ABB

M-G Open Transition Scheme

This document is intended to describe the components, required inputs and outputs, sequence of operations and the basic logic to implement ABB's transfer scheme for M-G applications.

Contents

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Distribution Automation

4300 Coral Ridge Drive
Coral Spring, FL 33065

Telephone: (954) 752-6700
Telefax: (954) 345-5329

Single Line Diagrams

The following is a one line diagram of the connections required to the relays for the implementation of the transfer scheme

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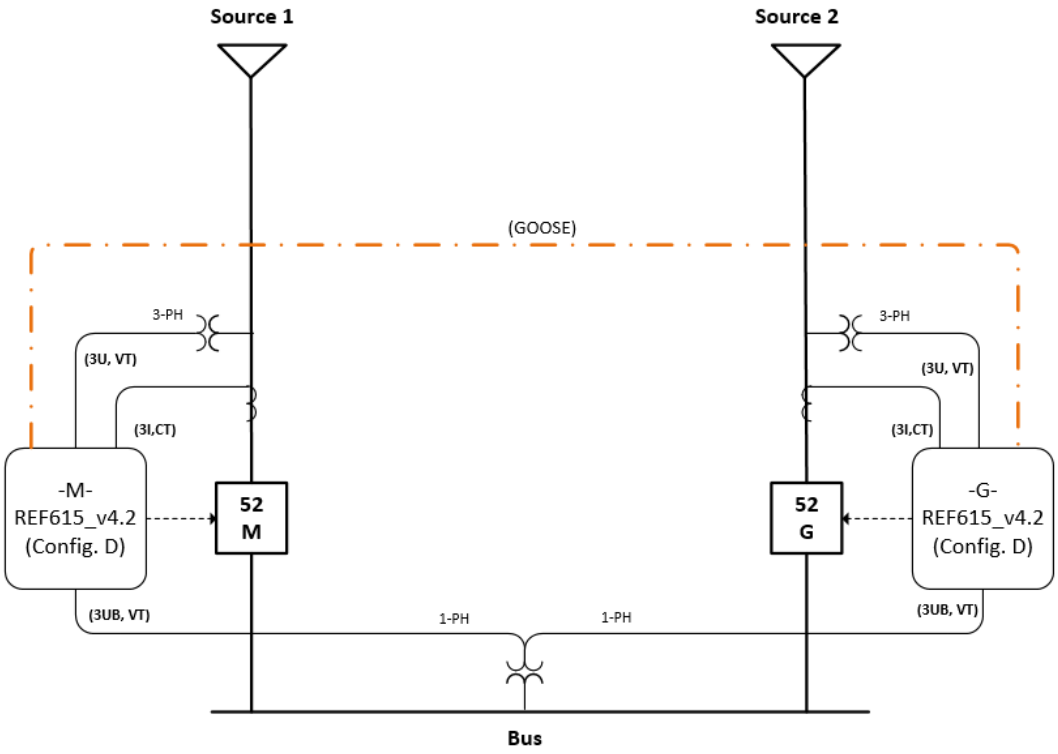
SINGLE LINE DIAGRAM



Schemes: M-G

Relays: Main Relay Order Code: HAFDDADAFHE5BBN12E
Generator Relay Order Code: HAFDDADAFHE5BBN12E

Required Inputs

The following inputs to the each relays being used for the transfer scheme are required for the proper operation of this automatic transfer scheme.

Main Relay

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Coral Spring, FL 33065
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Telefax: (954) 345-5329

