STULZ

CLIMATE. CUSTOMIZED.

STULZ Explorer WPA

Air-cooled chillers
for a cooling capacity of 160 to 565 kW

STULZ is a global company with headquarters in Hamburg, Germany, 19 subsidiaries, 7 production sites and distribution and service partners in more than 140 countries.

More than 40 years' experience
Since its foundation in 1947, STULZ has evolved into one of the world's leading system suppliers of air conditioning technology. The company has undergone continuous expansion since 1974 in Germany and abroad with the development, production, installation and service of precision air conditioning units, chillers and humidifying systems for for mission-critical applications.

Intelligent solution for mission-critical applications

The WPA Explorer product range expands the series of efficient STULZ chillers with applications in the industrial, IT and comfort air conditioning sectors.

The Explorer series combines high cooling capacity with compact dimensions.

Applicable to all WPA Explorer units:

Refrigerant R410A
All WPA Explorer chillers use R410A refrigerant that does not damage the ozone layer. In addition, it has lower global warming potential than conventional refrigerants.

Outdoor installation
The WPA Explorer units are designed for outdoor installation. The electronic components within the electrical cabinet are protected in accordance with protection type IP54. With the available options, the operational limits of the chiller can be expanded both in the direction of particularly low and also particularly high outside temperatures.

Low noise

The WPA Explorer is also available in a low-noise version.

This version works particularly quietly due to sound insulation of the compressors.

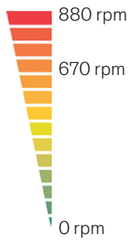
The compressors, fans and pumps are the only noise sources with the WPA Explorer. Depending on operating conditions, the noise level of the chiller can be reduced by up to 10 dB.
To do this, the maximum fan speed is restricted during operation. Furthermore, cooling capacity that is comparable with the standard version can be attained with the low-noise version due to the matching of condensers and fans.

Restriction of fan speed

To reduce noise emission, the fan speed is reduced by approx. 30% by the use of a star-delta circuit.

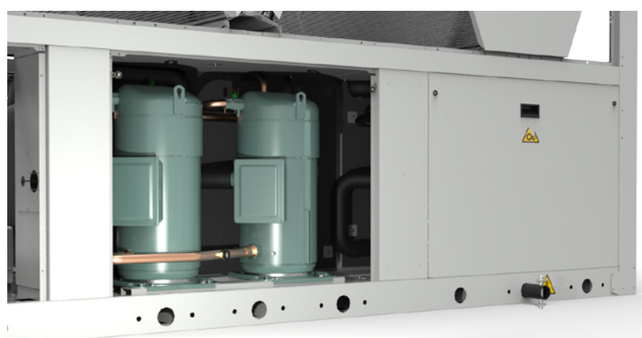
Standard version

Low-noise version



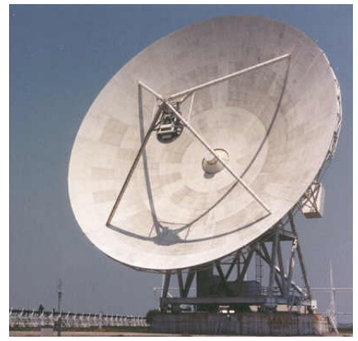
Acoustic insulation

In the WPA Explorer, the compressors and pumps are insulated by a polyester fiber-coated housing for sound insulation.
This housing around the compressor is made of metal plate painted in the color of the chiller. Despite the additional housing, the control box of the compressor remains easily accessible.



Applications

Data center and telecommunications

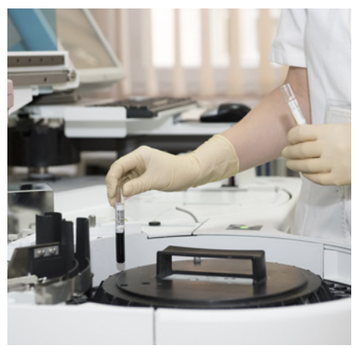


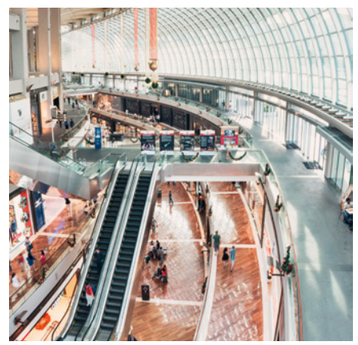
Outside air temperature:	-20 °C to +45 °C
Chilled water: Inlet	+12 °C to +22 °C
Chilled water: Outlet	+7 °C to +18 °C

Process and industrial cooling

Outside air temperature:	-20 °C to +45 °C
Chilled water: Inlet	+0 °C to +30 °C
Chilled water: Outlet	-5 °C to +25 °C

Comfort air conditioning





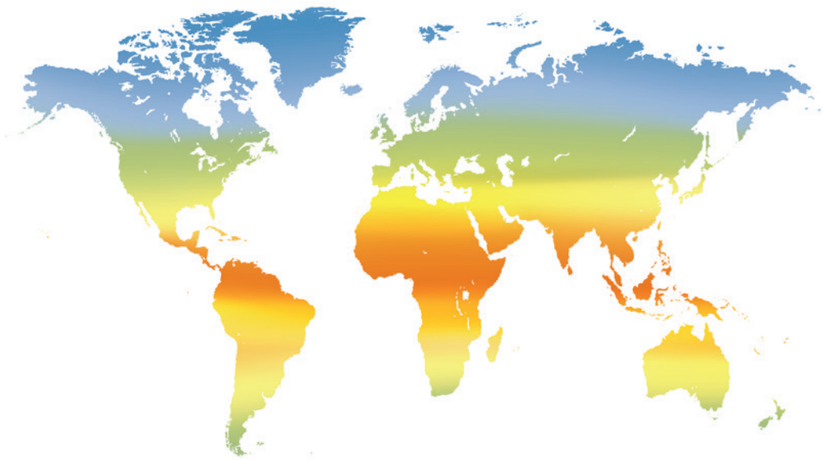
Outside air temperature:	-20 °C to +45 °C
Chilled water: Inlet	+12 °C to +20 °C
Chilled water: Outlet	-7 °C to +15 °C

Free Cooling

The Free Cooling circuit of the WPA Explorer comprises copper-aluminum heat exchangers. A 3-way valve controlled by the STULZ C2020 controller ensures maximum performance and minimizes the operating time of the compressors.

