

Air handling units with heat pump DP Comfort



TECHNICAL CATALOGUE

DP air handling units with heat pumps

Dan-Poltherm Sp. z o.o. has been operating on the Polish market since 1994 and specializes in air conditioning systems, ventilation, dehumidification and air heating. Our offer is targeted at designers, contractors, ventilation and air conditioning executors, investors, and individual customers. We guarantee the highest quality products and services. Dan-Poltherm employs professional technical staff, and the combination of experience with youth is the strength of our team. The motto of our company is to be close to customers, from the early phase of counseling to the period of device operation, as well as after the expiry of warranty obligations.

We have a quality management system certified according to ISO 9001.

We offer:

Free advice and selection of equipment

Installation and commissioning of equipment

Warranty and post-warranty service

In 2008, we started producing our own energy-saving DP air handling units equipped with reversible heat pumps. DP air handling units allowed to expand current central air conditioning unit with a new series. So our commercial and service company has become a trade, production and service company, which, on the one hand, imposes additional obligations on us, but on the other hand motivates us to work even more effectively.

DP – General description

DP air handling unit, equipped with highly efficient reversible heat pump, represent a new range of devices placed on the production line in 2008 by Dan-Poltherm. New units were created as a result of many years of work by a team of professionals and a thorough analysis of market needs. Using the latest technology in the field of air conditioning, we managed to create energy-efficient and reliable devices.

Compact DP air handling units are equipped with highly efficient, reversible heat pumps with COP coefficient close to 6 and EER above 4. DP PRS unit in standard comes with two recirculation sections: winter and year-round, called the PRS system. With a limited amount of fresh air (30%), the heat pump can operate effectively in the temperature range from -24 ° C to +35 ° C. For larger static losses of the air conditioned property (such as large windows), or with more fresh air (up to 100%), DP units can be equipped with a rotating cross or glycol heat exchanger.

DP units adjust preset spending and compressed air through high-efficiency variable speed fans with direct drive. They are also equipped with air supply and exhaust filters with pollution signaling. The offered DP units have built-in complete control managed by a freely programmable controller with the ability to work with BMS and our remote visualization system DP ViewNet. DP units, at the time of delivery, are complete, pre-tested, ready to work year-round air conditioning systems. Dan-Poltherm provides proprietary software driver, based on years of experience of our specialists. Multiple improvements and tests in different conditions allow optimal control of work and protection against failures of equipment.

The DP series includes models ranging from air flow 800 m³ / h and ending with a capacity of 40 000 m³ / h.

DP Series includes six configuration of air handling units with heat pumps:

DP-PRS - air handling units with heat pumps PRS air recirculation systems (shopping centers and facilities with limited participation of fresh air)

DPR - rotary heat exchanger with integrated heat pumps (theaters, cinemas, museums, lecture halls, auditoriums, concert halls, sports halls, buildings with a high proportion of fresh air)

DPR-PRS - units with rotary heat exchanger, heat pumps and PRS recirculation systems. DPR-PRS units combine all of the advantages of these two kinds. They are characterized by a high proportion of fresh air and increased cooling and heating capacity (use, as above),

DPX - air handling units with cross heat exchanger and heat pumps (theaters, cinemas, museums, lecture halls, auditoriums, concert halls, sports halls, buildings with a high proportion of fresh air)

DPX-PRS - air handling units with cross heat exchanger and heat pumps equipped with PRS recirculation system

increasing the cooling and heating efficiency of the heat pump (use, as above),

DPG-PRS – units equipped with PRS recirculation system with glycolic exchanger module allowing to increase the share of fresh air. Wider use for horizontal units where rotary or cross heat exchanger cannot be used because of the limited amount of space.

DP – Heat recovery

DP units are devices with configuration allowing optimum recovery of energy from the exhaust air. The system used in standard DP-PRS units apparently has a single-stage energy recovery - the heat pump. In fact, the heat pump can achieve up to three degrees of recovery. The recovery of sensible heat is present in each case. Latent heat recovery depends on humidity. The next stage in the recovery process should be entire heat recovery from energy supplied to drive compressors, by passing it to the cooling system, and more specifically, to the condenser. Using partial recirculation, we actually get the fourth stage of recovery.

DP units with additional X, R or G exchanger are the real fifth stage heat recovery.

