

# FenwalNET 8000-ML™

Effective: October 2012

## Multi-Loop Intelligent Fire Alarm-Suppression Control Unit

F-74-800



### FEATURES

- Multi-loop, intelligent, suppression-focused control unit
- Out-of-the-box features
  - 2 SmartOne SLC with 255 unrestricted addresses each
  - 4 x 40 Display-Keypad
  - 2 NACs and 2 R-NACs
  - 3 Programmable and 1 Trouble Form-C Relays
  - 2 Auxiliary Power Outputs
  - USB ports for PC and printer
  - RS-232 ports for Graphics
  - 4 Programmable soft-switches
  - 120/240 V 50/60 Hz AC input
  - 5.4 A Power Supply Unit
  - 2-Tier or 3-Tier NEMA 1 Enclosure – fits between 16” studs
  - RS-485 Annunciator bus
- Reliable and dependable suppression control features Triple-R redundancy
- Suppression systems include:
  - FM-200, FE-13, 3M Novec 1230 Fire Protection Fluid, Argonite and Halon Clean Agents
  - Water-Mist
  - Sprinkler Supervisory Service
  - Deluge, Pre-Action, Foam, Foam-Water Systems
- Modular expandable
  - From 3 to 8 SLCs (2,040 addresses)
  - Functional and Expansion Modules
  - Power Supply
  - Networkable up to 64 nodes with 130,560 addresses across network
- Event-Output-Control programming
- High level serviceability and diagnostics
  - Ground fault detection by circuit
  - 10,000 event log capacity
- Backwards compatible with installed investment
  - SmartOne SLC devices & protocol
  - Fenwal Control Heads
  - Fenwal Initiators
  - Legacy FN-2000 panels via simple retrofit kit
- Seamlessly integrated HSSD, ASD and LHD
- Internet connectivity with e-mail notification feature
- BACnet, Modbus TCP/IP, Modbus RTU compatibility
- Pleasing aesthetics
- Pluggable terminal blocks
- FM Approved to ANSI/UL864
- UL Listed No. S2422
- cUL Listed No. S2422
- CSFM Approved: No. 7165-1076:0194
- NYC Fire Department Certificate of Approval: No. 6092
- City of Chicago Acceptable for Class 1 Applications



### DESCRIPTION - CONTROL UNIT

The FenwalNET 8000-ML is one of the most technologically advanced intelligent fire alarm-suppression-focused control units available to the industry today. It combines the high quality, system reliability, and flexibility required by modern commercial, high-tech and industrial applications in an aesthetically pleasing and physically robust package. Its modular architecture enables easy field expansion from the base 2-SLC unit that supports 510 addressable devices (255 per circuit) to an 8-SLC system capable of 2,040 addressable devices. Despite its compact fit-between-wall-studs dimensions, the FenwalNET 8000-ML is designed to be quick and easy to install. Cutting edge technologies incorporated in the electronics design enable diagnostics for time-efficient commissioning.

#### Main Controller Board - MCB

The FenwalNET 8000-ML's main printed circuit board contains the system's central processing unit (CPU) and all of the primary circuits. The MCB is the heart of the system, controlling the operation and supervision of all the system modules and software. It receives loop device data, processes the data based on pre-programmed instructions, and transmits output commands to the output modules, field devices, and display(s). The MCB is mounted to the enclosure using special design hinged stand-offs which permit the board to swing left and enable easy access to the PMU/PSU assembly behind.

#### User Interface

The user interface consists of a built-in keypad and a display which provide physical means by which an operator and/or installer performs system functions, enters the security password, operates soft keys, navigates the system menus, configures and tests the entire FenwalNET 8000-ML system.

