

**STULZ**

CLIMATE. CUSTOMIZED.



# STULZ Explorer WSW

Water-cooled chiller for mission-critical applications

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 IT data centers and telecommunications installations.

**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.

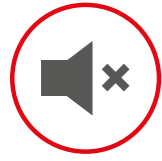
**Applicable to all WSW Explorers:**

**Refrigerant R134a**

All units of the WSW Explorer product series use R134a 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.

**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).



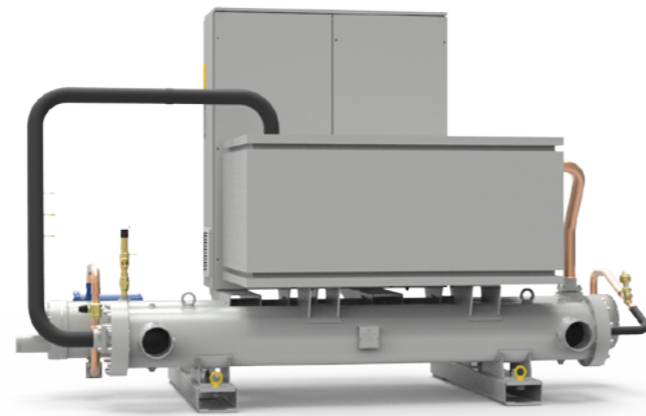
## Low noise

WSW Explorers are available as low-noise versions.

These versions work particularly quietly due to special noise insulation.

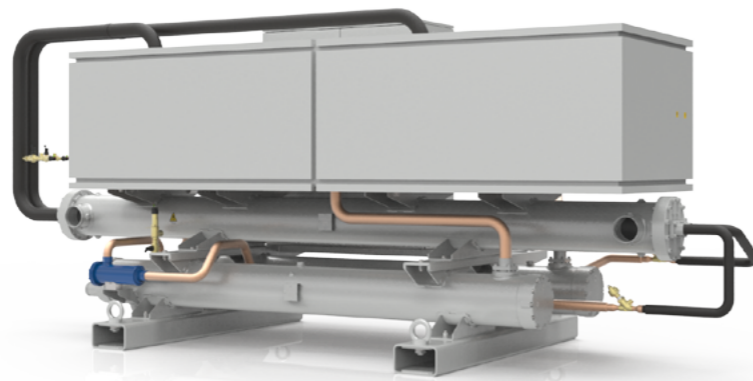
**Available for all sizes.**

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



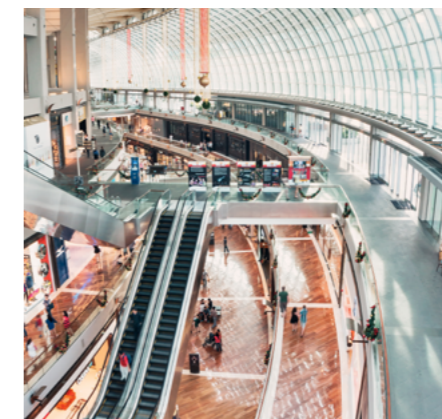
Chilled water temperatures (evaporator): Inlet +12°C to +22°C  
Outlet +7°C to +18°C

### Process and industrial cooling



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

### Comfort air conditioning



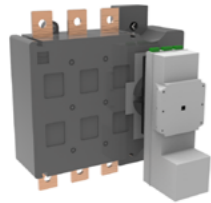
Chilled water temperatures (evaporator): Inlet +12°C to +20°C  
Outlet +7°C to +15°C

# Options



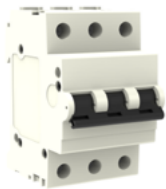
## Compressor soft start

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  $\cos \phi$  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 C2020 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 C2020 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.



