

Feeder Automation Manager maximizes system reliability

The benefits of distribution automation, or self-healing grids, go beyond simply improving system reliability. Distribution automation systems can enhance system protection, manage system overloads and estimate Distributed Energy Resource (DER) contributions. Distribution automation systems are helping system operators manage increasingly complex distribution systems, while decreasing work loads for planning and protection engineers.

Improve system performance in less time

Eaton's Feeder Automation Manager (FAM) includes a graphical user interface, object-oriented configuration, advanced simulation capabilities, communications dashboard and post-event traceability allowing users to turn distribution automation into an integrated process.

The robust, standardized tools empower utility engineers to easily change automation settings in minutes rather than months by eliminating costly custom programming and "trial and error" debugging. Utility engineers can own the feeder automation process with FAM's many advanced tools instead of paying third-party resources to make simple changes.

Feeder Automation Manager includes powerful standard features to improve system functionality

Standard functionality includes:

- Fault isolation and reconfiguration
- Loss of source voltage reconfiguration
- Setting profile management for multiple system configurations
- System mis-coordination correction
- Movable open points so the system can be active in any configuration
- Loss of voltage reconfiguration for open conductors
- Manual/SCADA initiated return-to-normal
- Load transfer or drop capabilities for overload conditions
- Hot Line Tag automatically prevents re-energization of the line segments connected to that device

Designed for scalability

Eaton's FAM allows users to easily add and remove devices using a standardized interface without reprogramming the reconfiguration algorithms. With the ability to handle thousands of input devices, automation is only limited by the physical load flows of the power system and communication infrastructure providing data to the system.



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CONFIDENCE BEFORE DEPLOYMENT

With Feeder Automation Manager, utilities can take charge with configurable software. Standardization of a configurable solution reduces installation and training costs with each deployment and enables utilities to deploy self-healing grid as an integrated process rather than a project.

Enhanced integration capabilities

Virtually any existing control with standard communication protocols can be integrated into the Feeder Automation Manager system, eliminating the need for additional hardware or protocol converters. Eaton's FAM solution ensures compatibility with existing legacy controls and the next generation of intelligent electronic devices.

FAM software seamlessly integrates into existing SCADA and DMS systems, allowing operators to enable and disable automation and provides a view of what is happening on the system from the control center.

Distributed Energy Resource (DER) integration

FAM can integrate with DERs. The DERs can be modeled in FAM to account for the issues of load masking and unpredictable load support. FAM can also control the DER connecting switch and can ensure that the DER has been disconnected from the system before the associated line segment is re-energized. FAM can then block those DERs from reconnecting to an alternate feeder. FAM can also estimate the output of solar DERs that may be aggregated in an area of dense rooftop installations. By knowing the GPS coordinates of the solar DERs, FAM can eliminate the need for direct measurement of the contributions of those DERs which may be difficult to obtain.

Flexible communication media

FAM software will work with multiple communications media including serial and Ethernet radios, fiber, cellular modems, and others. The software will also work with any combination of communication technologies allowing utilities to leverage their existing communications infrastructure and upgrade to new communication technologies in the future as needed.

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Advanced security

Eaton has a robust cybersecurity design, development and review process in place for critical systems like FAM. FAM software incorporates security features including individual authentication and authorization via user roles to limit data and control access. All user actions are logged, providing system administrators oversight of all active user sessions. Active directory user groups can be defined so that once initial setup is completed, all future user access can be controlled via the network administration.

Prior to each new software release, all source code is scanned and optimized to eliminate any possible exploitable code vulnerabilities. All operating system security patches are reviewed and tested for compatibility issues within 10 days of release.

Commitment to Cybersecurity

Eaton's experience and commitment to cybersecurity has led to the establishment of Eaton's Cybersecurity Center of Excellence (COE). Through its Cybersecurity COE, Eaton constantly monitors the ever changing landscape of cybersecurity, identifies threats and provides recommendations for security enhancements.

How the integrated process works

Distributed or centralized control

Eaton's FAM software can be distributed geographically across a utility's system or installed on a central server in the control center.

Easy operation with HMI

Eaton's Visual T&D software which is integrated into the FAM software package allows the electrical system to be visualized for system monitoring and control. Control of the system can be performed at the substation with an HMI, or at the control center level using SCADA commands. Control includes the ability to individually operate any switch for manual restoration or to use the built-in Return-to-Normal functionality. The HMI provides virtual push-button control for enabling or disabling automation functionality, resetting targets, printing feeder health reports, and more.

Feeder Automation Manager Simulator

The FAM simulator provides users the ability to test the configurations and automation engine response under normal and abnormal power system conditions. The automation engine analyzes the data produced by the simulator and responds to that data as if it were produced by the real devices in the field. The automation engine is unaware that the data is produced by the simulator, ensuring that its response is identical when the system is deployed in the production environment.

The FAM simulator can facilitate laboratory testing – reducing concept to installation time and minimizing automation costs. The FAM simulator resides on a PC and is a powerful tool for training, commissioning and ensuring robust deployments.

Post event traceability, analysis and reporting

Eaton's FAM solution provides logs, event reports and analysis for each event on the system. A complete set of logs for all system services is maintained both locally on the system server and can be sent to a remote syslog server for duplicate storage and archiving purposes.

All actions are recorded in detail to allow for post event traceability and analysis. All event entries are time and date stamped to the server clock, which allows the automation engineer to easily audit events on the distribution system.

The FAM system also provides summarized event reports. These event reports summarize what actions were taken by the FAM system and the time that was required for the event to complete. Each event is analyzed by the system and categorized as completely successful, partially successful or unsuccessful, helping the utility implement a comprehensive continuous improvement process for the self-healing system.

Powerful reporting and analysis

Summary report example shown.

Title	Utility XYZ
Subsystem	NorthCentralRegion
Start Time	Jul 21 2020, 02:23:53 PM (-05:00)
Duration	29 seconds and 868 milliseconds
Type	Fault
Outcome	Success
Outcome details	Automation completed successfully
Initial condition	Switching Device R11: New fault
End Time	Jul 21 2020, 02:25:39 PM (-05:00)

FAM saves time by providing real-time reporting and analysis to keep stakeholders informed of system performance

For more information on
Eaton's Feeder Automation
Manager visit Eaton.com/FAM

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