

NFS-320SYS(E)

Intelligent Addressable Fire Alarm System



Intelligent Fire Alarm Control Panels

General

The NFS-320SYS intelligent Fire Alarm Control Panel is part of the ONYX® Series of Fire Alarm Controls from NOTIFIER.

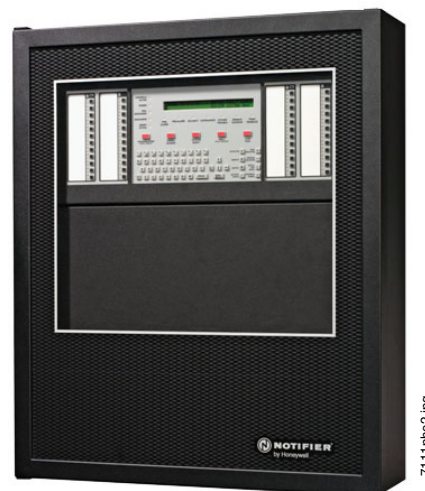
As a stand-alone small-to-large system, or as a large network, the ONYX Series of products meet virtually every application requirement.

Designed with modularity and for ease of system planning, the NFS-320SYS can be configured for small to moderate size building applications, or for a large campus or high-rise applications. Simply add additional peripheral equipment to suit the application.

NOTE: Unless called out with a version-specific "E" at the end of the part number, "NFS-320SYS" refers to models NFS-320SYS and NFS-320SYSE; similarly, "CPU-320SYS" refers to models CPU-320SYS, CPU-320SYSE, and non-English versions.

Features

- Listed to UL Standard 864, 9th edition. ULC listed.
- One isolated intelligent Signaling Line Circuit (SLC) Style 4, 6 or 7.
- Maximum of 318 devices — Up to 159 detectors (any mix of ion, photo, thermal, or multi-sensor) and 159 modules (Normally Open [N.O.] manual stations, two-wire smoke, notification, or relay).
- Standard 80-character display.
- Network options:
 - High-speed network for up to 200 nodes (NFS2-3030, NFS2-640, NFS-320(C), NFS-320SYS, NCA-2, DVC, ONYXWorks, NCS, NFS-3030, NFS-640, and NCA).
 - Standard network for up to 103 nodes (NFS2-3030, NFS2-640, NFS-320(C), NFS-320SYS, NCA-2, DVC, ONYXWorks, NCS, NFS-3030, NFS-640, NCA, AFP-200, AFP-300/400, AFP-1010, and AM2020). Up to 54 nodes when DVC is configured for network paging.
- 6.0 amp switch mode power supply with four Class A/B built-in Notification Appliance Circuits (NAC). Selectable System Sensor, Wheelock, or Gentex strobe synchronization.
- Built-in Alarm, Trouble, and Supervisory relays.
- VeriFire® Tools offline program option. Sort Maintenance Reports by compensation value (dirty detector), peak alarm value, or address.
- Autoprogramming and Walk Test reports.
- Optional universal 318-point DACT.
- 80-character remote annunciators (up to 32).
- EIA-485 annunciators, including custom graphics.
- Printer interface (80-column and 40-column printers).
- History file with 800-event capacity in nonvolatile memory, plus separate 200-event alarm-only file.
- Alarm Verification selection per point, with tally.
- Autoprogramming and Walk Test reports.
- Positive Alarm Sequence (PAS) Presignal.
- Silence inhibit and Auto Silence timer options.
- March time/temporal/California two-stage coding/strobe synchronization.
- Field-programmable on panel or on PC, with VeriFire Tools program check, compare, simulate.
- Full QWERTY keypad.
- Charger for up to 200 hours of standby power.
- Non-alarm points for lower priority functions.



NFS-320SYS

- Remote ACK/Signal Silence/System Reset/Drill via monitor modules.
- Automatic time control functions, with holiday exceptions.
- Surface Mount Technology (SMT) electronics.
- Extensive, built-in transient protection.
- Powerful Boolean logic equations.

