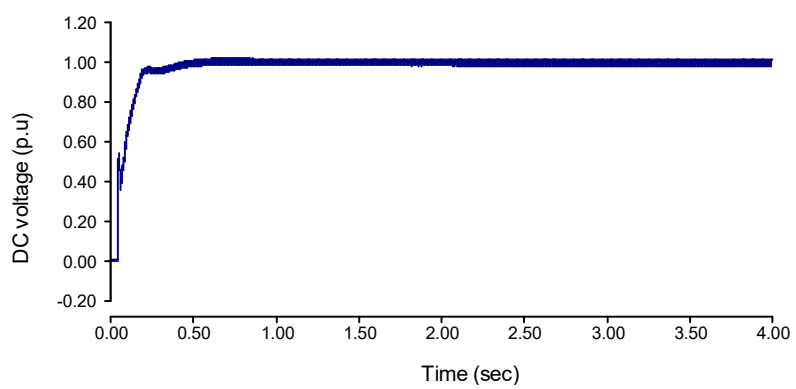
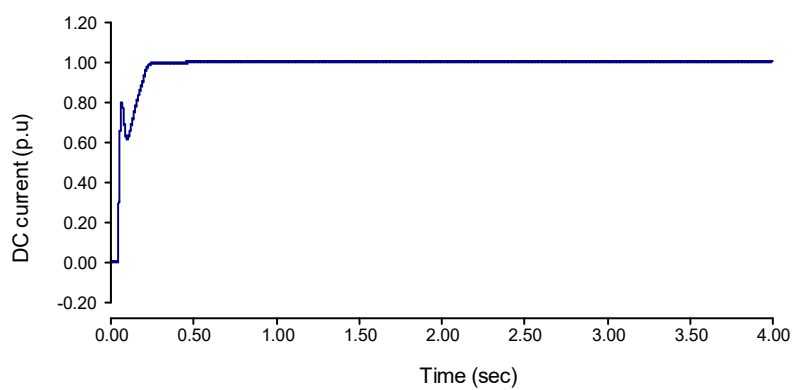


