

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 the incoming and one for the generator 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 one 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

Initial startup

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

Place selector switch in 'Automatic' mode.

Normal Mode of Operation

Normal plant operation is with 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 and generator 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 the utility incoming line will after a time delay causes, a signal to be sent to the generator to start the generator. Once the generator is up and running and voltage levels is within the established levels, main breaker will open and then the generator breaker will close.

When the voltage in the utility side is restored, the generator breaker will open after a time delay automatically and then the opened incoming line breaker will close.

A cool-off timer will be started when generator breaker is opened; once timer expires, a shutdown signal will be sent to the generator controls.

(b)

However, if the voltage is subsequently lost on the generator line after the transfer has occurred as described in (a) above, the second line will remain closed and start signal to generator will remain active. If the incoming line voltage becomes available before generator line is back to normal, then after a time delay the generator breaker will open and then the incoming line breaker will close.

A cool-off timer will be started when generator breaker is opened; once timer expires, a shutdown signal will be sent to the generator controls.

Bill of Material

43 M/A Manual/Auto switch

(2) Lockout Relays

(2) REF615 Ordering Code: HAFDDADAFHE5BBN12E for each Main and generator breakers

(1) Ethernet Switch*