

NORTHWEST FLORIDA STATE COLLEGE

MONUMENT SIGNS

Table of Contents

Section 16100 – Methods and Basic Materials	16100-1 – 16100-3
Section 16200 – Raceway Systems	16200-1 – 16200-4
Section 16300 – Conductors, Cable and Devices	16300-1 – 16300-4
Section 16880 – Outdoor Signs with Digital Display	16880-1 – 16880-5

I. GENERAL

1.1 SECTION INCLUDES:

- A. SUPPORTS
- B. EXCAVATION, TRENCHING, AND BACKFILLING
- C. CUTTING AND PATCHING
- D. EQUIPMENT CONNECTION
- E. IDENTIFICATION OF EQUIPMENT
- F. CLEANING AND PAINTING

II. PRODUCTS

2.1 SUPPORTS:

- A. FRAMING STEEL: Galvanized or painted rolled steel of standard shapes and sizes.
- B. MANUFACTURED CHANNEL: Hot dipped galvanized with all hardware required for mounting as manufactured by Unistrut, Steel City, or approved equal.
- C. MISCELLANEOUS HARDWARE: Standard sizes treated for corrosion resistance.

2.2 IDENTIFICATION:

- A. NAMEPLATES: Laminated black micarta with 1/4" high engraved white letters.
- B. PANEL DIRECTORIES: Panel schedules shall be typewritten (not handwritten)
- C. WIRE AND CABLE MARKERS: Cloth, split sleeve, or tubing type.

III. EXECUTION

3.1 INSTALLATION

- A. Products shall be installed in accordance with manufacturer's instructions.
- B. Install support systems sized and fastened to accommodate weight of equipment and conduit, including wiring, which they carry.

- (1) Fasten hanger rods, conduit clamps, and outlet junction boxes to building structure using pre-cast insert system, expansion anchors, preset inserts, beam clamps, or spring steel clips.
 - (2) Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchors on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
 - (3) Do not fasten supports to piping, ceiling support wires, ductwork, mechanical equipment, or conduit.
 - (4) Do not use powder-actuated anchors.
 - (5) Do not drill structural steel members without written consent from the Architect.
 - (6) Fabricate supports from structural steel or steel channel.
 - (7) Install surface mounted cabinets and panel boards with minimum of four anchors.
 - (8) Provide steel channel supports to stand cabinets one inch off wall in wet locations.
 - (9) Bridge studs top and bottom with channels to support flush mounted cabinets and panel boards in stud walls.
- C. CUTTING AND PATCHING: This Contractor shall provide all cutting, digging, etc., incident to his work and shall make all required repairs thereafter to the satisfaction of the Architect, but in no case shall the Contractor cut into any major structural element, beam, or column without written approval of the Architect.
- (1) Existing pavements, sidewalks, roads, curbs, walls, ceilings, floors, and roofs shall not be sawcut or patched. Existing concrete floors and other slabs, which require vertical piercing for installation of conduit raceways shall be neatly core drilled. The Contractor shall carefully lay out his drilling in advance and arrange it to minimize exposed work.
 - (2) The Contractor shall bear the expense of all cutting, patching, painting, repairing, or replacing of the work of other trades required because of his fault, error, or tardiness or because of any damage done by him.
 - (3) All patching, and finishing shall be performed by the General Contractor.
- D. Make electrical connections to equipment in accordance with equipment manufacturer's instructions.
- (1) Verify that wiring and outlet rough-in work is complete, and that equipment is ready for electrical connection, wiring, and energization.

- (2) Make wiring connections in control panel or in wiring compartment of pre-wired equipment. Provide interconnecting wiring where indicated.
 - (3) Install and connect disconnect switches, controllers, control stations, and control devices as indicated.
 - (4) Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit in damp or wet locations.
 - (5) Install pre-fabricated cord set where connections with attachment plug is indicated or specified, or use attachment plug with suitable strain-relief clamps.
 - (6) Provide suitable strain-relief clamps for cord connections to outlet boxes and equipment connection boxes.
- E. Install wire markers on each conductor in panel board gutters, boxes, and at load connections.
- (1) Use distribution panel and branch circuit or feeder number to identify power and lighting circuits.
 - (2) Use control wire number as indicated on schematic and interconnection diagrams or equipment manufacturer's shop drawings to identify control wiring.
- F. Cleaning and Painting: The respective Contractors for the various phases of work shall clear away all debris, surplus materials, etc., resulting from their work or operations, leaving the job and equipment furnished in the clean first-class condition.
- (1) All fixtures and equipment shall be thoroughly cleaned of plaster, stickers, rust, stains and other foreign matter or discoloration, leaving every part in an acceptable condition ready for use.
 - (2) The Contractor shall refinish and restore to the original condition and appearance, all electrical equipment, which has sustained damage to manufacturer's prime and finish coats or enamel or paint. Materials and workmanship shall be equal to the requirements described for other painting.
 - (3) **All new conduit or boxes exposed to view** shall be painted same color as surrounding background finishes.

