



# University Of Toronto

## Security and Access Control System Specification

Revision 2

**Effective July 28, 2015**

Campus Community Police Services  
Manager, Security Systems and Services

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## Contents

SECURITY AND ACCESS CONTROL SYSTEM MANDATORY REQUIREMENTS .....	4
16701 SECURITY SYSTEMS GENERAL REQUIREMENTS .....	1
16702 CONDUITS, BOXES, FASTENERS AND FITTINGS.....	1
16703 SECURITY SYSTEM WIRING .....	1
16710 ACCESS CONTROL SYSTEMS .....	1
16711 SURVEILLANCE SYSTEM.....	1
16712 INTRUSION SYSTEMS .....	1
16713 CODE BLUE SYSTEM.....	1
16730 SECURITY AND ACCESS CONTROL SYSTEM, TESTING AND COMMISSIONING .....	1



## Security and Access Control System Mandatory Requirements

The U of T security and Access Control System must be installed on all entrance and exit doors for all buildings that are being newly constructed or are undergoing significant reconstruction or re-purposing.

The following information is provided for the use of the University of Toronto's Facilities and Services Property Managers, Campus Police Services and the Project Management Office and the Consultant Teams working on new security and access control systems or additions to existing systems on the St. George Campus of the University of Toronto.

This Standard is also being used by the University of Toronto at Mississauga and the University of Toronto at Scarborough. Local variations may occur and it is expected that the Project Manager and Consultant will confirm their recommendations with the Managers of the security and access control systems at each campus before issuing the project specification.

Steps that **MUST** be taken once the project consulting team is formed on the St. George Campus:

At St. George Campus the consulting team is to contact Alan Truong, Manager, Security Systems and Services at 416 978-2905 (T) or Fax 416 946-8300 to identify the project and approximate timing.

The contact at the Mississauga Campus is Robert Messacar or his designate at (905) 828 5200.

The Contact at the Scarborough Campus is Carvill Lo at (416) 287-7599.

On the St. George Campus there are mandatory one time only and on-going fees that will be charged to the client. Clients must also agree to maintain the devices in good working order at all times and to repair or replace forthwith any device that is not functioning properly.

Centralized EBI and DVM servers are provided on the St. George Campus as are Code Blue DVM servers, making it unnecessary to purchase additional servers for any of the systems. Depending on the nature of the systems being installed, workstations and additional hardware may be necessary. The University of Toronto supplies and maintains all required servers, workstations and peripherals such as storage and printers for which the client is billed. Fees are subject to change and apply for the following:

- Shared servers, storage memory, workstations, printers and other required hardware;
- Licenses to operate on the Code Blue ToolVox system, Honeywell EBI system and DVM system;
- Credentials, scheduling and programming changes;
- Annual monitoring fee to Campus Police;
- Attendance at false alarm calls;
- Attendance at requests to provide access when the system is operating but the credential is not available;



- All maintenance, upgrading and repairs to any device

## Features

Unless otherwise specified:

The University has standardized on the Honeywell Enterprise Buildings Integrator software for security and access control and the Honeywell DVM system to manage video and surveillance systems. All products specified for the system must be recognized by and work in the software environment. Other products can work in the EBI software if a driver or other software is supplied. The product must be tested and accepted by the security system manager and only after it is proven to work as required in the EBI system. All of the hardware noted in this document has been proven to work as required. New hardware is being added to the list regularly and it is good practice to check with the respective managers to learn what is available for use with the EBI system.

All hardware must have a University supplied key override for any security door electrically locked. Such locks will accommodate Sargent standard mechanical or iLogic cylinders, in Large Format on the St. George Campus. All locks and keys are charged to the Client by the Lock Shop and should be carried as a project cost.

Acceptable locking devices include Sargent Wi-Fi/POE, and Harmony 2, 8000 series Rim Exit Devices that are connected to the Campus Honeywell EBI Security System. New locks are approved from time to time and project managers and designers should check with the Manager, Security Systems and Services at St. George Campus.

As of 2015 07 28, the Salto locking system has been added to EBI as a new install but a process and pricing has not been developed. Salto locking systems are installed in many areas of the St. George Campus. Salto systems are locally managed by the Client but are not part of the St. George Campus Security and Access Control system and are not managed, monitored or serviced by Campus Police Services. This is expected to change during the next year.

For new builds and installations, the Access Control System currently specified on campus is the PCSC Fault Tolerant System managed by Honeywell Enterprise Building Integrator (EBI) software. For expansions of existing systems, the PCSC iQ series may be used. All parts must be programmed to work with the PCSC controllers and FT devices.

When parts are being replaced or added to the system, there is a recognition process that is required in the EBI and DVM software. Prior to installation, the Manager, Security Systems and Services must be consulted and if required, the device will be configured, at the cost of the project, to work on the system prior to installation. This includes controllers and FT modules, card readers, cameras, door locks (wired, PoE and Wi-Fi) and peripheral devices.

All doors with the exception of overhead doors, shall report both forced open and door held unless otherwise requested by the University. The Manager, Security Systems and Services will identify those doors on which it may be disabled.



- Overhead doors shall be equipped with a door contact and key switch bypass.
- All elevators shall be equipped with a card reader to allow/restrict access to all floors so that they can be remotely locked down. Floor access will only be granted to a valid card holder. Floor tracking is not required.
- All decisions shall be controller based.
- Doors with automatic openers shall be interfaced so that the locking device is disengaged (unlocked) prior to the auto door operator attempting to open the door. (Avoid motor burnout and false alarms).

It is recommended that glass break detector be provided where there is a glass window integral in the door or surrounding glazing at Ground level. This may be removed by the client but the client must be advised in writing that failure to provide glass break protection may provide an undetected point of unlawful entry. The use of multiple motion detection devices may be a suitable alternative.

CCTV will be integrated into the EBI system (DVM) and 30 days of storage provided per camera. Costs for all licenses and server usage and memory will be made to the Client by F&S IT at St. George Campus.

All servers and computers will be provided by the University of Toronto. The University provides a virtual EBI server to which all new and added points are attached. Each project will be assessed a fee that covers the added capacity required by the project. The project pays for all licensing, network, storage and other fees required to be part of the system.

Network specifications will be provided by F&S IT on the St. George Campus; UTM IT at Mississauga and UTSC IT at Scarborough.

On the St. George Campus Code Blue ToolVox servers have been selected to manage the Campus Assist phone system. As the campus transitions to the VoIP telephony system, analog Code Blue devices will be installed to ensure that there is a means to call for assistance in emergent and urgent situations. Sufficient server capacity has been provided by the University. It is anticipated that Scarborough and Mississauga Campuses will follow the same protocols.



## 16701 Security Systems General Requirements

### GENERAL

#### Reference

This Section supplements “The General Conditions” and forms part of every Section of the Security System Specification.

#### Related Work

Comply with relevant Sections of this and other Divisions as required.

#### Codes and Standards

Design and Installation work shall be provided in accordance with the applicable international, federal, provincial, and local codes or standards current at the commencement of installation, including, but not limited to:

- Canadian and Ontario Electrical Code
- Ontario Building Code
- National Fire Code of Canada
- CSA Standards
- IEEE Standards
- ULC Standards
- FCC Standards
- AODA (Accessibility for Ontarians with Disabilities Act)
- ADA (Americans with Disabilities Act)
- All University of Toronto Standards
- University of Toronto Asbestos Training Certification.
- And any other governing authority having jurisdiction.

**Where more than one code or regulation is applicable, the more stringent shall apply.**

Cable sizing, installation, identification and termination shall be provided in accordance with the manufacturer's technical installation guidance, in addition to the applicable codes above.

In the absence of the manufacturer's recommendations on conductor application, the Contractor shall ensure that the cable selected meets all technical requirements of the equipment to be installed.

Comply with O.E.S.C. Electrical Bulletins in force at time of Bid submission. While not identified and specified by number in this Division, they are to be considered as forming part of related



Standards.

Abbreviations for electrical terms are as per C.S.A. Z85.

**This Section supplements "The General Conditions" and Division 1, and forms part of every Section of Division 16.**

### **Definitions**

Wherever the words "equal", "approved", or "approved equal" are used, it shall be understood to mean, "equal", "approved", or "approved equal" in the opinion of the Consultant only. Unless otherwise noted, provide the model and manufacturer specified with no substitutions unless approved by the consultant.

Wherever the words "install", "provide", or "supply and install", are used, it shall be understood to mean "provide and install, inclusive of all labour, materials, installation, testing, and connections" for the item to which referred.

"Concealed" is defined as "out of sight" in "normal" viewing conditions, and

Includes buried in concrete, above acoustic tile or gypsum board ceilings, within masonry or gypsum board constructed walls, within cable trays or below raised access floors.

