



CoolTeg Plus

Chilled water (CW) version: AC-TCW



Application

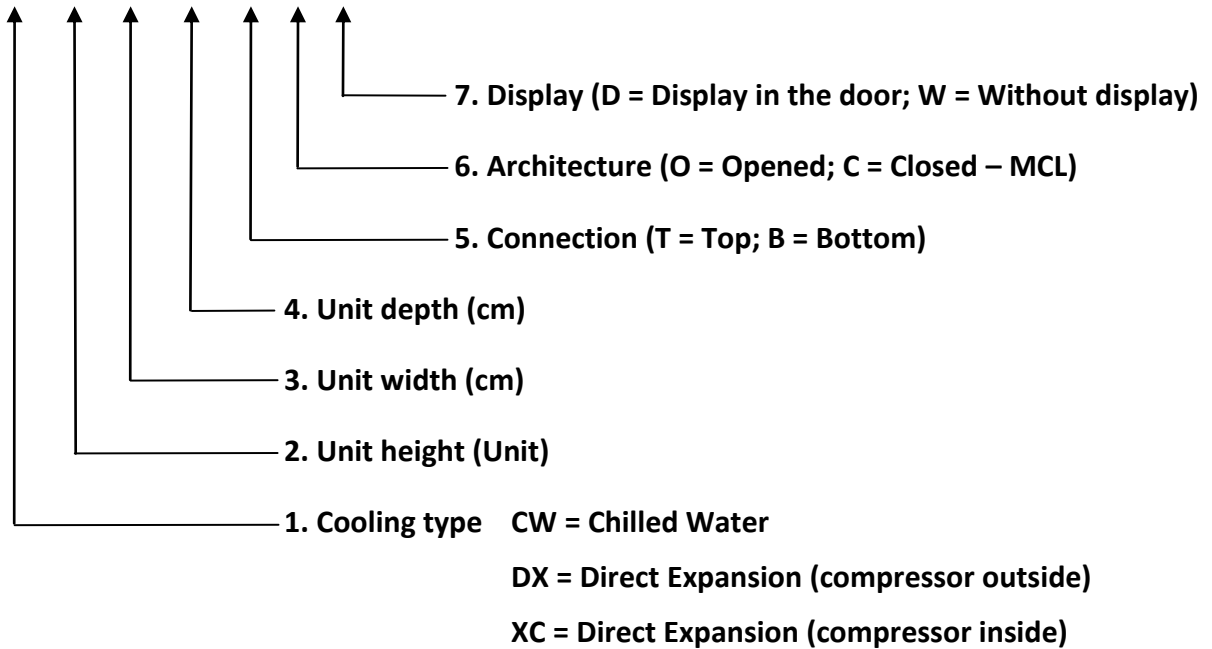
CoolTeg Plus air-conditioning units for data centers are designed to fit perfectly with the Conteg IT cabinet (rack) row. Their main task is to take hot air out from the rear side of the racks, cool it down and blow it to the front side of the racks to cool servers and other IT equipment.

Conteg recommends mechanically separating hot and cold zones in the IT room and increasing the temperature in the hot zone. This will increase the CoolTeg Plus unit's cooling capacity. The most typical application is the Conteg Modular Closed Loop (MCL). It is a custom-made container with various numbers of server racks and cooling units incorporated inside the loop.

A CoolTeg Plus unit in CW configuration is ready for connection to a chilled water system in the building. CoolTeg Plus CW units in either size CW30 or size CW60 are very useful for free-cooling systems.

Code

AC - T 1 - 2 - 3 / 4 - 5 6 7 - ACCESSORIES



Example:

AC-TCW-42-30/120-TOD



Function

The main parts and their functions:

Heat exchanger – to transfer heat from hot air to cold water. It is made of copper pipes with aluminum fins. The cross position of this HX inside the unit allows for maximum cooling capacity. The fins' hydrophilic surface helps keep the droplets of condensate. A condensation pan collects the water buildup and drains it out.

Fans – to transfer air from the hot zone through the air-conditioning unit to the cold zone. We use highly efficient radial fans with EC motors with stepless speed control to maintain airflow according to the actual request and to minimize energy consumption. Any fan failure is reported to the controller.

Filters – to clean the air and protect interior components. The Zick-zack filters, made from synthetic material in paper frames, maintain the EU4 filtration class. They are easily replaceable, if they become clogged. The clogging is detected by a differential pressure switch.