END OF SECTION

SECTION 16
ELECTRICAL

SECTION 16200
RACEWAY SYSTEMS

I. GENERAL

1.1 SECTION INCLUDES:

- A. CONDUIT AND CONDUIT FITTINGS
- B. ELECTRICAL BOXES AND FITTINGS
- C. SERVICE FITTINGS

II. PRODUCTS

2.1 CONDUIT AND FITTINGS:

A. CONDUIT:

- (1) Metal tubing: Galvanized steel.
- (2) Flexible Conduit: Steel.
- (3) Liquid-tight Flexible Conduit: Flexible steel conduit with PVC jacket.
- (4) Plastic Conduit and Tubing: NEMA TC 2; PVC. Use Schedule 40 conduit.

B. CONDUIT FITTINGS:

- (1) Conduit Fittings and Conduit Bodies: NEMA FB 1. Conduit fittings to be steel threaded type.
- (2) Tubing Fittings: NEMA FB 1. Tubing fittings to be steel set screw type.
- (3) Flexible Conduit Fittings: NEMA FB 1. Flexible conduit fittings to be steel set screw or screw-in type.
- (4) Liquid-tight Flexible Conduit Fittings: NEMA FB 1. Liquid-tight flexible conduit fittings to be steel compression type.
- (5) Plastic Fittings and Conduit Bodies: NEMA TC 3.

2.2 ELECTRICAL BOXES:

A. BOXES:

- (1) Sheet Metal: NEMA OS 1; galvanized steel 4" or 4-11/16" square. Provide galvanized plaster/tile ring for recessed outlet boxes.

- (2) Nonmetallic: NEMA OS 2.

III. EXECUTION

3.1 EXAMINATION AND PREPARATION:

- A. Examine supporting surfaces to determine that surfaces are ready to receive work.
- B. Electrical boxes shown on Drawings are approximate locations unless dimensioned. Obtain verification from Architect/Engineer of floor box locations and locations of outlets prior to rough-in. Outlets may be relocated to a distance of ten feet prior to rough-in with no additional cost to the Owner.

3.2 INSTALLATION:

- A. Use conduit and tubing for raceways in the following locations:
 - (1) Underground Installations: Schedule 40 PVC
 - (2) Installations in Concrete: Schedule 40 PVC.
 - (3) Exposed Outdoor Locations: Rigid steel conduit.
 - (4) Concealed Dry Interior Locations: Electrical metallic tubing.
 - (5) Exposed Dry Interior Locations: Electrical metallic tubing.
- B. Size raceways for conductor type installed.
 - (1) Minimum Size Conduit: $\frac{3}{4}$ " in underground locations, $\frac{1}{2}$ " in all other locations.
- C. Arrange conduit and tubing to maintain headroom and to present a neat mechanical appearance.
 - (1) Route exposed raceway parallel and perpendicular to walls and adjacent piping.
 - (2) Maintain minimum 6-inch clearance to piping and 12-inch clearance to heat surfaces such as flues, steam piping, and heating appliances.
 - (3) Maintain required fire, acoustic, and vapor barrier rating when penetrating walls, floors, and ceilings.
 - (4) Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack with pitch pocket.
 - (5) Group in parallel runs where practical. Use rack constructed of steel channel. Maintain spacing between raceways or de-rate circuit ampacities to NFPA 70 requirements.

- (6) Use conduit hangers and clamps; do not fasten with wire or perforated pipe straps.
- (7) Use conduit bodies to make sharp changes in direction.
- (8) Terminate all conduits with insulated bushings.
- (9) Use suitable caps to protect installed raceway against entrance of moisture and dirt.
- (10) Provide a pull cord in all empty raceways.
- (11) Install expansion joint fittings where raceway crosses building expansion joints.
- (12) Install plastic conduit and tubing in strict accordance with the manufacturer's recommendations. When plastic conduit is installed, use galvanized rigid elbows for 90-degree bends.

