DATASHEET

Room cooling system CoolRAC DF

CONTEG

TARGETED COOLING AND AIRFLOW MANAGEMENT

COOLRAC ROOM COOLING SYSTEM

CoolRAC units represent a family of precision cooling units specifically designed for easy integration into new and renovated data centers. These cooling units—with different cooling principles, sizes and outputs—are still the most widely used system for efficient targeted cooling from smaller server rooms to large data centers.

MAIN ADVANTAGES

- Variable installation options for the unit with fan module and air outlet in the double floor or above the floor
- Option to equip the unit with one or two fans
- Very low energy consumption thanks to EC fans and control software
- User-friendly and modern control system
- Flexibility of spatial layout
- Option to place the unit outside the data center room and connect the unit to the air duct
- Wide range of accessories

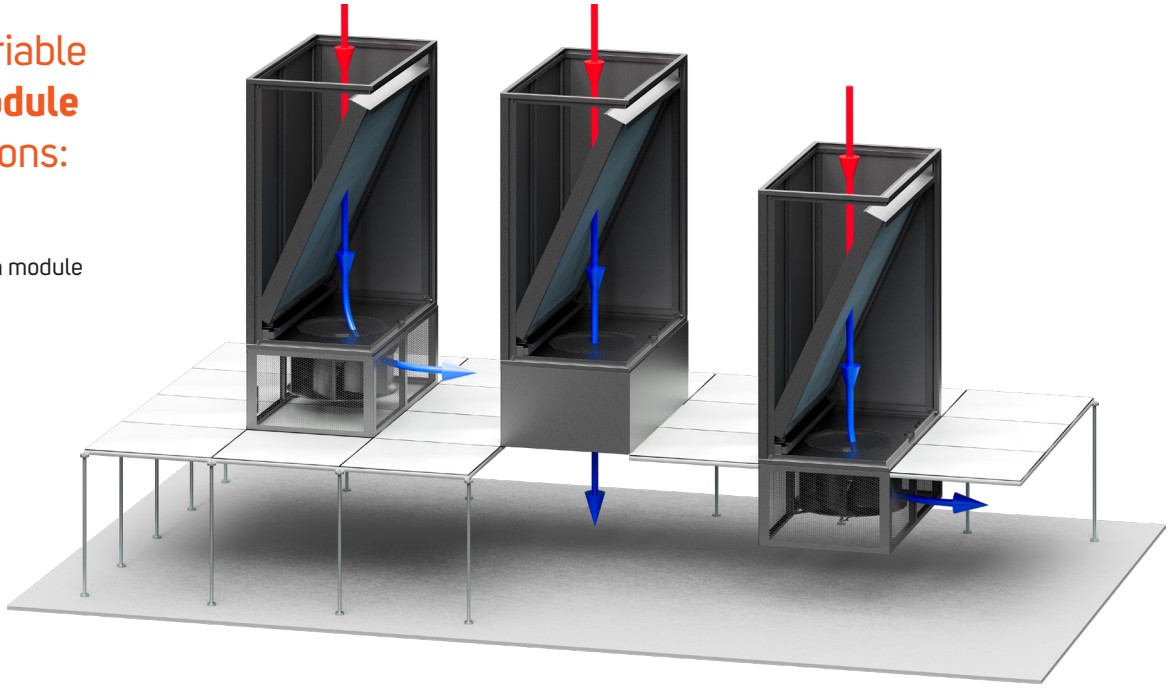
SUITABLE FOR

- Open aisle
- Contained cold/hot aisle
- Data center of any size

COLOR: RAL 9005 RAL 7035

Examples of variable air outlet **fan module installation** options:

- Above the double floor
- Into the double floor
- With installation of the fan module inside the double floor