Valve – to control cooling capacity according to actual needs. The 3-way (or 2-way upon request) water valve is used with a servo drive. It fluently modulates unit's capacity according to inputs from the controller. The Kv value of the valve is calculated to reach perfect control characteristic.

Sensors – for real feedback. Temperature is measured at four locations – two sensors are placed at the rear, and two sensors are located in the front of each unit (in the upper position and in the bottom position). Thanks to this placement, the controller always has the most up-to-date information. Air humidity is measured at the front and also in the rear of the unit. A differential pressure switch makes sure the filters stay clean. If the filters get dirty, an alarm will be activated.

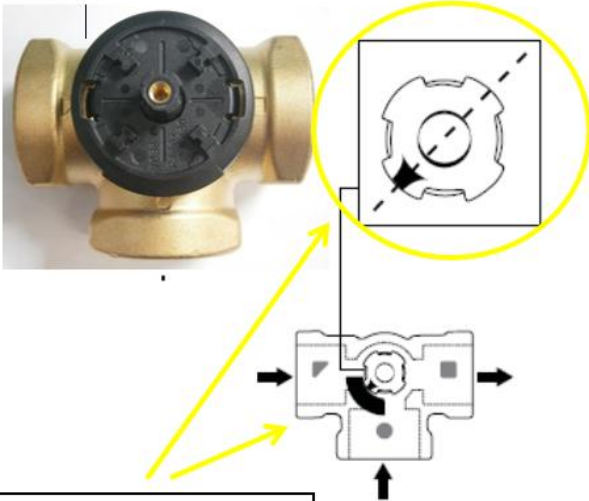
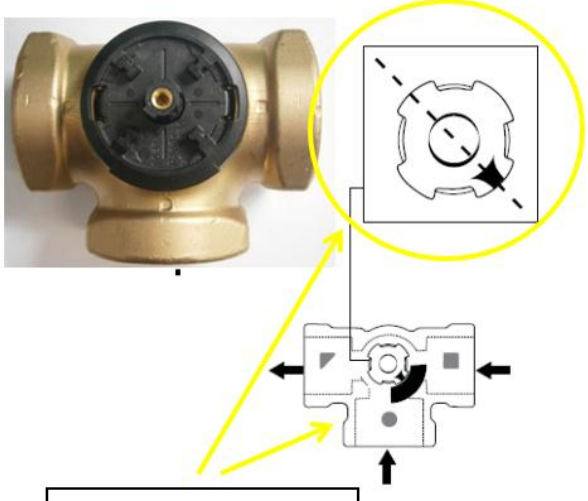

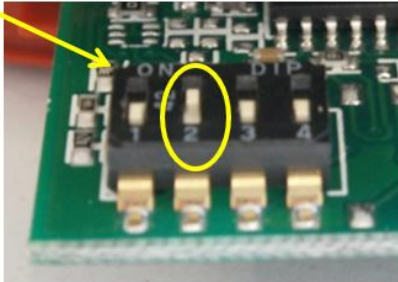

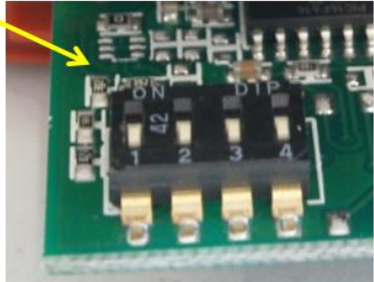
Control box – for electric power distribution, function control, safety, and communication. There is a main switch on the outside and circuit breakers on the power supply inside. One breaker is for the fan motors and the second one is for the controller. The controller that comes with the original Conteg software also manages all the functions for the CoolTeg Plus unit. Based on the values set by user, the controller can change the fan speed, adjust the water valve opening, and operate various accessories.

Display – for user-friendly communication with the unit's controller. The standard way for communication is through a 4.3" color touch display, which can be placed on the unit's front door or separately in the room. One display can maintain communication with up to 30 units. For a quick communication respond and full BMS functionality we recommend to use groups of 8 units as maximum. An RS485 port and two Ethernet ports allow remote control and monitoring via various building systems. A USB port is mainly used for easy software updates and history data download.

