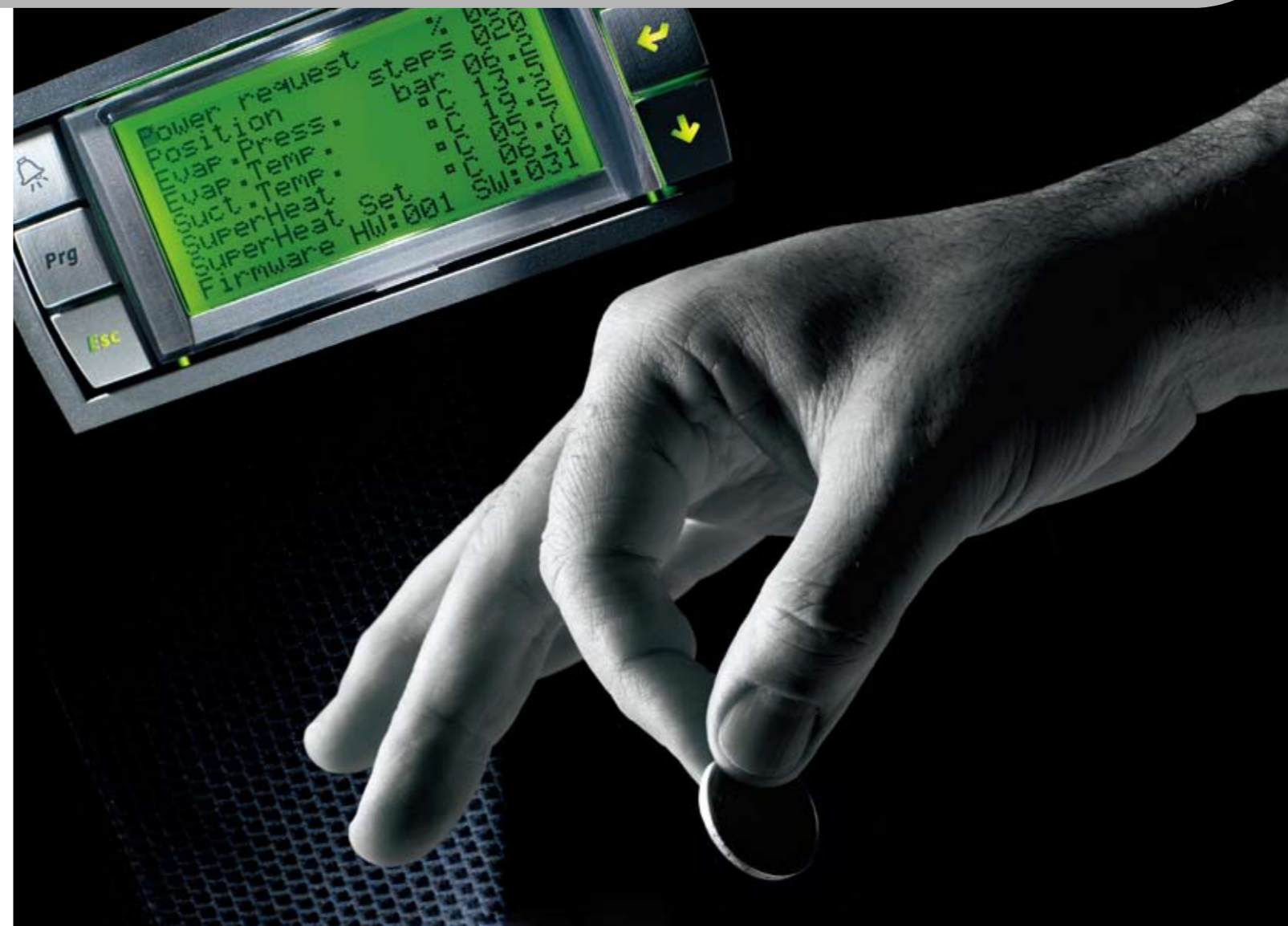
Every component of the Precision Conditioning range of units has been chosen in accordance with the major design criterion of energy saving for maximum efficiency. In this context, just one example is the selection of EC (Electronically Commutated) direct current motors. This new type of fan-motor combination offers a number of advantages over traditional types:

- 45% less power consumption on average for CW units and 60% less fan power consumption on DXA units
- high part-load efficiency
- fan speed adjustment via the microprocessor control while the unit is running

### 电子换向风机

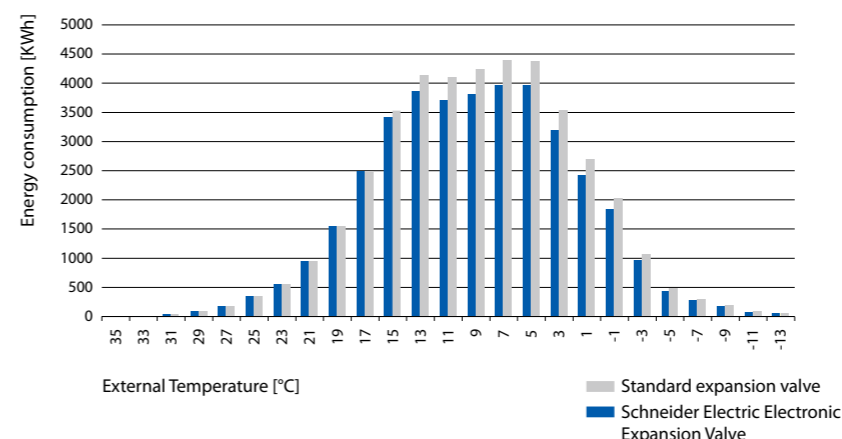
精密空调机组每一个部件的选择都遵循该系列总不同系列的精密空调机组的每一个部件都会选择按照最高效能和节能标准设计的产品。以电动马达风机为例, 这种风扇和马达相结合的新产品相比传统类型有许多优点:

- 对冷冻水机组平均节能45%; 对直接膨胀式风冷机组平均节能60%;
- 部分负载时能量使用效能相当高;
- 机组运行时, 可以通过微处理控制器调节风速;



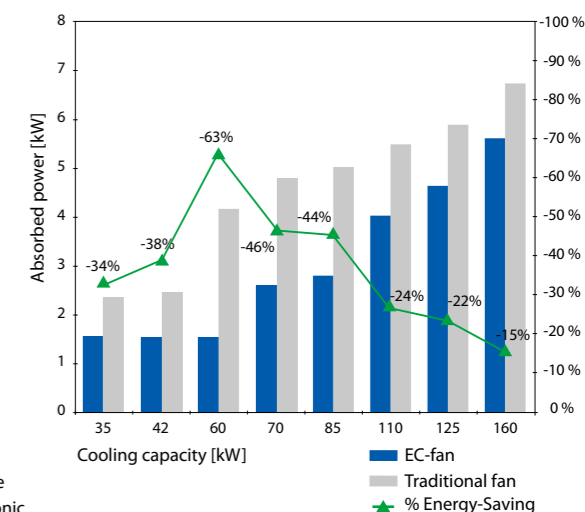
Comparison of annual power consumption between a unit fitted with EEVs and one with traditional expansion valves (cooling capacity 60 kW, space conditions 24° C, 50% R.H. at constant load, TDAV1822A + 2 x CAL0801 - Amsterdam).

