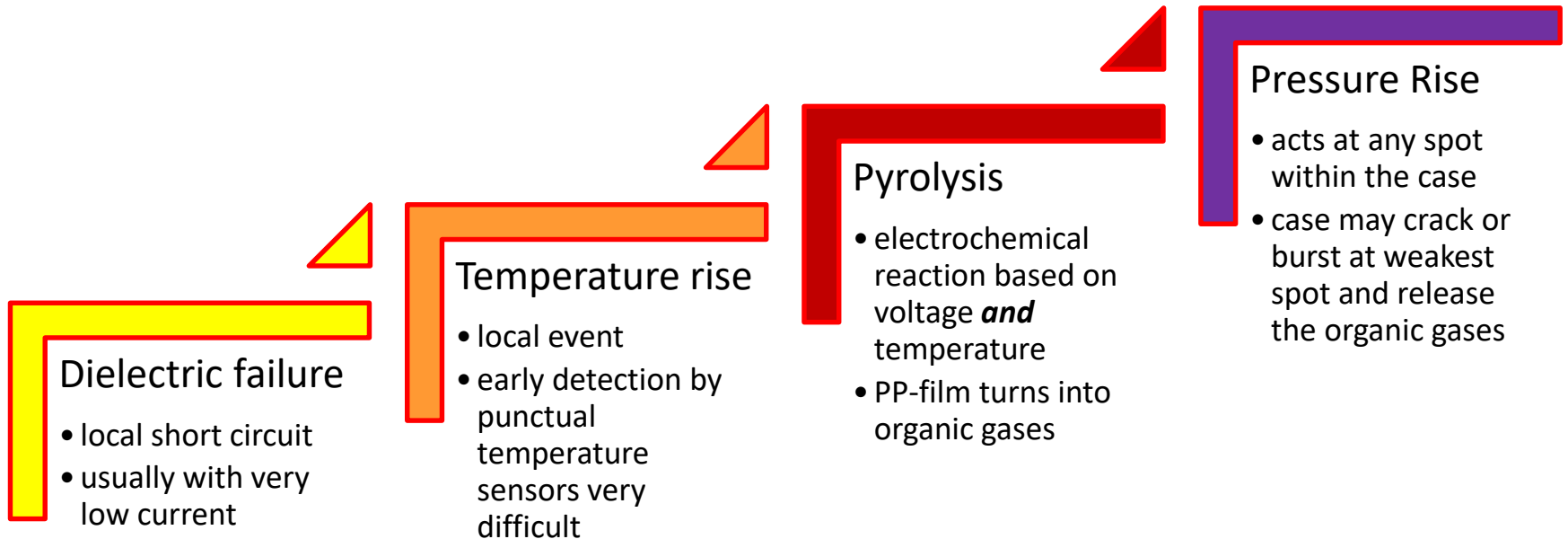


THE Safe Solution for Your DC-Link

World's First Capacitor with
Ultra-Low Inductance
AND Overpressure Protection



Dielectric Failure of Polypropylene Capacitors



Capacitor risk in high power converters



Undetected capacitor failure

- pyrolysis of PP-film
- Rise of internal pressure until case rupture



Circuit not disconnected

- Continuous release of explosive organic gases



Explosion of accumulated gas

- Destruction of entire converter
- collateral damage or injury

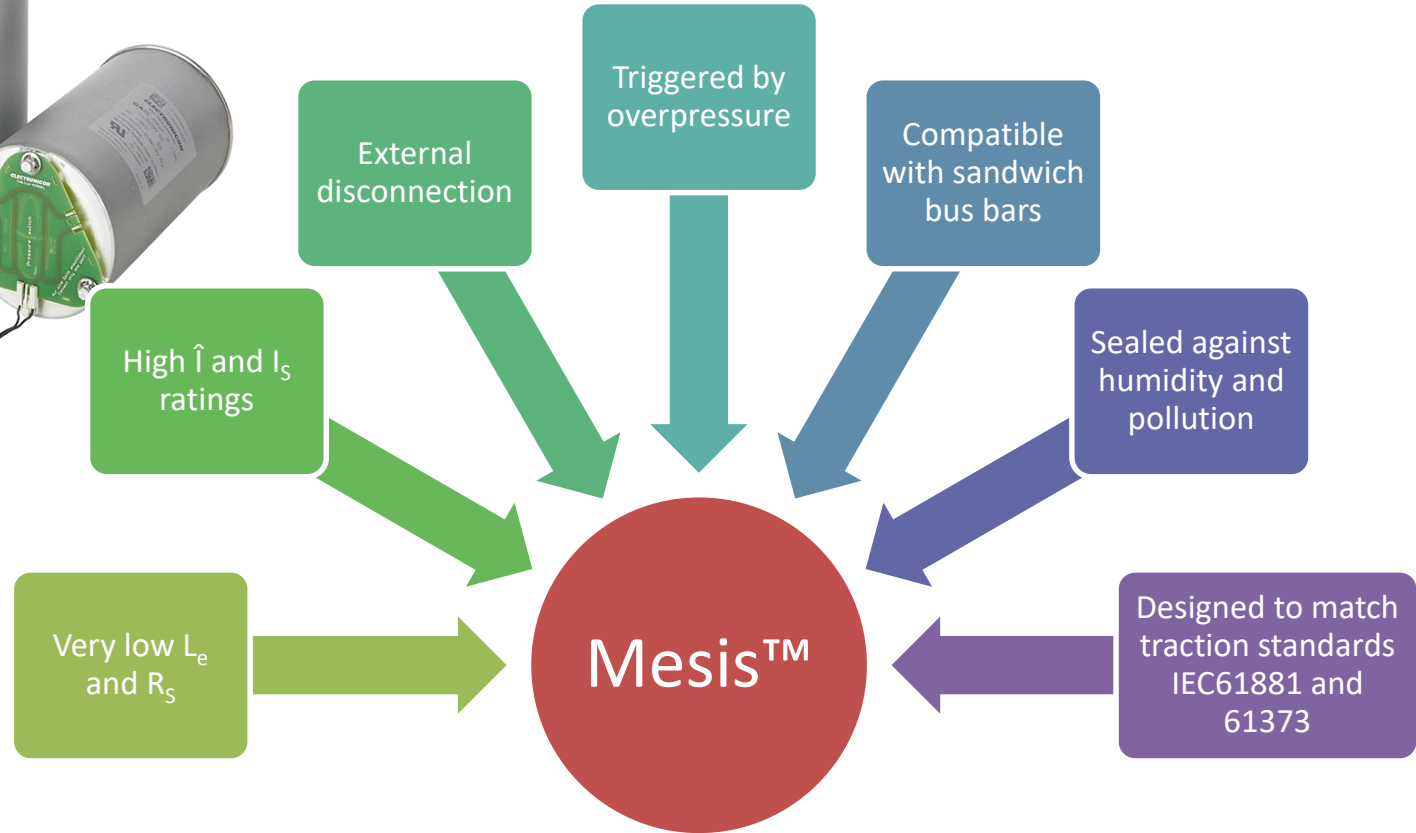
Safety Requirements for Cylindrical DC Capacitors

1. **No technical or mechanical compromise** with regard to installation, inductance, clearances, type of connection
2. Detect **every** failure
3. **Stop** the failure **in time**
4. **Prevent collateral damage** (fire, explosions, damaged busbars)
5. **Identification** and **selective replacement** of the failed unit

