GE
Grid Solutions

From SR Family to Advanced Multilin 8 Series:

A GENERATIONAL LEAP FORWARD IN PROTECTION & CONTROL TECHNOLOGY

White Paper by:

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Abstract

Microprocessor-based protection relays were introduced in the 1980s. The SR family was developed and introduced in the 1990s; it was one of the first relay families with common hardware, drawout ability, common configuration software, waveform capture and time tagged sequence of events recordings.

As the design of microprocessor relays ages, they can experience typical manufacturing and design challenges such as component obsolescence and availability issues. Common technical challenges for relays of this generation include the use of older technology with slower sampling rates, which limits expansion of advanced functions. The SR family is no exception to these challenges.

GE's latest 8 Series platform has more advanced hardware with protection algorithms equivalent to high-end transmission intelligent electronic devices (IEDs), ensuring more dependable and secure protection operations. High-end communications support both legacy and new protocols including IEC 61850, OPC-UA and IEEE 1588.

This ensures interoperability and integration into high-end protection, automation, asset performance management (APM) systems and ultimately IED asset strategies. The 8 Series' certified security features enable operators to meet NERC CIP and other cyber security regulations. It also has a significantly higher sampling rate, allowing it to perform advanced functions such as high-speed and secured protections, harmonics and power quality analysis, as well as electrical signature analysis. These embedded capabilities reduce stress on the asset and enhance asset visibility, which are key in APM.

To facilitate the upgrade of older SR relays to this new generation, retrofit kits have been developed that eliminate wiring changes, panel modifications and extensive re-testing requirements. Ensuring seamless integration of the new device into the SCADA system, the 8 Series leverages the same SR memory map. This paper outlines the steps and requirements to easily upgrade a fleet of SR devices, starting from the process of identifying when an upgrade is needed through to setting file conversion and commissioning once the new relay is installed.

The ever-changing electric grid demands higher performance in dependability, security, interoperability, communications and performance/primary asset monitoring from today's IEDs, which is only feasible with today's latest technologies embedded in the newest IEDs like the 8 Series.

SR Family Background

The introduction of the SR family of digital relays in the 1990s marked a significant technological leap forward in power system protection and control. Individual single function electromechanical relays, control, monitoring and metering devices were replaced by the SR family, one of the early generations of multifunction digital relays designed as a platform. The SR family design goals were:

Ease of Use

The SR family was one of the first series of protection relays designed as a platform, hence shared common aspects such as same shape and size (panel cutout), withdrawal ability, waveform capture, sequence of events with time-tagging and similar configuration tools such as setup software. The SR family covers the four main industrial applications: motor, feeder, transformer and generator protection.

Serviceability

The SR family was designed with a unique draw-out construction for the industrial market to ensure shorter shutdown times if service or changes are required to the installed SR due to protection scheme failures or changes.

Functional Convergence

In the 1990s, with the added capabilities and processing power of digital technologies, more functionalities traditionally provided in separate stand-alone devices (protection relays, sequence of event recorders, fault recorders, meters and control equipment) started to converge into one device.

The design of the SR family took into consideration this convergence of functionalities (such as waveform capture, sequence of events with time-tagging, high accuracy metering and several communications capabilities) in a single protection relay or IED on top of the need for very reliable multiple protection and control functions. To achieve all these features, the CPU and other processing units (such as digital signal and communications processors) had to be carefully selected with adequate horsepower to ensure optimal performance of maximum tasks.

SR Family Challenges by Today's Standards

Performance

Over the last 25 years, advancements in electronic technologies have paved the way to the development of higher performance, more robust hardware. This enables IEDs to sample at a much faster rate, calculate more data at higher speeds with faster protection algorithms through increased memory, and perform many more functionalities. Achieving these new functionalities would not be possible for the SR family.

Communication & Cyber Security Needs

Communications needs for IEDs have increased significantly over the last two decades. Much faster, newer protocols such as IEC 61850 with Ethernet redundancy (copper and fiber connectivity) are required for more automation and advanced protection and control schemes. A key requirement from the North American Electric Reliability Corporation (NERC) as defined by the Critical Infrastructure Protection (CIP) is to have cyber security measures (features and tools) in place to prevent unauthorized access to critical power systems' protection and control devices. These factors demand more sophisticated communications hardware and firmware exceeding the capabilities of IEDs designed more than two decades ago, such as the SR family.

