

TOP **10**
QUESTION
from the Tech Talk



Learning the Logic: Implementing the 850 Relay's Main-Tie-Main Auto Transfer Scheme

In our Tech Talk, **Learning the Logic: Implementing the 850 Relay's Main-Tie-Main Auto Transfer Scheme**, learn the fundamentals of the MTM transfer scheme settings and logic as well as implementation using the traditional hard-wired method and how moving to IEC 61850 GOOSE messaging can provide significant advantages.

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GE VERNOVA

**QUESTION****ANSWER**

What are the advantages of using IEC 61850 GOOSE messaging instead of hard wires?

GOOSE messages are dependent on transmission and subscription set-up; thus, they can be set and functionally tested in advance and may be reused an indefinite number of times. Wired schemes, however, must be re-engineered and physically implemented onsite each and every time. Over multiple applications, using GOOSE messaging significantly reduces the time and resources – both labor- and material-wise – required for settings development, installation, testing, and commissioning. It also provides flexibility in terms of reusable bit exchange and logic between the three relays and other IEC 61850 compliant devices that may be in the system.

For a scheme that utilizes GOOSE messaging instead of hard wires for inter-relay signaling, what if the communication link fails? Will the transfer scheme still work?

No. A communication link failure is similar to a hard-wire failure – the transfer scheme will be blocked. Once communication is lost, the relays will automatically detect that they are not properly receiving the GOOSE transmission that they are subscribed to, which results in missing status information required for the transfer scheme to function. Upon loss of any required status bit, the transfer scheme will default to “Transfer Not Ready” state.

In a scheme using IEC 61850 GOOSE messaging, is it mandatory to use ethernet switches?

No. Each 850 relay may have up to two copper or fiber ethernet ports. If it must communicate IEC 61850 to any device other than the three relays, then an ethernet switch should be used (MODBUS devices may connect to the available RS485 port). If no outside networking is required, the three relays' communication ports may be connected directly to each other for a closed, switchless system.

Can the built-in main-tie-main scheme be used if a 750-to-850 retrofit kit is installed versus a fully re-wired 850 chassis?

Yes. The transfer scheme logic and number of contact inputs and outputs required are unaffected. It is recommended to double check the transfer scheme settings should the EnerVista file conversion tool be used; however, there are no restrictions imposed by using a retrofit kit.

Can the main-tie-main scheme be implemented using any 8 Series or UR relay?

The built-in logic scheme is included only in the industrial model 850 relay. However, both the 8 Series and UR line of relays have FlexLogic capabilities where any custom logic scheme may be programmed. The same transfer logic can be built in any of these relays using FlexLogic, including modifications for other system configurations, or other transition or restoration methods.



QUESTION



ANSWER

Our transfer scheme is not working. What is the best way to approach troubleshooting?

The most common issue encountered during initial testing is that the faulted incomer breaker opens, but the tie breaker will not close. Remember that the synchrocheck element supervises closing of the tie breaker. Should the tie breaker not close when expected, the likely cause is an incorrect setting. Check the following:

1. In the tie relay, under *Control > Synchrocheck*, the *Dead Source Permissive* setting should be set to *Dead Bus* OR or *XOR Dead Line*.
2. Check the *Metering > Synchrocheck* screen. If all values are showing zeros, the synchrocheck element is not functional, which could indicate an issue with the next couple settings.
3. Under *System > Voltage Sensing*, the *VT Secondary* should be set to the voltage seen on the secondary side when nominal voltage is applied. If it's set to the actual VT secondary value, the difference in metering could exceed the synchrocheck tolerances.
4. Under *Control > Synchrocheck*, check that the difference tolerances for the frequency, angle, and voltage are reasonable. Settings that are too sensitive may cause unnecessary blocking of the synchrocheck element.

On our 750 relay MTM scheme, the tie relay always indicates "Tripped" while the system is in a normal configuration. Will this be the same on the 850 relay?

In the 750 instruction manual, it is noted to wire the breaker 52a contact in series with the Selected-to-Trip switch. This facilitates the Selected-to-Trip function to only be active while the tie breaker is closed. Should the Selected-to-Trip switch be wired directly to the relay, it will always be active regardless of the breaker position. Thus, when the breaker is open, the relay will indicate "Tripped". The same recommendation holds for the 850 relay; however, in the case of a direct wiring, the trip output contact will remain closed while no "Tripped" indication will be displayed on the front HMI.

What safeguards does the relay have to avoid an inadvertent transfer?

Fundamentally, the initial logic includes a status indication for the UV1 element, which picks up on an initial dip in voltage and immediately signals the alternate source to block a double transfer while the source in question may be experiencing a fault. Only if UV2 picks up without an incoming UV1 blocking signal will a transfer be initiated. Additionally, a Block Transfer setting is included and may be set to a manual blocking switch or any other functional operand. New settings have also been added to the 850 to optionally block a transfer initiation on operation of any overcurrent element to provide additional security preventing an unwanted transfer to an already faulted source.

Are typical program settings available for the main-tie-main scheme?

Yes. Example setting files are available for the traditional hard-wired scheme on both the 750 and 850 relays as well as an 850 transfer scheme incorporating GOOSE messaging. Please reach out to your local GE Vernova contacts for assistance.



QUESTION



ANSWER

If we upgrade our system, does GE Vernova offer consultation or customer service?

Yes. If you are interested in implementing a new main-tie-main scheme or have existing relays you would like to upgrade, please don't hesitate to reach out to your local GE Vernova contacts. GE Vernova's team of sales representatives, application engineers, technical support and field service engineers are ready to assist with application analysis, training, settings development, installation, and commissioning services to ensure you are confident and successful in implementing our protective relays and control schemes.



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