

**SECTION 16761
ACCESS CONTROL AND ALARM SYSTEMS**

PART 1 GENERAL

1.01 SUMMARY OF WORK

- A. The work includes all labor, materials and appliances required to furnish and install the access control and alarm system equipment as shown and noted on the drawings, and as specified. All attachments, connections, signal boosters, network processors, network distributors, line drivers and miscellaneous hardware needed to allow the system to communicate with the University's Primary System (Continental Instruments Corporation – CA3000), without interference with the existing system network, shall be the responsibility of the contractor. Division 1 shall apply to this section as fully as if written.

1.02 PRE-INSTALLATION SYSTEM ENGINEERING BY CONTRACTOR

- A. Through the project manager, the University's Access Control System Coordinator (ACS Coordinator) shall be contacted during the pre-engineering, development and review of the project for review of all access control and alarm systems requirements.
- B. Upon issuance of a contract, including the construction of components described within this section, the Contractor shall introduce the authorized installer to the ACS Coordinator.
- C. All input, output, relay, link and other related device schedules; terminal and device locations and cable and routing, shall be determined, submitted in writing and approved by the ACS Coordinator through the Project Manager, prior to the installation of any system components including conduits and rough electrical.

1.03 SECTION REFERENCE

- A. This section is applicable to, and is written in conjunction with the following Sections. Referencing below is made to alert the contractors involved of especially potential interactions or conflicts, but not all. In all cases, a complete working system is the responsibility of the general contractor.

Section 08710	Finish Hardware
Section 14200	Elevators
Section 16500	Wiring Methods, Raceways and Conductors
Section 16724	Fire Alarm System

1.04 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are intended to complement each other. Where a conflict exists between the requirements of the drawings and/or the specifications, it is the contractor's responsibility to contact, in writing, and request clarification from the University's ACS Coordinator through the Project Manager.
- B. Along with the architect and the project manager, the ACS Coordinator will review and approve the project submittals.

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- C. In case of conflicts not clarified prior to the bidding deadline, the contractor shall err to the side of better quality and greater quantity, or larger size in preparing the bid for this section. A clarification will be issued to the successful bidder and if appropriate, a deductive change order will be issued.
- D. As-built drawings shall be submitted for verification to the University's ACS Coordinator through the Project Manager prior to final contract payment. As-built drawings will be submitted on mylar with three sets of prints or in CAD from Autocad 12 or higher, unless specified otherwise.
- E. Symbols used on submittal and record drawings shall be consistent with the University's standard. Additions and deletions of symbols and indicators shall be by the approval of the ACS Coordinator. The following are the symbols being used by the University.

1. Input Devices (placed in triangles D)

AC	Alarm Controller
AS	Alarm Switches
BP	By-pass Button Control
CM	Ceiling Mounted Motion Detector
DC	Door Contact
DN	Duress Necklace/Clip-on
EA	Exit Alarm-Delayed Exit
FA	Fire Alarm Relay and/or Contact
FR	Fiber Optic Relay-Computer Alarm
HC	Ceiling Mounted Hatch
KP	Key Pad
KS	Key Switch
PD	Panic Switch Device
RC	Roll-up Door Contact
SC	Safe Contact
WM	Wall Mounted Motion Detector

2. Card Readers (Placed in Stars I)

AR	Alarm Reader-Used to Shunt Alarms
CRS	Magnetic Stripe Reader-Standard Duty
CRH	Magnetic Stripe Reader-Heavy Duty
PR	Proximity Reader

3. Lock and REX Devices (Placed in Squares q)

CM	Ceiling Mounted Motion Detector
ED	Electrified Delayed Exit Device
EL	Electrified Mortise Lockset
EP	Electrified Panic Device (Electro-Mechanical)
ML	Magnetic Lock
MO	Magnetic Lock with Outside Pull
TSB	Touch-Bar Sensor
TSP	Touch Pull-Bar Sensor
TM	Transom Mounted-Motion Detector
WM	Wall Mounted Motion Detector

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4. Closed Circuit Television, CCTV (Placed in Ovals ○)