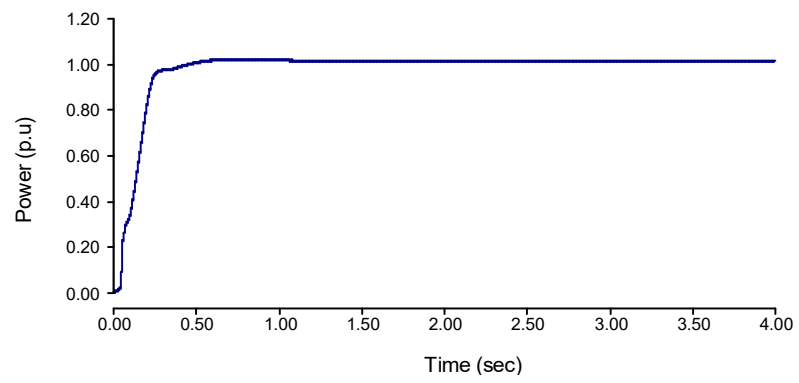
(a) AC voltage



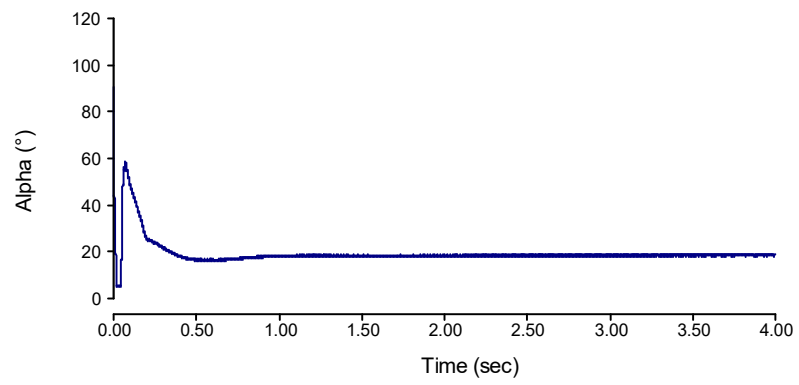
(b) DC voltage



(c) DC current

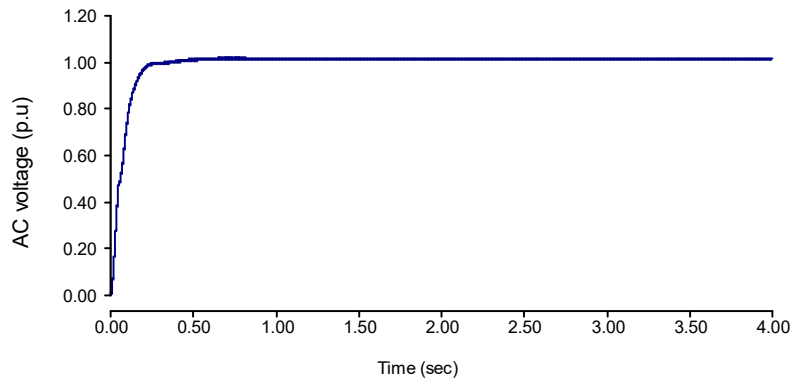


(d) Active power

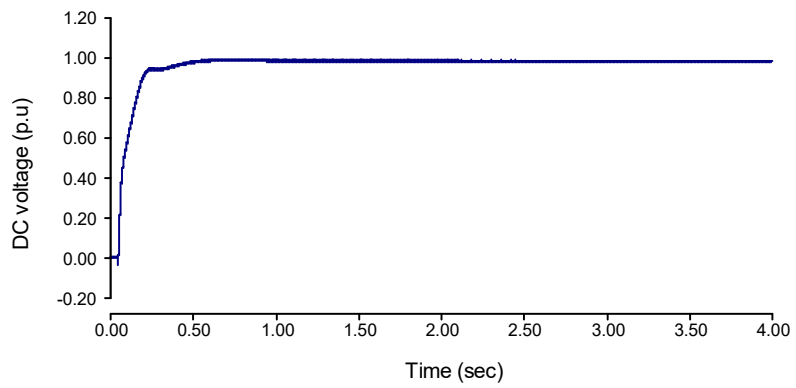


(e)  $\alpha$

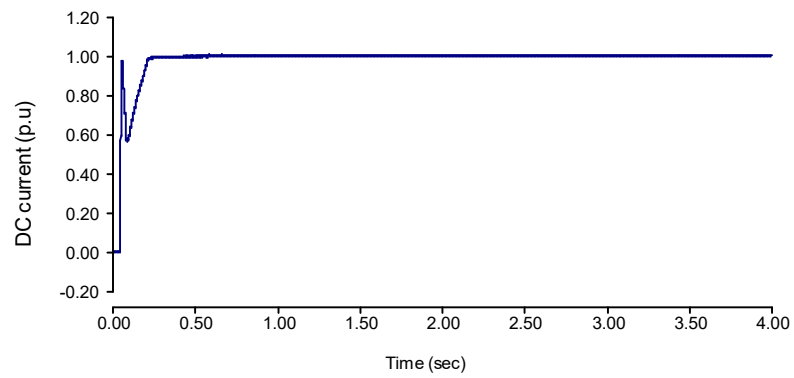
Figure S1 The steady state simulation results on rectifier side



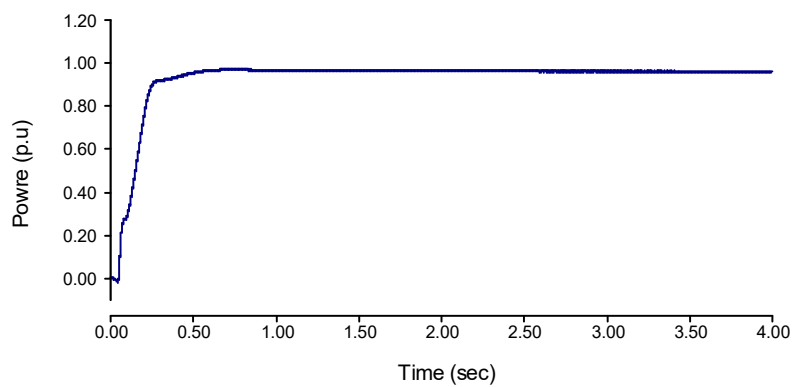
(a) AC voltage



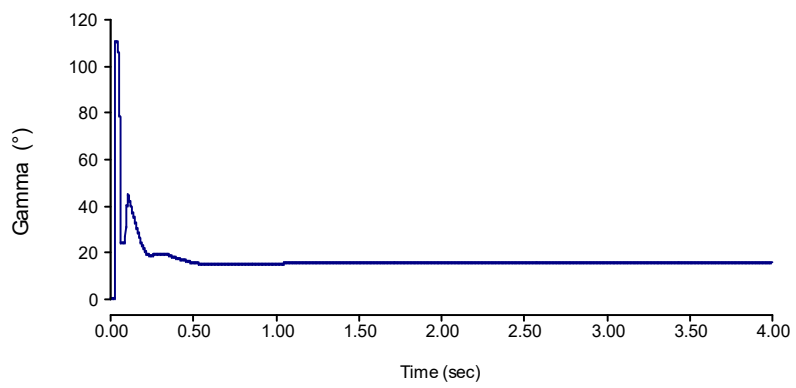
(b) DC voltage



(c) DC current

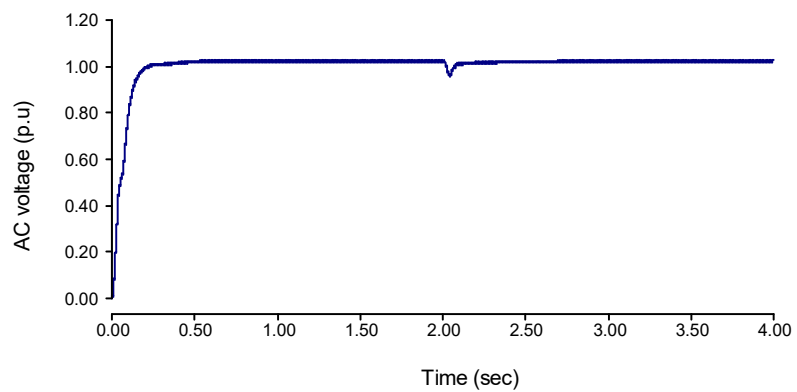


(d) Active power

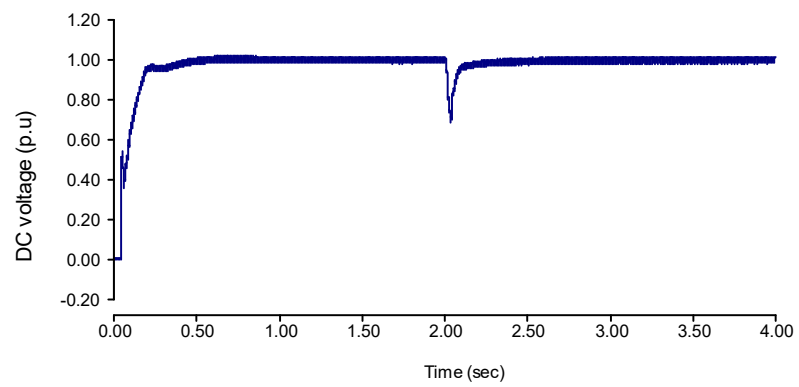


(e)  $\gamma$

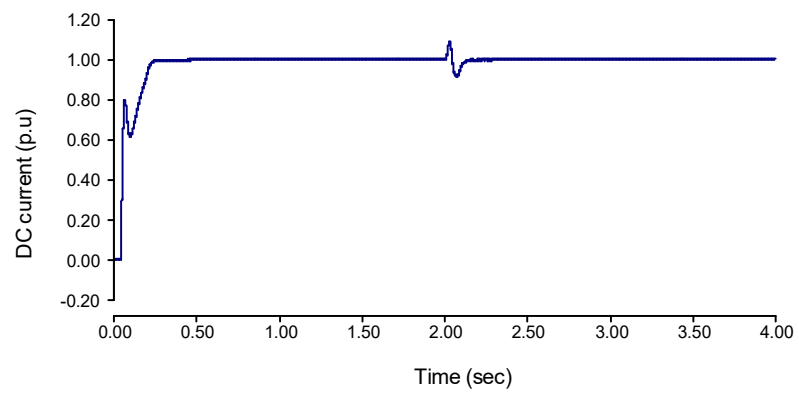
Figure S2 The steady state simulation results on inverter side