Protection and Control Requirements

The industrial power system is becoming much more complex, with the introduction of distributed energy resources, more co-generation, increasingly complex loads, and auto-restoration requirements such as transfer schemes. This mandates the need for high-speed and secured protection and control schemes capable of greater flexibility, programmability and automation requiring peer-to-peer communications. IEDs designed in the 1990s do not have these needed capabilities, and adding them is often not technically feasible.

Continuous Improvements, Life Cycle Management and Electronic Components

With the improvements in electronic components, design methodologies and lessons learned from existing product, many improvements have been implemented in IEDs (such as power supply enhancements); however, core capabilities (such as sampling rate and protection algorithms) can't necessarily be changed without a complete redesign. This limits the expandability and possible improvements that can be applied to older technologies.

Another key challenge is life cycle management of older IEDs. Older IEDs consist of electronic components designed even before the IED was designed and launched, and many of these components are being discontinued. Replacing older components with newer is in some cases not technically feasible, and will ultimately lead to older IEDs being discontinued.

Electronic components for aged IEDs may be unavailable and older parts cost more than their newer counterparts, based on the multi-generational product lifecycle defined by the electronic components manufacturers. Eventually, early generation device components become more difficult and expensive to source. Accordingly, a significant number of electronic components used in early generation digital relays are now discontinued.

Environmental Factors

Many industrial facilities (such as petrochemical plants) have significantly harsh environmental and operating conditions, which take a toll on IEDs that are in a lot of cases not designed for these conditions. The introduction of conformal coating as an option has protected products like the SR platform against harsh environmental conditions, but further design and manufacturing measures have been adopted for the next generation of relays. For example, GE has mandated a cleanliness level to mitigate chemical reactions from occurring with the environment, giving a higher level of reliability. In addition, accelerated life testing has shown that in harsh environmental conditions, more clearance is required between circuits, which exceeds safety standards.

Aging Aspects of IEDs

As critical assets (including IEDs) age, maintenance becomes more costly and frequent. Systems failures can range from minor to severe, including unwanted operations that are potentially costly to any industrial process. With the introduction of the early generation IEDs, the industrial culture started to change. More communication capabilities were introduced, operation times became faster, coordination between devices became tighter, relays stored events in memory, and the interface switched to software.

Early generation IEDs can start exhibiting failure symptoms as their electronic components reach the end of their design life. As illustrated in the "bathtub" curve, many older installations are now approaching the wear-out part of the curve. With older IEDs, it is generally not possible to determine accurately when the wear-out period is entered; key factors in this determination include the age of the relay and the severity of the physical environment it operates in.

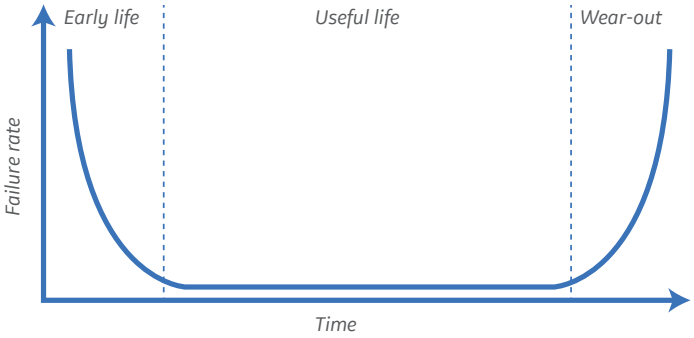


Figure 1: Bathtub curve illustrating the typical lifespan of a typical protection IED.

End-of-life failures are generally driven by the ambient environment of the IEDs and the stress they endure. Although some IEDs last for decades, their electrical components have a limited lifespan after which their deterioration results in either failure of the component or abnormal behavior.

