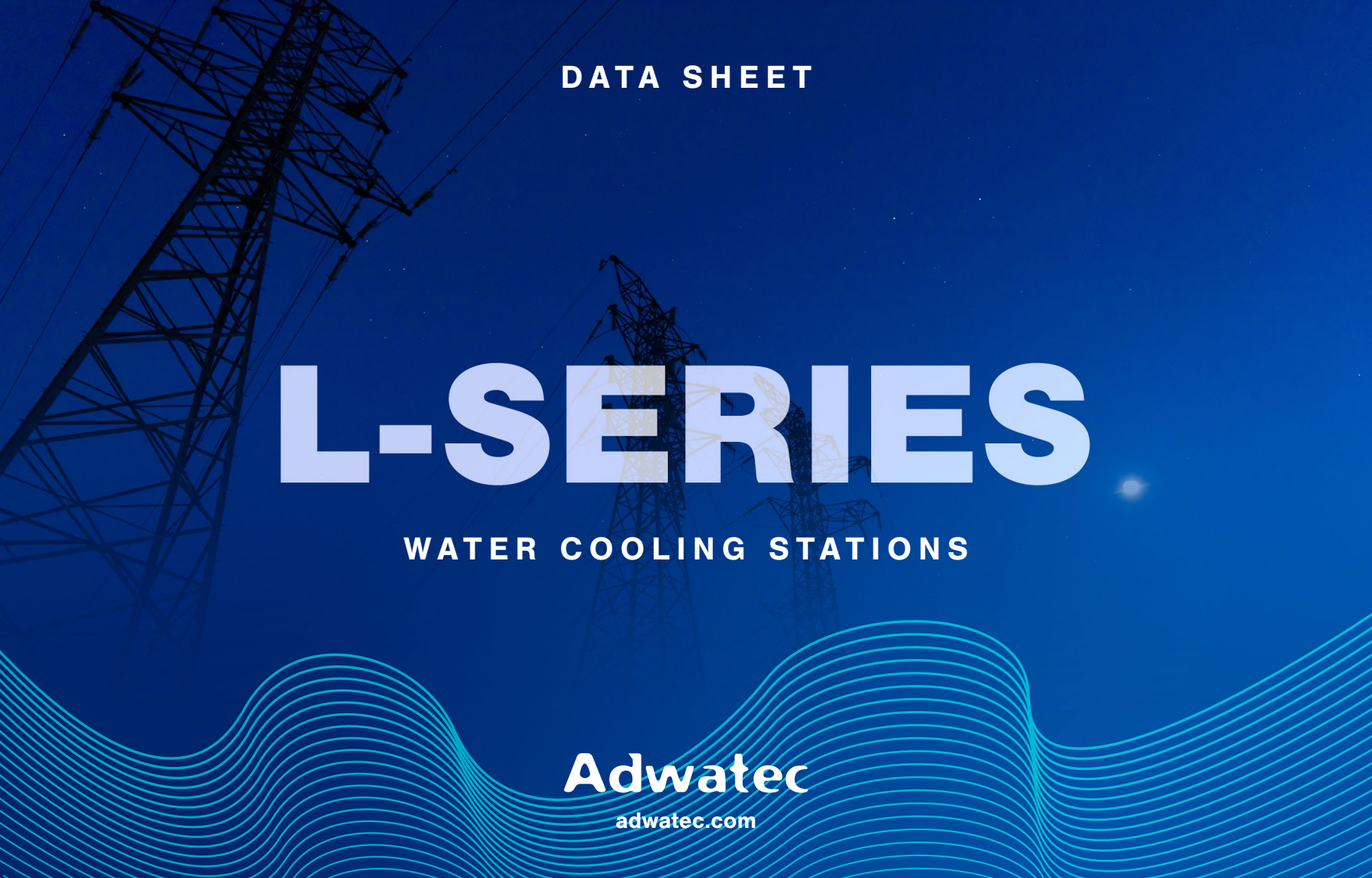




DATA SHEET

L-SERIES

WATER COOLING STATIONS

Adwatec

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L-SERIES

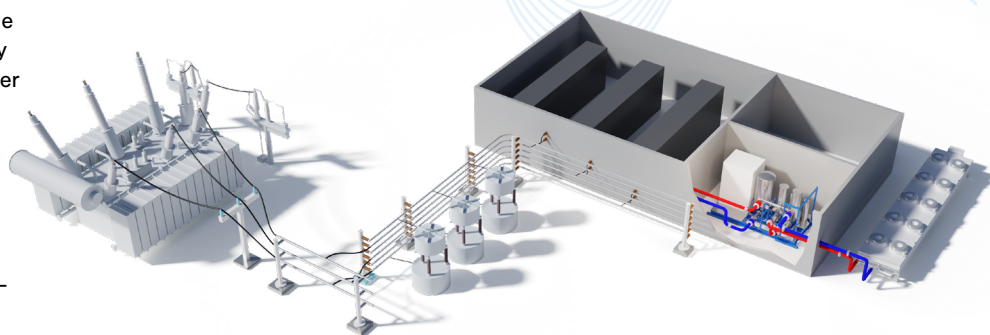
WATER COOLING STATIONS

MARKET REVIEW

The L series cooling stations are designed to meet the requirements of the most demanding water cooling systems. These cooling stations are widely used for Static Var Compensator (SVC), STATCOM, HVDC and other power electronics applications, where medium and high voltages are used.