### **Intent**

It is the intent of these drawings and specifications that the Trade Contractor provides complete and operational systems as required.

Where differences occur, the maximum condition shall govern.

Any miscellaneous items, hardware, devices, wiring, etc., not specifically described, but required for the operation of the system, shall be provided.

### **Contractor**

The contractor shall only submit products for which they are factory authorized to sell, install and service. The contractor shall furnish all equipment, accessories and material. This shall be done in strict accordance with specifications and applicable drawings as required for a complete and working system. All material and/or equipment necessary for proper operation of the system not specified or described herein shall be deemed part of the specifications.

### **University Provided Equipment**

The University will provide the computers to be used for workstations, video servers and the EBI server. All computer systems are Dell based.

The University will supply the Security Management and Video Management software and licenses.



The University will provide all access control credentials (cards and fobs).

The University will provide all signage for use with video surveillance that is installed as part of this system and managed by Campus Police. The signage is not suitable for video cameras installed by others.

The University will provide all LAN/WAN connections and network equipment with the exception of terminal servers and video streamers. The contractor will provide the cabling to the point of connection to the University network and the University will make the final connection.

### **EBI Server Programming, Graphics and Final connection to the Front End**

The contractor (usually using Honeywell as the sub-contractor) will provide all EBI programming, graphics, testing and final commissioning of the Access Control, Burglar, Intercom and CCTV Systems.

It is the contractor's responsibility to provide all programming of the Access Control, Burglar, Intercom and CCTV Systems so that the systems can be tested prior to connection to the Private Security Network.

It is the contractor's responsibility to co-ordinate with the client and Honeywell to complete final commissioning of all systems after final connection to the Private Security Network.

### **Existing Conditions**

Visit the site and examine the existing conditions affecting the work of this Division.

No claim for extra payment shall be made for extra work made necessary by circumstances encountered due to conditions that were visible upon, or reasonably inferable from an examination of the site prior to submission of the Bid.

### **Shop Drawings**

Submitted Shop Drawings must indicate details of construction, dimensions, scale, capacities, weights and electrical performance characteristics of equipment or materials, as well as specification reference Section number, and project name.

Submitted shop drawings must indicate equipment and cable identification tag as described in Item 1.25 "Identification".

Shop drawings shall be drafted in electronic format AutoCAD format) and submitted for review in the form of 1 (one) reproducible and 6 (six) prints, with sufficient space on the front for all Consultant's and Contractor's "review" stamps. Prior to substantial performance, an electronic as-built copy is to be given to the Owner.

Manufacturer's literature and similar published information will be submitted for review in the



form of 6 (six) originals or photocopies, with sufficient space or a cover sheet on the front for all Consultant's and Contractor's "review" stamps. Prior to substantial performance, all drawings and literature is to be scanned into a PDF format by the contractor and given to the Owner on a CD or DVD.

Shop Drawings shall include wiring details and mounted details of all devices, single line and schematic design drawings, riser diagrams, Data Gathering Panel (DGP's) details and terminations, power supply details and load summaries, all raceways and conduits and diagrams showing interconnections with the work of other Trade Contractors.

Work affected by submittal shall not proceed until review is complete.

Changes made to the Shop Drawings by the Consultant will not affect the Contract Price. Submit Shop Drawings for all material and equipment referred to in the contract documents including, but not limited to, the following equipment:

- Door Contacts.
- All perimeter and space protection devices.
- Card Readers, Cards and/fobs provided by U of T.
- Exit Buttons.
- Any other optional packages and components (as required for elevator control).
- Wire ways.
- Wiring Devices.
- Wiring diagrams of each distinctive door types, each system and devices.
- Equipment layout and wiring diagrams for all systems and enclosures.
- Interconnection diagrams to all existing equipment such as handicap door operators.
- Locations of all new access doors and/or hatches.

### **Contract Drawings**

The Drawings for the Security work are diagrammatic performance Drawings only, intended to convey the scope of work and indicate the general arrangement and approximate location of devices, and the approximate sizes and locations of equipment and outlets. The Drawings do not intend to show Architectural, Mechanical or Structural details.

Do not scale or measure Drawings, but obtain information regarding accurate dimensions, from the dimensions shown on the Architectural Drawings, or by site measurements. Follow the Security Drawings for laying out the work.

Refer to the other Division's Coordination Drawings or visit the site, to become familiar with all conditions affecting the work, and verify suitable spaces exist, in which the equipment will be installed.

Make, at no additional cost, any changes or additions to materials and equipment necessary to accommodate Structural conditions (offsets around beams, columns, etc.).



Alter at no additional cost, the location of materials and/or equipment as directed, provided that the changes are made before installation, and do not necessitate additional materials.

Exact locations of all boxes, conduit, wire runs and devices shall be presented to the University of Toronto for approval in advance of any installation.

Install ceiling mounted components (such as cameras etc.) in accordance with dimensioned reflected ceiling drawings, prepared by the (Architectural) Consultant. In the absence of such drawings, refer to the security consultant.

Leave space clear, and install equipment to accommodate future materials and/or equipment as indicated or specified, or to accommodate equipment and/or materials supplied by other Trade Contractors.

Verify that the spaces in which the equipment is to be installed is sufficient and install all equipment to maintain headroom and clearances, to conserve space, comply with codes, and to ensure adequate space and access for future servicing. Confirm at the site, the exact location of equipment, outlets and fixtures, and the location of outlets for equipment supplied by other Trade Contractors, before installation.

### **Coordination Drawings**

Prepare Drawings in conjunction with all Trade Contractors concerned, showing new and existing sleeves and openings for passages through structure, and any sleeves, conduit sizes, buried conduit and locations for inserts in cast-in-place or pre-cast concrete, required for this work.

Prepare the Drawings and show cable and conduit runs, security, equipment rooms, ceiling spaces and all other critical locations to avoid conflict. Base the Drawings on Shop Drawings and include all details pertaining to clearances, access, sleeves, electrical connections, location and elevation of pipes, ducts, conduits, etc., obtained from consultation with and agreement of all other Trade Contractors involved, or site conditions.

Forward all the Drawings, reviewed by all Trade Sub-Contractors, to all Consultants for their review. Provide print copies as required.

All Drawings shall be prepared in ample time for review and implementation.

Failure to do so, and any problems that arise, will be the responsibility of the Trade Contractor.

Should the Trade Contractor neglect or otherwise fail to provide co-ordination drawings, it shall assume the cost of any and all relocation work that could have been avoided through the submission of co-ordination drawings.

### **Record Drawings**

Prepare a complete and separate set of white prints to keep on the site at all times.

These prints shall be marked up to record clearly, neatly, accurately and promptly:



All locations of security work, deviations from and changes to the "Issued for Construction" Documents.

The accurate locations, depth, size and type of each underground security run will be recorded before concealment, to ensure accurate and future direct access to these buried services.

Routing of signal wire and cables, including the designations assigned to each wire/cable and antenna placements.

Accurate location of all equipment installed under the specifications.

The Record Drawings will be reviewed at regular intervals by the Consultant, and will be taken into consideration when reviewing the monthly applications for progress payment.

Project Record Drawings include all bid drawings and all submittals.

The Security System Contractor shall obtain, pay for, and keep up-to-date and available to the University of Toronto or its representative, complete blue line prints the project clearly annotated with "as-built" data as the work is provided.

Any University of Toronto backgrounds required shall be obtained at Security System Contractors sole expense.

### **As-built Drawings**

As-built drawings, in AutoCAD format, must indicate all cable and equipment identification tags. The Security System Contractor shall provide all security as-built information for incorporation into the As-Built Drawings including, but not limited to, the panel and circuit numbers of all power feeds.

As-built drawings shall contain all required information provided in the shop drawings and the up to date record drawings to reflect the installation when complete.

Provide one (1) paper copy of all as-built documents and provide electronic copies of all documents for the University and provide one (1) paper copy for consultant's approval.

As-built documentation shall be provided prior to substantial completion can be awarded.

### **Operation and Maintenance Manuals**

Provide complete and accurate information in a uniform intelligible manner consistent with UoT requirements.

Provide three (3) hard copy sets of operation and maintenance manuals and one (1) set in electronic format on CD including all scanned and AutoCAD shop drawings and product literature as described in 'Shop Drawings' in this specification section.

The Operation and Maintenance manuals shall include, but not limited to, the following information:

Details of design elements, construction features, component function and maintenance



requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of the installation.

Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature is not acceptable.

The Consultants reviewed as-built shop drawings.

After completion of all systems, complete equipment, panel and cable schedules.

