

A Comparison Note on Transfer Switches: STS and ATS

Transfer switches are used in power electronics to provide controlled transfers between two power supplies. In this note, we will always refer to devices that are able to perform switching, both with synchronous and asynchronous supply sources, with a Break Before Make (BBM) operation. This last feature is particularly fundamental in order to avoid a paralleling of the two supplies and to avoid that the neutrals get cross-coupled. The break introduced with BBM has to be sufficiently small in order to avoid too long energy gap to the load.

The use of transfer switches is used to increase the system MTBF through redundancy of supplies and by separating the loads. This is done in two typical ways.

In first place, the switch will perform a change on the source used for the supply of the load whenever the original source is out of tolerance. Secondly, separating the different loads, it is possible to avoid that a problem happening in one load will propagate also to the other loads. This latter case takes place during a short circuit, hence the switch supplying this load will not permit a transfer on the other source while all the other switches will change the supply source protecting their loads.

Two technologies for Transfer Switches: STS and ATS

There are two main technologies used for these devices with different characteristics in terms of switching quality and cost each having its merits and deficiencies: Static Transfer Switches (STS) and Automatic Transfer Switches (ATS).

STS is based on static electronic components (SCR) therefore allowing for a fast and precise control of the switching between one line and the other. This solution permits to obtain a perfect Break Before Make (BBM) behaviour by never permitting a source overlap. Moreover, it is also capable of very fast switching between the two sources with a max delay of less than 5 msec (typically 4 msec).

ATS is based on electromechanical components where the BBM switching is actually made by controlling the relays on each source line. This kind of technology can still make a perfect Break Before Make change of supply sources both in synchronous and asynchronous conditions but it is certainly slower than the static solution.

The right Transfer Switch for each load need

By looking at the paragraph above it can be clearly understood that STS should be used in case of more critical loads where a longer voltage gap in the BBM procedure can be deleterious.

ATS, on the other end, is still a reliable product that should be used to increase the overall reliability of an installation. Indeed, is a product with a very high MTBF value. On the other side, due to its intrinsic lower switching speed, should not be used where the loads are very sensible to longer voltage sags (in the order of 6 msec). Anyway, ATS is certainly a lot more cost effective product respect to an STS one of the same rating.

Main features of STS and ATS

	STS	ATS
BBM feature	Always guaranteed. In CROSS there is a sensor for each SCR on and off state for a true BBM.	Always guaranteed. Similar sensor as per the CROSS but for the relays
Synchronous transfer between sources	Typical less than 4msec (max less than 5 msec)	Typical less than 6 msec
Asynchronous transfer between sources	0-20msec delay to be added to the above delay	0-20msec delay to be added to the above delay
Value	Highest quality and higher value	Good quality/price ratio

Competitors ATS: “MGE Pulsar STS 16” is really an ATS based on relay

The transfer switch product presented in MGE portfolio is called “MGE Pulsar STS 16”. As often happens with MGE marketing documentation there is a wanted misunderstanding on the name of the product that can easily mislead an unaware customer. Indeed, it seems to be a Static Transfer Switch type of equipment (MGE Pulsar STS 16). By looking just a little deeper in their leaflet is then possible to notice that the Break Before Make characteristics is made through the use of electromechanical components (relays) and not static electronic components (SCR) as in the case of Chloride’s CROSS STS. **Therefore MGE Pulsar STS 16 is actually a relay based ATS.**

Some tests have been made to see the **real transfer time of the MGE Pulsar STS 16 of 12 msec that actually is practically the double of Chloride ATS** in a typical condition.