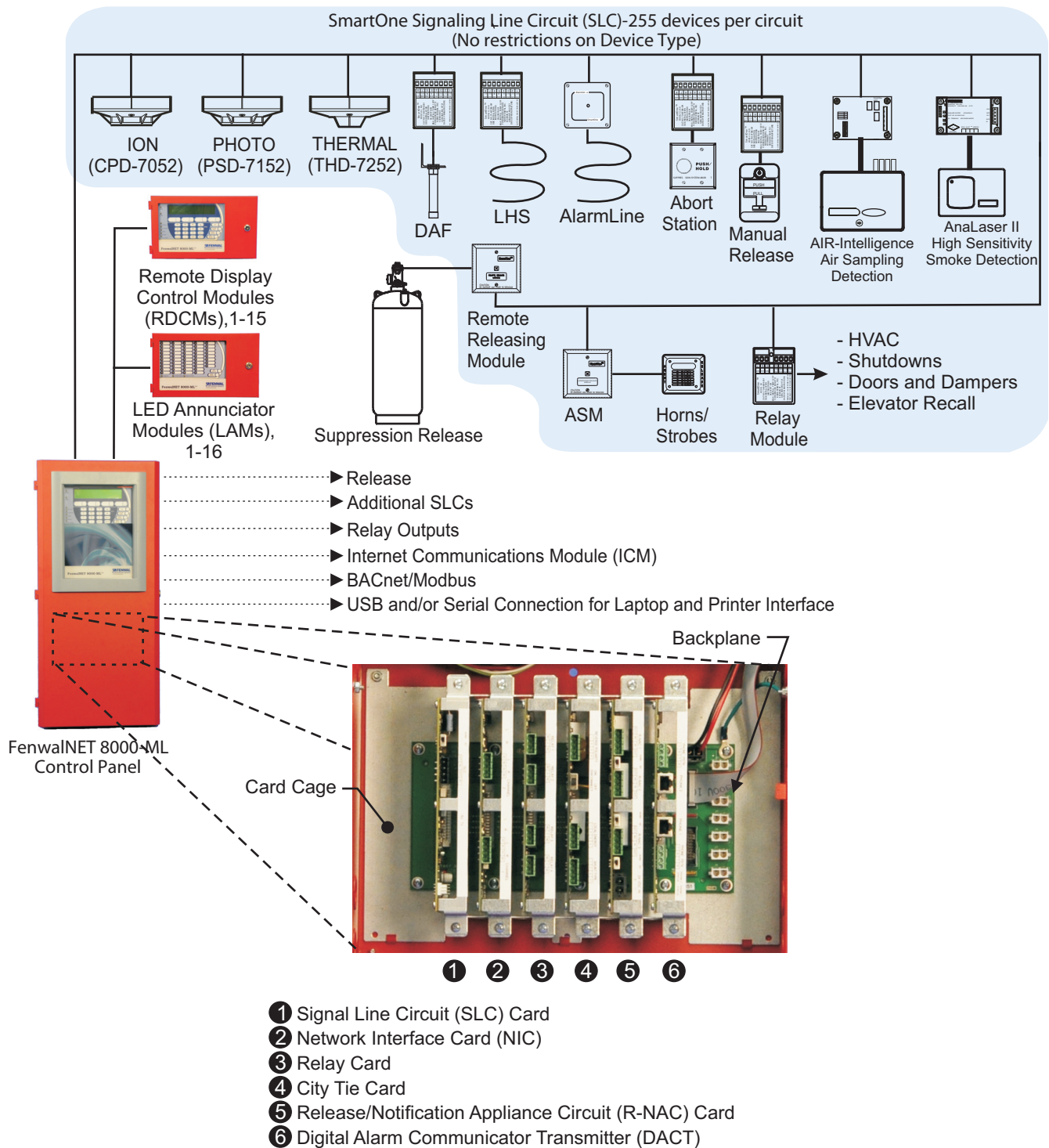


Figure 1. Modular Design to Meet the Most Demanding Applications



Main Controller Board (MCB)  
 Figure 2. Main Controller Board and User Interface

**MAIN CONTROLLER BOARD SPECIFICATION**

**MCB Signaling Line Circuits**

<b>Number of Circuits:</b>	Two
<b>Device Capacity:</b>	255 devices per SLC
<b>Device Type Restriction:</b>	None
<b>Wiring Classes:</b>	Class A, B or X
<b>T-Tapping Allowed:</b>	Class B only
<b>Circuit Voltage:</b>	Nominal 24 VDC
<b>Maximum Line Resistance:</b>	40 ohms per loop
<b>Maximum Capacitance:</b>	0.5 µF
<b>Maximum Current:</b>	350 mA (short circuit)
<b>Wiring Specifications:</b>	Twisted #14 AWG - #18 AWG, unshielded, low-capacitance wire with a nominal wire-to-wire capacitance of approximately 20 pf.

**MCB Notification Appliance Circuits**

<b>Number of Circuits:</b>	Two
<b>Compatible devices:</b>	24 VDC polarized horns, strobes, bells, etc.
<b>Wiring Classes:</b>	Class A or B
<b>Power Limited:</b>	Yes
<b>Synchronized Strobes:</b>	Yes, configurable

**MAIN CONTROLLER BOARD SPECIFICATION (Continued)**

<b>Maximum Output Current:</b>	Non-Synchronized: 2.0 A Synchronized: 1.5 A
<b>Maximum Output Circuit Terminal Voltage:</b>	28 VDC
<b>Minimum Output Circuit Terminal Voltage:</b>	20 VDC
<b>End-of-Line Resistor:</b>	10 K, 5%, 1/2 W
<b>Maximum Allowable Voltage Drop:</b>	2 V at End-of-Line

**MCB Release/Notification Appliance Circuits**

<b>Number of Circuits:</b>	Two
<b>Individually Configurable for Notification or Release:</b>	Yes
<b>Notification Specifications:</b>	Same as NAC
<b>Release Specifications:</b>	
<b>Compatible devices:</b>	
• <b>Fenwal Control head:</b>	max 1
• <b>Water Mist Solenoid valve:</b>	max 1
• <b>FM Group A, B, D, E, F, G, I, J or K Solenoid:</b>	max 1
• <b>Set of P/N 93-002009-004 Initiators:</b>	max 8
• <b>Set of P/N 31-199932-004 Initiators:</b>	max 12
• <b>Set of P/N 93-191001-001 Initiators:</b>	max 6
<b>Device type configurable:</b>	Yes, with device on-time after activation
<b>Wiring Classes:</b>	
• <b>Solenoids:</b>	Class A or B
• <b>Initiators:</b>	Class B
<b>Power Limited:</b>	Yes, requires In-Line Diode device
<b>Maximum Output Circuit Terminal Voltage:</b>	28 VDC
<b>End-of-Line Resistor:</b>	10 K, 5%, 1/2 W
<b>Allowable Voltage Drop:</b>	2 V

**MCB Relays**

<b>Number and type:</b>	3 Programmable and 1 Trouble Relay
<b>Relay Form:</b>	Form-C (1 NO + 1 NC)
<b>Rating:</b>	3A @ 30 VDC/120 VAC

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**MAIN CONTROLLER BOARD SPECIFICATION (Continued)****MCB RS-232 Serial Ports**

<b>Number of Ports:</b>	2
<b>Specifications:</b>	Bi-Directional 9600 Baud, 8 Data Bits, 1 Stop Bit, No Parity

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**MCB RS-485 Annunciator Port**

<b>Number of Ports:</b>	1
<b>Compatible Devices:</b>	
• <b>RDCM</b>	Max. 15 devices
• <b>R-LAM</b>	Max. 16 devices
• <b>ATM-L</b>	Max. 16 devices
• <b>ATM-R</b>	Max. 16 devices
<b>Compatible Device Maximum:</b>	31 in any combination and in any order
<b>Wiring Type:</b>	Twisted shielded low-capacitance fire alarm wire
<b>Wiring Minimum Size:</b>	AWG 18
<b>Maximum wire length:</b>	4,000 ft. (1,219 m)

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**MCB USB Device Ports:**

<b>Number of Ports:</b>	2
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**Power Supply**

The FenwalNET 8000-ML Control Unit requires a minimum of one Power Supply Unit and one Power Management Unit (PMU) Board for operation. Additional Power Supply Units may be added, based on calculated power requirement (refer to Battery Calculations in the *FenwalNET 8000-ML Installation, Operation, and Maintenance Manual*, P/N 06-237041-001).

One PMU board is needed to control up to 2 Power Supply Units. The FenwalNET 8000-ML Control Unit design offers optional Power Supply Units and Power Management Unit (PMU) Board to expand the available power to meet additional power requirements.

Each enclosure of the FenwalNET 8000-ML Control Unit can provide 20 Amps of power supply capacity and the system can charge up to 165-AH batteries for US applications and 132-AH batteries for Canadian applications.

