

SECTION 27 51 23
INTERCOMMUNICATIONS AND PROGRAM SYSTEMS

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section specifies a new and fully operating Intercom (IC) System.
- B. Conform to VAAR 852.236.91 and intent of the construction documents, recognizing that it may be impracticable to detail all items because of variances in manufacturers to achieve indicated intent.

1.2 RELATED WORK

- A. Connection to Electronic Access Control at doors: Section 28 13 00, PHYSICAL ACCESS CONTROL SYSTEM.
- B. Door hardware and operation of doors: 08 71 00 DOOR HARDWARE
- C. Conduit and boxes: Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS.

1.3 SUBMITTALS

- A. In addition to requirements of SECTION 27 05 11, REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS, submit:
 - 1. Written certification from OEM proposed provider of contract maintenance is an authorized representative of OEM. Include provider's legal name, address, and OEM credentials.
 - 2. Submit names, locations and point of contact for three installations employing proposed OEM IC Systems of comparable size and complexity performing for at least one year after final acceptance by user.
- B. Certifications:
 - 1. Submit documentation that supplier has been an authorized distributor and service organization for OEM for a minimum of three years and is authorized by OEM to pass thru OEM's warranty of installed equipment to Government.
 - 2. Submit certificate of successful completion of OEM's installation and training program for each installing technician of equipment being proposed. Provide current OEM certifications for installers to be approved by COR before being allowed to commence work on system.
 - 3. Provide current OEM certification documenting maintenance and supervisory personnel are authorized by OEM to service installed equipment during warranty.
 - 4. Furnish copies of applicable national, state and local licenses.
- C. Warranty: Submit OEM warranty.

- D. Needs Assessment Report: Provide a summary report of the needs assessment meeting conducted with nursing manager of each unit, as required by this section.
- E. Maintenance Material Submission:
 - 1. Provide one spare 304 m (1,000 foot) roll of accepted system (not microphone) cable.

1.4 QUALITY ASSURANCE

- A. Assign only technicians trained, qualified, and certified by OEM on engineering, installation, operation and testing of system.
- B. Provide system firmware from OEM with a proven history of product reliability and sole control over all source code.

1.5 WARRANTY

- A. Comply with FAR clause 52.246-21, except that warranty must be as follows:
 - 1. Manufacturer shall warranty their equipment and certified installation for a minimum of two years from date of installation and final acceptance by the Government.
 - 2. Provide, free of charge, product firmware and software upgrades for a period of one year from date of final acceptance by Government for any product feature enhancements.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide voice communication between wall-mounted intercom stations and desk or wall-mounted master stations.
- B. Provide accessories and miscellaneous appurtenances required for a complete and operating communications system and network.
- C. Coordinate features and select components to form an integrated IC system. Match components and interconnections for optimum performance of specified functions.
- D. Equipment: Modular type, continuous duty rated.

2.2 EQUIPMENT ITEMS

- A. Master Station Features:
 - 1. Basis of Design Manufacturer: AIPHONE Model JO-1MD and accessory MCW-S/A inside station desk mount where mounted on desk.
 - 2. Communicate selectively with all other add-on stations and speaker-microphone door stations by actuation of selector switches.
 - 3. Communicate simultaneously with other master stations.

4. Communicate with individual stations in privacy.
5. 7 inch TFT Color LCD Monitor to view camera image from Door Station.

B. Add-on Station Features:

1. Basis of Design Manufacturer: AIPHONE Model JO-1FD and accessory MCW-S/A inside station desk mount where mounted on desk.
2. Same features as Master.

C. Door Station Features:

1. Basis of Design Manufacturer: AIPHONE Model JO-DV
2. Color camera.
3. Microphone
4. Speaker
5. Communicate hands free.
6. Call master station and add-on station by actuating call switch.
7. Return busy signal to indicate that station is already in use.

2.3 HEAD END EQUIPMENT

- A. Provide required power supplies, communications hubs, network switches, intelligent controllers and other devices necessary to form a complete system.

2.4 SYSTEM CABLES

- A. Conductors: Jacketed, twisted pair and twisted multipair, untinned solid copper; sizes as recommended by system manufacturer, but no smaller than No. 18 AWG.
- B. Insulation: Thermoplastic; minimum 0.8 mm (1/32 inch) thick.
- C. Shielding: For speaker-microphone leads and elsewhere where recommended by manufacturer; No. 34 AWG, tinned, soft-copper strands formed into a braid or equivalent foil.
- D. Minimum Shielding Coverage on Conductors: 60 percent.
- E. Cabling must be plenum rated.

