

**STULZ**

CLIMATE. CUSTOMIZED.



# STULZ Explorer WSW

Water-cooled chiller for mission-critical applications

# The complete range of air conditioning technology – from one source.

**For over 40 years, the STULZ family-run company has been synonymous with precision air conditioning at the highest level.**

**Our solutions for the air conditioning of business-critical applications and sensitive systems have made us a leading company in our industry.**

Whether for data centers, industry or communication technology, the STULZ portfolio has a tailor-made cooling solution to suit your requirements.

We guarantee adherence to our uncompromisingly high requirements and quality standards both at our factory in Hamburg and all our production sites around the globe. Moreover, we work hard not only to satisfy our customers' individual wishes, but also to make sure our air conditioning solutions offer maximum energy efficiency and a minimal CO<sub>2</sub> footprint.

Our portfolio extends from traditional room cooling and High Density Cooling to chillers, air handling units and container modules, all the way to micro data centers, service, and our self-developed monitoring software. An all-embracing quality assurance system monitors all the details in development, production, implementation, and service.

Today, STULZ has a presence in more than 140 countries. STULZ GmbH has 21 subsidiaries and eleven production sites in Europe, India, China, and North and South America. We also have partner agreements with numerous sales and service partners on every continent. Our network of highly qualified specialists is a reliable guarantee of the highest standards.

The combined wealth of our experience, values, performance and service is what defines us and is especially valued by our customers. Air conditioning solutions – custom tailored and from one source:  
**ONE STULZ. ONE SOURCE.**

## ONE STULZ.

## ONE SOURCE.



# Intelligent solution for mission-critical applications

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



The Explorer series comprises chillers that have been specially developed to combine high performance with compact dimensions.

## Applicable to all WSW Explorers:

### Refrigerant R513A

WSW Explorer product series uses R513A refrigerant, which has hardly any effect on the environment and does not damage the ozone layer. In addition, it has lower global warming potential than conventional refrigerants.

### ErP 2021 ready

The Explorer WSW series meets the requirements of ErP 2021.

### Installation in interior spaces

WSW Explorer was designed for installation in interior spaces. The electronic components within the switch cabinet are protected in accordance with protection type IP54. With the available options, the utilization limits of the chiller can be expanded both in the direction of particularly low and also particularly high operating temperatures. Due to these flexible utilization limits, the chillers can be operated with dry coolers (high-temperature) in the same way as with cooling towers (medium-temperature) and well water (low-temperature).



## Low noise

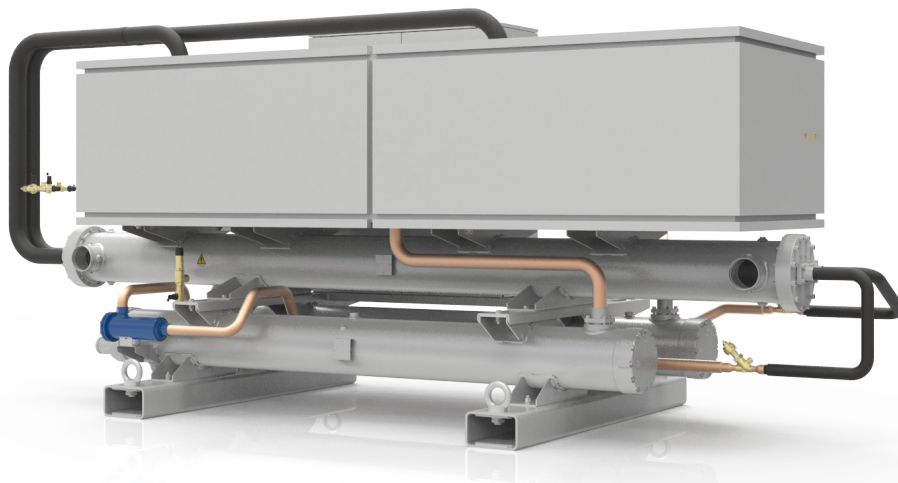
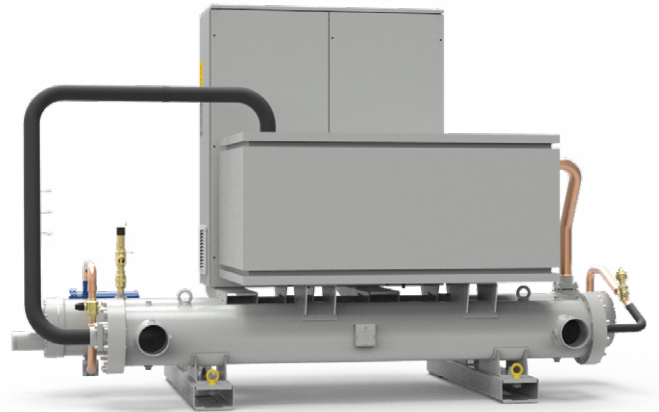
WSW Explorers are available as low-noise versions. These versions work particularly quietly due to special noise insulation.

**Available for all sizes.**

The compressors are the only source of noise with the WSW Explorer chillers. Depending on operating conditions, in the low-noise version the noise level of the chiller can be reduced by up to 10 dB.