All relays should be assessed for upgrade on an ongoing basis using such criteria as age of relay, criticality of application and physical environment. Assessing all of these factors together will help determine the correct upgrade strategy for each device. It is important to establish an upgrade plan, particularly for IEDs that protect critical assets. Upgrades should be scheduled well before the approach of scheduled maintenance or the appearance of end-of-life failures in order to prevent unplanned downtime. The upgrade process involves many steps including assessment, creating proposals, then purchasing and installing the new relays. Upgrading in small batches, re-routing loads, and adjusting maintenance schedules help ensure a seamless transition that keeps processes running within acceptable output levels.

SR End of Manufacturing: What Comes Next

With these limitations in mind, the SR family of relays will reach its end of manufacturing on December 31, 2021. However, support for this product line will continue. The 10-year warranty on SR devices sold since 2013 remains active. While advance replacements and spare modules will not be offered after the end of 2021, repair service will continue to be offered to SR devices outside of warranty.

Benefits of Upgrading to the Multilin 8 Series

With the challenges of the SR line in mind, a new platform of protection relays was developed by GE in 2014 called the Multilin 8 Series. An upgrade from a SR to an 8 Series device can fulfill today's increasing demands for faster and more accurate, reliable and secure multifunction protection, as well as asset monitoring.

The 8 Series platform has been designed around the need for superior reliability, performance, security and ease of use. The flexibility of hardware, firmware, and easy-to-use Enervista™ software empowers the user to achieve system protection, control and automation with minimal engineering time and greater ease. As the 8 Series is a platform, it utilizes common setup software to configure and manage all its devices. By upgrading to the 8 Series, customers can replace fleets of single function relays and early generation microprocessor relays with just one multifunction protection, control, and monitoring solution.

Figure 2: With an all-in-one multifunction protection, control and monitoring relay, users can move away from managing multiple protection devices across many platforms

Reliability, Performance and Serviceability

Older IEDs become less reliable as they experience end-of-life symptoms. The 8 Series body is made of extruded aluminum which acts as a heat sink. With a low-insertion force draw-out design, device management is simplified as relays can be inserted or replaced without having to disconnect field wiring or communications cables, very similar to the serviceability benefits that the SR family provided. Furthermore, the power supply on the 8 Series is field-swappable for ease of maintenance, which is not possible with the SR family. These design features not only give it a higher reliability but make fleet management and device maintenance much easier, reducing outage duration and mean time to repair.

Historically most older IEDs including the SR family, contain electrolytic capacitors, especially in power supplies. These are the weakest links in keeping relays functioning, as they tend to dry out and fail faster than other electronic components. The 8 Series HV power supply was designed without any electrolytic capacitors.

The 8 Series products have the best in class performance in the industry when it comes to security and dependability of protection. Using extensive self-diagnostic and integrity check mechanisms, the 8 Series range of IEDs offers secure protection for out of zone faults and internal failure modes. Powered by 128 samples/cycle data acquisition system and 2 ms protection scan time (at 60Hz), 8 Series relays offer sub-cycle operating time performance with security logic of direction and CT saturation detection for critical applications such as transformer, motor and generator differential protection. Clearing the fault one half to a full cycle earlier reduces the overall stress experienced by the primary apparatus which has a significant impact in extending the life of the asset through its life cycle. Fault isolation is further improved with the use of solid state output contacts, resulting in a total fault isolation time that is 12 to 14 ms faster than most equivalent protection devices available today. This faster response time translates to lower repair costs and asset downtime.

The 8 Series protection IEDs offer superior measurement accuracy as fine as 0.25% which essentially means an integrated metering application can be deployed for medium voltage applications. The 8 Series range of relays come with powerful FlexLogic™ function that can be used to eliminate a variety of discrete devices used for interlocking and DC schemes, and converge all those within the relay itself.

