

## Toshiba G8000, G8000MM, & G9000 Series UPS

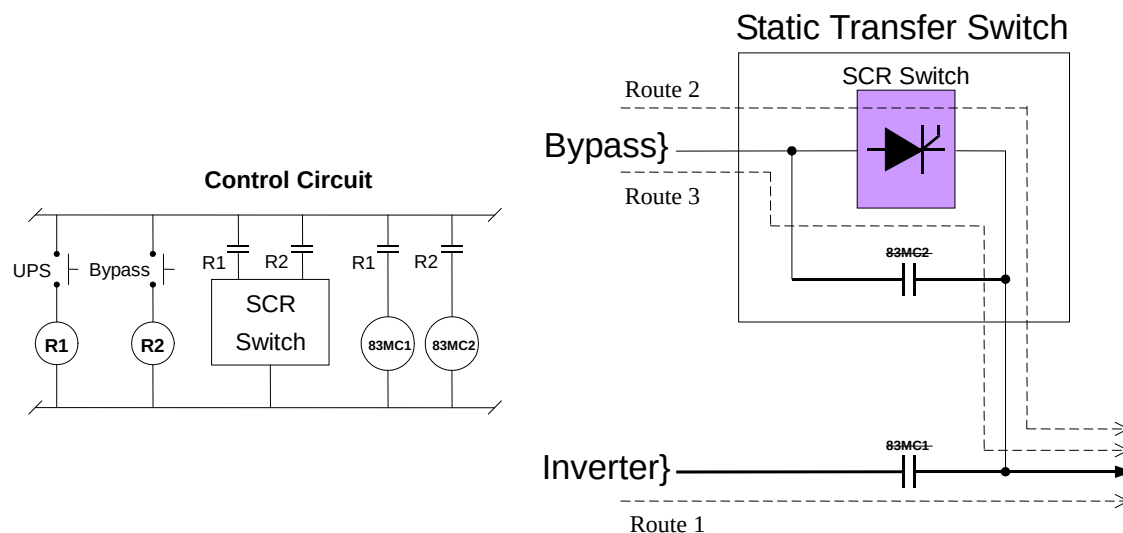
### Description of Toshiba Hybrid Static Transfer Switch

The Static Bypass Transfer Switch used in the Toshiba G8000, G8000MM, and G9000 UPS is a combination of a magnetic contactor and a SCR used in parallel configuration. This hybrid combination increases the overall reliability of the static bypass device beyond that of an individual SCR while not jeopardizing the speed or time of static bypass transfer to or from Inverter operation.

The Toshiba Hybrid Transfer Switch needs no cooling fans because the SCR device only conducts the load for the short time needed for the magnetic contactor to change contact states. The SCR has ample short-time current and heating rating for this duty. With much less heat produced, and no requirement for forced cooling, the risk of failure due to excessive heat is drastically reduced.