### Acoustic insulation

The compressors in the WSW Explorer are insulated with a polyester fiber-lined housing. The housing around the compressor is made of metal plate painted in the same color as the chiller. Above the housing, the control box of the compressor remains accessible.





# Applications

## Data center and telecommunications



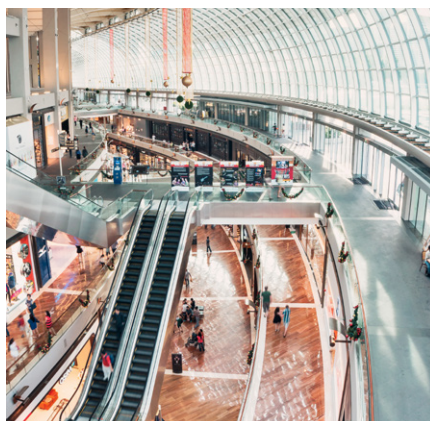
Chilled water temperatures (evaporator): Inlet + 12 °C to + 22 °C  
Outlet + 7 °C to + 18 °C

## Process and industrial cooling



Chilled water temperatures (evaporator): Inlet + 0 °C to + 30 °C  
Outlet - 5 °C to + 25 °C

## Comfort air conditioning



Chilled water temperatures (evaporator): Inlet + 12 °C to + 20 °C  
Outlet + 7 °C to + 15 °C



# Highest level of operational reliability

Care was taken during development and construction of the units that they would deliver maximum reliability. 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 due to the refrigerant circuit with screw compressors including output slider.

## 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: Fault-free operation 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.





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## **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 SEC.blue
- Check of the calibration of sensors and gages
- Test of functions and alarms

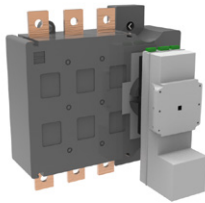
The inspection certificate is contained in the documentation package.

# Options



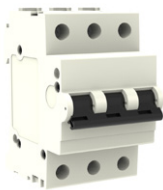
## Compressor soft start

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 switching. Special functions for mains applications / power generator, for example functions to check the switchability or the voltage and frequency of the mains power supply. The switch is mounted in the switch gear cabinet and has auxiliary contacts to display the line switching.



## Circuit breakers

Circuit breakers offer increased protection against current spikes that could otherwise damage the downstream components, e.g. compressors.



## Energy meter

Option to measure the power consumption of the entire chiller, mounted in the switch gear cabinet. The unit has an LCD display to show the values for current, voltage, moment values of the three 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 optimize phase displacement within a  $\cos \varphi$  value of 0.95.



## Flow monitor

Fluid circulation in the water circuit is monitored by the flow monitor. The flow monitor is mounted at the outlet side and is connected to the SEC.blue controller. An alarm is triggered to prevent damage to the chiller as soon as the minimum flow speed is fallen below.





### **Frost protection heating**

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



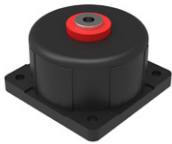
### **Shipping without refrigerant**

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



### **Container**

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



### **Anti-vibration mounts**

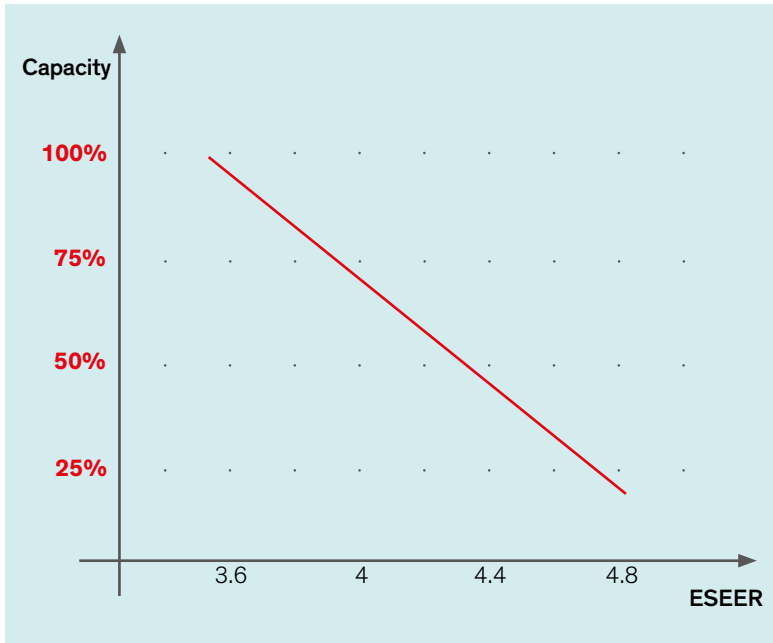
Anti-vibration mounts that are specially adapted to the chiller prevents transmission of the vibration.



### **Water filter**

Metal filters that prevent contamination of the evaporator and/or condensers and that guarantee the preservation of energy efficiency. The filters are mounted at the inlet of evaporators and/or condensers using Victaulic® connections.