D. Install electrical boxes as shown on the Drawings, and as required for splices, taps, wire pulling, equipment connections and regulatory requirements.

- (1) **Use cast outlet box in exterior locations, wet locations, and exposed interior locations**
- (2) Use large enclosure for interior pull and junction boxes larger than 12 inches in any dimension.
- (3) Locate and install electrical boxes to allow access. Provide access panels if required.
- (4) Locate and install electrical boxes to maintain headroom and to present a neat mechanical appearance.
- (5) Install pull boxes and junction boxes above accessible ceilings or in unfinished areas.
- (6) Provide knockout closure for unused openings.
- (7) Align wall-mounted outlet boxes plumb and level for switches, and similar devices.
- (8) Install lighting outlets to locate luminaries as shown on the Drawings.

E. Use recessed outlet boxes in finished areas where indicated.

- (1) Secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness, and plaster/tile ring installation.

- (2) Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.
 - (3) Locate boxes in masonry walls to require cutting corner only. Coordinate masonry cutting to achieve neat openings for boxes
 - (4) Do not install boxes back-to-back in walls; provide 6-inch separation, minimum. In acoustic-rated walls provide 24-inch separation minimum.
 - (5) Do not damage insulation.
- F. All communications conduits shall be metal, of the type as described in these specifications.

END OF SECTION

I. GENERAL

1.1 RELATED DOCUMENTS:

- A. Section 16000 – Electrical General Requirements, apply to the work specified in this Section, with additions and modifications specified herein.

1.2 SECTION INCLUDES:

- A. CONDUCTORS AND CABLE
- B. WIRING DEVICES

II. PRODUCTS

2.1 CONDUCTORS AND CABLE:

A. BUILDING CONDUCTORS:

- (1) Feeder and Branch Circuits 10 AWG and Smaller: Copper, solid conductor, 600-volt insulation, THHN/THWN.
- (2) Feeder and Branch Circuits 8 AWG and 6 AWG: Copper, stranded conductor, 600-volt insulation, THHN/THWN.
- (3) Control Circuits: Copper, stranded conductor, 600-volt insulation, THHN/THWN.

B. REMOTE CONTROL SIGNAL CABLE:

- (1) Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600-volt insulation, rated 60-degree C, individual conductors twisted together, shielded, and covered with PVC jacket.
- (2) Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300-volt insulation, rated 60-degree C, individual conductors twisted together, shielded, and covered with PVC jacket; UL listed.

- C. CORDS: Oil – resistant thermoset insulated multi – conductor flexible cord with identified equipment grounding conductor, suitable for extra hard usage in damp locations.

2.2 WIRING DEVICES AND WALLPLATES:

A. MANUFACTURERS:

- (1) Hubbell.
 - (2) Pass and Seymour.
 - (3) Slater.
- B. WALL SWITCHES: AC general use, quiet – operating snap switch rated 20 amperes and 120/277 volts AC, with plastic toggle handle.
- (1) Single Pole Switch: Hubbell 1221
 - (2) Color: Gray.
- C. RECEPTACLE:
- (1) Convenience Receptacle Configuration: Type 5-20R, plastic face. Model 5362 manufactured by Hubbell.
 - (2) Specific Purpose Receptacle: Configuration indicated on Drawings with black plastic face.
 - (3) Provide straight-blade receptacles to NEMA WD 1.
 - (4) Provide locking-blade receptacles to NEMA WD 5.
 - (5) GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter. Model GF-5362 manufactured by Hubbell.
 - (6) Color: Gray.
- D. DEVICE PLATES: Smooth stainless-steel ANSI 302/304. (Non-magnetic)
- E. WEATHERPROOF COVER PLATE: Gasketed cast metal with hinged gasketed device covers rated raintight while in use in accordance with Article 410-57 of the National Electrical Code.
- F. ATTACHMENT PLUG CAP: Match receptacle configuration provided for equipment connection.

III. EXECUTION:

3.1 EXAMINATION AND PREPERATION:

- A. Verify that interior of building has been physically protected from weather.
- B. Verify that mechanical work which is likely to injure conductors has been completed.
- C. Completely and thoroughly swab raceway system before installing conductors.