FLASHSCAN® INTELLIGENT FEATURES

- Poll 318 devices in less than two seconds.
- Activate up to 159 outputs in less than five seconds.
- Multicolor LEDs blink device address during Walk Test.
- Fully digital, high-precision protocol (U.S. Patent 5,539,389).
- Manual sensitivity adjustment — nine levels.
- Pre-alarm ONYX intelligent sensing — nine levels.
- Day/Night automatic sensitivity adjustment.
- Sensitivity windows:
 - **Ion** — 0.5 to 2.5%/foot obscuration.
 - **Photo** — 0.5 to 2.35%/foot obscuration.
 - **Laser (VIEW®)** — 0.02 to 2.0%/foot obscuration.
 - **Acclimate® Plus™** — 0.5 to 4.0%/foot obscuration.
 - **IntelliQuad™** — 1.0 to 4.0%/foot obscuration
- Drift compensation (U.S. Patent 5,764,142).
- Degraded mode — in the unlikely event that the CPU-320SYS microprocessor fails, FlashScan detectors revert to degraded operation and can activate the CPU-320SYS NAC circuits and alarm relay. Each of the four built-in panel circuits includes a Disable/Enable switch for this feature.
- Multi-detector algorithm involves nearby detectors in alarm decision (U.S. Patent 5,627,515).
- Automatic detector sensitivity testing.
- Maintenance alert (two levels).
- Self-optimizing pre-alarm.

**FSL-751 (VERY INTELLIGENT EARLY WARNING)
SMOKE DETECTION TECHNOLOGY**

- Revolutionary spot laser design.
- Advanced ONYX intelligent sensing algorithms differentiate between smoke and non-smoke signals (U.S. Patent 5,831,524).
- Addressable operation pinpoints the fire location.
- No moving parts to fail or filters to change.
- Early warning performance comparable to the best aspiration systems at a fraction of the lifetime cost.

**FAPT-851 ACCLIMATE® PLUS™
LOW-PROFILE INTELLIGENT MULTI-SENSOR**

- Detector automatically adjusts sensitivity levels without operator intervention or programming. Sensitivity increases with heat.
- Microprocessor-based technology; combination photo and thermal technology.
- FlashScan or classic mode compatible.
- Low-temperature warning signal at 40°F ± 5°F (4.44°C ± 2.77°C).

**FSC-851 INTELLIQUAD
ADVANCED MULTI-CRITERIA DETECTOR**

- Detects all four major elements of a fire (smoke, heat, CO, and flame).
- Automatic drift compensation of smoke sensor and CO cell.
- High nuisance-alarm immunity.
- Six sensitivity levels.

RELEASING FEATURES

- Ten independent hazards.

- Sophisticated cross-zone (three options).
- Delay timer and Discharge timers (adjustable).
- Abort (four options).
- Low-pressure CO₂ listed.

VOICE AND TELEPHONE FEATURES

- Integrates with FireVoice-25/50 Series.
- Integrates via serial connection with FireVoice-25/50ZS(T) Series. Telephone applications require ZST versions.