Known safety concepts for cylindrical capacitors

Concept	Current fuse	Segmented film	Sensors/Transmitters	Break action mechanism
Function principle	Overcurrent	Overvoltage	Temperature	Overpressure
disconnection	external	none; loss of capacitance	external	autonomous
Compatibility with LI sandwich bus bars	Cannot be integrated into low induct. circuit	Yes	Yes	Expansion of case impossible
Capacitor inductance	Low	Low	Low	High
Surge current strength	High	High	High	Low
reliability	sufficient fault current impossible due to high resistance of metallisation	segments do not act well at high temperatures; no response if no overvoltage	equal spread of overtemperature not guaranteed in plastic film capacitors	Very high, but only if expansion of case is possible

Mesis™: A Well-Proven Concept Now Available for Cylindrical Capacitors



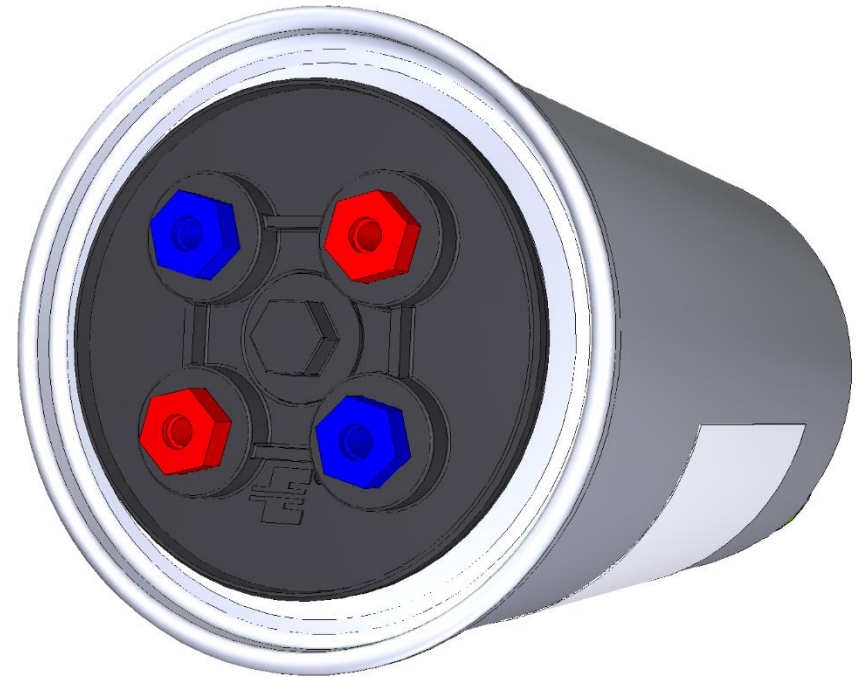
Very Low Inductance And Series Resistance