The operating times of the compressors can be minimized by the use of a Free Cooling circuit.

In the event of dropping outside temperatures, the STULZ C2020 controller opens the 3-way valve and thus permits cooling of the chilled water with the help of the outside temperature. In addition, if outside temperatures continue to fall, the speed of the fans is reduced to provide the exact amount of required cooling capacity.

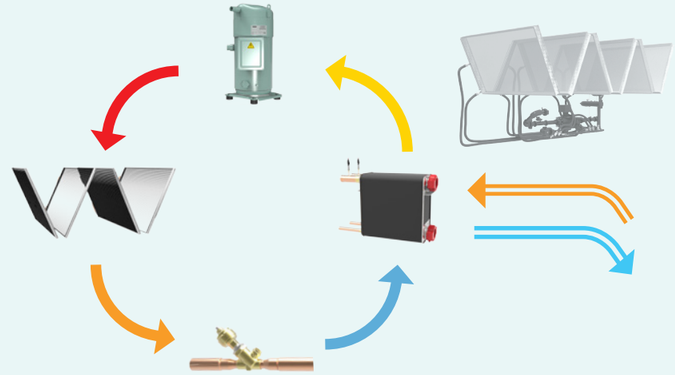


Temperate climate zones

Temperate climate zones
The energy saving of Indirect Free Cooling can be fully exploited in temperate climate zones. Electricity consumption for the provision of air conditioning for data centers is reduced by up to 60%.

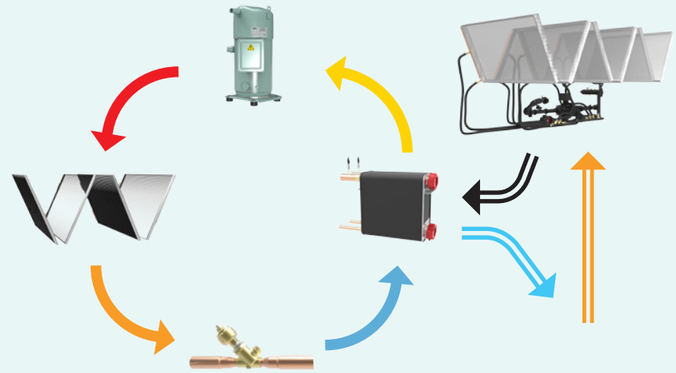
Compressor operation

In the case of high outside temperatures, the throughflow of the chilled water through the Free Cooling coil is blocked. The entire cooling capacity is generated with the help of the compressor.



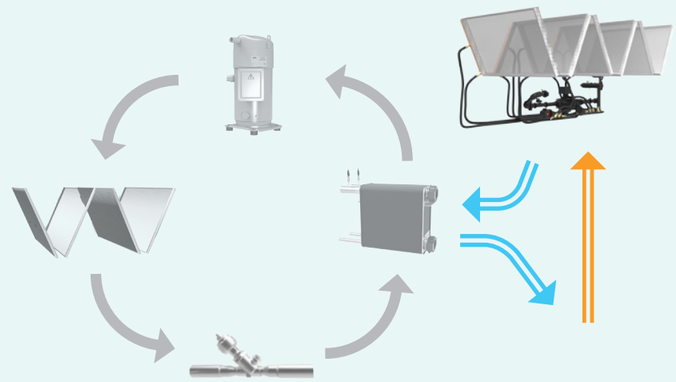
Mixed mode

In the case of outside temperatures below the water inlet temperature, part of the cooling capacity is generated via the Free Cooling coil. The residual heat is dissipated via the refrigerant circuit.



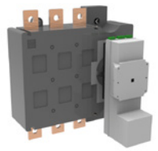
Free Cooling

Depending on the water and outside temperature, the chilled water is exclusively cooled with the help of the outdoor temperature. Only the fans of the chiller are operated.
The energy requirement is thus significantly reduced and the operating costs are minimized.



Options

Compressor soft start
This option reduces the starting current to decrease the load on the compressors and the electrical supply line upon start-up.



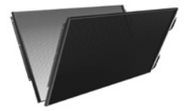
Automatic transfer switch
Three-phase switch without neutral with automatic or manual change-over. Special functions for mains applications / power generator, such as e.g. functions to check the switchability or the voltage and frequency of the mains power supply. The switch is mounted in the electrical cabinet and has auxiliary contacts to display the line switching.

Energy meter
Option to measure the nominal current of the entire chiller, mounted in the electrical cabinet. The unit has an LCD display to show the values for current and voltage, moment values of the 3 phases and also historical maximum and average values. In addition, the energy meter has the option of transmitting the data via ModBus RTU.

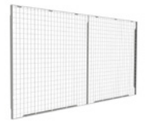
Condensers for phase compensation
Selected condensers to keep phase displacement within a cos φ value of 0.95.

Flow monitor
Fluid circulation in the water circuit is controlled by the flow monitor. The flow monitor is mounted in the return pipe and is connected to the C2020 controller. If a defined fluid circulation is not present, an alarm is activated to avoid damage to hydraulic components.