采用电子膨胀阀的机组与传统机组年度能量消耗对比 (TDAV1822A+2XCAL0801机组, 制冷60KW, 稳定负载状况下, 环境温度24, 50%RH.时的数据-测试地点阿姆斯特丹)。



Comparison of power consumption between a unit fitted with EC fans and one with traditional fans (space conditions 24° C, 50% R.H. at constant load, series TDCR and TDCV).

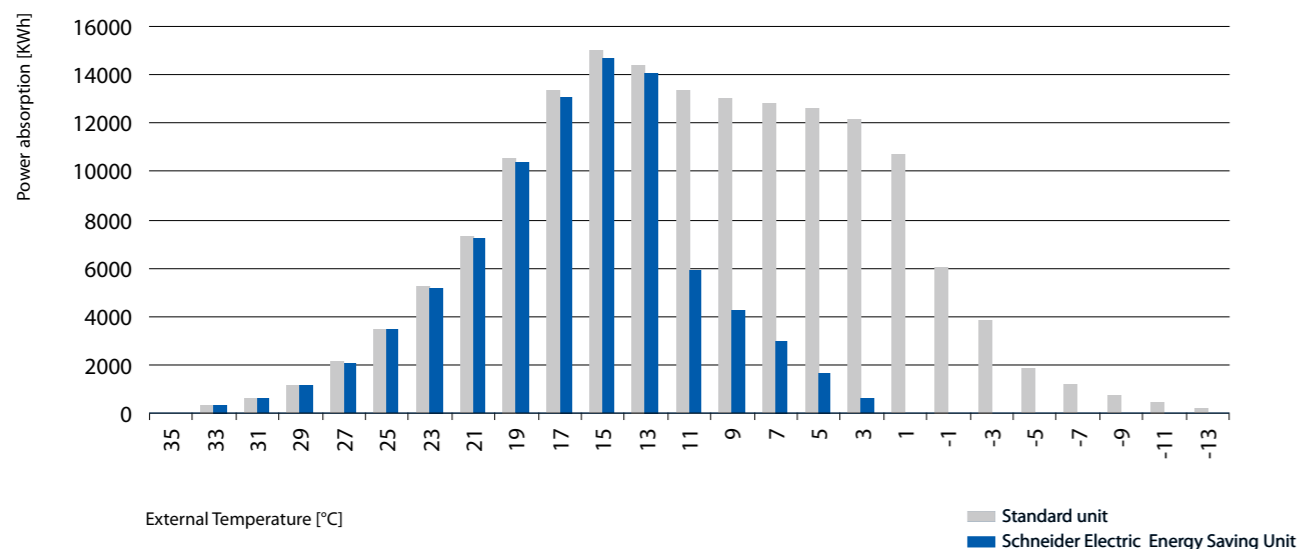
采用了电子换向风机的机组与采用传统风机的机组能量消耗对比 (稳定负载, 环境温度控制24度, 50%RH.时, TDCR与TDCV系列)





Comparison of annual power consumption between units with and without free-cooling system (Space conditions 24° C, 50% R.H. at constant load, TDER1822A + 2 x RAL3600 Vs TDDR1822A + 2 x RAL3600 - Frankfurt).

采用自由节能系统和未采用该系统的机组年耗电量消耗比(稳定负载, 环境温度24度, 50%RH.时, TDER1922A+2X RAL3600与TDDR1922A+2XRAL3600-法兰克福)



	Energy Saving	% Saving
Rome	-41506 kWh	-24,3%
Madrid	-55743 kWh	-33,5%
Milan	-68077 kWh	-41,2%
Frankfurt	-74730 kWh	-46,5%
Paris	-56620 kWh	-34,2%
Amsterdam	-84806 kWh	-53,2%
London	-72876 kWh	-40,1%
Berlin	-79015 kWh	-48,9%
Stockholm	-98348 kWh	-62,5%

Reduction in annual power consumption of units with free-cooling system compared to those without (Space conditions 24° C, 50% R.H. at constant load, TDER1822A + 2 x RAL3600 Vs TDDR1822A + 2 x RAL3600).

Riduzione del consumo energetico annuo di unità dotate o meno di sistema di free-cooling (Condizioni ambiente: 24° C, 50% U.R. a carico costante, TDER1822A + 2 x RAL3600 Vs TDDR1822A + 2 x RAL3600).

能量消耗仍然是现代化空调系统运行成本的重要组成部分之一。在确保机器运行最大的可靠性的同时, 确保将能量消耗降到最低是工业生产的必然选择。

精密空调节能款空调机组即是根据上述理念而设计的。

该节能原理的理论基础是: 当室外温度低于受控环境温度时, 自由节能制冷是可行的, 并且, 室外温度越低, 节能效果越好。自由节能制冷不需要使用压缩机并且是间接制冷, 即不需要借助于将外界空气泵入受控环境而实现制冷。从而可以保证稳定的受控环境温度和空气质量。

In many applications the room load can vary enormously during the course of a single day or from season to season. This in turn will cause wide variations in the amount of cooling required at any given moment. In these circumstances it is very important to use precision air conditioning units which very high energy-efficiency at part-load. Precision Conditioning models (with suffix \*\*21, \*\*42) are specifically designed with part-load environments in mind; fitted with two compressors operating in parallel on the same circuit, these models offer two stages of cooling on a single circuit of refrigeration. As the evaporator coil surface area (designed for the capacity of two compressors) is fixed, one single compressor in operation (fig. B) benefits from the availability of a "double sized" evaporator coil - this maximisation of the cooling effect leads to obvious increases in part load efficiencies and resultant beneficial rise in the part-load COP (Coefficient Of Performance).

