DATASHEET

Cooling unit with a hybrid system CoolTeg Plus DF

COOLTEG

COOLING UNIT WITH A HYBRID SYSTEM

COOLTEG PLUS DF

CoolTeg Plus DF

CoolTeg Plus DF in-row cooling units combine the advantages of CW and XC systems—free-cooling for low and medium outdoor temperatures and direct expansion cooling for use during high outdoor temperatures. The system thus reaches optimal minimum operating costs without the need to compromise.

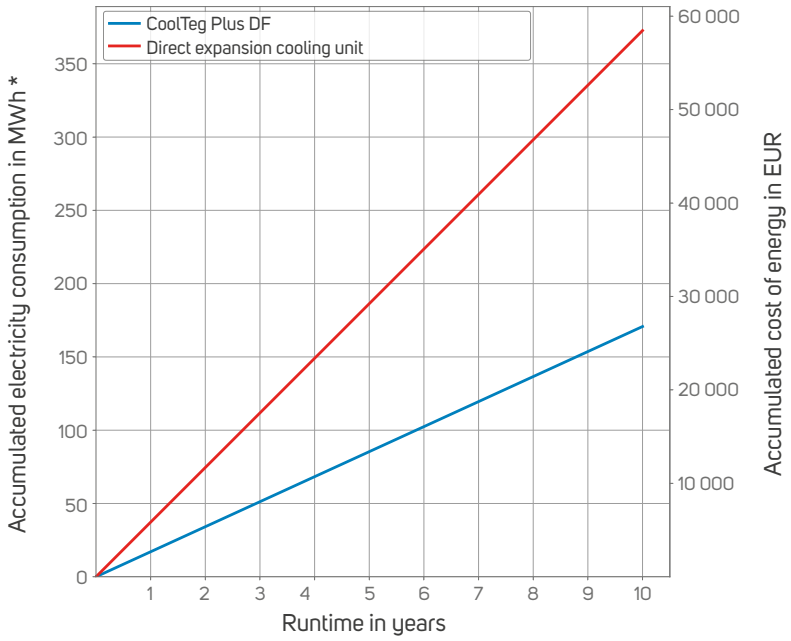
MAIN ADVANTAGES

- Free-cooling for the majority of the year—the unit has the most efficient heat exchanger in its category.
- Smart control system uses free-cooling to pre-cool the air even during high outdoor temperatures—energy consumption thus remains minimal.
- Investment in the unit returns within a few years thanks to savings on operating costs (compared to DX or XC systems).
- Since the main heat carrier is water, waste heat can be reused for heating or other purposes to further reduce costs.
- The water circuit and compressor circuit can be connected to two separate water sources—the unit can thus be fully redundant.

DESCRIPTION

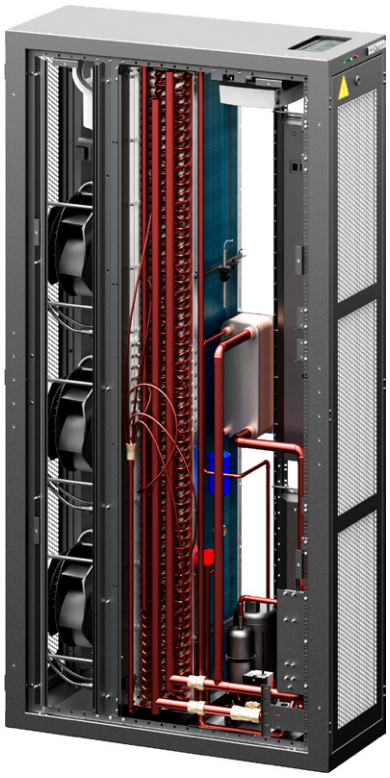
- 2-in-1—small and efficient cooling unit that smartly combines water-based and direct expansion-based cooling.
- Electronically controlled expansion valve—maximum cooling efficiency for any conditions
- Inverter-driven compressor—minimum energy consumption for all cooling capacities.
- Fans with EC technology enable efficient and smooth control of air flow rate.
- Smart control system ensures the set air parameters are reached precisely and with minimum consumption; immediately informs you of any issues.
- Operating range from –40 to +40 °C (upper temperature limit depends on the size of the outdoor heat exchanger). On request, can be supplied with accessories that allow operating the unit at as low as –55 °C.

