The ASCO 5702 Power Management Gateway bridges the gap between facility Operating Technology (OT) and the Internet-of-Things (IoT) to offer advanced Electrical Power Management System (EPMS) capabilities in an industrial-grade, network appliance. The following narrative describes its features, benefits, and application.

**Benefit Highlights**

An ASCO 5702 Power Management Gateway is shown in Figure 1. Its features and benefits include the following.

*An Open IoT Data Interface*

The 5702 Gateway translates equipment data and unifies communication mediums to a common, open, Ethernet interface. The device provides for data transfer between facility equipment and IoT building systems, enabling easier, deeper, and quicker visibility into facility power and energy conditions.

*Continuous Power Data Logging and PlayBack*

An ASCO 5702 Power Management Gateway can continuously record system-wide power data, then replay power events on animated, interactive, one-line diagrams. This provides for intuitive understanding of power events and enables faster response, forensic evaluation, predictive simulation, and enhanced personnel training.

*Remote Testing*

The ASCO 5702 Power Management Gateway enables safer and more efficient remote testing of transfer switches and engine-generators, and can manage loading through load bank controls.

*Streamlined Regulatory Reporting*

The ASCO 5702 Power Management Gateway helps facilities comply with code requirements, including CMS, NFPA, and IEC fire codes used for accreditation by The Joint Commission and Det Norske Veritas. The Gateway automatically generates emergency power testing and utility outage compliance reports for engine-generators, transfer switches, load banks, and fire pumps controllers.

*EcoStruxure™ Compatibility*

Unlocks the benefits and value of the Schneider Electric platform for power network edge-control applications, analytics, and services.

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**Figure 1:** The ASCO 5702 Power Management Gateway is a network appliance offering advanced power management capabilities.
Background Information

Critical backup power equipment, such as automatic transfer switches, has been used for nearly a century. Corresponding developments in paralleling switchgear, distribution equipment, and peripheral devices such as meters and surge protection devices have further advanced both the function and reliability of backup power systems. Hospitals, healthcare facilities, and mission-critical facilities such as data centers are particularly reliant on these systems to sustain operations during public power outages.

While critical power hardware has continually improved, monitoring and control systems have developed even more rapidly, particularly after the advent of internet communications. Modern developments include sophisticated monitoring and control solutions such as ASCO’s Critical Power Monitoring System (CPMS). Designed to increase understanding of real-time and historical power events, these solutions typically involve deploying advanced software to servers and clients on dedicated networks. Such systems can require significant time and resources to deploy.

The ASCO 5702 Power Management Gateway is an industrial-grade network appliance equipped with the latest version of ASCO’s industry-leading critical power management platform. Serving up to 256 power devices from a single unit, it can be mounted on a wall, inside power equipment, or in an equipment rack. Capable of aggregating signals and data from sources that use disparate communication protocols, transmission media, and data formats, the 5702 Gateway logs and relays data, signals, and alarms to local and remote annunciators and remote terminals as well as other building and IT monitoring systems. It offers all the functions and capabilities of a dedicated EPMS, with full capabilities for managing facility power in a network appliance. Its features and functions enable users to visualize and assess detailed power system information, reduce downtime, streamline regulatory compliance, and reduce costs.

The 5702 Gateway is also available with redundant features such as dual power supplies and redundant storage. In addition, two, separate, mirrored, Gateways can provide for redundant operation should one of the units fail.

Scalable to a Wide Range of Applications

The ASCO 5702 Power Management Gateway can monitor and control source, metering, and distribution devices, and is suitable for managing critical power equipment in small and large buildings alike. For medical facilities, it can manage backup power equipment for simple walk-in clinics to large medical complexes. When additional capacity is required, multiple gateways can communicate to provide seamless monitoring and control across large power systems.
Because 5702 Gateway is compact, it can be mounted on walls, inside equipment, or on equipment racks, and thus installs easily in backup power systems of nearly any configuration. For smaller systems, it can be obtained in models that handle just a few devices. For example, a standalone walk-in clinic may be served by a utility service and a single generator feeding the power system through an Automatic Transfer Switch (ATS). In this example, a Power Management Gateway may be simply configured to supply real-time information through a webpage, and through alarms and notifications to mobile devices via email, as shown in Figure 2.

In a mid-size application, a 5702 Gateway might serve an outpatient surgery center. In this example, a mid-sized facility might use a utility service and two generators that feed power through two ATSs. Equipped with a UPS for certain systems, and with cascaded surge protection on power distribution panels and critical equipment, the facility can also connect load banks for testing. A 5702 Gateway can be configured to monitor and test all this equipment. In addition, it can supply information for a variety of purposes and systems, including an intelligent alarm dashboard that groups and prioritizes alarms, and interactive one-line diagrams that display real-time metrics and status indicators on any client or connected web-enabled device. Figure 3 shows such a configuration.
In a large facility, a 5702 Gateway may be configured to handle up to 256 devices, and additional Gateways can be connected to further increase capacity. In a hospital, emergency power may be supplied by multiple generators and directed by power control switchgear and multiple ATSs. In addition, a hospital may be located on a campus with other facilities, such as the walk-in clinic and the outpatient surgery center. In this instance, the power equipment in each building could be monitored by one or more Gateways that feed information to a single monitoring system, and then provide advanced outputs. Advanced power metering, power analysis tools, and dynamic one-line diagrams with PLAYBack capabilities could facilitate rapid decision-making during power events as well as post-event forensic power analyses. Figure 4 shows a multi-facility solution with these capabilities.