In order to compare part-load efficiencies of different units, a number of different parameters have been developed which take into account the COP at 25%, 50%, 75% and 100% load and calculate a weighted mean. These parameters (IPLV: Integrated Partial Load Value, EMPE: Efficienza Media Ponderata in Regime Estivo, ESEER: European Seasonal Energy Efficiency Ratio) differ in their weightings and the operating conditions at which the different COPs are calculated but they all follow the same formula. All figures for Precision Conditioning units are based on the ESEER system which uses the formula:

$$\frac{(W_{100\%} \times COP_{100\%}) + (W_{75\%} \times COP_{75\%}) + (W_{50\%} \times COP_{50\%}) + (W_{25\%} \times COP_{25\%})}{100}$$

Tandem / Double circuit	T	D	T	D	T	D
Cooling capacity [kW]	25	25	35	35	45	45
COP	3,2	3,2	3,3	3,3	3,6	3,6
ESEER	4,0	3,5	4,1	3,6	4,3	4,0



在很多情况下, 室内热荷载会发生突变。不论以天为单位来看还是以季节为单位来看都是如此。

这将导致每一时段平均制冷需求次数大幅度变化, 在这种情况下, 使用具有相当高的“部分负载时能量使用效率”的精密空调就变得非常重要。带有\*\*21后缀的精密空调在同一循环系统中安装了两套平行运行的压缩机, 该机型在一个制冷循环中提供了两个制冷平台因为蒸发盘管(设计为能匹配双压缩机的容量)表面积是确定的, 一个单独运转的压缩机配上了一个两倍容量的蒸发盘管当然变得事半功倍一制冷效率的最大化毫无疑问地将导致部分载能效增加并且有助于部分负载时的制冷系数增加。

为了比较不同机组的部分负载时的能量使用效率, 我们使用了一系列不同的参数计算在25%, 50%, 75%和100%等不同的运行负载情况下的机器制冷系数, 并求其加权平均数。这些参数(IPLV:综合部分载荷指数(value), EMPE, ESEER:欧洲季节性能效比率)的加权系数和运行环境虽然不一样, 但是, 它们都依据同一个公式而来。

计算中精密空调机组获取所有的数值都是基于欧洲季节性能效比率系统, 该系统也采用了上述公式。

Comparison of part-load efficiencies for DXA units (TDAR).  
DXA机组部分负载能效比较。

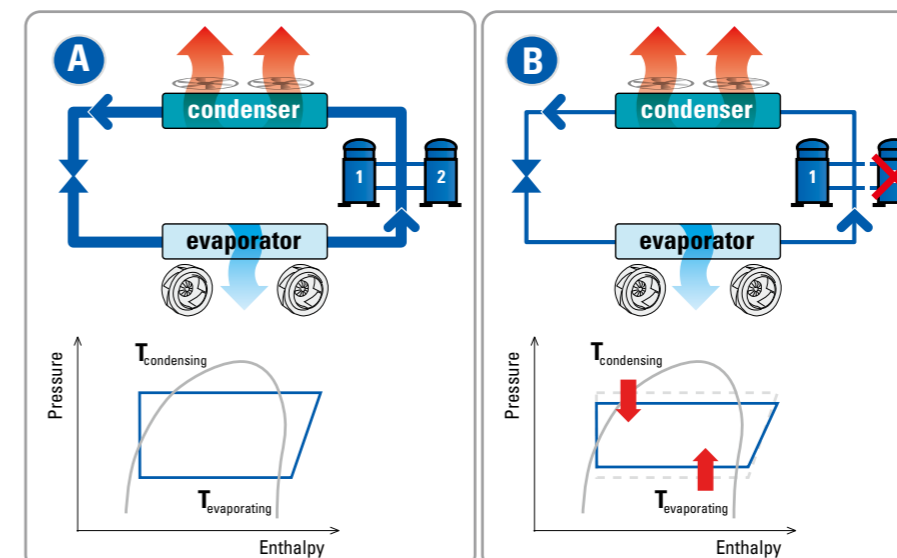
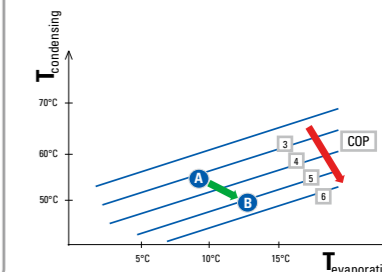


fig. A - 100% Operation

fig. B - part-load Operation







### Compact dimensions

Schneider Electric has always paid special attention to the dimensions of its equipment and to the logistics of its handling, installation and accessibility. Given the very high cost of space in high-tech environments, it is vital not only to have precision air conditioning with the smallest possible footprint but that the same equipment must also have full frontal component access to enable units to be installed side by side with each other, or with other equipment. Precision Conditioning units represent the industry benchmark in this respect - particularly compact, low-weight, quick and simple to install, and easy to manoeuvre even in confined spaces.

### Handling and installation

Precision Conditioning air conditioning units are designed for maximum ease of on-site handling and installation.

Particular attention was focused on reducing unit widths in order to optimise space utilisation in the data centre.

### Maintenance

The ease of maintenance of Precision Conditioning units is a further fundamental factor in reducing operating costs and avoiding downtime. The front panels can be opened without the need for special tools and all normal maintenance operations can be carried out from the front of the unit. A push-button catch ensures easy access to the controls compartment while the cover of the electrical panel inside is fitted with a safety interlocked mains isolator in compliance with safety regulations.

What is more, they can be carried out with the unit in operation and without disrupting the airflow.

### 尺寸紧凑

施耐德电气一贯重视机组的外形尺寸和设备搬运、安装的方便以及操纵的简便。

由于高科技环境的空间成本高昂，因此不光占地面积要尽可能地小，机组还必须具有完全的可正面访问属性（各个部件都能实现正面操作）以使得机组能够一台紧挨着一台安装，或者紧挨着别的设备安装。精密空调机组机构紧凑、重量轻、安装简单快捷、在狭小空间里的移动灵活方便，是同行业的表率。