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**POWER SUPPLY & MANAGEMENT SPECIFICATION**

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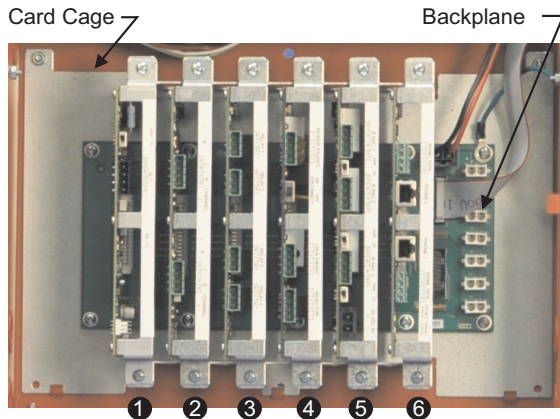
<b>Number of PMUs per control unit</b>	Minimum: 1 Maximum: 4
<b>Number of PSUs per PMU</b>	Minimum: 1 Maximum: 2
<b>Primary AC Input Power:</b>	
• <b>1 PSU:</b>	120 VAC, 50/60 Hz, 3.2 A 240 VAC, 50/60 Hz, 1.6 A
• <b>2 PSU:</b>	120 VAC, 50/60 Hz, 6.4 A 240 VAC, 50/60 Hz, 3.2 A
<b>Allowable Input Voltage Variation:</b>	115 ± 5% VAC 230 ± 4% VAC
<b>Secondary DC Output:</b>	
• <b>1 PSU:</b>	5.4 A @ 27.6 VDC
• <b>2 PSU:</b>	10.8 A @ 27.6 VDC
<b>Voltage Selection:</b>	Slide switch on PSU
<b>Trouble Relay Contact Rating:</b>	1.0 A @ 30 VDC (resistive)
<b>AC to Battery Transfer Voltage:</b>	
• <b>120 VAC:</b>	109 VAC
• <b>220 VAC:</b>	200 VAC
<b>Battery Charging Circuit Voltage:</b>	27.0 VDC (nominal)
<b>Maximum Battery Charging Circuit Current:</b>	
• <b>1 PSU:</b>	4 A
• <b>2 PSU:</b>	8.9 A
<b>Allowable Battery Type:</b>	2 x 12 VDC Sealed Lead-Acid Only
<b>Maximum Battery Capacity:</b>	UL/FM: 165 AH ULC: 132 AH
<b>Auxiliary Outputs:</b>	2 per PMU, power-limited
<b>Auxiliary Output Operating Voltage Range:</b>	19.2 - 27.6 VDC
<b>Auxiliary Output Maximum Current:</b>	2 A @ 470 µF max. per output

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### Backplane & Card Cage

The Card Cage is a metal frame which supports and secures up to six Expansion/Functional Cards plugged into the Backplane. The frame is fixed to the Backplane and mounts to the enclosure in the second- or third-tier positions. A fully expanded FenwalNET 8000-ML system can accommodate a maximum number of four Card Cages or 24 card slots in total. Unlike installation intensive control units, the FenwalNET 8000-ML features virtually plug-and-play architecture in that the control unit is intelligent enough to detect the type of card plugged in.



- ① Signal Line Circuit (SLC) Card
- ② Network Interface Card (NIC)
- ③ Relay Card
- ④ City Tie Card
- ⑤ Release/Notification Appliance Circuit (R-NAC) Card
- ⑥ Digital Alarm Communicator Transmitter (DACT)

Figure 3. Backplane and Card Cage

#### CARD CAGE SPECIFICATION

<b>Module Capacity each:</b>	Maximum 6
<b>Number of Card Cages:</b>	Maximum 4 per MCB
<b>Number of Expansion/ Functional cards:</b>	Maximum 24 per MCB

### Signaling Line Circuits - SLC

The Main Controller Board incorporates two SLC circuits. At the rate of one SLC per expansion card, up to six additional circuits can be included in one control unit. The Expansion Card occupies a single slot in the Card Cage Assembly and plugs directly into the backplane.

All SLC's are suitable for Class A, Class B and Class X wiring. A disconnect switch provides the means to physically isolate the circuit from its associated field wiring. Communications LEDs indicate data transmission (green) and reception (yellow) and a Status LED indicates module energized state (green) and de-energized state (yellow).

The FenwalNET 8000-ML is compatible with all SmartOne protocol based devices. The SmartOne communication protocol is called Broadcast Index Polling (BIP). The BIP enables each of the 255 initiating device on the SLC to communicate with the panel on an individual basis in an intelligent system. BIP imposes no limitations on the mix of automatic initiating devices and monitor/control modules on the signaling line circuit. Each SmartOne initiating device has a microprocessor, memory, and decision-making algorithms to interrupt normal control-unit communications and initiate an alarm signal. The BIP communication protocol divides the potential 255 addresses on the SLC loops into 8 groups of 32 addresses each and the panel constantly samples the groups for fire signatures. Once a fire signature is detected, the panel narrows down to the group with the SmartOne device(s) initiating the signature and further to the particular address initiating the fire signature.

The SmartOne smoke detectors manage their individual drift compensation routines, and have pre-alarm and alarm thresholds that are configurable in 0.1 percent-per-foot increments throughout the entire range of listed sensitivities. The FenwalNET 8000-ML can dynamically adjust the smoke detector alarm thresholds as the result of one or more alarm-initiating events to confirm that a fire requiring the rapid action of an associated extinguishing system has occurred. SmartOne smoke detectors can also be configured for non-latching operation that requires them to measure smoke signatures in excess of their alarm thresholds for the entire pre-discharge time period in order to discharge the extinguishing system. This prevents a transitory event that mimics a smoke signature such as the leakage of air-conditioning fluid from accidentally discharging the extinguishing system. SmartOne heat detectors have pre-alarm and alarm thresholds that are programmable in 1°F intervals.

#### SLC EXPANSION CARD SPECIFICATION

<b>Number of Cards:</b>	Subject to slot availability, max 6 per MCB
<b>Circuit Specifications:</b>	Same as SLC on MCB

### NACs & R-NACs

The Main Controller Board incorporates two Notification Appliance Circuits and two user-configurable Releasing/Notification Appliance Circuits. The system can be expanded by adding R-NAC cards to the backplane. The Expansion Card occupies a single slot in the Expansion Card Cage Assembly and plugs directly into the backplane. Each R-NAC card provides three Releasing-Notification circuits similar to the R-NAC circuit on the MCB. Given adequate power, the number of R-NAC Expansion

Cards in a system is limited only by the availability of card slots – which itself is limited to 24.

Notification Appliance Circuits can be wired as Class A or Class B and support 24 VDC polarized appliances such as horns, strobes and bells. Strobes can be either synchronized or non-synchronized.