Frost protection heating
The electric heating is controlled by the C2020 controller and prevents freezing of the hydraulic circuit. For operation under extreme conditions, the quantity of ethylene glycol or propylene glycol or propylene glycol in the chilled water circuit has to be adapted correspondingly.



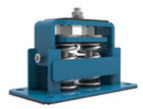
Corrosion coating
Protection of the heat exchangers in the event of aggressive outside air. This coating is present as standard for chillers with Free Cooling.



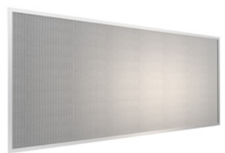
Coil protective grilles
Coil protective grilles protect the Free Cooling coils and condensers from coarse contamination and vandalism.
Powder-coated grille made from galvanized sheet metal, color RAL 9005.

Shipping without refrigerant
The chiller is delivered without refrigerant and is instead filled with nitrogen. The refrigerant filling is evident from the rating plate on the chiller.

Container
The chiller can be transported in a 40 foot high cube container.

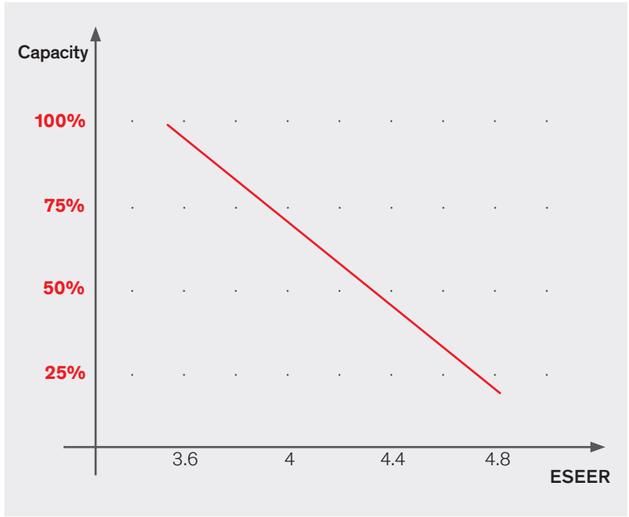


Anti-vibration mounts
Anti-vibration mounts that are specially adapted to the chiller prevent transmission of vibration. The anti-vibration mounts are delivered separately and must be installed by the customer.



Dust protection filter
Metal filters that prevent contamination of the condensers from dust in the air and hence guarantee the full preservation of energy efficiency. They are attached by two brackets on the condenser inlet.

Energy efficiency



The WPA Explorer chillers were designed and developed to cover a broad spectrum of applications (from the process industry and hospitals up to data centers). The Explorer units are available in high energy efficiency classes (class A or B). They can be operated under extreme outside conditions or in configurations that work extremely precisely thanks to application-specific temperature controls. In the case of almost all applications, the thermal loads and outside temperatures can be set out very variably. The WPA Explorer chillers are optimally suited to any outdoor and load conditions and attain high ESEER values that can also exceed a value of 5.

EER
Energy Efficiency Ratio
(coefficient of performance)

The energy efficiency ratio (EER) of a chiller describes the ratio of output cooling capacity to electric power consumption at a certain operating point. The EER value is e.g. calculated using an outside air temperature of 35 °C with a water inlet temperature of 12 °C and a water outlet temperature of 7 °C.

EER =
cooling capacity/power consumption

ESEER
European Seasonal Energy Efficiency Ratio
(coefficient of performance with partial load conditions in cooling mode)

The coefficient of performance with partial load conditions in cooling mode is a coefficient that is used to specify the efficiency of air conditioning units or chillers. The ESEER is specified by the certification body Eurovent Certification Company.

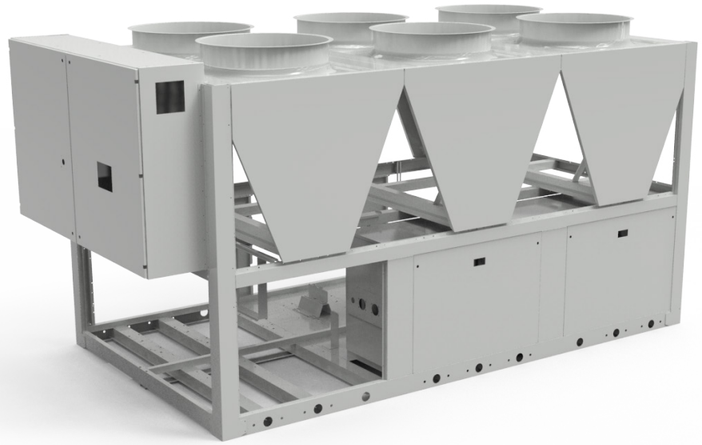
$$ESEER = 0.03 \times EER_{100\%} + 0.33 \times EER_{75\%} + 0.41 \times EER_{50\%} + 0.23 \times EER_{25\%}$$

IPLV
Integrated Part Load Value

The IPLV is a coefficient that was developed by the American Air Conditioning, Heating and Refrigeration Institute (AHRI). This coefficient usually serves to specify the performance of chillers under different conditions. Unlike the EER (Energy Efficiency Ratio) or the COP (Coefficient of Performance) that specify efficiency at full load, this coefficient specifies the efficiency of the chiller in partial load.

$$IPLV = 0.01 \times EER_{100\%} + 0.42 \times EER_{75\%} + 0.45 \times EER_{50\%} + 0.12 \times EER_{25\%}$$

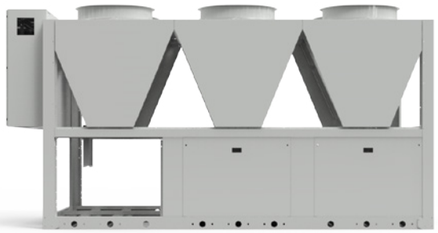
Design



The basic structure of the WPA product range is made from powder-coated, galvanized steel. Powder-coated and galvanized sheet metal parts are used for covers to seal condensers, compressor housing and electrical cabinet. Transportation eyes on the base frame allow safe transportation of the chiller. The bolted-on eyes can be removed after installation or for transportation of the chiller in a container. Pre-defined bores allow the easy and rapid installation of anti-vibration mounts.