3.2 INSTALLATION:

A. WIRING METHODS:

- (1) Concealed Interior Locations: Building conductors in raceway.
- (2) Exposed Interior Locations: Building conductors in raceway.
- (3) Above Accessible Ceilings: Building conductors in raceway.

B. Use no conductors smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.

- (1) Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 100 feet; and for 20 ampere, 277 volt branch circuit home runs longer than 200 feet.

C. Neatly train and secure wiring inside boxes, equipment and panelboards.

D. Use UL listed conductor pulling lubricant for pulling conductors in raceways.

E. Protect exposed cables.

F. Support cables above accessible ceilings to keep them from resting on ceiling tiles.

G. Make splices, taps, and terminations to carry full ampacity of conductors without perceptible temperature rise.

H. Terminate spare conductors with electrical tape.

I. Devices shall mount flush or as indicated on the Drawings.

J. Install wiring devices in accordance with manufacturer's instructions.

- (1) Install wall switches 48 inches above floor, "OFF" position down.
- (2) Install convenience receptacles 18 inches above floor, 6 inches above counters or splashbacks, with grounding pole on bottom.
- (3) Install GFCI receptacles at all outdoor locations and all indoor locations as required by NFPA70, and as indicated.
- (4) Install specific purpose receptacles at heights shown on Drawings.

K. Install wall plates flush and level.

- (1) Install decorative plates on switch, receptacle, telephone, television and blank outlets in finished areas.

- (2) Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- (3) Install weatherproof cover plates on all devices/boxes in wet or outdoor locations.

3.3 FIELD QUALITY CONTROL:

- A. Perform field inspection and testing of circuits under provisions of Section 16000.
 - (1) Inspect Conductors and cables for physical damage and proper connection.
 - (2) Torque test conductor connections and terminations to manufacturer's recommended values.
 - (3) Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

END OF SECTION

I. GENERAL

This project is a complete sign structure installation with one monument sign at the east end of campus and one monument sign at the west end of campus. Each monument sign will consist of two upper full LED digital displays (one on each side) and two lower logo sign lighted boxes (one on each side).

II. MATERIALS

2.1 DIGITAL DISPLAY CABINETS (2 required):

- A. Each display cabinet shall be constructed of aluminum. Display cabinets shall be made of aluminum sheets not less than .080 inches thick. The aluminum cabinets shall be primed with an aluminum primer and painted with black enamel, powder coated, or automotive-grade acrylic urethane paint.
- B. Overall dimensions of each sign cabinet shall be 6.25 feet \pm .5 inches in height and 9.5 feet \pm .5 inches in length. Coordinate final dimensions with landscape plans. Do not release until receiving approval from Landscape Architect.
- C. Hot dipped or powder coated galvanized angle steel mounting brackets for each display cabinet shall be provided.
- D. Two existing digital signs will be furnished by the owner at one of the new monument sign locations. Two new digital signs will be purchased of matching quality for the other monument sign location.

2.2 LED DISPLAYS (2 required):

- A. The programmable LED displays shall be 16 mm resolution or better and utilize a three LED pixel configuration, one red LED, one blue LED and one green LED. LED module assembly circuit cards shall be potted or conformal coated.

2.3 LIGHTED BOX CABINETS:

- A. Each lighted box cabinet shall be constructed of 4 - 6-inch aluminum extrusion. The corners shall be reinforced with mechanically or welded aluminum alloy inserts. The backs of the cabinets shall be made of aluminum sheets not less than .080 inches thick. The aluminum cabinets shall be primed with an aluminum primer and painted with black enamel, powder coated, or automotive-grade acrylic urethane paint.
- B. Overall dimensions of each sign cabinet shall be 9.5 feet \pm .5 inches in height and 9.5 feet \pm .5 inches in length. Coordinate final dimensions with landscape plans. Do not release until receiving approval from Landscape Architect.

- C. Face of box cabinets shall be same dimension as the digital display cabinet. Two (2) of the Faces shall have the “Northwest Florida State College” logo. The lighted boxes shall utilize UV protected vinyl covered, high impact tension flex face system. The logo shall match existing box signs furnished by the owner for one of the new monument sign location.
- D. Each lighted box shall use LED Side Lighting to illuminate the sign. LED Tube lights or High Lumen LED Strip lighting shall be used with IP65 rated LED Power supplies.

