

Where showed in the one line diagram the Automatic Transfer Scheme (ATS) should be based on ABB's Relion Microprocessor Protective relays and provide the following features:

The ATS Scheme shall take advantage of IEC-61850 GOOSE messages by limiting the number of cross unit wiring between cubicles.

The ATS Scheme shall be based on three relays to provide another level of selectivity for MTTM schemes, one relay for each incoming breaker, and one relay for the two tie breakers

It shall be possible to operate all breakers via its respective control switch when ATS scheme is in manual mode.

An external lockout relay shall be used to indicate if there is a fault in the bus and to prevent automatic transfer operation

It shall be possible to adjust timers and under voltage settings through the Human Machine Interface (HMI) of the relay.

It shall be possible to adjust timers and under voltage settings through the Web HMI without the need of any external software other than a web browser

To increase the reliability of the GOOSE communications between the devices the Microprocessor relays shall support either HSR or PRP redundancy communications

The ATS shall have two selector switches as indicated in the sequence of operations

The sequence of operations for the ATS scheme would be as follows

Selector Switches

43 M/A Manual/Auto Switch

Describes manual or automatic operation for the transfer scheme

43PT T1/T2 Preferred Tie Switch

Only when 43 M/A switch is in "Auto", used to indicate what tie breaker should be normally open when system is in "Auto" and both incoming lines are available

Normal Mode of Operation

The normal mode of operation would be with device 43 M/A switch in "Auto" mode, both incoming lines will be normally closed, and preferred tie breaker will be open as indicated by 43-PT switch. The alternate (non-preferred) tie breaker shall always be closed when 43 M/A switch is in "Auto" in order for the Automatic Transfer Scheme to work properly.

Electrical interlocks

Under manual operation there is an electrical interlock between all incoming sources to prevent paralleling.

In order for any of the Automatic mode described in this section to work properly, please make sure that the preferred tie breaker is open as indicated by selector switch 43PT, and the non-preferred tie breaker is always closed.

Automatic Mode

Selector switch device 43 in “Auto”

(a)

Loss of voltage (UV or NEG SEQ) on either incoming line will after a time delay cause its main breaker to open and then the preferred tie breaker will close, provided that voltage is present on the other incoming line.

When the voltage is restored, the main breaker would after a time delay automatically close and then the tie preferred breaker will open.

(b)

However, if the voltage is subsequently lost on the second line after the transfer has occurred as described in (a) above, the second line will after a time delay open and then the preferred tie would open.

Return of voltage on either line will after a time delay cause its main breaker to close, and then the preferred tie would close. When voltage returns to the other line, the main breaker will after a time delay close, and then the preferred tie breaker will open, restoring the system to normal.

(c)

Simultaneous loss (or restoration) of both sources will after a time delay cause both main breakers to open (or close), leaving the preferred tie breaker open.

Bill of Material

43 M/A Manual/Auto switch

43-PT T1/T2 Preferred Tie Switch

(3) Lockout Relays

(2) REF615 Ordering Code: HAFDDADAFHE5BBN12E for the Mains

(1) REF615 Ordering Code: HAFFFAFHE5BBN12E for the Ties

(1) Ethernet Switch