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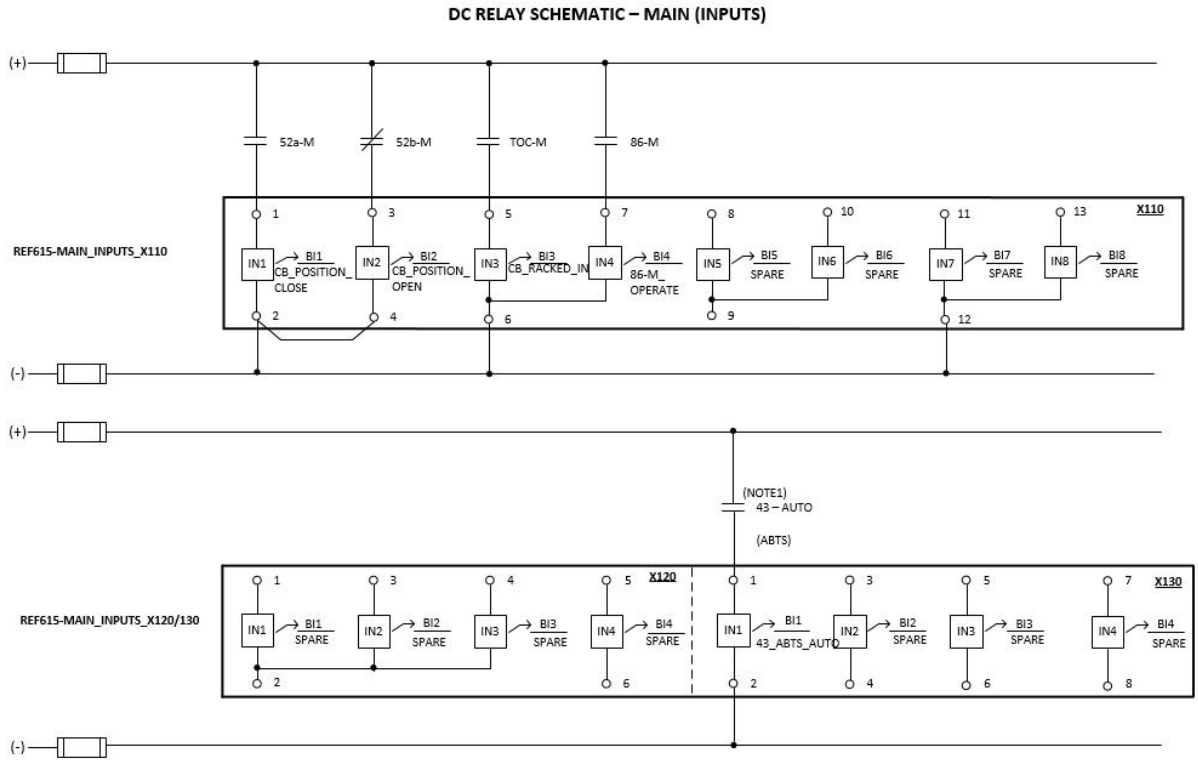
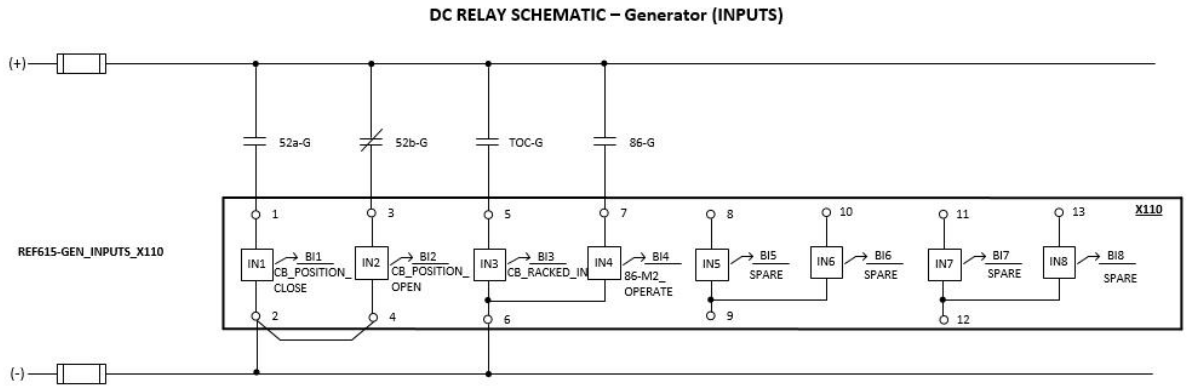


Generator Relay



Required Outputs

The following outputs from each of the relays being used for the transfer scheme are required for the proper operation of this automatic transfer scheme.

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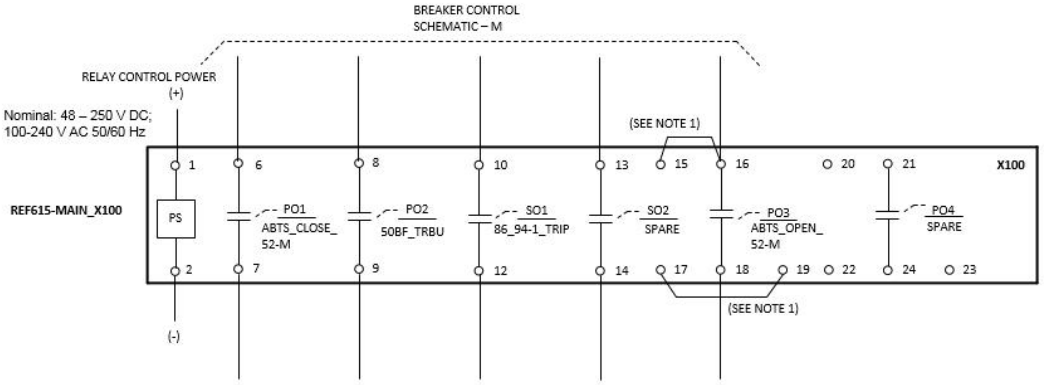
Main Breaker

DC RELAY SCHEMATIC – MAIN (PS &OUTPUTS)

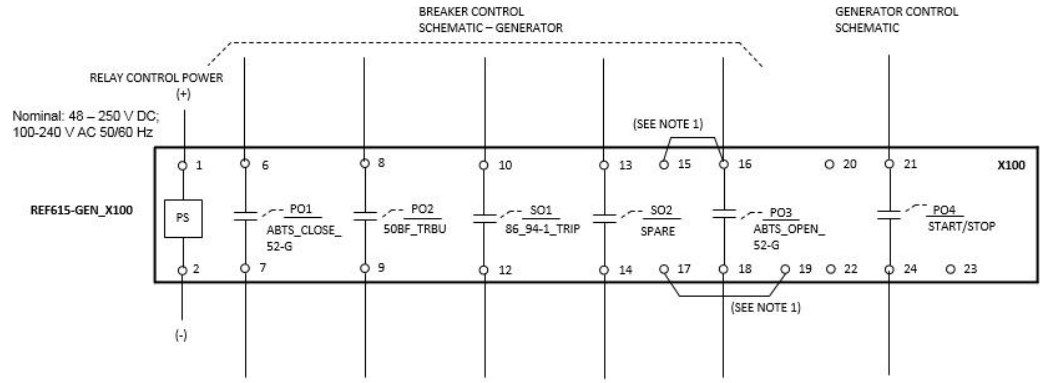


NOTE 1:

Jumpers connected to PO3 (X100_15-16, 17-19) used for Trip Coil Monitoring on M1 breaker.

