

SECTION 28 20 00
VIDEO SURVEILLANCE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes a video surveillance system consisting of cameras, digital video recorder, data transmission wiring, and a control station with its associated equipment.
- B. Related Requirements:
 - 1. Section 281500 "Access Control System Hardware Devices" to integrate access control system interface and control.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For video surveillance. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
 - 3. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.
 - 4. Wiring Diagrams: For power, signal, and control wiring.
- C. Design Data: Include equipment list consisting of every piece of equipment by model number, manufacturer, serial number, location, and date of original installation.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data, including all system user passwords.

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: One year from date of Substantial Completion.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
 - 1. Cable installer must have on staff an RCDD certified by Building Industry Consulting Service International.
- B. Source Limitations: Obtain central station, workstations, controllers, Identifier readers, and all software through one source from single manufacturer.
- C. Contractor must be licensed by the authority having jurisdiction over the location of the project to perform their scope of work
- D. Contractor must have successfully completed (3) similar projects in the past (36) months. Similar refers to size, scope and project type.
- E. A minimum of one credentialed project team member is required for applicable industry certifications including: ASIS - PSP or CPP
- F. Project team members must be certified by the manufacturer for all products being provided that require special termination, extended warranty, programming or special configuration. At least one team member must be certified for each product being provided.

PART 2 - PRODUCTS

2.1 IP VIDEO SYSTEM REQUIREMENTS

- A. System shall provide high-quality delivery and processing of IP-based video and control data using standard Ethernet-based networks.
- B. System shall have seamless integration of all video surveillance and control functions.
- C. Graphical user interface software shall manage all IP-based video matrix switching and camera control functions, two-way audio communication, alarm monitoring and control, and recording and archive/retrieval management.
- D. System design shall include all necessary compression software for high-performance, dual-stream, MPEG-2/MPEG-4 video. Unit shall provide connections for all video cameras, bidirectional audio, inputs, and control system outputs.
- E. All camera signals shall be compressed, encoded, and delivered onto the network for processing and control by the IP video-management software.
- F. All system interconnect cables, workstation PCs, and network intermediate devices shall be provided for full performance of specified system.
- G. All necessary licensing shall be included.
- H. Video-signal format shall comply with NTSC standard.

- I. Active tampering alarm on all connected devices.
- J. All solutions and products shall be fully supported by an open and published Application Programming Interface (API), which shall provide necessary information for the integration of functionality into third party applications.
- K. Network security best practices and the manufacturer's cyber-hardening recommendations shall be followed.
- L. Surge Protection: Protect components from voltage surges entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.
 - 1. Minimum Protection for Power Connections 120 V and More: Auxiliary panel suppressors complying with requirements in Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits."
 - 2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements in Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits" as recommended by manufacturer for type of line being protected.
- M. Tamper Protection: Tamper switches on enclosures, control units, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled. Control-station, control-unit alarm display shall identify tamper alarms and indicate locations.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NECA 1.
- C. Comply with NFPA 70.
- D. Electronic data exchange between video surveillance system with an access-control system shall comply with SIA TVAC.

2.3 STANDARD CAMERAS

- A. Acceptable equipment part numbers provided on drawings.
- B. Color Camera: By architect
 - 1. Signal-to-Noise Ratio: Not less than 50 dB, with camera AGC off.
 - 2. With AGC, manually selectable on or off.
 - 3. Manually selectable modes for backlight compensation or normal lighting.
 - 4. White Balance: Auto-tracing white balance, with manually settable fixed balance option.
 - 5. Motion Detector: Built-in digital.

- C. Automatic Color Dome Camera: Assembled and tested as a manufactured unit, containing dome assembly, color camera, motorized pan and tilt, zoom lens, and receiver/driver.
 - 1. Signal-to-Noise Ratio: Not less than 50 dB, with camera AGC off.
 - 2. With AGC, manually selectable on or off.
 - 3. Manually selectable modes for backlight compensation or normal lighting.
 - 4. Pan and Tilt: Direct-drive motor, 360-degree rotation angle, and 180-degree tilt angle. Pan-and-tilt speed shall be controlled by operator. Movement from preset positions shall be not less than 300 degrees per second.
 - 5. Preset Positioning: Eight user-definable scenes, each allowing 16-character titles. Controls shall include the following:
 - a. In "sequence mode," camera shall continuously sequence through preset positions, with dwell time and sequencing under operator control.
 - b. Motion detection shall be available at each camera position.
 - c. Up to four preset positions may be selected to be activated by an alarm. Each of the alarm positions may be programmed to output a response signal.
 - 6. White Balance: Auto-tracing white balance, with manually settable fixed balance option.
 - 7. Motion Detector: Built-in digital.

