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MS-NAE35xx-x, MS-NAE45xx-x, MS-NAE55xx-x, NAE8500-x

Network Automation Engine (NAE)

Description

The Network Automation Engine (NAE) brings an entirely new generation of technology into the Metasys® Building Automation System (BAS). The NAE is an automation engine that manages facilities using information and Internet technology.

The NAE uses the communication technologies of the building automation industry, including BACnet® protocol; LONWORKS® network; the N2 Bus to monitor; supervise Heating, Ventilating, and Air Conditioning (HVAC) equipment; and lighting, security, fire, and access control. The NAE55 supports a comprehensive set of supervisory features and functions for large facilities and technically advanced buildings and complexes. The NAE35 and NAE45 extend the power of the NAE to smaller buildings and enable the wider distribution of supervisory functions in larger facilities. The NAE85 is a high-capacity NAE. This device allows the integration of large BACnet Internet Protocol (IP) systems and can take the place of multiple NAEs.

A single NAE or a network of multiple NAE devices within a building provide monitoring and control, alarm and event management, data exchange, trending, energy management, scheduling, and data storage.

The NAE has an embedded Site Management Portal user interface and supports concurrently connected Web browsers with password access control and the security protection technology of the Information Technology (IT) industry.

Refer to the *Network Automation Engine Product Bulletin (LIT-1201160)* for important product application information.

Features

- communication using commonly accepted IT standards at the automation and enterprise level
- Web-based user interface
- Site Director function
- support for Web services at the automation network level
- user interface and online system configuration software embedded in NAE
- supervision of field controller networks including N2 Bus, LONWORKS network, BACnet MS/TP, and BACnet IP devices
- multiple connection options for data access

Applications

The NAE software is specifically designed to meet the needs of building owners and managers to efficiently monitor and control all the mechanical and electrical systems in a typical building such as:

- HVAC units
- central equipment including chillers and boilers
- lighting and electrical distribution
- power generation and energy monitoring equipment
- interfaces to security and fire detection systems

The NAE monitors equipment by collecting data from the field control devices, then coordinating the required commands and sending them to the equipment at the required priority.



NAE35/NAE45



NAE55

Repair Information

If the NAE fails to operate within its specifications, refer to the *Network Automation Engine (NAE) Product Bulletin (LIT-1201160)* for a list of repair parts available.

Selection Charts

NAE35 (Part 1 of 2)

Product Code Number ¹	Description
MS-NAE35xx-x (Base Features of Each NAE35)	NAE35 Network Automation Engines: Requires a 24 VAC power supply. Each model includes one RS-232-C serial port, one USB serial port, one Ethernet port, and an MS-BAT1020-0 Data Protection Battery.
MS-NAE3510-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an additional RS-232-C serial port for optional external modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.
MS-NAE3510-2U	Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an additional RS-232-C serial port for optional external modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk. Note: This model is UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment.
MS-NAE3511-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an internal modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.
MS-NAE3514-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; features Basic Access support; includes an additional RS-232-C serial port for optional external modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.
MS-NAE3515-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; features Basic Access support; includes an internal modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.
MS-NAE3520-2	Supports one LONWORKS trunk, includes an additional RS-232-C serial port for optional external modem. Supports up to 64 devices on the LONWORKS port.
MS-NAE3520-2U	Supports one LONWORKS trunk, includes an additional RS-232-C serial port for optional external modem. Supports up to 64 devices on the LONWORKS port. Note: This model is UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment.



Network Automation Engine (NAE) (Continued)

NAE35 (Part 2 of 2)

Product Code Number ¹	Description
MS-NAE3521-2	Supports one LONWORKS trunk, includes an internal modem. Supports up to 64 devices on the LONWORKS port.
MS-NAE3524-2	Supports one LONWORKS trunk, features Basic Access support, and includes an additional RS-232-C serial port for optional external modem. Supports up to 64 devices on the LONWORKS trunks.
MS-NAE3525-2	Supports one LONWORKS trunk, features Basic Access support, and includes an internal modem. Supports up to 64 devices on the LONWORKS trunks.

1. All models are also available in a Buy American version (add a G after the code number). For the European version, add an E after the code number. For repair parts, add -702 after the code number.