The Releasing Circuits can be wired as Class A or Class B and configured to activate agent control heads and solenoid valves. Fenwal initiators can only be wired Class B. The circuit-on time is configurable from 55 microseconds, 90 seconds, 10 minutes, 15 minutes, On-To-Reset, On-Off cycling dependant on the release device and suppression system. While the circuits are power limited, utilizing this option for releasing requires the use of a field In-Line Release Device – separate for solenoids and initiators. An NFPA-72 compliant disconnect switch provides the means to physically isolate the circuit from its associated field wiring.

#### R-NAC EXPANSION CARD SPECIFICATION

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<b>Number of Cards:</b>	Subject to slot availability, max 24 per MCB
<b>Number of Circuits Per Card:</b>	Three
<b>Circuit Specifications:</b>	Same as R-NAC on MCB

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#### Triple Redundancy Protection

Unlike some generic fire alarm control units adopted for releasing service, at its core the FenwalNET 8000-ML is suppression-focused. Featuring the exclusive Triple-R redundancy safeguard wherein no single component failure or combination of abnormal operating conditions, including main microprocessor failure, is allowed to result in accidental release activation, the FenwalNET 8000-ML provides the same high quality, dependability and maximum protection against inadvertent release that have been the hallmark of Fenwal suppression panels for decades. The Triple-R system requires that in order to activate a release, the main microprocessor issue two release commands of opposite polarity via separate signaling channels and that these commands combine with a signal from the control unit's watchdog timer to confirm the microprocessor operation. The Triple-R system ensures that electrical transients or disturbances such as power surges that could interfere with the operation of the main microprocessor will not inadvertently activate the connected suppression system. The result is a more robust and reliable suppression control unit.

#### Relays

The Main Controller Board incorporates 3 programmable Form-C Relays and 1 Form-C Trouble relay. The Expansion Card occupies a single slot in the Card Cage Assembly and plugs directly into the backplane. The sys-

tem can be expanded by adding Relay cards to the backplane. Each Relay card provides four programmable Form-C relays similar to those on the MCB. The number of Relay Expansion Cards in a system is limited only by the availability of card slots – which itself is limited to 24.

Each relay is independently-driven and can be pre-programmed to change state for all states of Alarm, Trouble and Supervisory conditions. Relays are normally de-energized, unless configured for Trouble. A Trouble relay is energized upon startup and changes state for any Trouble event, including failure of the Main Controller Board. R-G-Y status LEDs are provided. Contact ratings are 3 A at 30 VDC or 120 VAC.

#### RELAY EXPANSION CARD SPECIFICATION

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<b>Number of Cards:</b>	Subject to slot availability, max 24 per MCB
<b>Number of Relays Per Card:</b>	Four
<b>Relay Specifications:</b>	Same as Relays on MCB

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#### City Tie Card

The optional City Tie Card provides connection and operation for three independently operated signaling circuits used to connect to Municipal Tie inputs as either Local Energy output, Shunt-Type Master Box output or Reverse Polarity output. The City Tie Card occupies a single slot in the Card Cage Assembly and plugs directly into the backplane. The FenwalNET 8000-ML allows one City Tie Card per control unit.

#### CITY TIE CARD SPECIFICATION

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<b>Number of Cards:</b>	Max 1 per control unit
<b>Number of Circuits Per Card:</b>	Three
<b>Local Energy Type:</b>	24 VDC @ 550 mA maximum
<b>Shunt-Type Master Box:</b>	24 VDC @ 5 A maximum
<b>Reverse Polarity Type:</b>	24 VDC @ 100 mA maximum

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#### Networking

For large areas or campus-style applications, FenwalNET 8000-ML control units can be networked into a powerful system capable of supporting 130,560 addressable devices. The FenwalNET 8000-ML has the capability to provide true peer-to-peer networking of up to 64 control units. Added functionality is provided when the Remote Display-Control Module (RDCM) are connected to the individual control panels and hence into the interconnection scheme. The network is capable of performing fire-

alarm and/or suppression system operations on a network-wide basis:

- Event initiation
- Protected-premises local and/or remote event annunciation
- Occupant notification via audible and visible signaling appliances
- Process/equipment control to activate safety procedures
- Fire extinguishing system release
- Off-premises transmissions to central station or fire department

The network provides several convenient interconnect programming schemes wherein control panels can be configured individually or within created groups of control panels. When utilizing the grouping configuration, the interconnection automatically provides shared alarm and trouble responses. The programmable shared responses are: acknowledge, silence, reset, event logging and logic statements. Operator events can be activated into the interconnection via the control panels or any annunciator. A location address and programmable description is used to identify the panel initiating the event.

Network Interface Card – NIC

The Network Interface Card regenerates and boosts network communications between control units and electrically isolates the networked units from each other. All FenwalNET 8000-ML units must contain a NIC to be networked to one another. The NIC occupies a single slot in the Card Cage Assembly. Using the NIC, the control units transmit and receive messages via RS485 format over a twisted pair. An optional Fiber Optic Converter Module (FOCM), in addition to the NIC, allows connectivity via a fiber optic medium. The networking structure supports a mixture of fiber-optic and twisted-wire interconnections among networked control units. The network structure also supports up to 4,000 ft. long 18 AWG of copper wire between nodes (control units).

**NETWORK INTERFACE CARD (NIC) SPECIFICATION**

<b>Number of Cards:</b>	Max 1 per control unit
<b>Number of nodes in network:</b>	Maximum 64
<b>Wiring Classes:</b>	Class A or Class B
<b>Operating Voltage:</b>	24 VDC
<b>Operating Current:</b>	63 mA
<b>Data Ports:</b>	EIA/TIA-485
<b>Baud Rate:</b>	38,400 baud
<b>Recommended Wiring:</b>	AWG 18, twisted, shielded, pair
<b>Maximum Recommended Length:</b>	4,000 ft. (1,219 m)

Fiber Optic Converter Module – FOCM

A fiber-optic option is available for network applications (NIC card also required) with communication paths greater than 4,000 ft. or where excessive electrical noise is present. The FOCM is a bi-directional, externally-powered unit which is wall mountable in the standard FenwalNET 8000-ML remote enclosure. One FOCM is required at both interconnected FenwalNET 8000-ML control units for a single communication channel.