- TV Closed Circuit Television Camera
- QD Quad CCTV Monitors w/Multiplexor
- PT Pan and Tilt Motor/Controls
- TVM Single CCTV Monitor
- TR Time Lapse Recorder

5. Power Supplies and Batteries (Placed in Circles ○)

- BC Battery Cabinet
- BT Battery
- PS1 12VDC Power Supply
- PS2 24VDC Power Supply
- UP 110VAC Uninterruptable Power Supply
- VR Voltage Regulator

6. Controller and Accessories (Placed in Circles ○)

- EB Expander Input Board
- ER Extended Relay Board
- MC MicroTerm
- MN MiniTerm
- K2 256K Extended SuperTerm Memory
- K5 2MB Extended SuperTerm Memory
- ST SmarTerm
- SP SuperTerm
- AP Alarm Status Panel

F. All provisions shall be deemed mandatory except as expressly indicated as optional by the words "may" or "option".

1.06 SALVAGED MATERIALS AND EQUIPMENT

- A. Where remodeling, demolition, or upgrading is to be accomplished under this contract, all existing materials and equipment not designated as scrap by the ACS Coordinator shall be carefully disconnected, unmounted, and delivered to the University as directed by the ACS Coordinator.
- B. DO NOT reuse salvaged materials and equipment, unless specifically indicated on plans or specifications. Remove from the premises and legally dispose of all materials considered by the ACS Coordinator to be scrap.

1.07 QUALIFICATION OF SYSTEM CONTRACTOR

- A. The card access and alarm system contractor must be a San Diego County based, Continental Instruments Corporation (CIC) factory trained and authorized installer. The job site installers shall be thoroughly familiar with the CA3000 functioning and programming for a system with in excess of 500 readers and 1000 alarm inputs. Factory certification for the installers and personnel providing maintenance and warranty service is required and must be on file with the University prior to installation.

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1.08 SUBMITTALS

- A. The contractor shall submit shop drawings for review and approval by the ACS Coordinator through the Project Manager prior to installation of any phase of work. Submittals shall include complete details of proposed equipment locations and layout, wiring schematics, conduit layouts, network connections and system interfaces. Shop drawings shall be required on each phase of a project. The ACS Coordinator shall determine whether shop drawings will be submitted to the California State Fire Marshal.
- B. Submittals for substitutions and the approval of substitutions, shall be made by the ACS Coordinator through the Project Manager. Acceptance of substitutions shall be made in writing by the ACS Coordinator.

1.09 WARRANTY

- A. The contractor shall warranty all parts and labor for a period of one (1) year from the date of acceptance by the University.
- B. The contractor shall provide warranty service twenty-four (24) hours a day for the first thirty (30) days following acceptance. The contractor shall provide for a three (3) hour response time for the first (30) thirty days following acceptance.
- C. For the remainder of the one (1) year warranty period, the contractor shall then provide for a response within the next twenty-four (24) hours, Monday through Friday, after notification of a warranty problem.
- D. The contractor shall be able to perform any and all repairs to the system within twenty-four (24) hours, after notification of a warranty problem. This must be demonstrated to the satisfaction of the ACS Coordinator prior to the acceptance of any work.

PART 2 PRODUCTS**2.01 GENERAL**

- A. Where a particular manufacturer's product is specified, it is not intended to discriminate against other manufacturer's which are equal in quality of material, workmanship, appearance and function to those specified. Rather, it is intended to establish and indicate the desired standard of quality. If any tests are required to determine the equality of any substitutes, such tests shall be made by an independent authority as approved by the ACS Coordinator. All expenses related to proposed substitutions shall to be paid by the contractor. Proposed items are to be submitted with the bid and shall be a basis for the award of the contract.
- B. All materials and equipment shall bear evidence of the Underwriter's Laboratories Inc. Label (UL) or approval of other nationally recognized independent testing organizations adequately equipped and competent to perform such services when these standards are required and such product listing is available,

