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6
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8
9

Product Guide Specification

Specifier Note: This product specification is written according to the Construction Specifications Institute (CSI), *MasterFormat*[™], *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 section.

DIVISION 16730

GPS WIRELESS CLOCK SYSTEMS 1 Watt Transmitter External Antenna

Specifier Note: This section covers the Primex Wireless GPS Synchronized Clock System. Consult Primex Wireless for assistance in editing this section for the specific application.

Part 1 General Requirements and Scope

Furnish and install a complete new GPS wireless clock system using Primex Wireless Inc. GPS wireless system.

All bids shall be based on the equipment as specified herein. The specifying authority must approve any alternate system.

(Reference Division 16730 Clock Systems)

Specifier Note: Edit the following list as required for the project.

- 1 **1.1 Section Includes**
- 2 Transmission Systems
- 3 GPS Receiver
- 4 Primary Transmitter
- 5 Satellite Transmitter
- 6 Clocks
- 7 Analog
- 8 Digital

9
10 **Specifier Note: Edit the following list as required for the project. List other sections**
11 **with work directly related to this section.**

- 13 **1.2 Related Sections**
- 14 Division 16 – Electrical (120 volt grounded outlet required for transmitter).
- 15 Division 16735 – Wireless Tone Generator

16
17 **Specifier Note: List standards referenced in this section, complete with**
18 **designations and titles. This article does not require compliance with**

19
20 **1.3 References**

21
22 This Technical Specification and Associated Drawings
23 Primex Wireless GPS Satellite Time System User Manual.
24 Primex Wireless Extended Range 1 W User Guide

25
26 **1.4 Definitions**

27
28 GPS: Global Positioning System, a worldwide system that employs 24 satellites in an
29 integrated network to determine geographic location anywhere in the world, and which
30 employs and transmits Universal Coordinated Time, the world's most accurate and
31 reliable time.

32
33 UTC: Universal Coordinated Time

34
35 **1.5 System Description**

36 GPS wireless clock system transmitter shall transmit continuously. Clocks throughout
37 the facility, and shall be capable of clock readouts in multiple time zones where
38 desired.

39
40 The system shall provide wireless time using GPS and be synchronized to UTC. The
41 system shall not require hard wiring. Clocks shall automatically adjust for Daylight
42 Saving Time.

43
44 The system shall synchronize all clocks to each other. The system shall utilize GPS
45 technology to provide atomic time. The system shall not require hard wiring. Clocks
46 shall automatically adjust for Daylight Saving Time.

1 Analog Clocks shall be synchronized to within 10 milliseconds 6 times per day, and
2 The system shall have an internal oscillator that maintains plus or minus one second
3 per day between synchronizations, so that clock accuracy shall not exceed plus or
4 minus 0.2 seconds.

5
6 The system shall include an internal clock reference so that failure of the GPS signal
7 shall not cause the clocks to fail in indicating time.

8
9 The system shall incorporate a “fail-safe” design so that failure of any component shall
10 not cause failure of the system. Upon restoration of power or repair of failed
11 component, the system shall resume normal operation without the need to reset the
12 system or any component thereof.

13
14 Clock locations shall be as indicated, and clocks shall be fully portable, capable of
15 being relocated at any time.

16
17 The system must operate in accordance with a “Technical Acceptance Certificate”
18 issued under the authority of Industry Canada and the Ministry of Industry. This
19 license will be granted to and held by the end user.

20

21 **1.6 Regulatory Requirements**

22

23 Equipment and components furnished shall be of manufacturer’s latest model.

24

25 The end user will hold a license, known as a “Non Complex Fixed Station” Radio
26 License granted by Industry Canada and the Ministry of Industry

27

28 This license grants the end user protected use for wireless transmission at the
29 designated frequency.

30

31 IC-2365: Application for “License to Install and Operate a Radio Station in Canada”
32 must be completed and signed by end user prior to license issuance. The end user will
33 grant permission for Primex Wireless to apply for the license on their behalf. Primex
34 Wireless will provide all documents and technical information to Industry Canada for
35 approval.

36

37 This license will designate a unique “call sign” for each end user.

38

39 Transmitter and receiver shall comply with RSS 119 of Issue 6 of Industry Canada
40 specifications as follows:

41

42 This device may not cause harmful interference, and

43

44 This device must accept interference received, including interference that may cause
45 undesired operation.

46

1 Transmitter frequency shall be governed by IC: RSS119 Issue 6.

2
3 Transmitter output power shall be governed by IC: RSS119 Issue 6

4
5 System shall be installed in compliance with local and state authorities having
6 jurisdiction.

