



M-M 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-M applications.

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Single Line Diagrams

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

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.

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Main 1 Relay

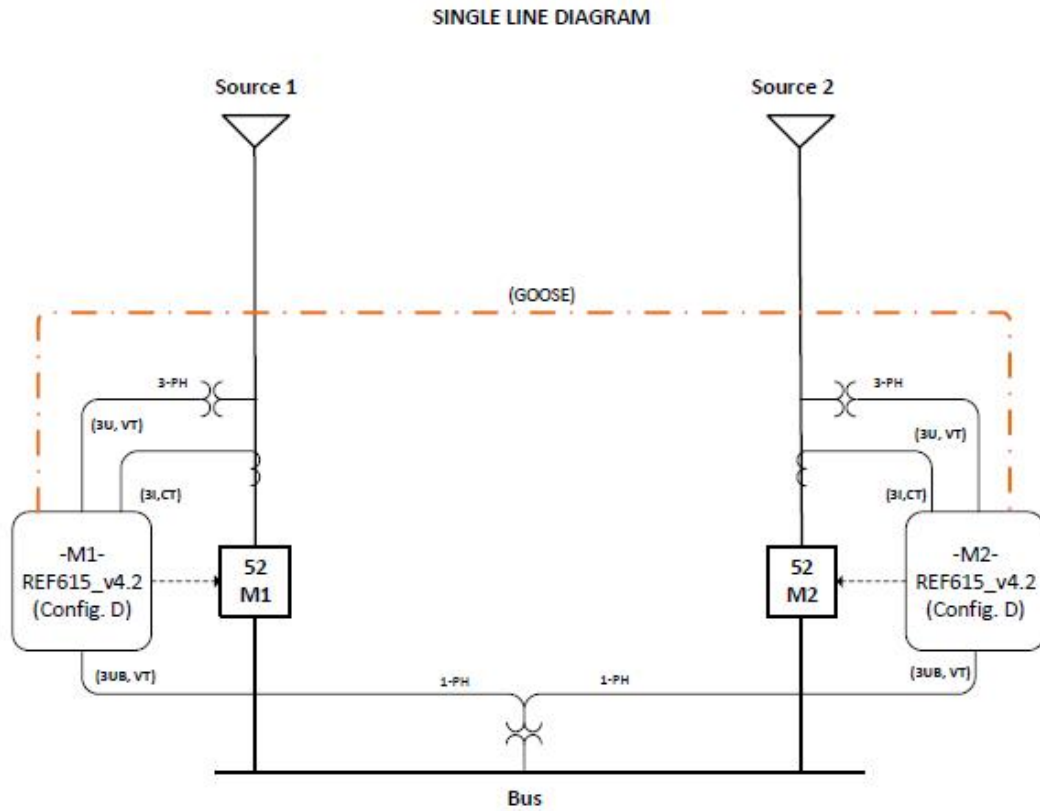
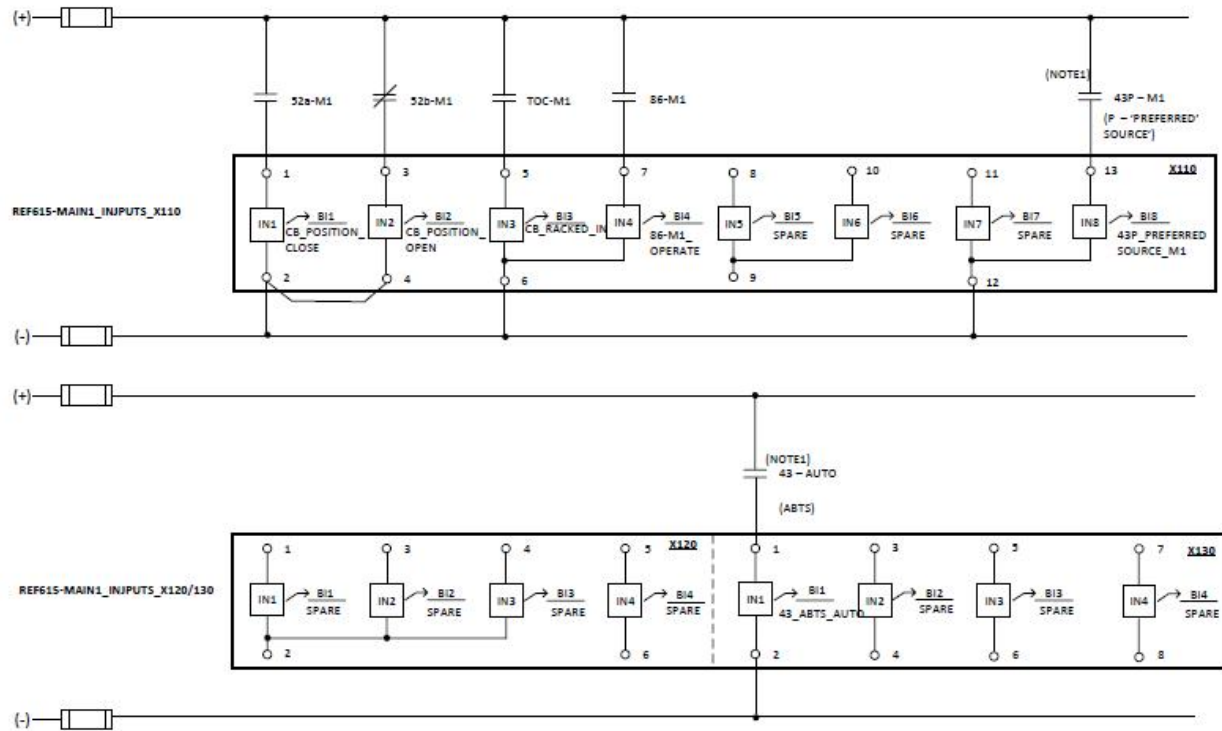
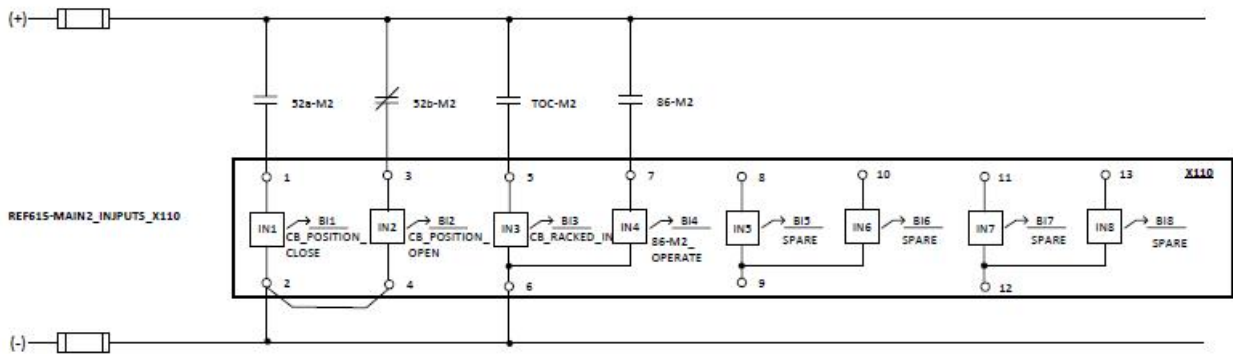