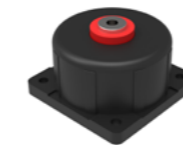
## Shipping without refrigerant

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

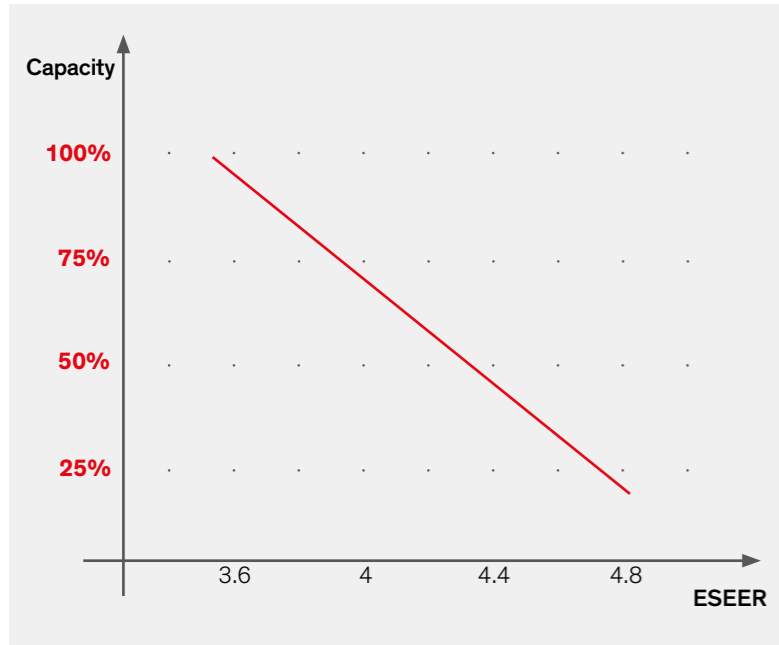
Anti-vibration mounts that are specially adapted to the chiller prevents transmission of the vibration.



## 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 12 °C and a water inlet temperature of 7 °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

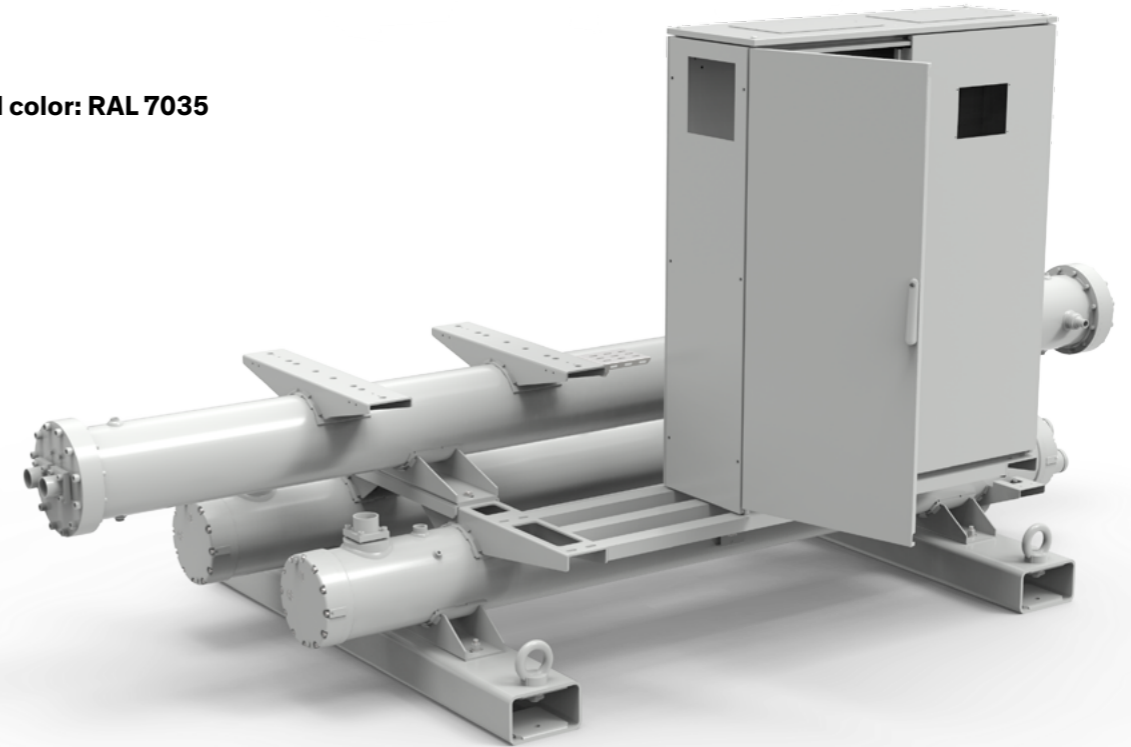
The IPLV is coefficient that was developed by the American Air Conditioning, Heating and Refrigeration Institute (AHRI). This coefficient usually serves to specify the performance of chillers under different conditions. Unlike the EER (Energy Efficiency Ratio) and COP (Coefficient of Performance) coefficients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