For short transmission distances (under 1 mile), such as within a building or on a campus, multi-mode optical fiber (MM fiber) can be used (62.5 μm core size/125 μm cladding diameter). For longer transmission distances (up to 12 miles), single-mode (SM fiber) can be used (8.3 μm core size/125 μm cladding diameter). Either type of fiber may be used and both connect to the FenwalNET 8000-ML power and RS-485 data lines in the same fashion.

The FOCM is shipped standard with one converter channel. For greater communication security and redundancy, a second converter channel may be added. This is most effective if the second channel is installed in a different pathway from the first.

**FIBER OPTIC CONVERTER MODULE (FOCM) SPECIFICATION**

<b>Operating Voltage:</b>	24 VDC
<b>Operating Current:</b>	175 mA
<b>Data Ports:</b>	EIA/TIA-485
<b>Max. Recommended Length for MM Fiber:</b>	1 mile (with no more than 6.4 dB/mile cable attenuation)
<b>Max. Recommended Length for SM Fiber:</b>	12 miles (with no more than 1.66 dB/mile cable attenuation)
<b>Baud Rate:</b>	38,400 Baud
<b>Temperature Range:</b>	0° to 50°C
<b>Humidity Range:</b>	0 to 93% RH, non-condensing
<b>Enclosure Dimensions (H x W x D):</b>	7-1/2 x 12-3/4 x 2-3/4 (in.) 191 x 324 x 70 (mm)

Digital Alarm Communicator Transmitter – DACT

The communication capabilities of the FenwalNET 8000-ML control unit are enhanced with an optional DACT which transmits system status over phone lines to a Central Station. The DACT card includes a built-in modem and two Loop Start Public Switched Telephone Network (PSTN) connections. Status LEDs are provided to indicate data transmission (green) and reception (yellow). A FenwalNET 8000-ML system allows one DACT Card per control unit. The DACT card operates on 24 Vdc and supports SIA DC-05-1999.09 Ademco Contact ID and SIA DC-03-1990.01 (R2003.10) protocols.

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**DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT)  
SPECIFICATION**

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<b>Number of Cards:</b>	Max 1 per control unit
<b>Operating Voltage:</b>	24 VDC
<b>Operating Current:</b>	37 mA
<b>Electrical Interface:</b>	PSTN line using a RJ45X phone jack
<b>Supported Protocols:</b>	SIA DC-05-1999.09 Ademco Contact ID SIA DC-03-1990.01 (R2003.10)
<b>Compatible Digital Alarm Communicator Receivers (DACRs):</b>	Sur-Gard System I, Sur-Gard System III and Osborne Hoffman Model 2000E

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**Internet Communications Module – ICM**

The Internet Communications Module (ICM) can be used to access the FenwalNET 8000-ML System via the Internet to view system status and current events and to download the history log. The ICM can be programmed to transmit up to five e-mails upon the occurrence of any unsolicited event in the system. The e-mail message embeds a link with the IP address of the control unit that sent the message for instant access to the remote system. The ICM can be accessed using any standard Web browsing program and requires no special proprietary software. The ICM also allows the FenwalNET 8000-ML Control Unit to report as a slave device via the Modbus TCP/IP Protocol to a master monitoring system for automated process control.

**INTERNET COMMUNICATIONS MODULE (ICM)  
SPECIFICATION**

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<b>Operating Voltage:</b>	24 VDC
<b>Operating Current:</b>	42 mA
<b>Operating Environment:</b>	32° to 120°F (0° to 49°C) 0-90% RH, non- condensing
<b>Data Port:</b>	RJ45
<b>Supported Field Protocols:</b>	Ethernet - Local Area Network or Wide Area Network (LAN or WAN)

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**Modbus/BACnet Interface**

The Modbus/BACnet Interface module provides protocol translation between the FenwalNET 8000-ML communication protocol and the communication protocol of an external monitoring system such as a building automation system. The Modbus/BACnet Interface module converts the FenwalNET 8000-ML Communications Protocol to BACnet Protocol. The unit is wall mountable in the same FenwalNET 8000-ML standard remote enclosure. The communication flow is one-way from the FenwalNET 8000-ML network to the external monitoring system. The single module supports systems with up to 4 SLCs. For systems including more than 4 SLCs, a second (Add-On) module is required.

**Modbus/BACnet SPECIFICATION**

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<b>Electrical Connections:</b>	<ul style="list-style-type: none"><li>• 6-pin Phoenix connector, RS232</li><li>• 3-pin Phoenix connector, RS485</li><li>• Ethernet-10/100 port</li></ul>
<b>Enclosure Dimensions (H x W x D):</b>	7-1/2 x 12-3/4 x 2-3/4 (in.) 191 x 324 x 70 (mm)
<b>Operating Voltage:</b>	9-30VDC or 12-24VAC
<b>Operating Current:</b>	150 mA @ 12VDC
<b>Operating Temperature:</b>	-40F to 187F (-40C to 85C)
<b>Humidity:</b>	5 - 90% RH, non-condensing
<b>Data Ports:</b>	RS232, Ethernet
<b>Max. RS232 Cable Length:</b>	50 ft. (15.2 m)
<b>Supported Baud Rate for BACnet MS/TP:</b>	9.6 - 76.8K baud

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**Enclosures**

The FenwalNET 8000-ML offers two enclosure sizes, 2-Tier and 3-Tier, for both main and expansion enclosures. The enclosures accommodate the MCB, PMU/PSU, Expansion Card Cages and Batteries. The enclosures are sized to fit between standard 16"-spaced wall studs and can accommodate a pair of 12 VDC12-AH or 17-AH SLA batteries (max. 40 AH). The enclosures are painted red, rated NEMA 1 and constructed from 16 AWG cold rolled steel per ASTM A-366. All Fenwal enclosures utilize a common key. Despite its compact dimensions, the enclosure allows a minimum of 1.5 in. (38 mm) of wiring space between the wall and any wiring terminal. Multiple knockouts provide flexibility in wiring entry.

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### Dead Front Covers

A sheet-steel dead-front cover may optionally be mounted between the door and electronics to prevent unwanted access to the electronics. With the dead-front installed, an operator has access only to the user interface. A blanking plate (included) may be removed if an integrated LED Annunciator is present. The dead front is typical in ULC/cUL applications.

### Enclosure Trim Ring

A sheet-steel red-enamel finished trim ring may be mounted around a semi-flush FenwalNET 8000-ML enclosure to enhance the Control Unit's aesthetic appeal after installation.