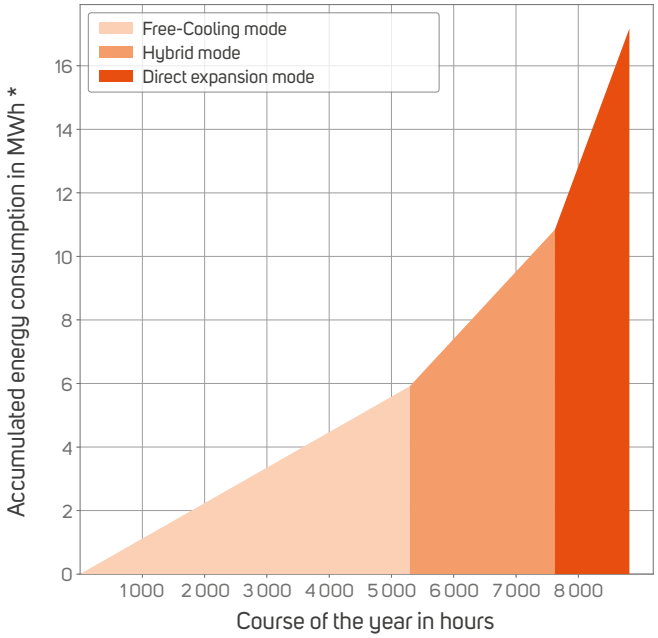
CoolTeg Plus DF can save you up to 20 MWh per year compared to a compression cooling unit.



* The unit's consumption is dependent on its location, or rather, the annual course of temperature at the location. The unit's consumption over the course of the year and use ratio of the individual cooling modes were calculated using nominal values and the annual course of temperature in Prague.

The DF hybrid unit runs in free-cooling mode up to 60 % of the year, in hybrid mode 26 % of the year, and in compression mode **only 14 % of the year**.





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COOLTEG PLUS DF (HYBRID SYSTEM)		
Indoor unit code		AC-TDF-42-40/XX-XXX
Connected outdoor unit		Dry cooler (water cooling using ambient air)
Basic data		
Cooling system	–	Hybrid free-cooling
Architecture [1]	–	Open or closed
Cooling capacity *	kW	25 (23.5**)
Refrigerant type	–	R410A
Nominal refrigerant charge	kg	2
Water flow rate *	m^3/h	1.8 (3.4 **)
Total pressure loss*	kPa	15 (35 **)
Power supply	V/ph/Hz	400/3/50-60
Maximum current	A	19.5
Nominal unit consumption	kW	6.7
Average unit consumption ***	kW	1.9
Fan power consumption *	kW	0.7
Compressor power consumption *	kW	6
Air flow rate *	m^3/h	6 000
Number of radial fans	pcs	3
Fan motor technology	–	EC
Filter class [2]	–	G4
Dimensions		
Height	mm (U)	1 978 (42U), 2 111 (45U), 2 245 (48U)
Width	mm	400
Depth [3]	mm	1 000 or 1 200
Weight—depth 1 000 mm, height 42/45/48U	kg	260/268/274
Weight—depth 1 200 mm, height 42/45/48U	kg	272/282/292
Connection dimension		
Supply pipe diameter and type	–	1" male thread
Return pipe diameter and type	–	1" male thread

Air parameters at the output (nominal conditions): 35 °C at 30 % RH. Condensing temperature: 45 °C. Water temperatures: 15/21 °C. Glycol content: 0 %.
* Values at nominal conditions. ** Compressor circuit (water circuit). *** Calculated using the annual course of temperature in Prague.

