

# Technical Note – Short-Circuit Currents in SolarEdge Three Phase Inverters

## Version History

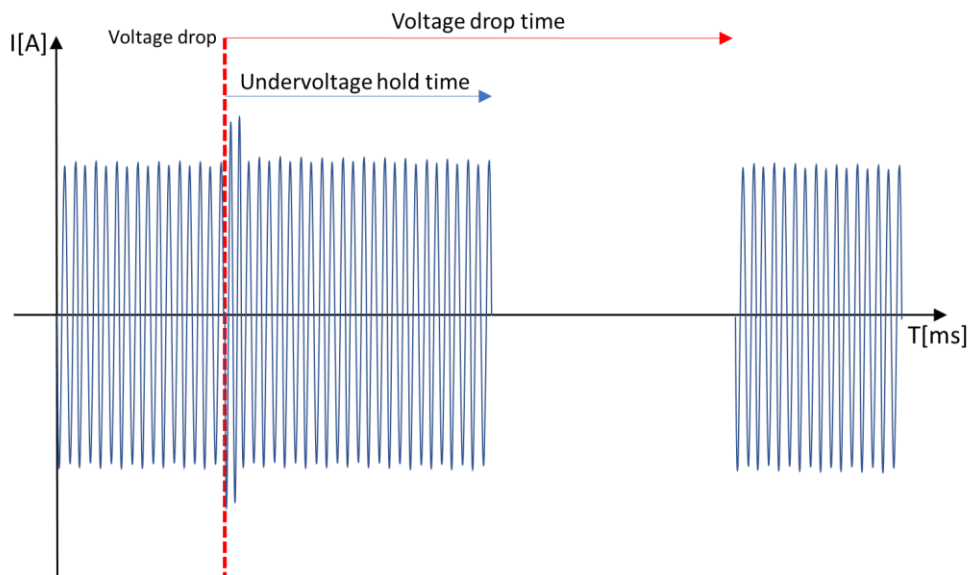
- Version 1.0, January 2021 – first version

## Introduction

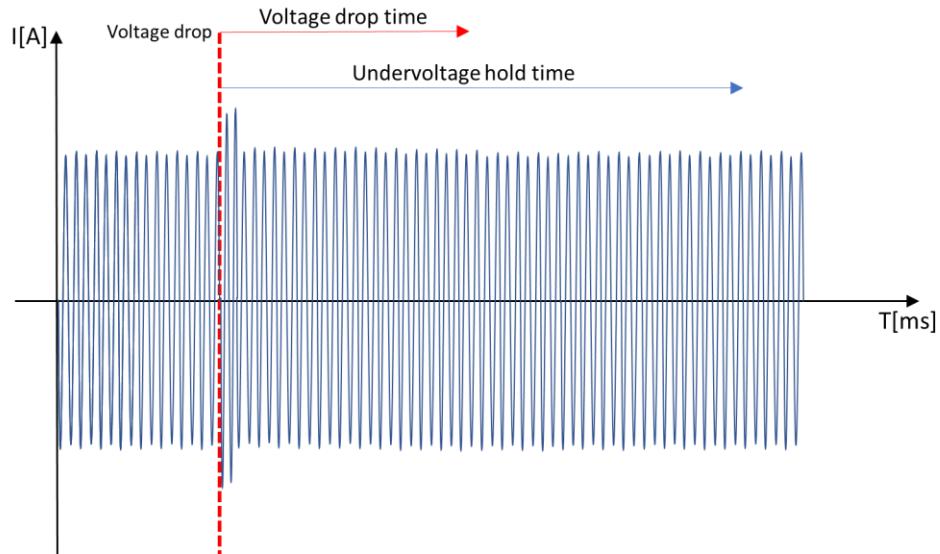
Grid failures may cause photovoltaic inverters to generate currents (“short-circuit currents”) that are higher than the maximum allowable current generated during normal operation. For this reason, grid operators may request short-circuit current ratings from vendors in order to prepare for failure scenarios.

This technical note describes the characteristics of the following short-circuit currents:

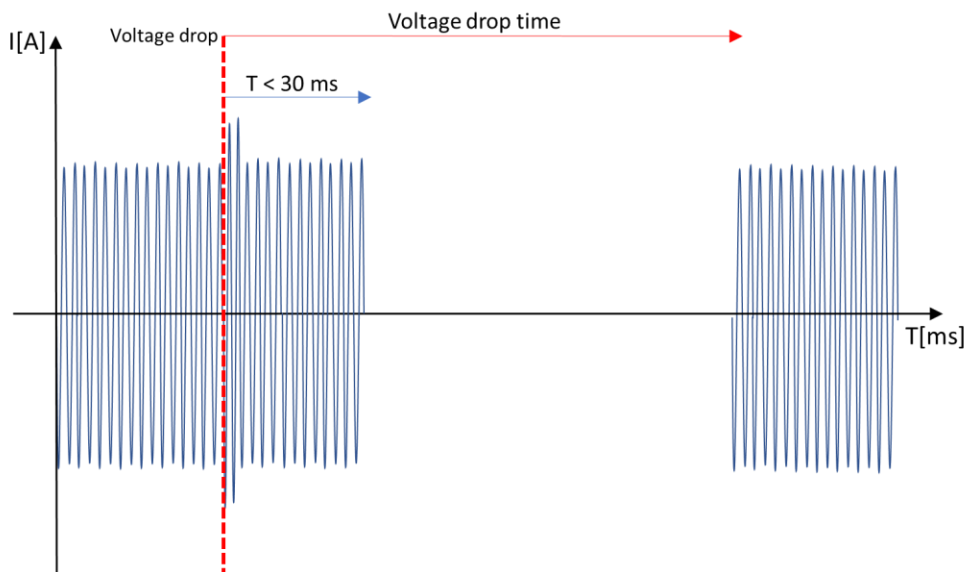
- $I_p$  – the peak current value of the current when a short circuit occurs. Duration: 40  $\mu$ s
- $I_k''$  – the initial symmetrical short-circuit current value, in RMS. Duration: < 30 ms
- $I_k$  – the short-circuit steady-state current, in RMS. The duration of  $I_k$  is dependent on country-specific parameters such as Low Voltage Ride Through (LVRT) and the hold time when undervoltage occurs:
  - In cases where  $LVRT_{enable} = 0$ : The inverter continues to push current until relays are opened.
  - When the undervoltage hold time is less than the voltage drop time,  $I_k$  duration equals the undervoltage hold time.



- When the undervoltage hold time is greater than or equal to the voltage drop time,  $I_k$  duration equals the voltage drop time (the inverter continues to push current until grid function returns to normal).



- In cases where  $LVRTenable = 2$ : The inverter stops pushing current after a period of less than 30ms following the voltage drop,  $I_k$  duration is less than 30ms.



## Short circuit current ratings during fault (without reactive current during the fault)

For three phase inverters and three phase inverters with Synergy technology

Part Numbers: SExxxK-xxxxBxxxx

Inom (A)	Inverter Model @400 L-L	Ip (A)	Ik'' (A)	Ik (A)	Ip Duration (us)	Ik'' Duration (ms)	Ik Duration (ms)
120	82.8	277.2	130.5	130.5	40	<30	Dependent on country-specific parameters: 1. LVRTenable=0 – the duration is the lesser of undervoltage hold time and the voltage drop time 2. LVRTenable=2 – the duration is less than 30ms
80	55	184.8	87	87	40	<30	
72.5	50	176.8	88.4	84.4	40	<30	
40	27.6	92.4	43.5	43.5	40	<30	
36.2	25	88.4	44.2	42.2	40	<30	

Inom (A)	Inverter Model @480 L-L	Ip (A)	Ik'' (A)	Ik (A)	Ip Duration (us)	Ik'' Duration (ms)	Ik Duration (ms)
120	100	277.2	130.5	130.5	40	<30	Dependent on country-specific parameters: 1. LVRTenable=0 – the duration is the lesser of undervoltage holdtime and the voltage drop time 2. LVRTenable=2 – the duration is less than 30ms
80	66.6	184.8	87	87	40	<30	

## For three phase inverters and three phase inverters with Synergy technology

Part Numbers: SExxxK-xxxxlxxx<sup>1</sup>

Inom (A)	Inverter Model @400 L-L	Ip (A)	Ik'' (A)	Ik (A)	Ip Duration (us)	Ik'' Duration (ms)	Ik Duration (ms)
145	100	294	159	159	40	<30	Dependent on country-specific parameters: 1. LVRTenable=0 – the duration is the lesser of undervoltage hold time and the voltage drop time 2. LVRTenable=2 – the duration is less than 30ms
130.5	90	288	159	159	40	<30	
120	82.8	285	159	159	40	<30	
96.5	66.6	196	106	106	40	<30	
80	55	190	106	106	40	<30	
72.5	50	182	53	53	40	<30	
48.25	33.3	98	53	53	40	<30	
43.5	30	96	53	53	40	<30	
40	27.6	95	53	53	40	<30	
36.25	25	91	53	53	40	<30	

Inom (A)	Inverter Model @480 L-L	Ip (A)	Ik'' (A)	Ik (A)	Ip Duration (us)	Ik'' Duration (ms)	Ik Duration (ms)
145	120	294	159	159	40	<30	Dependent on country-specific parameters: 1. LVRTenable=0 – the duration is the lesser of undervoltage hold time and the voltage drop time 2. LVRTenable=2 – the duration is less than 30ms
120	100	285	159	159	40	<30	
96.5	80	196	106	106	40	<30	
80	66.6	190	106	106	40	<30	

Inom (A)	Inverter Model @208 L-L	Ip (A)	Ik'' (A)	Ik (A)	Ip Duration (us)	Ik'' Duration (ms)	Ik Duration (ms)
145	50	294	159	159	40	<30	Dependent on country-specific parameters: 1. LVRTenable=0 – the duration is the lesser of undervoltage hold time and the voltage drop time 2. LVRTenable=2 – the duration is less than 30ms
120	43.2	285	159	159	40	<30	
96.5	17.3	98	53	53	40	<30	
80	14.4	95	53	53	40	<30	

<sup>1</sup> Applicable for models SE25K and above