

## C-series

# WATER COOLING STATIONS

**Adwatec Heavy Duty Water Cooling Stations** are compact and reliable solutions for power electronics cooling in a closed-loop water cooling system.

The cooling station circulates coolant between the power electronics and heat exchanger. A 3-way valve is used to ensure a constant temperature and to avoid condensation in power electronics.

All cooling stations can be delivered as an open frame solution or pre-installed into a standard Rittal VX25 cabinet.

C-series cooling stations are type approved by DNV. All cooling stations can be also approved in projects by any classification societies.

Full range of single and redundant pump stations.  
**Flow rates from 10 l/min to 1400 l/min.**

### KEY FACTS

- ◆ High flow rates with a minimal footprint. Footprints starting from W302 x D556.
- ◆ Wide selection of pumps and heat exchangers
- ◆ Temperature control with a PLC-controlled 3-way valve to avoid any condensation risks.
- ◆ Minimized commissioning time at the site
  - ◆ Microbubble collector system enables even up to 12 times faster de-airing
- ◆ Coolant level indicator in the expansion tank
- ◆ Sight glass to check the coolant quality
- ◆ Standard connection pipe product range
- ◆ IP54 rated components
- ◆ Pressure class PN6 (PN10 as an option)



Picture for reference only.  
Actual products may vary based of selected options.

CCE104R-3-W-P

Project-specific approvals e.g. with following classification societies:



# PRODUCT RANGE

PRODUCT CODE	Motor frequency (Hz)	Flow rate range (l/min)	Max. cooling power (kW) at $\Delta T = 5\text{ }^{\circ}\text{C}$ <sup>(2)</sup> and at max flow rate	Main dimensions W x D x H Open frame	Connection pipe size class	Pump motor power (kW) <sup>(3)</sup>	Supply voltages for pump motor (V)	Dry weight (kg)
	Frequency drive available as an option	Depends on the pressure losses <sup>(1)</sup>	Based on the standard heat exchanger	Based on selected options, page 3				Based on selected options, p. 3
<b>Single-pump models</b>								
CCE36S	50	10 - 70	29	302 x 556 x 1747	DN32	0,6	380-440, 660-690	120
	60	10 - 90	35			1,1		
CCE56S	50	40 - 140	45	302 x 556 x 1747	DN32	1,1	380-440, 660-690	120
	60	50 - 170	51			2,2		
CCE104S	50	90 - 210	115	507 x 570 x 1802	DN40	1,5	380-440, 660-690	148
	60	100 - 250	125			3		
CCE153S	50	150 - 360	157	507 x 598 x 1841	DN50	3	380-440, 660-690	202
	60	175 - 470	185			4		
CCE204S	50	200 - 480	243	690 x 739 x 1924	DN65	5,5	380-440, 660-690	415
	60	250 - 580	272			7,5		
CCE322S	50	250 - 660	293	690 x 739 x 1924	DN65	4	380-480, 660-690	430
	60	300 - 800	330			7,5		
CCE6421S	50	500-1260	440	1380 x 880 x 1895	DN80	11	380-480, 660-690	987
	60	600-1400	475			18,5		
<b>Two-pump (redundant) models</b>								
CCE36R	50	10 - 70	29	507 x 570 x 1802	DN40	0,6	380-440, 660-690	219
	60	10 - 90	35			1,1		
CCE56R	50	40 - 140	45	507 x 570 x 1802	DN40	1,1	380-440, 660-690	239
	60	50 - 170	51			2,2		
CCE104R	50	90 - 210	100	507 x 570 x 1802	DN40	1,5	380-440, 660-690	263
	60	100 - 250	112			3		
CCE153R	50	150 - 360	139	507 x 598 x 1841	DN50	3	380-440, 660-690	311
	60	175 - 470	163			4		
CCE204R	50	200 - 480	243	690 x 739 x 1924	DN65	5,5	380-440, 660-690	506
	60	250 - 580	272			7,5		
CCE322R	50	250 - 660	293	690 x 739 x 1924	DN65	4	380-480, 660-690	536
	60	300 - 800	330			7,5		