### 搬运和安装方便

精密空调机组的设计实现了最大限度的利于现场搬运和安装，并特别注重减小机组宽度以实现空间利用的最优化。

### 维护便利

便于维护是精密空调机组减少运作成本和避免当机的一个更基本的要素。

机箱的前盖板不需要使用任何特殊工具就能打开，所有的常规维修都可以从机组正面完成。

按钮式拉手保证了（维修人员）可以方便地接触控制部，并且根据安全规范，配电盘装有安全互锁隔离开关。

这些设计便于机组在运行过程中进行维修，丝毫不影响气流。





- 1 Scroll compressor.  
涡旋式压缩机
- 2 Brazed plate condenser.  
铜焊冷凝器
- 3 Electrode boiler humidifier.  
电极式加湿器
- 4 Three-way modulating valve in Energy-Saving units.  
三通调节阀(节能型机组用)
- 5 Backward curved centrifugal blades fans.  
后曲式离心风机
- 6 Electric heaters with safety thermostat.  
带过热保护的电加热器
- 7 Refrigerant circuit liquid receiver  
带截止阀和安全阀的储液罐
- 8 Safety valve.  
安全阀
- 9 Condensing pressure control valve.  
冷凝压力控制阀
- 10 Refrigerant circuit filter dryer.  
干燥过滤器
- 11 Electronic Expansion Valve.  
电子膨胀阀
- 12 Liquid line sight glass.  
液体管视镜
- 13 Refrigerant high pressure switch.  
高压保护开关
- 14 Refrigerant low pressure transducer.  
低压保护开关
- 15 Metal frame air filter.  
金属框架空气过滤器
- 16 Temperature and humidity sensor.  
温度和湿度传感器
- 17 Cooling coil.  
蒸发盘管
- 18 Microprocessor control board.  
微处理控制器
- 19 Electronic Expansion Valve driver.  
电子膨胀阀驱动器
- 20 Fan section panel.  
风机挡板
- 21 General main switch.  
总开关
- 22 Local user terminal.  
本地用户终端



Schneider Electric has always dedicated particular attention to equipping its units with sophisticated controls and management software, conceived, developed, implemented and tested by Schneider Electric itself.

In this way, as well as guaranteeing the maximum flexibility in application to any specific project, every control solution is designed to maximise the performance and reliability of the type of unit to which it is fitted. The operation of every component of the unit is monitored in real time, its performance optimised and kept within design parameters.

As sophisticated as the control algorithms may be, the interface is user-friendly and intuitive with a very easy-to-read backlit display. All-in-all, the control system is extremely reliable, very flexible and high-performance.

### Reliability

- Monitoring of all components
- Precise and clear display of any malfunctions or abnormal operating conditions with a record of the last 100 events
- Management of emergency conditions: the facility to deactivate the operation of heaters and humidifiers for example in predetermined emergency situations while still maintaining basic cooling needs

### Performance

- Energy-Saving: the special control algorithm ensures the optimum balance between energy-efficiency and precise environmental control at any given moment
- Free-cooling: extensive laboratory research and long experience of free-cooling systems in the field have enabled Schneider Electric to optimise the control of this facility to achieve unrivalled levels of running cost savings
- Electronically commutated dc fan motors: in chilled water units it is possible to provide continuous control of fan speed as a function of heat load in order to reduce power consumption at part-load
- Integral management of the electronic expansion valve: complete control of the operation of the EEV in order to:
  - Optimise the benefits in terms of energy-efficiency
  - Ensure constant air flow and distribution in all operating modes, including dehumidification
  - Absolute operating stability

### Flexibility

The control software enables the operation of the unit to be adapted to every type of installation thanks to:

- The facility to input a double set-point for both temperature and humidity
- The facility to change fan speed directly from the user terminal (units with EC fans)
- Flexible configurability of alarm outputs
- The facility to calibrate temperature and humidity sensors
- The facility to interface with a wide range of BMS systems

施耐德电气对于“为机组配备优秀的(经得住考验的)控制与管理软件”一直相当关注,并自行进行了相应的设计构想、研发、施行、测试。

精密空调机组的每一套控制方案都是配套于机组,为实现机组性能最大化和可靠性最大化而专门设计的。运行任何特殊任务时都能保证最大限度的使用灵活性,每一个部件的运行都实现实时监控,其性能最优而且保持了设计时的参数标准。

施耐德电气机组的控制面板界面十分友好,超薄面板直观易读。

总而言之,控制系统非常可靠,非常灵活,非常高效。

### 可靠性强

- 实现所有部件实时监控
- 准确而清晰地显示任何的事故和异常运转情况并保留100条历史记录。
- 危机管理: 加热器和加湿器的制动程序简单,在预设的紧急情形下,制动后仍然能够满足基本的制冷需求。

### 性能卓越

- 节能: 独特的控制方式保证机组能够在最佳能量使用效率与最精密环境控制之间保持平衡。
- 自由节能制冷: 广泛的试验和在自由节能制冷系统领域的长期经验使施耐德电气实现了控制的最佳化,从而在节约成本方面达到了前所未有的效果。
- 电子换向风扇电机: 在冷冻水机组中,这种风扇实现了对风速的持续性控制(热负荷功能之一),减少了部分负载情况下的耗电量。
- 电子膨胀阀的全局管理功能: 电子膨胀阀在运行中实现全局控制:
  - 使能量使用效率达到最大化;
  - 在包括除湿在内的任何运转模式下保证稳定的气流及气流分布;
  - 运转稳定、绝对可靠。

### 控制灵活

控制软件的如下特点使得机组能够适应各种形式的安装下的运行:

- 能够方便灵活地输入温湿度设定数值组
- 能够从用户终端直接而方便地改变风速(用于电子换向风机)
- 报警显示灵活可调
- 温湿度传感器校准方便
- 可灵活与多种楼宇管理系统连接



1 Local Area Network settings. Impostazione dei parametri della rete locale (LAN).

2 Wide connectivity to the most common communication protocols. Ampia connettività ai più comuni protocolli di comunicazione.

3 Built-in LAN card for local network connection (up to 10 units). Scheda LAN integrata per la realizzazione di una rete locale composta fino a 10 unità.

### Total supervision

Precision Conditioning units play a vital role in high-tech applications: that of guaranteeing the full efficiency of the systems they serve. The essential and costly nature of these services means they depend upon the maintenance of environmental conditions for their continued functioning - the consequences and costs of any interruption to operation are so serious as to be unacceptable. The performance of the total air conditioning system should therefore be continuously monitored in order to detect any potential faults so that preventative maintenance can be carried out before a breakdown occurs. In order to achieve this objective, entire installations of Schneider Electric equipment can be monitored from a central location, either on or off-site, via connection to a centralised supervision system.

For each individual unit, some of the operations that can be carried out in real time include:

- Signalling of alarm or warning conditions
- Display and memorising of environmental parameters
- Adjustment of set-points
- Display of run hours for main components
- Time due until the next scheduled service in a customisable maintenance programme.

Schneider Electric units have been designed and developed to interact with all the most widely used Building Management Systems, exchanging data via the most common communication protocols through serial connections, Local Area Networks, Ethernet or modem links.

Furthermore, the control system includes the Modbus communication protocol directly on the RS485 serial card, removing obviating the need for any gateway.