# Energy efficiency



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

## EER Energy Efficiency Ratio (performance coefficient)

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

$$\text{EER} = \frac{\text{cooling capacity}}{\text{power consumption}}$$

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

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

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

## IPLV Integrated Part Load Value

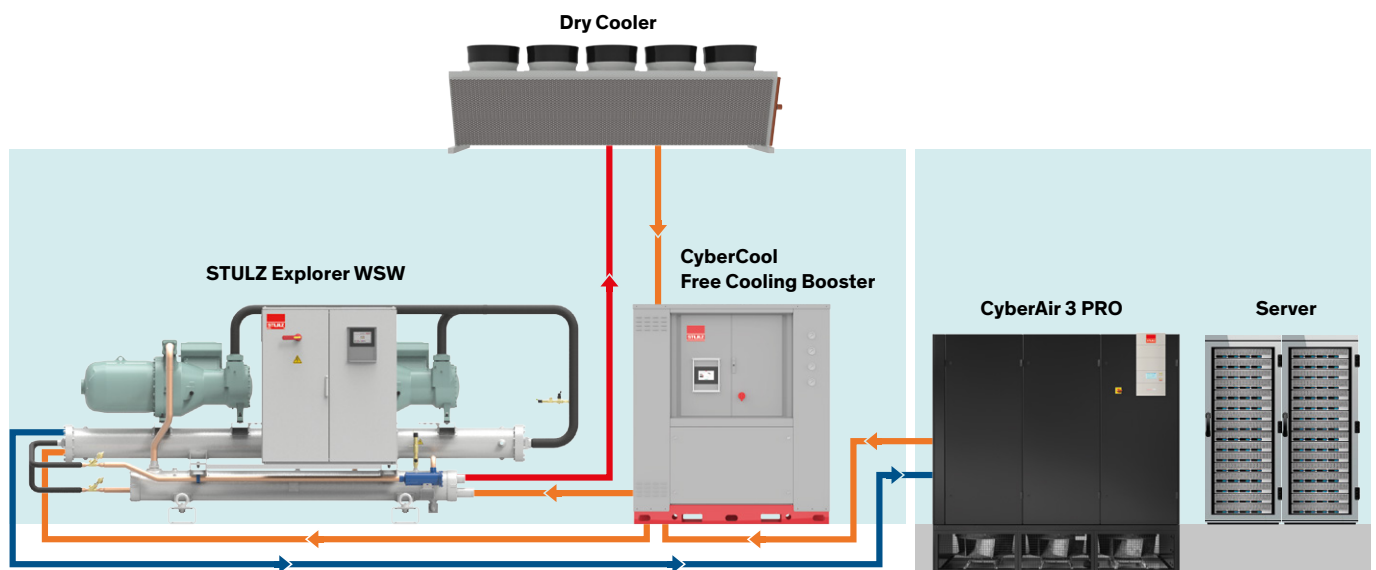
The IPLV is coefficient that was developed by the American Air Conditioning, Heating and Refrigeration Institute (AHRI). This coefficient usually serves to specify the performance of chillers under different conditions. Unlike the EER (Energy Efficiency Ratio) and COP (Coefficient of Performance) coefficients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

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

# Free Cooling with CyberCool Free Cooling Booster

Free Cooling is an intelligent solution for minimizing energy-intensive compressor mode and significantly cutting operating costs. Equipped with an additional Free Cooling module, Explorer WSW uses the outside temperature, which offers the greatest potential for savings, especially in cold and temperate climates.

Without complex and extensive planning, the Free Cooling module can be easily integrated and connected to the piping via a Victaulic connection. Thanks to its own control cabinet including SEC.blue controller, optimum control and trouble-free communication with the Explorer WSW are ensured.



## + Advantages at a glance

- Significant energy savings thanks to Free Cooling including Mixed mode
- Low commissioning times and installation costs thanks to plug-and-play principle
- High reliability thanks to redundancy concept and high-quality components
- With or without glycol in the consumer circuit
- Maintenance-friendly design: less stress on mechanical parts, therefore lower maintenance costs and long service life
- Energy-saving, variable speed pumps
- Both indoor and outdoor installation possible



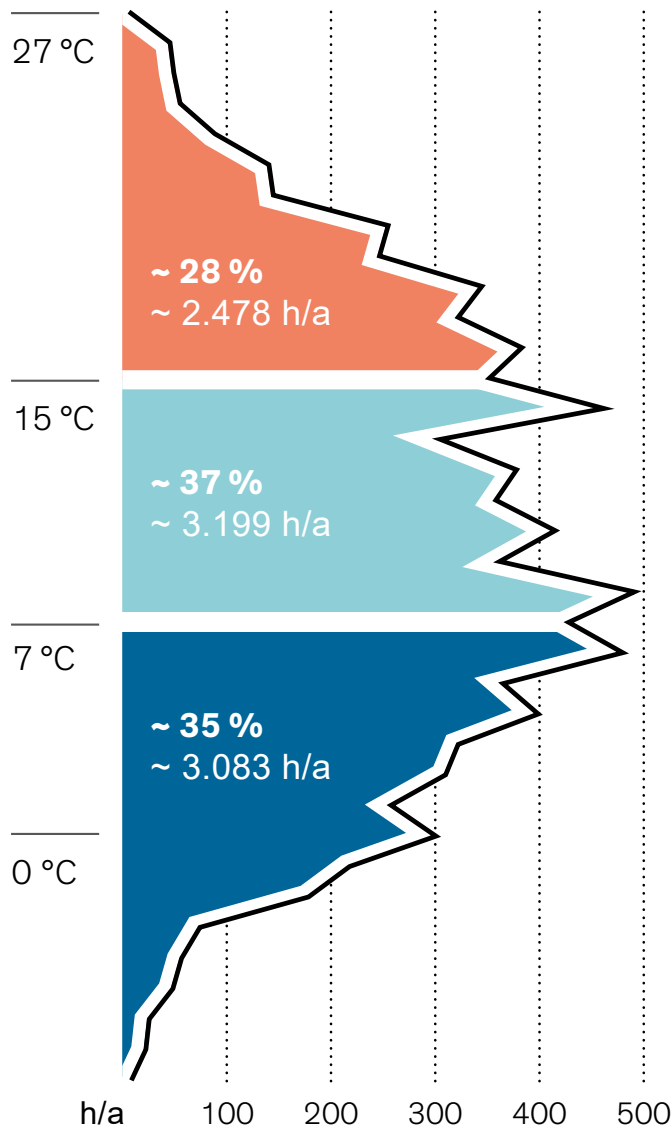
# Three operating modes for maximum efficiency

