

SPHEROS

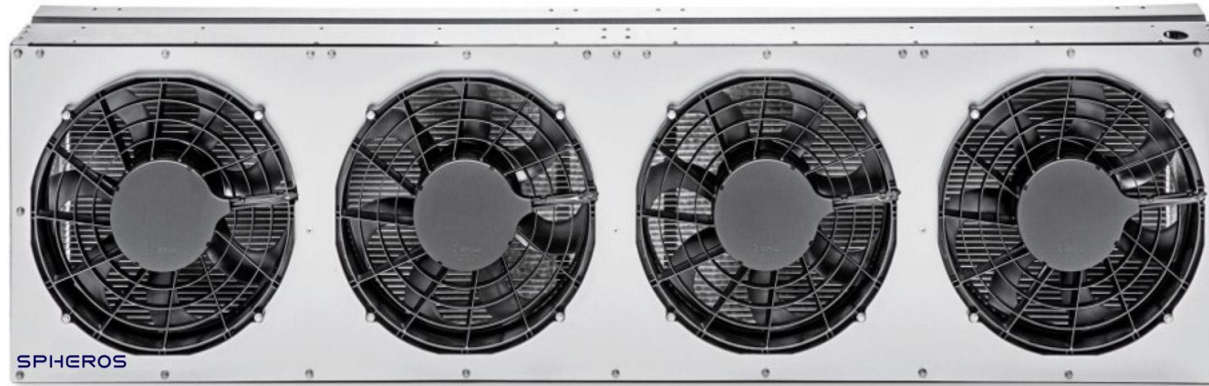
DD540-E

**Electric Double Deck
Rear Mounted
Air Conditioner**

MOVING THERMAL FUTURE

PRODUCT FAMILY

46kW / 55°C



Technical Data

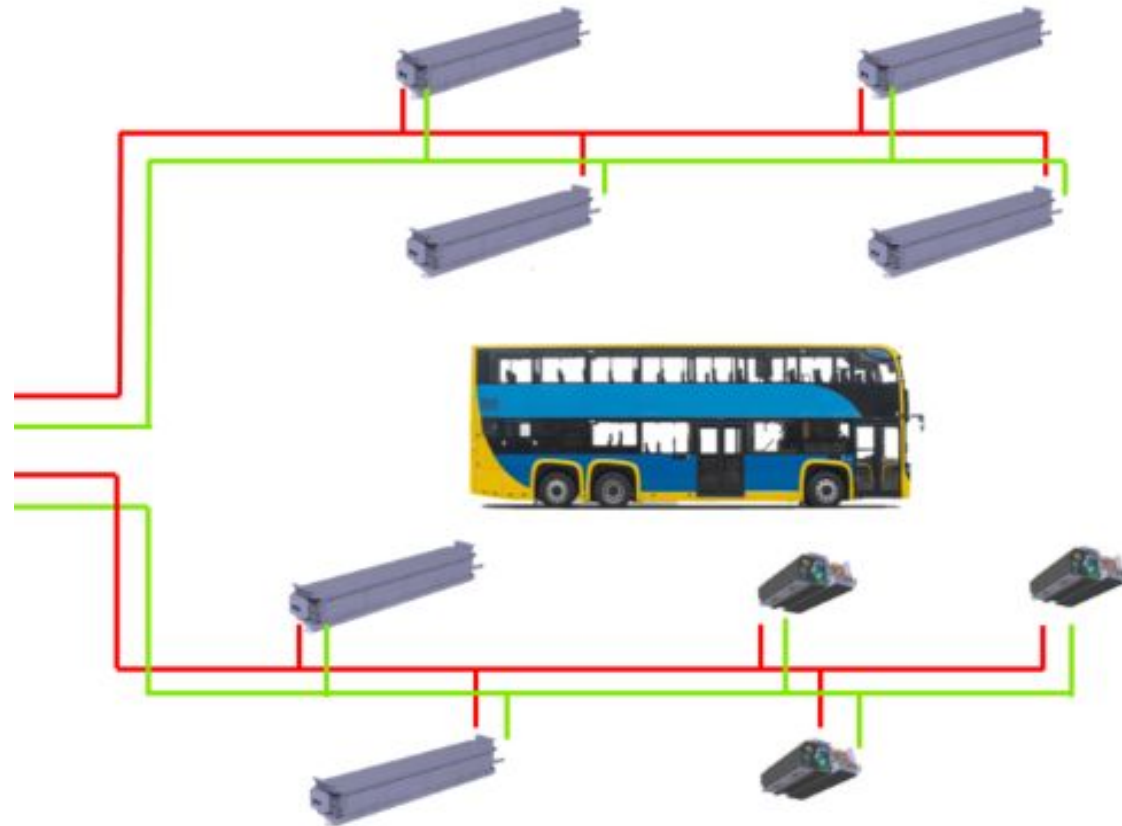
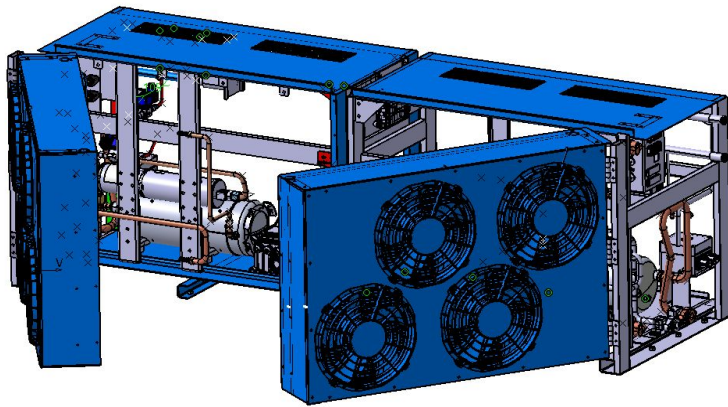
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DD540E SPLIT DESIGN