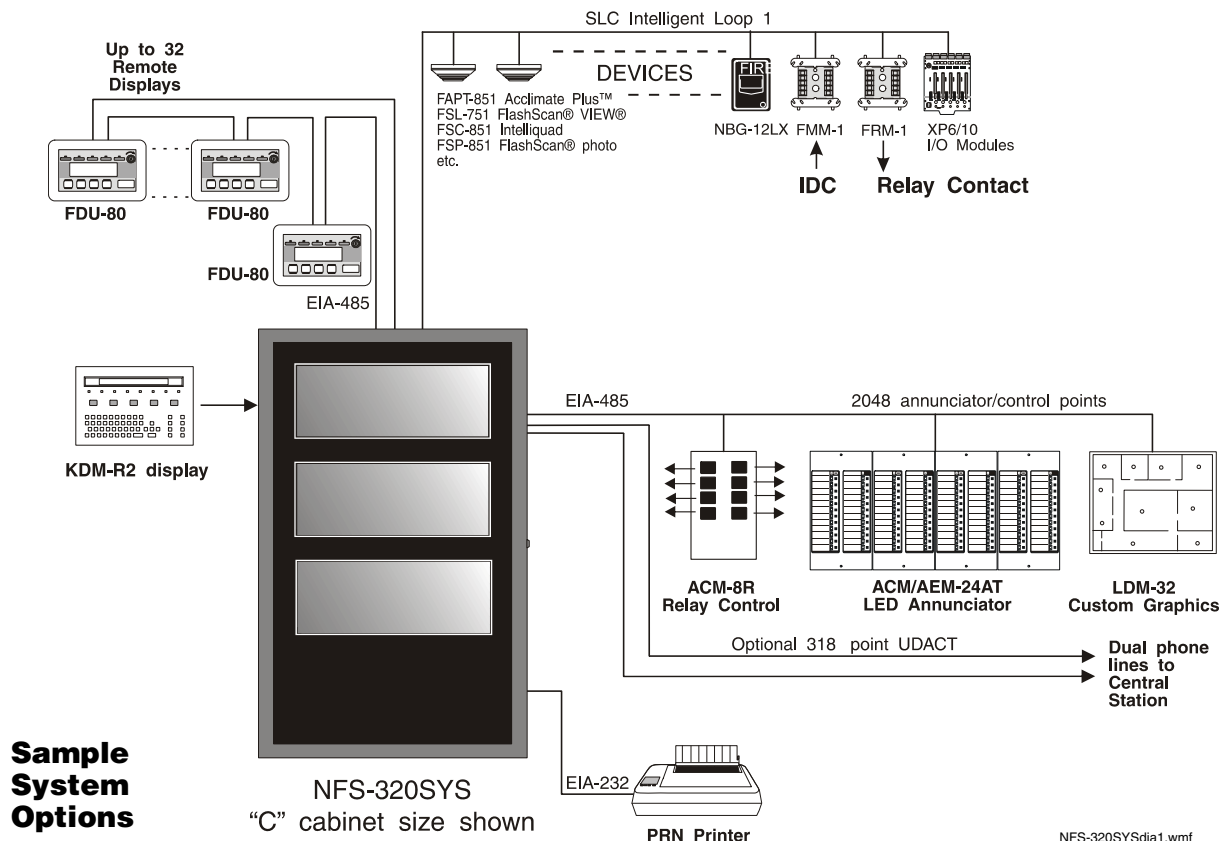
**HIGH-EFFICIENCY OFFLINE SWITCHING
3.0 AMP POWER SUPPLY (6.0 A IN ALARM)**

- 120 or 220/240 VAC.
- Displays battery current/voltage on panel (with display).

**FlashScan, Exclusive New
World-Leading Detector Protocol**

At the heart of the NFS-320SYS is a set of detection devices and device protocol — FlashScan (U.S. Patent 5,539,389). FlashScan is an all-digital protocol that gives superior precision and high noise immunity.

In addition to providing quick identification of an active input device, this new protocol can also activate many output devices in a fraction of the time required by competitive protocols. This high speed also allows the NFS-320SYS to have the largest device per loop capacity in the industry — 318 points — yet every input and output device is sampled in less than two seconds. The microprocessor-based FlashScan detectors have bicolor LEDs that can be coded to provide diagnostic information, such as device address during Walk Test.



ONYX Intelligent Sensing

Intelligent sensing is a set of software algorithms that provides the NFS-320SYS with industry-leading smoke detection capability. These complex algorithms require many calculations on each reading of each detector, and are made possible by the very-high-speed microcomputer used by the NFS-320SYS.

Drift Compensation and Smoothing: Drift compensation allows the detector to retain its original ability to detect actual smoke, and resist false alarms, even as dirt accumulates. It reduces maintenance requirements by allowing the system to automatically perform the periodic sensitivity measurements required by NFPA 72. Smoothing filters are also provided by software to remove transient noise signals, such as those caused by electrical interference.

Maintenance Warnings: When the drift compensation performed for a detector reaches a certain level, the performance of the detector may be compromised, and special warnings are given. There are three warning levels: (1) Low Chamber value, usually indicative of a hardware problem in the detector; (2) Maintenance Alert, indicative of dust accumulation that is near but below the allowed limit; (3) Maintenance Urgent, indicative of dust accumulation above the allowed limit.

Sensitivity Adjust: Nine sensitivity levels are provided for alarm detection. These levels can be set manually, or can change automatically between day and night. Nine levels of pre-alarm sensitivity can also be selected, based on predetermined levels of alarm. Pre-alarm operation can be latching or self-restoring, and can be used to activate special control functions.