Up to eight additional protection functions can be added by using FlexElements, allowing any measured analog quantity to be compared to either a fixed set point, or to another analog quantity of the same type. Advanced protection applications are also available, delivering capabilities such as:

- Motor protections with support of VFD, IEC curves, and cyclic load
- Motor differential without differential CTs and stator inter-turn detection
- Synchronous motor protection and control: comprehensive stator and rotor protection, field application and start sequence control, power factor regulation control, loss of excitation, and out-of-step and reactive power-based protection.
- Synchronous motor stator protections: out-of-step, loss-of-excitation, power factor, etc.
- Dual feeder applications within same device to achieve redundancy
- Distribution padmount 4-way switchgear protection & automation – all in one device
- Voltage ride-through and reactive power based under-voltage for renewable integration
- Transient ground fault detection for Peterson coil-based ground protection
- Directional power and power factor monitoring/control
- Transformer differential with high security using CT saturation and directional detection
- Synchro-check, VT fuse failure detection, CT supervision for enhanced secured protections
- Generator and generator-transformer unit protection to reduce stress on expensive power equipment
- 100% stator ground protection for generators
- Neutral admittance for sensitive ground

Communications and Interoperability

As the power system protection industry moves towards more integrated controls, monitoring, and diagnostics, hardware must be able to support these new features. In particular, communications functionality has progressed very rapidly. Newer automation products, such as substation servers and gateways, demand faster processing power, higher bandwidth, and redundant and self-monitoring communications and time synchronism methods from IEDs. Across the 8 Series platform, relays support the following protocols: Modbus TCP, DNP3.0, IEC60870-5-104, IEC61850 Ed2, GOOSE, PRP and time synchronization protocols including IEEE 1588 and SNTP. It provides the flexibility of communications using RS485, Ethernet copper, or Ethernet fiber. In particular, IEC61850 GOOSE functionality can be used to eliminate copper wiring between relays used typically for inter-trip and interlock functions.

Security

With increased dependence on relays, it is important to have a security infrastructure built around these devices to prevent breaches. The Federal Energy Regulatory Commission (FERC) has already mandated NERC CIP compliance around industrial security and mitigation technology for US electric utilities. To meet NERC requirements, the 8 Series relay has a built-in role-based access control system (supporting three unique roles: Administrator, Operator, Observer), as well as remote authentication services including RADIUS and Syslog, to control and track access to the relay settings, as well as automation and control functions. The advanced security option allows users to log security-based events on the relay. The 8 Series enables companies to comply with NERC CIP requirements and has been Wurldtech™ Achilles Level 1 certified. These certifications ensure the 8 Series relays are robust and can protect against various cyber-attacks.

Ease of Use

As demands on the system change, applications are becoming more complex, requiring sophisticated, reliable communications to support protection and control schemes. Engineers with relevant domain expertise are needed to set the correct relay settings for any application. As retirement rates rise, there is an increasing gap in expertise in power system protection. As a result, operators and engineers require more training and need simpler, more intuitive tools that support advanced applications.

All 8 Series platform devices use the same intuitive device configuration software (EnerVista 8 Series Setup Software) which features quick setup screens for step-by-step device configuration and a tree structure for settings, making it easier for beginners to learn and more efficient for experts to run. This quick setup process for 8 Series has 80% fewer protection and control settings than the SR. Features like the protection summary give the user a single location to see what has been configured in the relay and to easily modify. The quick action bar streamlines the most pertinent protection relay information required by the customer.

The setup software allows the customer to configure the single line diagram using the same library that will be seen on the relay itself. The HMI simulation feature mimics the graphical display for a real-time view of the relay. The large front panel color graphic display allows engineers to represent the single line diagram on the device. It also allows operators to easily perform control operations from the relay's front panel, reset alarms on the annunciator, and monitor the statuses and metering values. It has a simulation mode that facilitates testing of relay behavior without the need for expensive test equipment and software.

Safety

Electrical safety in a workplace is further enhanced by designing safety-oriented features and functions within the 8 Series platform. These integrated features are applied as an enabler to support further reduction in hazards, risks, accidents, human errors and near misses. Safety features such as arc flash protection, large graphical color LCD screen, high-speed protection processing, remote HMI simulator, instantaneous setting group changes, simple and intuitive device configuration, and wireless/remote user interface enhance overall safety and provide reliable process operations.

