

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.



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

CCE104R-3-W-P

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)

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



PRODUCT RANGE

| PRODUCT CODE | Motor frequency (Hz) Frequency drive available as an option | Flow rate range (l/min) Depends on the pressure losses ⁽¹⁾ | Max. cooling power (kW) at max flow rate Based on the standard heat exchanger | | | Main dimensions W x D x H Open frame Based on selected options, page 3 | Conn. pipe size class | Pump motor power (kW) ⁽³⁾ | Supply voltages for pump motor (V) | Dry weight (kg) Based on selected options, p. 3 |
|------------------------------------|--|--|--|---|---|--|-----------------------|--------------------------------------|------------------------------------|--|
| | | | $\Delta T = 3\text{ }^{\circ}\text{C}$ ⁽²⁾ | $\Delta T = 5\text{ }^{\circ}\text{C}$ ⁽²⁾ | $\Delta T = 7\text{ }^{\circ}\text{C}$ ⁽²⁾ | | | | | |
| Single-pump models | | | | | | | | | | |
| CCE36S | 50 | 10 - 70 | 18 | 28 | 37 | 302 x 556 x 1747 | DN32 | 0,6 | 380-440, 660-690 | 120 |
| | 60 | 10 - 90 | 22 | 34 | 44 | | | 1,1 | | |
| CCE56S | 50 | 40 - 140 | 30 | 45 | 59 | 302 x 556 x 1747 | DN32 | 1,1 | 380-440, 660-690 | 120 |
| | 60 | 50 - 170 | 34 | 51 | 67 | | | 2,2 | | |
| CCE104S | 50 | 90 - 200 | 67 | 100 | 135 | 507 x 570 x 1802 | DN40 | 1,5 | 380-440, 660-690 | 148 |
| | 60 | 100 - 250 | 75 | 112 | 153 | | | 3 | | |
| CCE153S | 50 | 150 - 360 | 75 | 131 | 188 | 507 x 598 x 1841 | DN50 | 3 | 380-440, 660-690 | 202 |
| | 60 | 175 - 470 | 88 | 155 | 222 | | | 4 | | |
| CCE204S | 50 | 200 - 500 | 162 | 248 | 330 | 690 x 739 x 1924 | DN65 | 5,5 | 380-440, 660-690 | 415 |
| | 60 | 250 - 580 | 180 | 270 | 362 | | | 7,5 | | |
| CCE322S | 50 | 300 - 600 | 185 | 283 | 375 | 690 x 739 x 1924 | DN65 | 4 | 380-480, 660-690 | 430 |
| | 60 | 380- 750 | 214 | 321 | 428 | | | 7,5 | | |
| CCE6421S | 50 | 500-1260 | TBA | 440 | TBA | 1380 x 880 x 1895 | DN80 | 11 | 380-480, 660-690 | 987 |
| | 60 | 600-1400 | TBA | 475 | TBA | | | 18,5 | | |
| Two-pump (redundant) models | | | | | | | | | | |
| CCE36R | 50 | 10 - 70 | 35 | 51 | 68 | 507 x 570 x 1802 | DN40 | 0,6 | 380-440, 660-690 | 219 |
| | 60 | 10 - 90 | 41 | 61 | 81 | | | 1,1 | | |
| CCE56R | 50 | 40 - 140 | 55 | 80 | 106 | 507 x 570 x 1802 | DN40 | 1,1 | 380-440, 660-690 | 239 |
| | 60 | 50 - 170 | 61 | 90 | 119 | | | 2,2 | | |
| CCE104R | 50 | 90 - 200 | 67 | 100 | 135 | 507 x 570 x 1802 | DN40 | 1,5 | 380-440, 660-690 | 263 |
| | 60 | 100 - 250 | 75 | 112 | 153 | | | 3 | | |
| CCE153R | 50 | 150 - 360 | 75 | 131 | 188 | 507 x 598 x 1841 | DN50 | 3 | 380-440, 660-690 | 311 |
| | 60 | 175 - 470 | 88 | 155 | 222 | | | 4 | | |
| CCE204R | 50 | 200 - 500 | 162 | 248 | 330 | 690 x 739 x 1924 | DN65 | 5,5 | 380-440, 660-690 | 506 |
| | 60 | 250 - 580 | 180 | 270 | 362 | | | 7,5 | | |
| CCE322R | 50 | 300 - 600 | 185 | 283 | 375 | 690 x 739 x 1924 | DN65 | 4 | 380-480, 660-690 | 536 |
| | 60 | 380 - 750 | 214 | 321 | 428 | | | 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 ⁽¹⁾ | 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 ⁽²⁾ | T | |
| | Gasketed W-W, stainless steel ⁽²⁾ | G | |
| | Water-to-air (external component) ⁽²⁾ | E | |
| Control/wiring (introduction to these options at page 6) | No control/wiring ^{(6) (7)} | 0 | V |
| | Connection box ^{(6) (7)} | C | |
| | Siemens PLC control system ⁽⁷⁾ | P | |
| | Vacon AC Drive with integrated PLC ⁽³⁾ | V | |
| | ABB AC Drive with integrated PLC ⁽³⁾ | A | |
| | Siemens PLC + frequency converters ⁽²⁾ | PV | |
| Supply voltage and frequency ⁽⁴⁾ | 50 Hz, 380 – 480 V | D5 | D5 |
| | 60 Hz, 380 – 480 V | E6 | |
| | 50 Hz, 660 – 690 V ⁽²⁾ | F5 | |
| | 60 Hz, 660 – 690 V ⁽²⁾ | 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 ⁽⁵⁾ | 0 | 0 |
| | Profinet | N | |
| | Profibus | B | |
| | 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