Self-Optimizing Pre-Alarm: Each detector may be set for "Self-Optimizing" pre-alarm. In this special mode, the detector "learns" its normal environment, measuring the peak analog readings over a long period of time, and setting the pre-alarm level just above these normal peaks.

Cooperating Multi-Detector Sensing: A patented feature of ONYX intelligent sensing is the ability of a smoke sensor to consider readings from nearby sensors in making alarm or pre-alarm decisions. Without statistical sacrifice in the ability to resist false alarms, it allows a sensor to increase its sensitivity to actual smoke by a factor of almost two to one.

Field Programming Options

Autoprogram is a timesaving feature of the NFS-320SYS. It is a special software routine that allows the NFS-320SYS to "learn" what devices are physically connected and automatically load them in the program with default values for all parameters. Requiring less than one minute to run, this routine allows the user to have almost immediate fire protection in a new installation, even if only a portion of the detectors are installed.

Keypad Program Edit (with KDM-R2) The NFS-320SYS, like all NOTIFIER intelligent panels, has the exclusive feature of program creation and editing capability from the front panel keypad, **while continuing to provide fire protection**. The architecture of the NFS-320SYS software is such that each point entry carries its own program, including control-by-event links to other points. This allows the program to be entered with independent per-point segments, while the NFS-320SYS simultaneously monitors other (already installed) points for alarm conditions.

VeriFire Tools is an offline programming and test utility that can greatly reduce installation programming time, and increase confidence in the site-specific software. It is Windows®-based and provides technologically advanced capabilities to aid the installer. The installer may create the entire program for the NFS-320SYS in the comfort of the office, test it, store a backup file, then bring it to the site and download from a laptop into the panel.

Placement of Equipment in Chassis and Cabinet

The following guidelines outline the NFS-320SYS's flexible system design.

Rows: The first row of equipment in the cabinet mounts in the chassis shipped with the CPU. Mount the second, third, or fourth rows of equipment in a CHS4 Series chassis.

Wiring: When designing the cabinet layout, consider separation of power-limited and non-power-limited wiring as discussed in the NFS-320SYS Installation Manual.

Positions: A chassis offers four basic side-by-side positions for components; the number of modules that can be mounted in each position depends on the chassis model and the size of the individual module. There are a variety of standoffs and hardware items available for different combinations and configurations of components.

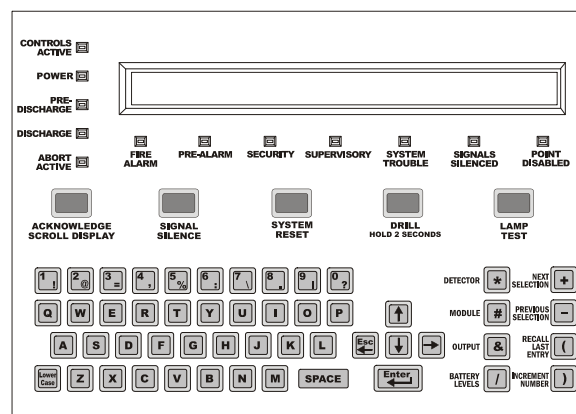
KDM-R2 Controls and Indicators

Program Keypad: QWERTY type (*keyboard layout, below*).

12 LED indicators: Power; Fire Alarm; Pre-Alarm; Security; Supervisory; System Trouble; Signals Silenced; Points Disabled; Control Active; Abort; Pre-Discharge; Discharge.

Membrane Switch Controls: Acknowledge/Scroll Display; Signal Silence; Drill; System Reset; Lamp Test.

LCD Display: 80 characters (2 x 40) with long-life LED backlight (*see illustration*).



7111keyp.wmf

Configuration Guidelines

Note: Stand-alone and network systems require a main display. On stand-alone systems, the panel's keypad provides the required display. On network systems (two or more networked fire panel nodes), at least one NCA-2, NCS, or ONYXWorks annunciation device is required.

NCA-2: Network Control Annunciator, 640 characters. On network systems, the NCA connects to (and requires) an NCM network communications module. Mounts in a row of FACP node or in two annunciator positions.