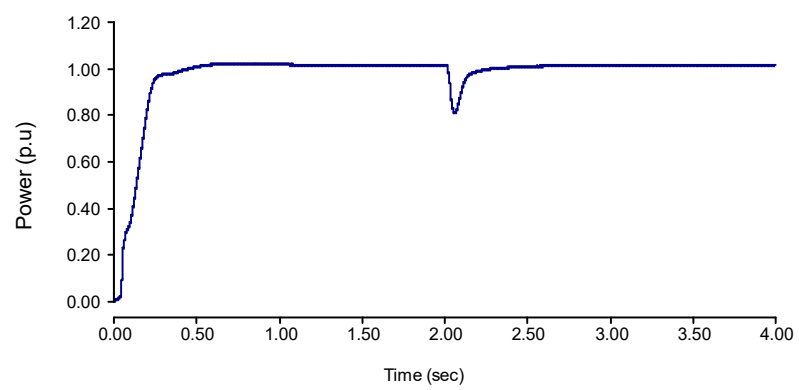
(a) AC Voltage



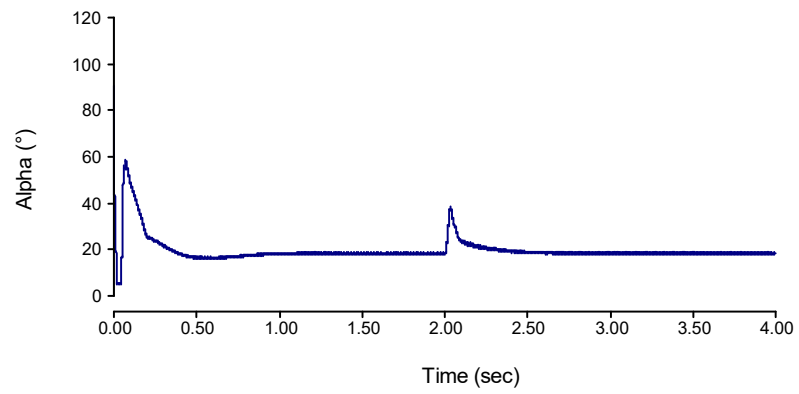
(b) DC voltage



(c) DC current

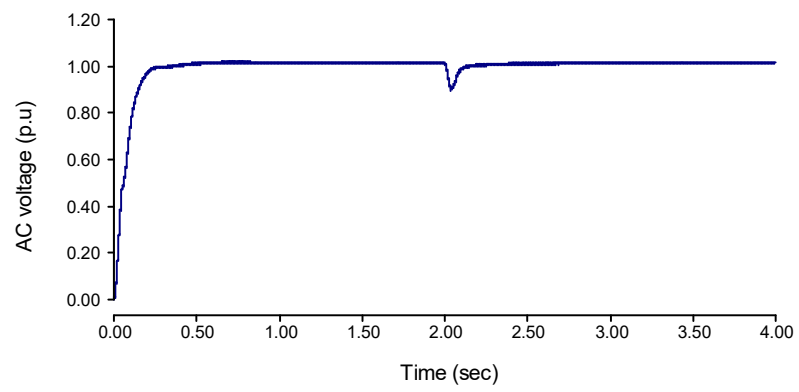


(d) AC power

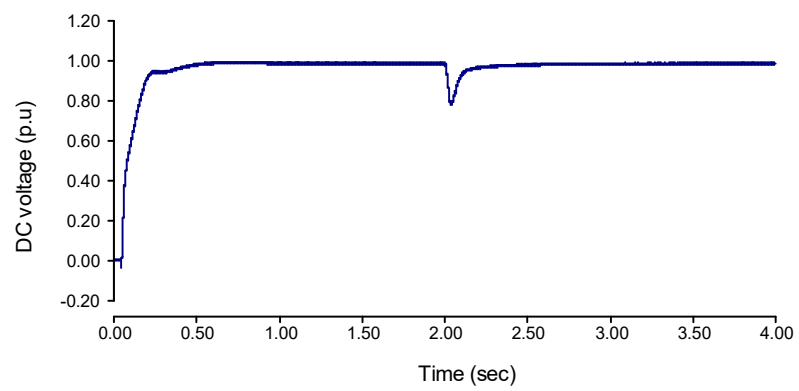


(f) Alpha ( $\alpha$ )

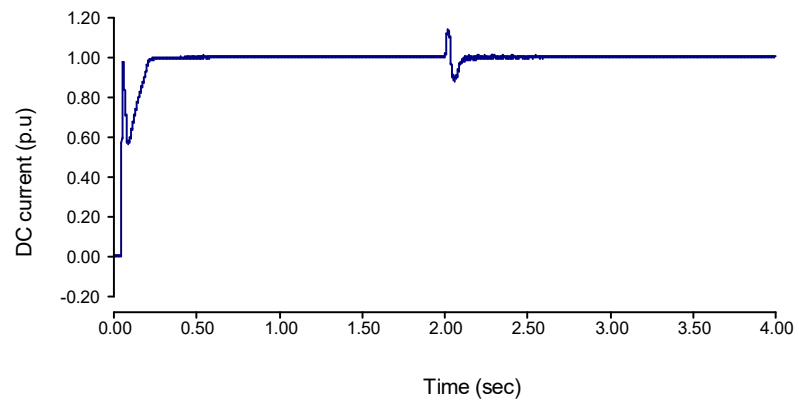
Figure S3 The transient state simulation results on rectifier side



