

Alstom MBCZ

It's a analog bus bar differential relay.

The relay is an analog device so the model is only a good approximation of the real behavior of the device.

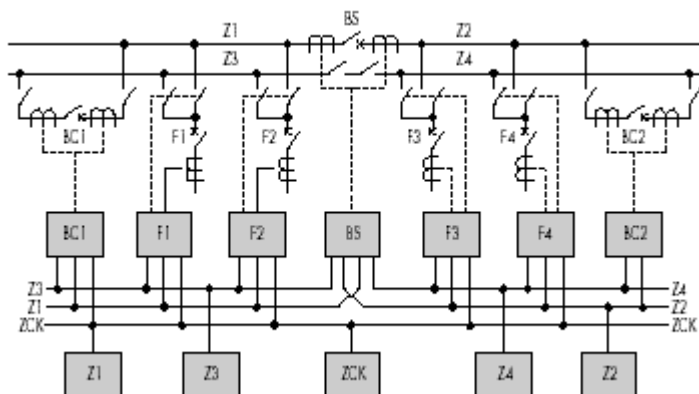
Please note that the bias characteristic has been linearized using two percentage, 20% between I/I_n and $8.5 I/I_n$ and 50 % above $8.5 I/I_n$.

The MBCZ is a modular relay, it means that new modules can be added to support various bus bar configurations: the current PowerFactor models support up to 6 feeders with a bus tie.

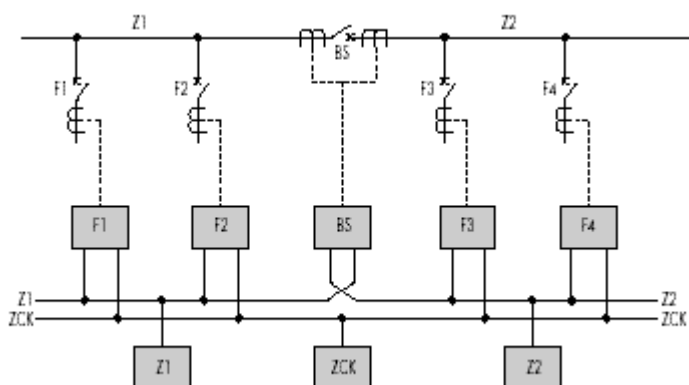
If a bus tie is present please remember that in the implemented schem the Feeder "F1", "F2", and "F5" and the bus coupler 1 ("BC1") are located on the bus bar section 1; The Feeder "F3", "F4", and "F6" and the bus coupler 2 ("BC2") are located on the bus bar section 2. The bus section Cts (if present) are "BS+" (the left one) and "BS-" (the right one)

The relay is working properly only if the relevant CTs are associated accordingly with this rules.

To support the double bus bar configuration with bus tie 5 protection zones are available: "Differential main zone 1", "Differential main zone 2", "Differential main zone 3", "Differential main zone 4" and "Differential check zone". The "Differential main zone 1" and "Differential main zone 3" differential block are devoted to protect the left section of the bus bar, the only difference between them is that "Differential main zone 1" is including "BS+" and "Differential main zone 3" is including "BS-"; The "Differential main zone 2" and "Differential main zone 4" differential block are devoted to protect the right section of the bus bar, the only difference between them is that "Differential main zone 2" is including "BS+" and "Differential main zone 4" is including "BS-". The "Differential check zone" is including the whole substation. A trip is generated only if both the "Differential check zone" and one of the differential main zones is tripping. Please refer to the drawing here below for an example of double bus bar with bus tie:



If we are protecting a single bus bar with with bus tie the "Differential main zone 1", the "Differential main zone 2" and the "Differential check zone" differential blocks are used. Please refer to the drawing here below for an example of a single bus bar with with bus tie.



If the bus tie isn't present only the "Differential check zone" model part is used and up to 6 feeders are supported. In this case the "Differential check zone" and the "Differential main zone 1" are protecting the same zone.

To reverse a CT negative values must be used inside the CT adapters for the "Ct ratio" variable. For this reason the allowed range of "Ct ratio" has been "extended" to allow inserting negative values. Please note that inside the relay the "matching ratio" can be only be positive and to reverse the CT the connection cables must be reversed.

Not implemented features:

- The saturated CT detection.
- The supervision/ breaker failure logic.
- The Single bus scheme with combined functions arrangement