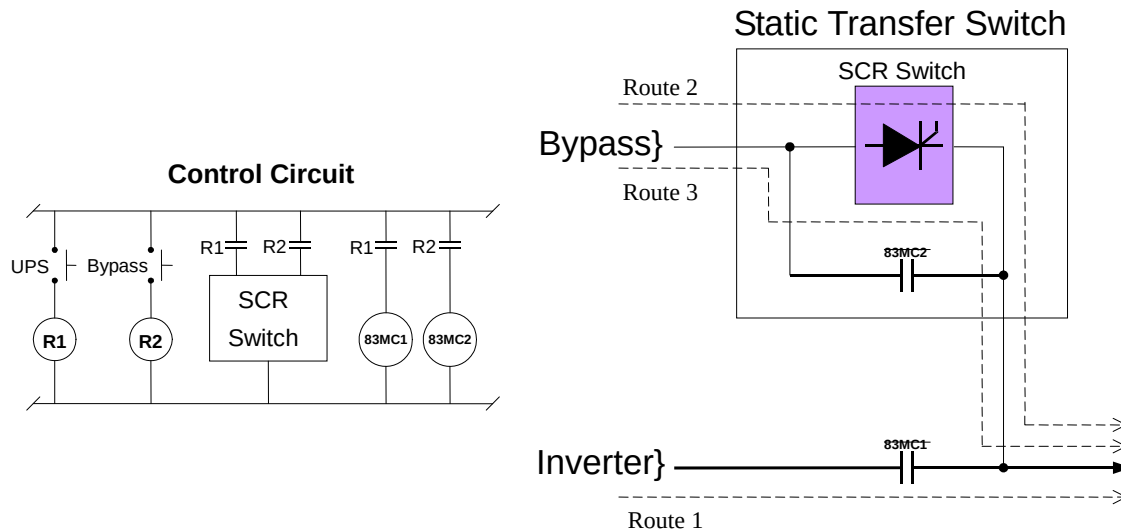
In addition, the contactor is not required to make or break the load current – which is done by the SCR. The result is the magnetic contactor experiences much less wear and contact erosion than a typical load-make/break contactor, resulting in increased reliability and longevity of the contacts.

The main circuit and control circuits are simplified as follows:



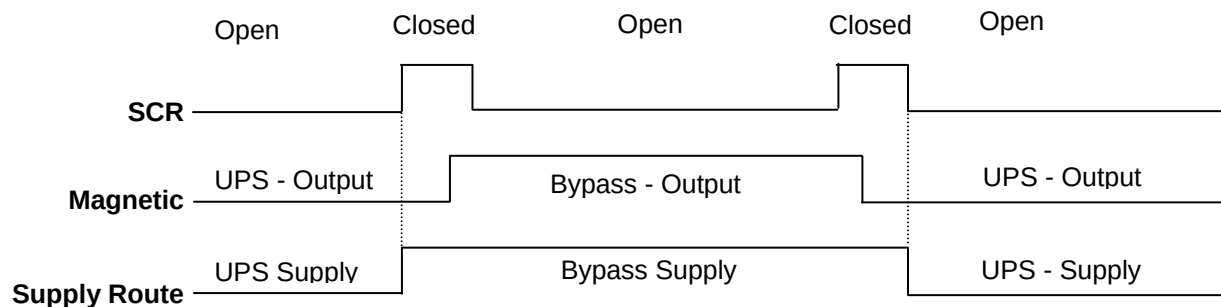
Transferring from UPS to Bypass:

1. Under normal operation, power flows from the Inverter, through the contactor 83MC1, to the output (Route 1). The control relays R1 and R2, and contactor coil 83MC2 is not energized.
2. Control switch "Bypass" is closed, energizing relay R2. R2 operates the Gate Switch, closing the SCR. Power instantly flows, through the SCR, from the Bypass supply to the output (Route 2). The Inverter supply is automatically synchronized to the Bypass supply.
3. R2 also energizes coil (83MC2), causing the contactor to change state, switching the output power flow from the Inverter to the Bypass supply. (Route 3).
4. Switch contact "Bypass" is opened and R2 is de-energized. This turns off the Switch Gate and opens the SCR. Coil 83MC1 of inverter output contactor is also de-energized.



Transferring from Bypass to UPS:

5. Power flows from the Bypass supply, through the contactor 83MC2, to the output (Route 3). The control relays R1 and R2, and contactor coil 83MC1 is not energized.
6. Control switch "UPS" is closed, energizing relay R1. R1 operates the Switch Gate, closing the SCR. Power instantly flows, through the SCR, from the Bypass supply to the output (Route 2). The Inverter supply is automatically synchronized to the Bypass supply.
7. R1 also energizes coil (C1), causing the contactor to change state, switching the output power flow from the Bypass to the Inverter supply. (Route 1).
8. Switch contact "UPS" is opened and R1 is de-energized. This turns off the Switch Gate and opens the SCR. Coil (C1) of magnetic contactor is also de-energized.



Time chart of Static Transfer Switch