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2.02 CONDUIT SYSTEMS

- A. All conduit, fittings, boxes, and related items shall conform to the specifications set forth in Section 16050, Basic Materials and Methods or as otherwise specified. All conduit sizes shall be no smaller than 3/4", unless otherwise noted with the exception that when a conduit serves only a single device and is within twenty (20) feet of a junction box, 1/2" conduit may be substituted.
- B. To identify the University's Access Control System from other conduit runs, all concealed conduit for this section shall be painted with dark blue paint at six (6) foot intervals along the entire run. These identification markings shall be continuous around the entire circumference of the conduit. Each marking shall not be less than 4" in width. All fittings and box cover plates shall also be painted the same color. Surface mounted conduit and raceway that is below the ceiling grid shall be painted the same color as the surrounding surface. The inside of all J-boxes regardless of wall placement, shall be painted dark blue.
- C. Conduit runs shall allow for 30% additional capacity with a nylon "pull line" installed for future use. Conduit runs with over 50% capacity shall have a nylon "pull line" installed for future use.
- D. The contractor shall provide and install all conduit necessary for the telecommunication connections for the University's Access Control Systems. These shall be dedicated conduit runs from the buildings telecommunications entry terminal to the SuperTerm controller room. The conduit runs shall include four (4) pairs, minimum 24 gauge conductor wire, with nylon pull line.
- E. In existing construction where surface mounted raceways are required, provide Wiremold 500-Series metal raceways painted to match surrounding surfaces.

2.03 WIRE AND CABLE

- A. All system wiring shall be shielded, stranded, plenum, copper cable. Signal cable size shall be a minimum 6 conductor, 22 gauge. Power cable for electric locks and exit devices shall be a minimum 18 gauge. Conductor size of cable shall be increased as required to limit DC voltage drop to 5% at maximum current draw.
- B. Low voltage power and signal cable may be run in the same conduit, however not in the same shielded cable. Wiring for all 120 VAC locks and controls must be run in a separate grounded conduit.

2.04 CONTROLLER/PROCESSOR

- A. The controller shall be CIC, Model Turbo SuperTerm CICIP 1800T(8-door). SuperTerms shall be provided, located, and installed by the contractor as noted.
 - 1. SuperTerms which interface and/or provide elevator control on a job site shall be modified (ordered) with 2.0 megabytes of additional

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extended memory to provide maximum "off-line" transaction memory storage.

2. SuperTerms shall be wall-mounted in a factory-furnished enclosure or may be group mounted in a NEMA 1 wall mounted cabinet. Design of the wall mounted cabinet shall provide suitable clearance for all components and wiring, adequate ventilation for heat producing components, and lockable doors. Cabinet doors shall have tumbler locks keyed to the University standard 284 cabinet key. Each cabinet door shall have a tamper switch, (Sentrol/GE Model # 3015 or 3012 or 3025T) and zoned to input 81 of the SuperTerm.

2.05 CARD READER

- A. Magnetic stripe card readers shall be manufactured by CIC and be magnetic stripe outdoor type, Model #R2140MMR. Color Black with black back plate.
 1. Where magnetic stripe card readers are placed in elevators and/or in areas likely to be damaged by vandalism or heavy use (loading docks), the reader shall be protected with a metal housing, CIC Model #R2140MMR or Mercury Security Model #MR-10-0W-BK-5V.
 2. Where heavy duty magnetic stripe card readers are specified, the reader shall be heavy duty type, CIC Model #R2140MMR or Mercury Security Model #MR-10-0W-BK-5V.
 3. Alarm card readers shall shunt alarm inputs by presenting a magnetic stripe card. The card reader housing shall have two (2) LED indicators; one (1) dedicated to cause an "open circuit" that will illuminate yellow and the second LED shall switch between red and green to indicate the alarm status as on or off respectively, CIC Model #R2140MMR w/red, green and yellow LED.
 4. Magnetic stripe card readers shall be installed vertically with the card reading top to bottom. (The magnetic strip on the card, is swiped facing right, passing "top to bottom".)
 5. Use one gang mount plate #WP-10BK for Card Access Reader.
 6. Use two gang mount plate #WP-20Bk For Card Alarm Reader.

2.06 PROXIMITY READERS (Must be specially approved for installation)

- A. Proximity Readers shall be manufactured by Hughes Identification Devices or other manufacturer with the model based on application and approved by ACS Coordinator.

