

AN6142

When I replace obsolete products in my equipment with modern replacements, do I need to replace all the devices in series in an arm?

Application Note

Replaces AN6142-1

AN6142-2 November 2022 (LN42259)

Figure 1 shows a simple 3-phase bridge where one thyristor is capable of blocking the phase to phase voltage.

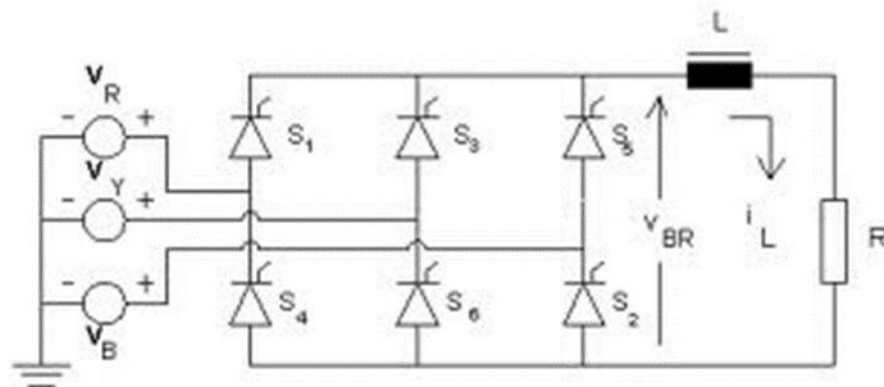


Figure 1. 3-phase fully controlled rectifier

If a higher voltage rating is required then either higher voltage devices are used, if available, or devices are used in series. These devices are specially selected to have similar leakage currents at the operating voltage so that they each take approximately the same voltage (static voltage sharing). By their design they will have similar turn-on characteristics and stored charges. This means that they will all turn-on together and not leave one device blocking the full voltage across the arm and that similarly they will all recover their blocking capability together (dynamic voltage sharing).

A modern replacement for an obsolete thyristor will not have the same characteristics and so if it is the only device replaced in a multi-series device arrangement then it will upset the voltage sharing and result in the overvoltage of itself or one of the original thyristors. Therefore, in the case where the thyristors S1 to S6 in figure 1 are actually series connected thyristors then all the devices in any individual switch (arm) must be of the same type.

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