

Specifications: 27 53 13.13 Clock System Primex OneVue™ Sync System with IP Ethernet/Power over Ethernet Technology

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Specifier Note: This product specification is written according to the Construction Specifications Institute (CSI), MasterFormatTM, SectionFormat, and PageFormat, contained in the CSI Manual of Practice. The section must be carefully reviewed and edited by the Architect/Engineer/Consultant to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the drawings. Delete all “Specifier Notes” when editing this specification.

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# GENERAL REQUIREMENTS & SCOPE

The system is specified as described.

1. Furnish and install a complete new Clock System using the Primex OneVue™ Sync System with IP Ethernet/Power over Ethernet Technology.
2. Furnish and install all system devices, accessories, and materials in accordance with these specifications and drawings to provide a complete and operating Clock System.
3. All bids shall be based on the equipment as specified herein. The model designations are that of Primex. The specifying authority must approve any alternate Clock System.
4. System shall include the following system devices

Specifier Note: Edit the following system devices as required for the project.

Specifier Note: InfoBoard operates as a Digital LED clock. InfoBoards also provide 64-character messaging and scheduled countdown capabilities.

* + Analog Clocks
	+ Digital Clocks
	+ Digital Code Blue Timers
	+ Digital Elapsed Timers
	+ Large InfoBoard
	+ Medium InfoBoard

# RELATED SECTIONS

Specifier Note: Edit the following list as required for the project. List other sections with work directly related to this section.

1. Division 26 “Electrical”
2. Division 26 Section “Common Work Results for Electrical”
3. Division 27 Section "Common Work Results for Communications"
4. Division 27 Section "Communications Horizontal Cabling"

# REFERENCES

System devices specified shall meet or exceed the requirements of the following.

Specifier Note: List standards referenced in this section, complete with designations and titles. This article does not require compliance with standards, but is merely a list of those used.

1. Federal Communications Division (FCC); Part 15 - Code of Federal Regulations.
2. National Fire Protection Association (NFPA); NFPA 70E-[2012], Standard for Electrical safety in the Workplace.
3. Institute of Electrical and Electronics Engineers (IEEE); IEEE 802.3af-[1998], Standard for Information Technology - Telecommunications and Information Exchange Between Systems.

# DEFINITIONS

This section provides commonly used terms within this specification.

1. TSA: Technical Support Agreement
2. AWS: Amazon Web Services
3. TLS: Transport Layer Security
4. HTTPS: Hypertext Transfer Protocol Secure
5. DHCP: Dynamic Host Configuration Protocol
6. PoE: Power over Ethernet
7. IP: Internet Protocol
8. NTP: Network Time Protocol
9. UTC: Coordinated Universal Time

# SYSTEM DESCRIPTION

## General Specifications

1. System devices shall be managed and monitored from the Manufacturer cloud-based system software, that allows OWNER to remotely manage system device settings and monitor system devices.
2. System shall consist of system clocks enabled with IP Ethernet/PoE technology.
3. System shall provide synchronized time by way of system devices connected to OWNER'S IP Ethernet/PoE network.
4. System shall not require the installation of any onsite system hardware or software, with the exception of the specified system devices.
5. Clocks shall be capable of automatically adjusting for Daylight Saving Time.
6. Clocks shall be fully portable, capable of being relocated at any time.
7. Clocks shall receive UTC time from a Network Time Protocol (NTP) time source; allow up to three NTP time sources for failover purposes.
8. Clocks shall operate with a free-running accuracy of .45 seconds per day, and will continue to operate in the absence of receiving the UTC time from an NTP time source.
9. Analog clocks shall report gross mechanical failures by way of automatically performing a daily midnight hand verification check; which if this check shall fail for three consecutive days, the clock shall report a hand position failure status, resulting in a clock warning state within the system software.

## System software specifications

1. System software shall provide an online device configuration procedure that allows OWNER supplied settings to be installed on system IP network devices prior to shipment from the Manufacturer.
2. System devices shall download settings from the system software over the OWNER'S existing IP network.
3. System shall provide a mobile app that allows the OWNER to add system devices to the system software or edit the devices’ assigned network and other primary settings for those devices added to the system software.
4. System software shall log the NTP accuracy of the system devices.
5. System software shall monitor and display the operating status of system devices.
6. System software shall provide an automated reporting method to notify system users of device operating statuses that may warrant corrective action.
7. System software shall allow the OWNER to manage authorized system users, including user access to data and system settings that is based on the role assigned to each system user. Access can be limited to viewing and managing the system, including reports, device settings, system users, and account settings.
8. System software shall maintain and store data for up to a minimum of ten (10) years.