**The chart is only indicative. Check the exact values from the pump selection chart on page 4 or by contacting Adwatec.**

- (1) Max flow rate depends on the pressure losses in customer cooling circuit. Please see operation curve at page 4  
 (2)  $\Delta T = \text{Coolant OUT} - \text{Technical water IN}$ . Also higher cooling capacities are possible with special heat exchangers.  
 (3) Follow 60Hz values always when a frequency converter is selected

## PRODUCT KEY

COMPONENT	ALTERNATIVES	CODE	DEFAULT CODE
Cooling unit	Open frame	CCE	CCE
	3-6	36	
Pump size  (performance curves at page 5)	5-6	56	104
	10-4	104	
	15-3	153	
	20-4	204	
	32-2	322	
	64-2-1	6421	
Number of pumps	Single	S	R
	Redundant	R	
Bypass valve	No temperature control	0	3
	PLC-controlled 3-way valve	3	
	Thermostatic 3-way valve <sup>(1)</sup>	T	
Heat exchanger  (introduction to these options at page 5)	Standard, water-to-water	W	W
	Brazed, full stainless steel W-W	S	
	Sea water resistant W-W, titanium <sup>(2)</sup>	T	
	Gasketed W-W, stainless steel <sup>(2)</sup>	G	
	Water-to-air (external component) <sup>(2)</sup>	E	
Control/wiring  (introduction to these options at page 6)	No control/wiring	0	V
	Connection box	C	
	Siemens PLC control system	P	
	Vacon AC Drive with integrated PLC <sup>(3)</sup>	V	
	ABB AC Drive with integrated PLC <sup>(3)</sup>	A	
	Siemens PLC + frequency converters <sup>(2)</sup>	PV	
Supply voltage and frequency <sup>(4)</sup>	50 Hz, 380 – 480 V	D5	D5
	60 Hz, 380 – 480 V	E6	
	50 Hz, 660 – 690 V <sup>(2)</sup>	F5	
	60 Hz, 660 – 690 V <sup>(2)</sup>	F6	
	50 Hz, other supply voltage	X5	
	60 Hz, other supply voltage	X6	
Remote control / monitoring  (Introduction to these options at page 6)	Hardwired, no fieldbus <sup>(5)</sup>	0	0
	Profinet	N	
	Profibus	B	
	DNP3	D	
	Modbus TCP	M	
	Other, contact Adwatec	X	

### Product key writing example: CCE104R-3-W-V-D5-0

(1) This option affects also to the product footprint and a lead time.

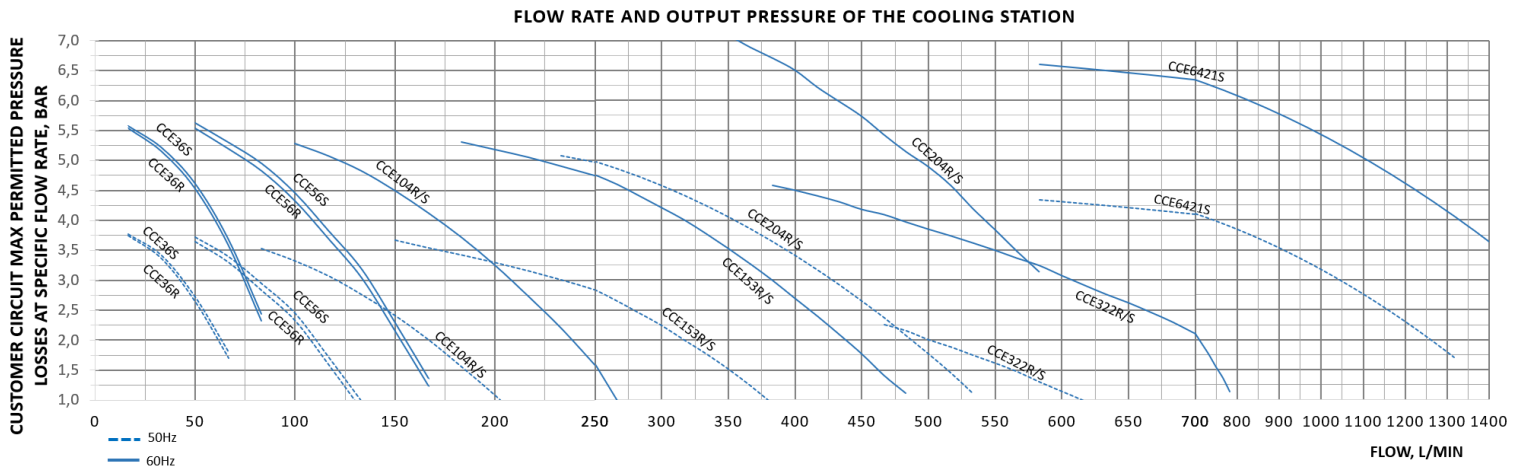
(2) This option may require more footprint than the default selection