These applications are referred as FACTS (flexible alternating current transmission systems) and are used to increase power transfer capability and improve controllability in electric power systems. For the FACTS systems high reliability, availability and maintainability is required which applies on the cooling system design as well. Typically, additional requirements are specified for the losses, noise emissions and environmental conditions.

In the cooling systems pure de-ionized water or mixture of de-ionized water and glycol is used as a coolant. Coolant high quality and low conductivity is maintained and observed with water treatment and monitoring circuit.





FEATURES & PRODUCT RANGE

Redundant pumps are used as a standard with stainless steel piping to provide robustness and long lifespan for the systems. Instrumentation is selected from high quality manufacturers and can be utilized with redundancy together with protection and control system to provide the utmost availability of the cooling system.

Cooling systems are equipped with water to water or external water to air heat exchangers taking into consideration the installation location and environmental conditions.

Delivery scope of the cooling system can range from cooling station to the turnkey delivery including external heat exchangers, interconnecting piping, installation supervision, commissioning, and training services.

The L series covers a large range of coolant flow and cooling power to meet application requirements. Typical cooling capacity ranges from 100 to 10 000 kW and coolant flow between 100 and 10 000 litres per minute. A wide variety of options is available for added reliability, availability, and maintainability.

TECHNICAL HIGHLIGHTS

PUMPS

L-series pumps are equipped with frequency drives as standard. VFD provides many benefits: accurate flow rate adjustment, lower current peak, less mechanical stress, variable speed for energy saving mode.

Adwatec L-series cooling stations use vertical multistage centrifugal pumps up to 5000 l/min. Bigger pumps are horizontal type. Pumps are rated in IE efficiency class to IE3/NEMA premium.

CONTROL SYSTEMS

Control system consists of a programmable logic controller (PLC) and a touch screen display (HMI). PLC program monitors process values, statuses and controls process devices. PLC can also communicate with another control system (remote main system) via fieldbus.

REDUNDANCY

Key features of the cooling station can be designed as redundant. Typically at least pumps have redundancy, but also heat exchanger and control system can be duplicated.

HEAT EXCHANGERS

L-series cooling stations can be equipped with any type of heat exchangers. Water-to-air heat exchangers are used when process- or sea water is not available at the site.

Adwatec prefers to use adjustable rotation speed EC fans in dry coolers. With EC fans an accurate temperature control can be ensured.

DE-IONIZING WATER TREATMENT

This is needed when application requires low liquid conductivity.

MAINTAINABILITY

Wearing process- and electrical components are located to easy access positions. Heavy components such as pumps have free space to enable lifting in maintenance situation. Pumps, strainers and other critical process components are equipped with shut-off-valves.

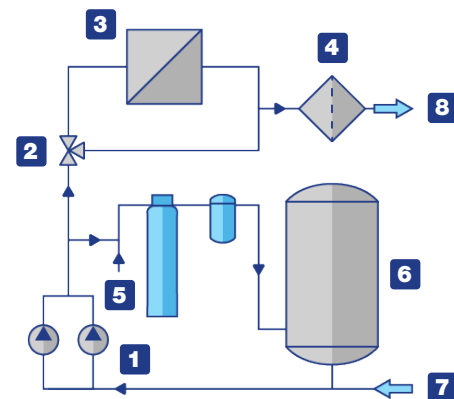


PRODUCT KEY

	Alternatives	Code	Example
Cooling station	"Large Cooling Equipment"	LCE	LCE
Cooling station pipe size class	DN40	040	100
	DN50	050	
	DN65	065	
	DN80	080	
	DN100	100	
	DN125	125	
	DN150	150	
Redundancy of the pump	DN200	200	
	Single (1 pcs)	S	R
	Redundant (2 pcs)	R	
Heat exchanger bypass function	Excluded	0	2
	2-way or 3-way by-pass valve	2	
Heat exchanger	W-W / stainless steel, copper brazed	W	E
	W-W / full stainless steel, welded	S	
	W-W / sea water resistant, titanium	T	
	W-W / full stainless steel, gasketed	G	
	W-A / external heat exchanger	E	
Redundancy of the control system	Single (1 pcs)	S	R
	Redundant (2 pcs)	R	

