

## SECTION 677 CAMERAS

### 677.1 Description

- (1) This section describes installing camera assemblies and associated poles, base plates, and camera lowering systems.

### 677.2 Materials

- (1) The department will furnish camera assemblies and poles.
- (2) Under the Install Camera Assembly bid item, furnish cables and connectors required to transmit video and camera control data between the camera assembly and the camera controller assembly. Conform to the following:
  1. For the camera control cables between the control receiver and pan/tilt unit, and between the control receiver and the camera/lens, use SDN flexible shielded control cable. Use cable that has a neoprene outer jacket and is rated at 600 volt. The cables shall consist of stranded 22 AWG conductors minimum. Use conductors that provide the control features and power requirements specified. Use MS connectors or other department-approved connectors at the control receiver. Use polymer/nylon conductor insulation.
  2. Use video cable between the camera unit and the control receiver made with RG-59U coaxial cable, dual-foil shield and 100 percent braid. Use BNC or MS conductors.
  3. Combine camera control and video into the same composite cable, if possible.
  4. Integrate the camera assembly with the camera lowering system.

### 677.3 Construction

- (1) Under the Install Camera Pole bid item, install department-furnished camera poles on new concrete bases at locations the plans show and conforming to [section 657](#).
- (2) Coat all threaded assemblies of metallic parts with a rust, corrosion, and anti-seize protection compound from the department's approved products list.
- (3) Furnish and install all incidental items, such as wire nuts, grommets, tape connectors, electrical nuts, etc., obviously necessary to make the proposed closed circuit television (CCTV) system complete from the source of supply to the most remote unit.
- (4) Install anchor bases on the concrete base using leveling shims from the department's approved products list. Adjust shims to plumb the pole under load.
- (5) Assemble the camera, zoom lens, camera enclosure, and pan/tilt unit before delivery to the job site. Deliver the assemblies to the job site as complete units, and install units on top of the camera poles using a pole mounting adapter as the plans show.
- (6) Mount camera enclosures directly to the mounting plates of the pan/tilt drives.
- (7) Mount pan and tilt drives to the poles as the plans show. Electrically bond the pole-mounting adapter to the pole. Electrically bond the pan/tilt drive to the mounting adapter.
- (8) Mount the camera assembly so that when the pan and tilt unit is at the mid-point of its mechanical motion, the orientation of the camera's line of sight is as the plans show.
- (9) Furnish and install camera cables in conduit and poles as the plans show. Provide continuous cable runs without splices between the camera assembly and the camera controller assembly.
- (10) Take every precaution to ensure that the cable is not damaged during storage or installation. Workmen should not step on cable or run over by any vehicle or equipment. Do not pull the cable along the ground or over or around obstructions.
- (11) Keep cable ends sealed at all times during installation using a cable end cap from the department's approved products list. Do not use tape to seal the cable end. Keep the cable end sealed until connectors are installed.
- (12) Do not exceed the minimum-bending radius of the cable at any time.
- (13) Provide a 6-foot cable slack for cabinets.
- (14) The contractor or field system integrator shall furnish all equipment, appliances, and labor necessary to test the installed camera cable between the camera assembly and the camera controller assembly. Successfully perform the following tests before any connections are made.

- (15) Perform continuity tests on the coax element of the camera cable using a metallic time domain reflectometer (MTDR) with chart recorder. Camera cable shall not exhibit any discontinuities such as opens, shorts, crimps, or defects.
- (16) Perform continuity tests on the stranded conductors element of the camera cable using a meter having a minimum input resistance of 20,000 ohms per volt. Each conductor shall show a resistance of not more than 16 ohms per 1000 feet of conductor.
- (17) Measure the insulation resistance between conductors, and between each conductor, ground, and shielding using a megger. Ensure that the resistance is infinite.
- (18) Should any cable fail to meet the test parameters, or should any testing reveal defects in the cable, replace the cable at no expense to the department. Retest the new cable as specified above.
- (19) The ATMS field system integrator shall submit copies of the test results, including any unsuccessful and subsequently successful tests to the engineer before any field operations testing.
- (20) Either shelf mount the control receivers or mount them directly into the 19-inch rack in the cabinet.
- (21) Make all camera cable connections between the camera controller assembly cabinet, control receiver, surge protector, and video transmitter, as required to provide a fully operational CCTV system.
- (22) After the camera controller assembly has been installed, and all other camera hardware, power supply, and connecting cabling has been installed, the ATMS field system integrator shall successfully perform a field test for the camera location. Conduct the test at the camera controller assembly cabinet, and include the following:
  1. Verification of installation of specified cables and connections between camera, pan and tilt unit, and control receiver.
  2. Local operation of all CCTV equipment exercising the pan, tilt, zoom, focus, iris opening, and manual iris control selection and operation, washer/wiper, and power on/off functions -- while observing the video picture on a portable video and waveform monitor.
  3. Demonstration of camera sensitivity at low light levels to meet the specified requirements.
  4. Demonstration of pan/tilt speed and extent of movement to meet the specified requirements.
  5. Measurement of video signal level at the network interface (input to video transmitter) with a waveform monitor to verify NTSC Standards.
- (23) Furnish all test equipment.
- (24) After all field CCTV equipment and telephone interface devices have been installed and successfully tested and the new cameras have been integrated into the existing central camera controller, the ATMS field system integrator shall test the intertie with the central camera control hardware and all new CCTV system components installed under this contract. The tests shall include the following:
  1. Verification that all interconnecting cable installations (video transmitter, camera's and camera controller) conform to the specifications.
  2. Operation of all camera assemblies from the central camera controller exercising the pan, tilt, zoom, focus, iris opening, and washer and wiper functions while observing the video picture on the local monitor and on monitors at central.
  3. Verification of camera and lens preset programming.
- (25) Following successful completion of the above tests, activate the entire CCTV subsystem and leave it on for 30 consecutive days. During this period, ensure that all materials and components of the CCTV subsystem furnished and installed operate as specified and without any failure.
- (26) In the event that any contractor-provided component of the CCTV subsystem malfunctions or operates below the level specified, the department will terminate the test period, and will require the ATMS field system integrator to determine and correct the problems, including repair or replacement of equipment, at no cost to the department. Upon correction of the problems, the engineer will start a new 30-day test period. If a malfunction is the result of equipment not installed by the contractor, the engineer will suspend the acceptance test period until the responsible party corrects these problems.

#### **677.4 Measurement**

- (1) The department will measure Install Camera Pole and Install Camera Assembly as each individual unit acceptably completed.

**677.5 Payment**

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
677.0100	Install Camera Pole	EACH
677.0200	Install Camera Assembly	EACH

- (2) Payment for Install Camera Pole is full compensation for installing department-furnished poles including all materials, mounting adapter, camera lowering system, all hardware, and fittings necessary to completely install the pole; and for installing identification plaques when required.
- (3) Payment for Install Camera Assembly is full compensation for installing department-furnished camera assemblies on camera poles; for providing camera cables; and for installing the camera controller assembly, control receiver, and all connections.