Standard color: RAL 7035

Rear side



Right side

Key features

- **Basic structure made from metal**
- **Epoxy paint** on the entire metal structure
- **Corrosion resistance** of all components
- **Transportation eyes** for secure transportation
- **Predefined bores for anti-vibration mounts**

Scroll compressors

The WPA chillers are equipped with scroll compressors. These compressors can process all environmentally-friendly refrigerants used by STULZ.
The refrigerant is continuously compressed with the help of the double-spiral system. In turn, this causes a reduction in the mechanical load on the components and guarantees a longer service life.

Compressor start

Compressor start is implemented directly via a delta circuit controlled by the STULZ C2020 controller.
The controller starts the compressors one after another. In doing so, it checks whether the pre-programmed downtimes are maintained, and guarantees uniform distribution of operating hours.

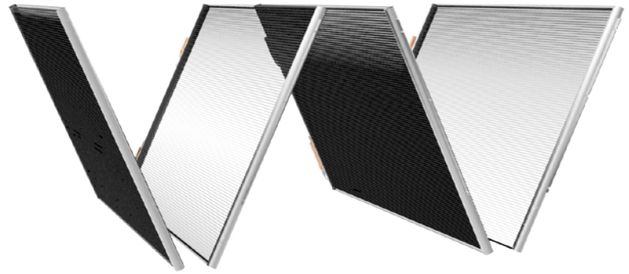
Tandem — trio

Depending on the size of the chiller, the compressors are installed in tandem or trio combinations.
Tandem (2 + 2 compressors): WPA 060 – 160
Trio (3 + 3 compressors): WPA 180 – 200
Dual refrigerant circuit in all sizes.

Condensers

V geometry

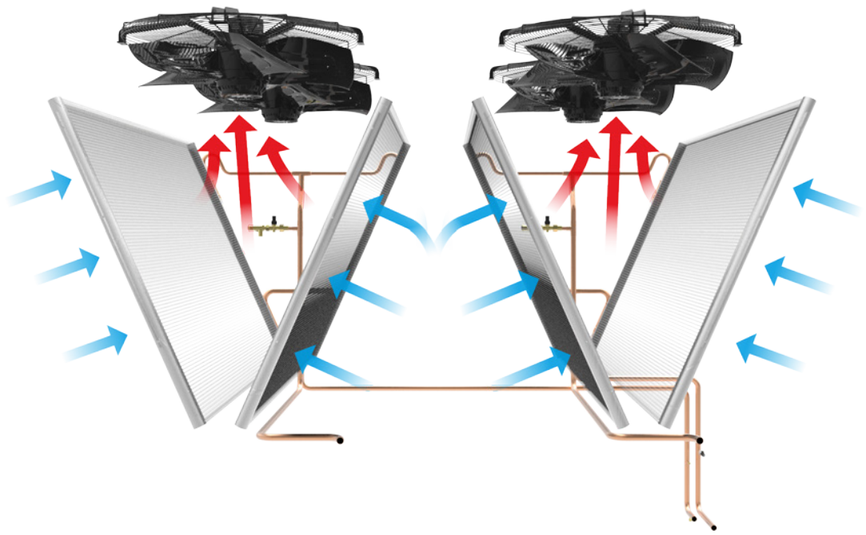
The microchannel condensers are made entirely from aluminum and allow high energy efficiency while retaining small dimensions. In designing the V geometry, care was taken to reduce air disturbances and to balance both refrigerant circuits. The air conduction through the condensers is improved, wherein noise development of the fans can be reduced in DX, Mixed and Free Cooling mode.