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Main 2 Relay

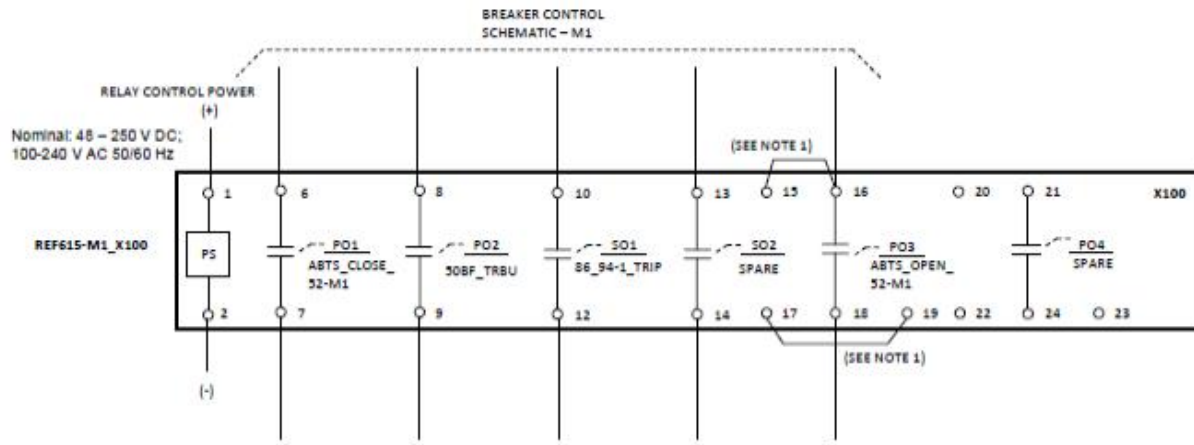


Required Outputs

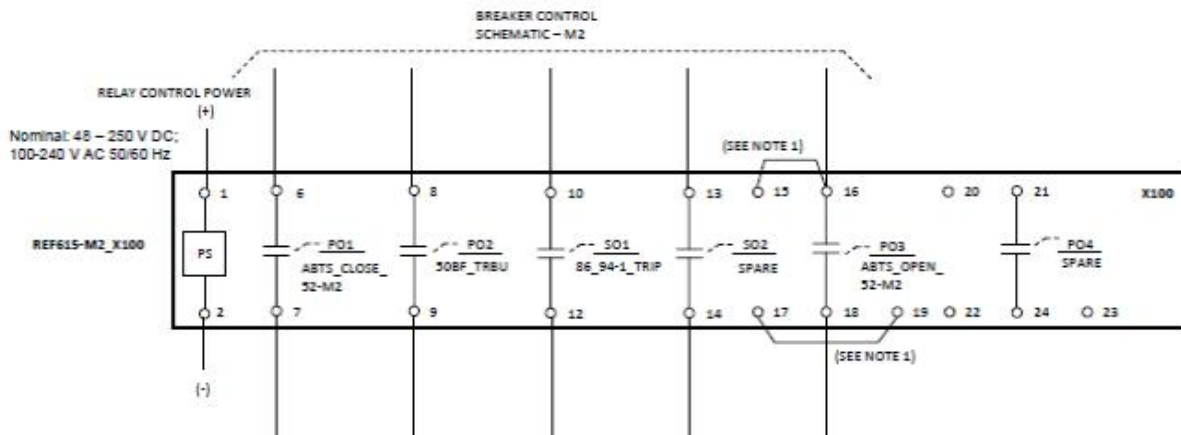
The following outputs from each of the relays being used for the transfer scheme are required for the proper operation of this automatic transfer scheme.

