

Attracting Tomorrow



ModCap MF

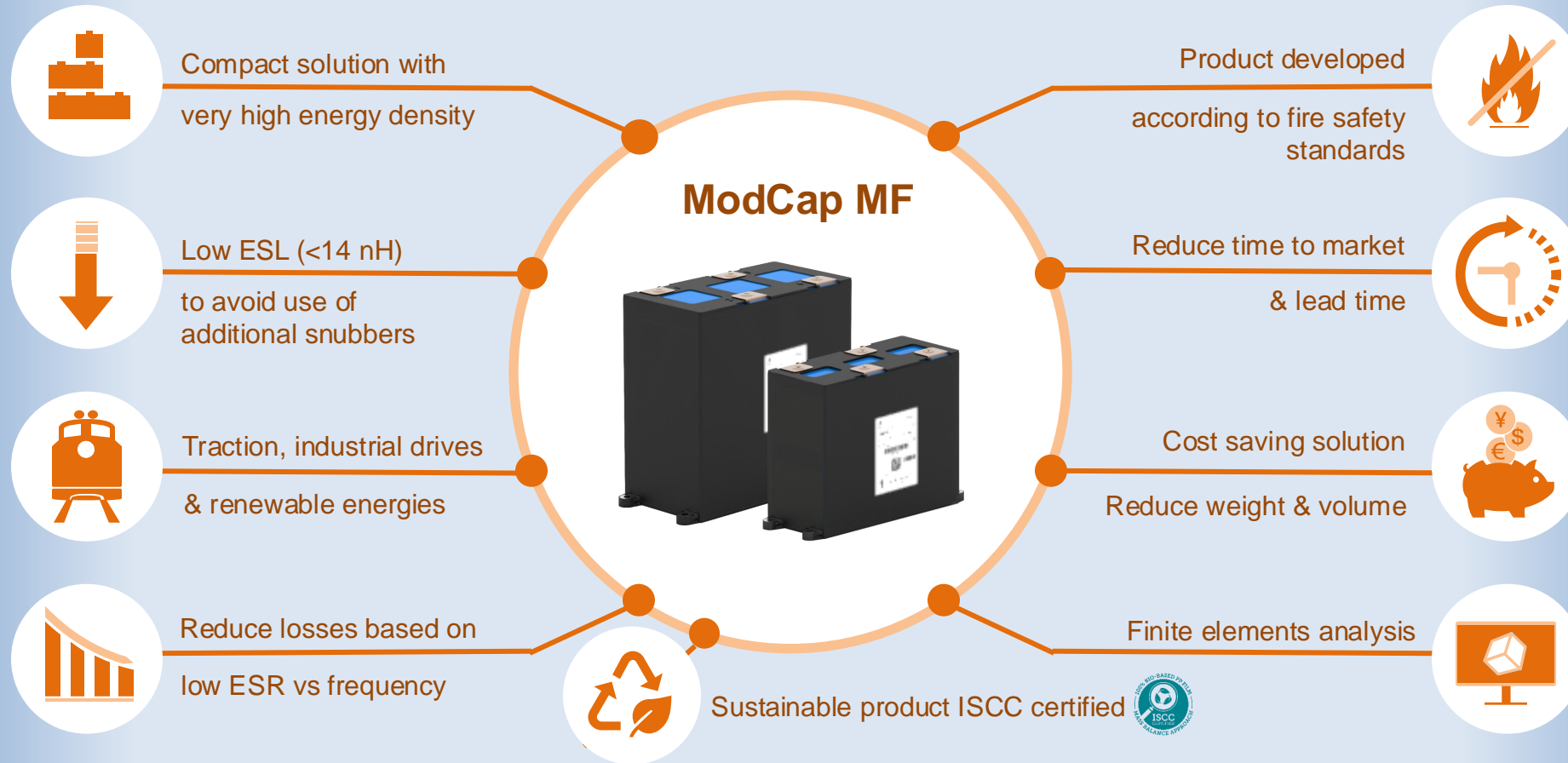
DCR Modular | New Modular High Frequency Series