Depending on the outdoor temperature, the most efficient mode is selected automatically and reliably throughout the year, whatever the local temperature profile.

**Compressor mode (DX)**  
At high outdoor temperatures, the entire cooling capacity is achieved using the compressor. The Explorer WSW works very efficiently, even in this mode, by using perfectly-matched components.

**Mixed mode**  
At moderate temperatures, the Explorer WSW runs in energy-efficient Mixed mode – a combination of Free Cooling and significantly reduced compressor cooling.

**Free Cooling mode (FC)**  
At low outdoor temperatures, Free Cooling delivers the greatest potential savings. In this case, only outside air is used for cooling and compressor cooling is switched off completely.



## High savings can be achieved through intelligent control of the operating modes.

	With Free Cooling	Without Free Cooling
Energy consumption	1,380,025 kWh	2,232,472 kWh
Energy costs	207,004 €	334,871 €
Savings per year	127,867 €	

Energy consumption using the example of a system with WSW360 chiller, WFM04 Free Cooling Booster and 2xEHLD1F 1267E dry coolers; operating temperature: 18/12 °C; based on the temperature profile of the city of Hamburg, 0.15 € / kWh

## Quick and easy installation thanks to plug & play

CyberCool Free Cooling Booster is a high-performance solution designed for plug-and-play installations, making it suitable for any location.

The standard unit is a pre-installed system that contains all important hydraulic components, so that installers don't need to take any construction measures to integrate Free Cooling. Due to the unit design, the Free Cooling modules can be installed quickly and easily, which reduces commissioning times and installation costs significantly.

Thanks to its own switch cabinet including SEC.blue controller, optimum control and perfect communication with chillers and dry coolers is ensured.

SEC.blue monitors both the outdoor and the operating temperature and regulates the cooling capacity of the dry cooler. Optimum control of the condensing temperature and maximum amount of Free Cooling hours are ensured even at high outdoor temperatures. This results in minimal operating costs and a low CO<sub>2</sub> footprint.

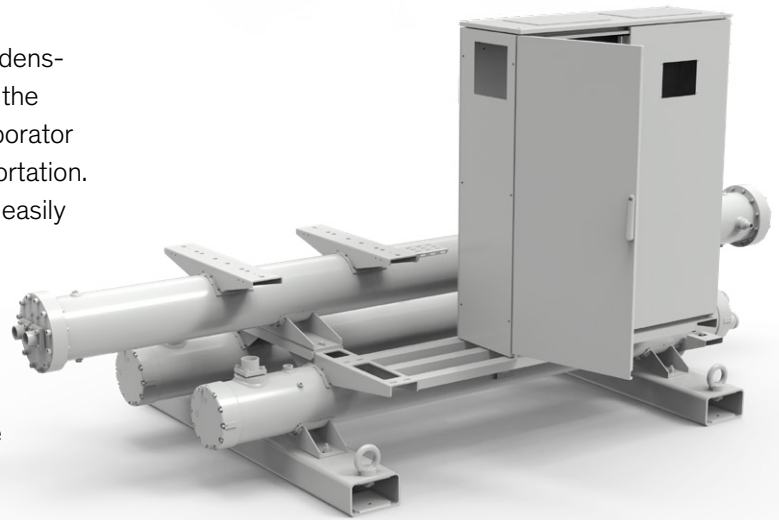


### + SEC.blue

- Intuitive user interface via 7" touch screen
- Ethernet port RJ32
- RS485 ModBus
- Alarm management
- Alarm history display

# Design

The most important components of the chiller such as condensers, evaporator and compressors are main components of the supporting basic machine structure. Condensers and evaporator support the entire weight of the chiller, even during transportation. The chiller can be lifted by pre-mounted eye bolts that are easily accessible.



