

Phoenix SG-5000 Gateway

Amperion's Phoenix SG-5000 is a multi-protocol smart grid communications gateway designed to meet station class standards delivering station-to-station communications. The Phoenix SG-5000 provides a robust platform that is based on a standard IP architecture, supporting multiple physical interfaces, protocols, and devices. Amperion's flexible and standards based architecture empowers utilities to make the best communications interface selection that meets their application needs.



Smart Grid Application Support

The Phoenix SG-5000 supports multiple smart grid applications requiring a robust communications platform.

Line Protection

The B-PLC technology is ideal for deploying the latest line protection schemes for transmission lines, like Current Differential, POTT, and DCB.

Automated SCADA Collection

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

Lease Line Replacement

With B-PLC leased phone lines to substations can now be retired, saving the utility recurring telecom expenses.

Station Security

B-PLC is a low cost way to meet NERC-CIP requirements for station security using video surveillance to protect against copper theft and vandalism.

Features and Benefits

Redundancy and High Availability

The Phoenix SG-5000 provides Five 9's of system availability using redundant communications paths. The B-PLC system utilizes two phases of the three phase transmission line to maximize performance in harsh environments and continued operation during a single line to ground fault.

Cyber Secure and Tamper Proof

The Phoenix SG-5000 employs hardware based 256 bit AES advanced encryption and access to configuration and performance data is highly protected by unique user account and password via SSH and HTTPS protocols. In addition, B-PLC communications are transmitted over utilities' own wires and are impossible to tamper and interfere with.

Open, Scalable Architecture

Amperion's IP based cyber secure architecture supports multiple network interfaces, protocols, and physical devices. This enables a migration path for the utility. Specifically, the Phoenix supports Sonet TDM with an integrated converter from a synchronous serial TDM interface to Ethernet. It also directly supports Ethernet and Serial connectivity, providing a roadmap from Serial legacy protocols to a standard IEC 61850 with multiple Ethernet ports.

Manageability

The Phoenix SG-5000 is managed and monitored by the Amperion-NMS. The NMS provides continuous monitoring and reporting with historical reports on an hourly, daily, monthly, and yearly basis. Reports include a graphical representation of throughput, temperature, uptime and availability. The Amperion-NMS can be remotely accessed through a secured cellular connection.

Complete B-PLC Smart Grid Solution

The Phoenix gateway together with the B-PLC Coupler and the Amperion NMS, make up a complete solution set of B-PLC communications over sub-transmission and transmission lines for smart grid applications.

Technical Specification:

Protocols:

- TCP/IP, IPsec, IPv4, IPv6 ready
- IEEE 802.1D Spanning Tree
- NAT, FTP, DHCP
- Serial over IP (SLIP, PPP)

Management:

- SNMP v2c, v3
- CLI: Serial, SSH
- WEB: HTTPS
- Syslog

Cyber Security:

- SSH for Serial Traffic
- HTTPS for Web Access
- Secure File Transfer (SFTP)
- Port Based Security
- IEEE 802.1x Port Access Authentication
- IPsec VPNs
- DES/3DES, AES, PSK, X.509, TKIP
- Multilevel Accounts
- RADIUS
- IEEE 1686-2007 (IED Security Standard)
- IEC 62351 1-8 SCADA (Data & Comm. Security)

Broadband Power Line Carrier:

- 200Mbps OFDM Modem 2 Units
- Connector 50 ohm N
- Forward Error Correction
- Dynamic Rate Adaption based on detected BER
- TX Power (Programmable) normal: -50 dBm/Hz
high setting: -38 dBm/Hz
- TX Mask (Programmable)
- RX Dynamic Range 90dB min
- Sensitivity max > --50dBm/Hz
min < -140dBm/Hz
- Repeater-Less Distance IP Data Rate (5MHz Channel)
up to 138KV 10Mbps @ 8km
- Chan, Phy Rates, Bandwidth Frequencies

Chan	Phy Rates	Bandwidth	Frequencies
1	42Mbps	5MHz	2.0 - 7.0MHz
2	42Mbps	5MHz	7.0 - 12.0MHz
3	42Mbps	5MHz	13.0 - 18.0MHz
4	42Mbps	5MHz	18.0 - 23.0MHz
5	42Mbps	5MHz	24.0 - 29.0MHz
6	42Mbps	5MHz	29.0 - 34.0MHz

Ethernet Port:

- 10/100 BASE-TX 3 Ports
- Connector RJ45
- Auto-Negotiating IEEE 802.3u

Serial Port:

- RS-232 2 Ports
Connector DB9 Female
Data Rates: 300 to 115.2kbps
- RS-422 Synchronous (Optional) 2 Ports
Connector DB25 Female
Data Rates: 64kpbs to 1.44Mbps

Data Switching:

- MAC Entries 8K MAC Addresses
- 16Gbps Non-Blocking
- BPLC to Ethernet Latency 3ms
- QoS Support
8 Priority Levels
IEEE 802.1Q 256 VLANs
Programmable Bandwidth and Latency allocation
- Repeater Operation
BPLC to BPLC Latency 3ms @ 10Mbps
- IEEE 802.3x Flow Control
- IEEE 802.1w Rapid Spanning Tree
- 802.1s Multi Spanning Tree
- IEEE 802.1Q/p
- Link Aggregation Control Protocol (LACP)

Packaging:

- Dimensions -48cm x 17cm x 44cm
(17.00" x 7.00" x 17.25")
- Weight 6.8Kg (15.lbs)
- Mounting 19" Computer Rack

Environmental:

- Operating Temperature 0° to 50°C
- Storage Temperature -40° to 85°C
- Humidity 10% to 80% non-condensing

Electrical:

- Operating Voltage 125V AC/DC
250V AC/DC
48V DC Only
- Power Consumption 30Watts
- Connector Terminal Block

Compliance:

- Emissions/Immunity EU R&TTE LV Directives
ETSI EN 301 489-1
ESTI EN 301 489-17
FCC Part 15 Class A
EN55024, EN61000
IEEE 1613
IEC 61850-3
- Safety CENELEC EN 60950-1
ANSI/UL 60950-1
CSA C22.2 60950-1

Ordering Information:

- Phoenix -

120 - 500y - xxx - 00		Base Unit
xxx	125	125 V AC/DC
	250	250 V AC/DC
	048	48V DC Only
y	0	No Sync Ports
	1	RS-422, 1 Port
	2	RS-422, 2 Port

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 U.S. and Foreign patents pending.