

Manufacturer's name and address	KACO new energy GmbH Carl-Zeiss-Str. 1 74172 Neckarsulm, Germany	120723
Type of grid and system protection	Internal grid and system protection	
Software version from	ARM: 4.76 / DSP: 4.70 / CFG: 7.12	
Allocated to generator unit type	3200 / 4400 / 5300 / 5500 / 6600	

Protective function	Setting value U_{Set}	Trigger value	Shutdown time
Voltage drop protector $U <$	$0.80 \cdot U_n$	$U_{Set} + 0.34\% \cdot U_n$	200 ms

Protective function	Setting value U_{Set}	Trigger value	Shutdown time
Voltage increase protector $U >$ as 10 min average <small>Measured in accordance with VDE 0124-100 5.4.5.3.2a. Shutdown must take place within 600 s.</small>	$1.10 \cdot U_n$	----	365.4 sec

Protective function	Setting value U_{Set}	Trigger value	Shutdown time
Voltage increase protector $U >>$	$1.15 \cdot U_n$	$U_{Set} - 0.04\% \cdot U_n$	198 ms

Protective function	Setting value F_{Set}	Trigger value	Shutdown time
Frequency drop protector $f <$	47.5 Hz	$F_{Set} + 0.01 \text{ Hz}$	186 ms

Protective function	Setting value F_{Set}	Trigger value	Shutdown time
Frequency increase protector $f >$	51.5 Hz	$F_{Set} \pm 0.00 \text{ Hz}$	165 ms

Islanding detection, active process	Shutdown limit	Shutdown time, max.
	5 s	1.506 s

Circuit-breaker	
Integrated circuit-breaker	Control unit type 1 Power relay Control unit type 2 Power relay
Actuation of circuit-breaker	by internal grid and system protection or by central grid and system protection Powador-protect via digital input "Inverter off" (from software package V.1.10 / ARM: V4.82 / DSP: V.4.80 / CFG: V7.16)
Inherent delay of circuit-breaker	25 ms

Shutdown time (grid and system protection trigger time plus inherent delay of circuit-breaker) must not exceed 200 ms. Checking of the overall functional chain "grid and system protection - circuit-breaker" led to a successful shutdown.