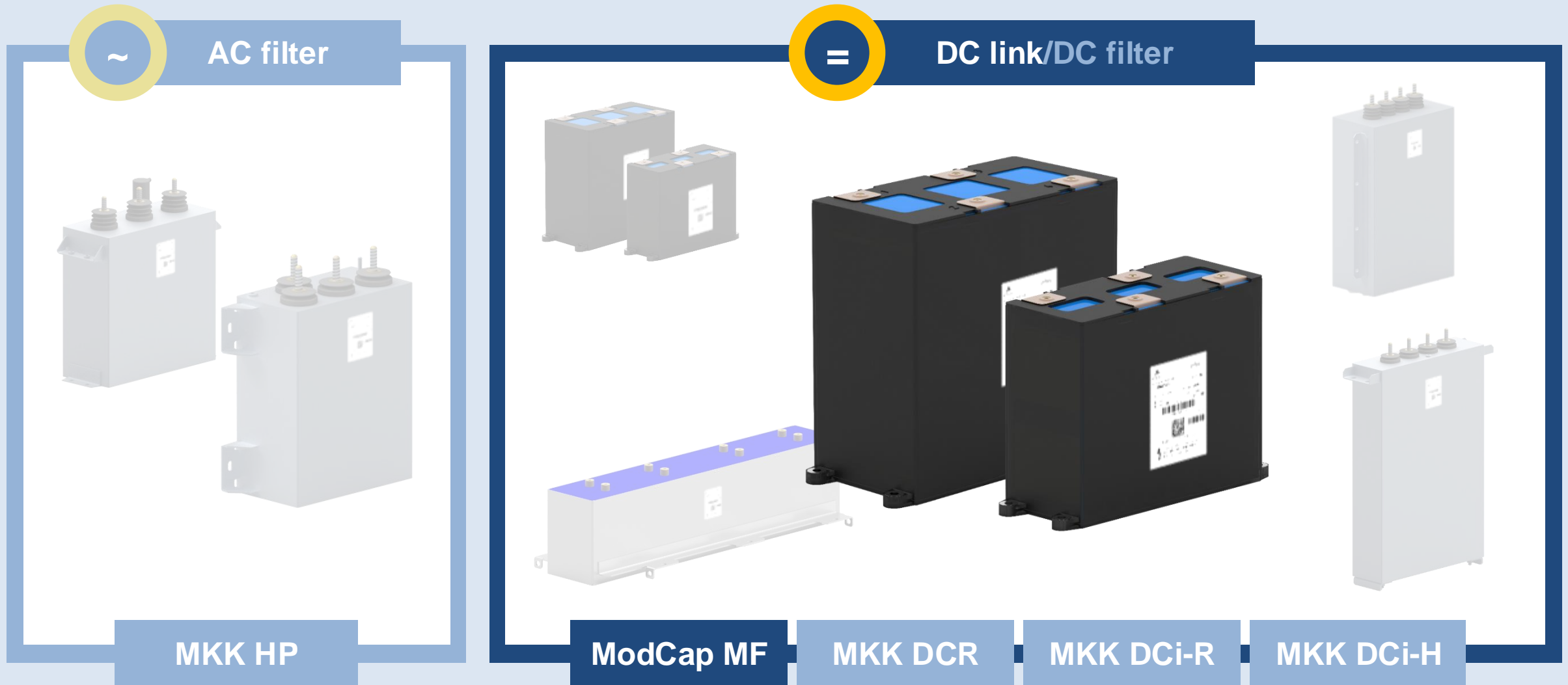
TDK Electronics Components, S.A.U.
Aluminum and Film Capacitors Business Group
Product Marketing
Malaga, Spain
March 2024