## Key features

- **Basic structure made from metal** so that no damage occurs when lifting and transporting
- **Epoxy paint** on the entire metal structure
- **Corrosion resistance** of all components
- **Transportation bolts** for secure transportation
- **Predefined bores for anti-vibration mounts**

**Standard color: RAL 7035**



## Semi-hermetic screw compressors

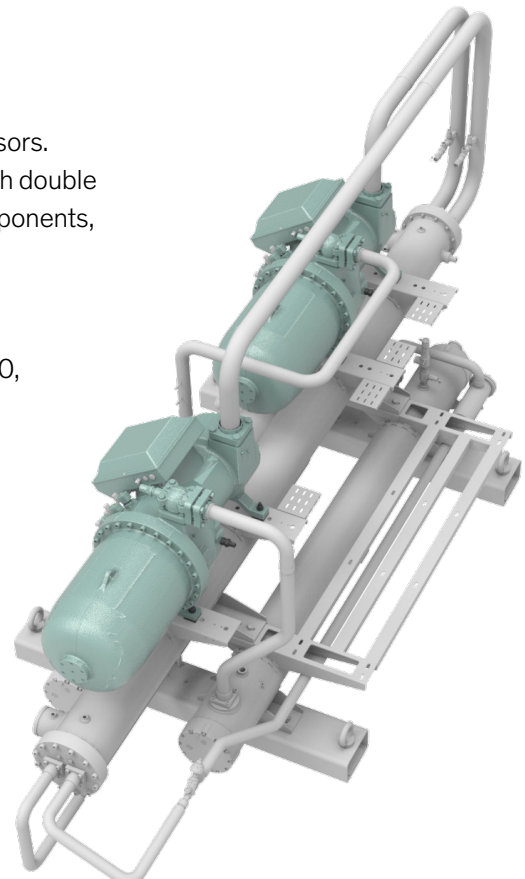
The STULZ Explorer chillers are based on semi-hermetic screw compressors. The refrigerant is continuously compressed by the compressor design with double screws. In turn, this causes a reduction in the mechanical load on the components, which increases the product's service life.

### Compressor start

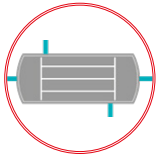
The compressors can be delivered with part-winding start (WSW080-250, except WSW 140) or star-delta (WSW 140, WSW 265 – 560).

### One or two compressors

Depending on the size, the chillers are equipped with one or two screw compressors that attain high cooling capacity with minimum footprint. At partial load they continue to work with high efficiency.





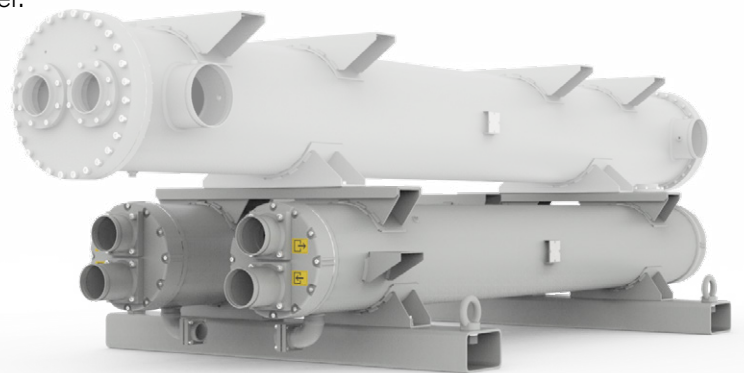


# Shell & tube condenser

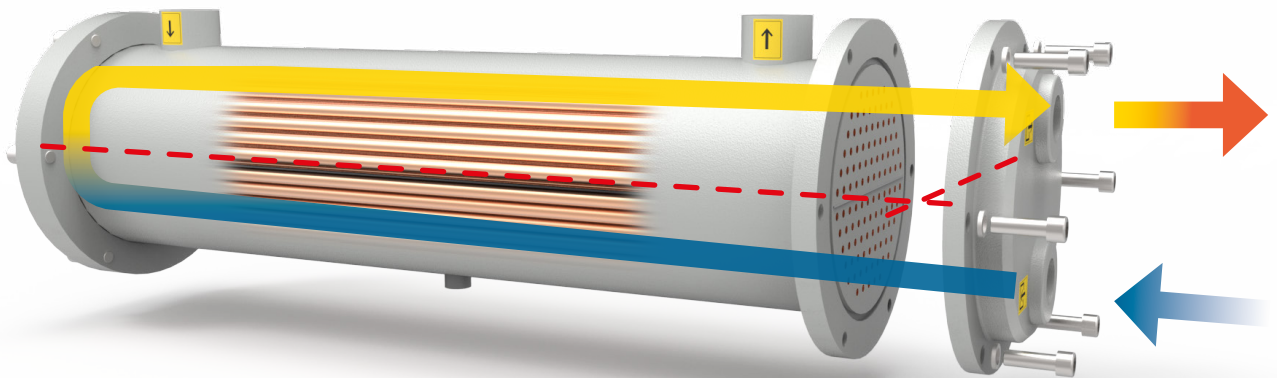
The shell & tube condensers comprise a steel jacket and copper pipes in the interior. They are coated on the outside with epoxy paint in the same color as the rest of the chiller (standard color: RAL 7035). Victaulic® connections allow fast and easy installation.

The small diameter of the internal copper pipes allows the greatest possible degree of heat exchange between refrigerant and water.

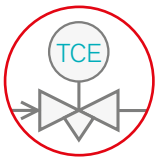
- Steel jacket
- Copper pipes
- Double passage
- Independent circuits
- Victaulic® connections



## Cooling water throughflow



The hydraulic circuit with double passage leads to small dimensions with the same thermal performance. For easy installation, the cooling water inlet and outlet connections for the water-glycol mixture are located on the same side.