DESCRIPTION

- Radial fans (with EC motors) for lowest energy consumption and precise control of airflow to servers
- High-efficiency copper-aluminium heat exchangers; also useful for Free-cooling systems
- Controller with special CONTEG software, based on long-term experience from worldwide data centers
- 4.3" color touch-screen display for user-friendly communication
- One display operating up to 16 units per group
- Independent unit control as well as CoolRAC group control functions for entire row of racks
- Wide range of settings adjust performance to specific project
- Communication through TCP/IP protocol (standard)
- Easy ModBUS and remote management from any computer connected to Internet (via integrated Webserver)
- Other protocols available
- Humidity sensors integrated into units
- Possibility of humidification and dehumidification mode integration in each unit
- Four temperature sensors per unit
- Three cooling systems:
  1. CW—chilled water system
  2. XC—directexpansionsystemwith compressor (within CoolRAC unit)
  3. DF—hybrid Dual Fluid system

COOLING UNITS WITH A HYBRID SYSTEM

COOLRAC DF

CoolRAC DF M

CoolRAC DF S

CoolRAC DF room 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.

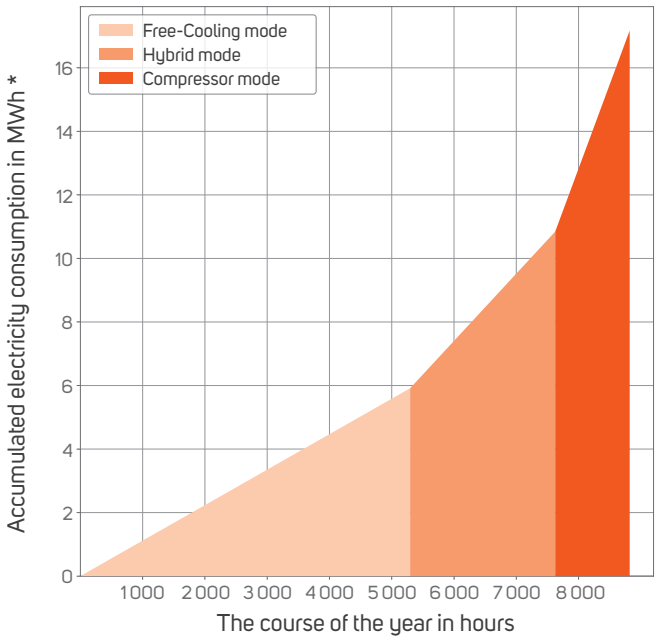
- Smart control system uses free-cooling to pre-cool the air even during high outdoor temperatures—energy consumption thus remains minimal.
- Investment in the unit returns within a few years thanks to savings on operating costs (compared to DX or XC systems).
- Since the main heat carrier is water, 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.
- R410A refrigerant

COLOR: RAL 9005 RAL 7035

The DF hybrid unit runs up to 60 % of the year in Free-Cooling mode, 26 % of the year in Hybrid mode and **only 14 % of the year in Compressor mode**.



* 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.

CoolRAC DF (HYBRID SYSTEM)			
Indoor unit code		AC-CRDF-00S	AC-CRDF-00M
Connected outdoor unit		Dry cooler (water cooling using ambient air)	
Basic data			
Cooling system	–	Hybrid free-cooling	
Architecture	–	DownFloor/UnderFloor/FrontFloor	
Nominal cooling capacity *	kW	25	45,8 (44,5 **)
Nominal net cooling capacity	kW	23,6	45,1
Power supply	V/Ph/Hz	400/3/50-60	
Running current *	A	13,5	18,1
Maximum current	A	21	25,9
Fan power consumption *	kW	1,4	0,7
Compressor power consumption *	kW	7,2	11,2
Nominal air flow rate *	m^3/h	6 000	10 300
Maximum air flow rate	m^3/h	10 400	12 320
Water flow rate *	m^3/h	5,5 (5,3 **)	4,3 (4,2 **)
Total pressure loss *	kPa	20 (23 **)	40 (45 **)
Number of radial fans	pcs	1	1 or 2
Fan motor technology	–	EC	
Refrigerant type	–	R410A	
Refrigerant filling	kg		3
Filter class	–	G4	
Dimensions			
Height	mm	2025	
Width	mm	714	1353
Depth	mm	763	
Weight	kg	300	376
Connection dimension			
Supply pipe diameter and type	–	1" male thread	
Return pipe diameter and type	–	1" male thread	