Generator Breaker

DC RELAY SCHEMATIC – GENERATOR (PS &OUTPUTS)



NOTES:

Jumpers connected to PO3 (X100_15-16, 17-19) used for Trip Coil Monitoring on G breaker.

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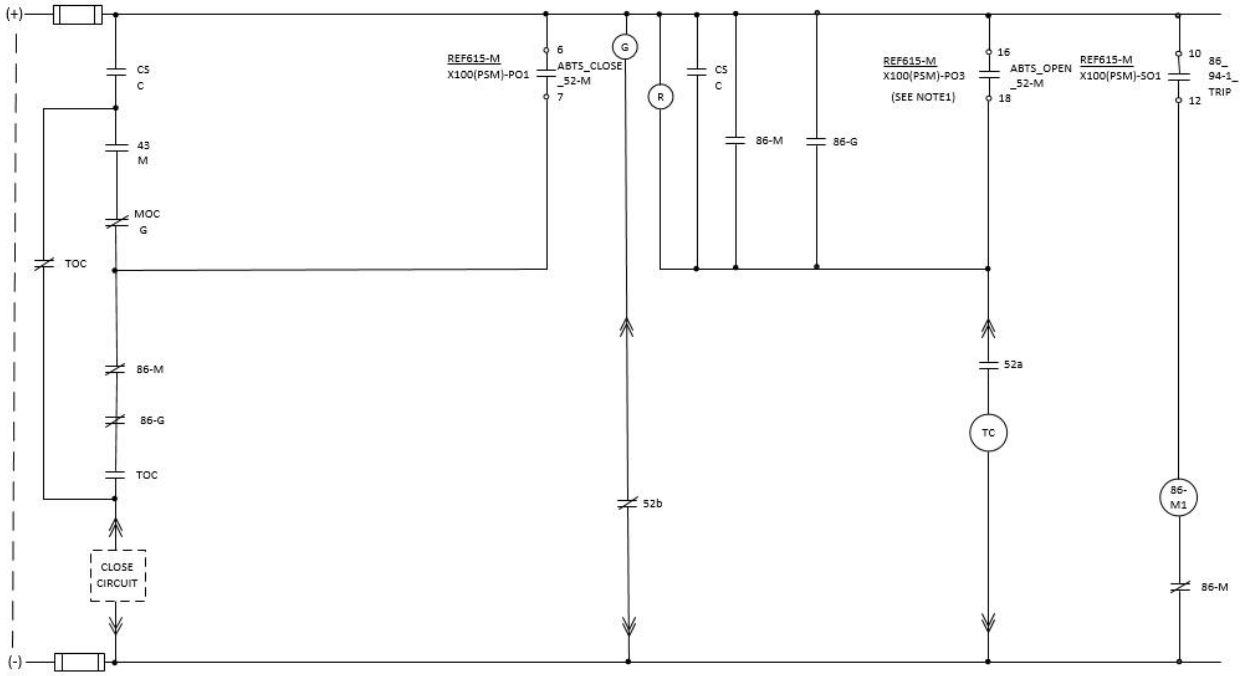
Breaker Schematics

The following breaker schematics represent all the connections and electrical interlocks required for the proper operation of the Automatic Transfer Scheme

Main Breaker



Generator Breaker

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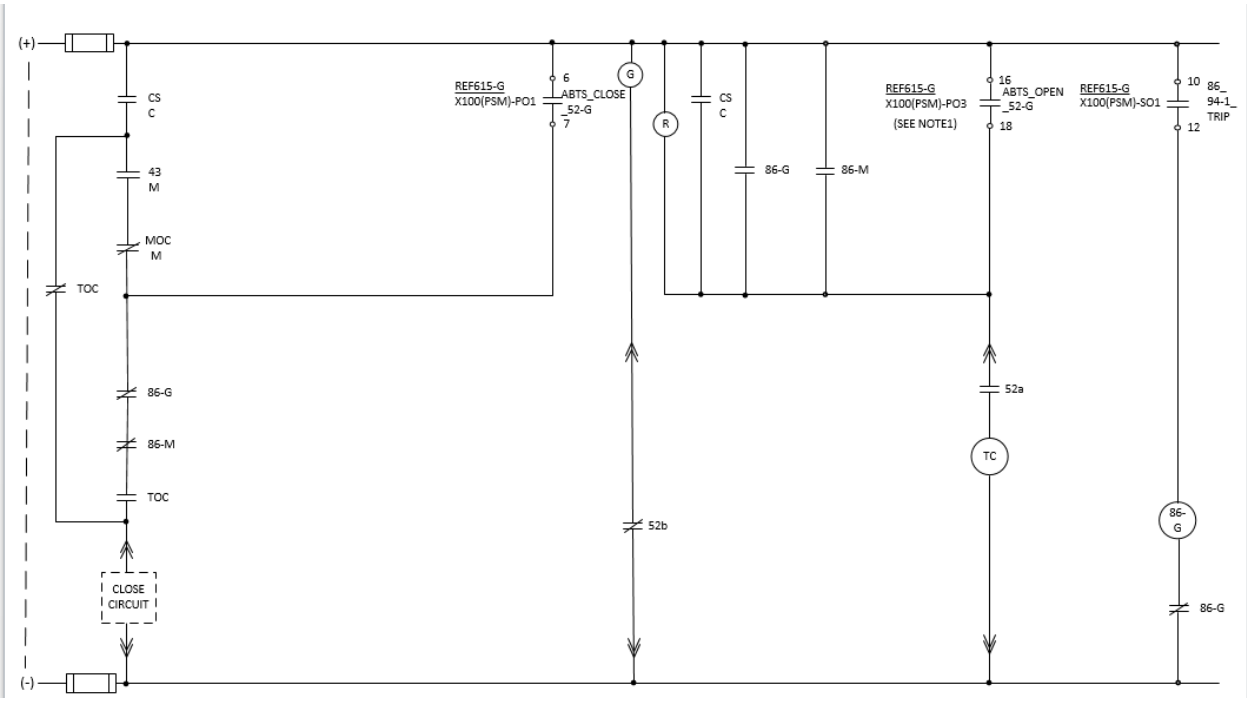