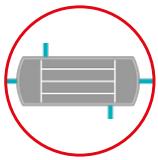


## Electronic expansion valve

Evaporation of the refrigerant is precisely controlled by finely-regulated expansion valves. The expansion valves use pressure sensors, temperature sensors and the STULZ SEC.blue controller to optimize heat exchange between the refrigerant and chilled water in the evaporator. This ensures that the upstream and downstream components do not overheat or freeze. The compressor is also protected from drawing in fluid refrigerant.

### + Key features

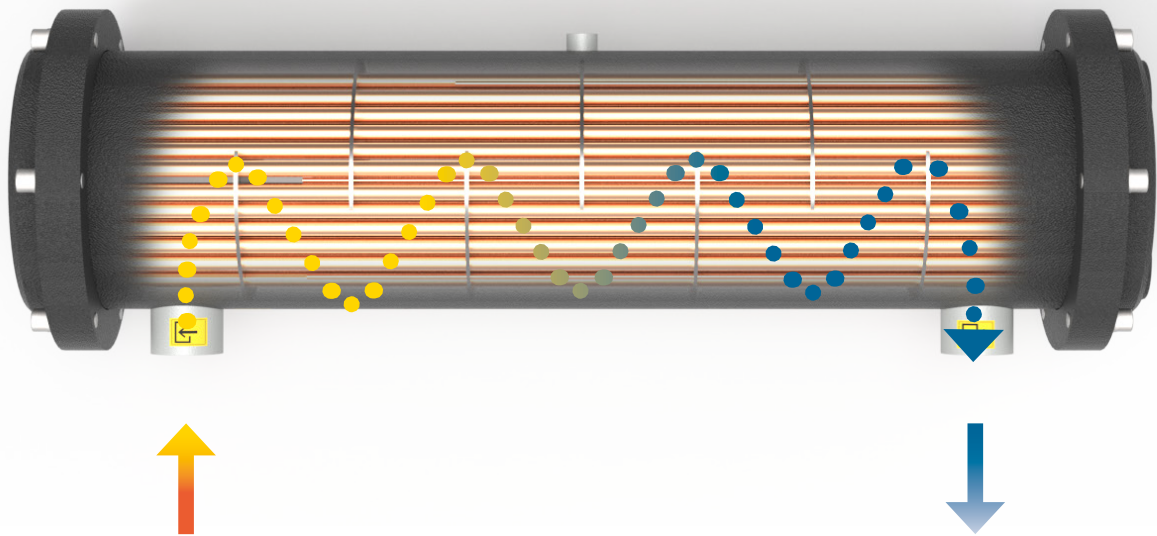
- **Extended working range** in comparison with conventional thermostatic valves
- **Protection against fluid return:**  
Pressure sensors and temperature sensors are used to regulate the evaporation temperature and superheating in an energetically-optimized manner.
- **Internal UPS for the expansion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



# Shell & tube evaporator

The shell & tube evaporator in the WSW Explorer comprises copper pipes with small diameter in the interior and an external steel jacket. Here, the evaporator comprises two completely separate chilled water circuits and a cooling water circuit that are arranged with respect to one another following the counterflow principle.

All heat exchangers have been optimized with regard to low pressure losses.



## + Key features

- **Two refrigerant circuits** to optimize heat exchange between chilled water and refrigerant
- **A chilled water circuit** with low hydraulic pressure losses
- **Steel jacket and copper pipes**
- **Completely insulated** with special thermal insulating material.
- **Differential pressure monitor (standard)** to continuously monitor the throughflow of the evaporator and to protect the evaporator from damage by freezing.
- **Victaulic® connections** for rapid installation
- **Low pressure losses**



# Controller STULZ SEC.blue



The WSW chillers are controlled by the SEC.blue 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

SEC.blue 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 front side IP66
- Operating thresholds from – 20 to + 60 °C
- Acoustic signal
- Four display LEDs

**The SEC.blue 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

**SEC.blue manages:**

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

# Switch gear cabinet



The switch gear cabinet is on the longitudinal side of the chiller and was generously dimensioned so that all deliverable options as well as customer-specific adaptations can be integrated therein. The components in the switch gear cabinet control the entire functional scope of the chiller. The switch gear cabinet has two or three doors, is ventilated and is 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 the EMC Directive (2014/30/EU).