DP – Construction

Supporting structures of all sections are made of anodized aluminum profiles. Shields are fully insulated with high-density polyurethane and coated on both sides with hot galvanized sheet, and then coated with an appropriate layer of polyester.

"Sandwich" type shields, fully insulated with polyurethane foam, have relatively small heat loss ($U = 0.55 \text{ W/m}^2\text{K}$) due to the thickness (40 mm) and density (42 kg/m³) of the material used for insulation. Sheathing comprises of completely closed and locked panels highly resistant to external weather conditions and corrosion, even in aggressive environments.

The unit has fixed shields, inspection covers and easily openable door, allowing quick access to the equipment during maintenance or inspection. Individual sections are combined into a single unit with internal fittings, ensuring a stable position on the mounting panel, on the prepared surface.

The unit's standard equipment is twisted, rigid foundation frame with a height of 100 mm and anti-vibration feet with adjustable height. The foundation frame is fixed to the structure of the unit, it has holes for easy transport, and its design makes installation of sections at the site easy.



DP – Accessories

Compact DP units are equipped with high-performance "plug-in" fans with direct drive, controlled by inverters or fans of the highest energy class, with EC motors. Both types of drive ensure a perfect fit of air flow to immediate needs

and meet applicable standards and regulations, such as the SFP.

DP units are equipped with heat pumps with "scroll" compressors with step or infinitely variable performance.

High performance, interleaved multi-circuit heat exchangers of heat pumps are designed and tested by Dan-Poltherm engineers, in collaboration with researchers from the Technical University of Gdansk. This innovative solution has received EU funding for innovative product.

Due to the increased heat transfer surface at heat exchangers, subsequent compressors are switched on much later, which causes a further increase in the (already very high) efficiency of the system.

The control panel is located inside the unit. The device has a built-in complete control, managed by a freely programmable controller.

As an optional feature of our units, we offer:

air heaters: electric, water or gas;

unit roofing, when mounted outside the building.

DP – Application

DP-PRS units are ideally suited for shopping centers, industrial and sports facilities, which require a limited amount of fresh air in a cross year's work. The use of R, X or G exchanger in combination with a heat pump allows you to increase the share of fresh air, providing a reliable and economical operation. It can be said that, due to high efficiency, they are complete air conditioning systems that, in a variety of applications, do not require supporting external systems, such as chilled or heating water. Only electricity is needed. It also greatly simplifies installation, commissioning and servicing the air conditioning system in the building.

DP pool units have an optimal configuration that provides the most energy-efficient operation of indoor swimming pools. DP pool units may have varying heat recovery elements such as:

- reversible heat pump
- irreversible heat pump
- cross heat exchanger
- double cross heat exchanger
- asymmetric cross heat exchanger
- glycol exchanger

The heat pump can work independently (as a dehumidifier), or as a team with one of the aforementioned passive heat exchangers. In some applications, the use of just one of the passive heat exchangers is enough. The final configuration of units is chosen by the designer, depending on facility specification and expectations of the investor.

Many years of experience have shown that the replacement of a large building chilled and heating water system and conventional air handling units with DP systems gives a visible investment saving. However, operational savings are much more significant.

The cooperation of DP devices with VAV controllers installed in the right places of ventilation system, allows optimal selection and providing the right amount of air for the current heat load of space, which, combined with variable fan output control, allows you to further minimize power consumption. The advantage of this system is that for most of the year it can provide 100% of fresh air at low operating costs, which undoubtedly creates conditions for higher comfort for persons who are inside the air-conditioned rooms.

DP – innovative technologies

Within the framework of the Regional Operational Programme for Pomorskie Voivodeship we have completed a project co-financed by the European Union from the European Regional Development Fund under the title: "Implementation of innovative technologies in the production of DP air handling units through the construction of a modern hall and the purchase of specialized equipment and assembly line."