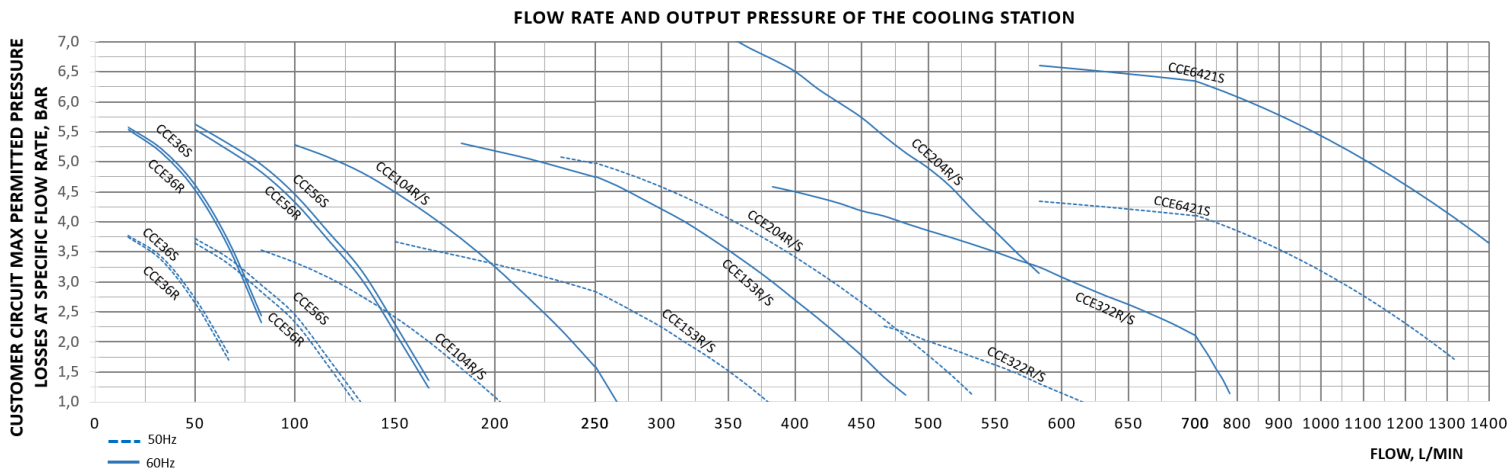
(4) If AC drive is chosen please follow 60Hz pump performance curve. Product code is always acc. to supply frequency

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

(6) Operating voltage 660/690VAC with VFD requires reinforces windings in the pump motor

(7) Motors rated 5,5kW or above require VFD control, DOL starting not recommended.