## Encryption and Authentication specifications

1. User software access sessions between the web browser and the system software shall be encrypted by the Hypertext Transfer Protocol Secure (HTTPS) protocol.
2. The network communication of system devices enabled with IP Ethernet/PoE technology shall be secure and encrypted using the Transport Layer Security (TLS) encryption protocol and Hypertext Transfer Protocol Secure (HTTPS) authentication.

## System Administration specifications

1. Software interface shall allow the OWNER'S system admin user(s) to manage the system components, including system device settings, reports, system-wide user password complexity settings and user session timeout setting to align with OWNER information security policies and procedures, manage system users and grant users' access to system data and features, activate and deactivate system users, and view users' login history.
2. System software shall allow each system user to manage their own system profile, including their password and contact settings.
3. System software shall allow system device settings to be user-defined to meet OWNER requirements.
4. System software shall allow devices, that send data to and download data from the system software over an IP network, to be assigned to a DHCP or Non-DHCP primary and an alternate network for failover purposes. Network settings are managed within the system software, allowing remote management to migrate devices from one network to another.
5. System software shall allow user-defined reporting; the system shall store and present historical data in the form of reports. User-defined data shall include the system devices included in a report, the frequency a report is system generated, and a specific range of data included in a report. System reports shall be displayed in the system software electronically within the interface to allow system users to download reports. The system shall allow report data to be restricted based on the role(s) assigned to the system users.

## System devices with IP Ethernet/PoE network communication specifications

1. Network Communication Protocols:
	* Hypertext Transfer Protocol Secure (HTTPS) over TLS 1.3
	* IP Addressing: Dynamic Host Configuration Protocol (DHCP and static IP addressing)
	* Data Packet Size: typically less than 5 kilobytes (kB)
2. Network setting data is stored locally in devices shall be encrypted and access to locally stored setting data can be controlled by a system admin user.
3. Manufacturer shall provide standalone configuration software to locally configure a device to meet OWNER security policies if IP network setting data cannot be stored in third-party software or to troubleshoot device network connectivity issues.

# REGULATORY REQUIREMENTS

1. Equipment and components furnished shall be of the Manufacturer latest model.
2. System devices shall be installed in compliance with local and state authorities having jurisdiction.
3. Electrical Components, Devices, and Accessories: Listed and labeled per NFPA 70 by the qualified testing agency.
4. Regulatory Requirements: System design and installation shall comply with the following: National Electric Code (NEC)
* Underwriters Laboratory (UL) standards
* Local codes and regulations

# SUBMITTALS

1. Product Data: Submit complete catalog data for each system device and components, describing physical characteristics and method of installation.
2. Shop Drawings: Showing the following. 1. Diagram of the proposed system showing the communication pathway and schedule of individual system device installation locations. 2. Indicate integration with the OWNER'S network. Include a line diagram of network relationships. 3. Show system device power requirements.
3. Samples: Submit one specified system device model(s) for approval. Approved sample(s) shall be tagged and shall be installed at a location directed.
4. Manufacturer Instructions: Submit complete installation, set-up, and maintenance instructions electronically.

Specifier Note: Informational submittals require review, but no response by A/E or OWNER.

1. Information submittal: Manufacturer Sample Warranty
2. Information submittal: Manufacturer Technical Support Agreement (TSA)

# SUBSTITUTIONS

1. Proposed substitutions, to be considered, shall be manufactured of equivalent materials that meet or exceed specified requirements of this Section.
2. Proposed substitutions shall be identified not less than 10 days prior to the bid date.

# QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of wireless and IP Ethernet/PoE connected system with a minimum of ten years record of satisfactory manufacturing and support of systems comparable to the basis of specified system design.

# DELIVERY STORAGE AND HANDLING

1. Deliver all components to the site in the Manufacturer original packaging.
2. Packaging shall contain Manufacturer name and address, product identification number, and other related information.
3. Store equipment in the finished building and in unopened packaging until ready for installation.