DP – Advantages

The main advantages of the DP air conditioning units are mainly:

High energy efficiency equipment (heat pump COP \approx 6, EER > 4),

Ventilation, heating, cooling, energy recovery - all in one compact unit,

No external media except electricity *

Highly advanced control system,

Space-saving due to compact solution

Modular design for quick and easy installation, and commissioning of the device,

Components of renowned world producers

Ability to work with BMS and remote monitoring through a Web browser,

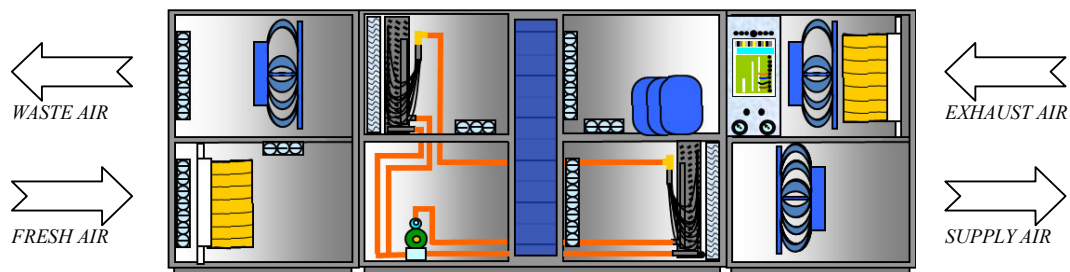
Several years of experience of DAN-POLTHERM.

** Not applicable to DP air handling unit with optional gas or water heater.*

Our air conditioning and ventilation systems based on DP units successfully work in a number of public buildings such as shopping centers, cinemas, auditoriums and concert halls.

DP – PRS

DP-PRS units provide reliable and economical operation. In the central DP-PRS are designed around the concept of Our heat pump co-operation design has been used, as an integral part of the device with two sections of recirculated air, forming together a single system, called the PRS by us (Polish Recirculation System).



Air handling units execution

Depending on the destination, DP units can be supplied in external or internal execution. You must also specify the execution as vertical or horizontal. If the units are to be equipped by-passes the heat exchanger pump should be included in the order.

Heat pumps parameters

DP standard units are equipped with a heat pump with performance tailored to each model. Upon request, the heat pump can have a different configuration (e.g., low-power), to be agreed with Dan-Poltherm.



Sizing DP air handling units

Heat recovery type:

PRS – air recirculation system

R– rotary heat exchanger

R-PRS – rotary heat exchanger and air recirculation system

X – cross heat exchanger

X-PRS – cross heat exchanger and air recirculation system

G-PRS – glycolic exchanger module and air recirculation system

Execution:

S – vertical unit

L – horizontal unit

Service side:

P – right unit

L – left unit

The adjacent quick-sizing chart, shows the scope of work of individual DP models and shows which unit should be selected, depending on the air flow.

All DP units may be supplied in "right-side" and "left-side" execution, depending on the access to the device possible at the facility. In determining the service side, the rule is that, standing in front of the air intake facing the direction of flow, the right or left hand side defines the unit's maintenance side.

Heat pumps

Heat pumps execution

All cooling systems are filled with refrigerant R407C.

Reversible heat pump in vertical DP units is one complete section, delivered complete to the site. The device is fully wired and filled with refrigerant, and tested at the factory prior to shipment to the customer.

Electrical connections with other external sections of the ventilator are done by pre-installed quick cable, which greatly reduces installation time on site.

Execution of heat pump / cooling systems:

- reversible heat pump - cooling in the summer and heating in the winter;
- cooling (non-reversible cooling system) - irreversible refrigeration system without the heating function for facilities with excessive heat loads, even during winter periods.

DP – Control

The new DP series is also most modern control systems.

DP units automatic is designed to simplify the start-up on premises.

Switchgear controls are installed in a specially dedicated control space, which reduces installation costs. There is no need to additionally assemble cable lines between the control panel and the switchgear.

All internal electrical connections are made and tested at the factory. At the site, it is enough to switch only the power cord to the unit and, the room sensor, if needed, and the device is ready for operation ("PLUG & PLAY").

To meet the expectations of our clients Dan-Poltherm introduced new control systems, which have been divided into two groups:

"STANDARD" control system

"ADVANCED" control system

„STANDARD” control system

Devices with STANDARD control have freely programmable controllers and software based on the years of experience of our specialists. DP units controller constantly monitor temperature, the parameters of the fan and heat recovery efficiency, and on the basis of the collected measurements control panel components, maximizing the efficiency of the device with the lowest energy consumption.

Each controller has an operator panel that allows local control of the device and reading all of the operational parameters. From the local desktop, you can also make schedules setting.