7
8 **1.7 Submittals**

9
10 **Specifier Note: In accordance with Industry Canada regulations, an**
11 **application for “Technical Acceptance Certificate” must be filed prior**
12 **to use of the equipment. Normally, the manufacturer will have**
13 **completed the filing and obtaining the license. If not, the Owner will be**
14 **required to file the application with the Industry Canada prior to use.**
15 **Furnishing the license, or a copy of the application, will confirm that**

16
17 Product Data: Submit complete catalog data for each component, describing physical
18 characteristics and method of installation. Submit brochure showing available colors
19 and finishes of clocks.

20
21
22 Submit IC Technical Acceptance Certificate prior to installing equipment. Furnish the
23 license or a copy of the application for the license, to the Owner/End User prior to
24 operating the equipment. The original license must be delivered to the Owner/End
25 User.

26
27 Samples: Submit one clock for approval. Approved sample shall be tagged and shall
28 be installed in the work at location directed.

29
30 Manufacturer's Instructions: Submit complete installation, set-up and maintenance
31 instructions.

32
33 **1.8 Substitutions**

34
35 Proposed substitutions, to be considered, shall be manufactured of equivalent materials
36 that meet or exceed specified requirements of this Section.

37
38 Proposed substitutions shall be identified not less than 10 days prior to bid date.
39 Other systems requiring wiring and/or conduit between master and clocks will not be
40 accepted.

41
42 Other systems using wireless technology in an unlicensed frequency range will not be
43 accepted.

44
45 Other systems using wireless technology where the license is held by any party other
46 than the end user will not be accepted.

1
2 **1.9 Quality Assurance**

3
4 Permits: Obtain operating license for the transmitter from the Industry Canada.

5
6 Qualifications:

Ma
7 Manufacturer: Company specializing in manufacturing commercial time system
8 products with a minimum of 30 continuous years of documented experience including
9 4 years experience producing GPS wireless time systems.

10
11 Installer: Company with documented experience in the installation of commercial time
12 systems.

13
14 Prior to installation, a site survey must be performed to determine proper transmitter
15 placement.

16
17 **1.10 Delivery Storage and Handling**

18
19 Deliver all components to the site in the manufacturer's original packaging. Packaging
20 shall contain manufacturer's name and address, product identification number, and
21 other related information.

22
23 Store equipment in finished building, unopened containers until ready for installation.

24
25 **1.11 Project Site Conditions**

26 Clocks shall not be installed until painting and other finish work in each room is
27 complete. Coordinate installation of GPS receiver for access to the roof or exterior
28 sidewall so that the bracket and related fasteners are watertight.

29
30 Coordinate installation of system antenna for access to the roof to comply with safety
31 standards detailed in manufacturers instructions.

32
33 **1.12 System Startup**

34
35 At completion of installation and prior to final acceptance, turn on the equipment;
36 ensure that all equipment is operating properly, and that all clocks are functioning.

37
38 **1.13 Warranty**

39
40 Manufacturer will provide a warranty on GPS receiver, transmitter, and antenna. All
41 other components will have a 1 year warranty.

42
43
44 **Part 2 – Products**

45
46 **2.1 Manufacturer**

1
2 GPS wireless clock system shall be manufactured by Primex Wireless, Inc., 8150
3 Keele St., Unit #2, Concord, Ontario L4K 2A5, 800-330-1459
4 www.primexwireless.com.
5

6 **2.2 Sequence of Operation**

7
8 Transmitter Operation: When power is first applied to the transmitter, it checks for
9 and displays the software version. It then checks the position of the switches and
10 stores their position in memory. The transmitter looks for the GPS time signal. Once
11 the transmitter has received the GPS time, it sets its internal clock to that time. The
12 transmitter then starts to transmit its internal time once every second. The transmitter
13 updates its internal clock every time it receives valid time data from the GPS.
14

15 Analog Clock Operation:

16
17 Apply power or insert batteries. Follow set up procedures detailed in manufacturer's
18 instructions.
19