The sequence of operations for the ATS scheme would be as follows

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 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

The normal mode of operation would be with device 43 in “Automatic” mode and main breaker closed.

Electrical interlocks

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

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

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Automatic Mode

Selector switch device 43 in "Auto"

(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.

ATS Logic

The following logic describes what it has been implemented within each of the protective relays to perform the sequence of operation, as described under the sequence of operation section

Main Breaker

Close/Open Logic

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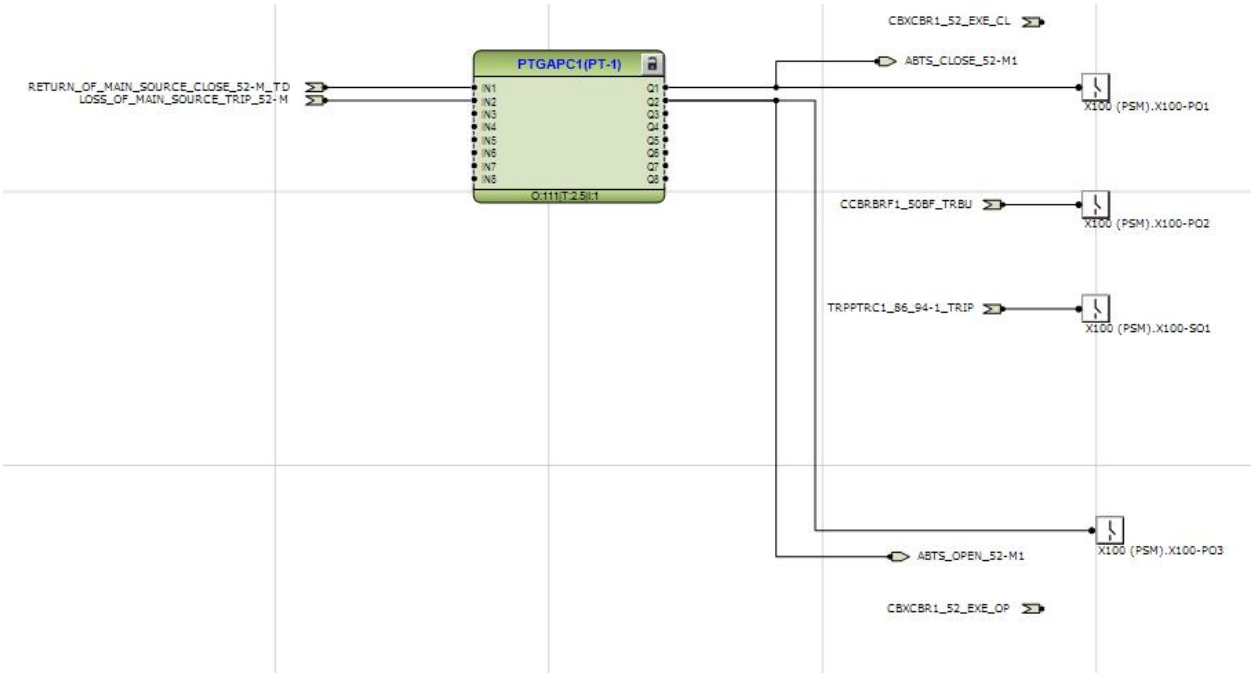
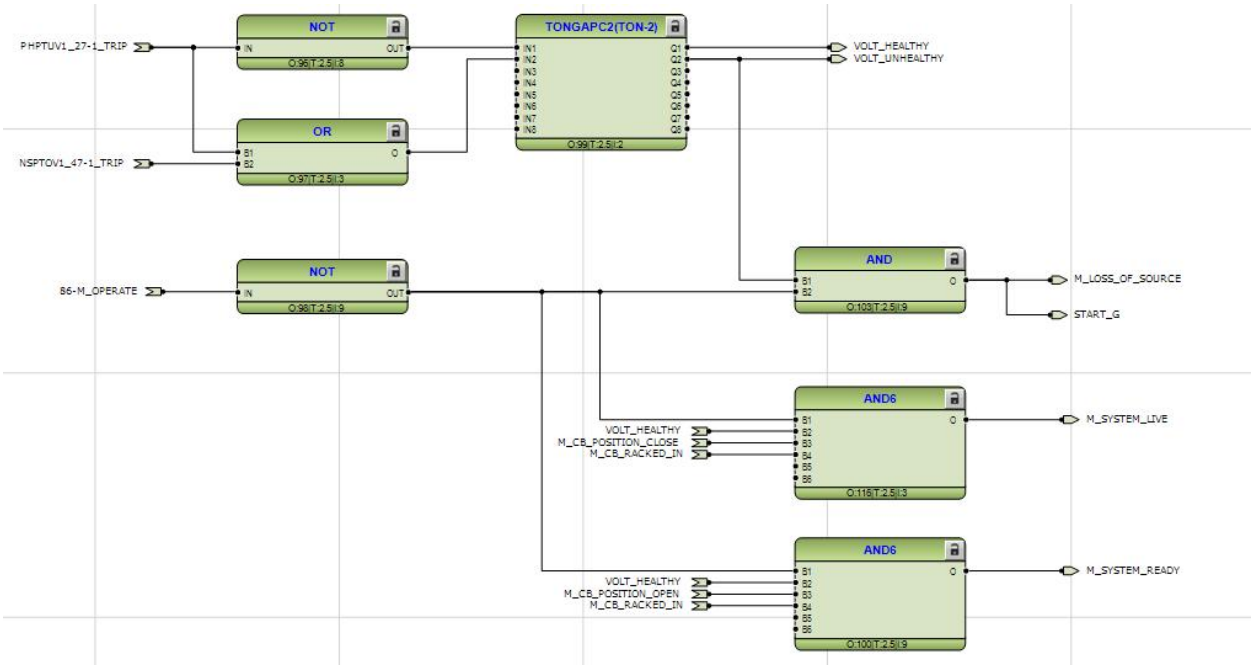