Ideal for HF DC Links

Examples

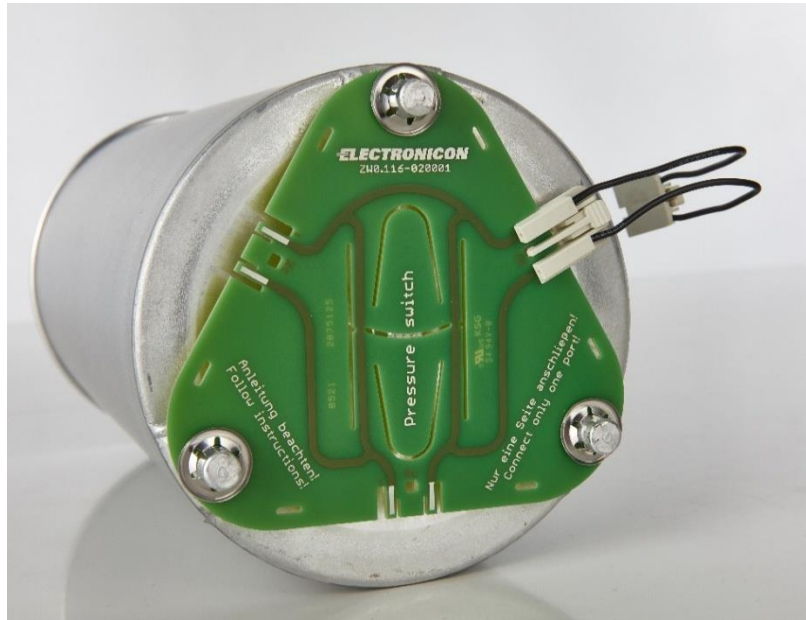
- 182 μ F 1800VDC, 116 x 126mm
 - L_e **10 nH**
 - R_s **0.35 m Ω**
 - I_{\max} (permanent) **90A**
- 1980 μ F 1000VDC, 116 x 282mm
 - L_e **22 nH**
 - R_s **0.41 m Ω**
 - I_{\max} (permanent) **120A**

Design W4, 4 Terminals



The only solution that reliably detects a failure of low-inductive power capacitors, evaluates them and enables immediate shutdown.

Individual Safety Device



Pressure Driven Mechanical Interruption of Control Circuit



Outer dimensions remain stable.

Permanent Monitoring

Suitable for control voltages up to 400 V rms or 24 VDC.

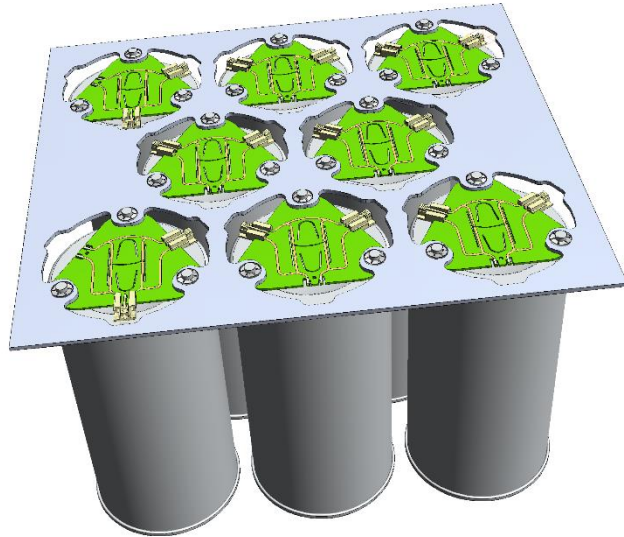
The control circuit can be looped through several units.

To prevent further escalation of the fault, the signal can (and must) be used for immediate shut-down of the affected circuit.



Assembly

The studs at the base of the can may be used for fixing the capacitors by starlock washers. Alternatively, fixation can be made by brackets or lateral holders.