20 After initial setup, the clock will shut off the receiver. Six times each day, the
21 microprocessor will activate the receiver and starting with the stored channel, it will
22 again look for a valid time signal. If necessary, the clocks will resynchronize to the
23 correct time.
24

25 If the clock has not decoded a valid time signal for a pre-determined number of days, it
26 will go to a step mode. Non signal reception can be caused by low battery voltage. If
27 this occurs, replace the batteries.
28

29 **2.3 Equipment**

30 General: The clock system shall include a transmitter, a roof or window mounted
31 GPS receiver, indicating clocks, and all accessories for complete operation.
32

33 **Specifier Note: Select appropriate cable length for distance between**
34 **GPS unit and transmitter, from the following:**
35

36 GPS Receiver: GPS roof mounted, with 16-foot cable (5m) attached (additional
37 Primex Wireless extension cable available: 50ft (15.25m), 100 ft (30.5m), and 200 ft
38 (61m).
39

40 The GPS Receiver shall be a complete GPS receiver including antenna in a waterproof
41 case, designed for roof or outdoor mounting. Provide mounting bracket for attachment
42 to roof structure.
43

44 The GPS Receiver cable must be plenum rated where required by local code.
45

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1 Transmitter: Primex Wireless Model **14000-E**, consisting of wireless transmitter with
2 external antenna and GPS receiver. Unit shall obtain current atomic time from
3 satellite. The clock system shall transmit time continuously to all clocks in the system.
4
5 Transmission:
6
7 Frequency Range: 72.100 to 72.400 MHz.
8
9 Transmission Power: 1 watt (30dBm) maximum
10
11 Radio technology: narrowband FM
12
13 Number of channels: 16
14
15 Channel bandwidth: 20 kHz maximum
16
17 Transition mode: one-way communication
18
19 Data rate: 2 KBps
20
21 Operating range: 32 degree F to 158 degrees F (0 degrees C. to 70 degrees C).
22
23 Transmitter:
24
25 Transmitter output power: +26 to +30 dBm
26
27 Frequency deviation: +/- 4 kHz
28
29 Transmitter power requirements: 120 VAC 60 Hz
30
31 Internal power requirements: 5 VDC
32
33 Carrier frequency stability: +/- 5 ppm
34
35 Transmitter shall have 16 channels to assure interference-free reception, which will be
36 pre-assigned at the factory.
37
38 Transmitter shall have the following switches:
39
40 Includes all Canadian time zones: Atlantic, Newfoundland, Eastern,
41 Central, Mountain, and Pacific
42
43 Daylight Saving Time bypass switch.
44
45 12-hour or 24-hour display.
46

G.P.S. Wireless Clock System 1 Watt Transmitter External Antenna
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- 1 Transmitter housing shall be black metal case, 16-3/4 inches (424.4mm) by 12 inches
- 2 (304.8mm) by 1-7/8 inches (46.4mm) in size.
- 3
- 4 An external antenna is included with the transmitter model number.
- 5 The antenna connects to the transmitter via a 50-ohm 100ft.coaxial cable.
- 6
- 7 Transmitter housing shall incorporate a display, which shall include the following:
- 8
- 9 Time readout
- 10
- 11 AM and PM indicator if 12-hour time display is set
- 12
- 13 Day and date readout
- 14
- 15 Indicator for Daylight Savings or Standard Time
- 16
- 17 LED which shall flash red in event of GPS reception problem
- 18
- 19 GPS reception indicator
- 20
- 21 Transmitter shall contain an internal clock such that failure of reception from the GPS
- 22 will not disable the operation of the clocks.
- 23
- 24 Power supply (included)
- 25 Input: 120 volt AC 50/60 Hz, 0.4 amps.
- 26 Output: 9 volt DC, 2.0 amps.
- 27
- 28 Antenna: An external antenna is included with the transmitter model number.
- 29 The antenna connects to the transmitter via a 100 ft. (30.5m) 50-ohm coaxial cable,
- 30 Antenna: Dimensions: radiating element 29.4 inches (747mm)
- 31
- 32 Ground radials 41.5 inches (1063 mm)
- 33
- 34 Equivalent flat plate area: 0.68ft² (0.063m²)
- 35
- 36 Polarization: Vertical
- 37
- 38 H-plane beamwidth: omni
- 39
- 40 E-plane beamwidth: 78 degrees (half power)
- 41
- 42 Max. Input power (75 watts@ 50 degrees)
- 43
- 44 Gain: 0 dBd
- 45 VSWR (max)<: 1.5
- 46

