

CSI Specification 27 53 13

Wired Clock System

Rev 1

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This product specification is written according to the Construction Specifications Institute (CSI), *MasterFormat™*, *SectionFormat*, and *PageFormat*, contained in the *CSI Manual of Practice*. Reference 16735, Master Format 2004 Section 27 53 13

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section specifies a master clock and program control system including the following components:
 - 1. Master clock and program control unit
 - 2. Secondary indicating clocks
 - 3. Program signal devices
 - 4. Clock circuit power boosters
 - 5. System wire and cable
- B. System Description
 - 1. System shall perform the following functions:
 - a. Supply power to remote indicating clocks
 - b. Maintain correct synchronized time and transmit time-correction signals over dedicated system wiring from a master clock to any type(s) of secondary clocks, including the following:

Analog Synchronous Clocks: Correct for minute- and second-hand synchronization at least once each hour and for hour-hand synchronization at least once each day.

Digital Clocks: Synchronize minute indication every hour and hour indication every 12 hours.

- 2. Initiate and execute programs for scheduled automatic operation of remote devices. Include audible signal devices.
- 3. Provide for manual control of programmed signal and equipment switching circuits.
- 4. Communicate with remote PC for access to UTC time base and to permit programming from remote location.
- 5. Maintain system access security with a minimum of two levels of user-access control to restrict use of system controls to authorized personnel. Level of access applies to both local access and access from a remote computer. Access to user programming and control functions is accomplished by entering a minimum four-digit code.
- 6. Regulate system timing function using power-line frequency, backed up for power outages by an internal battery-powered, crystal-controlled oscillator.
- 7. System shall be capable of programming multiple independent event schedules into memory and running them simultaneously for different output circuits.
 - a. Quantity of Programmable Schedules: Sixteen minimum.
 - b. Number of Weekly Events that can be programmed for each schedule: 128 minimum.

c. Simultaneous operation of independent schedules shall be limited only by the number of signal-device and equipment-switching output circuits.

8. Daylight Saving Time Correction: Programmable for automatic correction.

9. Adjustments to Master Clock Output Signals: Duration of momentary signal shall be individually programmable for each signal and equipment-control output circuit from 1 to 9 seconds. Signals shall be programmable for either on or off switching to suit equipment-operation scheduling.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: UL Listed

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Time and Signal Co. or approved equal.

2.2 MASTER CLOCK

- A. Description: Microprocessor-based, software-controlled unit having the following components and features:
 - 1. Programming and control switches.
 - 2. Informational Display: LED or backlit LCD type.
 - a. Normally shows current time, date, and day of week display.
 - b. Provides programming cues when system is being programmed.
 - 3. Output Circuits for Power and Correction of Secondary Indicating Clocks:
 - a. Wired Synchronous Clock Power Circuit and One Correction Circuit: For analog and digital clocks. Relay controlled.
 - 4. PC interface software for remote programming and automatic NIST or UTC synchronization.

5. Ethernet or RS232 data communication port.
6. Circuits for audible signal devices: Relay controlled manually switchable, using controls on master clock. Rated 120-V ac, 10 A minimum. A minimum of two circuits.
7. Circuits for Programmable Switching of Remote Equipment and Circuits: Relay controlled manually switchable, using controls on master clock. Rated 120-V ac, 10 A minimum. A minimum of two circuits.
8. Power Supplies: Capacity for internal loads and power and correction circuits of connected clocks.
9. Enclosure: UL Listed industrial control panel, surface mount with front panel latch. When cover is closed, display indication shall be visible through the cover.
10. Battery Backup for Time Base: Lithium battery to maintain the timekeeping function and retain the programs in memory during outage of normal ac power supply for up to 7 years.

2.3 SECONDARY INDICATING CLOCKS, GENERAL

- A. Analog Clock: Equipped with a sweep second hand.
- B. Digital Clock: Microprocessor-controlled unit with red LED digital time display of hours, minutes, and seconds.
 1. Display Height: 2.5-Inch (64mm) Clock: Hour and minute numerals readable at 50 feet (15m)
 2. Display Height: 4-Inch (102mm) Clock: Hour and minute numerals readable at 100 feet (30m)
 3. Display Format: Selectable between 12-hour (with "PM" indicator on LED display) and 24-hour formats.
 4. Connections for Power and Correction:
 - a. Wired synchronous connection to master clock for both operating power and correction.
- C. Connection Provision for Secondary Indicating Clocks: Plug connector, 4-pin locking type.