Introducing the New Modular Standard Series Highlights

Attracting Tomorrow

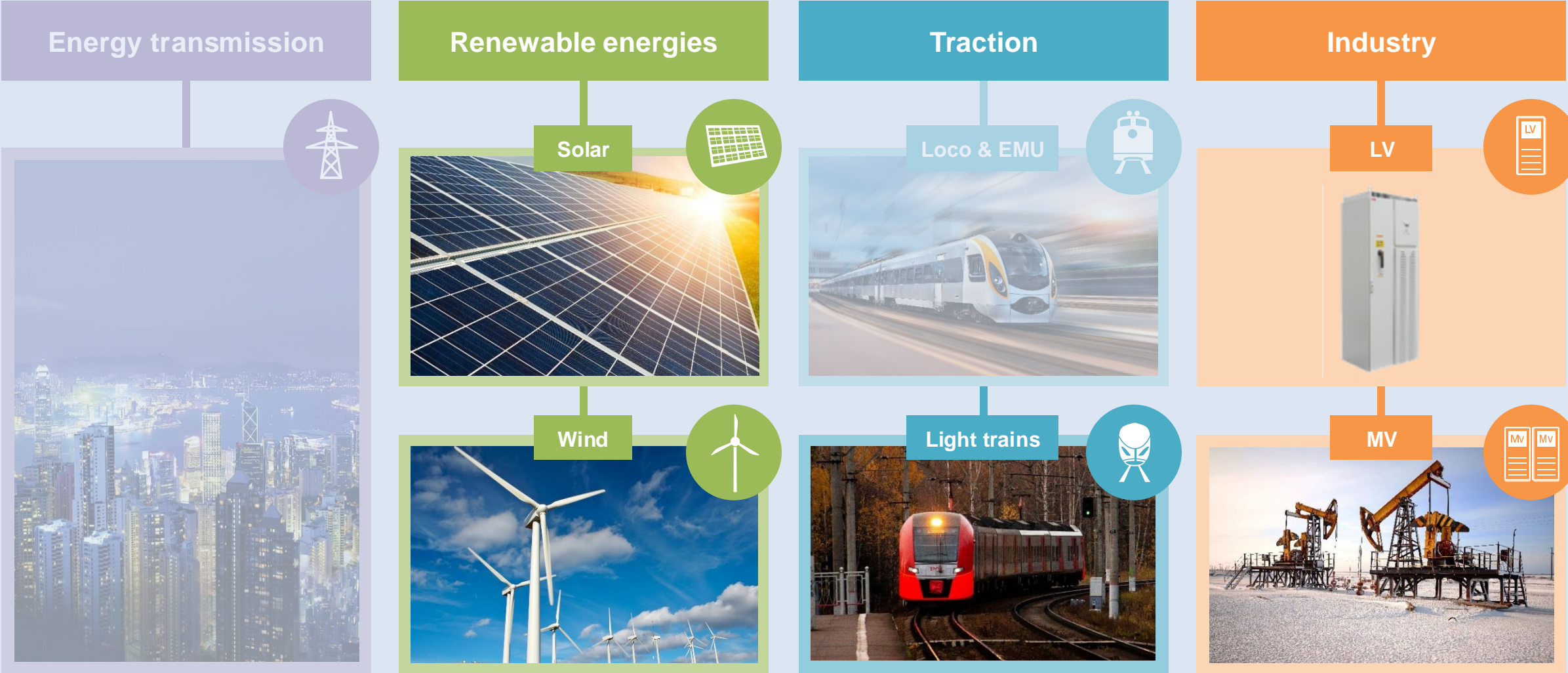


ModCap MF Series | B25645A*



ModCap MF Series | B25645A*

DC-Link Applications



General Overview

B25645A* Series

=

ModCap HF (dry-modular-high frequency)