Review information provided in the maintenance instructions and manuals with the Owners operating personnel to ensure a complete understanding of the electrical equipment and systems and their operation.

### **Access Doors**

Wherever any item of security equipment requiring accessibility, maintenance or adjustment is concealed, ensure adequate access, or provide an Access Door and carry all cost for material and labour.

Doors shall be sized for proper and easy access, and located to suit the concealed device. In removable acoustic panel ceilings, no Access Doors are required. Use ULC labeled rated Access Doors in all fire rated walls and ceilings, which act as fire barriers and match the Door type with the ceiling or wall type and applied finish.

Submit for the Consultant's review, floor plans and shop drawings showing the size, type and exact location of all Access Doors.

All Access Doors and tiles requiring removal shall be shown on the Record Drawings.

### **Drilling**

All required drilling shall take place during off-hours. Drilling schedule is to be approved by the University of Toronto Facilities and Services Department prior to any drilling taking place.

### **Cutting and Patching**

All cutting and patching required for the installation of new equipment after Consultant's approval will be carried out by the appropriate trades at the Security Contractors expense. Prepare drawings showing the extent of the work and submit for the Consultant's approval.

Inform other Division Trade Contractors in sufficient time with regard to required openings. Where this requirement is not met, bear the cost of all cutting and patching.

In existing work, and work already finished, cutting and patching will be carried out by the appropriate trades at the Security Contractors expense. Be aware of fire rated partitions, minimize the area affected by the work. Acceptance of the finished work is at the sole discretion of the Consultant.



Painting of finished surfaces damaged by the Security Contractor or required by Security Contractor will be by an appropriate contractor at the Security Contractor's expense.

### **Sealing**

Where cables, cable tray, or conduits pass through non fire-rated floors, walls or roof, provide internal and external sealing thereto.

Comply with manufacturer's installation instructions for all sealant applications.

Refer to architectural drawings for location of fire ratings.

### **Fire Stopping**

Fire-stopping and smoke seal materials and/or systems to provide closures to fire and smoke at opening around penetrations, at un-penetrated openings, at projecting or recessed items, and at openings and joints within fire separations and assemblies having a fire-resistance rating, including openings and spaces at perimeter edge conditions shall be supplied and installed to meet the requirements of the fire and/or smoke ratings required.

### **Sprinkler proofing**

For all areas of this building that are protected by a wet sprinkler system, security equipment shall be provided for installation in such an environment.

Provide couplings with waterproof bushings when entering or exiting from top of equipment.

Provide drip shields on all DGPs.

### **Cleaning**

Clean all tubs and other surfaces that have been exposed to construction dust and dirt. Clean the insides and outsides of panel boards, splitters and other security equipment, and completely remove all debris and tools from the project.

At the end of each workday, all areas shall be cleaned and left in a tidy manner with all tools and materials stored in a provided secure area.

### **Completion of Contract**

All the equipment must be cleaned and tested, before certification of Substantial Completion by the Consultant.

From the date of issuance of final system acceptance by the Owner, all

Equipment, materials and workmanship, must be unconditionally warranted for not less than 1 (one) year, complete with 24hr/7 days a week 4 hour response time.

Defects and deficiencies that originate or become evident during the warranty period shall be



repaired or replaced, at no cost.

All work relating to the replacement of defective items shall be carried out at a time that is acceptable to the Owner.

The Contractor will assume liability for costs incurred due to these defects affecting the University operations.

### **Expediting**

Continuously check and expedite delivery of all materials and equipment required for the successful execution of the work.

If requested by Consultant, inspect at the source of manufacture, to confirm status, and submit an itemized flow chart of equipment order and delivery dates.

Continuously check and ensure that the necessary information is communicated to all parties involved.

Immediately inform the Consultant in writing of any anticipated delays.

### **Field Supervision and Workmanship**

Throughout the construction of the work, a properly qualified Superintendent must be available at all times. The Superintendent who starts the work must not be changed unless requested by the Consultant, or by the Trade Contractor with written permission from the Consultant.

Provide proper office supervision of the work. The person responsible for office supervision shall visit the site as often as necessary, to ensure work is properly performed, and attend meetings when so requested.

Submit resume of proposed supervisory staff when called upon to do so by Consultant.

Workmanship throughout shall conform to the highest standards applicable.

### **Identification**

Identify all security equipment and wiring.

All cables, wires, wiring forms, antennas, terminal blocks and terminals shall be identified by labels.

All equipment nameplates and labels shall be consistent with University of Toronto standards.

Wording on nameplates and labels to be approved by the Consultant and shall be in English.

Use nameplates for:

- Data gathering panels, indicating designation, voltage, phase, number of wires and location of feed.
- Terminal cabinets, indicating system and voltage.

Nameplates shall be Lamicoid, 3mm (1/8") thick, with a face colour to match the colour of the



equipment on which it is mounted, and a contrasting (black or white) core.

Nameplates shall be mechanically attached to equipment.

Labels shall be of the Mylar/cloth self-adhesive type, black typed, not hand written, lettering on white background, for all conduits and cables, and located at each end of the run and at junction and pull boxes.

Use coloured paint dabs on the inside of outlet box, pull box, and panel cover as it is installed. In ceiling spaces, provide colour to outside of boxes also. Paint colour to match system colours as defined in "Finishes". Paint colour code shall be as follows:

- Orange- Security System
- Green - 120-volt power

Use plastic self-adhesive tape to identify incoming utility source lines; feeders, sub-feeders and bus work in each switchboard and unit sub-station.

Tape colour code shall be as follows:

- Red - Phase A
- Black - Phase B
- Blue - Phase C
- White - Neutral
- Green - Ground

Complete all DGP directories with neat, type written list of circuit numbers and item controlled. DGP directories shall be laminated and inserted into sleeves mounted to the back of the cover of the termination cabinets.

### **Inserts, Hangers and Sleeves**

Provide hangers, inserts, sleeves and supports as required.

Refer to the applicable specification section for inserts.

Hangers shall not be welded to structural steel members and burning of holes in structural steel is prohibited.

Sleeves in new construction are to be of a type suitable for the application, and be sealed and made watertight. Sleeves through concrete shall be schedule 40 steel pipe, sized for free passage of conduit, and installed flush with underside of concrete slab and extend 100mm (4") above finished floor.

Be responsible for the installation of sleeves in accordance with the Construction Schedule.

### **Location of Devices**

Locate devices from dimensional Architectural elevation drawings or from site coordination documents prepared by the Construction Manager. Do not install devices back-to-back in walls,



but allow minimum 150mm (6") horizontal clearance between boxes.

Change location of devices, at no extra cost or credit, providing distance does not exceed 3m (10 ft.) and information is given before installation.

Where devices are shown adjacent to one another in plan but occur at different elevations, they shall be vertically aligned.

Exact location of all boxes, conduit, wiring runs, panels and devices shall be presented to the University of Toronto for approval in advance of any installation.

### **Materials and Equipment**

Materials and equipment shall be new, C.S.A. certified, and manufactured to the standards specified.

Where there is no alternative to supplying equipment that is not C.S.A. certified, Obtain special approval from the local Inspection Department.

Be aware that all equipment, whether "Base", "Approved equal" or "substitute" must fit into the space allocated. Be responsible for any increase in space requirements, due to non-conformity to the above requirement.

If a single item is specified, the specified item shall form the basis of the Bid, with no substitutes allowed.

### **Mounting of Equipment and Devices**

Mounting height of equipment is from finished floor to centre line of equipment unless specified or indicated otherwise.

Mounting heights shall conform to ODA/ADA requirements.

If mounting height of equipment is not indicated, verify with Consultant before proceeding with installation.

DGP's - Top at 2400mm (8'-0")

All equipment shall be wall-mounted with sufficient clearance to meet all applicable codes and facilitate observation and testing. Units shall be installed parallel and square to building lines.

### **Noise, Heat and Vibration**

If, during construction or the warranty period, power supplies or other material or equipment is producing excessive noise, heat or vibration, the equipment will be considered by the Consultant to not meet the specifications and these products shall be replaced without delay or additional cost to the Owner.

Connections to noise-producing and vibrating equipment must be made with flexible conduit. This includes transformers (both power and distribution), dimming equipment racks, generator set and motors.



### **Owners Equipment**

Where specified, install all equipment provided by the Owner.

Receive, store and install equipment, and accept full responsibility for it and its correct operation.

### **Panel Enclosures**

It is the contractor's responsibility to provide enclosures large enough to ensure that the wiring of the panels is done in a neat and professional manner. If the manufacturer's provided enclosures are not of a sufficient size to wire the panel in a neat and professional manner, properly sized enclosures shall be provided.