# PROJECT SITE CONDITIONS

1. System design is integrated with the OWNER'S existing IP Ethernet/PoE network; limited to system devices equipped with IP network technology.
2. Conductors and Cables: Comply with requirements of Division 27 Sections "Common Work Results for Communications" and "Communications Horizontal Cabling.
3. Signal and Control Circuits: Manufacturer recommended stranded, single conductors, or twisted- pair cables.
4. Data Circuits: Category 5 minimum, twisted-pair cable.

# SOFTWARE MAINTENANCE

1. [Manufacturer] [Reseller] shall offer an annual Technical Support Agreement (TSA); agreement shall be inclusive to system software access, phone/email technical support, software maintenance and revisions, and firmware revisions.
2. All system updates, enhancements and maintenance are performed per agreed upon TSA.

# SECTION INCLUDES

1. The system and equipment are specified as described in this section.
2. All bids shall be based on the equipment as specified herein. The model designations are that of Primex. The specifying authority must approve an alternate system.

# MANUFACTURER

A. System shall be manufactured by:

Primex, Inc. 965 Wells St, Lake Geneva, WI 53147 | Phone: (262) 729-4858 | info@primexinc.com | [www.primexinc.com](http://www.primexinc.com/)

# SYSTEM SOFTWARE

1. Basis of Design System Software: Primex OneVue
2. Cloud-based software that resides on Amazon Web Services (AWS) and is accessed via the internet.
3. System software stores and monitors system device operating conditions.
4. All system devices and system settings are managed from the system software.

# SYSTEM DEVICES & ACCESSORIES

Specifier Note: Remove all SUPPLY MODELS that do not apply to your project's specification requirements. Refer to the Product Data Sheets located on the Primex website for product part numbers. [https://www.primexinc.com/support/literature](http://www.primexinc.com/support/literature)

## Analog Clocks shall meet the following specifications

1. Clocks (single-sided) shall be wall-mounted.
2. Additional colors, finishes, and dial faces are available from Manufacturer.
3. Clock faces can be customized by Manufacturer to display the organization name or logo as specified.
4. Clock frames and lenses are of durable thermoplastic.
5. Clocks shall have a tamper-proof/theft resistant clock-lock mounting slots.
6. A dual-mount kit is available from the Manufacturer that combines two single clocks to create a dual-sided clock.
7. Power over Ethernet (PoE) models shall have an integrated power supply compliant with the IEEE 802.3at/af (PoE+) standard. The device shall operate as a Class 0 PoE device with a nominal power consumption of 1 Watt and a peak consumption of 2 Watts.
8. On PoE models, the installer may optionally utilize four D cell batteries as power backup. In the event of PoE power interruption, the clock shall seamlessly continue operation (on batteries) until power is restored.
9. If PoE power is interrupted, and backup batteries are not installed, the clock will stop until power resumes. Upon resumption of power, the clock will self-correct to the current time.
10. Installer will furnish clock batteries in accordance with Manufacturer instructions.
11. Operating/Storage Temperature Range: 32F – 158F (0C – 70C)
12. SUPPLY MODELS - Analog Clocks

## Education series

A. Size: [12.5"] [16"]

B. Color: Black

## Traditional series

A. Size: [12.5”] [16”]

B. Color: [White - 12.5" only] [Black]

## Traditional series PoE

A. Size: [12.5”] [16”]

B. Color: [White - 12.5" only] [Black]

## Slim metal series PoE

A. Size: [12.5”] [16”]

B. Power: PoE

## Wood series PoE

1. Size: 16"
2. Finish: [Honey] [Dark Cherry] [Clear Oak] [Walnut]
3. Power: PoE

## Digital Clocks shall meet the following specifications

1. Clock LED display must include a 12- or 24-hour time display, a PM indicator light, and an alternating time and date display option.
2. Dual-mount kit is available from the Manufacturer that combines two single clocks to allow for a dual-sided clock.
3. Power over Ethernet (PoE) models shall have an integrated power supply compliant with the IEEE 802.3at/af (PoE+) standard. The device shall operate as a Class 0 PoE device with a nominal power consumption of 5 Watt and a peak consumption of 13 Watts.
4. Clock shall have a power outage memory backup and maintain the correct time up in its memory for a minimum of 1 hour without power.
5. Clock shall be viewable from 150 ft. (45.7 m).
6. Clock shall have highly visible 7-segment LED digits.
7. Clock shall have display dimmer options, including 100%, 75%, 50%, and 25%.
8. Clock enclosure shall be ABS plastic and junction box shall be UL listed (UL 50E 1st Ed; listing number E469550).
9. Opearting Temperature Range: -40F – 140F (-40C – 60C)
10. Storage Temperature Range: -40F – 185F (-40C – 85C)
11. SUPPLY MODELS - Digital Clocks