(3) The combination of control system (V) or (A) and a supply voltage 690V (F5) / (F6) not recommended

(4) If AC drive is chosen please follow 60Hz pump performance curve. Product code is always acc. to supply frequency

(5) With limited I/O of Vacon AC drive, the remote control can be used with certain device configuration

# PUMP SELECTION



# CONTROL SYSTEM SELECTION

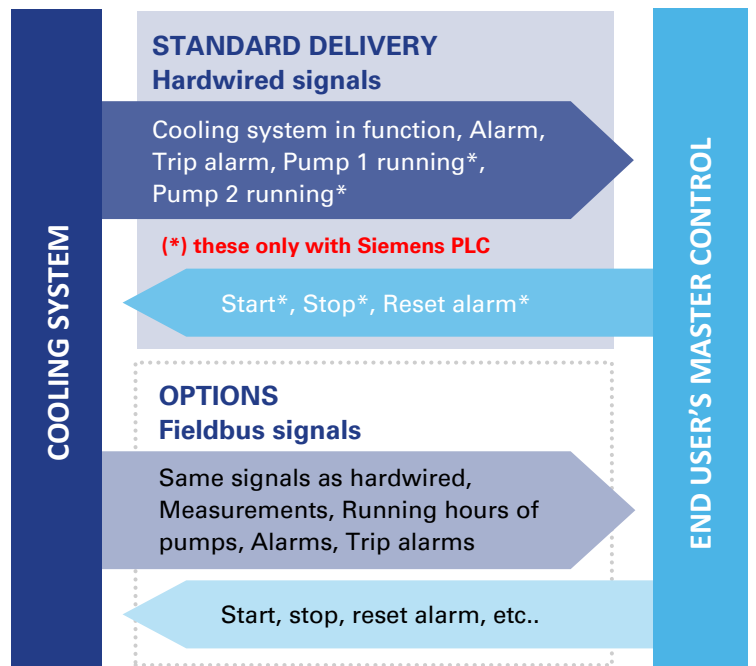
<b>NO CONTROL/WIRING (0)</b>	No internal wiring. M12 sensor connectors. Pressure sensors 4..20 mA. Pressure sensors PT1000. 3-way valve actuator 24 VDC, 0...10 V.
<b>CONNECTION BOX (C)</b>	All internal electrics of the cooling station are wired to connection box (junction box). No control system included.
<b>VACON 100 AC DRIVE WITH INTEGRATED PLC (V)</b>	Preferred choice always when a supply voltage is less than 500V. Enables both a 60Hz pump curve and an accurate flow rate adjustment. Limited amount of I/Os.
<b>ABB ACS880-01 DRIVE WITH INTEGRATED PLC (A)</b>	Good choice in applications where a supply voltage is less than 500V. Can be also used to control dry coolers with 1-4 fans.
<b>SIEMENS PLC (P)</b>	Preferred choice when <b>1)</b> supply voltage is over 500V or <b>2)</b> a dry cooler is selected or <b>3)</b> extra I/O's or extra functions are needed
<b>SIEMENS PLC + FREQUENCY CONVERTERS (PV)</b>	Good choice in applications where supply voltage is 50Hz <b>AND</b> several options are selected or some special feature is required.