Loss of Main Source



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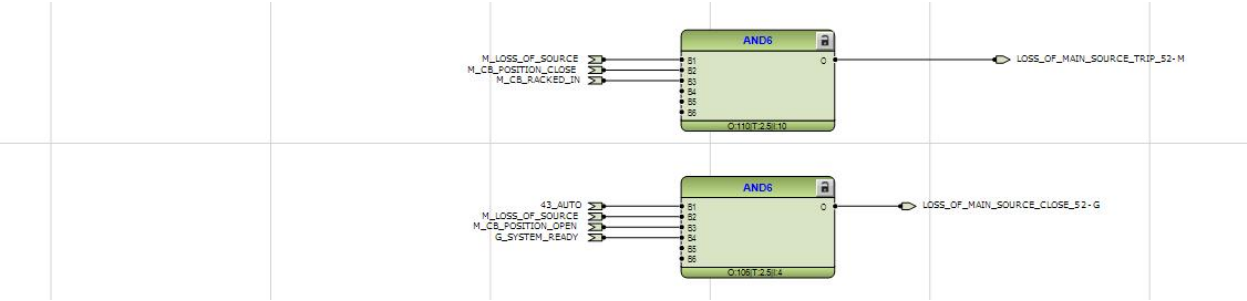
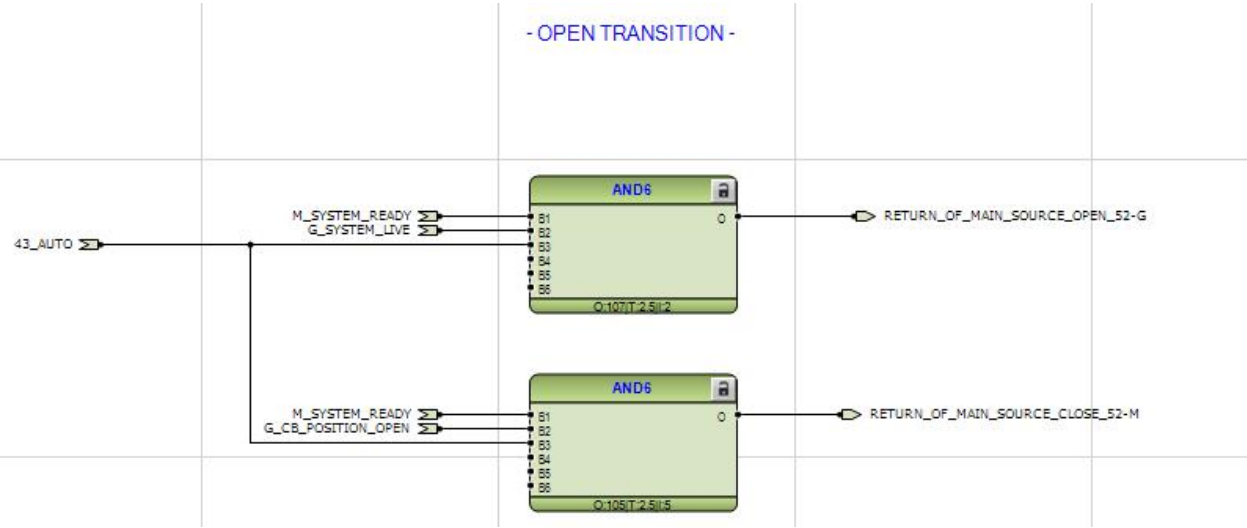