2.07 ELECTRO-MECHANICAL EXIT DEVICES

- A. Electro-mechanical exit devices shall be manufactured by Sargent. Models are dependent on the type of door and its swing, with the standard being model 12-55-56 prefixes electric dogging 80 series for panic type exit devices and Model #8271-LW1L with REX switch series for mortise type exit devices.

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1. The device shall provide for contact operation (system-door bypass) when the inside lever or crash bar is depressed.
2. All electro-mechanical locks shall be fail secure, have a latching mechanism, a continuous duty coil, and a cylinder lock.
3. Connector plugs shall be used on all electric locks for disconnecting wires; door lock power and REX at door, inside crash bar or inside mortise pocket. Power wires shall be equipped with male connectors on the solenoid side (lock side). Signal conductors shall have female connectors on the solenoid side (lock side). Connectors shall be Sargent Molex plug system or JT&T Products #2125C male plugs and #2124C female plugs: Tel.#775-322-7000 in Reno, Nevada.

2.08 ELECTROMAGNETIC LOCKS (Must be specially approved for installation)

- A. Electromagnetic locks shall be Securitron or equal. Models are dependent on the type of door and its swing with the standard being Securitron Model #62-24.
 1. All electromagnetic locks shall have fail-safe relays wired for fail safe operation (perform undelayed egress, without the use of the SuperTerm).

2.09 TOUCH-BAR SENSOR EXIT DEVICE (Must be specially approved for installation)

- A. Touch bar sensor exit devices shall be Securitron Model TSB-3 or approved equal.
 1. All touch-bar sensor exit devices shall have fail safe relays wired for fail safe operation (perform undelayed egress without the use of the SuperTerm).

2.10 REMOTE BY-PASS DEVICE (Must be specially approved for installation)

- A. Manual remote by-pass button (request to exit) shall be Securitron Model PB-2 (with power indicator) series, or approved equal. Where special automated exits require a hands-free need, use a dual function motion detector which is to be approved by the ACS Coordinator.

2.11 DOOR POSITION SWITCH (Door Contact)

- A. Door position switches shall be Sentrol/GE Model #1275W. Model #2505A for exposed grouted frames, Model #2205A for exposed roll-up door applications, or approved equals per ACS Coordinator.
 1. Installation of door position switches is required at all door openings, using empty shell part #1932C.
 2. The contractor shall insure that door and frame fire ratings are maintained.

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3. Unused wire terminals shall be electrically insulated to prevent ground fault.
4. Where the gap between components of door position switches exceeds 3/4", prior approval from the ACS Coordinator is required.
5. All alarmed doors require a local audible sounder device per section 2.16, 2.21.

2.12 FAIL SAFE RELAYS

- A. Relays shall be installed on all non-mechanical exit applications. The fail-safe relays shall be located in the SuperTerm. Fail-safe relays shall be wired for fail safe operation (perform undelayed egress, without the use of the SuperTerm). Relay shall be Securitron Model #RB-4-24 or approved equal.

2.13 ARMORED DOOR LOOPS (ELECTRIC HINGES FOR FIRE DOOR APPLICATION ONLY)

- A. Armored door loops shall be Sargent Model #3261, Securitron Model #TSB-C, or approved equal. Loops shall be used on all applications that require power to transfer from frame to door, EXCLUDING FIRE RATED DOORS ONLY. Loops shall be connected to metal (stainless) cover plates on the wall and to the door or device at the device end.
- B. Door cords shall be mounted on the top of the doorframe on store front doors or hollow metal doors.
- C. Electric hinges, part # Marray TEF2+4C, are required on all fire rated doors.

2.14 WINDOW SENSORS

- A. Sensors shall be Sentrol Model #5815 A-W or approved equal.

2.15 MOTION DETECTOR ALARMS

- A. Detector sensors shall be C&K Model DT7435T series for wall mounted applications or Model DT6360STC for ceiling mounted applications.
- B. Audible sounding devices are required per section 2.16, 2.21.

2.16 AUDIBLE SOUNDING DEVICE

- A. Device shall be Gentex Corp GX91-W, white in color for areas not requiring visual alert.