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Main Breaker 1



Main Breaker 2



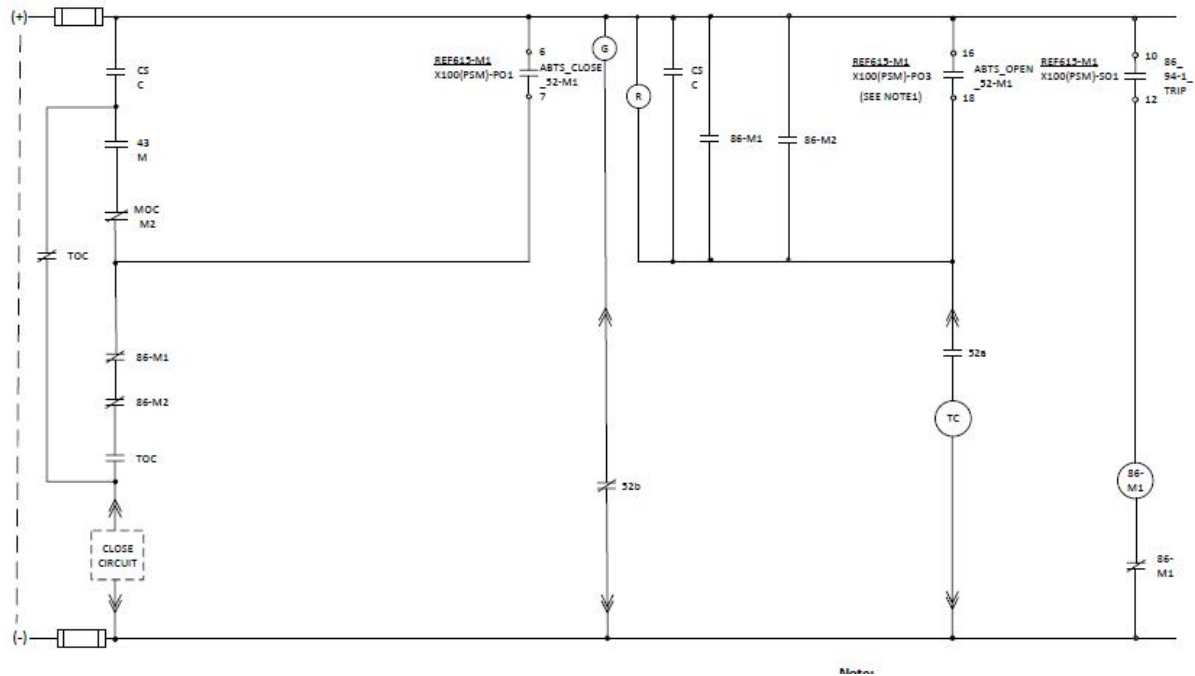
Breaker Schematics

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

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Main Breaker 1



Main Breaker 2

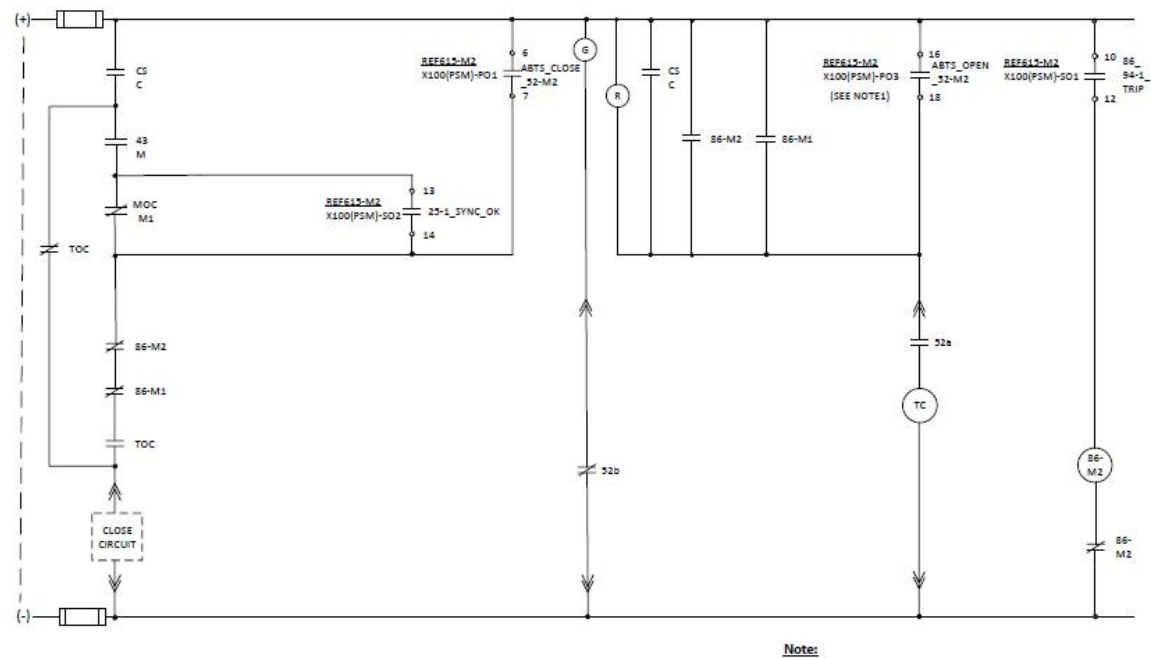


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The sequence of operations for the ATS scheme would be as follows

Selector Switches

43 M/A Manual/Auto Switch

Describes manual or automatic operation for the transfer scheme

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

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

Electrical interlocks

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

Automatic Mode

Selector switch device 43 in “Auto”

(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)

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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.