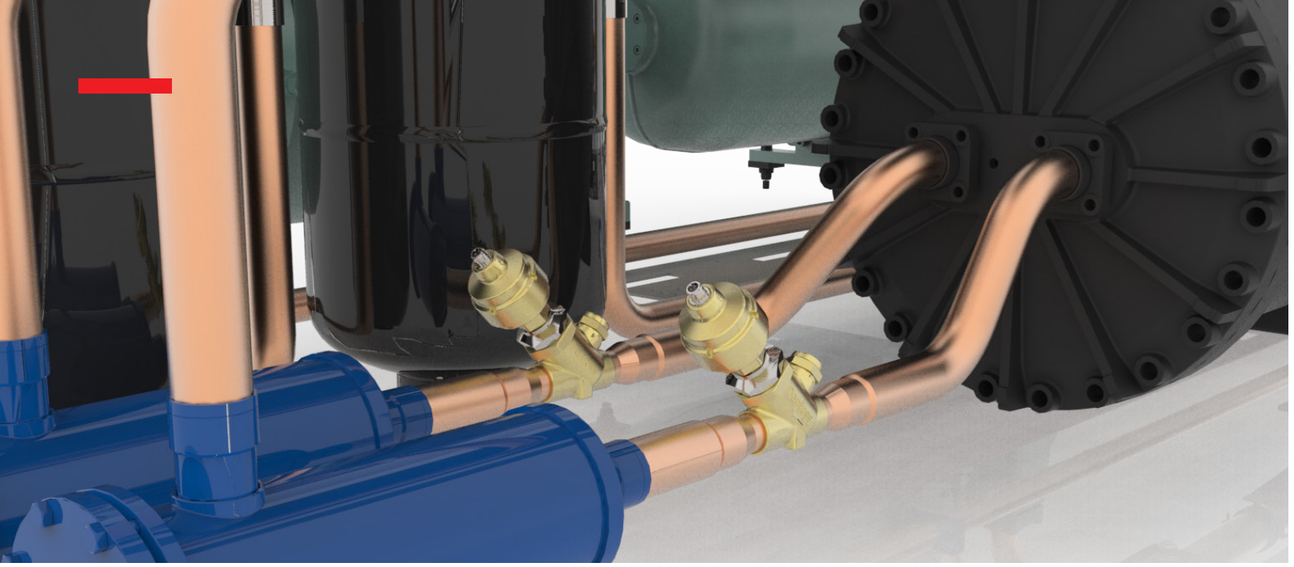


Axial fans

Axial fans with phase angle control are fitted to the Explorer as standard. The fans cannot be connected to an air duct.

Air flow





Electronic expansion valve

Evaporation of the refrigerant is precisely controlled by the most modern expansion valves. The expansion valves use pressure sensors, temperature sensors and the STULZ C2020 controller to optimize heat exchange between the refrigerant and chilled water in the evaporator. In addition, this prevents the upstream and downstream components from overheating or freezing.

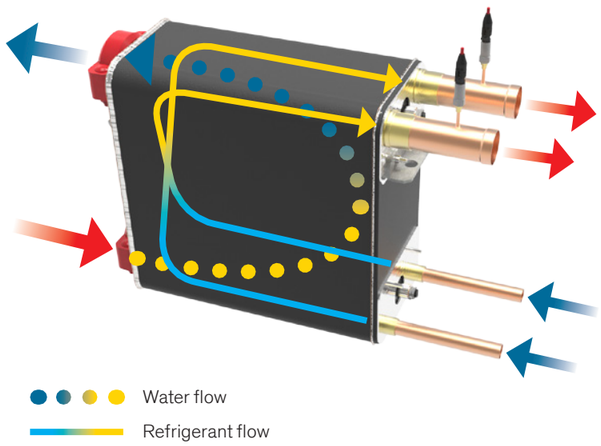
Key features

- **Extended working range** in comparison with conventional expansion valves
- **Protection against fluid return**
  Pressure sensors and temperature sensors are used to regulate the evaporation temperature and overheating in an energetically-optimized manner.
- **Internal UPS for the expansion valve**
  In the event of a power supply failure, the valve is closed completely to avoid fluid refrigerant reaching the evaporator.

Evaporator

Brazed plate heat exchanger
(WPA 060 – WPA 140)

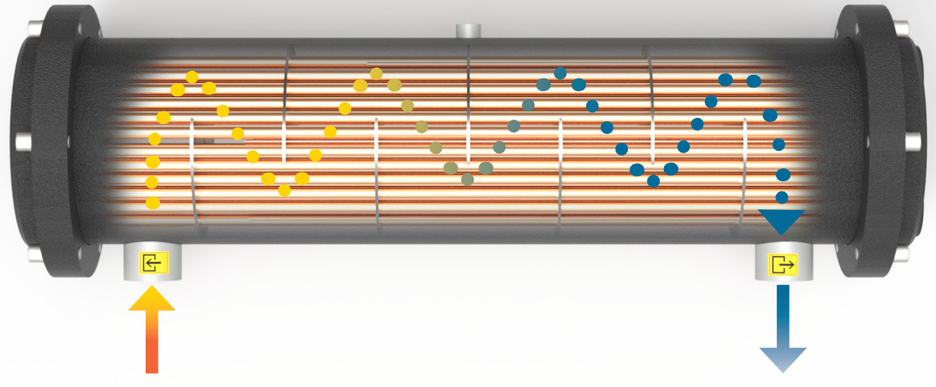
The evaporator with brazed plates comprises stainless steel plates and copper solder joints. Externally, it is fully jacketed with special thermal insulation.
There is a dual refrigerant circuit and a single water circuit, arranged in accordance with the counterflow principle. This means that it is possible to maximize the heat exchange between the refrigerant and chilled water while maintaining low pressure drops in both circuits.
For rapid installation, Victaulic® connections are used in the water circuit.
Integrated differential pressure monitors and anti-frost sensors protect the evaporator from the possibility of freezing.



Shell and tube evaporator
(WPA160 – WPA 200)

The shell and tube evaporator comprises copper pipes and a steel outer jacket. The evaporator comprises two completely separate refrigerant circuits and a chilled water circuit that are arranged in accordance with the counterflow principle.

All heat exchangers have been chosen with regard to low pressure drops.
For easy installation, Victaulic® connections are used for the chilled water connections.



Controller STULZ C2020

The WPA chillers are controlled by the STULZ C2020 controller, which was specially developed to exploit the full performance of each individual component and to control this in an optimum manner due to the high computing power and storage capacity.
The numerous adjustable parameters and available functions are combined onto a few concise screens, via which the user can control the entire chiller.

Touch display

The STULZ C2020 has a 7-inch LCD touch display and can be operated intuitively via a clear menu structure. It is possible to check the functional status, operating hours, alarm progression and alarm signals of the chiller via the controller.
In addition, the controller serves for switching on and off, and to adjust the operating parameters of the chiller.

The menus are available in different languages: Italian, English, German, French, Russian and Spanish.