2.17 UNINTERRUPTABLE POWER SUPPLY SYSTEM (UPSS)

- A. UPSS shall be a minimum Securitron Model #BPS-24-6-Special in 24 VDC applications. An additional power supply for providing SuperTerm power and auxiliary equipment (card readers) shall be a minimum Securitron

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Model #BPS-12-6-Special in 12 VDC applications (sized for maximum equipment current draw).

1. The Securitron UPS devices shall be specifically ordered to provide a minimum of 76 ampere hours, battery load to concurrently charge batteries and operate equipment.
2. All power supplies shall be sized to provide 72 hours of uninterrupted power. Battery calculations shall be submitted with shop drawings.
3. Each door opening shall be assigned an individual terminal output relay (breaker) and shall be sized for 2 amperes. The contractor shall use Securitron Slave Boards Model CCB-8 where additional outputs are required.
4. Power supplies for electrically operated locks and exit devices shall be 24 VDC output, regulated and filtered; UL listed.
5. The contractor shall select suitable capacities and quantities of power supplies based on actual loads served with at least 20% allowance for future expansion of the system.
6. Each SuperTerm, Lantronics device, and proximity reader shall be assigned an individual circuit breaker at the low voltage power supply.
7. The contractor shall provide and wire into input #17 of the SuperTerm a controller indicating a loss of AC power to the UPSS. A sensor shall be located on the load side of the 120 volt AC power fuse inside of the power supply cabinet.
8. Power supply cabinet doors shall have tumbler locks keyed to the University standard 284 cabinet key.

2.18 BATTERY BACK-UP

- A. Batteries shall be Yuasa, Model YUA-NP3812-12 volt, 38 ampere hour or approved equal. Battery cabinets shall be Thorn or approved equal. Battery back-up devices shall be required on all portions of the access control and alarm systems.
 1. Battery back-up devices shall provide 72 hour back-up power for all equipment and be modified as required to charge 76 ampere-hour batteries.
 2. Battery back-up devices are dependent on total system electrical load and shall be sized accordingly with at least 20% allowance for future expansion of the system.
 3. Battery cabinet doors shall have tumbler locks keyed to the University standard 284 cabinet key.

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4. Battery Test switches shall be installed to isolate the batteries from the power supply, and from each other when a parallel configuration is used. See sketch attached.

2.19 VOLTAGE REGULATOR

- A. As specified by the hardware manufacturer, the contractor shall assure the voltage for door power does not exceed 26.2 RMS by means of a voltage regulator located in the J-box to which the door cord is connected. The voltage regulator shall be SC or approved equal. Model shall be a PR-5 or approved equal. The contractor shall provide voltage regulators at each panic bar requiring power, as needed.

2.20 LNETWORK CONNECTIONS

- A. Unit shall be Lantronics Part #UDS1100 or approved equal.
 1. All SuperTerms are configured to operate on Lantronics#UDS1100.
 2. Lantronics#UDS1100 are required in all configurations.
 3. Lantronics shall be installed at the Superterm or as specified by the ACS Coordinator prior to start of construction.
 4. The contractor shall install one Lantronics for each series of ten SuperTerm controllers, in multi-drop sequence. The contractor is responsible for communications, conduit, and wiring between doors, alarms and Superterms and Lantronics devices within the job site.
 5. Lantronics cabinet doors shall have tumbler locks keyed to the University standard 284 cabinet key.
 6. Power and proper operation of the Lantronics device is the responsibility of the contractor. The contractor shall coordinate with the University's Telecommunications and Network Services for a dedicated Ethernet port at Lantronics locations.

2.21 LOCAL AUDIBLE DOOR ALARM

- A. Alarm device shall be Gentex Model GX9D-2 as modified to comply with this paragraph or as an approved equal.
 1. Local audible door alarms shall sound when designated doors are used for unauthorized exit. Audible alarm shall be flush mounted, 79dBA minimum at 10 feet, 12 VDC. Face plate color selection shall be made to match the existing wall color.

2.22 HANDICAP INTERFACE

- A. Each handicap door shall be equipped with a card access handicap door interface logic board, Stanley Access - Model #PTX300.