NEW



Recommended applications

Features

- Capacitance range from 350 up to 3900 μ F
- Voltage range from 900 up to 2300 V DC
- Low ESL <14 nH
- Temperature range up to 90 °C hotspot
- IEC 61071, IEC 61881-1, EN 45545-2 HL3 R23 (fire and smoke)
- UL recognized
- Filled with polyurethane resin (dry technology)
- Plastic case (open), Flat windings
- Sustainable product with 100% bio-based polypropylene film

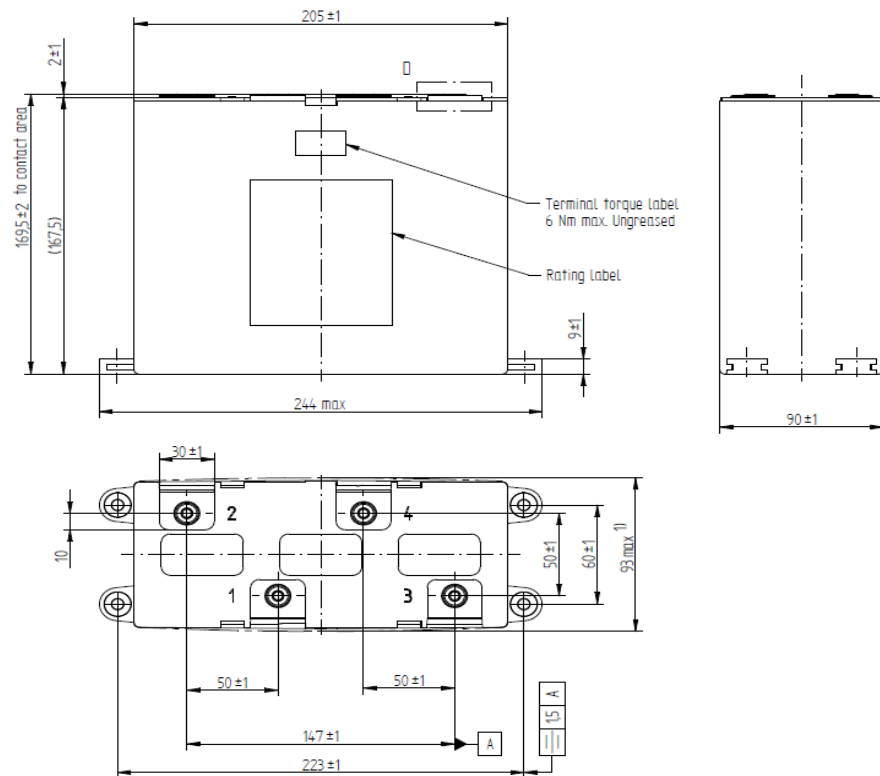
Benefits

- High energy density, ultra compact solution
- Modular concept for parallel connection
- Snubber avoidance / low voltage overshoot
- Lifetime up to 200,000 hours
- Finite elements analysis available for the whole series
- Cost oriented solution
- Reduced time to market & lead time