## Surface Mount 2.5" Digits

* 1. Number of Digits: [4 Digit] [6 Digit]
	2. Digit Color: [Red] [Green]
	3. Bracket: [4˚ Slope Bracket, 10’ (3m) cord with plug] [18˚ Slope Bracket, 10’ (3m) cord with plug]

## Surface Mount 4" Digits

1. Number of Digits: [4 Digit] [6 Digit]
2. Digit Color: [Red] [Green]
3. Bracket: 4˚ Slope Bracket, 10’ (3m) cord with plug

## Flush Mount 2.5" Digits

1. Number of Digits: 6 Digit
2. Digit Color: [Red] [Green]

## Elapsed Digital Timers shall meet the following specifications

1. Timer shall also function as a clock or function as a count-down/count-up interval timer when programmed with a three-button wall mount control switch.
2. Timer shall accurately count up or count down up to a maximum of 99 hours, 59 minutes, and 59 seconds.
3. Timer shall include a three-button wall-mountable control switch. This control will be mounted in a single gang electrical box. Control buttons must be washable with water and common disinfectants.
4. Switch control shall connect to the timer with a supplied reversed wire (cross-pinned) telephone cable with an RJ-11 connector. It can be extended up to 100 ft. (30.48 m).
5. Timer switch control can be configured to simultaneously activate two connected timers.
6. Timer shall be viewable from up to 150 ft. (45.7 m).
7. Timer shall have highly visible 7-segment LED digits.
8. Timer shall have display dimmer options, including 100%, 75%, 50%, and 25%.
9. Timer display shall include a 12 or 24-hour time display, a PM indicator light, and an alternating time and date display option.
10. Timer shall have an audible tone option on the count-up and count-time function with a frequency of 3KHz +/-0.5KHz.
11. Power over Ethernet (PoE) models shall have an integrated power supply compliant with the IEEE 802.3at/af (PoE+) standard. The device shall operate as a Class 0 PoE device with a nominal power consumption of 5 Watt and a peak consumption of 13 Watts.
12. Timer shall have a power outage memory backup and maintain correct time up to a minimum of 1 hour without power.
13. Clock enclosure shall be ABS plastic and junction box shall be UL listed (UL 50E 1st Ed; listing number E469550).
14. SUPPLY MODELS - Elapsed Timers

## Surface Mount 2.5" Digits

* 1. Number of Digits: [4 Digit] [6 Digit]
	2. LED Color: [Red] [Green]
	3. Bracket: [4˚ Slope Bracket [18˚ Slope Bracket]

## Surface Mount 4" Digits

1. Number of Digits: [4 Digit] [6 Digit]
2. Digit Color: [Red] [Green]
3. Bracket: 4˚ Slope Bracket

## Flush Mount 2.5" Digits

1. Number of Digits: 6 Digit
2. Digit Color: [Red] [Green]

## Code Blue Digital Timers shall meet the following specifications

1. Timer shall function as a standard digital clock and integrate with the OWNER'S existing (supported) code blue control system.
2. Timer shall support code blue systems that apply a voltage to start a code blue event or code blue systems that use a dry contact and do not inject a voltage.
3. Timer shall include a three-button wall-mountable control switch. This control will be mounted in a single gang electrical box.
4. Timer switch control and buttons must be a cleanable surface with use common disinfectants.
5. Timer switch control shall connect to timer with a supplied reversed wire (cross-pinned) telephone cable with an RJ-11 connector. It can be extended up to 100 feet (30.48m).
6. Timer switch control can be configured to simultaneously activate two connected timers.
7. Timer display must include a 12 or 24-hour time display, a PM indicator light, and an alternating time and date display option.
8. Code Blue Timer must include an optional audible tone to alert changes in interval cycles in the count-up and count-down function.
9. Digital Clock shall have display dimmer options, including 100%, 75%, 50%, and 25%.
10. Power over Ethernet (PoE) models shall have an integrated power supply compliant with the IEEE 802.3at/af (PoE+) standard. The device shall operate as a Class 0 PoE device with a nominal power consumption of 5 Watt and a peak consumption of 13 Watts.
11. Code Blue Timer shall have a power outage memory backup and maintain the correct time up to a minimum of 1 hour without power.
12. Clock enclosure shall be ABS plastic and junction box shall be UL listed (UL 50E 1st Ed; listing number E469550).
13. SUPPLY MODELS - Code Blue Timers