G.P.S. Wireless Clock System 1 Watt Transmitter External Antenna
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1 Frequency range: 68-78MHz (broadband)

2

3 Impedance: 50 ohms

4 Lightning Protection: Direct Ground

5 Connector N female

6

7 Pole or Wall Mountable

8 Mounting hardware supplied

9

10 **Specifier Note: Select optional antenna mast configurations. See manufacturer's**
11 **instructions for building mount or non – penetrating mast options**

12

13

14 Optional Non penetrating antenna mast kit

15 Primex Wireless Model **ANT-NP1**

16 Installer must provide ballast material per manufacturer's instructions

17 Building -mount antenna mast kit. Primex Wireless Model

18 **ANT – P1**

19

20 Wind survival rating 120mph (200kph)

21 Additional Equipment

22

23

24 **Specifier Note: Large buildings and multi-building projects may require**
25 **satellite transmitters to provide proper coverage. Consult Primex Wireless for**
26 **assistance in making this determination. If satellite transmitters are required,**
27 **include the following two items in the project specification.**

28

29 Wireless Receiver Switches: Switches shall receive time packets from the Primary
30 Transmitter and relay the synchronized time to the Satellite Transmitter connected to
31 it. The unit shall include the following:

32

33 Antenna mounted on top of the switch housing, 11-1/2 inches (292mm) long.

34 Power Supply:

35 Input 120 VAC 50/60 Hz, 0.4 amps

36 Output: 9 volt DC, 10.25 amps

37

38 RS 232 data cable, 5 feet (1.5mm) long

39 Daylight Saving Time bypass switch

40

41 Dimensions: 4-1/4 inches (108mm) long, 5/-3/4 inches (146mm) wide, 1-1/4 inches
42 (31.75mm) deep.

43

44 Weight: 12 ounces (.34kg)

45 Operating Range: 32 degrees F to 158 degrees F (0 to 70 degrees C)

46

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1 Satellite Transmitters Primex Wireless Model **14144**: Satellite Transmitters shall
2 receive the signal from the Wireless Receiver Switches and transmit the signal to the
3 devices in its vicinity, which are out of the range from the Master Transmitter. The
4 unit shall include the following:

5
6 Antenna mounted on top of the housing, 46 inches (1168mm) long.

7
8 Wireless Receiver Switch.

9
10 Power Supply

11 Input: 120 VAC, 50/60 Hz, 0.4 amps

12 Output: 9 volt DC, 2.0 amps.

13
14 6 foot (1.83m) cord.

15
16 Transmission Power: 1 watt maximum

17
18 72 MHz frequency.

19
20 Traditional analog clocks (battery): Analog clocks shall be wall mounted. Clocks shall
21 have polycarbonate frame and polycarbonate lens. Face shall be white. Hour and
22 minute hands shall be black. 9 inch (228.6mm) diameter analog clock: Primex
23 Wireless Model **14280** 12-1/2 inch (317.5mm) diameter analog clock: Primex
24 Wireless Model **14155**

25 16 inch (406.4mm) diameter analog clock: Primex Wireless Model **14163**

26 24 inch (610mm) diameter analog clock: Primex Wireless Model **14346**

27
28 Additional colors, finishes, and dial faces are available from manufacturer.

29
30 Analog clocks shall be battery-operated, and shall have minimum 5-year battery life.

31
32 Analog clocks shall be capable of automatically adjusting for Daylight Saving Time.
33 An on-off switch located on the transmitter shall disable this function if desired.

34
35 Time shall be automatically updated from the transmitter 6 times per day.

36
37 Analog clocks shall remember the time during changing of batteries.

38
39 9 inch (228.6mm) and 12.5 inch (317.5mm) analog clocks shall have a tamper
40 proof/theft resistant clock lock mounting slots.

41
42 Installer will furnish clock batteries in accordance with manufacturer's instructions (9
43 inch /228.6mm– 2 C cells, 12.5inch/317.5mm, 16 inch/406.4mm –2 D cells and 24
44 inch/610mm – 2 C cells)

45
46 **Specifier Note: Select optional dial designs, colors, case options and hands from
manufacturer's brochure**

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Analog clock receivers shall be as follows:

Receiver sensitivity: >-110 dBm

Receiver power: dual lithium battery pack, supplied by manufacturer.