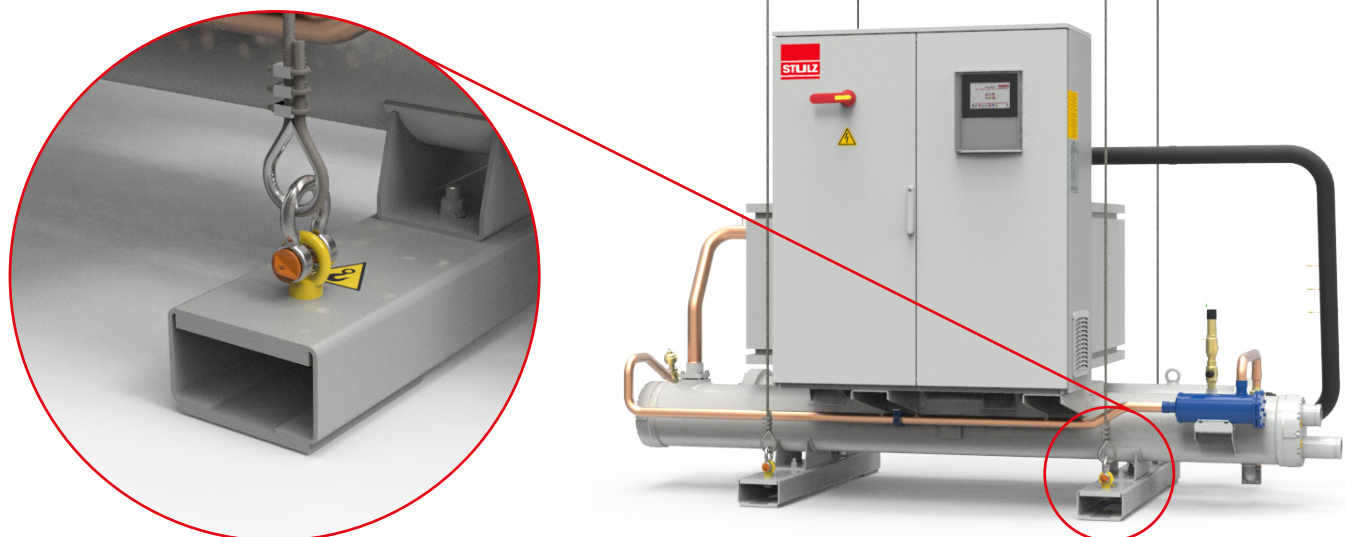
## Key features

- 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
- **Visual separation of the load and control circuit**

# Transport

## Lifting

The WSW chillers can be lifted via a load lifting beam by using a crane. In order to guarantee secure lifting, the chillers are equipped as standard with transportation eyes.



## Transportation on pallet

The chiller can be transported by means of a suitable pallet and materials handling equipment.