## Surface Mount 2.5" Digits

* 1. Number of Digits: 6 Digit
	2. Digit Color: [Red] [Green]
	3. Bracket: [4˚ Slope Bracket] [18˚ Slope Bracket]

## Surface Mount 4" Digits

1. Number of Digits: 6 Digit
2. Digit Color: [Red] [Green]
3. Bracket: [4˚ Slope Bracket] [18˚ Slope Bracket]

## Flush Mount 2.5" Digits

* Number of Digits: 6 Digit
* Digit Color: [Red] [Green]

## Large InfoBoard shall meet the following specifications

1. Highly visible LED matrix panel; viewable from up to 150 ft. (45.7 m).
2. Digit LED colors: red, green, blue, yellow, magenta, cyan, and white (limited colors with non-subscription solution).
3. Display user-defined 64 character message (subscription required).
4. Power over Ethernet: IEEE 802.3af standard and compatible with 802.3at standard
5. AC power supply: Input: 120 VAC (100-240)/ 50–60 cycle, 0.6A. Output: 12V 2A. 10 ft. (3.0m) cord with two-prong plug. UL/cUL listed.
6. Power outage memory backup and maintain the correct time up to a minimum of 1 hour without power.
7. Bluetooth® Wireless Communication Protocol: Bluetooth® Low Energy (BLE) Wireless Technology, version 4.1 for configuration only
8. Weight: 4.3 lb. (2.0kg)

I. Dimensions: 8.25” (21.0 cm) H x 20.875” (53.0 cm) W x 2.625” (6.7 cm) D

1. Enclosure: ABS plastic. Junction box: UL listed (UL 50E 1st Ed; listing number E469550)
2. Ethernet port: 10/100M RJ45
3. RJ11 port: Timer Control Switch connection for use with Code Blue Timer and Elapsed Timer function

## Medium InfoBoard shall meet the following specifications

1. Highly visible LED matrix panel; viewable from up to 150 ft. (45.7 m).
2. Digit LED colors: red, green, blue, yellow, magenta, cyan, and white (limited colors with non-subscription solution).
3. Display user-defined 64 character message (subscription required).
4. Power over Ethernet: IEEE 802.3af standard and compatible with 802.3at standard
5. AC power supply: Input: 120 VAC (100-240)/ 50–60 cycle, 0.6A. Output: 12V 2A. 10 ft. (3.0m) cord with two-prong plug. UL/cUL listed.
6. Power outage memory backup and maintain the correct time up to a minimum of 1 hour without power.
7. Bluetooth® Wireless Communication Protocol: Bluetooth® Low Energy (BLE) Wireless Technology, version 4.1 for configuration only
8. Operate with a free-running accuracy of .45 seconds per day, and will continue to operate in the absence of NTP time source.
9. Weight: 3.5 lb. (1.6 kg)

J. Dimensions: 8.25” (21.0 cm) H x 14.576” (37.0 cm) W x 2.625” (6.7 cm) D

1. Enclosure: ABS plastic. Junction box: UL listed (UL 50E 1st Ed; listing number E469550)
2. Ethernet port: 10/100M RJ45
3. RJ11 port: Timer Control Switch connection for use with Code Blue Timer and Elapsed Timer function

## Accessories

System shall include the accessories below.