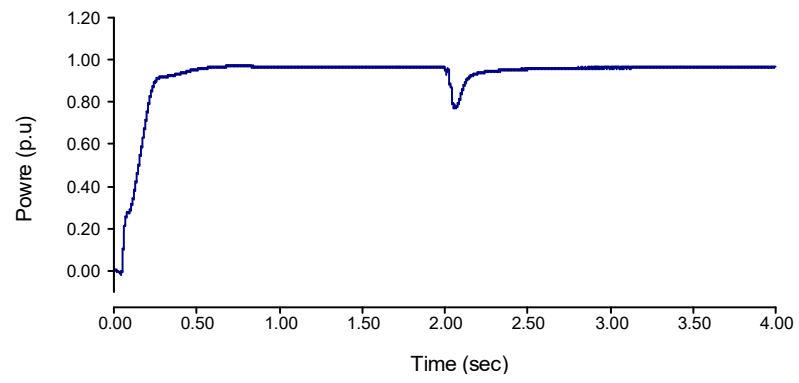
(a) AC voltage



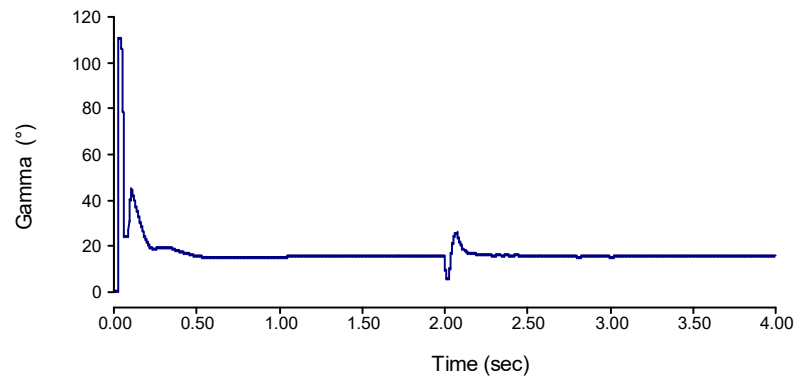
(b) DC voltage



(c) DC current

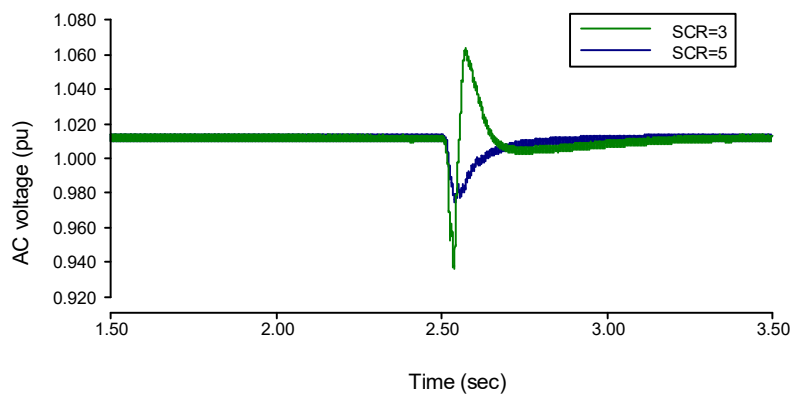


(d) AC power

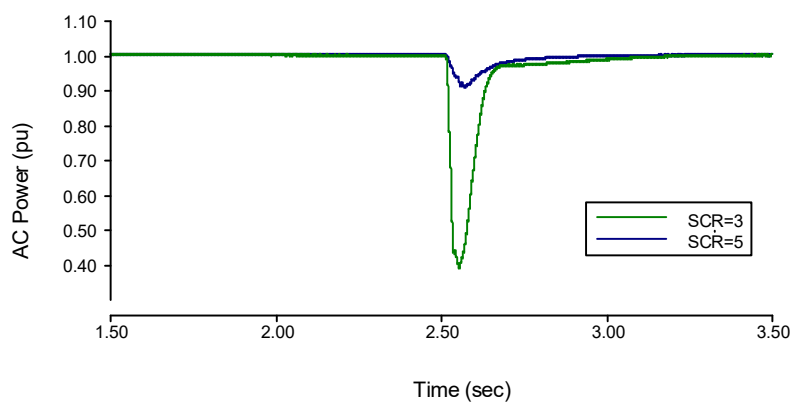


(e)  $\gamma$

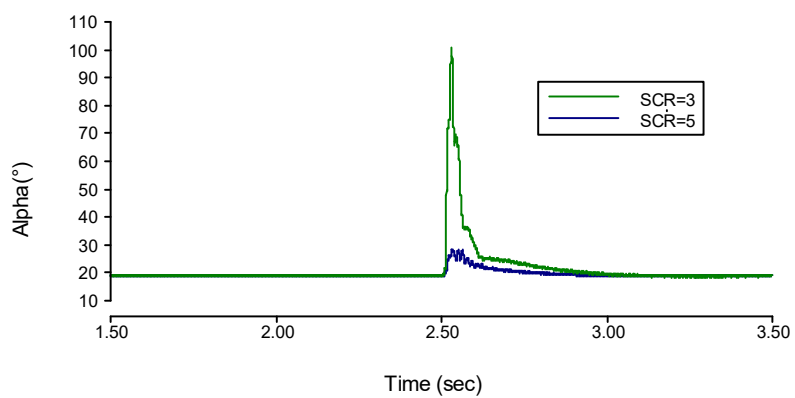
Figure. S4 the transient state simulation results on inverter side