ATS Logic

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

Main 1

Close/Open Logic

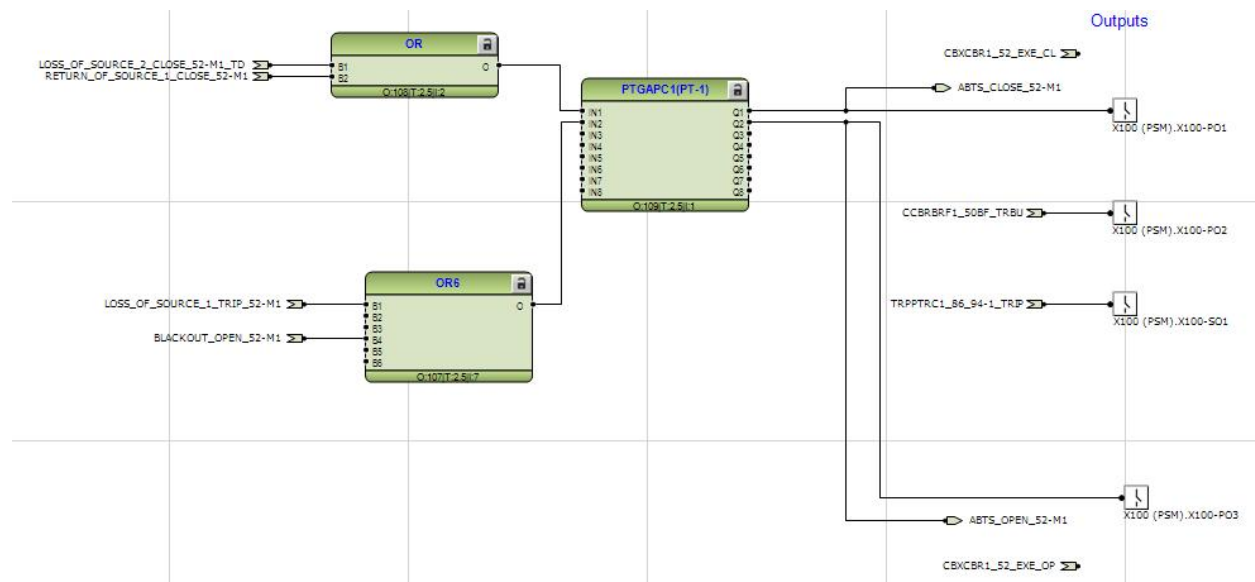
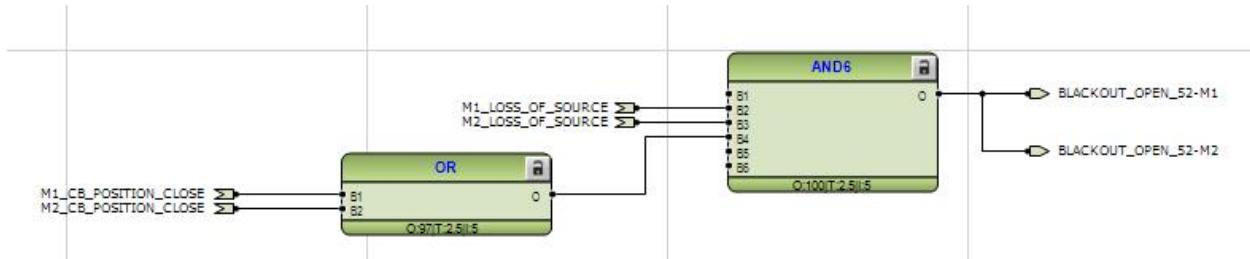


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Blackout



Loss of Source 1

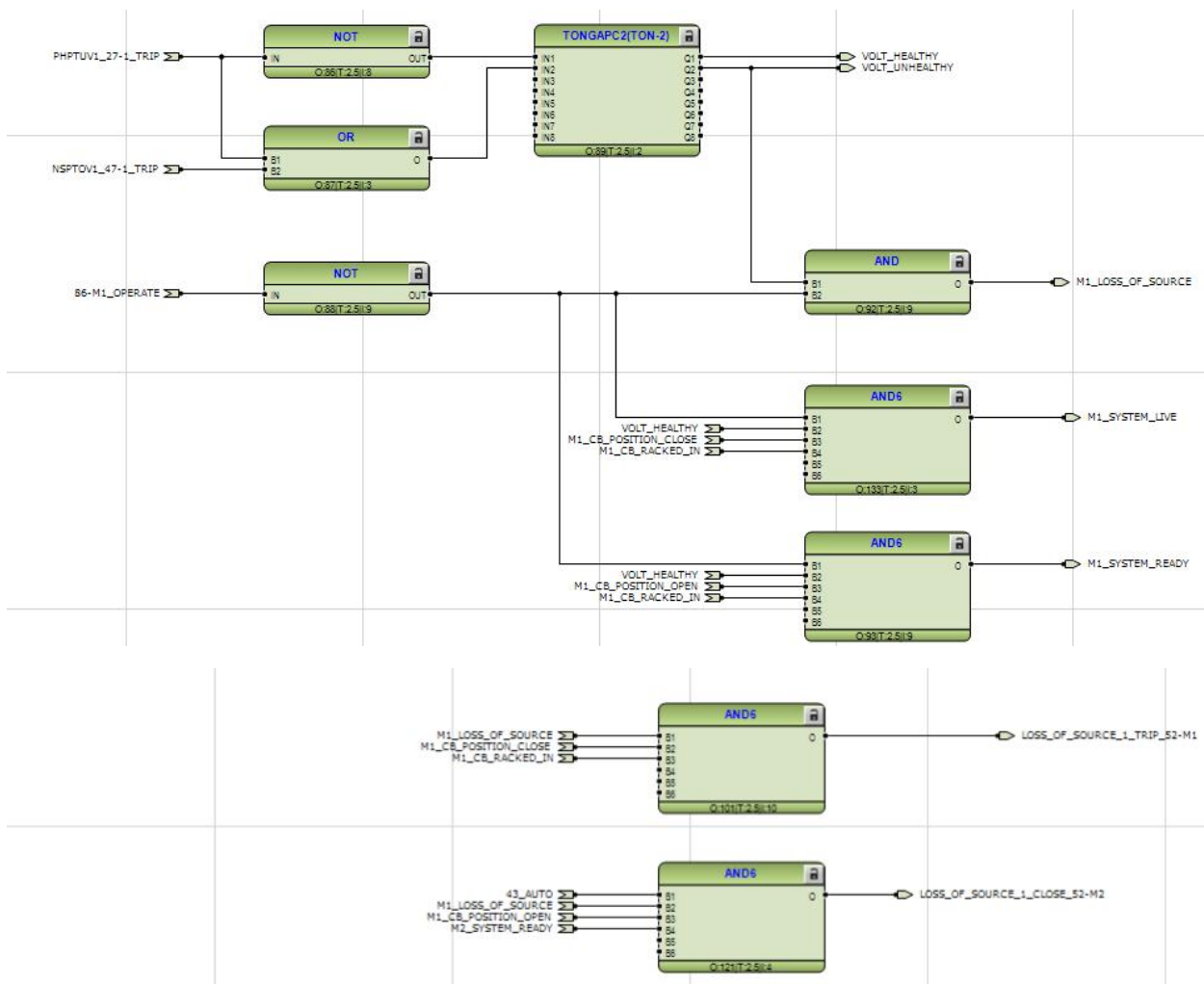
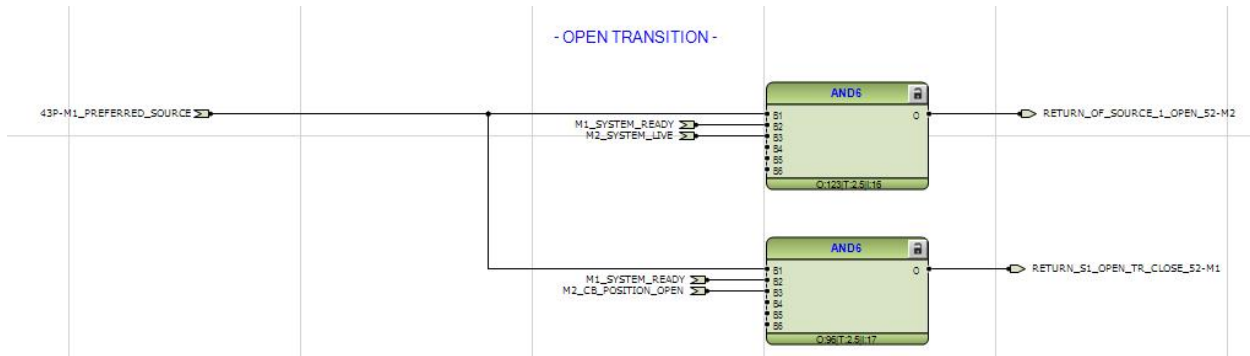