Product key writing example: LCE100R-2-E-R

COOLING PROCESS PRINCIPLES



- 1 Pumps with redundancy option
- 2 Heat exchanger by-pass function
- 3 Heat exchanger (water to air or water to water)
- 4 Strainer with bypass and redundancy options
- 5 Coolant filling point and de-ionization circuit with filter
- 6 Expansion tank
- 7 Coolant from power electronics
- 8 Coolant to power electronics

TECHNICAL DATA

Technical properties

		LCE040	LCE050	LCE065	LCE080	LCE100	LCE125	LCE150	LCE200
pipe size class		DN40	DN50	DN65	DN80	DN100	DN125	DN150	DN200
max flow rate	l /min	~220	~420	~700	~900	~1550	~2300	~3500	~6000
pump type code		10	15	20 / 32	45	64 / 95	95 / 125	125 / 155	185 / 215
Cooling capacity	kW	According to customer needs							
pump electrical power ¹⁾	kW	3	4-7,5	11-15	15-18,5	22-30	30-37,5	37,5-55	55-110
pump sound power	dB(A)	55	60	60	60	67	67	70	74

Required free maintenance area around the cooling station

front side (X1)	mm	2000	2000	2000	2000	2000	2000	2500	2500
back, free standing (X2)	mm	600	600	600	600	1000	1000	1500	1500
back, wall placed (X2)	mm	100	100	100	100	100	100	200	200
other sides (X3)	mm	600	600	600	600	1000	1000	1500	1500

Main dimensions

Free standing cooling station with water-to-water heat exchanger(s) and single control system

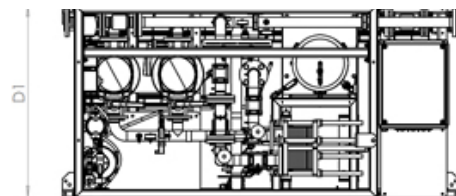
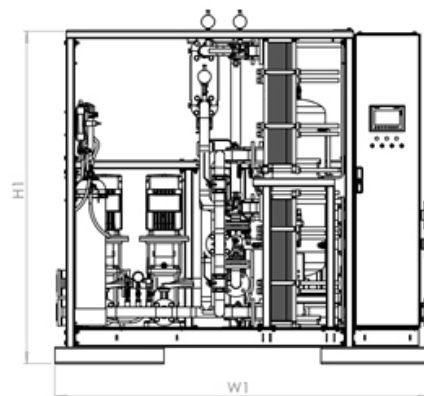
width (W1)	mm	2300	2300	2900	2900	4200	4600	5000	5300
depth (D1)	mm	1120	1120	1650	1650	1750	1850	2200	2200
height (H1)	mm	2040	2040	2130	2130	2130	2130	2130	2130

Wall placed cooling station with water-to-water heat exchanger(s) and single control system

width (W1)	mm	2300	2300	2900	2900	4200	4600	5000	5300
depth (D1)	mm	1120	1120	1650	1650	1600	1850	2200	2200
height (H1)	mm	2040	2040	2130	2130	2130	2130	2130	2130

¹⁾ depends on system pressure losses

Dimensions in this table are based on solutions equipped with a single control system. Redundant control system may require more footprint.



TECHNICAL DATA

Cooling station main dimensions									
		LCE040	LCE050	LCE065	LCE080	LCE100	LCE125	LCE150	LCE200
pipe size class		DN40	DN50	DN65	DN80	DN100	DN125	DN150	DN200
max flow rate	l /min	~220	~420	~700	~900	~1550	~2300	~3500	~6000
pump type code		10	15	20 / 32	45	64 / 95	95 / 125	125 / 155	185 / 215
Cooling capacity	kW	According to customer needs							
pump electrical power ¹⁾	kW	3	4-7,5	11-15	15-18,5	22-30	30-37,5	37,5-55	55-110
pump sound power	dB(A)	55	60	60	60	67	67	70	74
Free standing cooling station with water-to-air heat exchanger(s) and single control system									
width (W1)	mm	2300	2300	2910	2910	3550	4000	4600	4900
depth (D1)	mm	1120	1120	1170	1400	1750	1850	2200	2200
height (H1)	mm	2040	2040	2040	2060	2080	2080	2080	2080
Wall placed cooling station with water-to-air heat exchanger(s) and single control system									
width (W1)	mm	2300	2300	2910	2910	3300	4000	4600	4900
depth (D1)	mm	1120	1120	1170	1400	1400	1750	2200	2200
height (H1)	mm	2040	2040	2040	2060	2080	2080	2080	2080
Wall placed cooling station with water-to-air heat exchanger(s) and redundant control system									
width (W1)	mm	3340	3340	3440	3440	3500	4000	5000	5300
depth (D1)	mm	1170	1170	1170	1400	1400	1750	2200	2200
height (H1)	mm	2040	2040	2040	2060	2100	2100	2100	2100

¹⁾ depends on system pressure losses

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