PART 3 EXECUTION

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3.01 SYSTEM WIRING

- A. All cable shall be installed in a continuous run from the SuperTerm processor to the equipment end (i.e.; instrument, magnet, electric lock, motion detector, etc.) with no splicing of conductors allowed within the run. Ground shields/braids are to be connected to the equipment ground at the SuperTerm processor end only. Unused wire (terminal) and door end ground shields shall be electrically insulated to prevent ground fault. A wire "loop" shall be left in every junction/pull box.
- B. Cable shall be sized and routed to maintain voltage drop within acceptable limits. The contractor shall ensure and verify maximum allowable voltage drop for each terminal device with the manufacturer. Design voltage drop criteria is as follows:
1. Electric exit devices @ .750 amperes stall current, 5% V.D.

Wire Size	Maximum Distance
#18	100 feet
#16	160 feet
#14	260 feet
#12	410 feet
#10	660 feet
 2. Electric Locks (mortise) @ .250 amperes, 5% V.D.

Wire Size	Maximum Distance
#18	300 Feet
#16	490 feet
#14	780 feet
- C. Where a fire alarm system interface is specified, the contractor shall provide and wire relay contact closures with normally-open or normally closed contacts as required by the Fire Alarm Control Panel (FACP).
- D. The contractor shall ensure all access control and security components requiring 120V AC power are connected to circuits dedicated to the access control and security system. If available, these 120V AC circuits shall be connected to an "emergency" power system approved by the ACS Coordinator.
- E. Under no circumstances shall the lock power cabling be exposed to the outside of an opening or be accessible to the reader connection box.
- F. Installations shall be consistent throughout the University. Deviations from the normal installation must be approved by the ACS Coordinator.

3.02 CABLE ROUTING

- A. Communication, reader and alarm cables may be run in the same grounded conduit with low voltage power and door lock power supplies. Minimum single conduit size is $\frac{3}{4}$ ".

3.03 HARDWARE

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- A. All card access equipment hardware shall be installed under strict manufacturer's recommendations while conforming to all applicable codes and regulations. Installation shall be done by factory-trained installers who are thoroughly familiar with the CA3000 functioning and programming. The Contractor shall provide evidence of factory certification for each installer.
- B. All handicapped door openers shall be activated by presenting a card at the reader, and then touching or pressing an automatic door-opening "button". A card access handicap door interface logic board, Cal door Model #PTX300, shall be install on each handicap door.
- C. The egress side of all handicapped doors shall only require activation of the "button" or similar device to unlock and open the door.

3.04 COMMUNICATIONS

- A. The Contractor shall provide, install, wire and test any communication line repeaters, signal boosters, network processors, network distributors, line drivers and miscellaneous hardware that may be required to allow each SuperTerm to communicate with the main CA3000 computer.
- B. The Contractor shall insure that the operation of equipment under this portion of the contract shall not adversely effect the operation of the remainder of the access control and alarm system or its network. All changes or proposed modifications to the existing system, shall be authorized in writing by the ACS Coordinator through the Project Manager.

3.05 TEST AND INSPECTION

- A. The system shall be tested, calibrated, adjusted, and programmed as an integrated system. All components and the system shall operate to the satisfaction of the University ACS Corrdinator.
- B. When the system is complete, the Contractor shall do a 100% test of all components of the system. Each device shall be tested for supervision and alarming capability. The system shall be tested for operation on battery power. Testing shall be by, or under the direct supervision of the Contractor's factory trained installer. ACS Coordinator and Project Manager shall be notified of the testing date and time at least seven days in advance.
- C. The Contractor shall submit certification that the entire system is installed and operating properly and in conformance with plans, specifications, and University requirements. Testing shall be complete and certification prepared before final inspection.
- D. Final inspection will be conducted by the ACS Coordinator and a University Physical Plant Lockshop representative.

3.06 TRAINING

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- A. A training program for the ACS Coordinator shall be conducted for not less than 4 hours, at a time and location designated by the University. Four additional sets of bound manuals shall be delivered at this time. Manuals shall contain operating instructions, wiring diagrams, parts lists with part numbers, and local suppliers and service information. Information needed for trouble-shooting and maintenance shall be included.

* * * * * END OF SECTION * * * * *