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Return of Source 1



BLACKOUT

(SOURCE 1 & 2 return at same time after blackout)

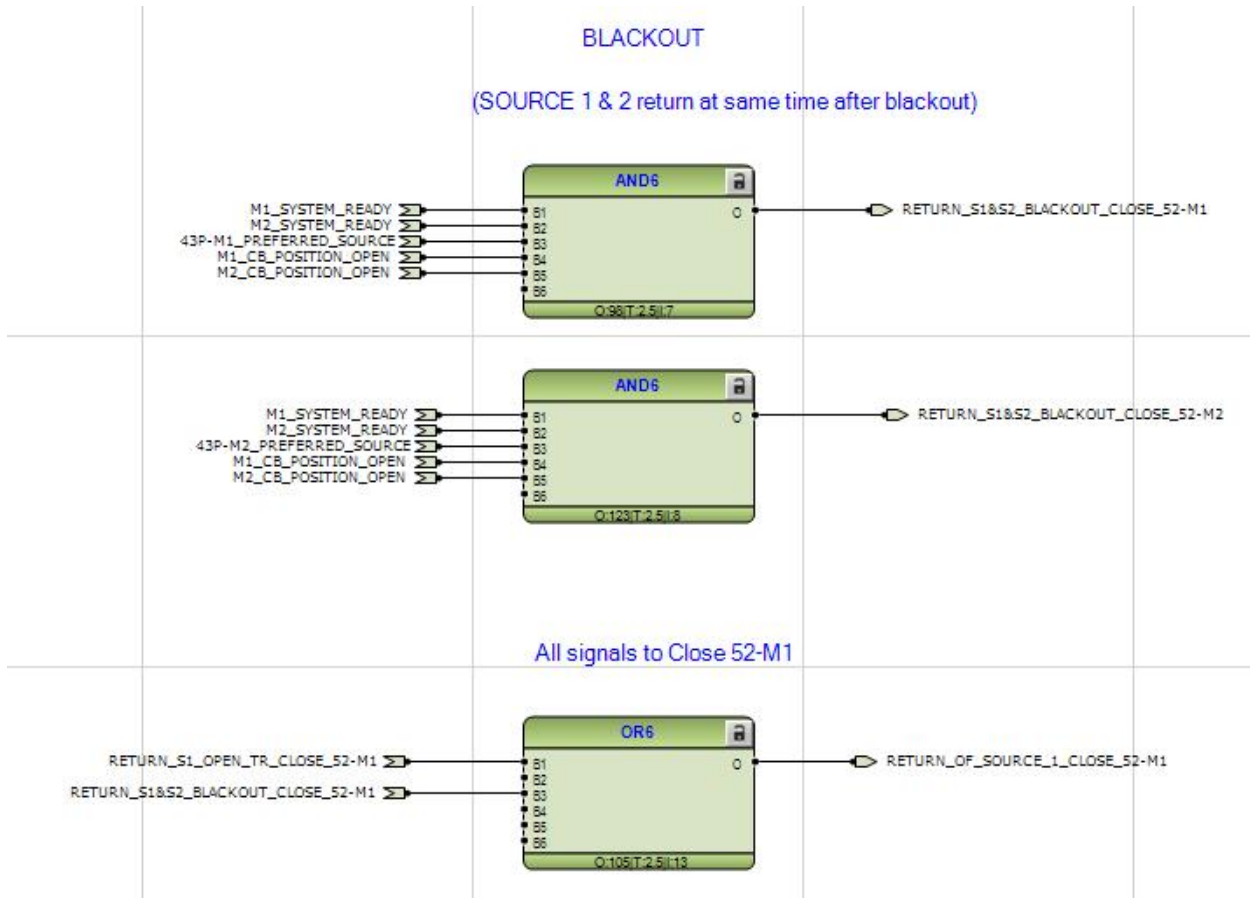
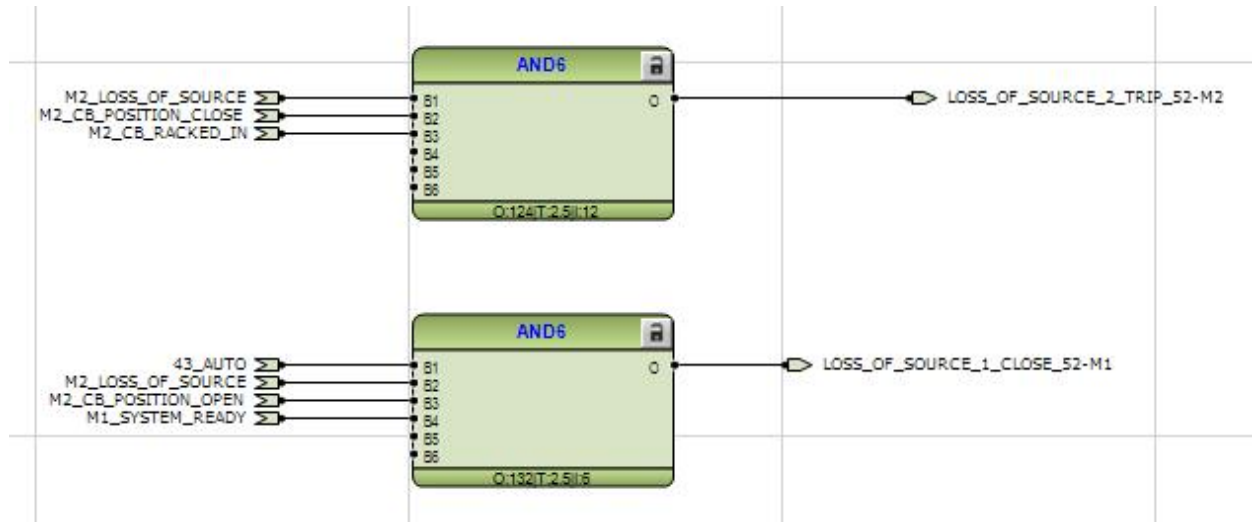