Unit connection

Water pipes

CoolTeg Plus units can be connected to the cooling system with a pure water or standard anti-freeze mixture. These units are also suitable for free-cooling systems. The inlet liquid temperature must be between +6 and +30 °C. The maximum operating pressure is 10 bar (PN 10). The CW30 unit is equipped with DN32 piping with an internal thread for connecting. The CW60 unit is equipped with DN40 piping with an internal thread. Connect the chilled water supply to the unit's piping inlet (designated IN). Connect the piping for returning water to the chiller to the unit's piping outlet (designated OUT), leading from the control valve. The connection is located 22 cm from the bottom of the unit.

CW30	CW60
Setting of 3-way valve	
 <p data-bbox="193 1272 517 1379">Correct position of the valve body</p>	 <p data-bbox="959 1272 1273 1379">Correct position of the valve body</p>
Setting of rotation direction in servomotor	
 <p data-bbox="560 1653 810 1756">DIP switch No.2 is ON</p> 	 <p data-bbox="1257 1619 1508 1756">Correct position (all dip-switches are OFF)</p> 

CW30	CW60
Indication of direction	
<div data-bbox="209 315 759 376" style="border: 1px solid black; padding: 5px; text-align: center;">Correct position of the pointer</div> 	<div data-bbox="914 315 1465 376" style="border: 1px solid black; padding: 5px; text-align: center;">Correct position of the pointer</div> 
Water inlet and outlet	
	

We recommend using flexible house pipes with shut-off valves to connect to the building's chilled water system. Do not forget to complete the pipe's thermal insulation after the final connection and pressure test.

Power supply

CW30

To connect the cooling unit, equip the cable with a C13 plug and protection against accidental disconnection. A 2 m long cable is supplied with the unit. A plug for the IEC C14 socket is located at the bottom of the control box (electric switchboard) inside the cooling unit. The main switch is located next to the socket. The power supply must be 230 V; 50/60 Hz, 10 A.

CW60

A 5 x 1.5 mm² power cable should be connected directly to the main terminal board (terminals L1, L2, L3, N and PE) inside the control box of the unit. This cable is not supplied with the unit. The main switch is located on the cover of the control box. The power supply must be 3 x 400 V; 50/60 Hz, 10 A.

Drainage

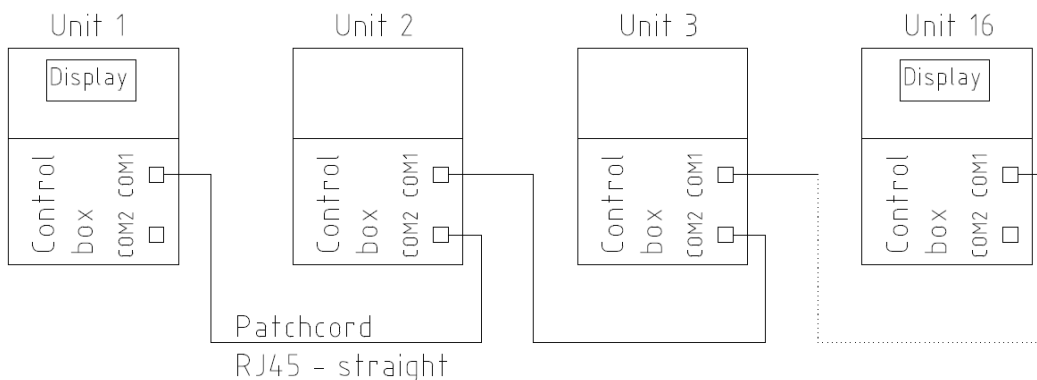
Each indoor unit must be connected to the room's drainage system. Condensate from the bottom pan should be collected with a syphon and put in the drainage piping or drained off with a condensate pump. Outlet from the condensate tank is equipped with a G 1/2" thread (22 mm outer diameter).

Communication lines

The electric switchboard for a cooling unit without a display includes two communication ports, COM1 and COM2 (RJ45 female connector). Both communication ports are identical, and they can be used to connect units in chain. Cooling units with touch-screen displays come with only the COM1 connector, which is used to communicate with other units. The second ETH port is ready for Ethernet communication, allowing the user to control the system remotely.

Use a shielded FTP cable (category 5e) with RJ45 male connectors to connect the units together. The cable must be "directly" connected (not "Cross-over" cable).