2.4 LENSES

- A. Acceptable equipment part numbers provided on drawings.
- B. Description: Optical-quality coated lens, designed specifically for video-surveillance applications and matched to specified camera. Provide color-corrected lenses.

2.5 POWER SUPPLIES

- A. Low-voltage power supplies matched for voltage and current requirements of cameras and accessories, and of type as recommended by manufacturer of camera and lens.

2.6 CAMERA-SUPPORTING EQUIPMENT

- A. Acceptable equipment part numbers provided on drawings.
- B. Pan-and-Tilt Units: Motorized units arranged to provide remote-controlled aiming of cameras with smooth and silent operation, and equipped with matching mounting brackets.
 - 1. Panning Rotation: 0 to 355 degrees, with adjustable stops.
 - 2. Tilt Movement: 90 degrees, plus or minus 5 degrees, with adjustable stops.
 - 3. Speed: 12 degrees per second in both horizontal and vertical planes.
 - 4. Wiring: Factory prewired for camera and zoom lens functions and pan-and-tilt power and control.
- C. Mounting Brackets for Fixed Cameras: Type matched to items supported and mounting conditions. Include manual pan-and-tilt adjustment.
 - 1. Camera Viewing Window: Polycarbonate window, aligned with camera lens.
 - 2. Duplex Receptacle: Internally mounted.

3. Alignment Provisions: Camera mounting shall provide for field aiming of camera and permit removal and reinstallation of camera lens without disturbing camera alignment.
4. Built-in, thermostat-activated heater and blower units. Units shall be automatically controlled so the environmental limits of the camera equipment are not exceeded.
5. Sun shield shall not interfere with normal airflow around the housing.
6. Mounting bracket and hardware for wall or ceiling mounting of the housing. Bracket shall be of same material as the housing; mounting hardware shall be stainless steel.
7. Finish: Housing and mounting bracket shall be factory finished using manufacturer's standard finishing process suitable for the environment.

2.7 DIGITAL VIDEO RECORDERS

- A. Acceptable equipment part numbers provided on drawings.

2.8 IP VIDEO SYSTEMS

- A. Acceptable equipment part numbers provided on drawings.
- B. Description:
 1. System shall provide high-quality delivery and processing of IP-based video, audio, and control data using standard Ethernet-based networks.
 2. System shall have seamless integration of all video surveillance and control functions.
 3. Graphical user interface software shall manage all IP-based video matrix switching and camera control functions, two-way audio communication, alarm monitoring and control, and recording and archive/retrieval management. IP system shall also be capable of integrating into larger system environments.
 4. System design shall include all necessary compression software for high-performance, dual-stream, MPEG-2/MPEG-4 video. Unit shall provide connections for all video cameras, camera PTZ control data, bidirectional audio, discreet sensor inputs, and control system outputs.
 5. All camera signals shall be compressed, encoded, and delivered onto the network for processing and control by the IP video-management software.
 6. Camera system units shall be ruggedly built and designed for extreme adverse environments, complying with NEMA Type environmental standards.
 7. Encoder/decoder combinations shall place video, audio, and data network stream that can be managed from multiple workstations on the user's LAN or WAN.
 8. All system interconnect cables, workstation PCs, PTZ joysticks, and network intermediate devices shall be provided for full performance of specified system.

PART 3 - EXECUTION

3.1 WIRING

- A. Comply with requirements in Section 270528 "Pathways for Communications Systems."
- B. Wiring Method: Install cables in raceways unless otherwise indicated.

- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- D. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- E. For communication wiring, comply with the following:
 - 1. Section 271323 "Communications Optical Fiber Backbone Cabling."
 - 2. Section 271513 "Communications Copper Horizontal Cabling."

3.2 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A. Set pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera. Connect all controls and alarms and adjust.
- B. Identify system components, wiring, cabling, and terminals according to Section 270553 "Identification for Communications Systems."

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
 - 2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:
 - a. Verify operation of auto-iris lenses.
 - b. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.
 - c. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object 50 to 75 feet (17 to 23 m) away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
 - d. Set and name all preset positions; consult Owner's personnel.
 - e. Set sensitivity of motion detection.
 - f. Connect and verify responses to alarms.
 - g. Verify operation of control-station equipment.

3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
 4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation.
- C. Video surveillance system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- 3.4 DEMONSTRATION
- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain video-surveillance equipment.

END OF SECTION 28 20 00