- Protection type on the front side **IP66** for outdoor use
- Operating thresholds from **– 20** to **+ 60 °C**
- **Acoustic signal**
- **4 display LEDs**

The C2020 controller is equipped with the following pre-installed functions:

- **Series circuit** to connect several chillers and to manage the components as with one single chiller
- **Redundancy** to switch to another chiller if one chiller fails, to ensure uninterrupted operation
- **Emergency cooling** to switch redundant chillers in the same line in the event that the active chiller is not in a position to provide the necessary cooling capacity
- **ModBus RTU** to control and read out the chiller data
- **STULZ protocol** to connect the chiller with monitoring systems from STULZ
- **Anti-frost protection**

The C2020 controller manages:

- **Compressors**
  Starting, switching off and controlling the output within prescribed thresholds
- **Electronic expansion valves**
  Control of the evaporation of refrigerant to guarantee the required cooling capacity with minimal electrical power consumption
- **Pumps (option)**
  The controller manages redundant operation when using two pumps to guarantee uniform distribution of the operating hours between the pumps

Electrical cabinet

The electrical cabinet is on the front side of the chiller and was generously dimensioned so that all deliverable options as well as customer-specific adaptations can be installed in it. The components therein control the entire functional range of the chiller. The electrical cabinet has two or three doors, is ventilated and equipped with a load-break switch including door blocking and a display for the controller. The chiller is supplied with power via a three-phase terminal (400 V / 50 Hz or 460 V / 60 Hz). Secondary units are additionally supplied via an internal 230 V transformer.

Components and design fulfill the requirements of CEI EN 60335-2-40, CEI EN 61000-6-1/2/3/4 and EMC Directive (2014/30/EU).

Key features

- Protection type **IP54**
- **Generous dimensions**, so that all available options as well as customer adaptations can be integrated
- **Touch display** with transparent protective cover
- **Load-break switch including door blocking** to guarantee the safety of the user

Hydraulics

The following hydraulic options are available for the WPA chiller:

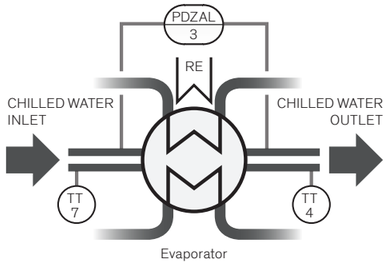
- 1 pump with upstream and downstream shut-off valves for easy maintenance (WPA 060 – WPA140)
- 2 pumps with upstream and downstream shut-off valves (WPA 060 – WPA140)
- Pressure vessel (WPA 060 – WPA140)
- Frost protection heating on the main components of the hydraulic circuit

Victaulic® connections

For easy maintenance, all hydraulic connections are Victaulic® connections.

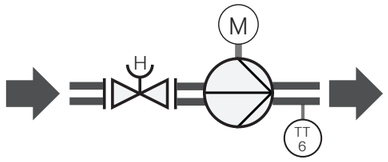
Only evaporator

Evaporator with
brazed plates: WPA 060 – WPA140
Shell and tube evaporator: WPA160 – WPA 200



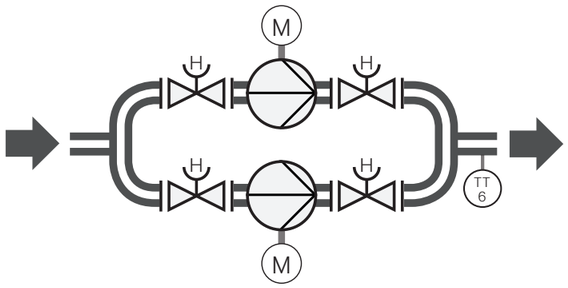
With 1 pump

The pump is available with inverter control.
Pressure pump with effect on the evaporator in variant without buffer tank.
Suction pump with intake from buffer tank, where installed.



With 2 pumps

Redundant pumps: One pump is in operation while the second is in standby mode. In the event of a malfunction of the first pump, the second is activated by the STULZ C2020.
For easy maintenance, each pump is equipped with upstream and downstream shut-off valves.