PUMP SELECTION

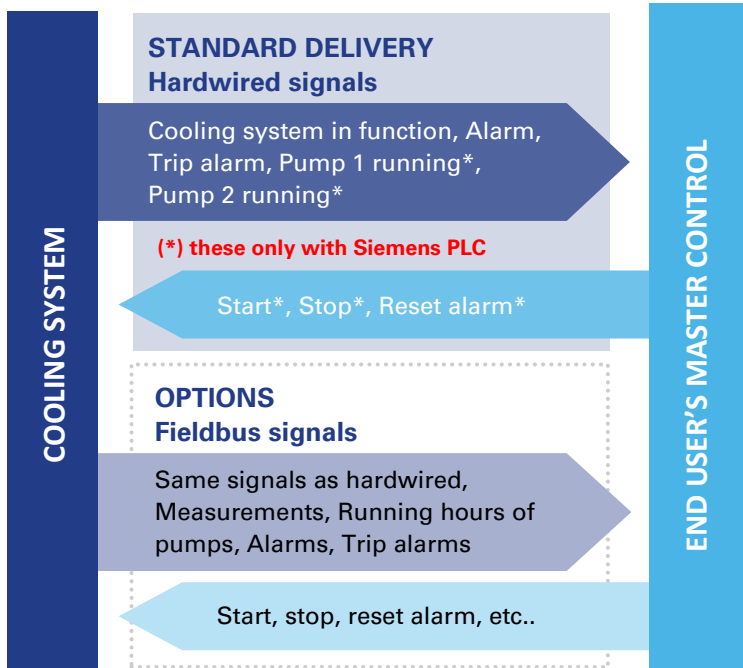


CONTROL SYSTEM SELECTION

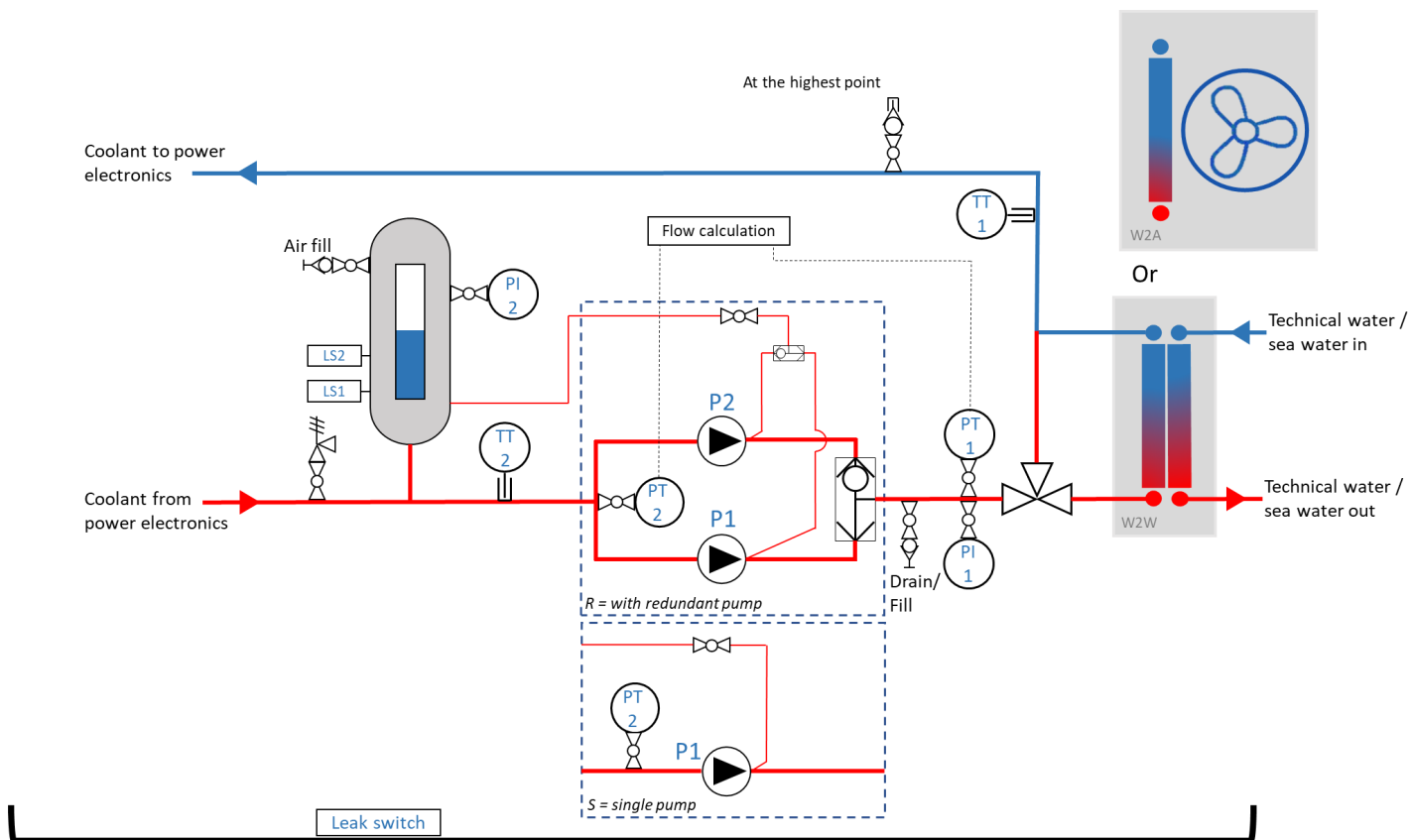
| | |
|--|--|
| NO CONTROL/WIRING (0) | <p>No internal wiring. M12 sensor connectors. Pressure sensors 4..20 mA. Pressure sensors PT1000. 3-way valve actuator 24 VDC, 0...10 V. Note that operating voltage 660/690VAC with VFD requires reinforces windings in the pump motor. Motors rated 5,5kW or above require VFD control, DOL starting not recommended.</p> |
| CONNECTION BOX (C) | <p>All internal electrics of the cooling station are wired to connection box (junction box). No control system included. Note that operating voltage 660/690VAC with VFD requires reinforces windings in the pump motor. Motors rated 5,5kW or above require VFD control, DOL starting not recommended.</p> |
| VACON 100 AC DRIVE WITH INTEGRATED PLC (V) | <p>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.</p> |
| ABB ACS880-01 DRIVE WITH INTEGRATED PLC (A) | <p>Good choice in applications where a supply voltage is less than 500V. Can be also used to control dry coolers with 1-4 fans.</p> |
| SIEMENS PLC (P) | <p>Preferred choice when 1) supply voltage is over 500V or 2) a dry cooler is selected or 3) extra I/O's or extra functions are needed. Motors rated 5,5kW or above require VFD control, DOL starting not recommended.</p> |
| SIEMENS PLC + FREQUENCY CONVERTERS (PV) | <p>A suitable option when additional pump head is needed beyond 50Hz frequency, or when precise flow rate adjustment with low energy consumption is desired, or when pressure regulation is necessary, or when several options are selected, or when some special features are required.</p> |