### 可实现完全监控

精密空调机组在高科技应用领域扮演着重要角色: 通过环境控制以保证其所服务的系统的高效率。系统要持续稳定地运作必须依赖于特定的环境条件,这是环境控制服务如此重要、如此昂贵的根本原因。空调运行的任何中断其结果和损失都将是严重、难以接受的。从而整个空调系统的运行必须受到持续的监控,以侦测任何可能的故障并在当机之前采取必要的措施。

为了实现这一目的,整个施耐德电气机组设备都可以与集中管理系统连接,实现从控制中心进行现场或远程监控。对每一个独立的机组,能够实时执行的操作包括:

- 发出报警信号或者进行环境警告
- 显示并记录环境参数
- 调整参数的设定值
- 显示主要部件的运行时间
- 可根据用户设定的维护计划时间表显示的维护倒计时

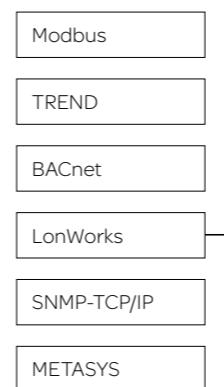
施耐德电气机组可与大多数楼宇管理系统通过串口、局域网、以太网、调制解调器进行连接,使用大多数的通用协议进行数据交换。

另外,RS485串口卡还为控制系统提供了modbus 通讯协议,不需要再使用其他的网关就可进入。



1 Local user terminal. Terminale utente locale.

2 Room temperature and relative humidity visualization and parameter settings. Impostazione dei parametri di funzionamento e visualizzazione delle condizioni ambientali.



3



1-2-3 Schneider Electric Research & Development Laboratory. Laboratorio di Ricerca e Sviluppo Schneider Electric.



## Outstanding performance

Complex high-tech installations need precision air conditioning systems, i.e. they must maintain Environmental Conditions within precisely defined limits, without hunting, regardless of fluctuations in demand.

To confidently perform under these conditions, particularly in sensitive IT environments whose failure has catastrophic consequences, requires a commitment to Research and Development, that encompasses the very ideals of Precision Conditioning, both man and machine.

Schneider Electric's commitment to 5% of annual turnover in R&D has resulted in 2000 m<sup>2</sup> of research and testing facilities in conjunction with state-of-the-art software and sophisticated mathematical modelling techniques. All Precision Conditioning components are rigorously pre-tested to ensure that supplier's data is matched by performance in situ.

## The outcome is Outstanding Performance

- precision air conditioning units that provide almost exclusively sensible cooling
- energy efficient design producing latent cooling only when required
- high airflow rates to produce efficient fluid dynamics and prevent temperature swings
- extremely compact dimensions
- low fan power consumption

Finally, the complete Precision Conditioning unit is tested and re-tested to ensure consistent performance across all ranges, in every model.

## Respect for the environment

Every aspect of the Precision Conditioning series has been evaluated for its environmental impact during the process of design and development, a philosophy reflected across the whole Schneider Electric product range.

In addition to minimising the indirect global warming potential by efficient use of energy, this also means the use of recyclable materials and strictly eco-compatible refrigerants.

Precision Conditioning units are also particularly quiet, thus contributing to an environment suited not only to equipment but also to people.

The same applies to the range of air-cooled condensers and dry-coolers, because low external noise levels can be equally important in many applications, particularly for night-time operation.

## 机器性能优异

复杂的高科技设备（特别是在对环境相当敏感，稍有不慎就会产生灾难性后果的IT行业）需要将环境条件控制在特定的范围内，不能出现超出限制的摆动或者震荡。这就需要精密空调系统的参与。

要使设备能够在这样的运行环境稳定运行。就需要对精密环境的控制研究开发进行人力物力投入，这就是精密空调产品和我公司员工一直践行的理念。

在研发工作上，施耐德电气每年投入5%的营业额，建成了两千平米的研究实验室，采用最优秀的软件和数据模型技术。所有的精密空调部件都经过了严格的测试，以确保供应商提供的性能数据与实际中的性能数据符合。

## 卓越的性能：

- 所有精密空调里独有的高显冷
- 只有当需要时才产生潜冷
- 大风量支持的温度均匀分布和恒定
- 结构紧凑
- 风扇低能耗

最后精密空调机组还必须经过反复测试以确保每一系列每一型号性能的稳定。

## 环保

在研发过程中，对精密空调系列的每一方面对环境可能产生的影响都进行了考量。这也是始终贯穿于施耐德电气产品系列的一个理念。除了有效的利用能源，最小化潜在的全球变暖趋势外，还采用可回收材料和严格无害于环境的制冷剂。

精密空调机组运行特别安静，其对环境的贡献不仅体现在创造适合所服务的设备之环境，也包括缔造有宜于人类的环境。

风冷冷凝器和干冷器也具有上述特点：因为在很多情况下，特别是夜间运行时，低外部噪音显得同样很重要。

## 施耐德电气：全球能效管理专家

作为全球能效管理专家，施耐德电气致力于通过更好的能源管理及节能降耗技术帮助中国客户减少碳排放，实现商业竞争力的提升。施耐德电气的EcoStruxure™能效管理体系旨在为客户提供涵盖电力、工业、建筑楼宇、数据中心、安防5个领域、可集成的智能能源管理体系解决方案，帮助客户最大化能源使用效率。通过EcoStruxure™实时监控和优化能源使用，企业的能源管理将会更加透明，可实现最高达30%的持续性节能降耗。

## 施耐德电气致力于中国的节能减排

施耐德电气从自身做起，对在华的21家工厂实施了针对改善自身能效的“能源行动方案”。2009年新竣工的施耐德（北京）中低压电器有限公司就是其中的典型代表。它通过一个能效管理平台，将整个工厂的配电系统、暖通系统、照明系统进行实时能耗管理。在新厂房占地面积增加37%的情况下，2009年施耐德（北京）中低压电器有限公司仍节能12.4%，而项目的投资回收期小于3年。

施耐德电气还积极与中国政府及相关机构合作推进节能减排，获得了广泛认可。其中：2010年成为工业和信息化部首批节能服务公司名单中仅有的两家国际公司之一；2011年初又荣获节能服务产业委员会(EMCA)颁发的“2010中国节能服务产业优秀企业奖”。