Return of Main Source



Goose Signals

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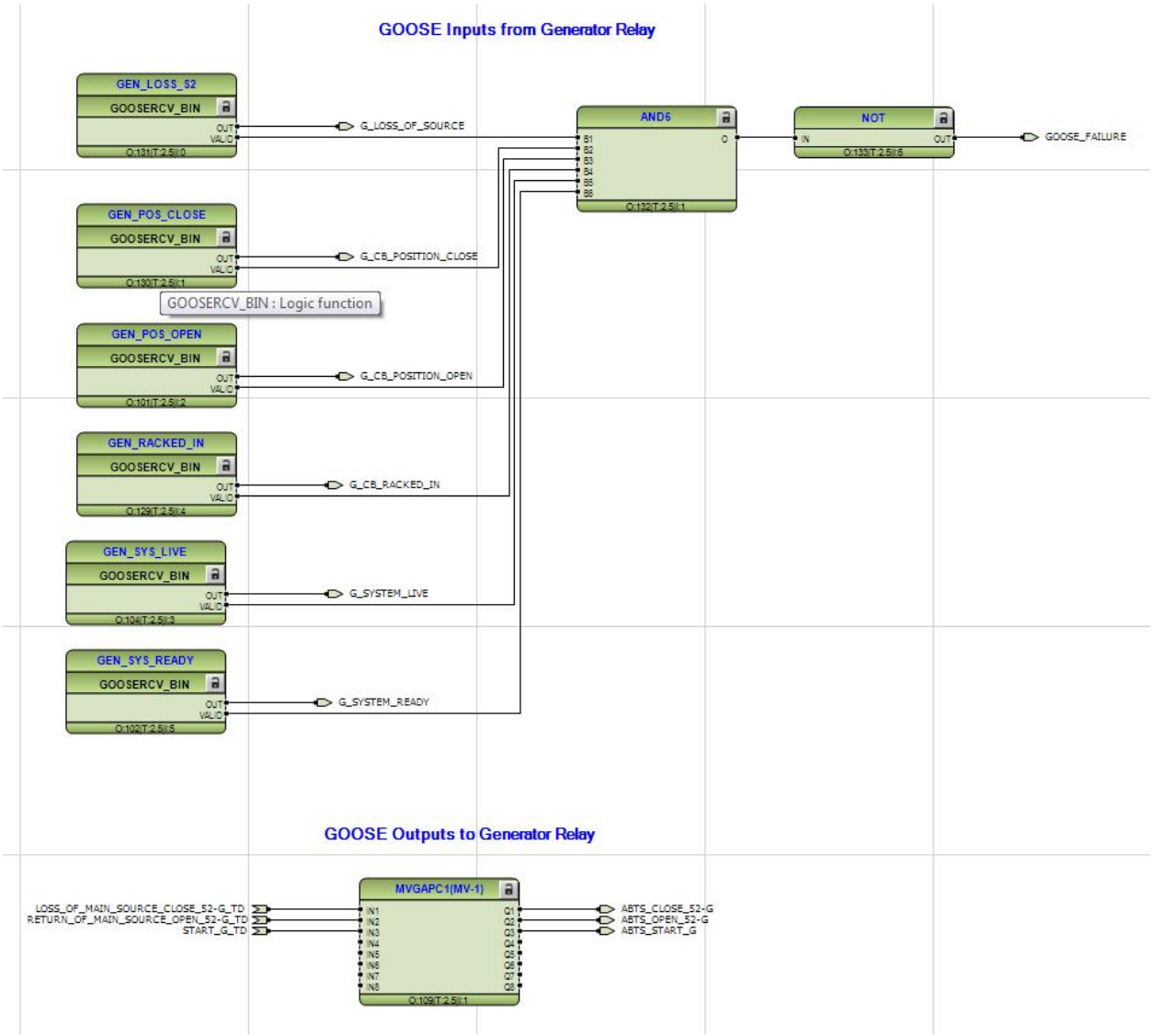