### **Permits and Fees**

Submit to the local Electrical Inspection Department, and Local Utility, the necessary number of Electrical Drawings and Specifications for examination, special inspection and/or approval, prior to the commencement of the work, and pay all costs, and associated fees. If required prepare any additional drawings/documents required by the Authority.

The Consultant will provide upon request, the required quantity of drawings and specifications. Provide Certificate(s) of Acceptance from the Authorities Inspection Department, upon completion of work.

If Maglock permits are required, include the cost of document preparation and building permit costs.

### **Plywood**

Supply and install all plywood backboards as required for this Division, and in Tele/Data Rooms as shown. Plywood shall be highest quality fire retardant fir, 1200mm wide x 2400mm high (4'-0" wide x 8'-0" high), 19mm (3/4") thick. Prime and paint backboards on both sides with fire retardant paint, equal to CGSB Spec. #1-GP-151M, of a colour to match the equipment and services mounted thereon as defined in "Finishes" above.

Plywood backboards or Unistrut are to be used for mounting the following surface wall mounted equipment thereon:

- Cabinets
- GFI Equipment
- Pull Boxes
- Security equipment

Where practical, group devices on a common backboard.



### **Emergency Power and Battery Back-up**

120VAC, 60Hz power shall be provided from the nearest emergency power electrical panel, through a junction box, to the system device, unless otherwise specified or by using a standalone APS UPS,

Breaker locking device shall be placed on all circuit breakers feeding any device, including but not limited to power supplies, connected to the security system.

### **Circuit Breakers to be installed and supplied by the University of Toronto.**

All DGP's and power supplies shall have battery backup to keep the systems fully functional for a minimum of 4 hours.

### **Progress Payments**

Submit a complete breakdown of the Contract Price with each progress billing, indicating percentage of work complete, in a form acceptable to the Owner/Consultant.

### **Protection**

Protect exposed live equipment during construction for personnel safety.

Install doors for temporary storage rooms containing the Trade Contractors non- installed security equipment. Keep these doors locked, except when under direct supervision of Electrician.

The Security Trade Contractor's qualified Superintendent shall be present for all concrete pours in order to witness and accept responsibility for protection of equipment.

### **Restrictions**

Tele/data rooms and closets are designed for tele/data, Fire Alarm and Security Data Gathering Panels (DGP's) and equipment only. Do not locate any other electrical equipment therein, nor use these rooms for risers or feeders for services except for voice and data equipment, unless specifically shown on the drawings.

### **Temporary Service**

If required, others shall provide a temporary electrical service.

Provide extension cords, extension lighting and equipment required for the work of this trade.

### **Valuation of Changes**

The Consultant will scrutinize submissions and therefore require complete detailed itemization of all material, labour, unit prices and overhead and profit mark-ups.



### **Voltage Ratings**

Operating voltages shall be as indicated in C.S.A. C235.

### **Warning Signs**

Provide warning signs, as specified to meet requirements of Ministry of Labour Safety Inspection, Inspection Department, Authorities having jurisdiction and Consultant.

Use decal signs, in English minimum 750mm x 250mm (7" x 10") in size as required by Authorities.

On all system enclosures where potential over 70V is present.

### **Wire Pulling Lubricant**

Lubricant shall be non-corrosive and CSA approved for the type of cable used.

Lubricants shall be soap or wax based, depending upon application. Use soap based for short runs and for semi-conducting insulated wires, and wax based for long runs.

### **Unit Prices**

Unit pricing, when submitted, shall be used for the addition or deletion of the items as stated. When changes are issued, the change will be priced in reference to the difference of the change not the unit price. (I.e. Door type on a door in the contract changes to another door type, devices that are similar between the door types are not deleted then added, only the sum difference between the door types will be priced.)

End of Section



## 16702 Conduits, Boxes, Fasteners and Fittings

### GENERAL

#### Reference

Read and be governed by the Security System General Requirements Section.

#### Related Work

Comply with relevant Sections of this and other Divisions as required.

### PRODUCTS

#### Conduits

Rigid Metal and Epoxy Coated Conduit shall be threaded, galvanized steel and shall be manufactured to CSA C22.2 No. 45.

Electrical Metallic Tubing (EMT) and couplings shall be manufactured to CSA C22.2 No. 83. Couplings shall be steel setscrew type.

Rigid PVC Conduit shall be manufactured to CSA C22.2 No. 136.

Flexible Metal and Liquid-Tight Flexible Metal Conduit shall be manufactured to CSA C22.2 No. 56.

Rigid PVC Conduit shall be manufactured to CSA C22.2 No 211.2.

Conduit accessories, conduits and fittings shall conform to CSA C22.2 No. 18.

Explosion-proof flexible metal conduit shall be manufactured in compliance with the category (Class) of protection required.

#### Conduit Fastenings

For Rigid or EMT conduit, one-hole steel straps to secure surface conduits 50mm and smaller. Two-hole steel straps shall be used for conduits larger than 50mm.

For PVC conduit two-hole heavy-duty straps shall be used.

Beam clamps to secure conduits to exposed steel work.

Channel type supports for two or more conduits.

Six mm diameter threaded rods to support suspended channels.

#### Conduit Fittings

Fittings shall be manufactured for use with conduit specified. Coating shall be same as conduit.

Bushing and connectors shall be with nylon-insulated throats.

Provide knockout fillers to prevent entry of foreign materials.



Use conduit outlet bodies for conduit up to and including 32 mm (1-1/4") and pull boxes for larger conduits.

Provide double locknuts and insulated bushings on sheet metal boxes.

Factory "ells" where 90° bends are required for 25 mm and larger conduits.

Steel set screw or rain tight insulated steel connectors and couplings for EMT.

Explosion-proof fittings shall be manufactured in compliance with the category (Class) of protection required.

### **Expansion Fittings**

Weatherproof expansion fittings with internal bonding assembly suitable for 200 mm linear expansion.

Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19mm deflection in all directions.

Weatherproof expansion fittings for linear expansion at entry to panel.

### **Device and Conduit Boxes – General**

Boxes shall be suitable for the utilization voltage.

Combination boxes shall have barriers where outlets for more than one system are grouped.

Recessed 100 mm (4") square or larger outlet boxes shall be complete with single or ganged plaster rings to suit application.

### **Sheet Steel Device Boxes**

Electro-galvanized steel single and multi-gang device boxes for flush installation, shall be minimum size 75 mm x 50 mm x 37 mm (3" x 2" x 1-1/2") unless otherwise specified or required. 100 mm (4") square outlet boxes shall be used when more than one conduit enters one side, with extension and plaster rings as required.

Boxes for door switches and push buttons shall be sized as required.

Utility boxes for connection to surface mounted EMT conduit, shall be minimum 100 x 54 x 48 mm (4" x 2-1/8" x 1-7/8") size.

Square or octagonal outlet boxes for lighting fixture outlets, shall be minimum 100 mm (4") size.

Square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster or tile walls, shall be minimum 100 mm (4") size.

### **Masonry Boxes**

Electro-galvanized steel masonry single and multi-gang MBD boxes shall be used for flush mounted devices in exposed block walls

### **Concrete Boxes**



Electro-galvanized sheet steel concrete boxes shall be used for flush mounting in concrete, with matching extension and plaster rings as required.

### **Conduit Boxes**

Cast FS or FD ferroalloy boxes with factory-threaded hubs and mounting feet shall be used for outlets connected to surface mounted rigid conduit.

### **PVC Boxes**

F Series and octagon boxes shall be moulded type, with fastening ears and screw-secured covers as required.

### **Fish Cord**

Pulling cables shall be Polypropylene and of a strength suitable for tension to be pulled.

## **EXECUTION**

### **Location of Conduit**

All conduit and wiring shall be concealed.

Asbestos may be present in any and all locations. Ensure proper installation methods are followed for work in areas that are deemed to have asbestos. If it is unclear whether asbestos is present, it is the contractor's responsibility to test the area or conduct the work required as if asbestos is present.

The typical standard drawings do not indicate all conduit runs. Those indicated are in diagrammatic form only.

### **Installation**

The conduits for the following circuits and systems shall be run separately:

- CCTV
- Access control & Burglar
- Intercom
- Power

Install all wiring, including but not limited to branch circuit and signal wiring, in surface mounted EMT conduit in ceilings, furred spaces, and in hollow walls and partitions, unless otherwise specified. Install surface mounted wire mold in finished surfaces as specified.

Rigid PVC conduit shall be used throughout below grade areas and may be used under slab on grade areas. Do not use PVC conduits in slabs below or above grade. All conduits shall be surface mounted to minimize risks of future damage when core drilling during future renovations.