A serial connection is necessary to ensure correct communication between the units. A cooling unit with a display always has to be in the first or last position of the communication chain. See the illustrative diagram.



Technical data

		CW30	CW60
Indoor unit type		AC-TCW-42-30...	AC-TCW-42-60...
Connected outdoor unit		Chilled water system	
BASIC DATA			
Cooling system		Chilled Water	
Architecture ⁽¹⁾		Opened or Closed	Opened
Nominal cooling capacity ⁽²⁾	kW	26	61
Nominal Net cooling capacity ⁽³⁾	kW	25	58
Power supply	V/ph/Hz	230 / 1 / 50	400 / 3 / 50
Nominal Power consumption	W	770	2930
Nominal Airflow ⁽⁴⁾	m ³ /h	4000	10500
Number of fans	pcs	5	3
Motor fan technology		EC	
Water flow (or Refrigerant type)	kg/h	3700	8750
Filter class ⁽⁵⁾	-	G4	
DIMENSIONS			
Height ⁽⁶⁾	mm (Unit)	1978 (42U), 2111 (45U), 2245 (48U)	
Width	mm	300	600
Depth ⁽⁷⁾	mm	1000 or 1200	
Weight – depth 1000 mm, height 42/45/48U	kg	163/168/173	248/256/264
Weight – depth 1200 mm, height 42/45/48U	kg	173/179/185	260/270/280
PIPING CONNECTION			
Supply pipe diameter and type	-	1¼" female	1½" female
Return pipe diameter and type	-	1¼" female	1½" female

(1)...CoolTeg units can be used independently in rack rows or integrated in a Modular Closed Loop (MCL) - closed-architecture system of racks and cooling units. Type code is changed according to the key.

(2)...Cooling capacity is changed by controller. The nominal one is calculated at an indoor hot air temperature level of 35°C without condensation (air humidity below dew-point), chilled water temp. 6/12°C (for CW), outdoor temp. +35°C (for DX and XC), clean filters

(3)...Net cooling capacity is the total capacity reduced for the heat load of fans. This is the available cooling capacity for the unit.

(4)...Airflow is changed by controller. The nominal one matches to the nominal cooling capacity

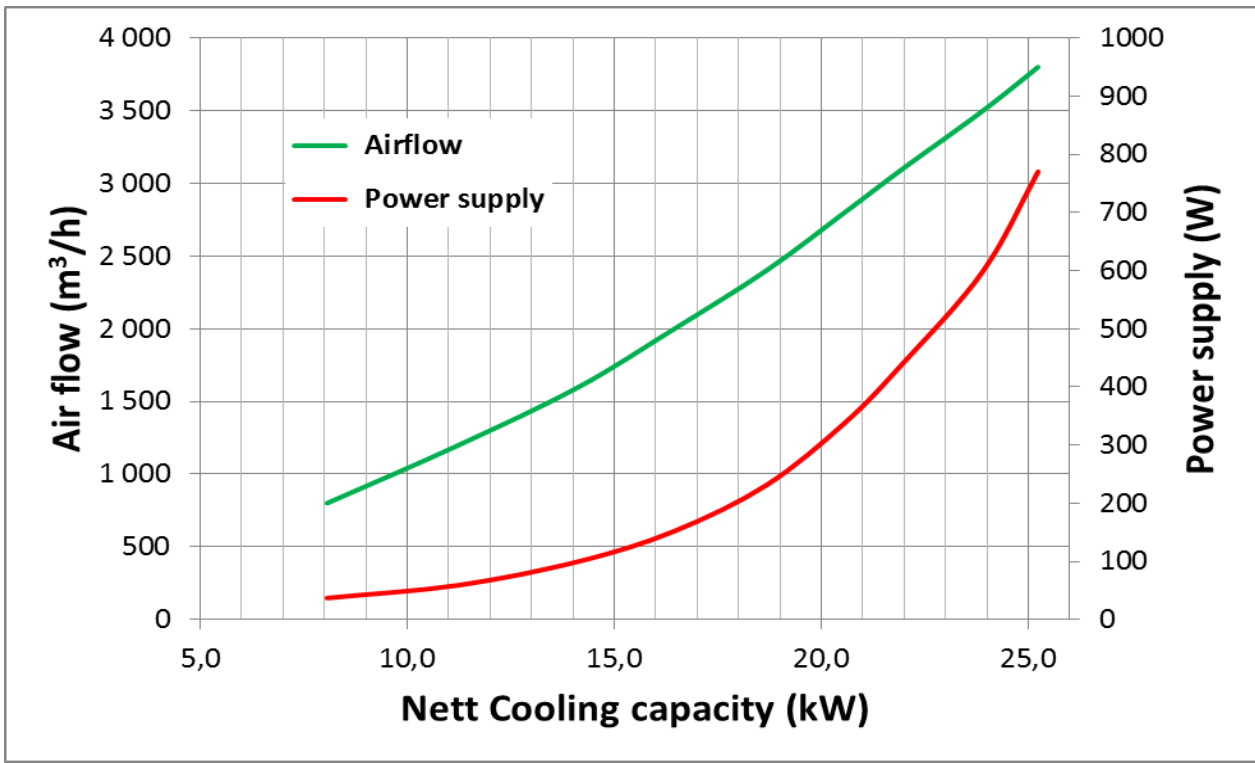
(5)... Closed-architecture (MCL) units are generally delivered without filters