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

# Design

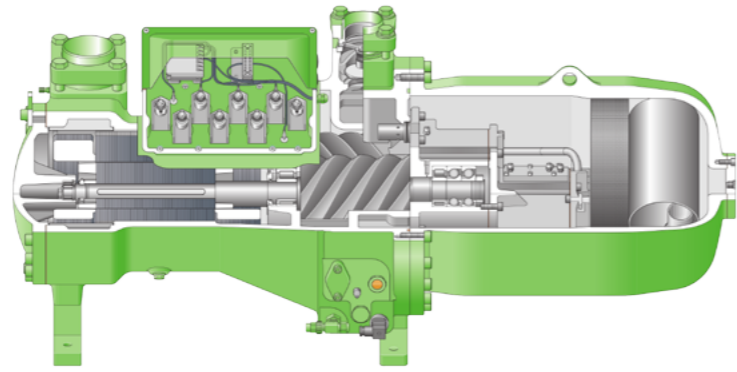
The most important components of the chiller such as condensers, evaporator and compressors are main components of the supporting basic machine structure. Condensers and evaporator support the entire weight of the chiller, even during transportation. The chiller can be lifted by pre-mounted eye bolts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

Standard color: RAL 7035



## + 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**



## Semi-hermetic screw compressors

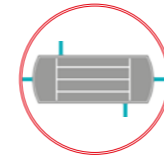
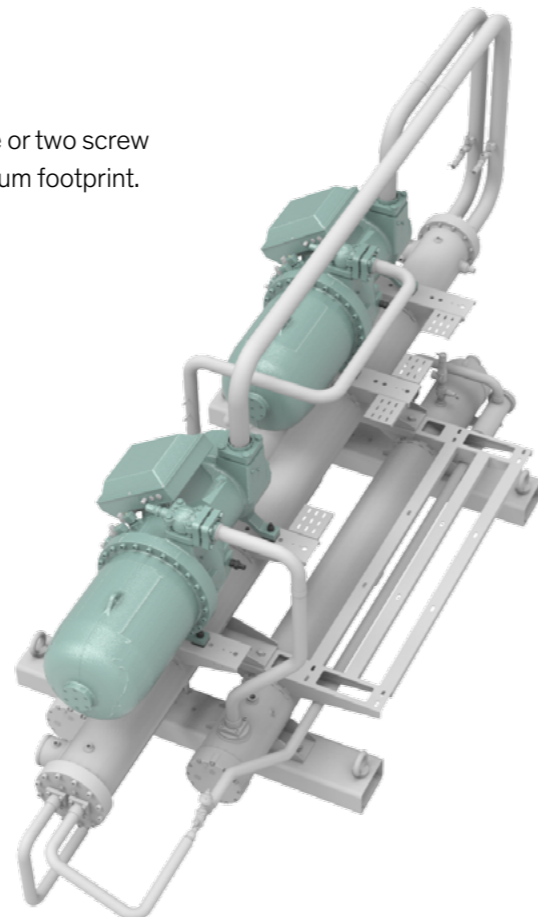
The STULZ Explorer chillers are based on semi-hermetic screw compressors. The refrigerant is continuously compressed by the compressor design with double screws. In turn, this causes a reduction in the mechanical load on the components, which increases the product's service life.

### Compressor start

The compressors can be delivered with part-winding start (WSW080-250, except WSW140) 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.