Design concept



Split design to enable perfect air contribution throughout the complete bus



DD540E REAR MOUNTED AIR CONDITIONER

Technical data



	DD540E Split
Maximum cooling capacity	46kW
Evaporator air flow - each deck	8000 m3/h
Condenser air flow	12000 m3/h
Input HV range	450V - 850VDC
Total current	34A (DC600V)
Weight	400kg
Dimensions L x W x H (mm)	2180 x 730 x 760
Refrigerant	R407C
Cut-Off temperature	52°C
Optional	<ul style="list-style-type: none">- Nano-coated coils- Electrostatic air cleaner



Components

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ELECTRIC DRIVEN COMPRESSOR

Compressor 74/110cc

Technical Data

Cooling performance	26Kw
Dimensions	app. 313 x 240 x 165 mm
Weight	45kg
Ambient temperature	-40 to +85°C
Compressor type	Scroll
Protection class	IP 6K9K / IP 67
Refrigerant	R134a or R407C



FREQUENCY INVERTER

Technical Data

Working voltage range (output)	250 - 890V
Output voltage	3PH, 0-380VAC, 0-90 Hz
Allowed ambient temperature	-40°...50°C @ full load 50°...70°C @ derated power
Max. temperature as tested in application	55°C
IP-Class	IP65; IP67; (IP55 fans)
DC/DC Converter output	27,5V/80A
DC/DC Converter power	2200W
Weight	12.5kg
Max. operating altitude	3000m
Communication	Basic/CAN
Certification	E1 compliant
Integrated pre-charging	Yes



CONTROL UNIT

Spheros SC620

Functional, robust and easy to operate

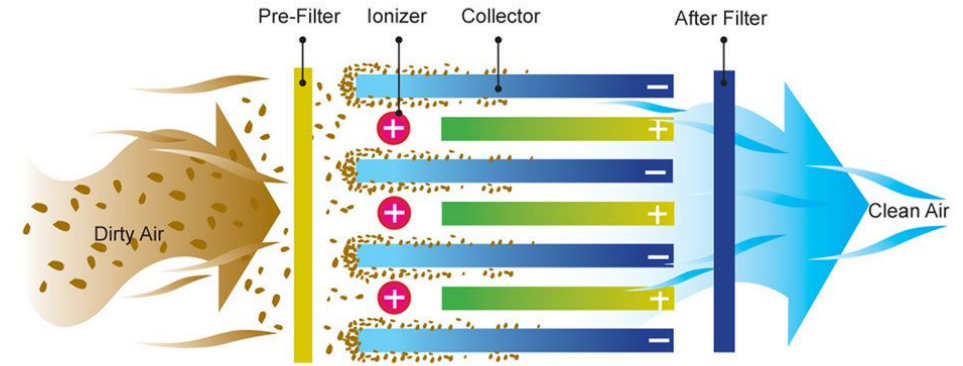
- ▶ HV control unit for HVAC HP unit
- ▶ Error code display
- ▶ Proven and reliable Spheros quality
- ▶ Front splash proof (IP54)
- ▶ Efficient controlling of EC fans and blowers
- ▶ Support up to 3 substations