(a) AC Voltage

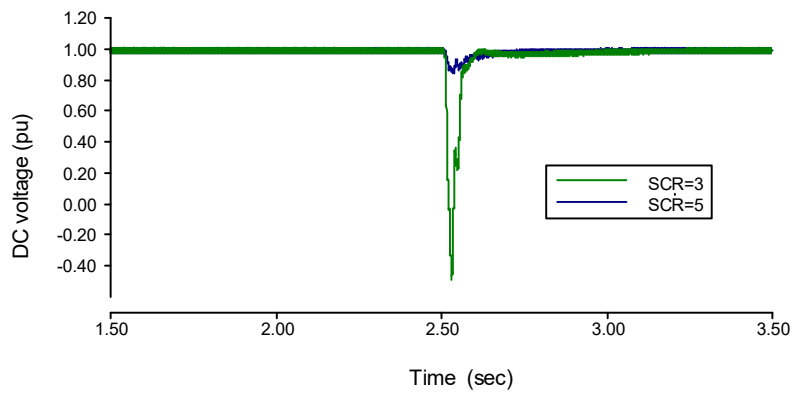


(b) AC Power



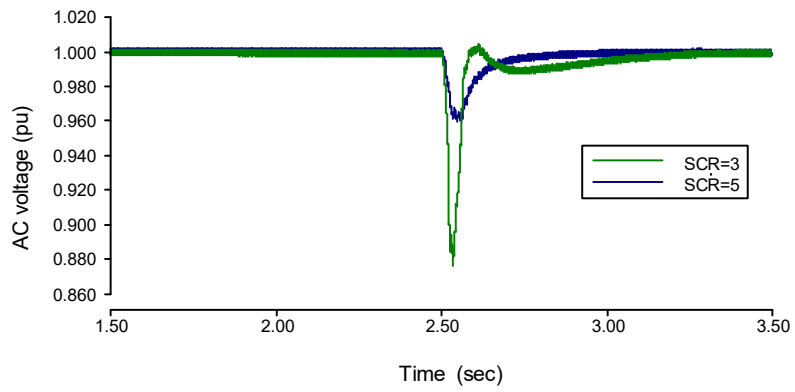
(c) Alpha ( $\alpha$ )



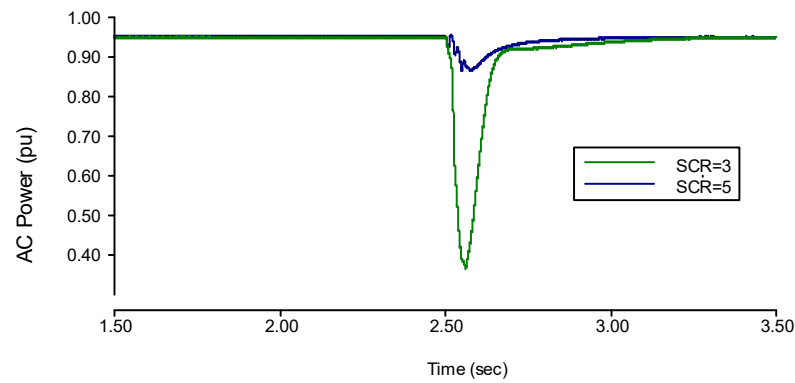


(d) DC Voltage

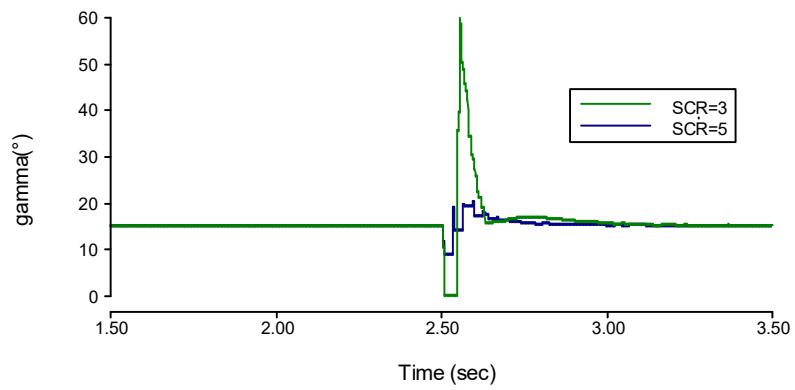
Figure S5 Transient state performance of rectifier side under single phase to ground fault