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## MAIN & EXPANSION ENCLOSURE SPECIFICATION

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<b>Material of Construction:</b>	16 gauge (0.053 in. or 1.35 mm) rolled sheet steel
<b>Enclosure Rating/ Degree of Protection:</b>	NEMA 1
<b>Color:</b>	Red (C21136 of Federal Standard 595)
<b>Enclosure Dimensions (H x W x D):</b>	
• <b>3-Tier:</b>	31-1/2 x 14-3/8 x 5-3/8 (in.) 800 x 365 x 137 (mm)
• <b>2-Tier:</b>	22-1/2 x 14-3/8 x 5-3/8 (in.) 572 x 365 x 137 (mm)
<b>Dead Front Dimensions (H x W):</b>	
• <b>3-Tier:</b>	31-1/3 x 14 (in.) 796 x 356 (mm)
• <b>2-Tier:</b>	22-5/8 x 14 (in.) 567 x 355 (mm)
<b>Trim Ring Dimensions:</b>	
• <b>3-Tier:</b>	17-1/2 x 34-5/8 (in.) 444 x 879 (mm)
• <b>2-Tier:</b>	17-1/2 x 25-5/8 (in.) 444 x 651 (mm)

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## CONTROL UNIT FEATURES

### Seamless Integration with Specialty Detectors

SmartOne loop protocol interface cards enable the FenwalNET 8000-ML to seamlessly integrate with specialty detectors. AIR-Intelligence Air Sampling Smoke Detectors (ASD) and AnaLASER-II High Sensitivity Smoke Detectors (HSSD) connect via Addressable Protocol Interface Cards (APIC) and AnaLASER Interface Modules (AIM-II) respectively and report pre-alarms and

alarms in a manner analogous to SmartOne smoke detectors. AlarmLine Integrating Linear Heat Detector sensors (LHD) connect via AlarmLine Addressable Modules (AAM) and report pre-alarms and alarms similar to a Smart-One heat detector. Fixed Temperature Linear Heat Sensor cables (LHS) connect via Addressable Input Modules (AI) and report point alarms.

### Field Programming Options

The FenwalNET 8000-ML Configuration Software (FCS8000) tool is used to program the control unit for each individual site-specific application. Programming is for control-by-event scenarios and consists of entering a series of conditional control statements that logically join initiating points to control-unit-based outputs and remote control modules. Each SmartOne field device can be assigned a location message of up to 40 characters via the configuration tool. A USB Device Port is available to connect a laptop computer for application upload.

An *AutoLearn* routine that creates a general alarm (one-input-activates-all outputs) application can be invoked from the User Interface to speed the configuration process. A more sophisticated *Auto-Setup* routine which automatically configures the control unit for a typical waterless fire-suppression system can also be invoked.

### Automatic SLC Device Testing

The FenwalNET 8000-ML features an exclusive automatic SLC device testing protocol. With this cutting edge supervisory technology, the control unit routinely checks all SLC devices in groups of 32 for operational status. If a group fails, the control unit then interrogates at lower level in that group and pin-points and reports the malfunctioning device on the User Interface within seconds.

### Duplicate Address Detection

Electronic device addressing is via the Handheld Programmer (HHP). The fully-digitized FenwalNET 8000-ML Control Unit protocol has the ability to monitor the SLC for devices with duplicate addresses. Should such duplication be detected, the control unit displays these addresses on the User Interface – thereby reducing the overall configuration time.

### Battery Life Tracking

The FenwalNET 8000-ML software includes an optional Battery Monitoring Mode which can track battery lifetime from the original install date and emit an audible signal on the replacement due date.

### Annunciator Bus

The Main Controller Board includes an RS-485 bus which can communicate with up to a total of 31 Remote Annunciators. These include up to 15 RDCM Remote Display/Control Modules, up to 16 LAM LED Annunciator Modules. This capability can be expanded to include up to 16 legacy ATM-R and ATM-L Annunciator Terminal Modules.

## CONTROL UNIT ACCESSORIES

### Large Capacity Battery Cabinet

An optional NEMA-1 surface-mount Battery Cabinet is available for a pair of up to 12 VDC 40-AH sealed lead acid batteries. The cabinet is designed to be located within 100 feet of the control unit. The red painted cabinet is constructed of cold-rolled steel as other available FenwalNET enclosures. The door is hinged on the left and includes the same lock and key used with all FenwalNET enclosures. Three conduit knockouts are provided at the top to accommodate either 1/2-inch or 3/4-inch standard electrical conduit fittings.

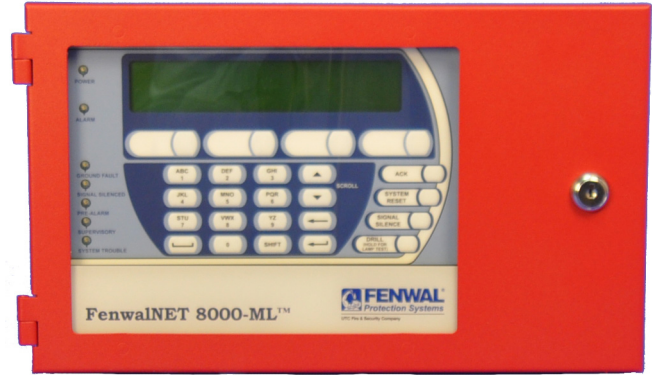


Figure 4. RDCM

### REMOTE BATTERY ENCLOSURE SPECIFICATION

<b>Accommodates:</b>	Up to 2 x 12 VDC 12-AH or 17-AH Battery (max 40 AH)
<b>Material of Construction:</b>	18 AWG (0.053 in. or 1.35 mm) rolled sheet steel
<b>Enclosure Rating/Degree of Protection:</b>	NEMA 1
<b>Color:</b>	Red (C21136 of Federal Standard 595)
<b>Enclosure Dimensions (H x W x D):</b>	12 x 20 x 8-1/4 (in.) 305 x 508 x 210 (mm)

### REMOTE ANNUNCIATORS

#### Remote Display Control Module - RDCM

RDCMs are user interfaces that replicate the FenwalNET 8000-ML and can be located remotely from the main enclosure so as to accomplish system control from multiple locations. RDCMs display all system events and allow full system control and operator intervention via an LCD display, keypad, buzzer, five (5) system status LEDs and four (4) user-programmable soft-keys. A synchronization signal output allows expansion of up to 15 RDCM units. RDCMs are wall mountable in their own discrete enclosures and operate on 24 VDC sourced from either the FenwalNET 8000-ML Auxiliary Power Output or listed external power supply.