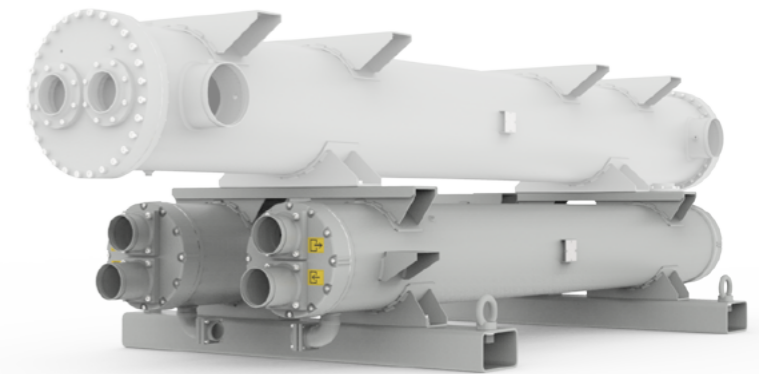


## Shell & tube condenser

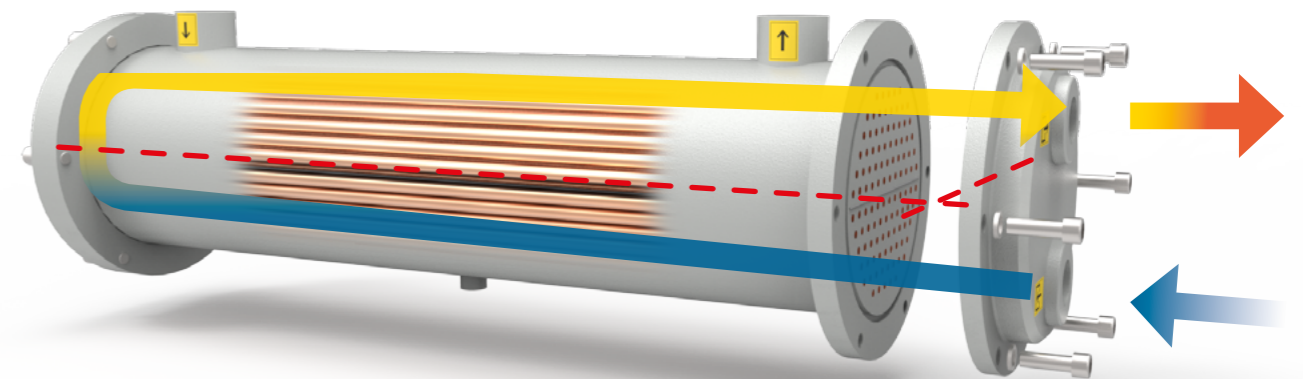
The shell & tube condensers comprise a steel jacket and copper pipes in the interior. They are coated on the outside with epoxy paint in the same color as the rest of the chiller (standard color: RAL 7035). Victaulic® connections allow fast and easy installation.

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

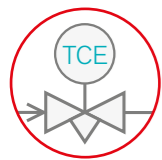
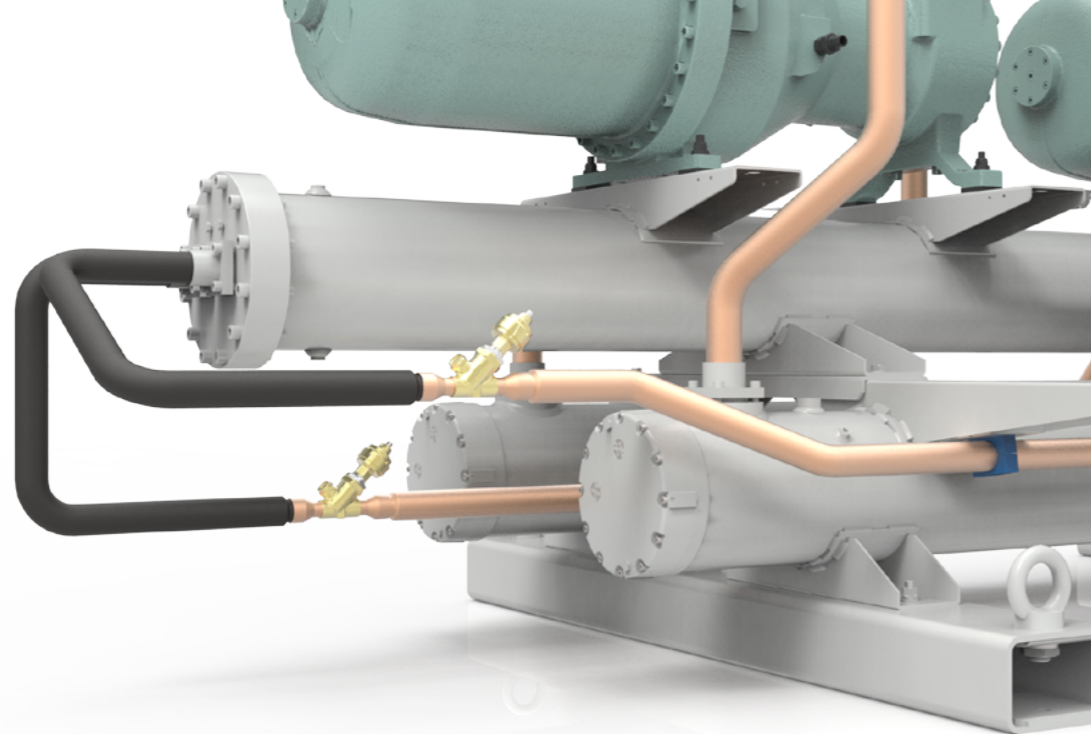
- Steel jacket
- Copper pipes
- Double passage
- Independent circuits
- Victaulic® connections