近年来，施耐德电气还在中国积极推动能效人才的培养。2009年和2010年施耐德电气连续成功举办了“施耐德电气杯”大学生节能增效创新竞赛，来自清华大学、上海交通大学、华北电力大学、北京航空航天大学、山东建筑大学、同济大学等数十所高校累计超过240支大学队伍参加，产生超过30余项优秀的大学生节能增效创新设计作品。2010年，施耐德电气与北京大学共同发起并建立中国高校能源系统设计与管理研究中心（简称能源管理研究中心），该中心计划通过3-5年的发展，成为全国最具影响力的能源系统设计与管理研究和示范项目平台。2010年9月，施耐德电气在中国正式推出施耐德电气能源大学（www.MyEnergyUniversity.com）中文版，旨在帮助中国培养一流的能效管理专业人才。能源大学是中国首个免费在线学习节能增效的平台，也是国内屈指可数的专业能效管理学习机构，它能够：提供方便、灵活的免费在线学习机会，并且满足不同级别的学习需要（入门级和专业级）。



T*AR/T*AV 风冷机组	0511	0611	0721	0722	0921	0922	1021	1022
T*WR/T*WV 水冷机组								
额定制冷容量 (房间条件: 24°C-50%Rh)								
输入电源 V/ph/Hz	400/3+N/50							
后曲叶片式离心风机 (型号为T*AR & T*WR)								
T*AR风冷机组 总冷量 kw	19.5	22.8	26.0	26.0	31.8	31.8	35.3	35.3
显冷量 kw	19.5	21.5	26.0	26.0	30.2	30.2	32.2	32.2
T*WR水冷机组 总冷量 kw		22.9			30.3			
显冷量 kw		21.5			29.6			
风机数量	1	1	1	1	1	1	1	1
额定风量 m <sup>3</sup> /h	5740	5740	8180	8180	8180	8180	8180	8180
电子换向 (EC) 离心风机 (型号为T*AV & T*WV)								
T*AV风冷机组 总冷量 kw			26.0	26.0	31.8	31.8	35.3	35.3
显冷量 kw			26.0	26.0	30.3	30.3	32.1	32.1
T*WV水冷机组 总冷量 kw		23.4			30.3			
显冷量 kw		21.5			29.7			
风机数量		1	1	1	1	1	1	1
额定风量 m <sup>3</sup> /h		5740	8220	8220	8220	8220	8220	8220
压缩机								
形式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式
数量	1	1	2	2	2	2	2	2
制冷回路	1	1	1	2	1	2	1	2
电加热器								
总功率 kw	6	6	9	9	9	9	9	9
电极式加湿器								
加湿量 kg/h	5	5	8	8	8	8	8	8
尺寸								
宽度 mm	1010	1010	1310	1310	1310	1310	1310	1310
厚度 mm	750	750	865	865	865	865	865	865
高度 mm	1960	1960	1960	1960	1960	1960	1960	1960
T*AR机组: 建议冷凝器								
数量	1	1	1	2	1	2	1	2
型号	CAL0661	CAL0801	CAL0801	CAL0361	CAL1011	CAL0511	CAL1301	CAL0511
T*WR机组: 建议干冷器								
数量		1			1			
型号		RAL1500			RAL1500			

\*制冷剂R407C

如需其它配置参数请与施耐德电气信息技术 (中国) 有限公司联系

T*AR/T*AV 风冷机组	1121	1122	1321	1322	1422	1622	1822	2202	3002
T*WR/T*WV 水冷机组									
额定制冷容量 (房间条件: 24°C-50%Rh)									
输入电源 V/ph/Hz	400/3+N/50								
后曲叶片式离心风机 (型号为T*AR & T*WR)									
T*AR风冷机组 总冷量 kw	38.7	38.7	42.4	42.4	51.6	58.8	65.8	81.5	103.3
显冷量 kw	38.7	38.7	42.4	42.4	51.6	57.6	60.5	78.6	97.6
T*WR水冷机组 总冷量 kw			41.7			58.8	65.2	81.8	108.6
显冷量 kw			41.7			57.6	60.3	78.8	102.6
风机数量	2	2	2	2	2	2	2	3	3
额定风量 m <sup>3</sup> /h	11710	11710	11710	11710	15600	15600	15600	23200	26000
电子换向 (EC) 离心风机 (型号为T*AV & T*WV)									
T*AV风冷机组 总冷量 kw	39.0	39.0	42.8	42.8	51.8	58.9	65.9	81.5	103.3
显冷量 kw	39.0	39.0	42.8	42.8	51.8	58.4	61.3	78.6	97.6
T*WV水冷机组 总冷量 kw			42.0			58.9	65.5	81.8	108.6
显冷量 kw			42.0			58.4	61.1	78.8	102.6
风机数量	2	2	2	2	2	2	2	3	3
额定风量 m <sup>3</sup> /h	12320	12320	12320	12320	16030	16030	16030	22000	23000
压缩机									
形式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式
数量	2	2	2	2	2	2	2	2	2
制冷回路	1	2	1	2	2	2	2	2	2
电加热器									
总功率 kw	15	15	15	15	15	15	15	18	24
电极式加湿器									
加湿量 kg/h	8	8	8	8	8	8	8	8	8
尺寸									
宽度 mm	1720	1720	1720	1720	2170	2170	2170	2170	2400
厚度 mm	865	865	865	865	865	865	865	865	950
高度 mm	1960	1960	1960	1960	1960	1960	1960	1960	1960
T*AR机组: 建议冷凝器									
数量	1	2	1	2	2	2	2	2	1
型号	CAL1301	CAL0661	CAL1301	CAL0661	CAL0801	CAL1011	CAL1011	CAL1301	CAL4002
T*WR机组: 建议干冷器									
数量			1			1	1	1	1
型号			RAL2300			RAL3600	RAL3600	RAL3600	RAL3600

\*制冷剂R407C

如需其它配置参数请与施耐德电气信息技术 (中国) 有限公司联系

T*AR/T*AV 风冷机组	2222	2242	2522	2542	2842	3342	
T*WR/T*WV 水冷机组							
额定制冷容量 (房间条件: 24°C-50%Rh)							
TUAR/TUAV(EC)风冷上送风机组	总冷量 kw	66.8	74.0	85.6	82.3	92.0	105.1
	显冷量 kw	60.8	66.8	73.3	71.9	77.9	85.8
TDAR/TDAV(EC)风冷下送风机组	总冷量 kw	69.9	76.3	88.6	85.1	95.7	109.3
	显冷量 kw	69.9	75.1	82.3	80.6	89.7	96.0
TUWR/TUWV(EC)水冷上送风机组	总冷量 kw		78.5		91.5	100.8	122.7
	显冷量 kw		63.8		77.4	79.9	99.1
TDWR/TDWV(EC)水冷下送风机组	总冷量 kw		82.2		91.9	104.0	121.3
	显冷量 kw		77.6		83.6	93.4	101.5
输入电源 V/ph/HZ	400/3+N/50						
后曲叶片式离心风机 (型号为T*AR & T*WR)							
风机数量	3	3	3	3	3	3	
额定风量 m <sup>3</sup> /h	22000	22000	23000	23000	23500	23500	
电子换向 (EC) 离心风机 (型号为T*AV & T*WV)							
风机数量	3	3	3	3	3	3	
额定风量 m <sup>3</sup> /h	22000	22000	23000	23000	23500	23500	
压缩机							
形式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	
数量	2	4	2	4	4	4	
制冷回路	2	2	2	2	2	2	
电加热器							
总功率 kw	18	18	18	18	24	24	
电极式加湿器							
加湿量 kg/h	8	8	8	8	8	8	
尺寸							
宽度 mm	2582	2582	2582	2582	2582	2582	
厚度 mm	865	865	865	865	865	865	
高度 (下送风机组) mm	2175	2175	2175	2175	2175	2175	
高度 (上送风机组) mm	1960	1960	1960	1960	1960	1960	
T*AR机组: 建议冷凝器							
数量	1	1	1	1	1	1	
型号	CAL2002	CAL2002	CAL3002	CAL3002	CAL4002	CAL5002	