NAE45

Product Code Number ¹	Description
MS-NAE45xx-x (Base features of each NAE45)	NAE45 Network Automation Engines: Requires a 24 VAC power supply. Each model includes one RS-232-C serial port, one USB serial port, one Ethernet port, and an MS-BAT1020-0 Data Protection Battery.
MS-NAE4510-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an additional RS-232-C serial port for optional external modem; supports up to 100 devices on the N2 or BACnet MS/TP trunk.
MS-NAE4510-2U	Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an additional RS-232-C serial port for optional external modem; supports up to 100 devices on the N2 or BACnet MS/TP trunk. Note: This model is UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment.
MS-NAE4511-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an internal modem; supports up to 100 devices on the N2 or BACnet MS/TP trunk.
MS-NAE4520-2	Supports one LONWORKS trunk, includes an additional RS-232-C serial port for optional external modem; supports up to 127 devices on the LONWORKS port.
MS-NAE4520-2U	Supports one LONWORKS trunk, includes an additional RS-232-C serial port for optional external modem; supports up to 127 devices on the LONWORKS port. Note: This model is UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment.
MS-NAE4521-2	Supports one LONWORKS trunk, includes an internal modem; supports up to 127 devices on the LONWORKS port.

1. All models are also available in a Buy American version (add a G after the code number). For the European version, add an E after the code number. For repair parts, add -702 after the code number.

NAE55

Product Code Number ¹	Description
MS-NAE55xx-x (Base features of each NAE55)	NAE55 Network Automation Engines: Requires a 24 VAC power supply. Each model includes two RS-232-C serial ports, two USB serial ports, two RS-485 ports, one Ethernet port, and one MS-BAT1010-0 Data Protection Battery. Supports up to 100 devices on each N2 or BACnet MS/TP trunk.
MS-NAE5510-1	Supports two N2 or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk).
MS-NAE5510-0U	Supports two N2 or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk). Note: This model is UL Listed, UUKL 864 8th Edition Smoke Control Equipment and is available for replacement in or expansion of existing UUKL 864 8th Edition Metasys smoke control applications only.
MS-NAE5510-1U	Supports two N2 or two BACnet MS/TP trunks (or one N2 trunk and one BACnet MS/TP trunk). Note: This model is UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment.
MS-NAE5511-1	Supports two N2 or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk); includes an internal modem.
MS-NAE5512-1	Supports two N2 or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk). Note: MS-NAE5512-1 models support N2 tunneling on N2 trunks (only).
MS-NAE5513-1	Supports two N2 or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk); includes an internal modem. Note: MS-NAE5513-1 models support N2 tunneling on N2 trunks (only).
MS-NAE5520-1	Supports a LONWORKS trunk, and two N2 trunks or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk). Supports up to 255 devices on the LONWORKS trunk.
MS-NAE5520-1U	Supports a LONWORKS trunk, and two N2 trunks or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk). Supports up to 255 devices on the LONWORKS trunk. Note: This model is UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment.
MS-NAE5521-1	Supports a LONWORKS trunk, and two N2 trunks or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk); includes an internal modem. Supports up to 255 devices on the LONWORKS trunk.

1. All models are also available in a Buy American version (add a G after the code number). For the European version, add an E after the code number. For repair parts, add -701 after the code number.

Network Automation Engine (NAE) (Continued)

NAE85

Product Code Number	Description
MS-NIE8500-0 ¹	NxE85 model with 1U chassis for mounting in a server rack Note: The NAE85 models ship as MS-NIE8500-0 models. Use the ChangeModel utility in the NxE85 Metasys software to change an NIE85 to an NAE85.
MS-NxE85SW-0	NxE85 software for 10,000 objects (new projects only software)

1. Standard NxE85 models supports 10,000 objects; an upgrade is available to support an additional 15,000 objects.

Accessories

Product Code Number	Description
MS-BAT1010-0	Replacement data protection battery for NAE55 and NIE55. Rechargeable gel cell battery: 12 V, 1.2 Ah, with a typical life of 3 to 5 years at 21°C (70°F)
MS-BAT1020-0	Replacement data protection battery for NAE35, NAE45, and NCE25. Rechargeable NiMH battery: 3.6 V 500 mAh, with a typical life of 10 years at 21°C (70°F)
MS-15KUPG-0	15,000 object upgrade for NxE85
MS-NAETUNL-8	ToggleTunnel utility for converting an NAE55/NIE55 to an NAE55 model with the N2 Tunneling and Wireless N2 Field Bus features enabled. Not for use with MS-NAE5510-0U or MS-NIE5510-0U.
MS-RAP-0	Ready Access Portal Server provides a user interface that is a natural, complementary extension of the Metasys Site Management Portal user interface. Note: This option is not necessary for sites that have an ADS/ADX that is the Site Director because Ready Access Portal Server is provided with the ADS/ADX solution.
MS-EXPORT-0	Export Utility extracts historical trend, alarm, and audit data from the system and presents the historical data in a variety of formats. Note: This option is not necessary for sites that have an ADS/ADX that is the Site Director because Export Utility is provided with the ADS/ADX solution.
AS-XFR100-1	Power transformer (Class 2, 24 VAC, 92 VA maximum output), with enclosure
AS-XFR010-1	Power transformer (Class 2, 24 VAC, 92 VA maximum output), no enclosure
SC450RM1U (OEM Part No.)	Recommended Uninterruptable Power Supply (UPS) for NxE85 Models: American Power Conversion (APC®) Smart-UPS SC 450VA, 280 W 120 VAC input/output with NEMA 5-15R output connections