ELECTROSTATIC AIR CLEANER

Smart, ecological and economical way to clean air

- ▶ **Fast installation** - no costly ductwork, direct plug to 24VDC
- ▶ **High efficiency** - 97% at 0.3 microns
- ▶ **Smart design** - low static pressure drop keeps efficient operation of blowers
- ▶ **Easy maintenance** - No washing, disposable fiber pad changed in only few minutes
- ▶ **Removes odors** - Activated-carbon center screen effectively removes smoke, pollen, dust, odors
- ▶ **Save, quiet, dependable** - runs on 24V, short-circuit-proof, no ozone or arcing produced



ELECTROSTATIC AIR CLEANER

High Efficiency Approved

Efficiency Data				
Particle size	3 - 10 microns	1 - 3 microns	0.3 - 1 microns	<0.3 microns
Type	Pollen, mold, dust mites, hairspray	Automobile emissions, lead dust, large bacteria	Smoke (tobacco, cooking), small bacteria, fine dust, paint pigments	VOCs (odors, off-gases including formaldehyde from carpets, furniture and cleaning products)
Captures efficiency	99%	98%	97%	40%

NANO-COATING

Anti-Corrosion Protection

High level of corrosion and mass loss is a big problem, especially in regions with high humidity or located close to the sea.

Table 1 Average mass loss of Fe, Zn, Cu and Al after completion of one year exposure (measured and calculated from triplicate samples) and corrosivity classification (ISO 9223) for the three exposure sites

Metal	(a) West (inside NTU campus)		(b) Jurong Island		(c) St Johns Island	
	Mass loss (g/m ²)	Corrosivity category	Mass loss (g/m ²)	Corrosivity category	Mass loss (g/m ²)	Corrosivity category
Fe	276	C3	162	C2	237	C3
Zn	9.1	C3	9.7	C3	9.3	C3
Cu	14.9	C4	12.4	C4	13	C4
Al	0.3	C2	0.3	C2	0.4	C2

Performance	TCP	Nano-Coating
Chemical Composition	Cr2+	Cr2+,
Technology	Soaking	Soaking, raw earth
Film thickness	100 - 500 nm	500 - 2000 nm
Cohesion strength	> 10MPa	> 10MPa
Surface finishing (base metal Ra <0.5)	Ra < 0.6	Ra < 0.1
Adhesion	Level 0	Level 0
SWAAT salt-spray until leakage time	~ 2500h	>3500h
Low-High temperature resistance	-60°C to +50°C	-60°C to +200°C
PH scope of application	6.5 - 7.5	5.0 - 8.5
Contact angle with water	<70° (Hydrophilicity)	>120° (Hydrophobic)
Chemical resistance	poor	good
Wear resistance	poor	good
Thermal conductance	good	good
Weather resistance	poor	good
Aging resistance	good	good
SO2-Gas resistance	poor	good
Self-cleaning ability	poor	good

Solution:

Nano-coating of the aluminum components to increase corrosion resistance.

Improve of:

- Corrosion resistance: Neutral salt spray test more than 3000 hours (SWAAT)
- Thermal conductivity: does not affect thermal conductivity

Highlights

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HIGHLIGHTS

Low life-cycle-costs	Environmentally friendly	Comfort
<ul style="list-style-type: none">• Low power consumption due to low unit weight• Long duration due to brushless EC blowers and fans• Proven components• Smart opening solution for easy access to main components• Nano-coating increases the corrosion resistance without affecting the thermal conductivity	<ul style="list-style-type: none">• Hermetically sealed refrigerant circuit• Low noise emission• Electrostatic air filter to reduce maintenance cost and time as well reduction of filter waste	<ul style="list-style-type: none">• High cooling capacity of 46kW• Evenly distributed airflow throughout the complete vehicle• Separate control of upper and lower deck possible• Cooling attention for driver area easily to realize

SPHEROS

moving thermal future