### 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.

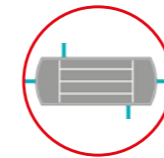


## Electronic expansion valve

Evaporation of the refrigerant is precisely controlled by finely-regulated expansion valves. The expansion valves use pressure sensors, temperature sensors and the STULZ C2020 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

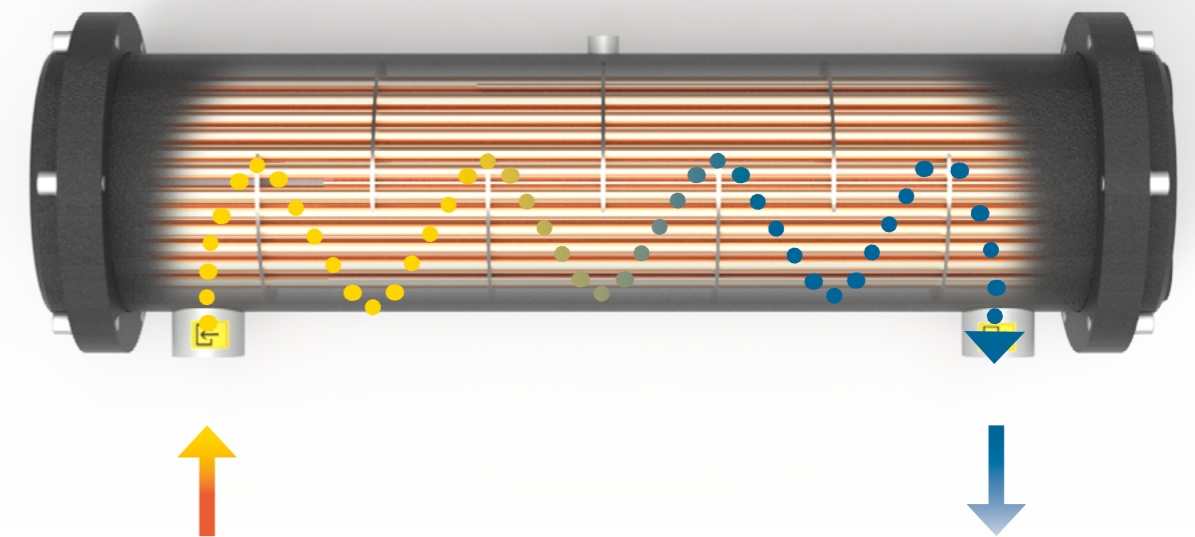
- **Extended working range** in comparison with conventional thermostatic valves
- **Protection against fluid return:** Pressure sensors and temperature sensors are used to regulate the evaporation temperature and superheating in an energetically-optimized manner.
- **Internal UPS for the expansion valve:** 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 C2020



The WSW 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 front side **IP66**
- Operating thresholds from **- 20 to + 60 °C**
- **Acoustic signal**
- **Four 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