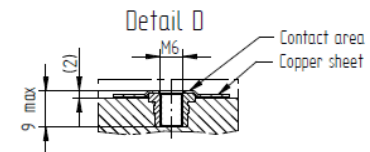
Construction A

Simplified Drawing & 3-D

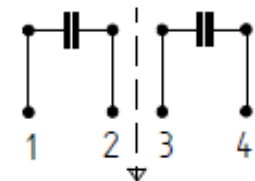
Main dimensions: 243 x 169.5 x 90 mm



Terminal



Electric diagram



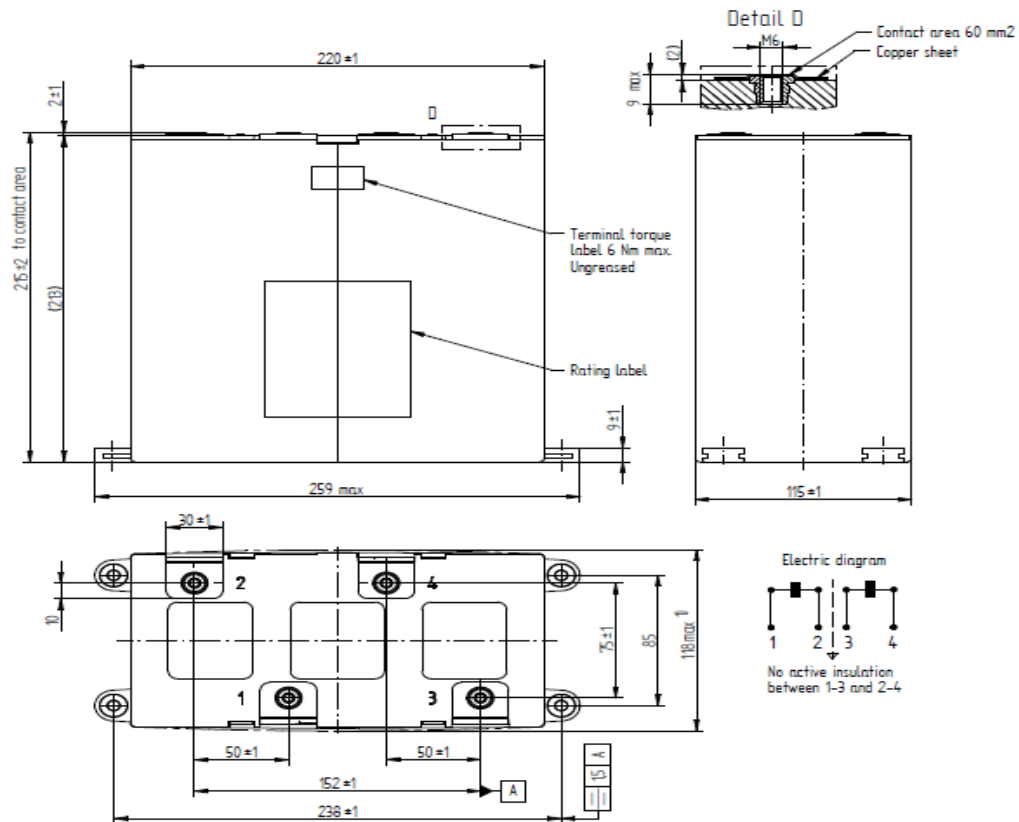
No active insulation
between 1-3 and 2-4