1. Analog Clock - Dual Clock Kit

Black - Fits 12.5" Traditional Series or Educational Series Analog Clock White - Fits 12.5" Traditional Series or Educational Series Analog Clock

1. Analog Clock Slim Metal Series Clock - Dual Clock Kit Fits 12.5” (31.75cm) Slim Model Clock

Fits 16” (40.6cm) Slim Model Clock

1. Digital Clock - Dual Clock Bracket Kit

Ceiling mount: [2", 4-Digit] [2", 6-Digit] [4", 4-Digit] [4", 6-Digit]

Wall mount: [2", 4-Digit ] [2", 6-Digit] [4", 4-Digit]

1. Wire Clock Guard

Analog Wire Guard, 18” (45.72cm) square

Digital Wire Guard, Small, 2.5” (6.35cm), 4- or 6-digit

Digital Wire Guard, Large, 4” (10.16cm), 4- or 6-digit, medium or large InfoBoard

1. Polycarbonate Guard

Digital Clock Polycarbonate Guard, Small, 2.5” (31.75cm), 4- or 6-digit.

Digital Clock Polycarbonate Guard, Large, 4” (6.35cm), 4- or 6-digit\*, medium or large InfoBoard.

Analog Clock Polycarb Guard\*\* Fits 9” (22.86cm) and 12.5” (31.75cm) clocks and mini InfoBoard only Flush-Mount Digital Clock Polycarb Guard, 2.5” (6.35cm), 6 digit

Flush-Mount Digital Clock Polycarb Guard with Gasket, 2.5” (6.35cm), 6 digit

1. Large InfoBoard, Medium InfoBoard, MiniBoard accessories MiniBoard Desktop Stand

Medium InfoBoard Dual Mount Kit Ceiling or Wall Large InfoBoard Dual Mount Kit Ceiling Only

Elapsed Timer and Code Blue Conversion Kit. Includes RJ-11 cable, Code Blue timer connector, Timer Control Switch.

Timer Control Switch. For Code Blue Timer and Elapsed Timer operation.

1. Crash Cart Kit

Complete kit for mounting a Digital Clock Timer to a mobile crash cart

# EXAMINATION

1. Examine conditions with the Installer present for compliance with requirements and other conditions affecting the performance of the system and system devices.
2. Do not proceed until unsatisfactory conditions have been corrected.
3. Verify that construction is complete in spaces to receive equipment and that rooms are clean and dry.

# INSTALLATION

1. General: Install system devices in accordance with applicable codes.
2. Install system devices in accordance with Manufacturer written instructions.
3. Provide all system equipment necessary for a complete and operable system.
4. Comply with requirements of Division 27 Sections "Common Work Results for Communications" and "Communications Horizontal Cabling."
5. Cables: Install cables in raceways and cable trays except within consoles, cabinets, and desks [and except in accessible ceiling spaces and framed partitions where exposed wiring is allowed by Owner]. Install plenum cable where required. Conceal cable installation where possible.

# FIELD INSPECTION

1. Inspection: Make observations to verify that system devices and components are properly labeled.
2. Prior to final acceptance, inspect each system device and component, adjust as required, and replace parts that are found defective.
3. At the completion of system device installation and prior to final acceptance, turn on the equipment; ensure that all equipment is operating properly and that the system software and all system devices and components are functioning.

# SERVICES

1. Manufacturer system software user guides and system device installation guides shall be provided electronically within system software.
2. Commissioning General: Provide system commissioning in accordance with Manufacturer written recommendations. Perform operational testing to verify compliance with requirements. Adjust as required.
3. Services shall include a specified level of commissioning services.

Specifier Note: Only include one level of the available commissioning services identified below. Contact Primex for additional information.

1. Remote commissioning service: system deployment training, including system setup, device configuration, and system functionality by way of a web conference.
2. Onsite commissioning service: system training, system setup, validation of device configuration and system functionality, verification of device network connections, and device installation training.
3. Onsite installation and commissioning service: system training, configuration, validation of device configuration, training on system functionality, verification of device network connections, and device installation.

# CLEANING

1. Prior to final acceptance, clean exposed surfaces of devices, using cleaning methods recommended by Manufacturer.
2. Perform cleanup as work progresses and leave the work area clean at the end of each day.
3. Upon completion, remove surplus materials, rubbish, tools, and equipment.
4. Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning.

# DEMONSTRATION

1. Initial Demonstration: provide a demonstration to identified OWNER facility staff that is responsible to maintain the system.
2. Demonstrate maintenance procedures for system devices.
3. Demonstrate the system features, including monitoring and management of system devices.

# PROTECTION

1. Protect finished installation until the final project acceptance.
2. Repair damage to adjacent materials caused by the system installation.

# TESTING

A. All system devices must be tested at their operational installation location under normal operational conditions.