## The C2020 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

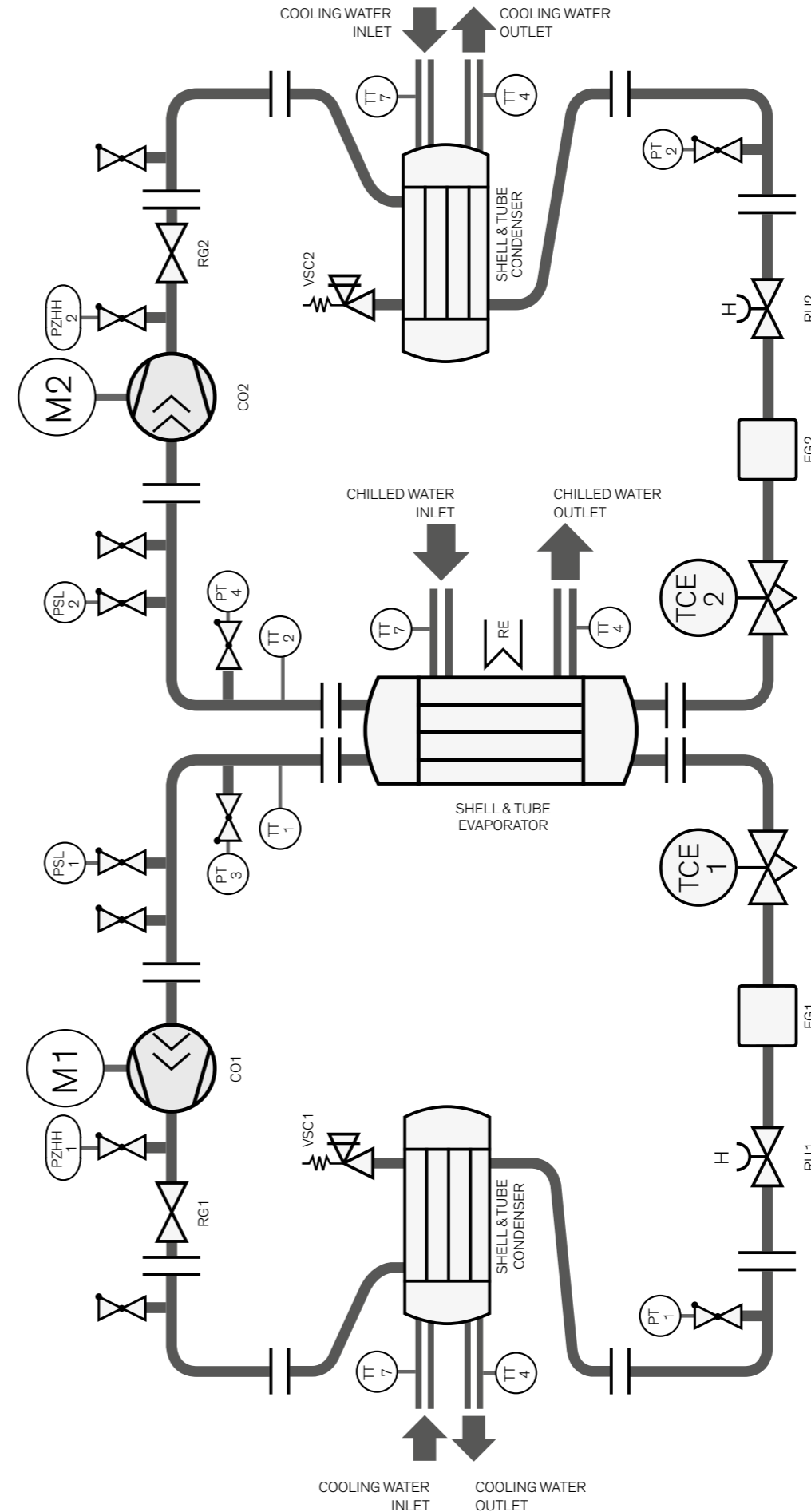
The chiller can be transported by means of a suitable pallet and materials handling equipment.

## 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

## 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.

## 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

### Nameplate power rating of single-circuit machines

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

### Dimensions / weight

		080	090	110	125	140
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	31425	3190	3350	3824

### Nameplate power rating of dual-circuit machines

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

### Dimensions / weight

		160	180	220	250	265	280	320	360	420	480	560
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  
<sup>1</sup> In accordance with ISO 3744

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With specialist, competent partners in ten German branches and in subsidiaries and exclusive sales and service agents around the world.

Our seven production sites are situated in Europe, North America and Asia.

For further information, please visit our website at [www.stulz.com](http://www.stulz.com)



You can find out more  
on our product page.