CPU-320SYS: Central processing unit with integral 3.0 amp (6.0 A in alarm) power supply for an NFS-320SYS system. Includes CPU factory-mounted on a chassis one Signaling Line Circuit; installation, programming and operating manuals. *Order one per system or as necessary on a network system.*

CPU-320SYSE: Same as CPU-320SYS but requires 220 VAC.

CPU-320SYS-FR: Same as CPU-320SYS but with French keypad and French language display.

DP-DISP2: Dress panel for top row in cabinet with CPU-320SYS/E installed.

BMP-1: Blank module for unused module positions.

BP2-4: Battery plate, required.

POWER SUPPLIES, STANDARD CABINETS

ACPS-610: 6.0 or 10 Amp addressable charging power supply. See *DN-60244*.

APS2-6R: Auxiliary Power Supply. Provides up to 6.0 amperes of power for peripheral devices. Includes battery input and transfer relay, and overcurrent protection. Mounts on two of four positions on a CHS-4L or CHS-4 chassis. See *DN-5952*.

FCPS-24S6/-24S8: Remote six-amp and eight-amp power supplies with battery charger. See *FCPS-24S6/-24S8 data sheet, DN-6927*.

CHS-4: Chassis for mounting optional equipment.

CHS-4L: Low-profile four-position Chassis.

DP-1B: Blank Dress panel. Provides dead-front panel for unused tiers.

CAB-4 Series Enclosure: The NFS-320SYS mounts in a CAB-4 Series enclosure (available in three sizes, B-D). The backbox and door are ordered separately. It requires BP2-4 battery plate. A trim ring is available for semi-flush mounting.

COMPATIBLE DEVICES, EIA-232 PORTS

PRN-6: 80-column printer. See *DN-6956*.

VS4095/S2: Printer, 40-column, 24 V. Mounted in external backbox. See *DN-3260*.

COMPATIBLE DEVICES, EIA-485 PORTS

ACM-24AT: ONYX Series ACS annunciator – up to 96 points of annunciation with Alarm or Active LED, Trouble LED, and switch per circuit. Active/Alarm LEDs can be programmed (by powered-up switch selection) by point to be red, green, or yellow; the Trouble LED is always yellow. See *DN-6862*.

AEM-24AT: Same LED and switch capabilities as ACM-24AT, expands the ACM-24AT to 48, 72, or 96 points. See *DN-6862*.

ACM-48A: ONYX Series ACS annunciator – up to 96 points of annunciation with Alarm or Active LED per circuit. Active/Alarm LEDs can be programmed (by powered-up switch selection) in groups of 24 to be red, green, or yellow. Expandable to 96 points with one AEM-48A. See *DN-6862*.

AEM-48A: Same LED capabilities as ACM-48A, expands the ACM-48A to 96 points. See *DN-6862*.

LCD-80/FDU-80: 80-character, backlit LCD display. Mounts up to 6,000 ft. (1828.8 m) from panel. Up to 32 per FACP. See *LCD-80-80TM (DN-3198) and FDU-80 (DN-6820)*.

LDM: Lamp Driver Modules LDM-32, LDM-E32, and LDM-R32; remote custom graphic driver modules. See *LDM data sheet, DN-0551*.

ACM-8R: Remote Relay Module with eight Form-C contacts. Can be located up to 6,000 ft. (1828.8 m) from panel on four wires. See *ACM-8R data sheet, DN-3558*.

SCS: Smoke control stations SCS-8, SCE-8, with lamp drivers SCS-8L, SCE-8L; eight (expandable to 16) circuits (HVAC only). See *SCS data sheet, DN-4818*.

TM-4: Transmitter Module. Includes three reverse-polarity circuits and one municipal box circuit. Mounts in panel module position (single-address-style) or in CHS2-M2 position. See *DN-6860*.

UDACT: Universal Digital Alarm Communicator Transmitter. See *DN-4867*.

UZC-256: Programmable Universal Zone Coder provides positive non-interfering successive zone coding. Microprocessor-controlled, field-programmable from IBM®-compatible PCs (requires optional programming kit). Up to 256 programmable codes. See *UZC-256 data sheet, DN-3404*.