(6)... Without plinth or transport trolley

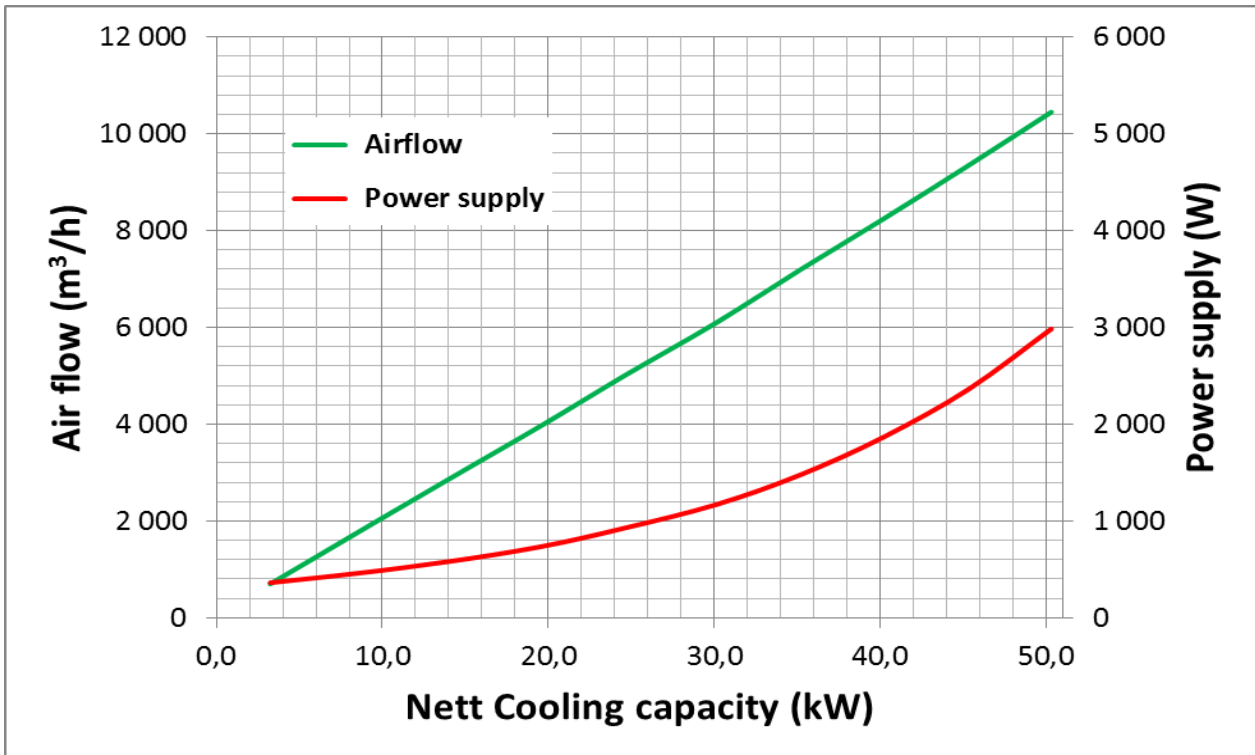
(7)... Closed Architecture (MCL) units are available only in 1200 mm depths