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Loss of Source 2



Return of Source 2

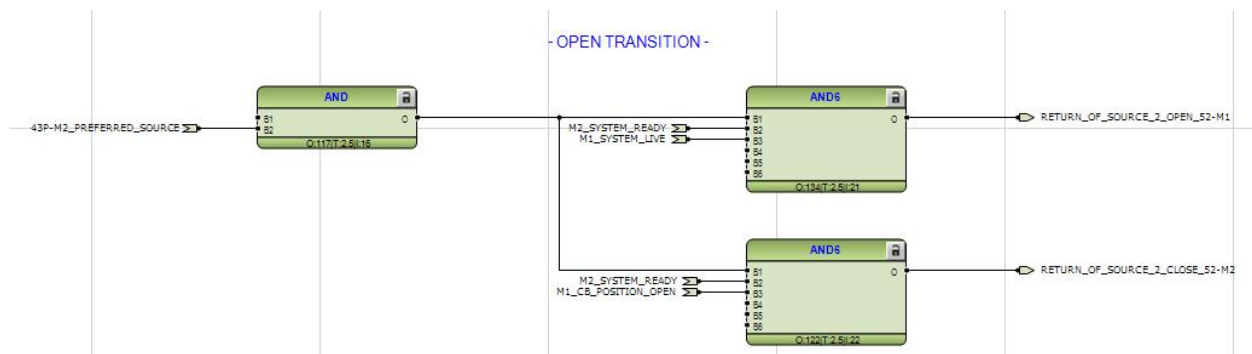


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Goose Signals

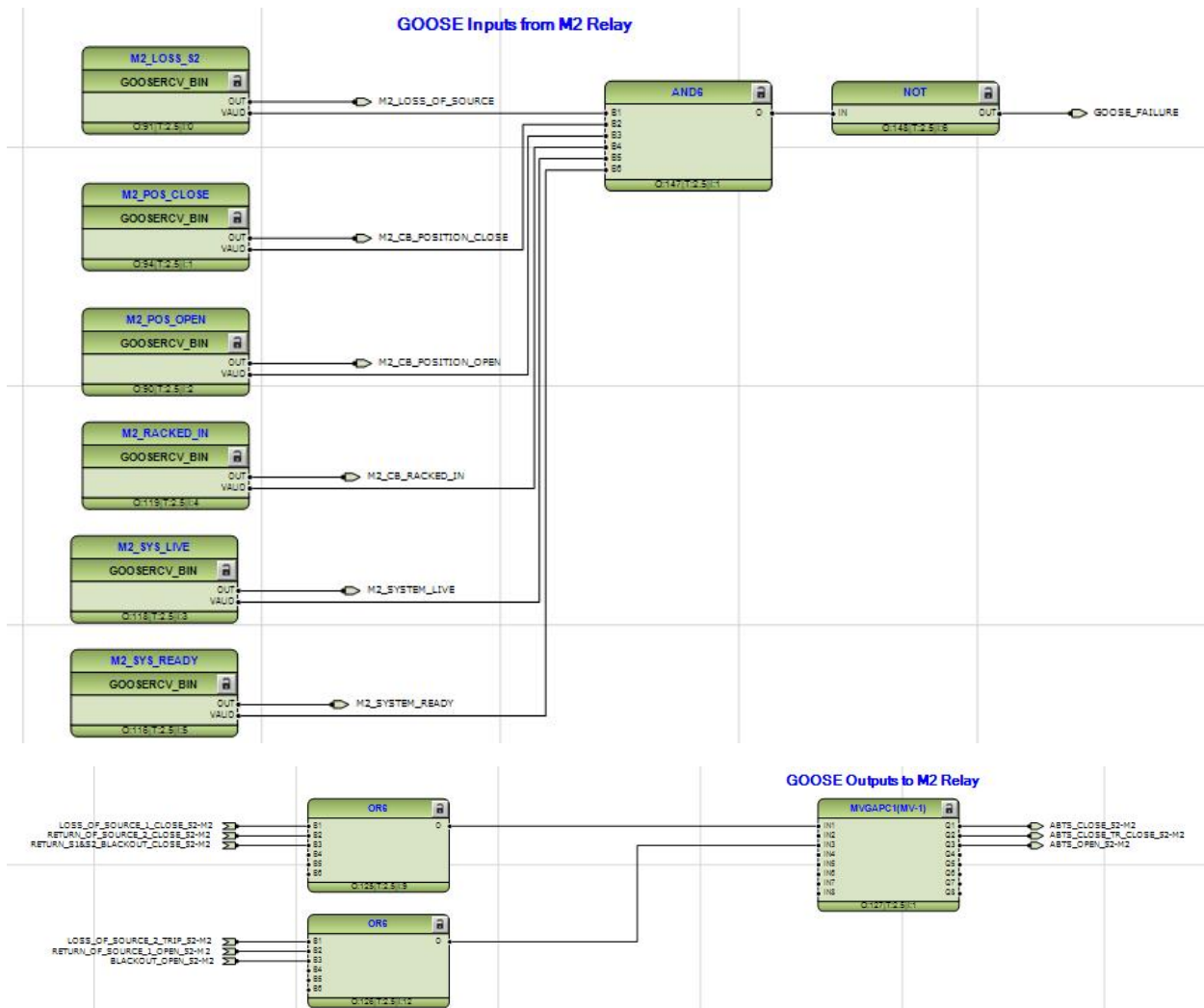
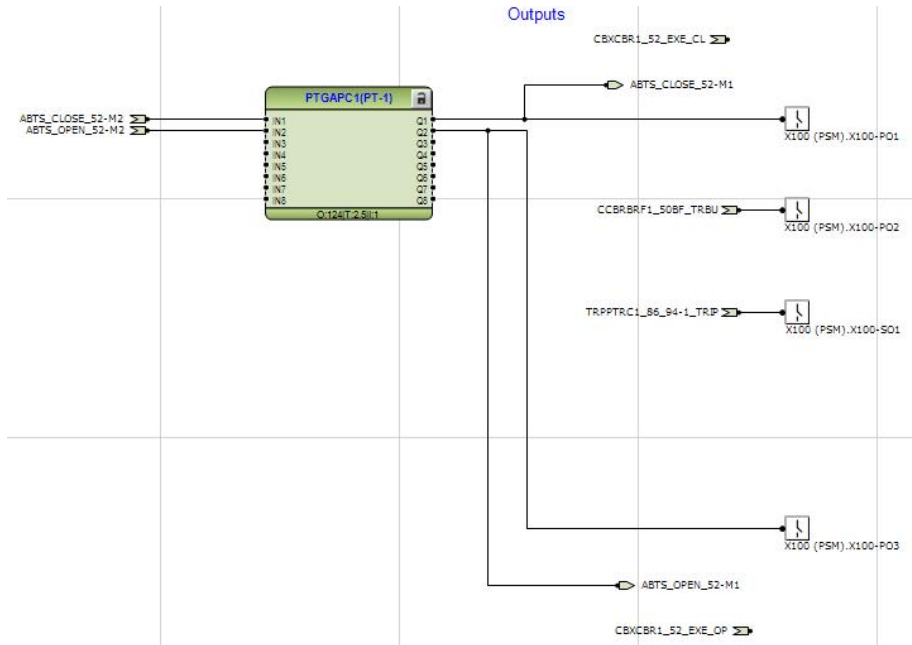


