



# ELECTRIFIED VEHICLE SAFETY COMPONENTS



## HIRTENBERGER CIRCUIT BREAKERS ARE USED IN

- FHEV (Full Hybrid Electric Vehicle)
- PHEV (Plugin Hybrid Electric Vehicle)
- BEV (Battery Electric Vehicle)
- EREV (Extended Range Electric Vehicle)
- Charging infrastructure to secure battery charging

## HIRTENBERGER CIRCUIT BREAKERS SUPPORT ELECTRICAL SAFETY – POST CRASH SAFETY

- Disconnecting powertrain from battery system
- Safe car condition post-crash for first responders and occupants
- Fire protection in case of short circuit

## CIRCUIT BREAKER 500

- Full range fuse replacement
- Low internal resistance
- Developed according latest industrial standards
- One component to protect high voltage circuits
- Constant application parameters over lifetime and temperature
- Separation time less than 2 ms



### TECHNICAL DATA

Dimensions	Distance between screws: 76 mm Length 46 mm, Width 46 mm, Height 80 mm (without conductor)
Weight	251 g
Separation Capacity	16,000 A @ 500 VDC max. & 20 $\mu$ H higher values on request
Separation Time	< 2 ms
Nominal Current	400 A @ 85 °C
Pyrotechnics	GTMS Igniter (AK - LV 16 / 2012 & USCAR-28)
Pyrotechnic Interface	Pin Type
Operating Temperature / Ambient Temperature	- 40 °C to 120 °C / - 40 °C to 85 °C
HV - LV isolation resistance	50 M $\Omega$ , both before and after activation
Internal Resistance	< 40 $\mu$ $\Omega$

## CIRCUIT BREAKER 1000

- Full range fuse replacement
- Low internal resistance
- Developed according latest industrial standards
- One component to protect high voltage circuits
- Constant application parameters over lifetime
- Separation time less than 3 ms
- Rated voltage up to 1000 VDC



### TECHNICAL DATA

Dimensions	Length 72 mm, Width 72 mm, Height 91 mm (without conductor)
Weight	< 450 g
Separation Capacity @ 900 VDC	30 kA @ 5 $\mu$ H; 25 kA @ 10 $\mu$ H; 20 kA @ 15 $\mu$ H; 17 kA @ 20 $\mu$ H
Separation Time	< 3 ms
Nominal Current	400 A @ 85 °C
Pyrotechnics	GTMS igniter (AK – LV 16/2012 & USCAR-28)
Pyrotechnic Interface	Pin Type
Operating Temperature / Ambient Temperature	- 40 °C to 120 °C / - 40 °C to 85 °C
HV - LV isolation resistance	Galvanic separation independent of current level according to AK - LV 123.
Internal Resistance	< 70 $\mu$ $\Omega$

## CIRCUIT BREAKER 60

- Full range fuse replacement
- Low internal resistance
- Developed according latest industrial standards
- Separation time less than 2 ms



### TECHNICAL DATA

Dimensions	Distance between screws: 55 mm Length 50 mm, Width 33 mm, Height 25 mm (without conductor)
Weight	55 g
Separation Capacity	2,000 A @ 60 VDC max. higher values on request
Separation Time	< 2 ms
Nominal Current	300 A @ 85 °C
Pyrotechnics	GTMS Igniter (AK - LV 16 / 2012 & USCAR-28)
Pyrotechnic Interface	Pin Type
Operating Temperature / Ambient Temperature	- 40 °C to 120 °C / - 40 °C to 105 °C

## CIRCUIT BREAKER 60 SIWAP

- Full range fuse replacement
- Low internal resistance
- Developed according latest industrial standards
- Separation time less than 2 ms
- Includes signal line cut off
- Sealing protection IPX4K



### TECHNICAL DATA

Dimensions	Distance between screws: 64 mm Length 50 mm, Width 33 mm, Height 31,6 mm, Diameter 37 mm
Weight	50 g
Separation Capacity	2,000 A @ 60 VDC max. higher values on request
Separation Time	< 2 ms
Nominal Current	250 A @ 85 °C
Pyrotechnics	GTMS Igniter (AK - LV 16 / 2012 & USCAR-28)
Pyrotechnic Interface	Pin Type (4 pins)
Operating Temperature / Ambient Temperature	- 40 °C to 120 °C / - 40 °C to 105 °C

## CIRCUIT BREAKER 60 i (intelligent)

Supports electrical safety – in use (intelligent)

- Self detection of hazardous currents – independent from control unit → automatic break
- Permanent current measurement
- Measurement accuracy 5% (50 A - 2600 A)
- Communication via CAN – BUS available
- Robust against power supply interruptions
- Low standby current
- Developed according latest industrial standards
- Energy for ignition stored on board
- Comply with ASIL Level B



### TECHNICAL DATA

Dimensions	Distance between screws: 81 mm Length 64 mm, Width 50 mm, Height 52 mm
Weight	130 g
Separation Capacity	2,000 A @ 60 VDC max. higher values on request
Separation Time	< 2 ms
Nominal Current	300 A @ 85 °C
Pyrotechnics	GTMS Igniter (AK - LV 16 / 2012 & USCAR-28)
Pyrotechnic Interface	Pin Type
Operating Temperature / Ambient Temperature	- 40 °C to 120 °C / - 40 °C to 105 °C

## CIRCUIT CLOSER 500 – POST CRASH

- Closing switch for a secure and irreversible electrical connection after trigger signal
- Used for discharging capacitors in a power converter
- Short circuits a load circuit to eliminate the risk of electric shock for occupants and first responders
- Less than 1 ms switching time



### TECHNICAL DATA

Dimensions	Diameter 26 mm, Height 40 mm
Weight	20 g
Operating Voltage	500 VDC (1000 VDC on request)
Continuous & Peak Current	300 A for 0.5 s + 4 kA for 5 ms (both simultaneous)
Operating Temperature	- 40 °C to 120 °C
Switching Time	< 1 ms
Contact resistance	< 10 mΩ (after activation)
Pyrotechnics	GTMS Igniter (AK - LV 16 / 2012 & USCAR-28)
Pyrotechnic Interface	Pin Type
Busbar Connection	Custom