Technical Specifications

NAE35 and NAE45 (Part 1 of 2)	
Power Requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), Safety Extra- Low Voltage (SELV) power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum)
Power Consumption	25 VA maximum
Ambient Operating Conditions	0 to 50°C (32 to 122°F); 10 to 90% RH, 30°C (86°F) maximum dew point
Ambient Storage Conditions	-40 to 70°C (-40 to 158°F); 5 to 95% RH, 30°C (86°F) maximum dew point
Data Protection	Supports data protection on power failure. Rechargeable NiMH battery: 3.6 VDC 500 mAh, with a typical life of 5 to 7 years at 21°C (70°F); Product Code Number: MS-BAT1020-0
Processor	192 MHz Renesas™ SH4 7760 RISC processor
Memory	128 MB Flash nonvolatile memory for operating system, configuration data, and operations data storage and backup 128 MB Synchronous Dynamic Random Access Memory (DRAM) for operations data dynamic memory
Operating System	Microsoft® Windows® CE embedded
Network and Serial Interfaces	One Ethernet port; 10/100 Mbps; 8-pin RJ-45 connector One optically isolated RS-485 port; 9600, 19.2k, 38.4k, or 76.8k baud (depending on protocol); with a pluggable and keyed 4-position terminal block (FC Bus available on NAE351x and NAE451x models only) One LONWORKS port; FTT10 78 Kbps; pluggable, keyed 3-position terminal block (LONWORKS port available on NAE352x-x and NAE452x models only) One RS-232-C serial port with standard 9-pin sub-D connector that supports standard baud rates. A second serial port, on models without an internal modem, that supports an optional, user-supplied external modem. One USB serial port with standard USB connector that supports an optional, user-supplied external modem. Option: One telephone port for internal modem; up to 56 Kbps; 6-pin RJ-11 connector (NAE models with an optional internal modem have one RS-232-C serial port only.)
Housing	Plastic housing material: ABS + polycarbonate UL94-5VB Protection: IP20 (IEC 60529)
Mounting	On flat surface with screws on three mounting clips or a single 35 mm DIN rail
Dimensions (Height x Width x Depth)	131 x 270 x 62 mm (5.2 x 10.6 x 2.5 in.) Minimum space for mounting NAE35 and NAE45: 210 x 350 x 110 mm (8.3 x 13.8 x 4.3 in.)
Shipping Weight	1.2 kg (2.7 lb)

Network Automation Engine (NAE) (Continued)

NAE35 and NAE45 (Part 2 of 2)	
Compliance	<p>United States UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment (MS-NAE35x0-2U and MS-NAE45x0-2U models only) FCC Compliant to CFR47, Part 15, Subpart B, Class A</p> <p>Canada UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment Industry Canada Compliant, ICES-003</p> <p>Europe CE Mark, EMC Directive 89/336/EEC, in accordance with EN 61000-6-3 (2001) Generic Emission Standard for Residential and Light Industry and EN 61000-6-2 (2001) Generic Immunity Standard for Heavy Industrial Environment</p> <p>Australia and New Zealand C-Tick Mark, Australia/NZ Emissions Compliant</p> <p>BACnet International BACnet Testing Laboratories™ (BTL) 135-2004 Listed BACnet Building Controller (B-BC)</p>
NAE55	
Power Requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), Safety Extra-Low Voltage (SELV) power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum)
Power Consumption	50 VA maximum
Ambient Operating Conditions	0 to 50°C (32 to 122°F); 10 to 90% RH, 30°C (86°F) maximum dew point
Ambient Storage Conditions	-40 to 70°C (-40 to 158°F); 5 to 95% RH, 30°C (86°F) maximum dew point
Data Protection Battery	Supports data protection on power failure. Rechargeable gel cell battery: 12 V, 1.2 Ah, with a typical life of 3 to 5 years at 21°C (70°F); Product Code Number: MS-BAT1010-0
Clock Battery	Maintains real-time clock through a power failure. Onboard cell; typical life 10 years at 21°C (70°F)
Processor	300 MHz Pentium® class Geode® GX1 MMX enhanced processor for MS-NAE5510-0U 400 MHz Geode GX533 processor for MS-NAE55xx-1 models
Memory	256 MB Flash nonvolatile memory for operating system, configuration data, and operations data storage and backup for MS-NAE5510-0U model 512 MB Flash nonvolatile memory for operating system, configuration data, and operations data storage and backup for MS-NAE55xx-1 models. 256 MB Synchronous Dynamic Random Access Memory (DRAM) for operations data dynamic memory for all models
Operating System	Microsoft Windows XP® embedded
Network and Serial Interfaces	One Ethernet port; 10/100 Mb; 8-pin RJ-45 connector Two optically isolated RS-485 ports; 9600, 19.2K, or 38.4K baud; pluggable and keyed 4 position terminal blocks (RS-485 ports available on NAE55 models only) Two RS-232-C serial ports, with standard 9-pin sub-D connectors, that support all standard baud rates Two USB serial ports, standard USB connectors support an optional, user-supplied external modem Options: One telephone port for internal modem; up to 56 Kbps; 6-pin RJ-11 connector One LONWORKS port; FTT10 78 Kbps; pluggable, keyed 3-position terminal block (LONWORKS port available on NAE552x-xxx models only)
Housing	Plastic housing with internal metal shield Plastic material: ABS + polycarbonate UL94-5VB Protection: IP20 (IEC 60529)
Mounting	On flat surface with screws on four mounting feet or on dual DIN rail
Dimensions (Height x Width x Depth)	226 x 332 x 96.5 mm (8.9 x 13.1 x 3.8 in.) including mounting feet Minimum space for mounting: 303 x 408 x 148 mm (12.0 x 16.1 x 5.8 in.)
Shipping Weight	2.9 kg (6.4 lb)
Compliance	<p>United States UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment (MS-NAE55x0-1U models only) UL Listed, UUKL 864 - 8th Edition, Smoke Control Equipment (MS-NAE5510-0 model only) FCC Compliant to CFR47, Part 15, Subpart B, Class A</p> <p>Canada UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment Industry Canada Compliant, ICES-003</p> <p>Europe CE Mark, EMC Directive 89/336/EEC, in accordance with EN 61000-6-3 (2001) Generic Emission Standard for Residential and Light Industry and EN 61000-6-2 (2001) Generic Immunity Standard for Heavy Industrial Environment</p> <p>Australia and New Zealand C-Tick Mark, Australia/NZ Emissions Compliant</p> <p>BACnet International BACnet Testing Laboratories™ (BTL) 135-2004 Listed BACnet Building Controller (B-BC)</p>

