

NES Data Concentrator

The intelligent Smart
Grid Manager



The NES¹ Data Concentrator efficiently manages smart meters and other smart grid devices on a neighborhood area low-voltage power line network. It provides the connectivity infrastructure between these devices and the Unified Intelligent Energy Management (UIEM) Control Center at the utility's service center.



The Data Concentrator automatically:

- Discovers smart grid devices.
- Monitors the health and operation of the devices.
- Securely configures devices through encrypted communications.
- Creates and optimizes the low-voltage power line mesh to ensure reliable communications.
- Coordinates the bidirectional delivery of device data, including metering data.

Features

Enclosure

- Robust; vandal and weather resistant.
- Translucent face cover lets installers easily see internal modem LEDs for WAN verification and diagnostics.
- 4 utility-sealable cover screws.
- Easily wall-mountable with 3 screw holes.
- Internal modem bay accepts and powers standard wired and wireless modems (DC-1000/SL), and includes a weather-tight gland for fitting an antenna or antenna cable (for an external modem antenna).

Installation

- Design lets utility choose the lowest-cost installation point on the low-voltage network, or where WAN signal strength is best.
- Remotely upgradeable firmware enables true zero-maintenance installation. Future market demands can be covered by updating the device's firmware.
- Besides the distribution transformer it can be installed at any point in the low-voltage power line network topology.

WAN-Communication

- Communicates with the NES System Software using any IP-capable network, whether wired or wireless, public or private, WAN or LAN, including analog telephone service.
- EIA-232 serial version uses standard IP Point-to-Point Protocol to connect with the modem.
- Intelligently compresses data to reduce WAN bandwidth use.
- Supports end-to-end data encryption to secure metering data and ensure customer privacy.
- Multilayered authentication thwarts potential cyber attacks.

Neighborhood Network Management

- Automatically discovers meters and other devices at installation, and as the result of dynamic network topology changes.
- Collects and reports meter data, including consumption, load profiles, and power quality measurements and forwards collected data to UIEM Control Center.
- Downloads tariff tables and

configuration data to devices.

- Broadcast capability enables time-critical services such as demand response and load-shedding.
- Maintains accurate date and time in all devices.
- Monitors and reports theft and tampering, including phase inversion for single phase meters.
- Sums total daily energy consumption by supervised meters for use in line-tap detection.
- Detects and reports trouble conditions such as line breaks and device failures.
- Independently initiates connections to central System Software to report urgent events (configurable).

Options

- EIA-232 serial port option with internal modem bay to connect to wired or wireless modems for networks such as GPRS, CDMA, EV-DO, or PSTN:
- Ethernet option with fix installed Ethernet modem to connect to any IP-based network on infrastructure such as fiber optic, cable, DSL, private RF mesh; GPRS, etc.

Specifications

Maximum NES Devices Managed

1,024 NES electricity meters and 4,096 associated M-Bus devices (Models 78704-001K and 78705-001K) or

5 NES electricity meters and 20 associated M-Bus devices (Model 78704-001V and 78705-001V).

Input Voltage

120/240VAC, -10% to +20%, 50/60Hz.

Phase Coupling

Connections for 3 phases (L1Ø, L2Ø, L3Ø) and Neutral.

Power Consumption

5W to 10W typical.

Clock

Real-time clock accurate to ±1 minute per month; corrected by NES System Software.

LAN Interface

CENELEC A-band power line communication channel.

WAN Interface

Standard Hayes-compatible modem or null modem interfacing to an IP-capable network (Model 78704).

10BASE-T/100BASE-TX Ethernet with 2 meter Ethernet cable (Model 78705).

EIA-232C Serial Port

Operates at standard baud rates up to 115.2 kbps (DC-1000/SL).

Optical Port

IEC 61107 (physical and electrical requirements).

Data Security

CHAP, MS-CHAP, PAP and 128-bit application-level authentication for WAN; 96-bit authentication on power line network; 128-bit RC4 encryption for WAN and power line communication; strong passwords protect optical communication, with additional brute force attack protection.

Electromagnetic Compatibility

EN50065-1:2001, EN55022:1998, EN55024:1998, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN61000-4-12, EN61000-4-13, EN61000-4-16.

Temperature, Specified Operating Range

-40° to +70°C.

Humidity

25-90% @ 50°C (non-condensing).

Enclosure Type

Plastic; tested to IP56.

Enclosure Dimension

22.2cm L x 16.9cm W x 7.9cm H.

Modem Dimensions

11cm x 7cm x 3cm (maximum, DC-1000/SL).

Modem Power Supply

14VDC, 3W (maximum, DC-1000/SL).

Antenna Connection

Supports an external antenna through the upper enclosure gland (DC-1000/SL).

Mounting

DIN 43857; 3 screw hole mounts for ANSI markets; mounting points for an NES IEC poly phase or single phase meter are included on the face.

Safety Ratings

Certified by TÜV, SEMKO, and KEMA-KEUR per EN 60950.

Certified by TÜV per UL 60950 and CSA 60950.

CE Mark.

RoHS Compliance

Compliant with European Directive 2002/95/EC on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment.

Data Storage

Non-volatile memory

Life Expectancy

20-year design.

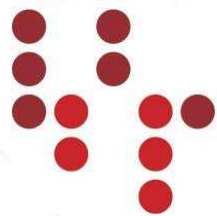
Documentation

DC-1000/SL and DC-1000/SLE Data Concentrator User's Guide 078-0370-01A.

Ordering Information

- DC-1000/SL Data Concentrator 78704-001V (manages up to 5 devices)
- DC-1000/SL Data Concentrator 78704-001K (manages up to 1,024 devices)
- DC-1000/SLE Data Concentrator 78705-001V (manages up to 5 devices)
- DC-1000/SLE Data Concentrator 78705-001K (manages up to 1,024 devices)

Model 78704 includes a pre-assembled and attached power cable, and terminal covers extensions suitable for use if an NES IEC Poly Phase or Single Phase meter is installed on the face of this product. The 78704 model numbers do not include the modem, serial and power cables for the modem, or an antenna. Model 78705 includes a pre-assembled and attached power cable and a captive 2 meter Ethernet cable. Factory provisioned versions as well as customizations of the hardware and software are available. Contact your Echelon sales representative for details.



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