Capacity diagrams

Size CW30



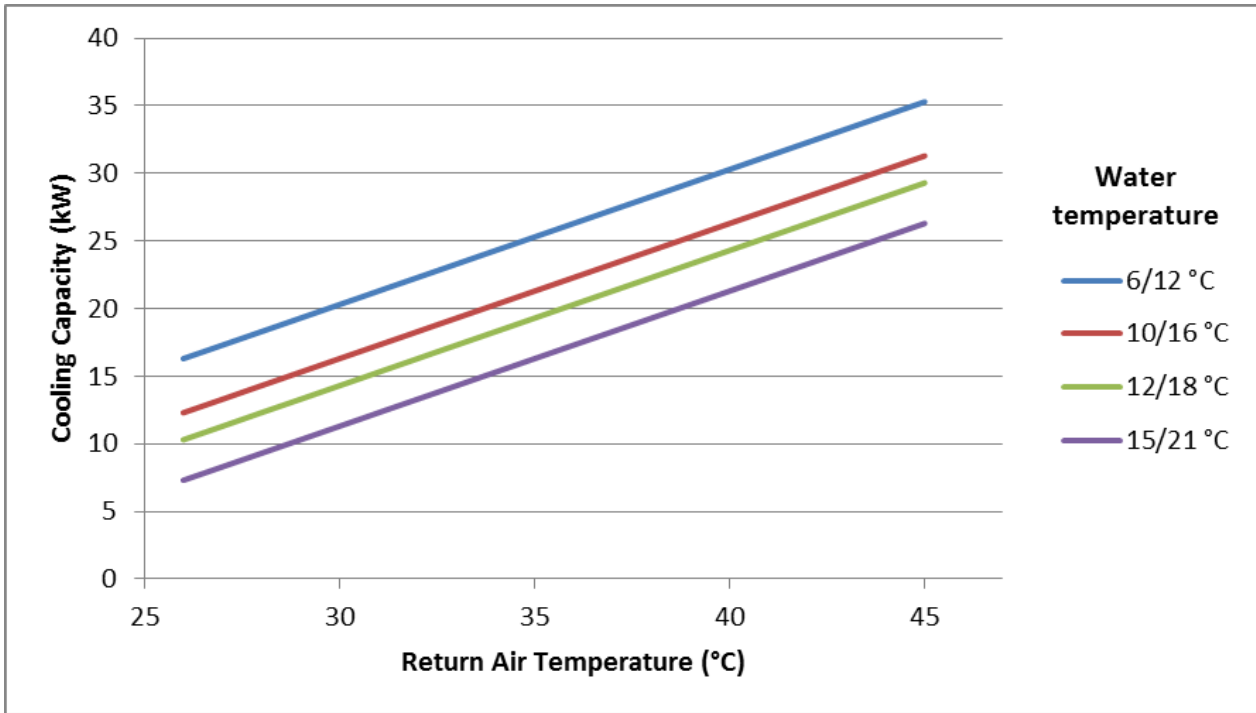
Size CW60



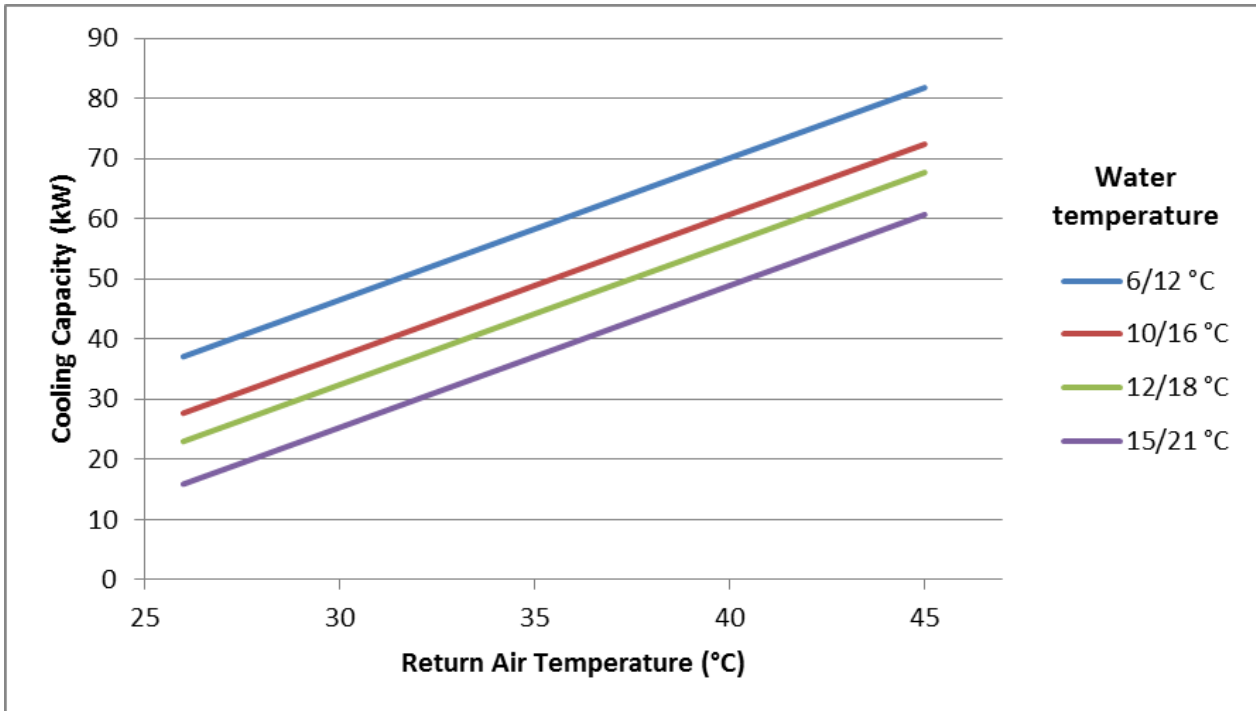
Conditions: Input air temperature = 35°C; cooling without condensation; water temperature = 6 / 12°C



Size CW30



Size CW60



Conditions: Maximum airflow; full water valve opening



Control function

Each CoolTeg Plus unit includes an independent controller inside the control box. This controller sends signals to the fans and water valve to change their airflow and water flow through the heat exchanger in order to maintain the temperature setting in the cold and hot zones.

The cold zone temperature set point: The water valve changes the opening according to the difference between the cold zone set point and the real time temperature. The user can set limits for minimum and maximum opening.

The temperature difference set point: The indoor unit's fans change their speeds to maintain the temperature difference between the cold and hot zones. The goal is to maintain a balanced airflow in the whole system (the cooling units and IT equipment). The user can set limits for minimum and maximum fan speed.

The pressure difference set point: For projects with well separated cold and hot zones (contained aisles), we recommend using pressure control instead of temperature control based on the speed of the fans. The indoor unit's fans change their speed to maintain the pressure difference between the cold and hot zones. The user can set the desired overpressure (between -10 and +10 Pa) and limits for the minimum and maximum fan speed. An additional accessory is needed for this function (pressure control set includes differential pressure meter). The goal is to maintain a balanced airflow in the whole system (the cooling units and IT equipment).