Depending on the required communication protocol customers can choose:

A controller with LonWorks communication protocol:

A controller with Modbus communication protocol:

Units equipped with Modbus protocol allow to plug in a module room that allows remote reading and setting of device parameters.

„ADVANCED” control system

This control system has been prepared for our most demanding customers.

The controller has a built-in graphical "Web Server", which allows limited visualization of operation, changes in setting time programs and archiving data within the controller. Simply connect the controller to a LAN so that all of its features are available anywhere in the world.

The device control can be done using any smartphone or PC with a Web browser.

DP –ViewNet System

With the introduction of the new DP series, Dan-Poltherm Sp. z o.o. introduced a system for comprehensive management and control system of ventilation and air conditioning throughout the facility. Coils, humidifiers, power meters, and many other facility devices, manufactured by other producers as well, can be connected to the system in addition to air-conditioning units. An additional advantage of the DP ViewNet is the ability to integrate with other facility-oriented systems.

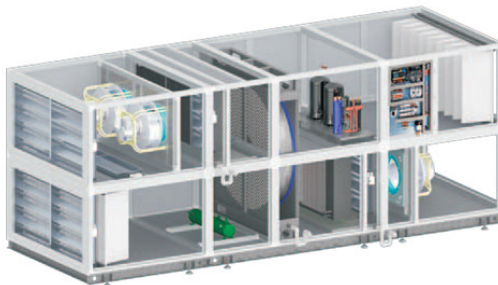
Local control uses a 17-inch touchscreen computer. Just tap the screen to change the schedule of equipment or

change the set temperature.

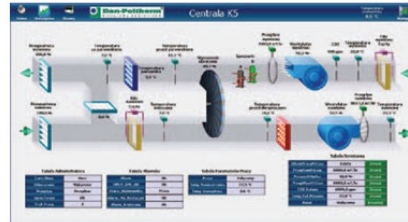
DP ViewNet allows unlimited recording of device parameters. The collected data can be viewed as graphs or exported to CSV, PDF, TXT or HTML files.



DP Comfort air-handling units are operation-ready sets with complete built-in automatic controls. With its proprietary and factory-tested software, any unit's operation is optimised in terms of its energy efficiency. Once powered, the devices are operation ready and do not require any expensive connections to external heating and cooling services, thus reducing the demand for power from boiler houses and power units installed in the building.



ViewNet DP system enables the devices' remote servicing by Dan-Poltherm maintenance personnel, which entails daily checks of the devices' performance and immediate response to any failure. The user is provided with the ability to control the building's system on-line via a web browser from any mobile or desktop device.



Upon delivery, every Dan-Poltherm's air-handling unit with heat pump is a complete, factory tested and operation ready air conditioning system. Every DP Comfort air-handling unit has a built-in control board and complete automatic controls managed by a freely programmable controller. DP units' controllers constantly monitor the temperatures, fans' operating parameters, and heat recovery efficiency, and on the basis of the collected measurements they control unit components to maximize the device's efficiency at the minimum energy consumption. Each unit's controller has an operator interface for local control of the device, and readout of all operating parameters. Also time schedule settings can be made from the local interface level.

Screenshot of the Dan-Poltherm ViewNet web interface showing a dashboard for 'KINO GEMINI'. The dashboard features a navigation bar with 'Start', 'Alarmy', 'Historyczne', 'Back', 'Forward', and 'Logoff' buttons. Below the navigation bar, the title 'KINO GEMINI' is displayed in a stylized font. The main content area contains seven temperature control cards for different units: Centrala N1W1, Centrala N2W2, Centrala N3W3, Centrala BCVU S1, Centrala BCVU S2, Centrala BCVU S3, and Centrala BCVU S4. Each card shows the current temperature (0,0 °C) and the set temperature (22,0 °C for the N units, 0,0 °C for the BCVU units). The interface is clean and modern, with a dark header and light background for the main content.



