

Phoenix™ SG-5000 Gateway

Amperion's Phoenix SG-5000 is a secure multi-protocol smart grid network gateway designed to meet station class standards delivering station-to-station and station-to-control center communications. The Phoenix SG-5000 provides a robust platform that is based on an open architecture, supporting multiple physical interfaces, protocols, and devices. Amperion's flexible and standards based architecture empowers utilities to make the best communications selection appropriate for specific applications and environmental factors.



Smart Grid Application Support

The Phoenix SG-5000 was designed from the ground up to support smart grid applications requiring a robust network gateway. Examples:

Real Time Protective Relaying

For improved grid reliability and efficiency, utilities will require real-time protective relaying whereby differential current is measured and compared.

Station Video Security

Physical protection of utility assets such as substations is of great concern. Video cameras are being placed at substations where video footage is captured and transferred back to the control center.

Automated SCADA Data Collection

SCADA data is collected at the substation and automatically sent across the network to other substations and/or back to the control center saving the utility the cost of manual readings on site.

Real Time Synchrophasor Data Streaming

Synchrophasor data aggregation requires broadband communications at every station. PMU data is used for dynamic real time monitoring of grid conditions.

Features and Benefits

Redundancy and High Availability

The Phoenix SG-5000 provides Six 9's of system availability using redundant communications paths. The IP routing capabilities of the Phoenix SG-5000 enable data to be re-routed in the event of a single network path failure. Amperion's patented Switcher™ algorithm provides built-in intelligence for instant failover and recovery.

End-to-End Quality of Service (QoS)

There are a plethora of smart grid applications present and evolving that will contribute to network congestion. Sensing and control applications, energy load, resource management, and advanced metering will all contribute to increased network traffic. Through policy management, QoS will enable traffic priority based on delay, jitter, bandwidth, packet loss, and network availability.

Multi-Tier Cyber Security

The Phoenix SG-5000 employs "Defense in Depth" security via Amperion's multi-tier cyber security solution. IP VPNs are used to secure network tunnels, while RADIUS AAA is used to authenticate devices and users accessing the network. The 256 bit AES advanced encryption is used on every network link to secure data going across the network.

Open, Scalable Architecture

Amperion's IP based open architecture supports multiple network media interfaces, protocols, and physical devices. This enables utilities to select best-of-breed network components and devices rather than being locked into a single solution that may not be adequate to meet requirements.

Manageability

The Phoenix SG-5000 family is managed and monitored by the Amperion SG-NMS. The NMS provides report generation capabilities so the user can monitor the Phoenix SG-5000 performance. Reports include a graphical representation of throughput, temperature, uptime and availability. The Amperion SG-NMS is integrated with Google Earth enabling static snapshots or dynamic monitoring of the network and its geography map in real-time.

FIXED NETWORK SPECIFICATIONS/ WAN INTERFACES

FIBER: Optional

Microwave: Optional

HVBPL:

Standard	IEEE 802.3u
Frequency	2 – 34 MHz
Frequency Agility	5MHz band pass filters; 6 software selectable non overlapping channels
External Connector	50 ohm N connector

LAN INTERFACES

Ethernet	10/100 Mbps external; RJ45 Serial RS 232
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MANAGEMENT

Options	HTTPS, SSH CLI, SNMPv2c
Logging	Syslog

COMPLIANCE

Regulatory	CENELEC EN 60950-1 ANSI/UL 60950-1, CAN/CSA C22.2 60950-1
CE Mark	Compliant

PHYSICAL CHARACTERISTICS

Width	19" wide rack mountable
Height	4U
Weight	20lbs
Mounting	Substation control room

ENVIRONMENTAL

Operating Temperature	-40 C to 85 C
Operational Humidity	10% to 80% non-condensing
Packaging	

ELECTRICAL

Input	125VDC or 48VDC Terminal Block
Consumption	40W

HV Specifications

HV Line Voltage	69KV to 138KV
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MV Specifications

MV Line Voltage	6KV to 46KV
MV Line Current	Up to 300A
MV Line Frequency	50Hz or 60Hz

STANDARDS

Substation	IEEE1613, IEC61850
Fiber	IEEE C37.94,G.703
Security	NERC CIP, AES

Protected by multiple US and International Patents:

US 5,684,450; US 5,929,750; US 5,933,071; US 6,172,597; US 6,144,192; US 6,282,405; US 6,756,776; US 6,885,674; US 6,985,715; US 6,993,317; US 7,307,357; US 7,492,245; US 7,535,685; US 5,864,284; US 6,040,759; US 7,319,717; and other patents pending.