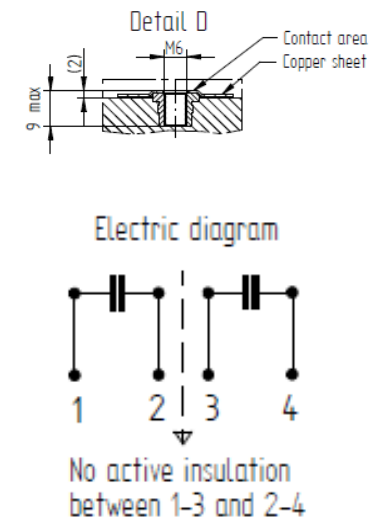
Construction B

Simplified Drawing & 3-D

Main dimensions: 258 x 215 x 115 mm

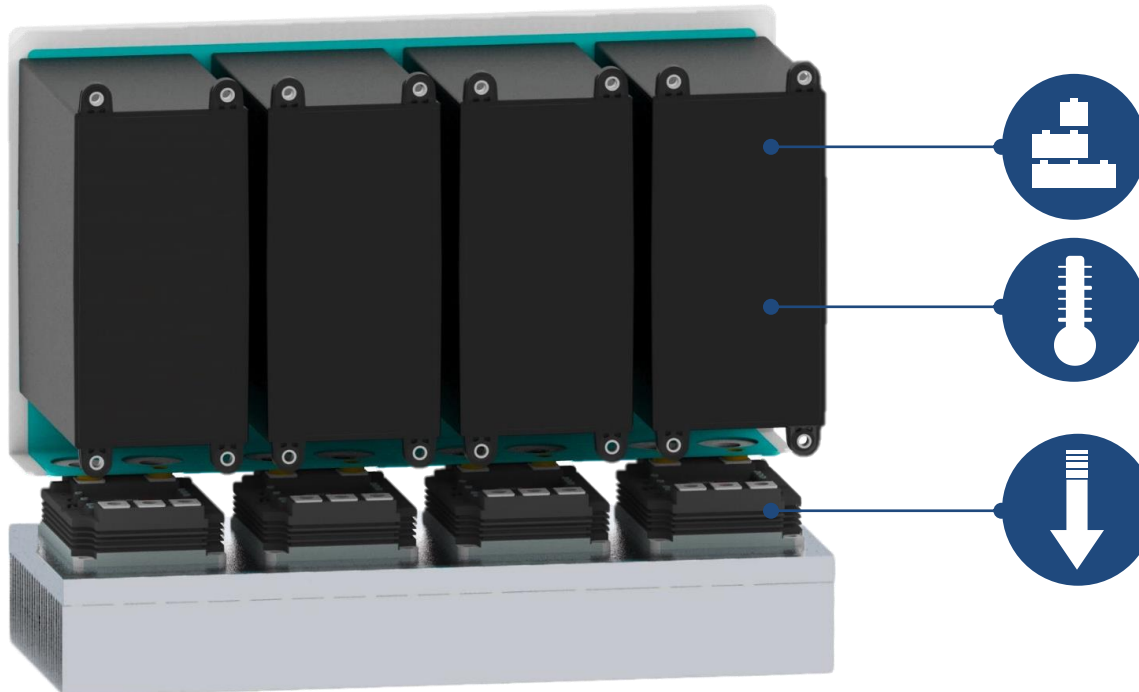


Terminal



Highlights: Compactness, Low ESL & Higher Operation Temperature

Compact power unit



- Capacitors can be mounted very close to the power modules to reduce loop inductance.
 - Ultra compact solution
 - Less investment on cooling
- Very short connection between capacitor and semiconductor
 - Low ESL (<14 nH)
 - Possible snubber capacitors avoidance

Electromagnetic Behavior of Modular Standard Series

Electromagnetic: Modelling

Customer input

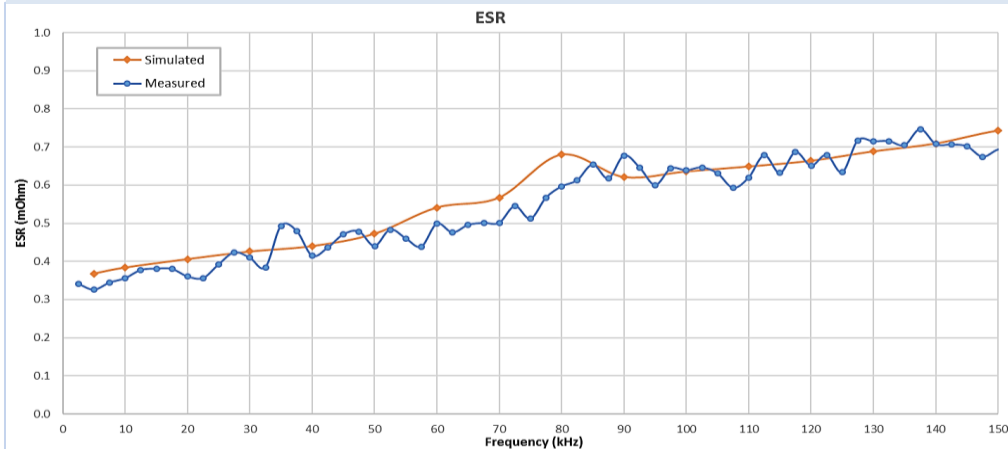
Current-frequency spectrum

TDK input

Capacitor design

Simulation

Capacitor electrical model: including ESL and ESR vs frequency
Total losses and its internal distribution (must for accurate thermal simulation)