Generator Breaker

Close/Open Logic

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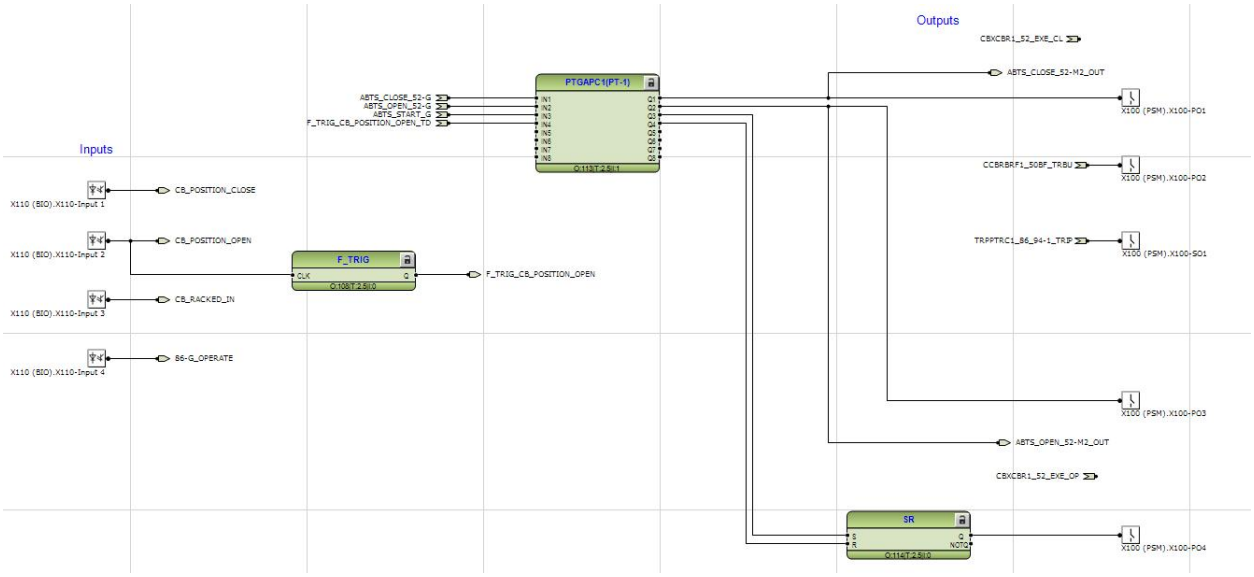
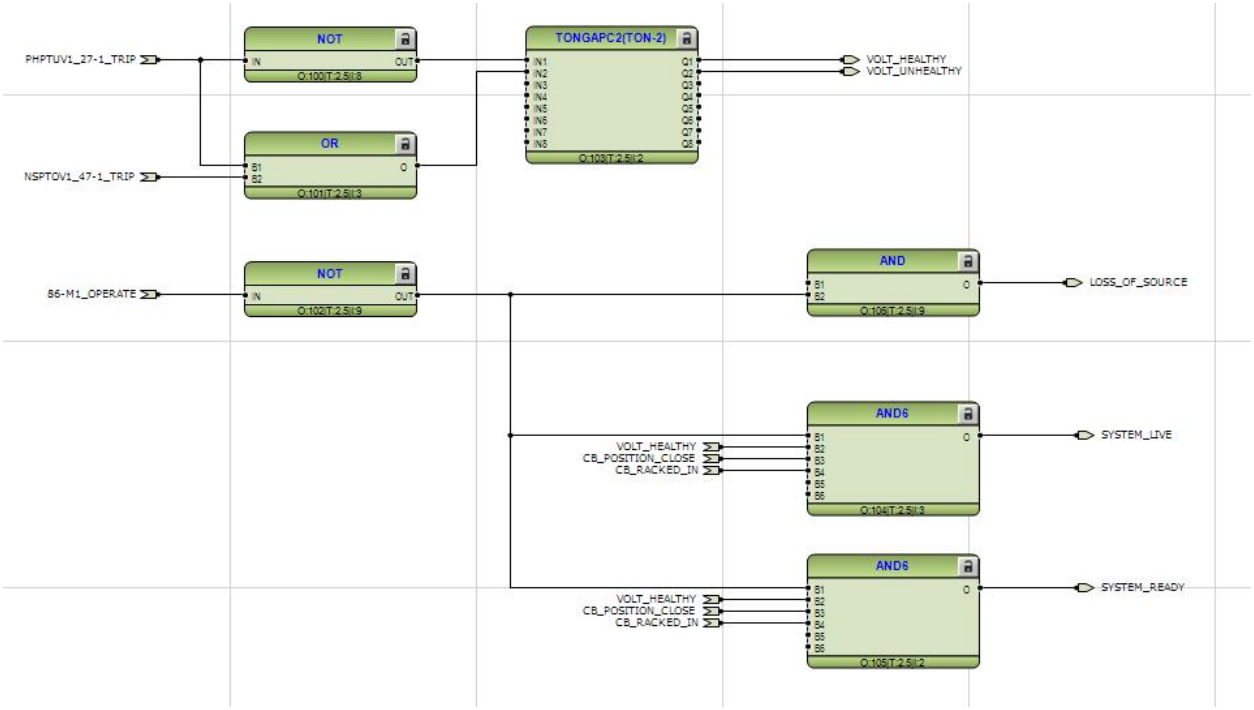


ATS Logic



Goose Signals

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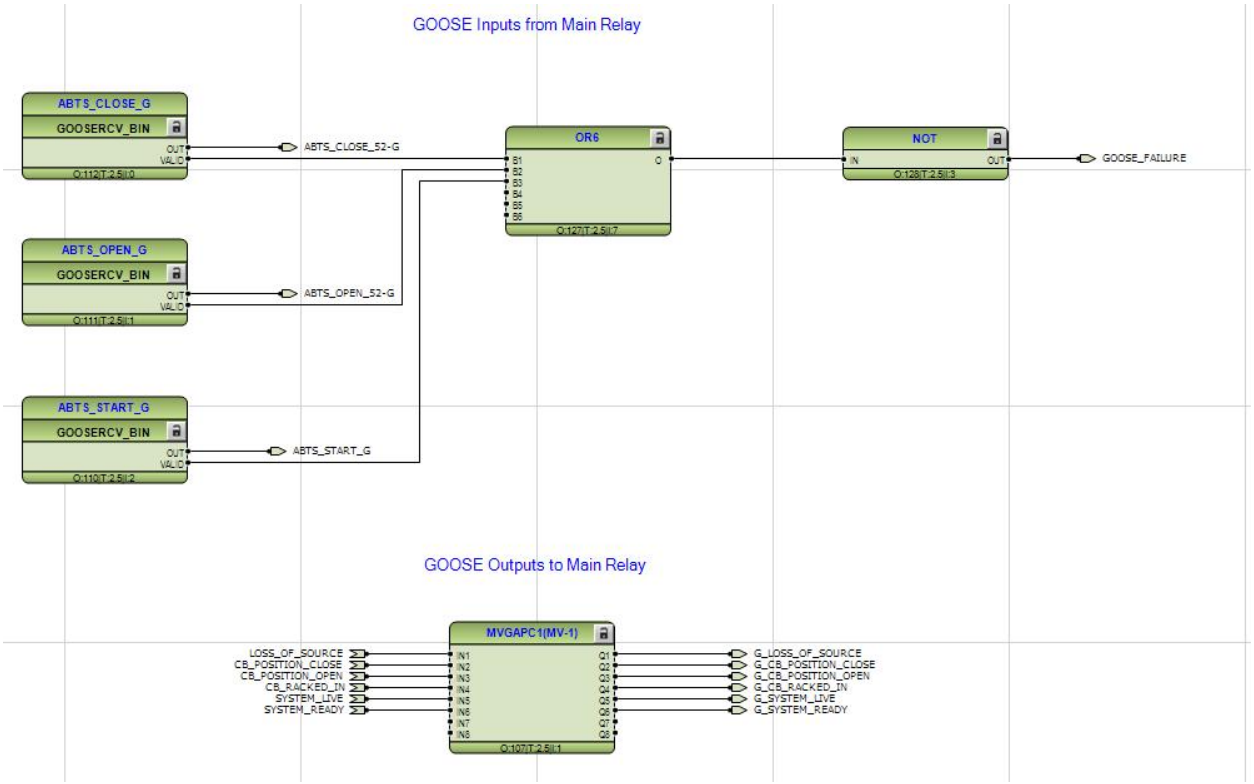