Use rigid galvanized steel conduit for wiring where conduits are exposed to possible mechanical damage.

Use PVC conduit for wiring in poured concrete.

Use epoxy coated rigid galvanized steel conduit for wiring in corrosive areas.

Flexible steel conduit is permitted for the final connection to devices mounted in suspended ceilings from the branch wiring junction box above, with flexible conduit length not to exceed 3 m (10'), and be neatly installed and attached to device support. Flexible conduit and armored cable will be accepted in parts of existing building, where furred spaces above ceilings are too congested to permit conduit to be installed, but only with Engineer's written permission. Terminate armored cable, where shown, in accordance with the manufacturer's recommendations.

Use liquid tight flexible metal conduit for connection to vibrating equipment.

Use explosion proof flexible connection for connection to explosion proof devices.

Aluminum conduits shall not be used

Runs of conduit and cables, where shown, are indicated only by general location and routing. Install conduits and cables so as to provide maximum head room and to interfere as little as possible with free use of spaces through which they pass. They shall be installed as close to building structure as possible such that, where concealed, necessary furring can be kept to a minimum.

Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.

Arrange conduits, installed in suspended ceilings, to provide minimum interference with removal of tiles.

Conduit shall be of sufficient size to permit easy removal of conductors at any time. Conduit sizes, where shown, are minimum and shall not be reduced.

Where existing locations of flush mounted electrical devices correspond to new devices shown, the existing down drop conduit and outlet box may be re-used. Provide new devices, new cover plates, new home-run conduit and complete new wire.

Vertical raceways to be provided with insulated cable support bushings or other approved method of supporting the weight of the cable, where vertical runs exceed those of Table 21 of the Electrical Code or where indicated.

Install conduit-sealing fittings in hazardous areas and fill conduit with compound.

Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.

Mechanically bend steel conduit over 19mm (3/4") dia.

Field threads on rigid conduit shall be of sufficient length to draw conduits up tight.

Run 2-25 mm (1") spare conduits up to ceiling space and 2-25 mm (1") spare conduits down to ceiling space from each flush panel. Terminate these conduits in 150 x 150 x 100 mm (6" x 6" x 4") junction boxes in ceiling space or in case of an exposed concrete slab; terminate each conduit in flush concrete type box.



Where conduits become blocked, remove and replace blocked section. Where a block conduit is buried in concrete, abandon it and provide surface mounted conduit, to be located as determined by the Consultant. Do not use liquids to clean out conduits.

Conduit manufacturer's touch up enamel shall be used to repair all scratches and gouges on epoxy-coated conduit.

Install junction boxes or cable anchor boxes wherever necessary for proper pulling or anchoring of cables. Install so as to be accessible after building is completed and set to come within finished lines of building.

Where EMT, PVC or rigid PVC is used or where indicated, run green insulated ground wire in conduit, with minimum one ground conductor per three ungrounded conductors.

Provide expansion couplings, with bonding jumper and ground clamps where raceways cross building control joints.

Install fish cord in empty conduits.

Dry conduits out before installing wire.

Conduit fills shall not exceed forty percent (40%).

### **Surface Conduits**

Run parallel or perpendicular to building lines.

Locate conduits behind infrared or gas fired heaters with not less than 1.5m clearance.

Run conduits in flanged portion of structural steel.

Group conduits wherever possible on suspended or surface channels.

Do not pass conduits through structural members except as indicated.

Do not locate conduits less than 75 mm (3") parallel to steam or hot water lines with minimum of 25 mm (1") clearance at crossovers.

### **Concealed Conduit**

Do not install horizontal runs in masonry walls.

Do not install conduits in terrazzo or concrete toppings.

### **Conduits in Cast-in-place Concrete**

Conduits shall not be buried in slabs unless specifically noted otherwise.

Where permitted, locate to suit reinforcing steel. Install in centre one third of slab and ensure that conduits are completely encased in a minimum 50 mm (2") of concrete. Organize conduits in slab to minimize crossovers.

Protect conduits from damage where they stub out of concrete by transitioning to manufactured rigid conduit elbows or by the use of junction boxes and extension rings.

Install sleeves where conduits pass through slab or wall.

Where conduits pass through waterproof membrane provide oversized sleeve before



membrane is installed. Use cold mastic between sleeve and conduit.

Do not place conduits in slabs in which slab thickness is less than 4 times conduit diameter.

### **Conduits in Cast-in-place Slabs on Grade**

Run conduits 25 mm (1") and larger below slab and encased in 75 mm (3") concrete envelope. Provide 50 mm (2") of sand over concrete envelope below floor slab.

### **Conduits Size**

The minimum conduit size to be used is 19mm (3/4").

### **Boxes**

Support boxes independently of connecting conduits.

Fill boxes with paper, foam sponges or similar approved material to prevent entry of construction material.

Size box wiring chambers in accordance with Electrical Code.

Gang boxes together where wiring devices are grouped.

Provide matching blank cover plates for boxes without wiring devices.

Use combination boxes where outlets for more than one system or voltage are grouped.

For flush installations, mount outlets flush with finished wall using plaster rings to permit wall finish to come within 5 mm (1/4") of opening.

Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

END OF SECTION



## 16703 Security System Wiring

### GENERAL

#### Reference

Read and be governed by the Security System General Requirements Section.

#### Related Work

Comply with relevant Sections of this and other Divisions as required.

#### General Requirements.

The purpose of this document is to specify installation standard of the wiring system for the Card Access, CCTV, Security and Intercom Systems for the University of Toronto security projects.

The contractor shall provide conduits, wire ways, back boxes for all components and interconnecting wiring.

The contractor shall provide coordination and interfacing with the supplier of the architectural hardware.

#### Summary of Work Included

Provide and test the installation of the cabling for the card access, CCTV, security and intercom systems to provide complete and functioning systems.

The system shall include connection to architectural hardware devices and field devices as shown on the Drawings.

All wiring and connection to interfacing systems, including but not limited to, fire alarm, closed circuit television, intercom, door hardware and door operators shall be provided and coordinated with the appropriate contractors.

The quantities of components shall be determined and installed based on the requirement to provide a complete and fully operational wiring infrastructure for Security System, as per the intent of the specification, and as shown on the drawings and recommended by the manufacturer.

### PRODUCTS

#### Quality Assurance

#### Manufacturer Qualifications

#### Standard of Acceptance



Belden  
Honeywell  
PCSC

## EXECUTION

### Installation

The security system wiring classification and installation for the trunk cabling between the central equipment, converter panels, card reader controllers and remote alarm terminals shall be Class "B".

All cables are to be FT4 in a conduit unless specifically identified otherwise.

Where specifically called for, cables not installed in conduit shall be FT6 rated.

All cables to comply with the equipment manufacturer specifications. All signal cables for the security system shall be cables with individually shielded pairs of twisted and multi-strand wires unless otherwise specified by the manufacturer. All shield wires to be grounded at one end of the cable. All unused wires in a cable to be grounded at one end of the cable.

All cabling shall be continuous and free of splices. Cables may only terminate at point of final connection with the exception of approved patch panels.

Cables shall not enter any box or equipment enclosure, unless the cables are terminated in that enclosure. Designated pull boxes are exempt from this requirement and shall not have any terminations or splices made in the pull box.

Cables, cable bundles or wire bundles shall be clamped at least once between the point of cabinet entry and the connecting point.

Wires and cables, with the exemption of conduits and ducts, shall be combined into bundles wherever possible and shall be secured by means of flat lacing cord, nylon tie wrap, or other means acceptable to the Consultant. Self-adhesive cable clamps or cables anchors are not acceptable.

Cable ties shall prevent slippage and at the same time shall not deform the cable insulation or determine insulation cold flow.

Where nylon tie wraps are used, tails should be cut flush with no exposed sharp ends.

Bundled wires and cables shall be parallel to one another and shall not entwine other conductors or cables. This requirement should not be construed as prohibiting the use of twisted pairs, where required. Branched leads may cross other conductors if required.

All cabling shall be home run from the device to the termination panel. No field interconnection will be allowed. The only exception is multiple doors that share common mullions and are designated by a single door typical.

Cable size and length shall meet the manufacturer's recommendations and all applicable codes and standards.

All termination points, including but not limited to screw type terminals, shall be rated to accept



gauge of wire to be terminated.

No more than 2 cables shall terminate in each screw type terminals. Where more than 2 cables are required to terminate at the same point, additional termination blocks shall be added to conform to the 2 cables per termination point.

Marrette type connectors shall not be used. Connectors shall be crimp connectors.

Install, the wiring system and integrate the system as indicated in this specification. Where information is not available from the University of Toronto upon request, the worst-case condition must be assumed to ensure a complete, functional system.