Customer benefits

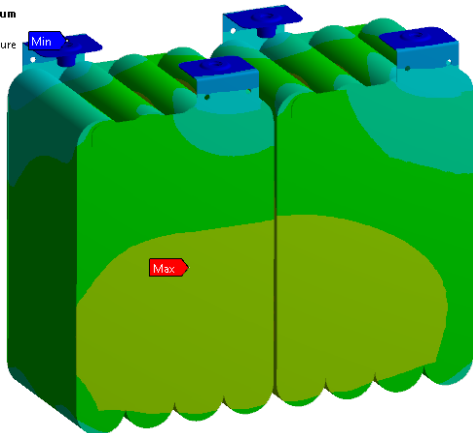
- Electromagnetic model available for specific simulation according to current-frequency spectrum defined by the customer.
- Capacitor electrical model available in time and frequency domain
- Losses at defined current-frequency spectrum and its internal distribution
- Graphs with simulated ESR fully available for further thermal calculations by calculating losses all along the complete range of frequency

Thermal Behavior of Modular MF Series

Thermal: Hot spot & temperature mapping

B: 2kHz Spectrum
Naked
Type: Temperature
Unit: °C
Time: 1

90 Max
87,8
85,5
83,3
81,1
78,9
76,7
74,4
72,2
70 Min

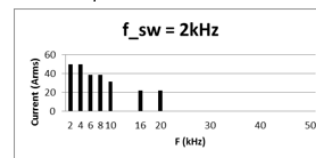


- Capacitance: 1 mF
- Current: 155 A
- Power losses: 11 W
- DeltaT = 15 K

Boundary conditions considered:

- Ambient temp: 70 °C
- Busbar temp: 80 °C
- Natural convection

Current spectrum considered



Customer benefits

- Thermal model available for specific simulation according to spectrum and boundary conditions defined by the customer.
- Thermal simulations to be integrated as part of the type test report.
- Thermal simulations may reduce the complexity and time of technical approvals, no further specific thermal stability test on lab.
- Detailed temperature mapping allows customer to estimate in advance hot spot areas
- Thermal simulation to be done as per specific customer requirements (customized current spectrum and thermal boundary conditions)
- Heating transference from bus bar may be analyzed in advance

ModCap MF

Ordering Code System

Nominal voltage (V)	Capacitance ±10% (µF)	Nominal current (A)	Surge current (kA)	Repetitive peak current (kA)	Dimensions (L x W x H, mm)	Con-struction	Part number
900	2075	200	225	5	205x90x170	A	B25645A9218K003
	3900	155	250	5	220x115x215	B	B25645A9398K003
1000	1705	190	220	5	205x90x170	A	B25645A1178K003
	3210	150	245	5	220x115x215	B	B25645A1328K003
1100	1330	180	215	5	243x169.5x90	A	B25645A1138K003
	2525	140	240	5	258x215x115	B	B25645A1258K003
1250	1045	170	210	5	243x169.5x90	A	B25645A1118K003
	1985	135	235	5	258x215x115	B	B25645A1198K003
1350	980	160	205	5	243x169.5x90	A	B25645A1108K013
	1865	130	230	5	258x215x115	B	B25645A1188K003
1600	710	150	200	5	243x169.5x90	A	B25645A1757K003
	1375	120	225	5	258x215x115	B	B25645A1138K013
1800	525	140	195	5	243x169.5x90	A	B25645A1567K003
	1025	115	220	5	258x215x115	B	B25645A1108K003
2000	415	130	185	5	243x169.5x90	A	B25645A2447K003
	820	110	210	5	258x215x115	B	B25645A2827K003
2300	335	120	175	5	243x169.5x90	A	B25645A2367K003
	670	105	200	5	258x215x115	B	B25645A2677K003



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