| | | 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 | • | • | • |

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

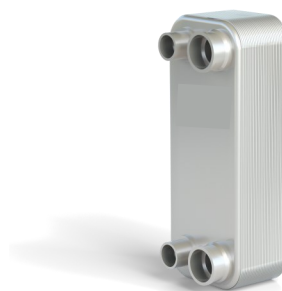


PROCESS AND INSTRUMENTATION DIAGRAM



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"> Rittal cabinet RAL7035 IP55 with plinth / base 100mm Leakage pool (leakage detector sensor excluded) 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 adwatec.com/connection-pipes/ |
| Leakage detector sensor | AD0007108 | Leakage detector set and an amplifier |
| DI module, Right hand version | AD0009643 | <ul style="list-style-type: none"> De-ionization (DI) module is needed if a coolant should have a low conductivity level. 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. Delivered without a cabinet by default |
| DI module, Left hand version | AD0009644 | " |
| Portable filling pump set | AD0006127 | Including following <ul style="list-style-type: none"> Filling pump Hoses 5+5 meters Quick connectors Air pump |
| Electric pre-heater | AD0005674 | This is needed in cold environment to pre-heat a coolant before system start-up. Installed into a coolant pipe. Separate installations for 1kW or 3kW heating powers. |
| Pressure control function | AD0008263 | <ul style="list-style-type: none"> This option is preferred if a design pressure of the power electronics (or other) is relatively low (meaning < 2-3 bar). This option includes an additional loose item pressure sensor assembly and a software for the pressure control function. Note! This option can be selected only if the cooling station includes a frequency converter |
| Spare part recommendation | * | Adwatec recommended spare part kit. |
| Document approval by classification society | * | Project specific document approval by a classification society |
| Inspection survey by classification society | * | Inspection Survey and witness of the pressure test at Adwatec site. Inspection Survey Report issued by a classification society. |

* Item number to be specified by Adwatec sales