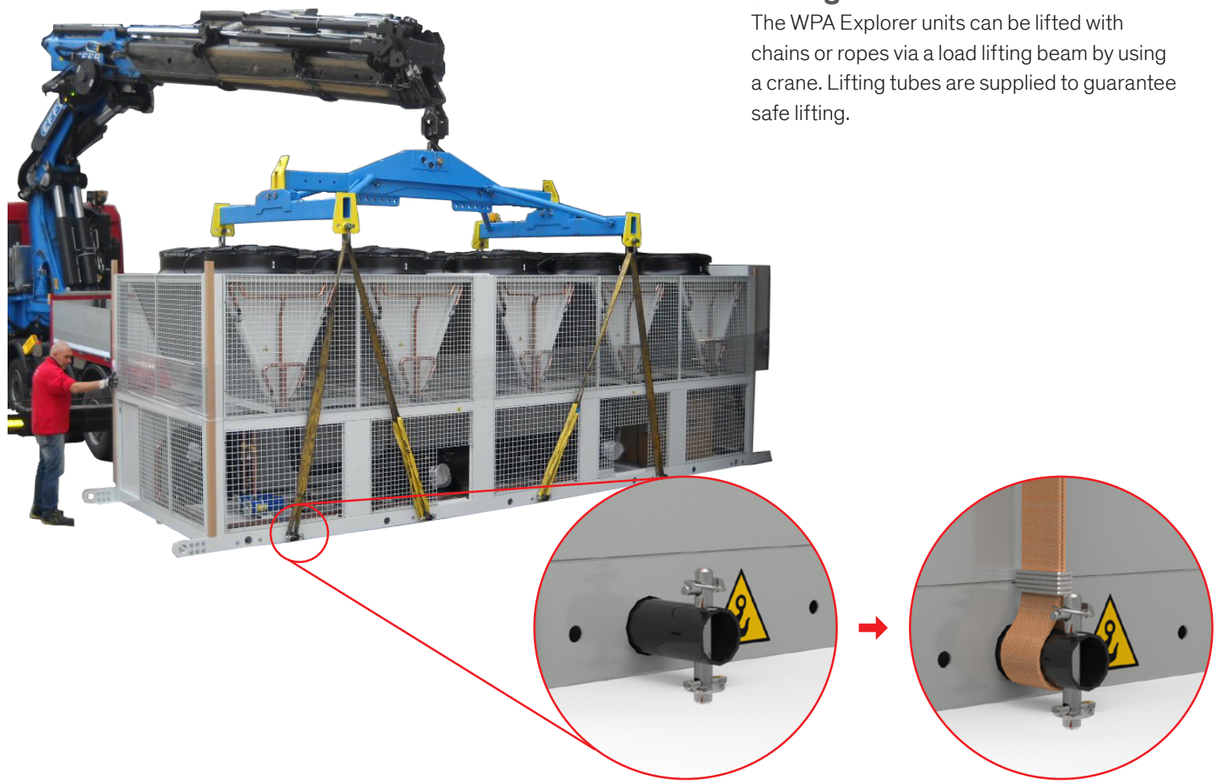
Buffer tank

Depending on size, the storage volume is adapted to the nominal cooling capacity of the machine.

Transport

Lifting

The WPA Explorer units can be lifted with chains or ropes via a load lifting beam by using a crane. Lifting tubes are supplied to guarantee safe lifting.



Shipping in containers

The WPA Explorers can be transported in containers with a length of 40 feet.
To do this, two metal carriers must be installed under the chiller and the transport eyes removed.

Highest level of operational reliability

The focus was on maximum reliability during development and construction.
This not only guarantees the problem-free condition of the chiller during transportation on the road or in a container, it also ensures reliable operation over many years.
The arrangement of the components allows easy maintenance.
The chiller can be adapted to different thermal loads via the refrigerant circuit with scroll compressors.

The quality of STULZ

All chillers have been developed and produced in accordance with the following directives and standards:
- UNI EN ISO 9001: Quality management system
- UNI EN ISO 14001: Environmental management
- 2006/42/EC: Machinery directive
- 2014/35/EU: Low-voltage directive
- 2014/30/EU: EMC directive
- 2014/68/EU: Pressure equipment directive
- EN 378-1, 2, 3, 4: Chilling systems and heat pumps
- DIN EN ISO 12100: Safety of machines
- EN ISO 13857: Safety of machines – safety clearances
- EN 60204-1: Safety of machines – electrical equipment
- EN 61000-6-2: Immunity for industrial areas
- EN 61000-6-4: Generic standards – emitted interference for industrial areas

In all phases of project planning and production, maintenance of these directives and laws was checked by an independent quality system.

All components that are installed in STULZ Explorer chillers are subjected to quality control.

The finished chillers are subjected to functional testing and leakage tests as standard.
These include:
- Leakage test of the refrigerant and hydraulic circuit
- Checking of control parameters of the STULZ C2020
- Check of the calibration of sensors and gages
- Test of functions and alarms

The inspection certificate is contained in the documentation package.

Technical data

Standard

WPA-XXX		060	070	080	090	100	110	120	140	160	180	200
Cooling capacity	kW	165.5	187.5	222.6	245.2	266.5	318.6	353.1	385.1	432	504	559.3
Power consumption	kW	53.3	64.4	73.7	83	91.6	100.4	114.2	127.5	131.9	173.6	199.8
EER		3.1	2.9	3	3	2.9	3.2	3.1	3	3.3	2.9	2.8
ESEER (ISO14511)		4.31	4.38	4.02	4.26	4.26	4.55	4.38	4.23	4.52	4.79	4.62
Filling quantity of refrigerant	kg	18+18	18+18	17+17	18+18	16+16	23+23	25+25	25+25	69+69	81+81	89+89
Sound power[1]	dB(A)	85.8	85.8	86.1	86.2	86.2	98.5	97.3	92	97.4	97.7	89.8

Low noise

WPA-XXX		060	070	080	090	100	110	120	140	160	180	200
Cooling capacity	kW	160.6	180.7	216.6	237.4	276	310.3	342.6	391.7	419.5	507.3	563.4
Power consumption	kW	104.2	119.1	126.7	174.2	119.9	104.2	119.1	126.7	136.6	174.2	119.9
EER		2.9	2.8	2.8	2.7	3.1	3	2.9	3.1	3.1	2.9	2.8
ESEER (ISO14511)		4.37	4.44	4.07	4.31	4.2	4.61	4.43	4.2	4.55	4.79	4.61
Filling quantity of refrigerant	kg	18+18	18+18	17+17	18+18	16+16	23+23	25+25	25+25	69+69	81+81	89+89
Sound power[1]	dB(A)	77.9	77.9	78.7	79.5	80	80.6	81.4	81.7	82.5	82.7	82.1

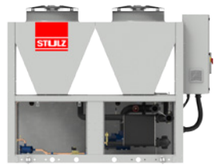
Free Cooling

WPA-XXX		060	070	080	090	100	110
Cooling capacity	kW	191	217.8	245.4	271.8	294.9	347.7
Power consumption	kW	50.5	59.5	69.4	78.8	88.9	94.9
EER		3.8	3.7	3.5	3.4	3.3	3.7
ESEER (ISO14511)		4.94	4.92	4.94	5.06	5.09	5.3
Filling quantity of refrigerant	kg	18+18	18+18	17+17	18+18	16+16	23+23
Sound power[1]	dB(A)	86.1	86.1	86.3	86.6	86.6	87.9