Centrala wentylacyjna N1W1 - Sale kinowe 1 i 4

Praca: Postój
Tryb pracy: Postój
Alarm: OK

Harmonogram

Przeływ nawiewu:

0 m³/hr

Zadany: 12200 m³/hr

Harmonogram

Przeływ wywiewu:

0 m³/hr

Zadany: 12200 m³/hr

Harmonogram

Reset centrali:

Wyłączony

Reset

Temperatura sala 1:

0,0 °C

Temperatura sala 4:

0,0 °C

Poziom CO2 sala 1:

0 ppm

Poziom CO2 sala 4:

0 ppm

Udział śwież. powietrza:

0 %

Minimum: 30 %

Harmonogram

Temperatura aktualna:

0,0 °C

Zadana: 22,0 °C

Harmonogram

Poziom zadany CO2:

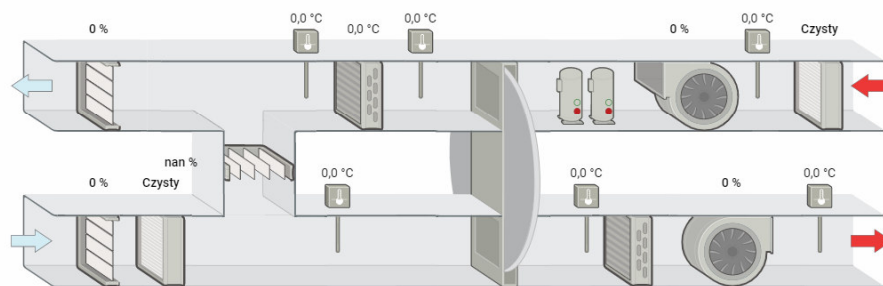
0 ppm

Zadany: 700 ppm

CO₂ Harmonogram

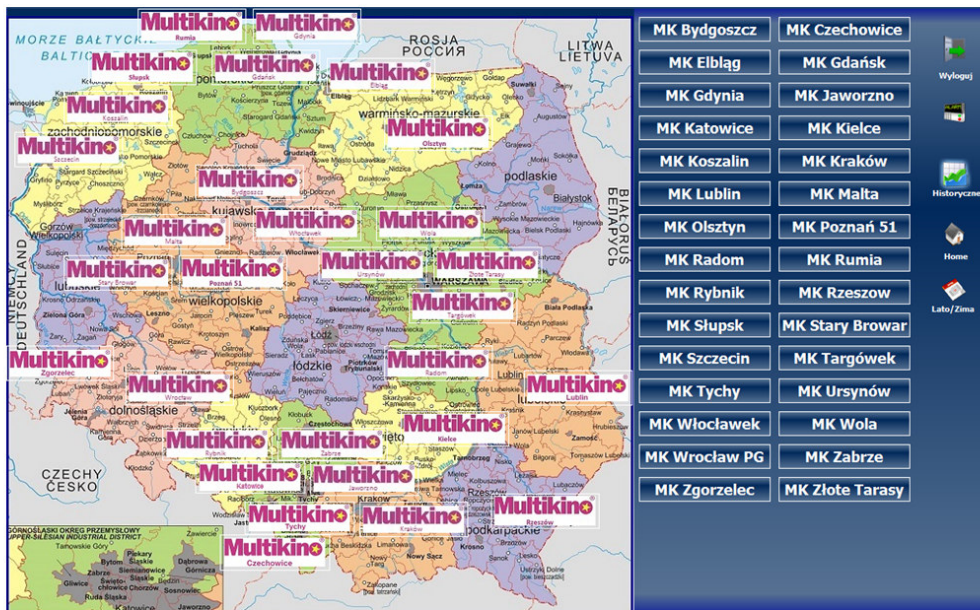


Centrala wentylacyjna N1W1 - Sale kinowe 1 i 4



Example of managing platform for multicinemas:

Platforma Zarządzania Urządzeniami cd..



Dan-Poltherm
Kierujemy powietrzem

Basic layout of DP ViewNet

Advantages of DP ViewNet

- 1) There is no need to purchase a dedicated computer with expensive software for the workstation.
- 2) DP ViewNet has all of the classic characteristics of the BMS and many others.
- 3) The control system user can log on using a smartphone or any computer with a Web browser.
- 4) The central control system includes an easy-to-use touchscreen computer – 17 inches.
- 5) Very advanced graphics.
- 6) DP ViewNet can be extended to control any devices that are installed on site.
- 7) Ability to work with any open communication protocol causes the expansion of the system to be unlimited.

When selling the above-mentioned system Dan-Poltherm offers remote support of factory service centers, including daily operation control and immediate service response in the event of a failure.