End-of-line resistors shall be located at the device. End-of-line resistors shall not be located in termination panels.

Install wire parallel and square with building lines, including raised floor areas.

Protect cable ends at all times with acceptable end caps except during actual termination.

Coaxial cable shall not be subjected to any bend less than a 150mm (6") radius.

The Cables for PTZ control shall not be daisy-chained.

All field installed BNC connectors to be type 3-piece-crimp or Compression fit connectors Twist-on connectors are not acceptable.

Provide communications wiring UTP or fibre optics cable for connection to the University Campus Police monitoring system. Termination hardware and patch panels shall be provided in coordination with the University.

Fibre optic cable shall not be subjected to any bend of less than a 200mm (8") radius.

Fibre optic cable shall be provided with guides and tie-downs on termination boards so that when terminated to the transmitter or receiver, each individual fibre shall be protected from inadvertent movement or impact that would exceed design tolerances and potentially damage the fibre.

Protect wire and cable from kinks.

Provide grommets and strain relief material where necessary, to avoid abrasion of wire and excess tension on wire and cable.

All card readers shall be wired with a cable with a minimum of 6 conductors, excluding any grounding conductors.

All network cabling to be provided as shown on the contract drawings shall be a minimum of Cat5e.

## **Testing**

Test for ground loops that may result from use of different power sources for various components.

All equipment shall be securely fastened with appropriate fittings to ensure positive grounding and be free of ground loops throughout the entire system.

After installation, and before termination, all wiring and cabling shall be checked and tested to insure there are no grounds, opens, or shorts on any conductors or shields. All test results shall



**University of Toronto**  
Security and Access Control System  
Specification  
Rev. 5.0

Section 16703  
Security System Wiring  
Page 4 of 4

be documented and submitted with the as-built documentation.  
Visually inspect wire and cable for faulty insulation prior to installation.

**Identification And Tagging**

Refer to Section 16700

End of Section



## 16710 Access Control Systems

### GENERAL

#### Reference

Read and be governed by the Security System General Requirements Section.

#### Related Work

Comply with relevant Sections of this and other Divisions as required.

#### Overview

All burglar and the PCSC Fault Tolerant door access system hardware and software must be 100% compatible and fully integrated with the EBI system software installed by Honeywell and operated by the University of Toronto Police.

The University has already purchased and installed the EBI server software, database and completed installation of door access hardware components at existing campus locations.

Installation of additional door access system components must fully meet the specifications of the existing EBI installation and integrate seamlessly with that system.

The access control system shall allow for interfaces with other systems including, but not limited to, the burglar alarm, intercom, fire and CCTV systems.

The burglar alarm system shall allow for interfaces with other systems including, but not limited to, the access control, intercom, fire and CCTV systems.

The burglar alarm system hardware and software must be 100% compatible and fully integrated with the EBI system software installed by Honeywell and operated by the University of Toronto Police and/or to the FBII CP220 Central Station Receiver.

#### Fault Tolerant Access Control System Specifications:

The access control system must be capable of performing the following tasks with the EBI system:

Allow or deny the unlocking of a locked entrance based on criteria established in the software for individual cardholders.

Record a log file of all system activity, including door access granted and denied, alarms, system messages, and data maintenance.

Allow monitoring of the overall system for functionality and alarms from multiple points. System will require and record alarm acknowledgments by operator.

Utilize the campus TCP/IP network for communications between controllers and the central database.

Provide security of the door, even in the event communication is lost to the main database,



allowing the door to continue to recognize which cards to grant access to, and continuing to record access transactions.

Allow proper egress in emergency situations such that no special knowledge or card is required to exit a space.

Must comply with OBC and other standards of the campus.

Provide for a Guard Tour feature to record the rounds of security personnel, including alarming if a guard check-in is overdue or missed.

Allow for central administration of the access control database for purposes of populating and maintaining the overall database, while allowing numerous secured users to grant or deny access for individuals from multiple workstations around the campus.

Allow for unattended scheduled unlocking of individual doors for a sustained period of public access.

System capability (as part of its own application), to digitally record cameras associated with alarm events as well as pre and post alarm images, with the ability to review the camera images as part of the alarm log on the workstation. The digital video recording would take place on separate networked recording units with video capture devices allowing for up to 16 cameras recorded per computer. It must be possible to select video files by, date or range of dates, and by the hour or hour range, or by the video file name, as well as in association with an alarm event.

System capability to view live video on any workstation via the network or through a separate video input to the computer.

The main system must be an on-line type system, where data is exchanged between the central server and the readers via the campus network and other wiring.

The system must fully and completely integrate with the EBI door access system manufactured by Honeywell.

## PRODUCTS

### Access Control System

The access control system will be a PCSC Fault Tolerant system consisting of SDM (single door reader) and DDM (double reader doors) controllers and a Main Controller.

#### FT Main Controller

- Automatic hot cutover
- fail safe operations
- open system platform
- open architecture protocol
- Ethernet/PoE communication
- peer to peer communications
- auto alternate communication routing



- access action for disabled persons
- onboard rechargeable battery circuit
- user selectable input monitoring modes

The SDM FT Controller (located at the door) has the following features:

- 32 Bit CPU
- onboard PoE communication
- 1 Weigand Reader port
- 1 door lock form C relay output
- 1 Rex Input
- 1 door position input
- 1 powered lock output

The DDM FT Controller (located in a locked room) has the following features:

- 32 Bit ARM Processor and Architecture
- on board Ethernet communication
- PoE connection
- Flash memory
- 3 communication ports
- Seven segment status display
- Host online notification
- tamper
- Battery charger output
- electronically Protected power input
- 5 state alarm monitoring
- 2 Weigand reader ports
- 2 door lock form C relay outputs
- 2 Rex Inputs
- 2 door position inputs
- 2 alarm shunt outputs
- 4 voltage outputs
- 4 sense inputs
- powered lock output

The controllers shall be fitted with memory expansion to handle a minimum of 25,000 cardholders.

Upgrade modules shall provide supervised inputs. Non-supervised input modules shall not be used.



Elevator access controls DGP's shall be PCSC IQ ELV series controllers.

Control panels shall be within a key locked enclosure with a tampered cover to be monitored as a separate input.

### **Proximity Cards/Fobs**

HID iClass Cards and Fobs will be supplied by the University

### **Card Readers**

Card Readers, where wall mounted, shall be HID iClass R40 Proximity card readers.

Card readers shall be wired to ensure that the panel supervises the reader. It is the contractor's responsibility to ensure that the proper number of cables are supplied to provide this supervision if the number of conductors specified is insufficient for the proper installation.

Card readers, where installed beside the doors or on mullions, shall be HID iClass R10 Proximity card readers.

Doors surrounded by glazing shall have mullion mounted card readers.

Audible alert integral to the card reader shall be connected and shall annunciate when the door is in both "Door Held Open" and "Door Forced Open" alarm conditions.

Request to Exit (REX) will be in the handle or push bar of the lock.

In exceptional circumstances and only with the written approval of the manager, security systems, a REX may be installed above the door on the secure side as below.

REX motion detectors shall be passive infrared technology and equipped with an adjustable relay timer, a cover tamper switch and an adjustable vertical and horizontal area of detection.

REX motion detectors shall be Kantech T-Rex model #T.REX-LT or approved equal.

REX motion detectors shall be monitored as a separate input and shall not be interconnected to the door contacts to be bypassed so that the request to exit is a controller-based decision.

Detectors shall have a tampered cover that is monitored as a separate input unless using the PCSC FT SDM or other controller that is not equipped with an extra input.

### **Door Contacts (Person Doors)**

Door contacts shall be Sentrol 1078T 1" door contact or approved equal.

All door contacts shall be concealed unless otherwise approved by the consultant.

Door contacts shall be of a colour to match the colour of the doorframe where possible. This information must be provided at the design stage or the standard white contacts will be provided

### **Door Contacts (Overhead Doors)**

Door contacts shall be Sentrol 2200 Series door contact or approved equal.

### **Key Switch Bypass (Overhead Doors)**



Key switch bypass shall consist of a tubular key and a lock switch that is maintained ON/OFF (DISARMED/ARMED) with the key removable only in the OFF (ARMED) position.

Key switch shall be monitored as a separate input and shall not be interconnected to the door contacts to be bypassed so that the bypass is a controller-based decision.

### **Motion Detection (Interior Area Protection)**

Motion detectors shall be dual technology consisting of both passive infrared and microwave technologies and shall be Honeywell Dual Tec Series detectors or approved equal.

Detectors shall have a tampered cover that is monitored as a separate input.