COMPATIBLE INTELLIGENT DEVICES

BEAMHK: Heating kit for transmitter/receiver unit of FSB-200(S) below. See *DN-6985*.

BEAMHRK: Heating kit for use with the reflector of FSB-200(S) below. See *DN-6985*.

BEAMLRK: Long-range accessory kit, FSB-200(S) below.

BEAMMRK: Multi-mount kit, FSB-200(S) below.

BEAMSMK: Surface-mount kit, FSB-200(S) below.

FSB-200: Intelligent beam smoke detector. See *DN-6985*.

FSB-200S: Intelligent beam smoke detector with integral sensitivity test. See *DN-6985*.

FSC-851: FlashScan IntelliQuad Advanced Multi-Criteria Detector. See *DN-60412*.

FSI-851: Low-profile FlashScan ionization detector, will replace FSI-751. See *DN-6934*.

FSP-851: Low-profile FlashScan photoelectric detector, will replace FSP-751. See *DN-6935*.

FSP-851T: Low-profile FlashScan photoelectric detector with 135°F (57°C) thermal, will replace FSP-751T. See *DN-6935*.

FSP-851R: Remote-test capable photoelectric detector for use with DNR(W) duct detector housings. See *DN-6935*.

FST-851: FlashScan thermal detector 135°F (57°C), will replace FST-751. See *DN-6936*.

FST-851R: FlashScan thermal detector 135°F (57°C) with rate-of-rise, will replace FST-751R. See *DN-6936*.

FST-851H: FlashScan 190°F (88°C) high-temperature thermal detector. See *DN-6936*.

FAPT-851: FlashScan Acclimate Plus low-profile multi-sensor detector, will replace FAPT-751. See *DN-6937*.

FSL-751: FlashScan VIEW laser photo detector. See *DN-6886*.

DNR: InnovairFlex low-flow non-relay duct-detector housing (order FSP-851/FSP-851R separately). Replaces FSD-751PL/FSD-751RPL. See *DN-60429*.

DNRW: Same as above with NEMA-4 rating, watertight. See *DN-60429*.

B224RB: Low-profile relay base.

B224BI: Isolator base for low-profile detectors.

B200S: Intelligent sounder base, capable of producing a variety of tone patterns including ANSI Temporal 3. Compatible with synchronization protocol. See *DN-60054*.

B200SR: Intelligent sounder base, Temporal 3 or Continuous tone. See *DN-60054*.

B710LP: Low-profile base. Standard U.S. style.

B501: European-style, 4" (10.16 cm) base.

FMM-1: FlashScan monitor module. See *DN-6720*.

FDM-1: FlashScan dual monitor module. See *DN-6720*.

FZM-1: FlashScan two-wire detector monitor module. See *DN-6720*.

FMM-101: FlashScan miniature monitor module. See *DN-6720*.

FCM-1: FlashScan NAC control module. See *DN-6724*.

FCM-1-REL: FlashScan releasing control module. See *DN-60390*.

FRM-1: FlashScan relay module. See *DN-6724*.

NBG-12LX: Manual fire alarm station, addressable. See *DN-6726*.

ISO-X: Isolator module. See *DN-2243*.

XP6-C: FlashScan six-circuit supervised control module. See *DN-6924*.

XP6-MA: FlashScan six-zone interface module; connects intelligent alarm system to two-wire conventional detection zone. See *DN-6925*.

XP6-R: FlashScan six-relay (Form-C) control module. See *DN-6926*.

XP10-M: FlashScan ten-input monitor module. See *DN-6923*.

NETWORK OPTIONS

NCM-W, NCM-F: Standard Network Communications Modules. Wire and multi-mode fiber versions available. See *DN-6861*.

HS-NCM-W/MF/SF/WMF/WSF/MFSF: High-speed network communications modules. Wire, single-mode fiber, multi-mode fiber, and media conversion models are available. See *DN-60454*.

RPT-W, RPT-F, RPT-WF: Standard-network repeater board with wire connection (RPT-W), fiber connection (RPT-F), or allowing a change in media type between wire and fiber (RPT-WF). See *DN-6971*.

ONYXWorks: UL-listed graphics PC workstation and computer hardware. See *DN-7048* for specific part numbers.

NFN-GW-EM-3: NFN Gateway, embedded. See *DN-60499*.