Antenna type: internal

Antenna gain: -7 dBd

If the transmitter stops transmitting valid time signals due to power failure, the clocks will continue to function as accurate quartz clocks until a valid time signal is decoded. If signal transmission is not restored after 96 hours,

The second hand will “five -step” as a visual indicator that the signal has been lost. Should the clocks lose power and signal, the clocks will not function.

Specifier Note: Analog clock faces can be made with Owner's logo as an option. If desired, leave in the following, and arrange for Owner to provide hard copy or digital copy of logo in format required by Primex Wireless. Contact Primex Wireless for details

Analog clock faces shall bear Owner's logo as indicated.

Traditional analog clocks (AC): Analog clocks shall be wall mounted. Clocks shall have polycarbonate frame and polycarbonate lens. Face shall be white. Hour and minute hands shall be black.

12-1/2 inch (317.5mm) diameter analog clock, 24 VAC, Primex Wireless Model **14323** 12-1/2 inch C, 12-1/2 inch (317.5mm) diameter analog clock, 120 VAC, Primex Wireless Model **14306** Additional colors, finishes, and dial faces are available from manufacturer.

Analog clocks shall be AC powered (24 VAC or 120 VAC). Clocks must have an 18 inch (457.2mm) cord with two-prong plug (120 VAC) or pigtail (24 VAC) to connect to power source.

Analog clocks shall be capable of adjusting for Daylight Saving Time.

Time shall be automatically be updated from the transmitter 6 times per day.

If power is interrupted, the clock will stop until power resumes. Upon resumption of power, the clock will self correct to the current time.

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1 Clocks shall have a tamper proof/theft resistant clock lock mounting slots.

2
3 Analog clock receivers shall be as follows:

4
5 Receiver sensitivity: >-110 dBm

6
7 Receiver power: 24 VAC or 120 VAC (see model #)

8
9 Antenna type: internal

10
11 Antenna gain: -7 dBd

12
13 If transmitter stops transmitting valid time signals due to power failure, the clocks will
14 continue to function as accurate quartz clocks until a valid time signal is decoded. If
15 signal transmission is not restored after 96 hours, the second hand will “five step” as a
16 visual indicator that the signal has been lost. Should the clocks lose power and signal,
17 the clocks will not function.

18
19 **Specifier Note: Analog clock faces can be made with Owner's logo as an option. If**
20 **desired, leave in the following, and arrange for Owner to provide hard copy or**
21 **digital copy of logo in format required by Primex Wireless. Contact Primex**
22 **Wireless for details**

23
24 Analog clock faces shall bear Owner’s logo as indicated.

25
26 Digital Clocks: Primex Wireless Model **14201**, 4 inch (101.6mm), 6 digit - 7 segment
27 LED display.

28
29 **Specifier Note: Base part number comes with red LED digits. Add letter “G” to**
30 **base number for green LED digits**

31
32 **Select optional digit style, colors, and case styles from manufacturer’s brochure.**

33
34
35 Digital clocks must be able to receive synchronized time signal
36 From Primex Wireless master or satellite transmitter.

37
38 Digital clocks must have time and date option.

39
40 Digital clocks shall be capable of automatically adjusting for Daylight Saving Time

41
42 Power Supply: 120 VAC, 50-60 cycle.

43
44 Digital clocks must be viewable from 150 feet (45.7m).

45
46 **Specifier Note: Where desired for protection of an clocks, specify the**
following optional equipment

1
2
3 Wire guards: Provide one for each clock as follows:

4
5
6 Analog clock wire guard Primex Wireless Model **14131**, 14 by 14 inch (355.6 by
7 355.6 mm) size, for nominal 12-1/2 inch (317.5 mm) diameter analog clocks.

8
9 Analog clock wire guard Primex Wireless Model **14123**, 18 by 18 inch (457.2 by
10 457.2mm) size, for 16 inch (406.4mm) diameter analog clocks. Digital clock wire
11 guard Primex Wireless Model 14388 for 2.5" (63.5mm) LED digital clocks

12
13 Digital clock wire guard Primex Wireless Model **14389** for 4" (101.6mm) LED digital
14 clocks.

15
16 Dual D Lithium Battery Pack Primex Wireless Model **14885** contains two sealed
17 parallel lithium primary batteries.