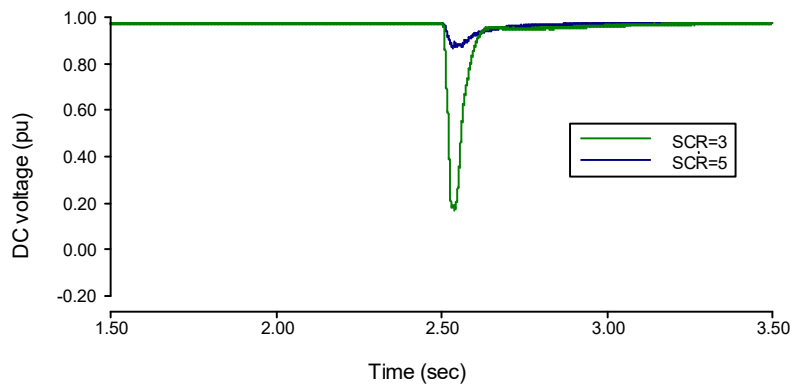
(a) AC voltage



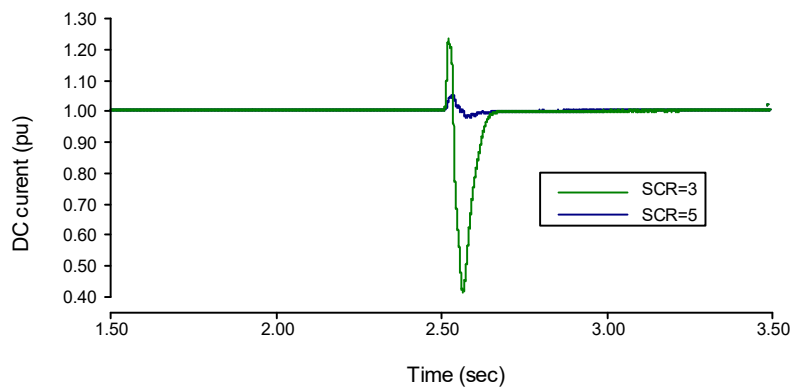
(b) AC Power



(c)  $\gamma$

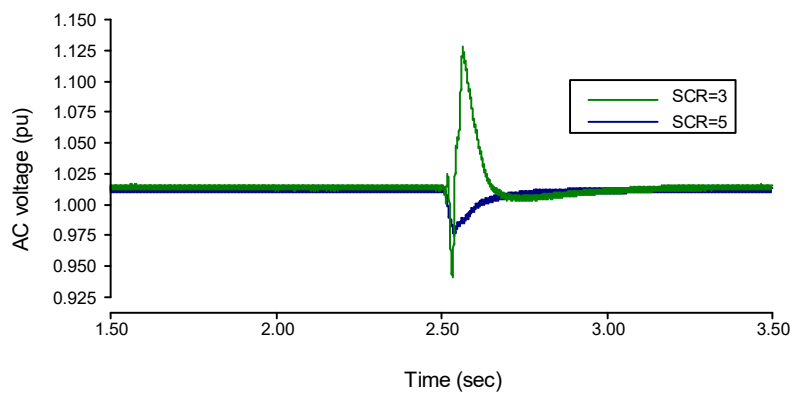


(d) DC Voltage

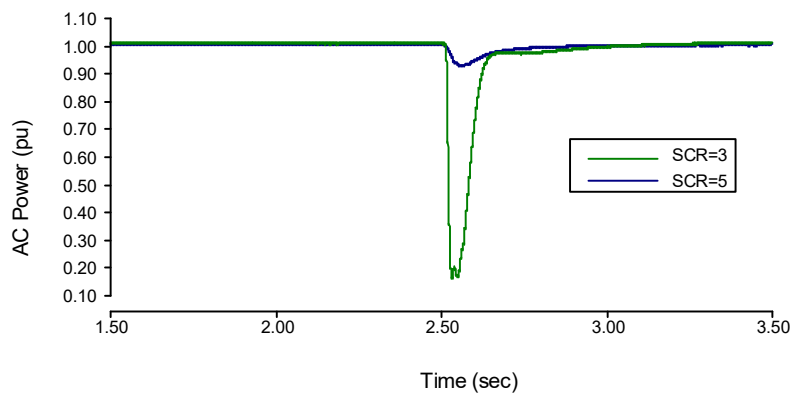


(e) DC Current

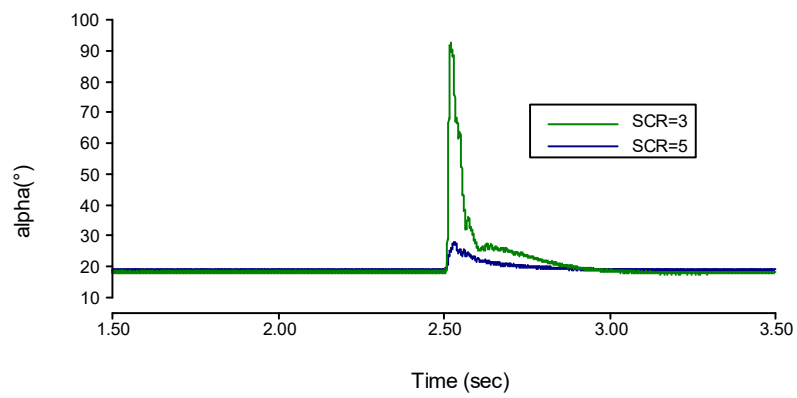
Figure S7 Transient state performance of inverter side under single phase to ground fault



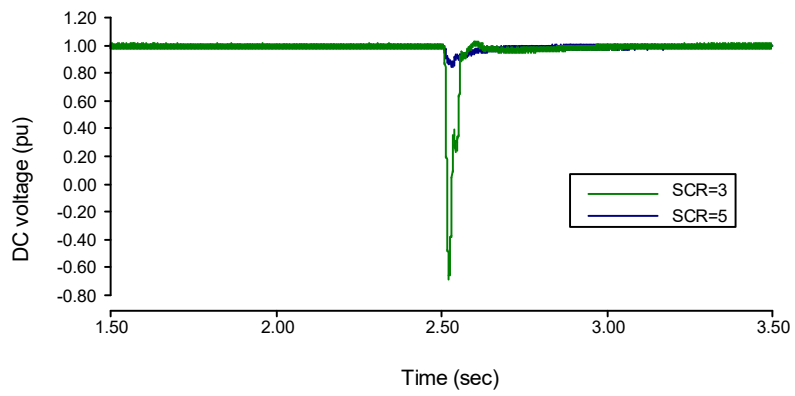
(a) AC Voltage



(b) AC Power

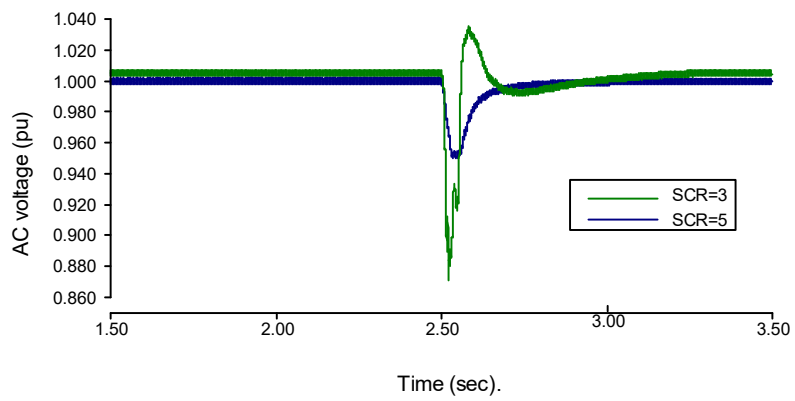


(c) Alpha ( $\alpha$ )