Detector model maximum coverage area shall be suitable to cover intended area unless otherwise specified.

### **Glass Break Detectors**

Glass break detectors shall be acoustic technology with a maximum range of 15 feet and shall be Honeywell FG-1625 Glass break or approved equal.

Glass break detectors shall be tested and approved for installation with 3M security window film.

Glass break detectors shall be mounted between 10ft to 12 feet from the windows they are intended to protect.

Detectors shall have a tampered cover that is monitored as a separate input.

### **Duress Buttons**

Duress buttons are not used on the St. George Campus.

### **Electrified Locking Devices (Door Hardware)**

All electrified locking devices shall be fail secure devices and shall be wired in a fail secure manner during a panel and/or power failure.

When using the PCSC FT SDM, lock status is not monitored. With the approval of the Manager, Security systems and Services, in high security applications, electrified locking devices shall be fitted with lock status monitors and monitored as a separate input.

Doors equipped with a mechanical or electrical crash bar/panic set shall have a request to exit switch integral to the door hardware. Doors with all other types of locking hardware shall incorporate a Request to Exit Motion Detector.

The University standard is to supply crash bars/panic sets on all exterior doors unless otherwise specified.

All hardware not supplied by the University of Toronto shall conform to the University of Toronto Door Hardware standards.

## **EXECUTION**



### **General Responsibilities and Requirements**

The quantities of components shall be determined and installed by the Security System Contractor based on the requirement to provide a fully operational Security System, as per the intent of the specification, and as shown on the drawings and recommended by the manufacturer.

Controllers shall be filled to a maximum of 75% of the maximum card reader capacity to allow for future expansion. Required inputs and outputs for each spare reader port to complete fully functional access door, as described in the specifications, are to be left spare as well.

All hardware mounted in exterior locations must be weather resistant and designed to maintain the aesthetic beauty of the campus.

Hardware must be durable enough to withstand high traffic locations without frequent failure.

Devices must be hardwired, with all wiring installed in conduit in accordance with written university standards for access system installation. The conduit system and cabling installed must be distinct and separate from the wire way/conduit system housing other systems cables in campus buildings.

Connections to devices must be secured, so that no cords may be easily disconnected from the devices and no cords are left exposed to unauthorized tampering.

The access control panels shall operate on TCP/IP communications protocol unless otherwise noted on the contract drawings that RS-485 communication may be implemented.

The Ethernet communication configurations shall be standard.

All control panels shall operate in local and remote configurations.

When allowed, RS-485 multi-drop total distance shall be 4,000 feet with a maximum of 16 control panels, without the use of modems or line drivers. If installation requires distances greater than listed above, a line driver or modem shall be used, after approval by the consultant.

All control panels shall provide a 12 VDC back-up battery for up to four hours of operation upon loss of AC power. The control panel shall provide a super capacitor to retain database information for up to seven days upon loss of power.

All controllers shall be equipped with the most current firmware available at the time of substantial completion.

All visible or easily accessible screws shall be tamper proof.

When centralized control panels are used, inputs shall employ double end of line resistors.

### **System Design**

All doors deemed as entry and/or exit doors shall be equipped with, as a minimum, an electrified locking device, door contact and a request to exit signaling device.

All entry and exit doors shall report both door forced open and door held open alarms.

All access control doors shall be equipped with a University supplied key override, so that in the event of a system failure access can be obtained.



All elevators shall be equipped with a card reader to allow/restrict access to all floors to allow the elevator to be locked down remotely. Floor monitoring is not required.

No interconnecting of devices will be allowed unless otherwise specified. All decisions shall be controller based.

Overhead doors are to be equipped with a door contact and key switch bypass.

Lock power and control panels are to have separate power supplies.

All power supplies are to be sized to accommodate the equipment to be powered and shall conform to manufacturer's installation recommendations.

Power supplies shall be loaded to 70% of the available ampacity of the power supply unless specifically designed for a single device to be connected to the power supply.

It is the contractor's responsibility to provide all interconnection and wiring to existing equipment already installed on site including, but not limited to, auto door openers and actuator buttons.

Doors with auto openers shall be interfaced so that the locking device is disengaged (unlocked) prior to the auto door opener attempting to open the door so as to avoid motor burnouts.

Burglar panels shall be able to be programmed to transmit alarm information in Contact I.D. format.

End of Section



## **16711 Surveillance System**

### **GENERAL**

#### **Reference**

Read and be governed by the Security System General Requirements Section.

#### **Related Work**

Comply with relevant Sections of this and other Divisions as required.

#### **Overview**

All Surveillance system hardware and software must be 100% compatible and fully integrated with the HDVM system software installed by Honeywell and operated by the University of Toronto Police.

The University has already purchased and installed the EBI server software, database and completed installation of camera hardware components at existing campus locations.

Installation of additional Surveillance system components must fully meet the specifications of the existing HDVM installation and integrate seamlessly with that system.

The Surveillance system shall allow for interfaces with other systems including, but not limited to, the access control, burglar alarm, intercom, and fire systems.

Each building shall be designed as a stand-alone system with a HDVM server and software supplied by the University and sized to accommodate the number of cameras to be installed. The server will be connected to the Private Security Network so that the University of Toronto Police may view selected video over the network.

Sites with a single camera to be installed may be connected to the main HDVM system by approval of the University of Toronto Police only.

Signs will be provided to the project by Campus Police (St. George Campus) and must be erected in the area where video surveillance is being conducted. No other sign may be used and no camera may be mounted without prominently displaying the sign.

### **PRODUCTS**

#### **Overview**

The CCTV system shall be designed and installed such that no tearing, rolling or distortion is observed on any monitor. There shall be no degradation of this requirement when the system operates through the video switcher / controller.

Cameras installed with light fixtures or similar bright objects in the field of view shall not exhibit blooming or any loss of overall picture quality.



Under normal operating conditions, the overall system performance shall meet or exceed the following minimum requirements:

- Signal to noise ratio: 50 dB
- Cross Modulation Index: 50 dB
- R.F. Isolation (Between Video Circuits): 50 dB
- Non-Linearity: Less than 5%
- System Resolution: 1280 by 960 to 160 x90

All equipment and materials used shall be standard components that are regularly manufactured and utilized in the manufacturer's system.

All cameras and housings within a site/building shall be from a single manufacturer and the aesthetics of all cameras installed within a site/building shall be similar.

### **Manufacturers**

Cameras shall be manufactured by:

- AXIS
- Honeywell
- Lenses shall be manufactured by:
- Axis Communications

### **Video Servers**

- Video servers shall have following capabilities:
- Transmit high quality video at a rate of 20 frames per second in all resolutions
- Resolution options up to 1280x960 min. and numerous compression levels.
- Support for PTZ units.
- Video servers shall be Axis Q74 for a single camera for up to 16 cameras.

### **Lenses**

Lenses for cameras that are not part of an integral camera and housing package shall be varifocal lenses with remote focus and zoom, P iris control, IR corrected, megapixel resolution and sized to fit the intended field of view.

Fixed Surveillance Domes (indoors)

The Axis P33 Network cameras shall have Lightfinder technology, Wide Dynamic Range-capture, built in IR Illumination, P-Iris control.

Models include:

- P3365V-2 MP
- P3346V
- P3384V-3 MP



**Image Sensors:**

P3354/P3364-V/P3364-LV/P3384-V progressive scan

**Lens**

Varifocal, remote focus and zoom, P-Iris control, IR corrected, megapixel resolution.

P3354/P3364-V/P3364-LV 6 mm; 2.5-6mm, 105-49 view, F1.2

P3354/P3364-V/P3364-LV 12 mm; 3.3-12mm, 82-24 view, F1.4

P3384-V/P3346/P3346-V/P3367-V; 3-9mm, 84-30 view, F1.2

P3365-V; 3-9 mm, 100-35 view, F1.3

**Minimum Illumination**

0.08 lux

**Video Compression**

H.264 Baseline and Main profile (MPEG-4 Part 10/AVC, Motion JPEG

**Resolution**

P3354/P3364-V/P3364-LV/P3384-V 1280x960 –approx.1.3 MP to160x90

P3365-V; 1920x1080-2MP to 160x90

P3346/P336-V: 2048X1536 -3MP to160-90

P3367-V: 2592 x 1944 -5 MP to 160x90

**Frame rate**

P3354/P3364-V/P3364-LV/P3365-V/P3384-V 25/30fps with power line frequency 50/60

P3346/P3346-V: 3MP capture mode: 20fps in all resolutions, HDTV 1080p (1920x1080 and 2MP 4:3 1600x1200 capture modes: 30 fps in all resolutions.

P3367-V: 5MP capture mode: 12 fps in all resolutions and capable of all P3364/-V capture modes.

