

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 two relays, one relay for each incoming breaker.

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 2 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

43P M1/M2 Preferred Switch

When 43 M/A switch is in "Automatic" indicates what incoming line is preferred in case both incoming lines are available.

Initial startup

Place selector switch (DEV 43) in 'Manual' mode. Close the preferred main breaker and open alternate main breaker by their respective control switch (DEV CS).

Place selector switch in 'Automatic' mode.

Normal Mode of Operation

Normal plant operation is with preferred main breaker closed and selector switch (DEV 43) in 'Automatic' mode.

Electrical interlock

The two incoming lines are electrically interlocked such that the two incoming breakers cannot be closed at the same time.

In event of the protective relay trip via lockout relay (dev 86), the opened main cannot be closed until the fault is removed, and lockout relay is reset.

Manual mode - (selector switch (DEV 43) in 'Manual')

Each main breaker can be closed by their respective breaker control switch (DEV CS) subject to electrical interlock above.

Automatic mode - (selector switch (DEV 43) in 'Automatic')

(a)

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

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

(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.

Return of voltage to the preferred line first will after a time delay cause its main breaker to close, returning the system back to normal.

Return of voltage to the alternate line first will after a time delay cause its main breaker to close. When voltage returns to the preferred line, the alternate breaker will after a time delay open, and then the preferred breaker will close, restoring the system to normal.

(c)

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

Bill of Material

43 M/A Manual/Auto switch

43P M1/M2 Preferred/Maintenance switch

(2) Lockout Relays

(2) REF615 Ordering Code: HAFDDADAFHE5BBN12E for the Mains

(1) Ethernet Switch*