OTHER OPTIONS

IPDACT-2/2UD, IPDACT Internet Monitoring Module: Connects to primary and secondary DACT telephone output ports for internet communications over customer-provided ethernet connection. Requires compatible Teldat VisorALARM Central Station Receiver. Can use DHCP or static IP. See *DN-60408*.

IPCHSKIT: IP Communicator Chassis Mounting Kit. For mounting an IPDACT-2/2UD onto the panel chassis or CHS-4 series chassis. Use IPENC for external mounting applications.

IPENC: External enclosure for IPDACT, includes IPBRKT mounting bracket; Red. For Black order IPENC-B.

IPSPLT: Y-adaptor option allows connection of both panel dialer outputs to one IPDACT-2/2UD cable input.

DPI-232: Direct Panel Interface, specialized modem for extending serial data links to remotely located FACPs and/or peripherals. See *DN-6870*.

VeriFire-TCD: VeriFire Tools CD-ROM. Contains programming software for the ONYX Series. Includes local panel connection cable. See *DN-6871*.

VeriFireUG-TCD: VeriFire Tools CD-ROM. Upgrade.

BAT Series: Batteries. NFS-320SYS utilizes two 12 volt, 18 to 200 AH batteries. This series of products replaces the previous PS Series. See *DN-6933*.

NFS-LBB: Battery Box (required for batteries larger than 25 AH).

NFS-LBBR: Same as above but red.

411: Slave digital alarm communicator. See *DN-6619*.

411UDAC: Digital alarm communicator. See *DN-6746*.

BB-UZC: Backbox for housing the UZC-256 in applications where the UZC-256 will not fit in panel enclosure. Black; for red, order BB-UZC-R.

SYSTEM SPECIFICATIONS

System Capacity

- Intelligent Signaling Line Circuits 1
- Intelligent detectors 159
- Addressable monitor/control modules 159
- Programmable software zones 99
- Special programming zones 14
- LCD annunciators per CPU-320SYS/E
(*observe power*) 32
- ACS annunciators
per CPU-320SYS/E 32 addresses x 64 points

Specifications

- Primary input power, **CPU-320SYS board:** 120 VAC, 50/60 Hz, 5.0 A. **CPU-320SYS/E board:** 220/240 VAC, 50/60 Hz, 2.5 A.
- Total output 24 V power: 6.0 A in alarm.

NOTE: The power supply has a total of 6.0 Amps of available power. This is shared by all internal circuits.

- Standard notification circuits (4): 1.5 A each.
- Four-wire detector power: 1.25 A.
- Non-resettable regulated power outputs: 1.25 A each.
- Battery charger range: 18 AH – 200 AH. Use separate cabinet for batteries over 25 AH.
- Float rate: 27.6 V.

Cabinet Specifications

NFS-320SYS systems can be installed in CAB-4 Series cabinets (*three sizes with various door options, see DN-6857*).

Temperature and Humidity Ranges

This system meets NFPA requirements for operation at 0 – 49°C/32 – 120°F and at a relative humidity 93% ± 2% RH (noncondensing) at 32°C ± 2°C (90°F ± 3°F). However, the useful life of the system's standby batteries and the electronic

components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a normal room temperature of 15 – 27°C/60 – 80°F.

Agency Listings and Approvals

The listings and approvals below apply to the basic control panel. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL** Listed: file S635
- **ULC** Listed: file S635
- **FM** Listed
- **CSFM:** 7165-0028:0243
- **FDNY:** COA#6067

Standards

The NFS-320SYS complies with the following UL Standards and NFPA 72 Fire Alarm Systems requirements:

- **UL 864, 9th Edition** (Fire).
- **UL 1076** (Burglary).
- **LOCAL** (Automatic, Manual, Waterflow and Sprinkler Supervisory).
- **AUXILIARY** (Automatic, Manual and Waterflow) (requires 4XTM).
- **REMOTE STATION** (Automatic, Manual and Waterflow) (requires 4XTM).
- **PROPRIETARY** (Automatic, Manual and Waterflow).
Not applicable for FM.
- **EMERGENCY VOICE/ALARM.**
- **OT, PSDN (other technologies, packet switches, data network.)**

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