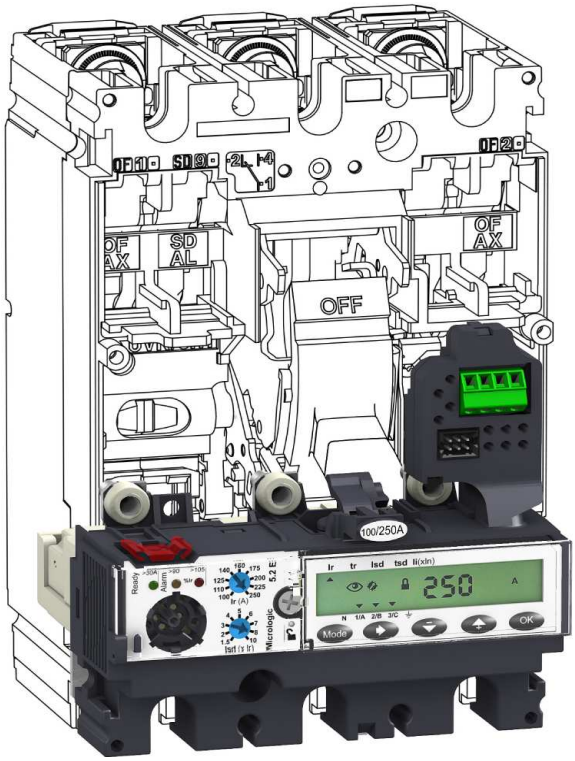
Low voltage electrical distribution

Compact NSX Micrologic 5/6

Electronic trip units

User manual
04/2012



Schneider Electric

ZSI Function

Presentation

The ZSI (Zone Selectivity Interlocking) function is a technique used to reduce the electrodynamic stress on equipment when time discrimination is used.

Principle of the ZSI Function

The ZSI function improves time discrimination by being selective about the position of the fault. A pilot wire links the installed circuit breaker trip units and can be used to manage the trip time delay for upstream circuit breaker Q1 according to the fault position.

The trip units on circuit breakers Q1 and Q2 have the same time delay settings as with time discrimination.

Diagram 3

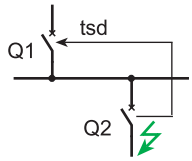
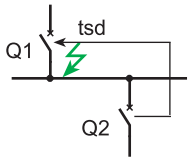


Diagram 4



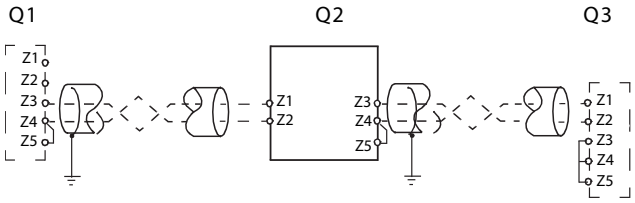
- In the event of a fault downstream of downstream circuit breaker Q2 (diagram 3), the trip units on circuit breakers Q1 and Q2 detect the fault simultaneously: via the pilot wire, the trip unit on circuit breaker Q2 sends a signal to the trip unit on circuit breaker Q1, which remains set on its time delay tsd. Circuit breaker Q2 trips and eliminates the fault (instantaneously if circuit breaker Q2 is not delayed).
  The other users downstream of circuit breaker Q1 are still supplied with power, the energy availability is optimized.
- In the event of a fault downstream of circuit breaker Q1 (diagram 4), the trip unit on circuit breaker Q1 does not receive a signal from the trip unit on circuit breaker Q2. Time delay tsd is therefore inhibited. Circuit breaker Q1 trips and eliminates the fault on the equipment instantaneously.
  The electrodynamic stress created by the short-circuit current on the equipment is reduced to the minimum.

The ZSI function can be used to optimize the availability of energy (just like time discrimination) and reduce electrodynamic stress on the equipment. The ZSI function is applicable to both short time and ground fault protection.

Using the ZSI Function with Compact NSX

Description

The Micrologic 5 and 6 trip units are designed to support the ZSI function. The figure below explains how the pilot wire is connected to the trip unit:



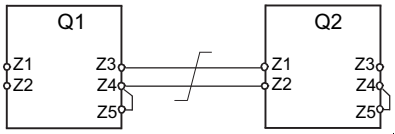
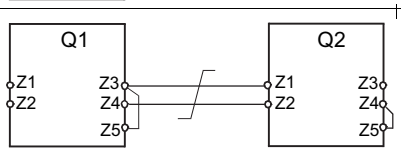
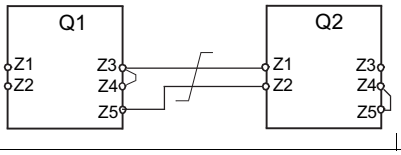
Q1 Upstream circuit breaker
Q2 Circuit breaker to be wired
Q3 Downstream circuit breaker
Z1 ZSI-OUT source
Z2 ZSI-OUT
Z3 ZSI-IN source
Z4 ZSI-IN ST short time protection
Z5 ZSI-IN GF ground fault protection (Micrologic 6)

Outputs Z3, Z4 and Z5 are only available on Compact NSX400/630 circuit breakers.

The short time and ground fault protection time delay settings (Micrologic 6) for the protections managed by the ZSI function must comply with the rules relating to time discrimination.

Connection Principles

The figures below show the options for connecting devices together:

Protection	Connection Diagram	
Ground fault and short time protection (Micrologic 6)		Output Z2 of the trip unit on the downstream circuit breaker Q2 is connected to inputs Z4 and Z5 of the trip unit on the upstream circuit breaker Q1.
Short time protection		• Output Z2 of the trip unit on the downstream circuit breaker Q2 is connected to input Z4 of the trip unit on the upstream circuit breaker Q1. • Inputs Z3 and Z5 must be short-circuited.
Ground fault protection (Micrologic 6)		• Output Z2 of the trip unit on the downstream circuit breaker Q2 is connected to input Z5 of the trip unit on the upstream circuit breaker Q1. • Inputs Z4 and Z3 must be short-circuited.

NOTE: When the ZSI function is not used downstream, inputs Z3, Z4 and Z5 must be short-circuited.

Failure to comply with this principle inhibits setting the short time and ground fault protection time delays.

Example of a Multi-Source Distribution

If a number of circuit breakers are installed upstream (as with multi-source distribution), the same principles apply.

A downstream circuit breaker must be connected to all the circuit breakers installed directly upstream as follows:

- All the commons (outputs Z1/inputs Z2) are connected to one another.
- Output Z2 is connected simultaneously to inputs Z3 and/or Z4 and/or Z5 of all the trip units on the circuit breakers installed upstream.

NOTE: Management of this configuration does not require any additional relays to ensure the ZSI function is controlled according to the sources in service.