2.5 RACEWAYS

- A. Raceways and Boxes: Comply with requirements in Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS.
- B. Each open top raceway must be NRTL listed for telecommunications systems and partitioned with metal partitions in order to comply with NEC Parts 517 and 800 to "mechanically separate" telecommunications systems of different service, protect installed cables from falling out when vertically mounted and allow junction boxes to be attached to the side to interface "drop" type conduit cable feeds.
- C. IC System Cable Infrastructure: EMT.

- D. Pull boxes must be minimum 63.5 mm (2-1/2 inches) deep and 152.4 mm (6 inches) wide by 152.4 (6 inches) long.

2.6 SYSTEM CONDUIT

- A. Provide separate 25.4 mm (1 inch) minimum diameter EMT conduit, for system installation.

2.7 FINISHES

- A. Provide finishes for exposed work such as plates, speakers, etc. accepted by design professional, COR and 0050P3B.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Review and coordinate with telecommunications cabling installer for location of intercom equipment in Telecommunications Rooms.
- B. Verification of Conditions: Before beginning work, verify location, quantity, size and access for the following:
 - 1. Isolated ground AC power circuits provided for systems.
 - 2. Pull boxes, wall boxes, wire troughs, conduit stubs and other related infrastructure for systems.
 - 3. System components installed by others.
 - 4. Overhead supports and rigging hardware installed by others.
- C. Installer must immediately notify COR, general contractor and design professional in writing of any discrepancies.

3.2 INSTALLATION

- A. General:
 - 1. Install work plumb and square and in a manner consistent with standard industry practice.
 - 2. Protect work from dust, paint and moisture as dictated by site conditions. Contractor is responsible for protection of work until final acceptance by Government.
 - 3. Install equipment according to OEM's recommendations.
 - 4. Provide any hardware, adaptors, brackets, rack mount kits or other accessories recommended by OEM for complete assembly and installation.
 - 5. Secure equipment firmly in place, including IC stations, speakers, system cables, etc.:
 - a. Supports, mounts, fasteners, attachments and attachment points must support loads with a safety factor of at least 5:1.
 - b. Do not impose weight of equipment on supports provided for other trades or systems.

- c. Any suspended equipment or associated hardware must be certified by OEM for overhead suspension.
- d. Contractor is responsible for means and methods in design, fabrication, installation and certification of any supports, mounts, fasteners and attachments.
- 6. Coordinate cover plates with field conditions. Size and install cover plates to hide joints between back boxes and surrounding wall. Do not allow cable to leave or enter boxes without cover plates installed.
- 7. Where cover plates are not fitted with connectors, provide grommets holes in size and quantity required.
- B. Wiring Practice: In addition to requirements in Section 27 10 00, STRUCTURED CABLING, adhere to the following additional practices:
 - 1. Execute wiring in strict adherence to National Electrical Code, applicable local building codes and standard industry practices.
 - 2. Where raceway and wire way are EMT (conduit), wiring of differing classifications must be run in separate conduit.
 - 3. Where raceway and wire way are an enclosure (rack, tray, wire trough, utility box) wiring of differing classifications which share same enclosure must be mechanically partitioned and separated by 102 mm (four inches). Where wiring of differing classifications must cross, they must cross perpendicular to one another.
 - 4. Do not splice wiring anywhere along entire length of run.
 - 5. Make sure cables are insulated and shielded from each other and from raceway for entire length of run.
 - 6. Do not pull wire through any enclosure where a change of raceway alignment or direction occurs.
 - 7. Do not bend wires to less than radius recommended by manufacturer.
 - 8. Replace entire length of run of any wire or cable that is damaged or abraded during installation. There are no acceptable methods of repairing damaged or abraded wiring.
 - 9. Do not apply wire pulling lubricants unless specifically recommended by cable OEM.
 - 10. Use grommets around cut-outs and knock-outs where conduit or chase nipples are not installed.
 - 11. Do not use tape-based or glue-based cable anchors.
 - 12. Bond shields and drain wires to ground.
 - 13. Terminate field wiring entering equipment racks as follows:

- a. Provide service loops at harness break-outs, plates, panels and equipment to allow plates, panels and equipment to be removed for service and inspection.
 - b. Microphone level wiring can only be terminated at equipment served.
 - c. Employ permanent strain relief for any cable with an outside diameter of 1 inch or greater.
14. Use only balanced audio circuits unless indicated otherwise.
15. Make connections as follows:
 - a. Use rosin-core solder or mechanical connectors appropriate to application.
 - b. For crimp-type connections, use only crimp tool specified by manufacturer for the application.
 - c. Use only insulated spade lugs on screw terminals. Spade lugs must be sized to fit wire gauge; do not exceed two lugs per terminal.
 - d. Twist on wire connectors and electrical tape are not permitted for any application.
- C. Cable Installation: In addition to requirements in Section 27 10 00, STRUCTURED CABLING, comply to the following practices.
 1. Acceptable means of cable support are conduit. Plastic tie wraps are not permitted as a means to bundle or support cables.
 2. Run cables parallel to walls.
 3. Do not lay cables on top of luminaires, ceiling tiles, mechanical equipment, or ductwork.
 4. Maintain minimum 61 cm (2'-0") clearance from all shielded electrical apparatus.
 5. Test cables after the total installation is complete. Document test results. Remedy any cabling problems or defects in order to pass or comply with testing. This includes re-pull of new cable as required.
 6. Terminate both ends of cables per industry and OEM's recommendations.
 7. Provide proper temporary protection of cable after pulling is complete before final dressing and terminations are complete. Do not leave cable lying on floor. Bundle and tie wrap up off of the floor until ready to terminate.
 8. Cover end of overall jacket with minimum 25.4 mm (1 inch) length of transparent heat-shrink tubing.

- a. Cut unused insulated conductors minimum 50.8 mm (2 inches) passed heat-shrink, fold back over jacket and secure with cable-tie.
 - b. Cut unused shield/drain wires minimum 50.8 mm (2 inches) passed heat-shrink cover shield/drain wires with heat-shrink tubing extending to overall jacket. Extend tubing 6 mm (1/4 inch) passed end of unused wires, fold back over jacket and secure with cable tie.
9. For each solder-type connection, cover bare wire and solder connection with heat-shrink tubing.
10. Terminate conductors; no cable must contain unterminated elements. Make terminations only at outlets and terminals.
11. Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Cables cannot be spliced.
12. Bundle, lace, and train conductors to terminal points without exceeding OEM's limitations on bending radii. Install lacing bars and distribution spools.
13. Cold-Weather Installation: Bring cable to room temperature before de-reeling. Heat lamps are not permitted.
14. Cable must not be run through structural members or be in contact with pipes, ducts, or other potentially damaging items.
15. Separation of Wires: (Refer to Raceway Installation)
 - a. Separate speaker-microphone, line-level, speaker-level, and power wiring runs.
 - b. Install in separate raceways or, where exposed or in same enclosure, separate conductors at minimum 30.5 cm (12 inches) apart for speaker microphones and adjacent parallel power and telephone wiring.
 - c. Separate other intercommunication equipment conductors as recommended by equipment manufacturer.
- D. System Conduit: Install manufactured conduit sweeps and long radius elbows according to wire and cable OEM instructions.
- E. Protection during Installation:
 1. Protect electronic devices during unpacking and installation by wearing electrostatic discharge (ESD) wrist straps tied to chassis ground.
 2. Wrist straps must meet OSHA requirements for prevention of electrical shock, if technician comes in contact with high voltage.

F. Cutting and Patching:

1. Keep work area clear of debris and clean area daily at completion of work.
2. Patch and paint any wall or surface that has been disturbed by execution of this work.
3. Provide any additional cutting, drilling, fitting or patching required that is not indicated as provided by others to complete work or to make its parts fit together properly.
4. Do not damage or endanger fully or partially completed construction of Government or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. Contractor cannot cut or otherwise alter such construction by facility or separate contractor except with written consent of Government or of such separate contractor; such consent cannot be unreasonably withheld. Contractor cannot unreasonably withhold consent to cutting or otherwise altering work, by facility or a separate contractor.
5. Where coring of in-place concrete is specified or required, including coring indicated under unit prices, location of such coring must be identified in the field and accepted by COR prior to commencement of coring work.

G. Fireproofing:

1. Fireproof openings where IC cables penetrate fire rated walls, floors and ceilings.
2. Provide conduit sleeves (if not already provided) for cables that penetrate fire rated walls and floors and ceilings. After cabling installation is complete, install fire proofing material in and around conduit sleeves and openings. Install fire proofing material thoroughly and neatly. Seal floor and ceiling penetrations.
3. Use only materials and methods that preserve integrity of fire stopping system and its rating.

H. Grounding:

1. Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, common mode returns, noise pickup, cross talk, and other impairments.
2. Do not use "3rd or 4th" wire internal electrical system conductors for ground.
3. Do not "mix grounds" of different systems.