Comment
All data apply with full loading of the unit (pump was not taken into consideration).
Outside air: +35 °C; chilled water inlet: +12 °C, chilled water outlet: +7 °C
[1] In accordance with DIN EN ISO 3744

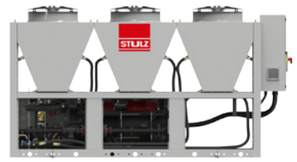
Dimensions

2 V blocks
160 – 218 kW



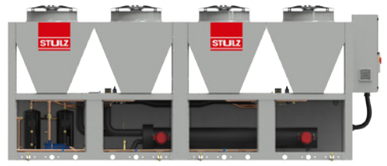
Height (mm)	2406
Width (mm)	2208
Depth (mm)	3140
Weight (kg)	2250 – 3090

3 V blocks
260 – 345 kW



Height (mm)	2406
Width (mm)	2208
Depth (mm)	4447
Weight (kg)	3100 – 4150

4 V blocks
385 – 560 kW



Height (mm)	2406
Width (mm)	2208
Depth (mm)	5820
Weight (kg)	4100 – 4600

5 V blocks
507 – 565 kW

Height (mm)	2406
Width (mm)	2208
Depth (mm)	7130
Weight (kg)	5200 – 5250

STULZ Company Headquarters

STULZ GmbH
Holsteiner Chaussee 283
22457 Hamburg
Tel. +49 40 5585-0
Fax +49 40 5585-352
products@stulz.de

STULZ Subsidiaries

GERMANY
AUSTRALIA
AUSTRIA
BELGIUM
BRAZIL
CHINA
FRANCE
INDIA
INDONESIA
ITALY
MEXICO
NETHERLANDS
NEW ZEALAND
POLAND
SINGAPORE
SOUTH AFRICA
SPAIN
UNITED KINGDOM
USA

STULZ Australia Pty. Ltd.
34 Bearing Road
Seven Hills NSW 2147
Tel. +61(2) 96744700
Fax +61(2) 96746722
sales@stulz.com.au

STULZ Austria GmbH
Industriezentrum NÖ – SÜD,
Straße 15, Objekt 77, Stg. 4, Top 7
2355 Wiener Neudorf
Tel. +43 1 615 99 81-0
Fax +43 1 615 99 81-80
info@stulz.at

STULZ Belgium BVBA
Tervurenlaan 34
1040 Brussels
Tel. +32(470)292020
info@stulz.be

STULZ Brasil
Ar Condicionado Ltda.
Rua Cancioneiro de Évora, 140
Bairro - Santo Amaro São
Paulo-SP, CEP 04708-010
Tel. +551141634989
Fax +551123896620
comercial@stulzbrasil.com.br

STULZ España S.A.
Avenida de los Castillos 1034
28918 Leganés (Madrid)
Tel. +34(91)5178320
Fax +34(91)5178321
info@stulz.es

STULZ France S. A. R. L.
107, Chemin de Ronde
78290 Croissy-sur-Seine
Tel. +33(1)34804770
Fax +33(1)34804779
info@stulz.fr

STULZ-CHSPL (India) Pvt. Ltd.
006, Jagruti Industrial Estate
Mogul Lane, Mahim
Mumbai - 400016
Tel. +91(22)56669446
Fax +91(22) 56669448
info@stulz.in

STULZ S.p.A.
Via Torricelli, 3
37067 Valeggio sul Mincio (VR)
Tel. +39(045)6331600
Fax +39(045) 6331635
info@stulz.it

PT STULZ Air Technology
Indonesia
Kebayoran Square blok KQ unit A-01
Jalan Boulevard Bintaro Jaya,
Bintaro Sektor 7,
Tangerang Selatan 15229
Tel. +62 21 2221 3982
Fax +62 21 2221 3984
info@stulz.id

STULZ México S.A. de C.V.
Avda. Santa Fe No. 170
Oficina 2-2-08, German Centre
Delegación Alvaro Obregon
MX- 01210 México
Distrito Federal
Tel. +52(55)52928596
Fax +52(55)52540257
ventas@stulz.com.mx

STULZ GROEP B. V.
Postbus 75
180 AB Amstelveen
Tel. +31(20)5451111
Fax +31(20)6458764
stulz@stulz.nl

STULZ New Zealand Ltd.
Office 71, 300 Richmond Rd.
Grey Lynn, Auckland
Tel. +64(9)3603232
Fax +64(9)3602180
sales@stulz.co.nz

STULZ Polska SP. Z O.O.
Budynek Mistral.
Al. Jerozolimskie 162
02 – 342 Warszawa
Tel. +48(22)8833080
Fax +48(22)8242678
info@stulz.pl

STULZ Singapore Pte Ltd.
1 Harvey Road
#04-00 Tan Heng Lee Building
Singapore 369610
Tel. +6567492738
Fax +6567492750
andrew.peh@stulz.sg

STULZ Air Technology and
Services Shanghai Co., Ltd.
Room 406, Building 5
457 North Shanxi Road
Shanghai 200040
Tel: + 86 21 3360 7101
Fax: + 86 21 3360 7138
info@stulz.cn

STULZ South Africa Pty. Ltd.
Unit 3, Jan Smuts Business Park
Jet Park, Boksburg
Gauteng, South Africa
Tel. +27(0)113972363
Fax +27(0)113973945
aftersales@stulz.co.za

STULZ U. K. Ltd.
First Quarter,
Blenheim Rd. Epsom
Surrey KT 19 9 QN
Tel. +44(1372)749666
Fax +44(1372)739444
sales@stulz.co.uk

STULZ AIR TECHNOLOGY
SYSTEMS (SATS), INC.
1572 Tilco Drive
Frederick, MD 21704
Tel. +1(301)6202033
Fax +1(301)6625487
info@stulz-ats.com

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