(Courtesy of GvA Mannheim)

Full Metal Case Against Humidity and Pollution



- Tested 1 000 hours @ U_N with 85°C and 85%RH
- Climatic class C/TX
- Operation at -50°C ... +85°C
- Operation possible under insulation oil (e.g. MIDEL)
- Designed to fulfill EN 45545 (parts 2/3)

Wide Variety of Ratings

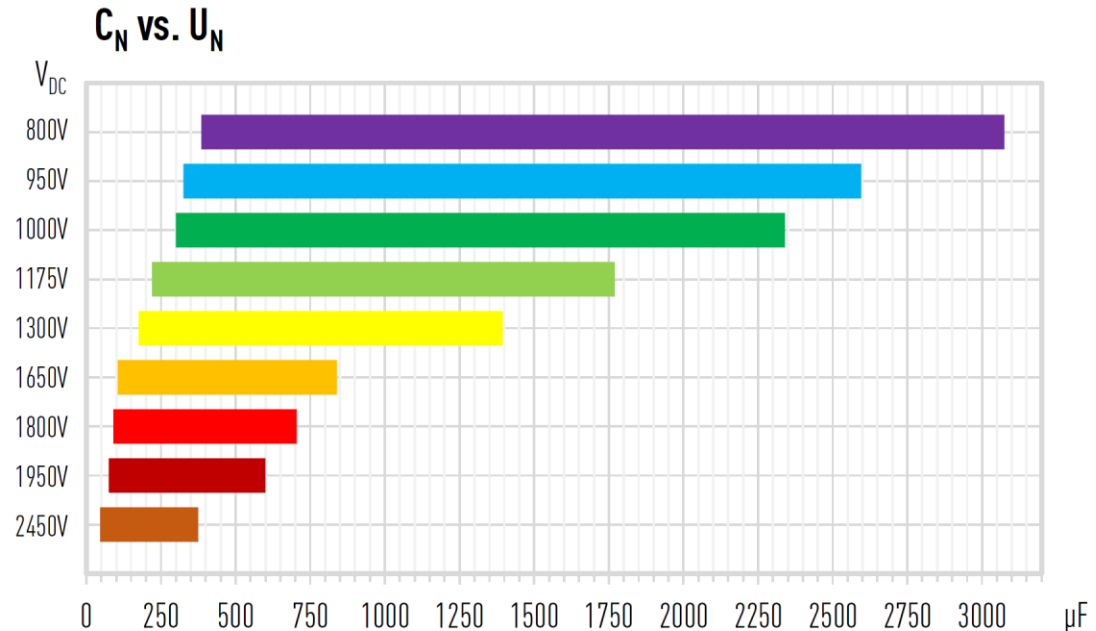
Voltage ratings

- 700 ... 2450 VDC
- ... 4000 VDC on request
- ... 1100 V_{ripple} (pk-pk)

Design life: 200,000 hrs

FIT rating: 100

(@U_N, 100,000 hrs, Θ_{HOTSPOT} 70°C)



Design Options

Design W6 with
2 terminals and Mesis™
protection



182 μ F 1800VDC, 116 x 126mm

L_e 25 nH

R_S 0.47 m Ω

I_{max} (permanent) 80A

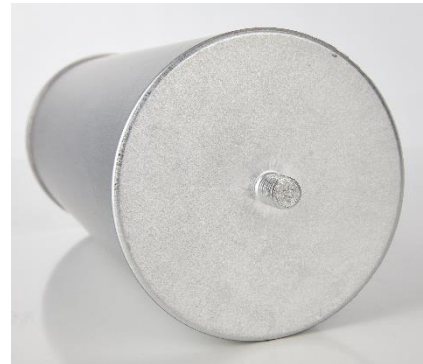
1980 μ F 1000VDC, 116 x 282mm

L_e 50 nH

R_S 0.59 m Ω

I_{max} (permanent) 120A

Type range E66 with designs
W4/W6 and
M12 mounting stud
(without Mesis™ protection)



230 μ F 2000VDC, 116 x 169mm

L_e 15 nH

R_S 0.55 m Ω

I_{max} (permanent) 90A

1470 μ F 1100VDC, 116 x 275mm

L_e 22 nH

R_S 0.43 m Ω

I_{max} (permanent) 120A

Summary: Your Benefits

- Get instant information and safety response in a fault event.
- Substitute box capacitors by protected, paralleled cylindrical units with sandwich bus bar connection:
 - **Minimized inductance** in your DC link.
 - Reduced power losses by **optimized series resistance**.
 - **Enhanced thermal balance** by superior heat dissipation and surface of aluminium cylinders.
 - **Increased rms** and surge current strength.
 - Protection against **climatic** and other environmental **stress**.
 - **Weight reduction**.