Advanced Control and Monitoring

The 8 Series has an advanced control option which allows six pages of configurable dynamic single line diagrams (SLD) with 12 control objects (with select-before-operate capabilities), 15 status objects, 15 metering objects, and 20 virtual configurable push buttons allowing detailed control and monitoring. This eliminates the need for separate mimic and control panels. Furthermore, annunciation screens allowing up to 36 points for alarming can be configured, eliminating the need for an additional annunciator panel.

The 8 Series also comes with a patented environmental awareness module that gives users a histogram view of data related to the temperature, humidity and surges to which the relay is subjected throughout its life. This enables operators to more easily monitor and maintain the health of their fleet of 8 Series relay.

Asset Monitoring & Diagnostics

To drive down asset maintenance and operation costs, customers often deploy several independent devices for asset monitoring and diagnostics. However, this can be costly and introduces potential issues as asset operational data becomes siloed within individual teams, preventing operators and asset managers from seeing a holistic view of an asset's operational performance. In the past, relays were considered simple protective devices that provide an independent set of data to protection engineers. The 8 Series platform takes a step closer in helping the end users gain a comprehensive understanding of what is happening with their assets. The 8 Series has advanced online

monitoring and diagnostic capabilities that provide timely, accurate and actionable information that maintenance crews can utilize on a regular basis. Depending on the asset being protected, the 8 Series platform offers many integrated monitoring and diagnostic tools including:

- breaker health monitoring on the feeder management system
- broken rotor bar detection, stator turn-to-turn fault detection, bearing and mechanical failure mode detection using electric signature analysis (ESA) algorithms, and detailed motor health reports on the motor management system. Specific to ESA, the relay supports synchronous, VFD-fed motors along with line fed machines, advanced data quality check, and motor health diagnosis using the CT signal alone (in situations where the VT signal is absent from the relay).
- patented dissolved gas analysis integration, loss of life, hottest spot, and aging factor on the transformer management system.
- harmonic level detection, operational statistical data and health report on the generator management system.

The 8 Series provides higher asset performance visibility and early warning alarms to provide operators and maintenance engineers with actionable intelligence, allowing for more proactive, condition-based planned maintenance work versus costly reactive maintenance activities. By integrating these advanced functions within the relay, operators can now have much more visibility to condition monitoring of medium voltage assets (i.e., mid-sized motors), that previously - due to the costs of advanced monitoring devices - were only connected to the most critical assets. With all functionalities housed in a single system, interoperability risk is reduced, data silos eliminated, and training and support costs reduced.

Upgrade Process

Aging relays in operation in harsh environments and/or applied to critical applications should be the first group of devices assessed for upgrade. Based on our field experience, there are many installations still in the field with relays that meet these criteria. Figure 3 illustrates examples of GE's Multilin SR and 8 Series relays through the years.

Figure 3: Design evolution of industrial relays

The following figure shows the general guide to an upgrade process.

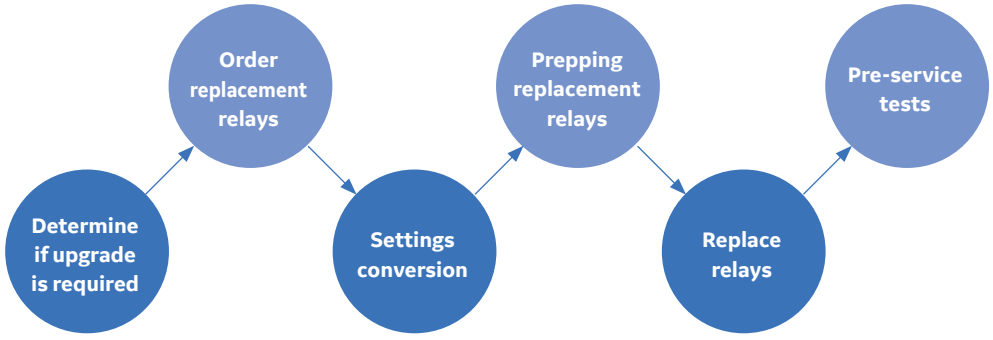


Figure 4: Overall upgrade steps

Determine if upgrade is required

The process starts by identifying if an upgrade is required. Criteria to consider in an effective asset management strategy for your fleet of protection devices include:

CRITERIA	CHECK
Age	Check the manufacturing product label on the relay for the serial number, model number, and the manufacturing date. Alternatively, for modern digital devices, the serial and model numbers can be checked using the associated device configuration software.
Extreme temperatures and humidity	Although relays can operate in a wide range of temperatures, electronic component degradation accelerates if components are exposed to the outer limits of their operating ranges for prolonged periods. Continuous operation at maximum temperatures creates stress on components such as power supplies, capacitors, and displays. Continuous start-up at minimum temperatures creates excess stress on the liquid crystals of the LCD displays.
Harsh environments	A relay used in environments containing high concentrations of chemicals is at greater risk of corrosion. Environments containing sulfur dioxide, nitrogen dioxide, chlorine, or hydrogen sulfide often cause significant erosion to relays that do not have conformal coating.
State of the relay	It is recommended that all relays be maintained at regular intervals (as defined by your local Reliability Coordinator) or as per the GE Maintenance Handbook (https://www.gegridsolutions.com/multilin/Publications/handbook.htm). If the proper maintenance schedules have not been followed, the life and performance of the relay may be less than expected.

Many of these checks can be performed by trained GE service staff. Regular relay audits ensure that the relays are up to date and give an early warning if an upgrade is required.

Order the replacement relays

The following table shows the upgrade options for GE relays. Older relays from other vendors can also be upgraded to the 8 Series platform of relays.

FROM	TO
SR 735/737 SR 750/760	850 Feeder Protection System
SR469	869 Motor Protection System
SR 745	845 Transformer Protection System
SR 489	889 Generator Protection System

IEDs can be ordered through our sales representatives or bought through the online store at **www.gegridsolutions.com/multilin/salesoff.htm**

Upgrade software and convert relay settings

Continuing the tradition of easy-to-use device configuration software, the 8 Series platform of relays share the common EnerVista setup software. The latest copy of the software can be downloaded from GE's website. The software allows the user to: Program and modify settings; load and save setting files; read actual values; monitor status; read pre-trip data and event records; access help files; and upgrade the firmware.

In addition, the 8 Series setup software provides enhanced operational and ease of use features such as a protection summary screen, Logic Designer, centralized event viewer, and configurable single line diagrams.

To facilitate the upgrade from older SR relays, the EnerVista 8 Series setup software supports conversion of offline settings files created in the SR series platform. The conversion can be initialized with EnerVista from the Offline/New Settings File commands located in the taskbar.

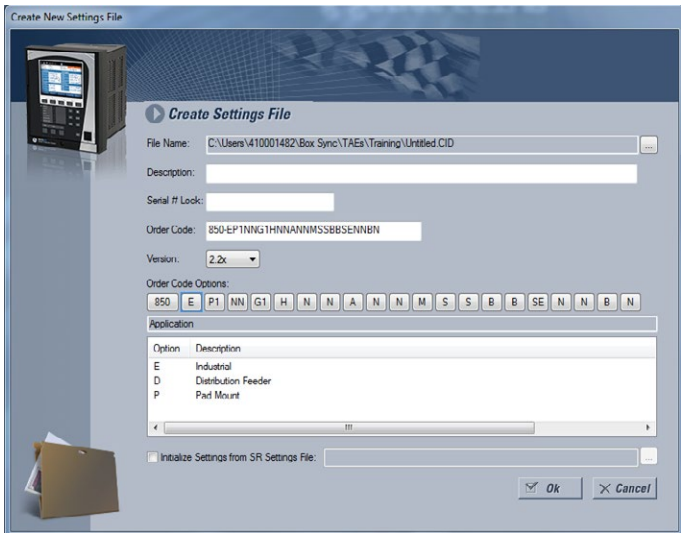


Figure 5: Settings file conversion report from SR to 8 Series in EnerVista

In the menu taskbar, click on Offline and select the New Settings File item. The Create New Settings File dialog box appears which allows for the setpoint file conversion.