2.4 CABINET CONSTRUCTION

- A. The display housing shall meet NEMA 3R standards.
- B. Display shall operate in a minimum ambient temperature range of -40 to +120° F (-40 to +50° C) and to a 95% humidity.
- C. No heating element shall be required to ensure operation of LED display.
- D. Internal display component hardware (nuts, bolts, screws, standoffs, rivets, fasteners, etc.) shall be fabricated from stainless steel, aluminum nylon, or other durable corrosion-resistant materials suitable for the signage application.
- E. Adequate ventilation shall be provided, either through convection or with fans of the bottom border of the display. Display should not require perimeter spacing for airflow.

2.5 COMMUNICATIONS:

- A. Communications with the digital display controls shall be via Owner furnished telephone modem or wireless communication and industrial computer to control the display.

2.6 POWER REQUIREMENTS:

- A. Each sign shall be powered by the new 120/240 VAC 1 Phase service. Surge protection devices to protect against power surges shall be included. Verify all power requirements of custom signage prior to rough-in. Await approval from engineer prior to releasing order.

2.7 SERVICEABILITY:

- A. Front access serviceability is required for all displays.

2.8 SPARE PARTS:

- A. A spare parts kit consisting of ten spare LED modules and six power supplies shall be provided. Ten spare data cables shall be provided.

2.9 ADDITIONAL ITEMS:

- A. The two (2) digital display cabinets will be equipped with a time and temperature module. Auto dimming feature shall be included.

2.10 APPROVED SIGN MANUFACTURERS:

- A. American LED
- B. Daktronics
- C. Watchfire

2.11 PRE-APPROVED SIGN INSTALLERS (SUB-CONTRACTORS):

- A. Southern Signs – Fort Walton Beach, Florida
- B. Signs Galore – Crestview, Florida
- C. C & S Signs – Milton, Florida
- D. Markham & Sons Signs – Pensacola, Florida
- E. Himes Signs – Destin, Florida
- F. Builtrite Signs – Pensacola, Florida
- G. Other sign installers shall submit for approval to bid. Pre-bid submittal shall include business resumes and ten (10) references for signs installed within 100 miles of NWFSC Campus with contact information for Purchaser/Owner Representative including telephone number and email address.

2.12 ALTERNATE BIDS:

All bids shall conform to, or exceed, Contract Documents. Alternates may be listed by bidder for evaluation by the Owner as follows:

- A. Added benefits exceeding Contract Documents by bidder (included at no additional cost).
- B. Less benefits than specified by Contract Documents with a listed deducted cost.
- C. More benefits than specified by Contract Documents with a listed added cost.

2.13 DETAILED SPECIFICATIONS:

- A. TECHNICAL SPECIFICATIONS – LED DISPLAYS (MARQUEE):
 - (1) Pixel Pitch shall be 16 mm
 - (2) Product shall be Full Color

- (3) Pixel Configuration shall be 1R, 1G, 1B
- (4) Brightness (NITS) = 10000
- (5) Display Size = 6.25 ft x 9.5 ft minimum ($\pm .5$ inches)
- (6) Weight = 1,722 lbs maximum

B. SYSTEM SPECIFICATIONS: System shall include

- (1) Time-Temp Sensor
- (2) Light Sensor
- (3) Control Computer – Windows Based Laptop+ Ind. Computer
- (4) Data Cable
- (5) Full 1 Year Warranty for Parts and Labor Plus Additional 4 Years Warranty for Parts
- (6) Spare Modules = 10
- (7) Spare Power Supply = 6
- (8) UL Rated Surge Protector

C. OTHER SPECIFICATIONS:

- (1) Number of Faces = 2
- (2) LED half-life shall be an estimated minimum of 100,000 hours
- (3) Viewing Angle = $140^{\circ}/65^{\circ}$ horizontal/vertical
- (4) Viewing Distance = 20 ft – 892 ft
- (5) Temperature Rating = $-20^{\circ}\text{F} - 120^{\circ}\text{F}$
- (6) Power Usage (W) = 10529 W maximum
- (7) Max Current = 48 A
- (8) Voltage (VAC) = 220 V
- (9) Weatherproofing = IP 65 front/back

- (10) Cabinet Material = Aluminum
- (11) Front Serviceable
- (12) Control System = Graphics and video capable control system with advanced timing directives.

III. INSTALLATION

- 3.1 The Installation shall be complete and operable to include instructions to the Owner for Operation and Maintenance.
- 3.2 The owner has a computer and remote access programming modem which will be furnished to the Contractor for use in startup and testing.

END OF SECTION