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Main 2

Close/Open Logic



ATS Logic

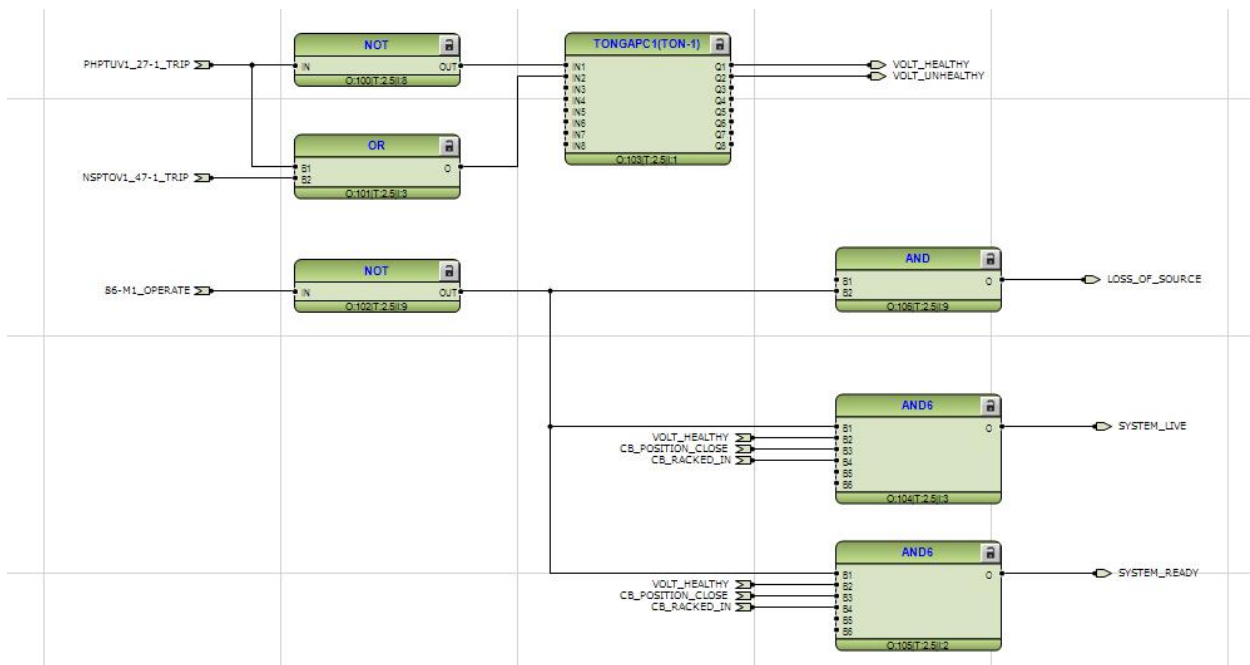
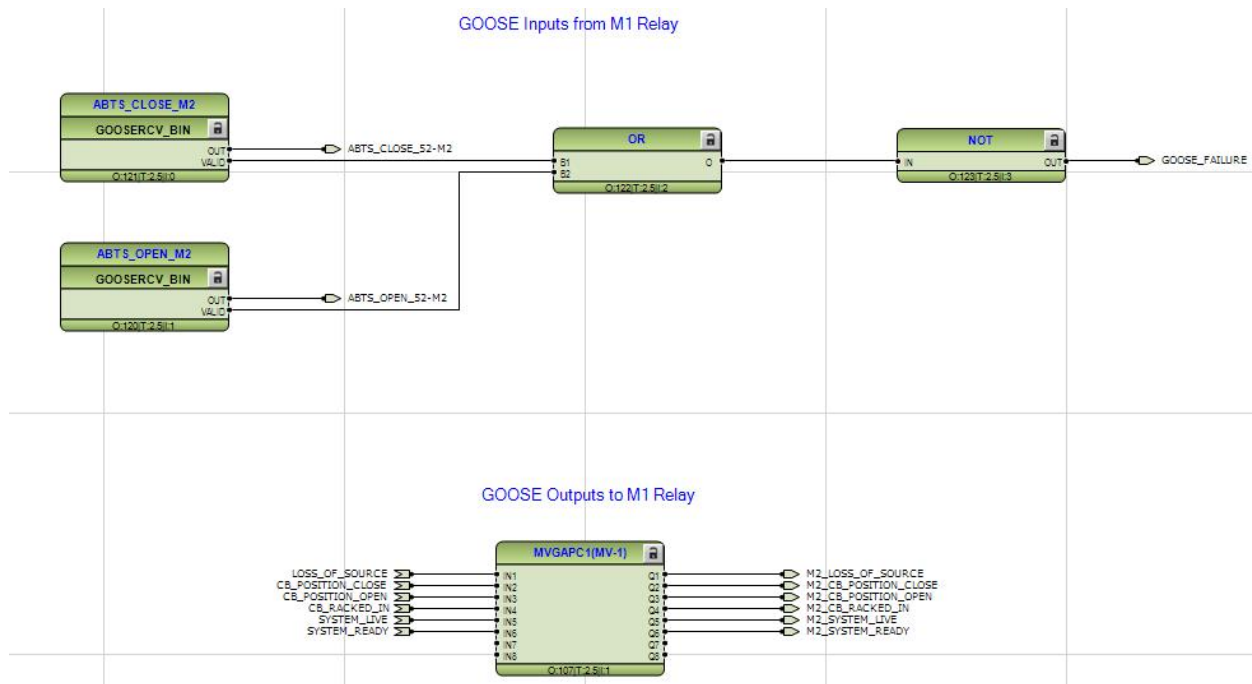