[1] CoolTeg Plus units can be used either independently (in rack rows), or integrated in a Modular Closed Loop (MCL) system—closed loop architecture systems of racks and cooling units.

[2] Units in Modular Closed Loop architecture (MCL) are delivered without filters (standard).

[3] Units in Modular Closed Loop architecture (MCL) are available in 1 200 mm depth only.

FOLLOW THE STEPS FOR DETERMINING THE CODE OF THE REQUIRED COOLTEG PLUS UNIT

AC	–	1.	–	2.	–	3.	/	4.	–	5.	–	6.	7.	8.	9.	10.	11.	12.	13.

An example of a correct code:

AC	–	TDX	–	42	–	30	/	10F	–	BOW	–	0	1	0	2	0	0	0	0

Description of the example of a correct code: CoolTeg Plus (facelift) in-row cooling unit with EC fans, suitable for connection to an outdoor condenser unit, open loop architecture, 300 mm width; 1 000 mm depth and 42 U height. 4.3" color touch screen, 1× USB, 2× Ethernet port, proprietary CONTEG SW, installed in the front door. Bottom connection. Condensate pump installed in the cooling unit. pCO WEB card for SNMP communication. Prepared for a Mitsubishi Electric outdoor condensing unit. Standard warranty: 2 years.

1. CoolTeg COOLING SYSTEM	
Code	Model
TCW	Chilled water
TDS	Direct expansion (small)
TDX	Direct expansion
TXC	With internal compressor
TDF	Hybrid system

2. HEIGHT	
Code	Options
41	42U (RF1/RB1)
47	47U (RF1/RB1)
52	52U (RF1/RB1)
42	42U (iSEVEN Server)
45	45U (iSEVEN Server)
48	48U (iSEVEN Server)

3. WIDTH	
Code	Width (mm)
30	300
40	400
60	600

4. DEPTH *	
Code	Depth (mm)
10F	1 000
12F	1 200

* F indicates a unit after a facelift. Units before a facelift have a 0 instead of an F.

5.1. PIPE CONNECTION	
Code	Options
B	Bottom connection
T	Top connection

5.2. ARCHITECTURE	
Code	Options
O	Open
C	MCL—modular closed loop

5.3. DISPLAY	
Code	Options
W	Not present
D	With screen

6. HUMIDIFIER	
Code	Options
0	Not present
1	Humidifier (standard)
2	Humidifier (low water conductivity)

7. CONDENSATE PUMP	
Code	Options
0	Not present
1	Condensate pump (standard)
2	Leak detection sensor rope
3	Condensate pump (powerful) *
A	Leak detection sensor rope + condensate pump (standard)
B	Leak detection sensor rope + condensate pump (powerful)

* Used in combination with a humidifier, or if displacement height is over 5 m. Max. height—30 m.

8. POWER SUPPLY	
Code	Options
0	Standard 230V/1f/50Hz
A	Dual power supply

9. COMMUNICATION	
Code	Options
0	Not present
M	Modbus
W	SNMP

10. REGULATION	
Code	Options
0	Standard
P	Control based on pressure
H	Communication with HMI (Mitsubishi Heavy Industry) units
R	Control based on pressure + communication with HMI (Mitsubishi Heavy Industry) units
E	Control based on pressure in combination with CoolTop units

11. CONTROL VALVES	
Code	Options
0	Standard (3-way valve)
2	2-way valve

12. FANS	
Code	Options
0	Standard
S	Extra powerful fans (only for CW30)

13. SPECIAL MODIFICATIONS	
Code	Options
0	Standard
R	External relay—unit status
6	6-row heat exchanger

FOR COOLTEG PLUS COOLING UNITS

BASIC ACCESSORIES

TOUCH SCREEN

- For more user-friendly communication with the unit's regulator, you can use a 4.3" color touch screen.
- A single touch screen can control up to 16 cooling units. For quick communication and full functionality of BMS, we recommend using a maximum of 8 units.
- RS485 port and Ethernet port enable remote control and monitoring using various master systems. The USB is used primarily for quick and easy software updating and downloading of historical data.
- The touch terminal has a number of functions: connection to a customer network, remote control, ModBus communication and many more.
- The screen can be placed directly onto a CoolTeg unit, on the side of a rack or onto a wall in the data room.