### REMOTE DISPLAY CONTROL MODULE (RDCM) SPECIFICATION

<b>Number of RDCMs:</b>	Max 15 on Annunciator Bus
<b>Power Input:</b>	150 mA maximum @ 24.0 VDC
<b>Input Capacitance:</b>	100 µF max.
<b>PMU Trouble Relay Input:</b>	Short = normal; open = fault
<b>Synch In/Out:</b>	3.3 VDC Logic
<b>Wiring Type:</b>	EIA/TIA-485, twisted unshielded pair, maximum capacitance 15 pF per ft.
<b>Wiring Minimum Size:</b>	AWG 18
<b>Maximum wire length:</b>	4,000 ft. (1,219 m)

#### Remote LED Annunciator Module - R-LAM

R-LAMs are annunciators that provide 48 independently programmable LEDs. Each LED is dual color (red and yellow) and has space available for an identification label. R-LAMs include three system-level LED outputs for Module Power, System Trouble and Signal Silenced. Also included are system-level input functional switches for Signal Silence and System Acknowledge/Self-Test commands. R-LAMs are mounted remotely from the main enclosure and utilize the same remote enclosures as do RDCMs. LED Annunciator Modules can also be mounted within the main FenwalNET 8000-ML enclosure for ULC/cUL applications.



Figure 5. R-LAM

#### REMOTE LED ANNUNCIATOR (R-LAM) SPECIFICATION

<b>Number of Modules:</b>	Max 16 on Annunciator Bus; 15 if integrated into Control Unit
<b>Power Input:</b>	150 mA maximum @ 24.0 VDC
<b>Input Capacitance:</b>	100 µF max.
<b>PMU Trouble Relay Input:</b>	Short = normal; open = fault
<b>Synch In/Out:</b>	3.3 VDC Logic
<b>Wiring Type:</b>	EIA/TIA-485, twisted unshielded pair, maximum capacitance 15 pF per ft.
<b>Wiring Minimum Size:</b>	AWG 18
<b>Maximum Wire Length:</b>	4,000 ft. (1,219 m)

#### REMOTE ANNUNCIATOR ENCLOSURE SPECIFICATION

<b>Accommodates:</b>	1 RDCM 1 R-LAM
<b>Material of Construction:</b>	18 AWG (0.053 in. or 1.35 mm) rolled sheet steel
<b>Enclosure Rating/Degree of Protection:</b>	NEMA 1
<b>Color:</b>	Red (C21136 of Federal Standard 595)
<b>Enclosure Dimensions (H x W x D):</b>	7-1/2 x 12-3/4 x 2-3/4 (in.) 191 x 324 x 70 (mm)

## RETROFITTING LEGACY INSTALLATIONS

### Legacy FenwalNET 2000 Control Unit Retrofit Kit

Installed FenwalNET 2000 control units can be upgraded to FenwalNET 8000-ML level by utilization of a retrofit kit. The retrofit kit consists of FenwalNET 8000-ML electronics, power supply and a door for the installed FenwalNET 2000 enclosure. The kit enables the FenwalNET 2000 electronics to be replaced without disturbing the original enclosure-backbox and conduits; thus maintaining the customers' investment in devices, suppression and wiring. The retrofit door is sized for the FenwalNET 2000 enclosure while its window is aligned with the FenwalNET 8000-ML.

#### FENWALNET 2000-TO-8000-ML RETROFIT KIT (P/N 74-800400-001)

The retrofit kit consists of the following parts:

• <b>Base Plate</b>	qty. 1
• <b>Base Plate Bracket</b>	qty. 1
• <b>Replacement Door</b>	qty. 1
• <b>Retrofit Installation Hardware</b>	qty. 1
• <b>PSU with wiring harness to PMU Board</b>	qty. 1
• <b>PMU Installation Hardware Kit</b>	qty. 1
• <b>MCB, complete with UI and mounting hardware</b>	qty. 1
• <b>MCB Installation Hardware Kit</b>	qty. 1
• <b>FenwalNET 8000-ML System Installation/ Configuration Kit</b>	qty. 1

#### OPTIONAL ADD-ONS TO BOTTOM TIER OF LEGACY BACKBOX: (room for only one from list below)

• <b>Card Cage Assembly with backplane, bracket, hardware and cables, P/N 74-800010-001</b>	qty. 1
• <b>Additional PSU/PMU Assembly with bracket and hardware, P/N 74-800030-003</b>	qty. 1
• <b>Standby Batteries</b>	one pair

## COMPATIBLE DEVICES

### SmartOne SLC Devices

Part Number	Description
71-402001-100	Photoelectric Detector
71-401001-000	Photoelectric Detector (retrofit only)
71-401004-000	Photoelectric Detector with Relay (retrofit only)
70-402001-100	Ionization Detector
70-401001-000	Ionization Detector (retrofit only)
70-401004-000	Ionization Detector with Relay (retrofit only)
70-404001-100	Heat Detector
70-400001-100	Flanged Detector Base
70-400001-101	Detector Base
70-400001-200	Detector-Base Adapter
70-400001-000	Detector Base (retrofit only)
70-403001-152	Duct Housing with Photoelectric Detector
70-403001-052	Duct Housing with Ionization Detector
70-403000-000	Duct Housing (retrofit only)
70-407008-001	Monitor Module (N/O)
70-407008-002	Monitor Module (N/C) (UL only)
70-407018-001	Monitor Module (N/O) (non-silicone)
70-407018-002	Monitor Module (N/C) (non-silicone; UL only)
70-407004-00 1	Monitor Module (N/O) (retrofit only)
70-408004-001	Control Module
70-408014-001	Control Module (non-silicone)
70-408001-000	Control Module without Mtg. Plate (retrofit only)
70-408002-000	Control Module with Mtg. Plate (retrofit only)
70-408003-000	Control Module with SS Mtg. Plate (retrofit only)
89-300010-001	AnaLASER II Interface Module
73-100003-001	Addr. Alarmline Mod.(in NEMA-4 enclosure)
70-200200-001	Addr. Signal Module
70-200200-003	Addr. Signal Module
70-200200-002	Addr. Signal Module (on 6SB Detector Base)
74-200012-002	Isolator Module (single-gang mount)
74-200012-004	Isolator Module (detector-base mount)
70-600000-00 1	Remote Releasing Module (standard mount)
70-600000-002	Remote Releasing Module (in-cabinet mount)
74-333001-001	APIC for AIR-Intelligence ASDs
30-193000-001	Suppression Abort Station (requires a Model AI Addressable Monitor Module)