3.3 FIELD QUALITY CONTROL

- A. Assign only technicians trained, qualified, and certified by OEM on engineering, installation, operation, and testing of system.
- B. Performance Testing:
 - 1. Intermediate Testing:
 - a. After completion of 25 percent of installation of equipment, including one master station, and remote station, and prior to any further work, this portion of system must be pretested, inspected, and certified. Check each item of installed equipment to ensure appropriate NRTL labels are affixed, NFPA, Life Safety, and Joint Commission guidelines are followed, and proper installation practices are followed. Include a full operational test.
 - b. Arrange for inspection and test conducted by a factory-certified representative to be witnessed by Government and SMCS 0050P2H3 at a minimum and COR. An identical inspection can be conducted between 65 and 75 percent of system construction phase, at direction of COR.
 - 2. Pretesting:
 - a. Upon completing installation of system:
 - 1) Align, balance, and completely pretest entire system under full operating conditions.
 - 2) Verify (utilizing approved test equipment) system is operational and meets performance requirements of this standard.
 - 3) Verify that system functions are operational, and no unwanted aural effects, (e.g. signal distortion, noise pulses, glitches, audio hum, poling noise, etc.) are present. At a minimum, pretest each of the following locations:
 - a) Networked locations.
 - b) System trouble reporting.
 - c) System electrical supervision.
 - b. Provide recorded system pretest measurements and written certification that system is ready for formal acceptance test to COR.
 - 3. Acceptance Test:
 - a. Schedule acceptance test date giving COR 30 days' written notice prior to date acceptance test is expected to begin. System must

be tested in the presence of a Government representative and OEM-certified representative. System must be tested utilizing approved test equipment to certify proof of performance and emergency compliance. Test must verify that the total system meets specification requirements. Notification of acceptance test must include expected duration of time of the test.

4. Acceptance Test Procedure:

a. Physical and Mechanical Inspection:

- 1) Government representative may tour areas where system and sub-systems are completely and properly installed to ensure they are operationally ready for proof of performance testing. Prepare system inventory including available spare parts. Each item of installed equipment must be checked to ensure appropriate NRTL labels are affixed.
- 2) System diagrams, record drawings, equipment manuals, Auto CAD Disks, intermediate, and pretest results must be inventoried and reviewed.
- 3) Failure of system to meet installation requirements of this specification can be grounds for terminating all testing.

b. Operational Test:

- 1) Contractor must demonstrate full functionality of system including:
 - a) Station to master calls.
 - b) Station to station calls.
 - c) Location identification of stations at intercom master station.

- c. Test Conclusion: Government will accept results of the test or require additional testing on deficiencies and shortages. Retesting to comply with these specifications must be done at Government's convenience and contractor's expense.

3.4 TRAINING

- A. Provide training of facility-identified staff assigned to units receiving communications by an IC system. Implement training from master console operator's perspective, and likewise, for any person whose specific responsibilities include answering IC calls and dispatching an appropriate response, provide operational training from their perspective. A separate training room may be set up that allows

this type of individualized training utilizing in-service training unit, prior to cut over of new system.

B. Provide the following minimum training times and durations:

1. 1 hour.

3.5 MAINTENANCE

A. Provide Government personnel with ability to contact contractor and OEM for maintenance and logistic assistance, remote diagnostic testing, and assistance in resolving technical problems at any time, during warranty period.

B. Response Time during Warranty Period:

1. COR is contractor's only official reporting and contact official for IC system trouble calls, during the warranty period.
2. A standard work week is considered 8:00 A.M. to 5:00 P.M. or as designated by COR, Monday through Friday exclusive of Federal holidays.
3. Respond and correct on-site trouble calls, during the standard work week:
 - a. A routine trouble call within one working day of its report. A routine trouble is considered a trouble which causes one IC station, or master IC station to be inoperable.
 - b. An emergency trouble call within four hours of its report.
 - 1) An emergency trouble is considered a trouble which causes a IC sub system or equipment cabinet, to be inoperable at any time.
 - 2) Emergency trouble calls include routine trouble calls in critical emergency health care facilities (i.e., cardiac arrest, intensive care units, etc.). COR must notify contractor of this type of trouble call.
4. If an IC component failure cannot be corrected within four hours (exclusive of the standard work time limits), provide alternate IC equipment.
5. Complete installation of alternate equipment/system within sixteen hours after the four hour trouble shooting time and restore operation of effected location to system performance standards.
6. Replace any sub-system or major system that cannot be corrected within one working day, with compatible temporary equipment returning system or sub-system to full operational capability, until repairs are complete.

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