# REMOTE CONTROL / MONITORING SELECTION

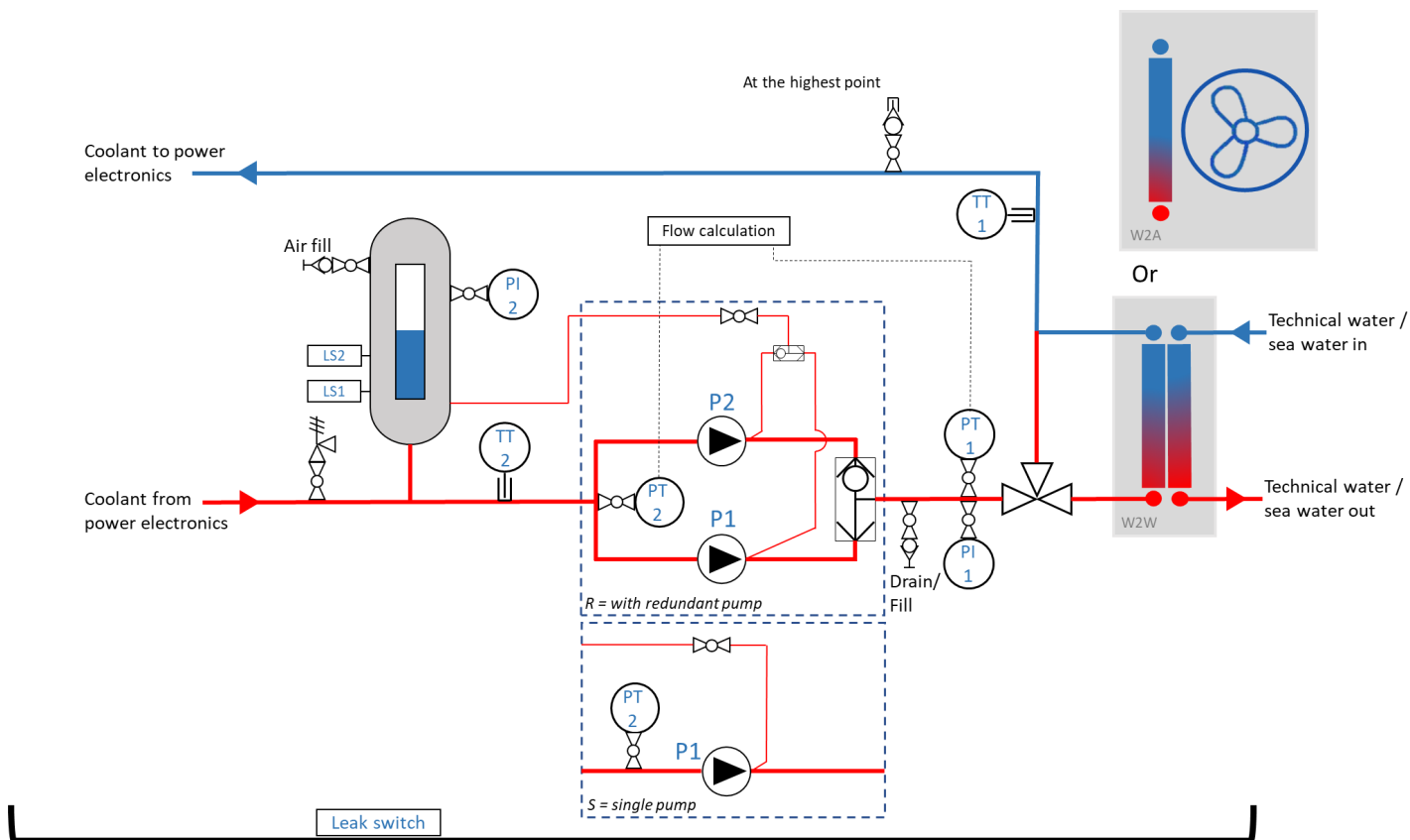
		SIEMENS PLC (P)	VACON PLC (V)	ABB PLC (A)
Hardwired	0	•••	•••	•••
Modbus TCP	M	•••	•••	•
Profinet	N	•••	•	•
Ethernet/IP	X1	–	•	•
Modbus RTU	X2	•	•	•
Profibus DP	B	•	•	•
CanOpen	X4	–	•	•
EtherCat	X5	–	•	•
IEC60870	X6	•	–	–
DNP3	D	•	–	–