Outlet air parameters (nominal conditions): 35 °C at 30 % RH. Condensing temperature 45 °C; water temperature 11/20 °C; glycol content: 0 %.
* Values at nominal conditions.
** Compressor circuit (water circuit).

FOLLOW THE STEPS FOR DETERMINING THE CODE OF THE REQUIRED COOLRAC UNIT

AC	–	CR	1.	–	2.	3.	4.	–	5.	–	6.	7.	–	8.	9.	10.	11.	12.	13.	14.	15.	16.

An example of a correct code:

AC	–	CR	DF	–	0	0	M	–	04	–	1	D	–	1	3	A	2	0	0	2	0	3

Explanation of an example of a correct Code: CoolRAC cooling unit based on the principle of dual-fluid technology (with integrated indirect free-cooling function), medium-sized W × H × D = 1 353 × 2 025 × 790 mm. Cooling capacity 45 kW. With perforated bottom cover for air distribution into the double floor. With integrated 4.3'' LCD touch screen. Integrated humidifier 3 kg/h steam. Powerful condensate pump. Dual power supply. pCO web communication card for SNMP communication. With two fans. Heating coils for electric reheating of air up to 1 200 W.

1. UNIT TYPE	
Code	Model
CW	Chilled water
XC	Direct expansion with an integrated compressor
DF	Free-cooling water cooling with an integrated compressor

2. EMPTY POSITION	
Code	Options
0	

3. EMPTY POSITION	
Code	Options
0	

4. UNIT DIMENSIONS	
Code	W × H × D (mm)
S	Small. 714 × 2 025 × 763mm
M	Medium. 1 353 × 2 025 × 790 mm

5. COOLING CAPACITY	
Code	Options
04	45 kW
06	60 kW
08	80 kW
10	100 kW

6. AIR DISTIBUTION	
Code	Options
0	All perforated
1	Perforated bottom
2	Perforated front
3	Perforated front and sides
4	Perforated front and one side
5	No perforation (for air-outlet installation)

7. DISPLAY POSITION	
Code	Options
D	Display in the door
W	Without display

8. HUMIDIFIER	
Code	Options
0	No humidifier
1	Standard humidifier
2	Humidifier for low conductivity
P	Preparation for humidifier

9. CONDENSATE	
Code	Options
0	Standard drain
1	MiniBlue
2	Flood rope
3	MegaBlue
A	MiniBlue + flood rope
B	MegaBlue + flood rope

10. POWER SUPPLY	
Code	Options
0	Standard
A	Dual

11. COMMUNICATION	
Code	Options
0	Standard
1	Modbus RS485 card
2	pCO WEB card

12. REGULATION	
Code	Options
0	Standard

13. EMPTY POSITION	
Code	Options
0	

14. FANS	
Code	Options
1	One fan
2	Two fans

15. SPECIAL MODIFICATIONS	
Code	Options
	Logo, color etc

16. ELECTRIC REHEATING OF AIR	
Code	Options
0	Without
1	600 W
2	900 W
3	1200 W

FOR COOLRAC 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 CoolRAC unit, on the side of a rack or onto a wall in the data room.

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 CoolRAC unit is powered separately.
- You can choose from 2 boiling vessels depending on water hardness.

pCO WEB COMMUNICATION CARD

- Accessory compatible with CoolRAC 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	DX30	XC30	DF	CoolTop2	CoolTop2 CoolTop3	–	CoolRAC XC CoolRAC DF		
40-100 kW	CW30 SuperC 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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