\*制冷剂R407C

如需其它配置参数请与施耐德电气信息技术 (中国) 有限公司联系

T*CR/T*CV冷冻水机组	0600	0700	1000	1200	1700	2000	2500	2700	3400	4000	TDC*4300	
额定制冷容量 (房间条件: 24°C-50%Rh)												
输入电源 V/ph/HZ	400/3+N/50											
后曲叶片式离心风机 (型号为T*CR)												
T*CR机组	总冷量 kw	23.7	27.0	33.9	43.6	59.1	69.3	87.6	97.9	110.5	125.5	163.6
冷冻水温度 (7/12°C)	显冷量 KW	22.7	25.4	33.2	41.4	57.7	67.0	81.5	88.7	103.5	113.6	137.3
风机数量		1	1	1	1	2	2	2	2	3	3	3
额定风量 m <sup>3</sup> /h		5990	6060	10200	10420	14920	18680	18680	18133	24140	24265	26294
电子换向 (EC) 离心风机 (机组型号为T*CV)												
T*CV机组	总冷量 kw	24.0	27.2	34.4	42.2	57.2	69.3	88.4	98.0	110.8	125.6	168.7
冷冻水温度 (7/12°C)	显冷量 kw	22.6	24.7	32.7	40.0	55.1	67.0	82.2	88.8	103.8	113.6	142.2
风机数量		1	1	1	1	2	2	2	2	3	3	3
额定风量 m <sup>3</sup> /h		5990	6060	10000	10000	14000	18680	18880	18184	24232	24273	27994
电加热器												
总功率 kw		6	6	9	9	15	15	15	15	24	24	24
电极式加湿器												
加湿量 kg/h		5	5	8	8	8	8	8	8	8	8	8
尺寸												
宽度 mm		1010	1010	1310	1310	1720	2170	2170	2170	2580	2580	2580
厚度 mm		750	750	865	865	865	865	865	865	865	865	865
高度 mm		1960	1960	1960	1960	1960	1960	1960	1960	1960	1960	2170

如需其它配置参数请与施耐德电气信息技术 (中国) 有限公司联系

T*TR/T*TV 双冷源风冷机组	0611	0921	1321	1622	1822	2242	2542	2842
T*DR/T*DV双冷源水冷机组								
额定制冷容量 (房间条件: 24°C-50%Rh)								
风冷机组 总冷量 kw	22.8	31.5	42.2	58.6	65.6	74.2	83.9	92.7
显冷量 kw	21.3	29.5	42.2	56.8	59.7	70.5	76.4	81.5
水冷机组 总冷量 kw	22.8	30.0	41.4	58.6	65.1	81.2	90.6	100.7
显冷量 kw	21.3	28.9	41.4	56.8	59.6	73.7	79.4	85.0
冷冻水机组 总冷量 kw (7/12°C)	20.6	27.4	38.6	50.3	50.3	92.4	94.6	96.1
显冷量 kw	20.6	27.4	38.6	50.3	50.3	86.9	90.0	92.2
输入电源 V/ph/HZ	400/3+N/50							
后曲叶片式离心风机 (型号为T*TR & T*DR)								
风机数量	1	1	2	2	2	3	3	3
额定风量 m <sup>3</sup> /h	5550	7970	11390	15320	15320	22000	23000	23500
电子换向 (EC) 离心风机 (型号为T*TV & T*DV)								
风机数量		1	2	2	2	3	3	3
额定风量 m <sup>3</sup> /h		7940	11650	15420	15420	22000	23000	23500
压缩机								
形式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式
数量	1	2	2	2	2	4	4	4
制冷回路	1	1	1	2	2	2	2	2
电加热器								
总功率 kw	6	9	15	15	15	18	18	24
电极式加湿器								
加湿量 kg/h	5	8	8	8	8	8	8	8
尺寸								
宽度 mm	1010	1310	1720	2170	2170	2582	2582	2582
厚度 mm	750	865	865	865	865	865	865	865
高度(上送风机组) mm	1960	1960	1960	1960	1960	1960	1960	1960
高度(下送风机组) mm	1960	1960	1960	1960	1960	2175	2175	2175
T*TR/T*TV机组: 建议冷凝器								
数量	1	1	1	2	2	1	1	1
型号	CAL0801	CAL1011	CAL1301	CAL1011	CAL1011	CAL2002	CAL3002	CAL4002
*制冷剂R407C								

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T*ER/T*EV 节能机组	0511	0611	0721	0722	0921	0922	1021	1022
额定制冷容量 (房间条件: 24°C-50%Rh)								
输入电源 V/ph/HZ	400/3+N/50							
后曲叶片式离心风机 (型号为T*ER)								
T*AR风冷机组 总冷量 kw	19.5	22.9	25.7	26.5	30.0	30.8	34.1	35.4
显冷量 kw	19.5	21.4	25.7	26.5	28.9	29.2	30.9	31.5
冷冻水机组 总冷量kw (7/12°C)	20.6	20.6	27.4	27.4	27.4	27.4	27.4	27.4
显冷量 kw	20.6	20.6	27.4	27.4	27.4	27.4	27.4	27.4
风机数量	1	1	1	1	1	1	1	1
额定风量 m <sup>3</sup> /h	5550	5550	7970	7970	7970	7970	7970	7970
电子换向 (EC) 离心风机 (型号为T*EV)								
T*AV风冷机组 总冷量 kw	20.0	22.3	25.7	26.6	30.2	31.2	34.4	35.4
显冷量 kw	20.0	21.2	25.7	26.6	29.2	29.9	31.8	31.6
冷冻水机组 7/12°C 总冷量kw	20.9	20.9	27.4	27.4	27.4	27.4	27.4	27.4
显冷量 kw	20.9	20.9	27.4	27.4	27.4	27.4	27.4	27.4
风机数量	1	1	1	1	1	1	1	1
额定风量 m <sup>3</sup> /h	5550	5550	7940	7940	7940	7940	7940	7940
压缩机								
形式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式
数量	1	1	2	2	2	2	2	2
制冷回路	1	1	1	2	1	2	1	2
电加热器								
总功率 kw	6	6	9	9	9	9	9	9
电极式加湿器								
加湿量 kg/h	5	5	8	8	8	8	8	8
尺寸								
宽度 mm	1010	1010	1310	1310	1310	1310	1310	1310
厚度 mm	750	750	865	865	865	865	865	865
高度 mm	1960	1960	1960	1960	1960	1960	1960	1960
建议干冷器								
数量	1	1	1	1	1	1	1	1
型号	RAL1500	RAL1500	RAL1500	RAL1500	RAL1500	RAL1500	RAL1500	RAL1500
*制冷剂R407C								