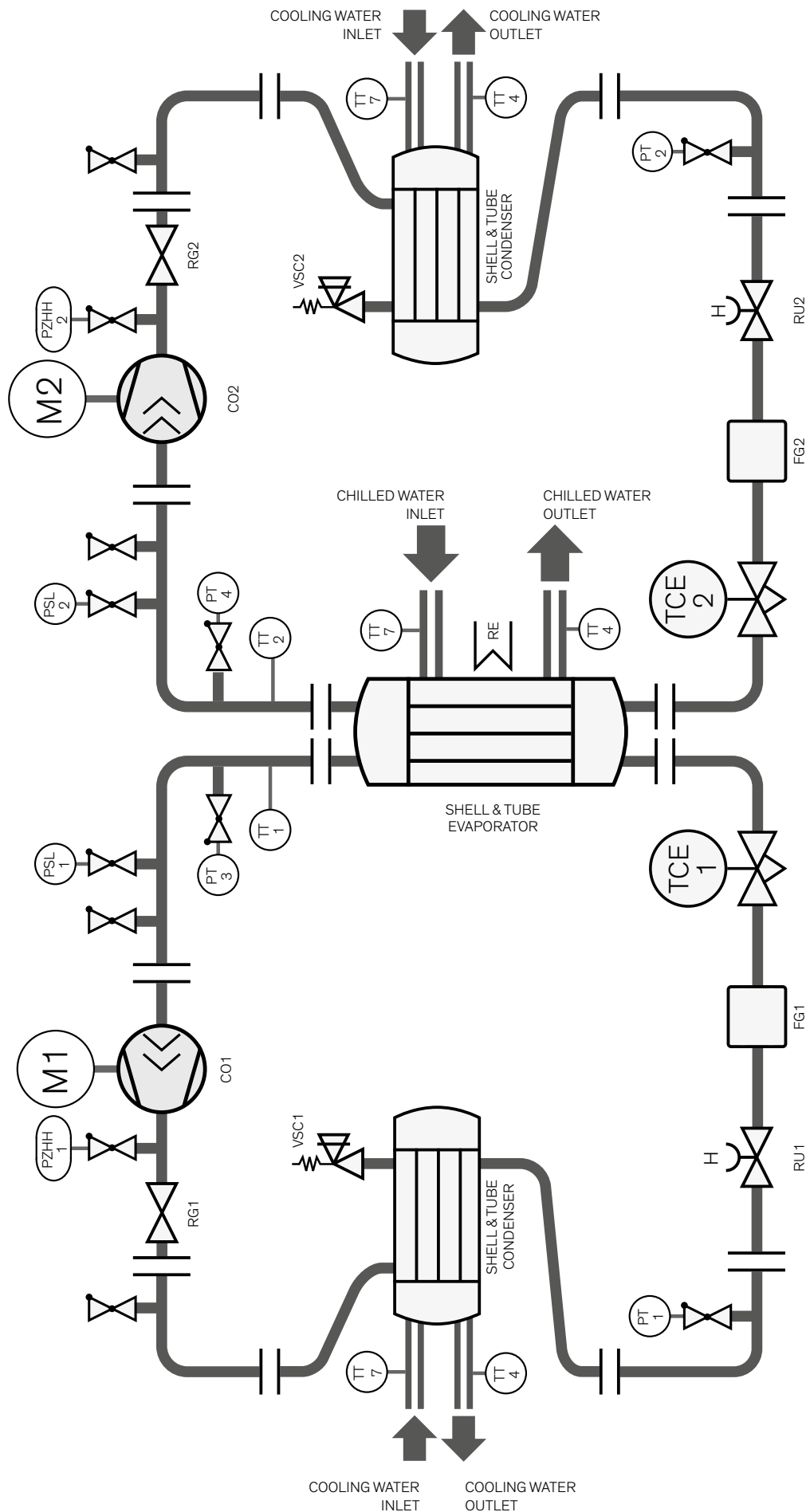
## Shipping in containers

The WSW chillers can be transported in containers with a length of 20 or 40 feet. For this, a pallet must be placed under the chiller. STULZ recommends transportation in wooden crates to provide additional protection to the chiller.





# Refrigerant circuit



Key	
	Refrigeration pipe
	Water circuit
	Signals
	Non-return valve
	Separable connection
	Semi-hermetic screw compressor
	Tank
	Separable shut-off valve
	Filter
	Electronic thermostatic valve
	Temperature sensor
	Safety pressure monitor
	Differential pressure monitor
	Motorized valve
	Separable non-return valve
	Safety valve
	Frost protection resistance

# Technical Data

## STULZ Explorer WSW single-circuit machines



### Performance data

Model	WSW-XXX	080	090	110	125	140
Cooling capacity	kW	230	286	310	352	429
Power consumption	kW	45	55	60	69	83
EER		5.06	5.15	5.13	5.06	5.12
ESEER (ISO 14511)		7.11	7.11	6.87	7.02	6.92
Filling quantity of refrigerant	kg	61	76	82	93	113
Sound power level <sup>1</sup>	dB(A)	89.8	89.8	90.2	91.2	90.5
<b>Dimensions / weight</b>						
Height	mm	1880	1880	1880	1905	1905
Width	mm	1340	1340	1460	1340	1340
Length	mm	3010	3010	3306	3790	3790
Transportation weight	kg	2625	2992	3029	3166	3640
Operating weight	kg	2755	3142	3190	3350	3824

All data apply with: cooling water inlet: +30 °C, cooling water outlet: +35 °C; chilled water inlet: +12 °C, chilled water outlet: +7 °C  
Refrigerant: R134a (GWP: 1,430); R513a (GWP: 573)

<sup>1</sup> In accordance with ISO 3744



## STULZ Explorer WSW dual-circuit machines

### Performance data

Model	WSW-XXX	160	180	220	250	265	280	320	360	420	480	560
Cooling capacity	kW	459	570	616	704	780	856	974	1104	1261	1376	1529
Power consumption	kW	90	110	120	139	154	167	189	213	240	272	300
EER		5.06	5.14	5.1	5.05	5.06	5.12	5.15	5.17	5.23	5.06	5.09
ESEER (ISO 14511)		6.94	7.03	6.74	6.91	6.73	6.55	6.73	6.93	6.56	6.55	6.55
Filling quantity of refrigerant	kg	15 + 15	75 + 75	81 + 81	92 + 92	103 + 103	113 + 113	128 + 128	145 + 145	160 + 160	180 + 180	200 + 200
Sound power level <sup>1</sup>	dB(A)	92.8	92.1	93.2	94.2	93.9	93.5	93.7	96.1	95.4	97.8	97.2

### Abmessungen

Height	mm	1970	1970	2100	1970	1986	1986	1993	2026	2129	2165	2165
Width	mm	1871	1871	1871	1871	1871	1871	1931	1891	1951	1936	1931
Length	mm	4416	4916	4558	4916	5084	4745	4856	5278	4583	5096	5390
Transportation weight	kg	3818	4420	4735	5069	5555	6073	6487	6736	7194	7576	7800
Operating weight	kg	4036	4663	5030	5395	5898	6442	7010	7269	7775	8205	8672

All data apply with: cooling water inlet: + 30 °C, cooling water outlet: + 35 °C; chilled water inlet: + 12 °C, chilled water outlet: + 7 °C  
Refrigerant: R134a (GWP: 1,430); R513a (GWP: 573)

<sup>1</sup> In accordance with ISO 3744



## CyberCool Free Cooling Booster

### Performance data

Model		WFM01	WFM02	WFM03	WFM04	WFM05
Flow rate	kW	59.4	96.4	119.6	188.4	260.9
Weight	kg	1140	1651	1940	3510	4655
Dimensions (height × width × depth)	mm	2126 × 1909 × 1404	2451 × 2208 × 1710	2451 × 2208 × 1710	2467 × 2360 × 4280	2467 × 2360 × 4279
System combination	WSW	110	160	220	320	480
	Dry cooler	EHL1D1F 1256B	EHL1D1F 1267E	EHL1D1F 1287A	2 x EHL1D1F 1267E	2 x EHL1D1F 1297A
Cooling capacity <sup>1)</sup>	kW	342	507	678	1071	1504
100 % Free Cooling <sup>1)</sup>	°C	7	7	7	7	8

<sup>1)</sup> Consumer: water temperature (in/out) 18 °C/12 °C; ethylene glycol 0 %; dry cooler: outdoor temperature 35 °C; ethylene glycol 30 %

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