MAKING THE GRID SMARTER

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

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		
xxx		Base Unit
	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