The humidity setting can start the dehumidifying mode if the value is too high. During the dehumidifying mode, the fan speed is minimized. The heat exchanger surface temperature is decreased to its minimum level through an increase in water flow. This causes maximum condensation on the cooler surface. The condensation is collected in the bottom pan and drained away. If the unit is equipped with a humidifier, then a humidifying mode is also available. The humidifier saves water and energy and guarantees stable conditions in the room.

Communication

Each air conditioner can be equipped with a one-touch display on the front door. If one display operates more than one unit, then all units in the group must be connected. Up to 16 units can be connected to one display. The SW version for 30 units is also available (for further information please contact your area sales manager). The units connected to the zone can cooperate with each other. Zone functions – standby management and overload start – are available. When the number of units in a zone is established, the following parameters must be set: number of running units (standby units are set automatically), changeover period (daily or weekly) and overload start (temperature limit that starts standby units to a standard cooling mode).

Two displays in each group are recommended in case one fails.

The display includes a web server application supporting IP address access. The communication protocol is TCP/IP (Ethernet connection) and can be used for various remote control possibilities. More groups of cooling units (more basic displays) can be connected to one large touch screen display to monitor the whole data center.

If needed, controllers (in each CoolTeg Plus unit) can be equipped with an additional extension card (separate wiring is needed), which can follow ModBus, SNMP or BACnet protocol.

It is also possible to use both standard and additional digital inputs and outputs in each cooling unit, which are typically used for general warnings and alarms as well as sending other basic information.