1. Select the Firmware Version and Order Code option for the new setpoint file.
2. For future reference, enter some identifying information, such 'Feeder 1 Relay' into the Description box to facilitate the identification of the device and purpose for the file.
3. To select the file name and path for the new file, click the button beside the File Name box.
4. To select the SR settings file used for initialization, click the Initialize Settings from SR Settings File button.
5. To locate and select the file to convert, click the button beside the Initialize Settings from SR Settings File box.

PRODUCT	FIRMWARE VERSION SUPPORTED FOR CONVERSION
750/760	All firmware versions (32-bit versions)
469	5.0x and higher
745	7.4x and higher
489	4.0x and higher

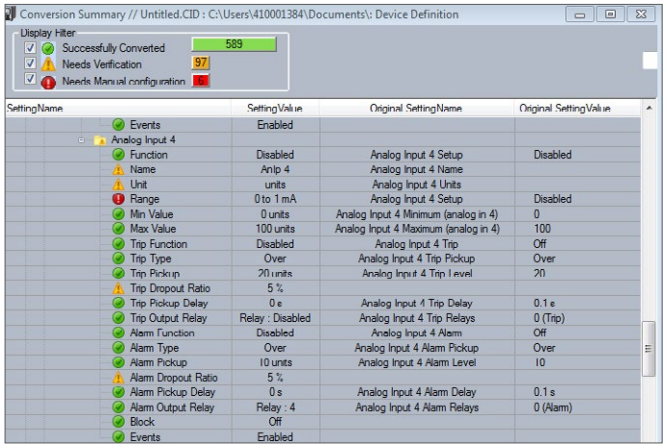


Figure 6: Settings file conversion report

Once the conversion is complete, a conversion report is displayed. This shows the original settings and the converted new settings. It also indicates if any manual configuration is required and which settings need to be verified. The conversion summary is available under the Device Definition for future reference. To quickly verify if all the desired elements are configured, view the protection summary.

SR compatibility mode for communication to Modbus master

The 8 Series supports emulation of the SR devices' Modbus memory map for retrofit applications. The emulation supports typical actual value data for common data items. When enabled, the 8 Series relay will respond to Modbus packets from a Modbus master as if it were a legacy SR relay. This mode can be turned on easily using a set point through the 8 Series setup software or using the relay's HMI. This is a powerful functionality that enables users to migrate from SR to 8 Series and keep all their Modbus communication to SCADA or DCS or PMS connections.

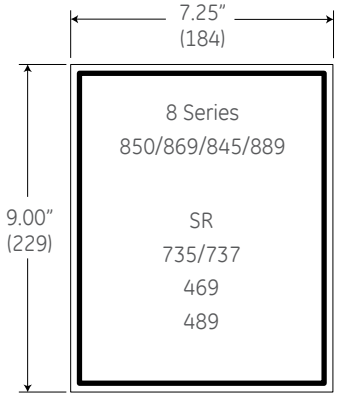
Pre-service checks and tests

Due to wiring changes, it is crucial to verify every feature of the relay that will be used to ensure the desired functionality. Key in-service and out-of-service maintenance tests include:

IN-SERVICE MAINTENANCE	OUT-OF-SERVICE MAINTENANCE
• Visual check of metering value integrity • Visual check of alarms, target messages, and LED indications • Visual inspection of relay's physical condition (loose wiring, excessive dust, corrosion, cracks) • Comparison of as-is online relay settings with as-left online settings file	• Check wiring integrity • Check analog values (current, voltages, RTDs, analog inputs) through injection tests for accuracy • Perform secondary injection tests to verify protection functions • Verify operation of contact inputs and outputs • Perform pushbutton functionality tests

Simplified Upgrade Kits & Solutions

Simplifying the retrofit process, SR to 8 Series retrofit kits are available for SR750/760, 735, 469 and 489 protection relays. Where traditional upgrade solutions may result in higher costs and extended process downtimes, GE's retrofit solutions eliminate the need for panel cut-out modifications, device re-wiring, and re-engineering. Settings file conversion is also simplified with automated conversion tools available through the relay's setup software. **With this solution, customers are able to perform the upgrade process in as fast as 21 minutes per device**.