**Figure 4: Prospective Hospital Campus Application**

**Bridging OT and IT**

Power equipment is typically operated and monitored by proprietary communications hardware and software. However, the value of these systems can be enhanced by connecting them to IT systems that already exist. To do so, communication protocols must be converted to those used by the highest-level system. For instance, one system may contain equipment that communicates using proprietary protocols, other devices that provide serial communications, and simple devices that supply status information through digital relays. Similarly, various monitoring systems require access to facility power and energy data using different open protocols and formats. A 5702 Gateway aggregates equipment data and transmits it simultaneously over Ethernet using open protocols such as, Modbus, BACnet, SNMP and OPC. This provides disparate systems with data they need in the format they need it, such as Building Management Systems, IT Management Systems, and other Enterprise Software Applications.
The 5702 Gateway reduces the time, effort, and expense associated with integrating communication protocols, mediums, and formats. It accepts inputs transmitted over various mediums. It is also equipped with pre-engineered data mapping for devices from major power equipment manufacturers. With these features, a 5702 Gateway aggregates signals and information from power devices, avoiding a need for further system integration. In addition, it can intelligently process incoming data to assess power equipment conditions, and then send alarms, notifications, and data to various devices and systems. This solution bridges differences between OT and IT to provide unprecedented integration and visibility as well as a high degree of interoperability between normally isolated systems. Figure 5 provides an overview of 5702 Gateway communication functions.

![Diagram of 5702 Gateway communication functions](image)

**Security and Authentication**

The 5702 Gateway enhances cybersecurity by employing IT-Compliant Encryption and IT-Compliant Authentication.

**IT-Compliant Encryption**

All data and control signals that pass between the 5702 Gateway and equipment fitted with ASCO 5170 Quad-Ethernet Modules are encrypted. They do not use plain text that can be easily read by unauthorized viewers. The Gateway also accepts IT-provided, signed, digital, TLS/SSL certificates, and encrypts all data sent to client computers that access its web-based power management application.

**IT-Compliant Authentication**

The 5702 Gateway offers four user levels and authentication. It is compatible with IT LDAP Active Directory Services for easier and more secure management of user profiles. For example, if an employee leaves a company’s workforce, the Gateway authentication for that user will be automatically removed when the firm’s IT Department revokes the employee’s access to its corporate networks. This reduces a facility manager’s duties for managing access and authentication.
Power Management

The 5702 Gateway provides comprehensive power management capabilities by directly monitoring power equipment from the service entrance to branch circuits. When power meters are present, the 5702 Gateway can log energy usage data, enabling data review and operational adjustments. Opting for custom, animated, one-line diagrams provides interactive screens showing the state of devices as well as power flow through circuits. Unlike display values on digital and analog meters, seeing power information in the visual context of an entire power system facilitates rapid understanding of conditions.

Building on interactive one-line diagrams, operators and engineers can use the 5702 Gateway to replay past events and prospective operating scenarios. This PlayBack feature uses logged data to visually replicate power events. The PlayBack feature is valuable when forensic analysis is required to discover why power events occurred. PlayBack can also be used for predicative simulation without disturbing actual power system operations. To do so, users define operating parameters and sequences to test system designs and operating outcomes. PlayBack can also help operator trainees visualize the causes and effects of power events on electrical system performance. A one-line PlayBack screen is shown in Figure 6.

Figure 6: The PlayBack feature uses the 5702’s event log to reconstruct events and display them sequentially on custom one-line diagrams.
Streamlined Regulatory Reporting

The 5702 Gateway continually records power equipment data into historical event logs, including data from test events and utility outages. The 5702 can also recognize when outages meet run-time and loading criteria for backup power system testing. When such outages occur, the 5702 automatically uses the data to generate test reports that comply with industry standards and regulations, thus reducing the quantity of disruptive and costly test events. For additional information about this capability, review our white paper entitled Automated Reporting for Emergency Power Systems. A report example shown in Figure 7.

EcoStruxure™ Compatibility

The 5702 Gateway is compatible with EcoStruxure, Schneider Electric’s IoT-enabled, open, interoperable platform for managing power systems in commercial buildings, manufacturing plants, data centers, and other facilities.
SUMMARY

Power Monitoring Gateways centralize monitoring and testing functions, which provide the capability to remotely test engine-generators, transfer switches, and power control systems. They also provide for remote control of load banks during testing. These capabilities can improve safety and efficiency.

The ASCO 5702 Power Management Gateway offers a fully provisioned EPMS in an industrial-grade network appliance. Its open IoT data Interface translates disparate power equipment signals and data to a unified Ethernet output that can be read by building monitoring and IT systems without significant system integration. Its continuous power logging capability enables power event playback, fast response, forensic evaluation, predictive simulation, and enhanced personnel training. In addition, the 5702 Gateway’s remote testing and automated reporting capabilities streamline operations and enhance compliance.