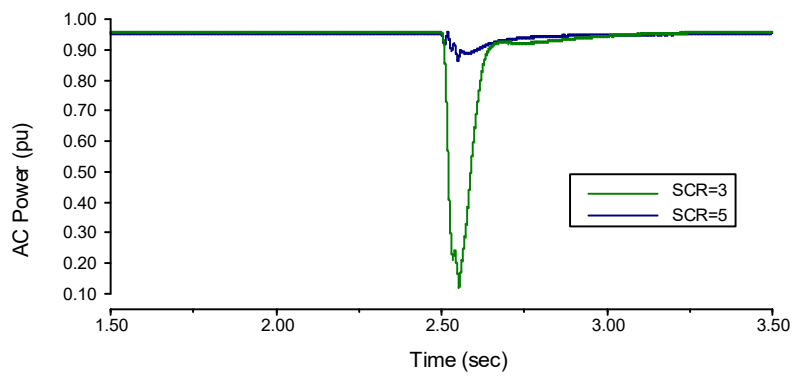


(d) DC voltage

Figure S8 Transient state performance of rectifier side under three phase fault to ground



(a) AC voltage



(b) AC Power

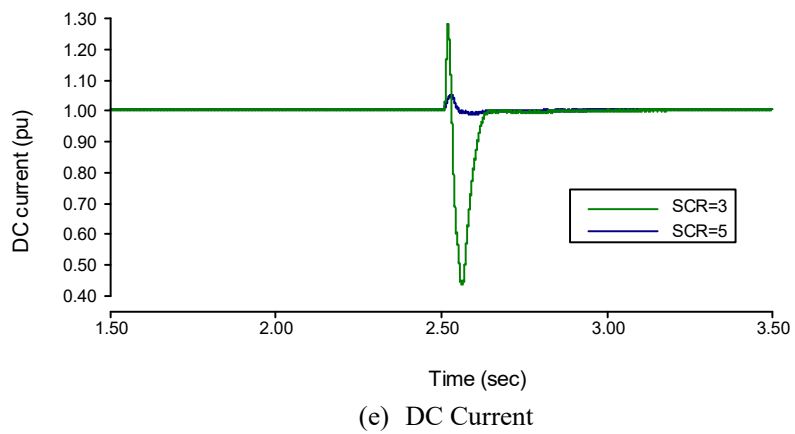
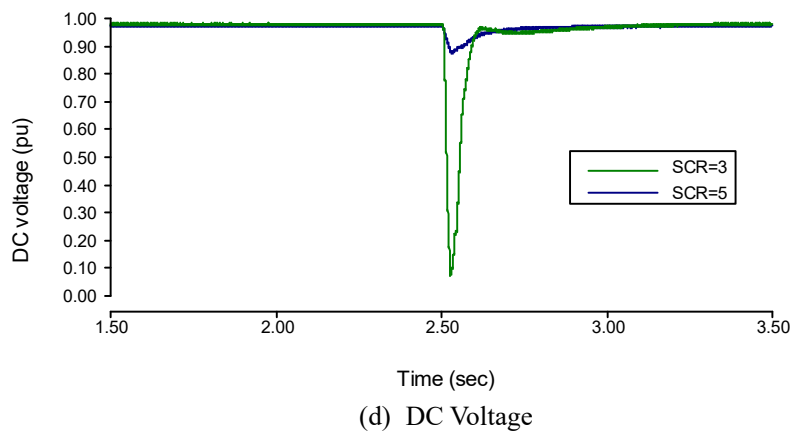
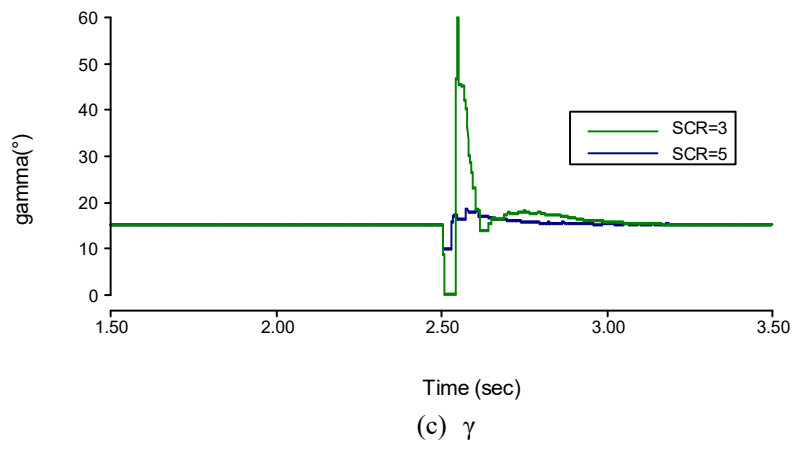
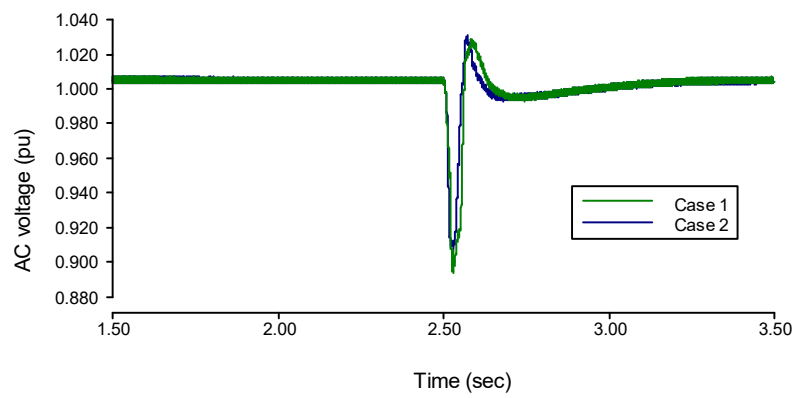
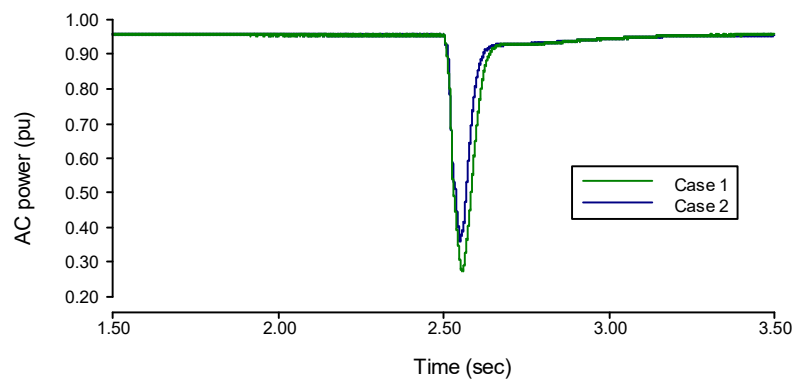