2.4 DETAILED REQUIREMENTS FOR SECONDARY INDICATING CLOCKS

- A. Clock Type: Analog
 1. Products:
 - a. American Time and Signal Co. or approved equal
 2. Face Configuration: Single or Double face as indicated.
 3. Mounting: Specify recessed (flush type) or surface mount
 4. Crystal: Clear Polycarbonate.

2.5 PROGRAM SIGNAL DEVICES

- A. Loudspeakers for Audible Tones: Refer to Division 16 Section "Public Address and Music Equipment."

2.6 CLOCK CIRCUIT POWER BOOSTER

- A. Description: Transformer power supply, mounted in steel cabinet with hinged door, and having fuse-protected input and output circuits.

2.7 BACK BOXES FOR SECONDARY INDICATING CLOCKS AND PROGRAM DEVICES

- A. Description: Box and cover plate assembly shall be furnished by device manufacturer and be suitable for device to be mounted. Back boxes shall be equipped with knockouts and hanger straps or mounting adapters arranged for flush mounting device, unless otherwise indicated.

2.8 GUARDS

- A. Description: Formed-steel wire, shaped to fit around guarded device, with 1-inch (25-mm) maximum clearance.
 - 1. Mounting Provisions: Fixed tabs welded to guard and arranged for screw attachment to mounting surface.
 - 2. Finish for Indoor Devices: Clear epoxy lacquer over zinc plating or powder coat painted finish.

2.9 WIRE AND CABLE

- A. Conductors: Insulated copper, with minimum sizes as recommended by the connected device manufacturer. Voltage drop for signal, control, and clock correction circuits shall not exceed 10 percent under peak load conditions.
- B. 120-V ac and Class 1 Signal and Control Circuits: Stranded single conductors of size recommended by system manufacturer. Materials and installations requirements are specified in Division 16 Section "Conductors and Cables."
- C. Classes 2 and 3 Signal and Control Circuits: Single conductor or twisted-pair cable, unless manufacturer recommends shielded cable.
- D. Data Circuits: Category 5 minimum, unshielded, twisted-pair cable, unless manufacturer recommends shielded cable.
- E. Plenum Cable: Listed and labeled for use in air-handling spaces, plenums, and plenum ceilings.
- F. Conductor Color-Coding: Uniformly identified and coordinated with wiring diagrams.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Wiring: Install 60 Hz wiring according to national and local electrical codes. Install data cable complying with TIA/EIA-568-A. Install number of conductors recommended by system manufacturer for functions indicated, and as follows:
 - 1. Conceal wiring except in unfinished spaces.
 - 2. Wiring Method: Install wiring in raceways.
 - 3. Wiring Method: Install wiring in raceways except for Classes 2 and 3 remote-controls and signaling circuits, as defined in NFPA 70, if installed in accessible ceiling spaces and hollow gypsum-board partitions, where

unenclosed wiring method may be used. Install listed plenum cable for Classes 2 and 3 wiring in environmental air spaces, including plenum ceilings.

4. Wiring Method: Install metal-clad cable except for Classes 2 and 3 remote-controls and signaling circuits, as defined in NFPA 70, if installed in accessible ceiling spaces and hollow gypsum-board partitions, where unenclosed wiring method may be used. Install listed plenum cable for Classes 2 and 3 wiring in environmental air spaces, including plenum ceilings.

3.2 ELECTRICAL CONNECTIONS

- A. Make splices, taps, and terminations on numbered terminal strips in junction, pull and outlet boxes, terminal cabinets, and equipment enclosures.
- B. Use plug connectors for connections to clocks.
- C. Ground clocks, conductor and cable shields to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

3.3 IDENTIFICATION

- A. Comply with Division 16 Section "Electrical Identification."
- B. Color-code wire and apply wire and cable marking tape to designate wires and cables so they are uniformly identified and coordinated with wiring diagrams throughout the system.

3.4 FIELD QUALITY CONTROL

- A. Perform the following field adjustments, tests, and inspections and prepare test reports:
 1. Perform operational-system tests to verify compliance with the Specifications and make adjustments to bring system into compliance. Include operation of all modes of clock correction and all programming and manually programmed signal and relay operating functions.
 2. Verify all units and controls are properly labeled and interconnecting wires and terminals are identified.
- B. Remove and replace malfunctioning units and retest as specified above.

3.5 PROGRAMMING AND ADJUSTMENTS

- A. Program system according to Owner's requirements. Set system so signal devices operated on Owner-required schedules and are activated for durations selected by Owner. Program equipment-control output circuits to suit Owner's operating schedule for equipment controlled.
- B. Adjust sound-output level of adjustable signal devices to suit Owner's requirements.

END OF SECTION 27 53 13