Network Automation Engine (NAE) (Continued)

NAE85	
Computer Type	Dell™ PowerEdge™ R300
Power Requirement	120/240 VAC 50/60 Hz
Power Supply	400 W
Ambient Operating Conditions	10 to 35°C (50 to 95°F); 20 to 80% RH (noncondensing twmax = 29°C)
Ambient Storage Conditions	-40 to 65°C (-40 to 149°F); 5 to 95% RH (noncondensing twmax = 38°C)
Data Protection	Recommended Uninterruptible Power Supply (UPS): American Power Conversion (APC®) Smart-UPS SC 450VA, 280 W, 120 VAC input/output, NEMA 5-15R output connections, OEM Part No. SC450RM1U
Processor	Single Dual-Core Intel® Core 2 Duo Processor E6405 at up to 2.13GHz, 2MB Cache, 1066 MHz
Memory	1 GB DDR2, 667 MHz, 1x1GB, Single Ranked DIMMs
Hard Disk	160 GB Serial ATA, 7.2K RPM, 3 Gbps
Operating System	Microsoft® Windows® 2003 Server R2 Web Edition
Network and Serial Interfaces	Two RJ45 1 Gbps Ethernet Ports: Port 1: For communicating with the BAS network Port 2: For communicating with an enterprise network Two Video ports for monitor; one front, one back One 9-pin Serial port Four USB ports (two on front, two on back)
Dimensions (Height x Width x Depth)	4.2 x 42.6 x 66 cm (1.7 x 16.8 x 26 in.)
Housing	Metal
Mounting	Mount in an EIA-310D compatible server cabinet
Shipping Weight	13.5 kg (23 lb)
Compliance	Europe: CE Mark BACnet International BACnet Testing Laboratories™ (BTL) 135-2004 Listed BACnet Building Controller (B-BC)

Minimum Computer Requirements for NxE85 Software	
Product Code	MS-NxE85SW-0 NxE85 software for 10,000 objects (new projects only software)
Recommended Computer Platform	Quad-Core Intel® Xeon® L5410 processor at 2.33 GHz, 12 MB cache, 1333 MHz recommended minimum 2x250 GB RAID1 hard disk DVD-RW drive
Memory	1 GB RAM minimum
Operating System	Microsoft Windows 2003 Server R2 Web Edition
Web Browser	Microsoft Internet Explorer® Version 6.x or Version 7.0 and JRE 1.6.0_07
Communication	Network Interface Single 1 Gbps Ethernet network interface card 10/100/1000 Mbps (100 Mbps or better recommended)
Data Protection	Recommended Uninterruptible Power Supply (UPS): American Power Conversion (APC®) Smart-UPS SC 450VA, 280 W, 120 VAC input/output, NEMA 5-15R output connections, OEM Part No. SC450RM1U