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T*ER/T*EV 节能机组	1121	1122	1321	1322	1422	1622	1822
额定制冷容量 (房间条件: 24°C-50%Rh)							
输入电源 V/ph/HZ	400/3+N/50						
后曲叶片式离心风机 (型号为T*ER)							
风冷机组 总冷量 kw	37.7	38.6	41.4	42.2	49.9	58.6	65.1
显冷量 kw	37.7	38.6	41.4	42.1	49.8	56.8	59.6
冷冻水机组 7/12°C 总冷量kw	38.6	38.6	38.6	38.6	50.3	50.3	50.3
显冷量 kw	38.6	38.6	38.6	38.6	50.3	50.3	50.3
风机数量	2	2	2	2	2	2	2
额定风量 m3/h	11390	11390	11390	11390	15320	15320	15320
电子换向 (EC) 离心风机 (型号为T*EV)							
风冷机组 总冷量 kw	37.7	38.6	40.5	41.5	49.1	58.0	64.3
显冷量 kw	37.7	38.6	40.2	40.6	49.1	55.0	57.6
冷冻水机组 7/12°C 总冷量kw	39.2	39.2	39.2	39.2	50.5	50.5	50.5
显冷量 kw	39.2	39.2	39.2	39.2	50.5	50.5	50.5
风机数量	2	2	2	2	2	2	2
额定风量 m3/h	11650	11650	11650	11650	15420	15420	15420
压缩机							
形式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式	涡旋式
数量	2	2	2	2	2	2	2
制冷回路	1	2	1	2	2	2	2
电加热器							
总功率 kw	15	15	15	15	15	15	15
电极式加湿器							
加湿量 kg/h	8	8	8	8	8	8	8
尺寸							
宽度 mm	1720	1720	1720	1720	2170	2170	2170
厚度 mm	865	865	865	865	865	865	865
高度 mm	1960	1960	1960	1960	1960	1960	1960
建议干冷器							
数量	1	1	1	1	1	1	1
型号	RAL1500	RAL1500	RAL2300	RAL2300	RAL2300	RAL3600	RAL3600

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T*ER/T*EV 节能机组	2242	2542	2842
额定制冷容量 (房间条件: 24°C-50%Rh)			
风冷机组 总冷量 kw	81.2	90.6	100.7
显冷量 kw	73.7	79.4	85.0
冷冻水机组 7/12°C 总冷量kw	92.4	94.6	96.1
显冷量 kw	86.9	90.0	92.2
输入电源 V/ph/HZ	400/3+N/50		
后曲叶片式离心风机 (型号为T*ER)			
风机数量	3	3	3
额定风量 m3/h	22000	23000	23500
电子换向 (EC) 离心风机 (型号为T*EV)			
风机数量	3	3	3
额定风量 m3/h	22000	23000	23500
压缩机			
形式	涡旋式	涡旋式	涡旋式
数量	4	4	4
制冷回路	2	2	2
电加热器			
总功率 kw	18	18	24
电极式加湿器			
加湿量 kg/h	8	8	8
尺寸			
宽度 mm	2582	2582	2582
厚度 mm	865	865	865
高度 (下送风机组) mm	2175	2175	2175
高度 (上送风机组) mm	1960	1960	1960
建议干冷器			
数量	1	1	1
型号	RAL2300	RAL3600	RAL3600

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施耐德电气信息技术（中国）有限公司

北京  
中国北京市朝阳区望京东路6号  
施耐德电气大厦  
电话：86 (10) 8434 6699  
传真：86 (10) 6431 5686  
邮编：100102

沈阳  
中国沈阳市和平区和平北大街69号  
总统大厦A座1902室  
电话：86 (24) 2281 5008  
传真：86 (24) 2281 5783  
邮编：110003

广州  
中国广州市天河区黄埔大道西33号  
三新大厦23楼BCD室  
电话：86 (20) 3820 1388 / 3820 2833  
传真：86 (20) 3820 1436 / 3820 2049  
邮编：510630

福州  
中国福建省福州市福飞南路104号  
福建省电子技术研究所内二楼  
电话：86 (591) 8760 3245  
传真：86 (591) 8762 3181  
邮编：350003

西安  
中国西安市高新技术开发区  
高新四路1号高科广场A座703室  
电话：86 (29) 8836 1996 / 8835 4020  
传真：86 (29) 8836 1973 / 8835 4025  
邮编：710075

上海  
中国上海市普陀区云岭东路89号  
长风国际大厦12层  
电话：86 (21) 6065 6699  
传真：86 (21) 6076 8993  
邮编：200062

深圳  
中国广东省深圳市福田区中心四路一号嘉里  
建设广场第一座四楼401-402A室  
电话：86 (755) 8275 3666  
传真：86 (755) 8611 7409  
邮编：518048

成都  
中国四川省成都市科华北路62号  
力宝大厦南塔22楼2208室  
电话：86 (28) 85269216  
传真：86 (28) 86511536  
邮编：610041

武汉  
中国湖北省武汉市建设大道568号新  
世界国贸大厦38层15号  
电话：86 (27) 8548 6861  
传真：86 (27) 8548 6862  
邮编：430015

重庆 86 (23) 6295 5085  
贵阳 86 (851) 5812 359  
南京 86 (25) 8621 8260  
杭州 86 (571) 8704 3721  
兰州 86 (931) 8446 778  
长沙 86 (731) 4150 268  
昆明 86 (871) 3152 124  
乌鲁木齐 86 (991) 3856 730