### Releasing Devices

Part Number	Device "On" Time	Max. per Circuit
890181	Momentary	1
895630	Momentary	1
93-487100-001	Momentary	1
48650001	Steady	1
06-118329-001	Steady	1
06-118384-001	Steady	1
38-509834-001	Steady	1
38-509837-001	Steady	1
81-100000-001	Steady	1
897494-000	Steady	1
897494-530	Steady	1
Marioff D21070	Steady	1
FM Group A	Steady	1
FM Group B,D	Steady	1
FM Group E,G	Steady	1
FM Group F	Steady	1
FM Group I	Steady	1
FM Group J	Steady	1
FM Group K	Steady	1
93-002009-004	Momentary	8
31-199932-004	Momentary	12
93-191001-001	Momentary	6

**ORDERING INFORMATION**

Part Number	Description
<b>FenwalNET 8000-ML SYSTEMS</b>	
74-800100-001	FN8000 Control Unit-3T
74-800101-002	FN8000 Control Unit-3T-ULC
74-800200-001	FN8000 Control Unit-2T
74-800201-002	FN8000 Control Unit-ULC
74-800101-001	FN8000 Control Unit-3T-ULC
74-800201-001	FN8000 Control Unit-2T-ULC
74-800102-001	FN8000 Control Unit-3T-City of Chicago
74-800202-001	FN8000 Control Unit-2T-City of Chicago
<b>EXPANSION ENCLOSURES</b>	
74-800100-003	FN8000 Expansion Encl-3T
74-800200-003	FN8000 Expansion Encl-2T
<b>ENCLOSURE TRIM RINGS</b>	
74-800100-004	FN8000 Trim Ring-3T Enclosure
74-800200-004	FN8000 Trim Ring-2T Enclosure
74-800300-004	FN8000 Trim Ring-RDCM Enclosure
<b>EXPANSION CARDS</b>	
74-800011-001	FN8000 SLC Card
74-800012-001	FN8000 Relay Card
74-800013-001	FN8000 R-NAC Card
74-800016-001	FN8000 City Tie Card
74-800015-001	FN8000 DACT Card
74-800017-001	FN8000 ICM Card
74-800014-001	FN8000 NIC Card
89-300014-001	FN8000 IIM Card (with modem)
89-300015-001	FN8000 IIM Card (without modem)
<b>EXPANSION CARD CAGE</b>	
74-800010-001	FN8000 Card Cage Assy
74-800010-002	FN8000 Backplane Board
<b>REMOTE ANNUNCIATORS/MODULES</b>	
74-800300-001	FN8000 Remote Display Control Module
74-800300-002	FN8000 Remote LED Annunciator
74-300004-032	FN8000 Model ATM-L LED Driver Module
74-300005-032	FN8000 Model ATM-R Relay Driver Module
<b>STANDBY BATTERIES (order 2 for 24V)</b>	
06-115915-013	Battery, 12 Vdc, 7-AH
06-115915-047	Battery, 12 Vdc, 12-AH
06-115915-046	Battery, 12 Vdc, 17/18-AH
89-100052-001	Battery, 12 Vdc, 35-AH (requires large capacity battery cabinet)
74-600000-514	Large Capacity Battery Cabinet, Red
74-800030-006	FN8000 Battery Tray

**ORDERING INFORMATION (Continued)**

Part Number	Description
<b>EXTERNAL MODULES</b>	
74-800300-005	FN8000 FOCM w/enclosure, for MM fiber
74-800300-006	FN8000 FOCM w/enclosure, for SM fiber
74-800300-015	FN8000 FOCM Add-On Converter Channel, for MM fiber
74-800300-016	FN8000 FOCM Add-On Converter Channel, for SM fiber
74-800300-007	BACnet Module w/enclosure
74-800300-017	BACnet Module Add-On Card
<b>REPLACEMENT ENCLOSURES AND COVERS</b>	
74-800101-005	FN8000 Dead Front-3T
74-800201-005	FN8000 Dead Front-2T
74-800100-101	FN8000 3T Main Enclosure
74-800200-101	FN8000 2T Main Enclosure
74-800101-101	FN8000 3T Main Enclosure ULC
74-800201-101	FN8000 2T Main Enclosure ULC
74-800300-101	FN8000 Remote Display Enclosure
<b>MCB &amp; KEYPAD/DISPLAY</b>	
74-800020-003	FN8000 Replacement LAM Board
74-800020-001	FN8000 Main Controller Board
74-800020-002	FN8000 Keypad-Display
<b>POWER SUPPLIES</b>	
74-800030-001	FN8000 PSU, 120-240VAC, 5.4A, with harness to PMU Board
74-800030-002	FN8000 Power Supply, 120-240VAC, 5.4A, without harness
74-800030-004	FN8000 Power Management Unit Board
74-800030-003	FN8000 Add-on Power Supply/PMU Assy.
74-800030-005	FN8000 PMU Assembly Mounting Bracket
74-800030-007	FN8000 Power Management Fuse Kit
<b>MISCELLANEOUS</b>	
74-800000-008	FN8000 Installation Configuration Kit
74-800000-001	FN8000 Installation-Hardware Universal
74-800000-004	FN8000 Releasing Diode Kit
74-800500-001	FN8000 Chicago Control Box
74-800000-002	FN8000 Main Plexiglass Window
74-800000-003	FN8000 R-LAM Plexiglass Window
74-800000-005	FN8000 Bezel-Enclosure Door
74-800000-006	FN8000 Harness Enclosure-to-Enclosure
70-600000-100	Hand-Held Programmer



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**ORDERING INFORMATION (Continued)**

Part Number	Description	
<b>RETROFIT KIT (order P/N 74-800400-001)</b>		
The Retrofit Kit consists of the following parts:		
		<u>Qty.</u>
74-800020-001	FenwalNET 8000-ML Main Control Unit (MCB) PCB with user interface, communication and power harnesses to PMU	1
74-800030-004	Power Management Unit Board	1
74-800030-001	Power Supply Unit with wiring harness to PMU	1
	Base Plate	1
	Base Plate Bracket	1
	Replacement Door and Window Assembly	1
	Installation Hardware	
	#6 nuts	4
	#8 nuts	2
	#10 nut	1
	Self-threading screw	1

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