CONTROL BASED ON PRESSURE

- Each unit can control air flow rate (fan speed) based on differences in temperature between the hot and cool zones or based on pressure differences.
- Flow rate control based on pressure differences ensures that air is supplied to the area in front of the server at the exact same rate as that at which the servers draw the air in.
- Perfect environment for servers (no risk of server damage caused by over- or under-pressure).
- Minimizes power consumption of the entire cooling system due to precise distribution of cooled air.

CONDENSATE PUMP

- All CONTEG units can be connected to the sewerage system via gravity feed.
- If there is no sewerage connection in the room, the water can be conducted away using a condensate pump.
- Each unit includes a water detector that activates the pump, and a level sensor that turns off the unit in case of increased water levels.

DUAL POWER SUPPLY

- Electrical PDU for two power branches. The device allows powering the unit from two independent sources.

STEAM HUMIDIFIER

- The steam humidifier maintains the set relative humidity of the air in the data center.
- The humidifier can output 3 kg of steam per hour
- The steam humidifier of the CoolTeg Plus unit is powered separately.
- You can choose from 2 boiling vessels depending on water hardness.

pCO WEB COMMUNICATION CARD

- Accessory compatible with CoolTeg regulators.
- Enables additional individual communication (monitoring and control).
- Communication via Ethernet network protocols.
- Functions: web server, e-mail, FTP, SNMP, BACNet, ModBus TCP/IP and more.

Comparison	CoolTeg Plus				CoolTop		CoolSeven	CoolRAC		
	CW	DX	XC	DF	CW	DX		CW	XC	DF
Installation										
Between IT racks	✓	✓	✓	✓	–	–	–	–	–	–
On top of IT racks	–	–	–	–	✓	✓	–	–	–	–
Inside of 19" racks	–	–	–	–	–	–	✓	–	–	–
Farther from IT racks	–	–	–	–	–	–	–	✓	✓	✓
Cooling medium										
Water/glycol	✓	–	–	–	✓	–	–	✓	–	–
R410A	–	✓	✓	–	–	✓	✓	–	✓	–
R410A + water/glycol	–	–	–	✓	–	–	–	–	–	✓
Application										
Smaller	✓	✓	✓	✓	✓	✓	✓	–	–	–
Medium	✓	–	✓	✓	✓	✓	–	✓	✓	✓
Bigger	–	–	–	–	–	–	–	✓	✓	✓
Occupied floor area (in data center)										
None	–	–	–	–	✓	✓	✓	–	–	–
Small	✓	✓	✓	✓	–	–	–	–	–	–
Large	–	–	–	–	–	–	–	✓	✓	✓
Nominal cooling capacity	Air temperature in hot zone: 35 °C; water temperature of 6/12 °C (for CW units), no condensation.									
7-19 kW	–	DXSmall DX30	–	–	–	–	CoolSeven	–	–	–
20-39 kW	CW30 CW30 SuperC	DX30	XC30	DF	CoolTop2	CoolTop2 CoolTop3	–	–	–	–
40-100 kW	CW60	–	XC40	–	CoolTop3	CoolTop2 CoolTop3	–	CoolRAC CW CoolRAC XC CoolRAC DF		
Suitable for										
Smaller applications – e.g. Modular Closed Loop	–	✓	–	✓	–	–	✓	–	–	–
High outside temp.	–	–	✓	–	–	–	✓	–	✓	–
Cooling system with a cold-water source	✓	–	–	–	✓	–	–	✓	–	–
No water in a data center	–	✓	✓	–	–	✓	–	–	✓	–
Free-cooling	✓	–	–	✓	✓	–	–	✓	–	✓

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