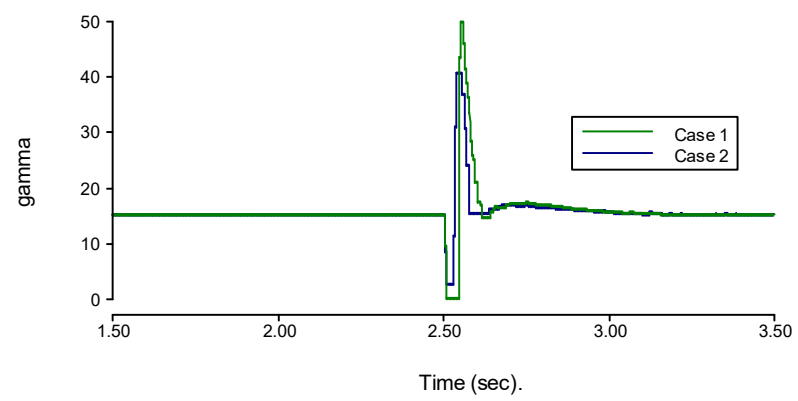
Figure S8 Transient state performance of inverter side under three phase fault to ground



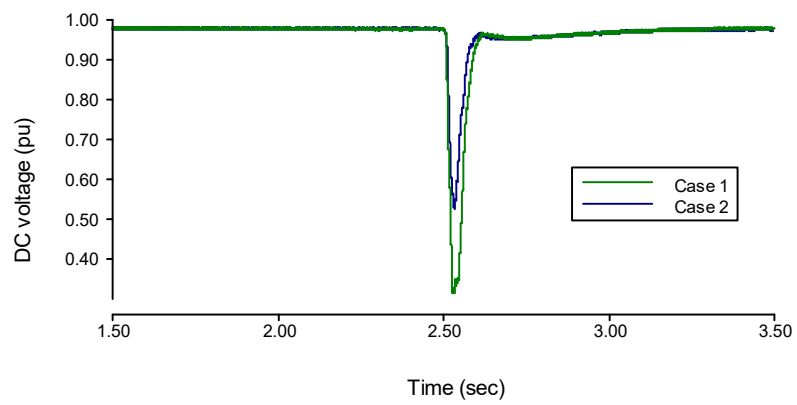
(a) AC voltage



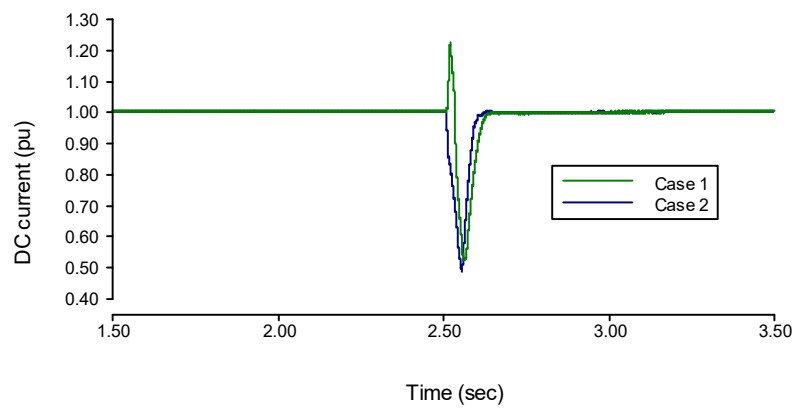
(b) AC power



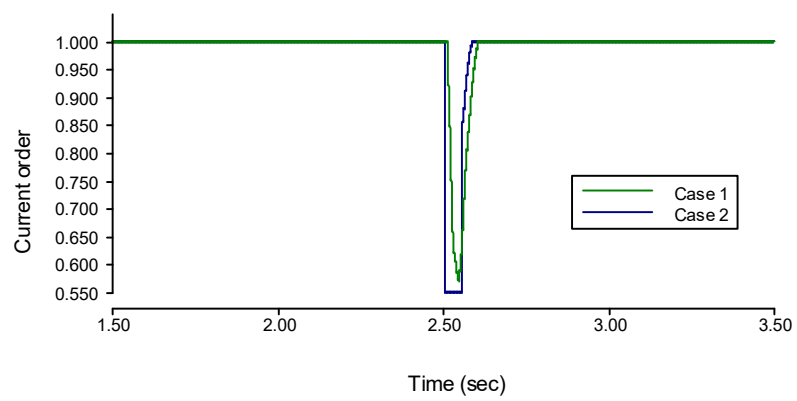
(c) gamma



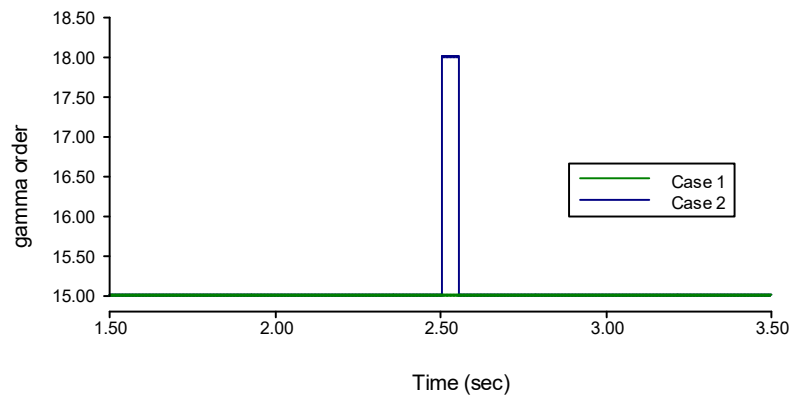
(d) DC voltage



(e) Current order



(f) DC current order



(g) gamma order

Figure S 9 Transient state performance of single phase to ground with severe AC fault