Make Your Distribution Protection System Smarter

Frequently asked questions about the SEL-FT50 and SEL-FR12 Fault Transmitter and Receiver System

Install the SEL-FT50 Fault Transmitters on laterals, branches, and main feeders to provide additional information for distribution protection decisions. When combined with the SEL-651R Advanced Recloser Control or other SEL distribution protection relays, the SEL-FT50 and SEL-FR12 System accelerates tripping, speeds up restoration, and improves safety.

What happens to the protection scheme if the SEL-FT50 radio signal experiences interference or isn't received by the SEL-FR12?

Your existing schemes are always in service. The system will enhance your existing protection schemes, but in the event of a communications interruption, a properly designed system will fall back to normal.

There are only 8 bits in the MIRRORED BITS® communications protocol. How do 8 bits represent 12 different SEL-FT50 devices?

For each SEL-FT50, there are two different status messages that it reports: faults and link status. So actually, there are 24 messages that have to be conveyed in a MIRRORED BITS communications message.

We can do this by using all of the available information. First, by default the SEL-FT50 Fault Transmitters are designed to be installed in groups of three that correspond to the three phases of the power system. Three units make up a trio, and each trio is assigned one bit to indicate the trio fault status and one to indicate the link status. The supervising relay or recloser control knows the phase on which the fault occurred. With the SEL-FT50 indicating the branch and the relay or recloser indicating the phase, we can enhance protection schemes.

Is the SEL Fault Transmitter and Receiver System cyber secure?

Yes. The fault is authenticated by the protective relay or recloser control. The SEL-FT50 provides additional information on the location of the fault while the fault is still active. This additional information *and* the recloser protection work together to enhance existing protection schemes. The SEL-FT50 alone does not control the protection decisions.

Additionally, with no electronic interface to either the SEL-FT50 or SEL-FR12, it is impossible for an attacker to alter settings remotely.

How can I monitor a single phase spur?

By default, the system can monitor four branches, regardless of whether they are single-phase or three-phase. If you wish to monitor more than four branches, including some single-phase laterals, you can configure the SEL-FR12 to report the fault status of individual SEL-FT50 Fault Transmitters by sending a specific MIRRORED BITS command to the recloser control or an SEL relay.

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Since the SEL-FT50 does not have batteries, can I use the SEL-FT50 in applications that have multiple reclose operations?

Yes. The SEL-FT50 harvests enough energy to be armed and ready to indicate faults for up to three reclose shots.

### I need more than 12 SEL-FT50 Fault Transmitters in close proximity for my application. Can I do this?

Both the SEL-FT50 and the SEL-FR12 have a setting for the network ID. Devices will only communicate if they have the same network ID. This allows you to install multiple fault receivers in a given area without fear of crosstalk. There are 16 unique network IDs available.

How much line current does the SEL-FT50 need to operate?

The SEL-FT50 needs 15 A continuously in order to remain awake and send its periodic link messages. When the SEL-FT50 is awake and linked, it operates at its lowest latency. The SEL-FT50 will work on lines that do not carry 15 A, but when a fault occurs, it takes up to a cycle to wake up and send the fault message.

Can I use the SEL-FT50 to indicate fault status for SCADA and OMS?

Yes. Fault indications from SEL-FT50 Fault Transmitters can be incorporated into DNP3 maps in recloser controls and pulled into SCADA/OMS.
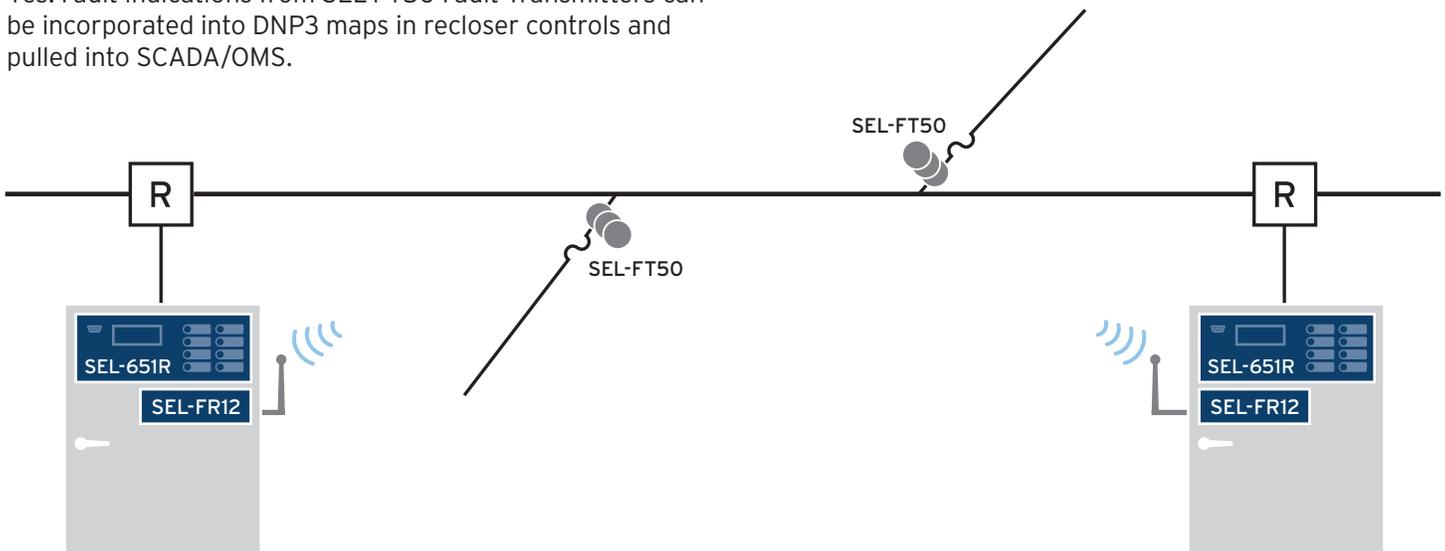
I do not have communications between my recloser controls. How do I exchange SEL-FT50 information on lines that are covered by these recloser controls?

Use two SEL-FR12 Fault Receivers with the same network ID to simultaneously receive the SEL-FT50 signals associated with the two recloser controls. A group of SEL-FT50 Fault Transmitters can be seen by more than one SEL-FR12. Or, use a pair of SEL-3031 Serial Radio Transceivers to communicate up to 20 miles.

Visit **selinc.com/products/FT50** and download the white paper, "A New Use for Fault Indicators—SEL Revolutionizes Distribution System Protection," to learn more.

Can I use this system with a relay that does not support Mirrored Bits?

Yes. You can install an SEL-2505 Remote I/O Module or SEL-2507 High-Speed Remote I/O Module to convert the Mirrored Bits messages into contact outputs. Depending on the selected baud rate, adding the SEL-2507 can add an additional latency of up to 1 ms.