Ethernet Communications

The following schemes represents the preferred communications between relays to transmit GOOSE signals and to ensure that reliable communications exist for the implementation of the transfer scheme

HSR

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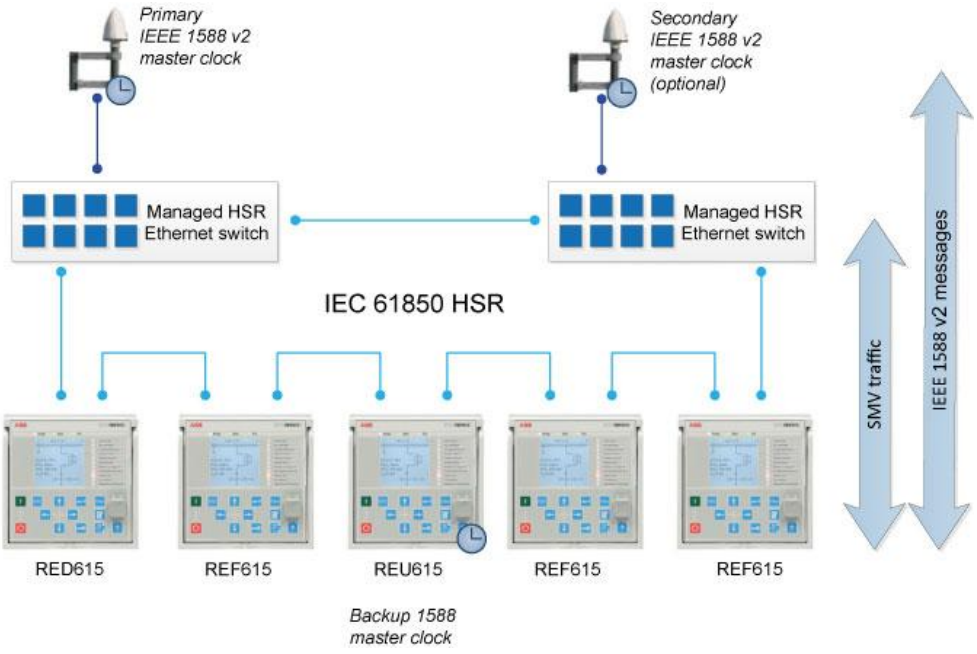
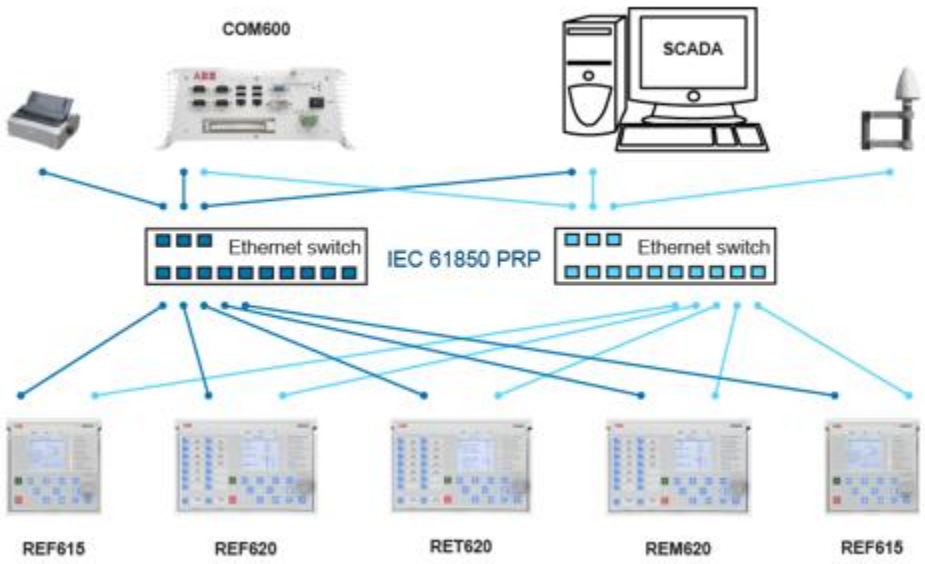


PRP



Bill of Material

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43 M/A Manual/Auto switch

(2) Lockout Relays

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

(1) Ethernet Switch

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Coral Spring, FL 33065
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Telefax: (954) 345-5329