The SR to 8 Series retrofit kits utilize the same terminal blocks as the SR device it is designed to replace. When performing relay replacement, it is important to follow site safety procedures.

To upgrade, remove the old SR device terminal blocks from their original case without disconnecting any wiring. Discard the old case, and install the retrofit kit.

The retrofit kits have been designed to fit the same cutout as the existing SR device, eliminating the need to make panel modifications or drawing changes. Simply plug the old terminal blocks into the retrofit kit's female terminals. All terminals are translated and wired on to the 8 Series chassis internally to provide seamless transition between the SR device and its 8 Series equivalent (SR 735, 750/760 to 850, 469 to 869, and 489 to 889). A 3 inch collar fitted to the new 8 Series relay keeps the depth at the same level as the old device, ensuring wires don't have to be pulled or pushed. Mechanical installation takes less than half an hour.

With this upgrade, you can utilize the benefits of advanced capabilities while keeping the installation cost low by not having to make any cutout changes, rewire the relay, or create new engineering drawings.

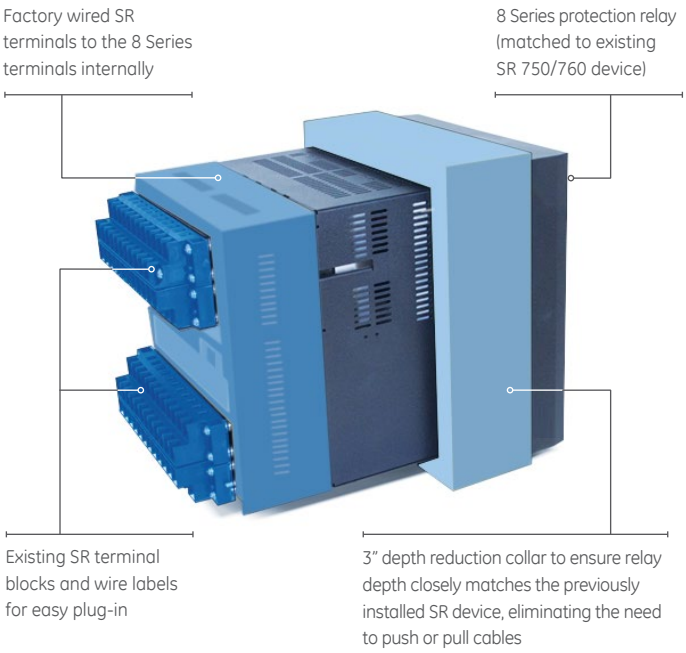


Figure 8: 8 Series Retrofit Kit

More details regarding the 8 Series retrofit kit can be found here: https://resources.gegridsolutions.com/interactive-product-explorers/multilin-8-series-retrofit

The upgrade guide for the 8 Series retrofit solution can be found here: https://www.gegridsolutions.com/products/manuals/8series/GEK-130906.pdf

Conclusion

Grid and industrial processes demand higher reliability, security, speed, and interoperability from IEDs than ever before. Aging relays installed in harsh environments that are applied in critical applications and still in service today begin to pose a risk of failure as they reach the end of their useful life. As these relays provide critical functions, taking a proactive approach to service is more important than ever.

With the SR family of relays reaching its end of manufacturing in December 2021, the 8 Series platform of relays is best suited for replacement of these relays since specific retrofit kits have been designed to eliminate panel rework or rewiring. An automated setting file conversion feature is available through the setup software to reduce device configuration and commissioning time. These features provide the ease of use, serviceability and performance that are the hallmark of all Multilin products.

Leveraging more than 35 years of extensive digital protection relay experience and the adoption of more advanced design practices and manufacturing standards, the 8 Series represents a generational leap forward in protection and control technology. The platform features more advanced protection, asset diagnostic capabilities, and extensive communications. In addition, its robust cyber security features allow users to be more proactive in servicing primary assets. All of these elements work together to create a clearer picture of asset health, early failure detection and maintenance plan development for assets needing it most, leading to extended life and higher reliability at a lower total cost of ownership.

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