••• Available by default	• Available as an option	– Not available
--------------------------	--------------------------	-----------------



# PROCESS AND INSTRUMENTATION DIAGRAM



Leakage pool and leak switch available as an option  
 P&ID shows cooling station with standard sensors

# HEAT EXCHANGER SELECTION



**W** Standard solution and the most compact choice.  
 Copper brazed stainless steel plates.



**S** Fully stainless steel brazed heat exchanger.  
 The correct choice in Danfoss iC7 applications.



**T, G** Titanium (T) sea water resistant and stainless steel (G)  
 plate heat exchangers are easy to open and clean.



**E** Water-to-air heat exchanger (= dry cooler).  
 Project-specific sizing. Delivered as a loose item.  
 Piping as an option.

## AMBIENT CONDITIONS

Ambient temperature shall stay in range +5°C ... +55°C and max humidity shall be 95%, non-corrosive, non-condensing.

All components in standard C-series cooling station are IP54 rated or higher.

Cooling station corrosion class is C1 according to ISO12944 in standard solutions and it can be improved up to C3 by selecting appropriate components. Improving the corrosion class above C3 is in customers responsibility and it requires upgrading the cabinet corrosion class and controlling the cabinet temperature. Adwatec scope of delivery does not include cabinet as a standard.

Coolant temperature range is +0°C ... +60°C. Higher temperatures are also possible, but it must be considered in design phase.

## ACCESSORIES

	ITEM NUMBER	DESCRIPTION
Cabinet installation Rittal VX25; sizes CCE36 – CCE153	AD0009646	Including following <ul style="list-style-type: none"> <li>Rittal cabinet RAL7035 IP55 with plinth / base 100mm</li> <li>Leakage pool (leakage detector sensor excluded)</li> </ul> This option available only with connection pipe sets.
Cabinet installation Rittal VX25; sizes CCE204 & CCE322	AD0009647	"
Connection pipe sets, standard	*	Ready connection pipe sets for coolant side circuit and raw water side circuit. See connection pipe tables from <a href="http://adwatec.com/connection-pipes/">adwatec.com/connection-pipes/</a>
Leakage detector sensor	AD0006124	Leakage detector set and an amplifier
DI module, Right hand version	AD0009643	<ul style="list-style-type: none"> <li>De-ionization (DI) module is needed if a coolant should have a low conductivity level.</li> <li>A module is attached to the cooling station and it can be either right hand or left hand version depending on how connection pipes are routed.</li> <li>Delivered without a cabinet by default</li> </ul>
DI module, Left hand version	AD0009644	"
Portable filling pump set	AD0006127	Including following <ul style="list-style-type: none"> <li>Filling pump</li> <li>Hoses 5+5 meters</li> <li>Quick connectors</li> <li>Air pump</li> </ul>
Electric pre-heater	AD0005674	This is needed in extremely cold environment to pre-heat a coolant before system start-up. By default this option will be delivered as a loose item component. Heating power 1kW / 3kW.
Pressure control function	AD0008263	<ul style="list-style-type: none"> <li>This option is preferred if a design pressure of the power electronics (or other) is relatively low (meaning &lt; 2-3 bar).</li> <li>This option includes an additional loose item pressure sensor assembly and a software for the pressure control function.</li> <li>Note! This option can be selected only if the cooling station includes a frequency converter</li> </ul>
Spare part recommendation	*	Adwatec recommended spare part kit.
Inspection survey by classification society	*	Inspection Survey and witness of the pressure test at Adwatec site. Inspection Survey Report issued by classification society.

\* Item number to be specified by Adwatec sales