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Goose Signals



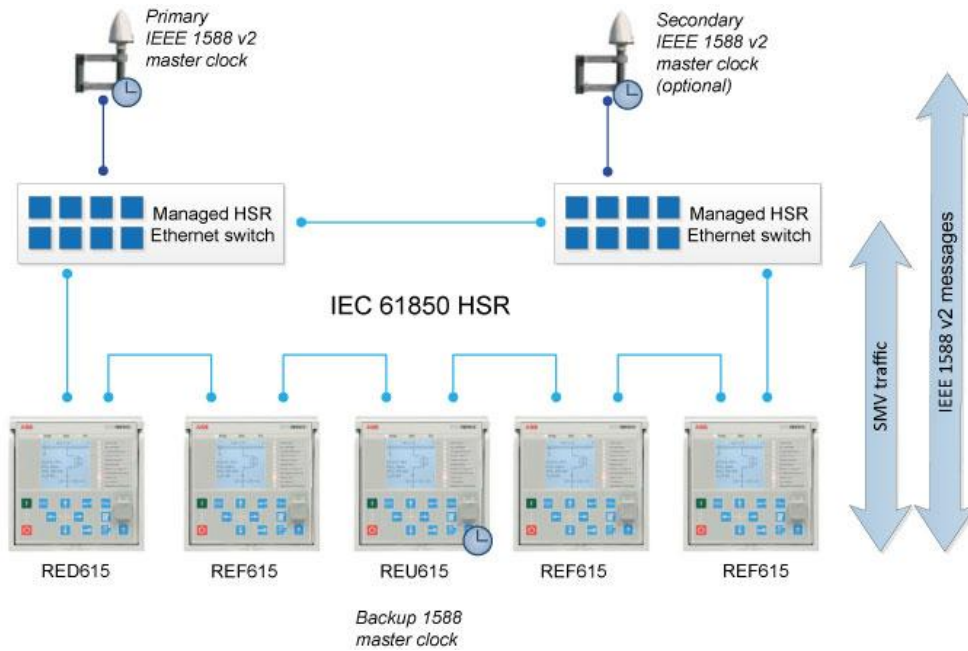
Ethernet Communications

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

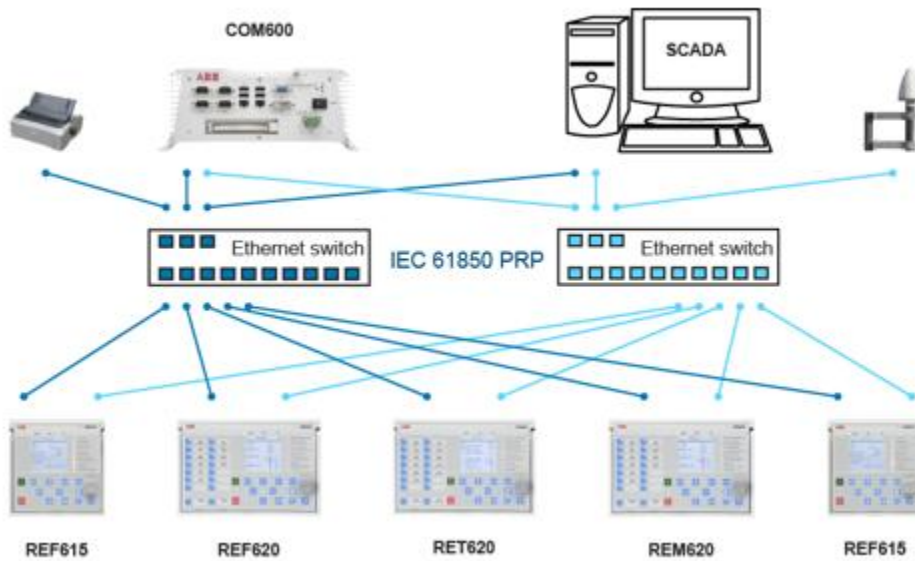
HSR

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PRP



Bill of Material

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43 M/A Manual/Auto switch

43P M1/M2 Preferred/Maintenance switch

(2) Lockout Relays

(2) REF615 Ordering Code: HAFDDADAFHE5BBN12E for the Mains

(1) Ethernet Switch

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