18 Cable Connection Sealant: Radio Shack Coaxial Cable Connector

19
20 Sealant 278-1645, or approved electrical grade silicone sealant.
21
22

23
24 **Specifier Note: Where desired for mounting transmitter, specify the following**
25 **equipment: One for each transmitter**
26

27 Transmitter Rack.

28 Primex Wireless Model **14005**, 3" (76.2mm) x 16.5" (419mm)(x 18"(457mm), 18
29 gauge metal, epoxy covered
30

31 **Part 3 – Execution**

32 33 **3.1 Examination**

34
35 Verify that construction is complete in spaces to receive equipment and that rooms are
36 clean and dry.

37
38 Verify that 120 volt electrical outlet is located within 6 feet (1.83m) of location of
39 transmitter and the outlet is operational and properly grounded.
40
41
42
43
44

45 46 **3.2 Installation**

1
2 **Specifier Note: The GPS unit can be mounted on the roof, on a pole, or at a window.**
3 **In each case, the GPS unit must have a clear view of the sky. If the GPS unit is**
4 **mounted on the roof, it must be located on a suitable bracket, well above the level of**
5 **standing or incidental water. If the GPS unit is mounted at a window, it must be**
6 **located away from low-E glass.**
7

8 GPS Unit: Install on roof in location indicated, in clear view of the sky. Install unit in
9 location free from standing water, and above accumulations of leaves or debris. Seal
10 cable connection to GPS with cable connection sealant. Any added cable lengths must
11 be protected from outside elements.
12

13 Locate transmitter in a penthouse, electrical closet, or telecommunications room in a
14 central location in the building. Clearance around all sides of the transmitter to
15 comply with local building codes.
16

17 **Specifier Note: To assure optimum performance of the System, a site survey must**
18 **be performed by Primex Wireless or a Certified Primex Wireless installation**
19 **company. Contact Primex Wireless Technical Support at 1-800-404-8112.**
20
21

22 Transmitter is connected to external antenna via a 50 ohm coaxial cable. Typical
23 length – 100ft (30.5m) Cable routing should comply with ANSI EIA/TIA-569 and
24 local building codes. If the cable is routed through conduit, the conduit should be a
25 minimum of 2 inch (50.8mm) diameter.
26

27 Transmitter enclosure must be bonded to an earth ground per ANSI EIA/TIA 607,
28 NEC Article 250, and local building codes
29

30 Antenna

31 Antenna should be mounted to a mast on the roof of the building connecting to the
32 transmitter via a 50-ohm coaxial cable. Consult manufacturer's instruction manual for
33 specific clearances and mounting instructions. Antenna must be bonded to an earth
34 ground per ANSI EIA/TIA 607, NEC Article 250, and local building codes.
35

36 Analog clocks (battery): Perform the following operations with each clock:
37

38 Install batteries.
39

40 Set clocks to correct time in accordance with manufacturer's instructions.
41

42 Observe analog clock until valid signals are received and analog clock adjusts itself to
43 correct time.
44

45 Install the analog clock on the wall in the indicated location, plumb, level and tight
46 against the wall. If using 12-1/2 inch (317.5mm) clock, attach using clock-lock
hanging method and suitable fasteners as approved by clock manufacturer.

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Analog clocks (AC): Perform the following operations with each clock:

Apply power (24 VAC or 120 VAC)
Observe clock until valid time signals are received and analog clock adjusts itself to correct time.

Install the analog clock on the wall in the indicated location, plumb, level, and tight against the wall. Attach using clock-lock hanging method and suitable fasteners as approved by clock manufacturer.

Specifier Note: Delete the following if wire guards are not required

Wire guards: Secure to wall, using approved theft-resistant fasteners.

3.3 Adjusting

Prior to final acceptance, inspect each clock, adjust as required, and replace parts which are found defective.

3.4 Cleaning

Prior to final acceptance, clean exposed surfaces of clocks, using cleaning methods recommended by clock manufacturer. Remove temporary labels from clock faces. Do not remove labels from backs of clocks.

3.5 Demonstration

Provide training to Owner's representative on setting and adjusting clocks, replacing batteries and routine maintenance.

3.6 Protection

Protect finished installation until final acceptance of the project.

3.7 Testing

All devices must be tested at their operational location under normal operational conditions to assure reception of signal.

END OF SECTION