**Video Streaming**

Multiple, individually configurable streams in H.264 and Motion JPEG. Controllable frame rate and bandwidth VBR/CBR H.264.

**Pan Tilt Zoom (PTZ) Interior Cameras**

The product specified shall be a high speed domed camera system available in pendant or suspended ceiling mounted versions designed for indoor surveillance applications. The camera system consists of an integrated color CCD camera with a 1/4-inch imager and a 16X (4.1 mm-65.6 mm) auto-iris, auto-focus zoom lens; a variable/high speed, 360° pan/tilt unit; and an intelligent, integral receiver/driver. This camera system is compatible with the Philips/Bosch



Allegiant series switcher/controller and the System4 Video Management System.

The camera shall accept Philips/Bosch Biphase camera control codes or customer programmed control code protocol via an RS232 input.

The camera shall provide a Fast Address feature to allow the camera address number to be remotely programmed from the system keyboard without the need to set address dip switches in the camera. The camera shall be compatible with the Philips/Bosch Allegiant Switcher/Controller having CPUs version 5.2 or newer and controlled via Philips/Bosch variable speed keyboards.

The camera shall be equipped with an 16x optical zoom lens.

To ensure optimal zoom control, the camera shall provide a scaling function that automatically adjusts the speed of the pan or tilt movement dependent upon the field of view of the lens. When the zoom lens is set for wide angle field of view, the joystick of the controller keyboard will allow the speed of the pan and tilt to operate faster than when the lens is set to a narrow zoomed in field of view. Slower pan and tilt speeds when the lens is zoomed in provides for more controlled target tracking by the operator.

The camera's 360° pan rotation shall be divided into 16 independent sectors. Each sector may be titled with up to 16 characters. Any or all of the 16 sectors may be blanked from the operator's view when viewing restrictions are required.

The camera shall allow the storage of up to 99 preset scenes with each preset programmable for 16 character titles. A tour function shall be available to consecutively display each of the preset scenes for a programmed dwell time. Any or all of the presets may be included in or excluded from the tour.

The camera shall be capable of recording two (2) separate tours of an operator's keyboard movements consisting of, tilt, and zoom activities for a total combined duration time of 15 minutes. Recorded tours may be continuously played back.

When an operator stops manual control of the camera, and a programmed period of time is allowed to expire, the camera will execute one of the following programmable functions:

- return to preset #1
- return to the automated tour previously executed
- do nothing.

The camera shall ensure that any advanced commands required to program the camera are accessed via three levels of password protection ranging from low to high security.

The camera system shall provide a feature that automatically rotates, or pivots, the camera to simplify tracking of a person walking directly under the camera.

The camera shall be supplied as standard product with a tinted viewing bubble, but an optional clear viewing bubble shall be available as required by the application.

The camera shall be offered in suspended ceiling or pendant mounted versions as required by the application.

The pendant mounted versions shall be available in white or charcoal colors. Wall mount and pipe mount kits shall be available for pendant mounted units.



## EXECUTION

### **General Responsibilities and Requirements**

Supply and install all fittings and accessories, whether or not they are specified, required for proper, safe and reliable operation of the system.

A preposition shall be programmed for every alarm trigger that is visible in the field of view of the camera.

All fields of view shall be approved by the Owner and/or the Owner's Representative prior to final testing.

End of Section



## **16712 Intrusion Systems**

### **GENERAL**

#### **Reference**

Read and be governed by the Security System General Requirements Section.

#### **Overview**

All burglar and door access system hardware and software must be 100% compatible and fully integrated with the EBI system software installed by Honeywell and operated by the University of Toronto Police.

The University has already purchased and installed the EBI server software, database and completed installation of door access hardware components at existing campus locations.

Installation of additional door access system components must fully meet the specifications of the existing EBI installation and integrate seamlessly with that system.

The access control system shall allow for interfaces with other systems including, but not limited to, the burglar alarm, intercom, and fire and CCTV systems.

The burglar alarm system shall allow for interfaces with other systems including, but not limited to, the access control, intercom, and fire and CCTV systems.

The burglar alarm system hardware and software must be 100% compatible and fully integrated with the EBI system software installed by Honeywell and operated by the University of Toronto Police and/or to the FBII CP220 Central Station Receiver.

### **PRODUCTS**

#### **Intrusion System Specifications**

The control panel shall be the ADEMCO VISTA-128BPT Commercial Burglary Partitioned Security System or equivalent.

#### **System performance**

**Control Panel** - The control panel shall be an eight (8)-partition, UL commercial burglary control panel that supports up to 128 zones using basic hardwired, polling loop, and wireless zones. It shall also provide supervision of the bell output, RF receivers, and relay modules. In addition, the control shall provide the ability to schedule time-driven events, and allow certain operations to be automated by pressing a single button. The system shall be capable of interfacing with an ECP long range radio (LRR) unit that can send Contact ID messages, and alphanumeric paging devices. The control shall provide integrated access control and CCTV -switching capability.

**Basic Hardwired Zones** - The control shall provide nine (9) hardwired zones with the following



characteristics:

- EOLR supervision (optional for zones 2-8): Shall support N.O. or N.C. sensors (EOLR supervision required for UL installations).
- Individually assignable to one of eight (8) partitions.
- Supports up to 16 two-wire smoke detectors on one selected zone.
- Supports four-wire smoke or heat detectors on any zone (power to four-wire smoke detectors must be supervised with an EOL device).
- Supports up to 50 two-wire latching glass break detectors on one selected zone.

#### Optional Expansion Zones

**Polling Loop Expansion** - The control shall support up to 119 additional hardwire zones using a built-in two-wire polling (multiplex) loop interface. The polling loop shall provide power and data to remote point modules, and constantly monitor the status of all zones on the loop. Maximum current draw shall not exceed 128 mA. The polling loop zones shall have the following characteristics:

- Interface with RPM (Remote Point Module) devices.
- Individually assignable to one of eight (8) partitions.
- Supervised by the control panel.
- A 12,000 ft. (3658 m.) wire runs capability without using shielded cable.
- Each RPM (Remote Point Module) enclosure shall be tamper protected.

**Wireless Expansion** - The control shall support up to 128 wireless zones using a 5800 series RF receiver (fewer if using hardwire and/or polling loop zones). Wireless zones shall have the following characteristics:

- Supervised by control panel for check-in signals (except certain non-supervised transmitters).
- Tamper-protection for supervised zones
- Individually assignable to one of eight (8) partitions.
- Supports wireless devices listed for Commercial Burglary using the 5881ENHC RF Receiver.

**Partitions** - The control shall provide the ability to operate eight (8) separate areas, each functioning as if it had its own control. Partitioning features shall include:

- A Common Lobby partition (1-8), which can be programmed to perform the following functions:
  - Arms automatically when the last partition that shares the common lobby is armed.
  - Disarms when the first partition that shares the common lobby is disarmed.
- A Master partition (9), used strictly to assign keypads for the purpose of viewing the status of all eight (8) partitions at the same time (master keypads).



- Assignable by zone.
- Assignable by keypad.
- Assignable by relay to one or all eight (8) partitions
- Ability to display fire and/or burglary and panic and/or trouble conditions at all other partitions' keypads (selectable option).
- Certain system options selectable by partition, such as entry/exit delay and subscriber account number.

**User Codes** - The control shall accommodate 150 user codes, all of which can operate any or all partitions. Certain characteristics must be assignable to each user code, as follows:

- Authority level (Master, Manager, or several other Operator levels). Each User Code (other than the installer code) shall be capable of being assigned the same or a different level of authority for each partition that it will operate.
- Opening/Closing central station reporting option.
- Specific partitions that the code can operate.
- Global arming capability (ability to arm all partitions the code has access to in one command).
- Use of an RF (button) to arm and disarm the system (RF key must first be enrolled into the system).

**Peripheral Devices** - The control shall support up to 30 addressable ECP devices, which can be any combination of keypads, RF receivers, relay modules, annunciator modules, and interactive phone modules. Peripheral devices have the following characteristics:

- Each device set to an individual address according to the device's instructions.
- Each device enabled in system programming.
- Each device's address shall be supervisable (via a programming option).

**Keypad Annunciator** - The control shall accommodate up to 16 keypads or six (6) touch-screen (i.e., advanced user interface) keypads. The keypads shall be capable of the following:

- Performing all system arming functions.
- Being assigned to any partition.
- Providing four programmable single-button function keys, which can be used for:
  - Panic Functions -activated by wired and wireless keypads; reported separately by partition.
  - Keypad Macros -32 keypad macro commands per system (each macro is a series of keypad commands). Assignable to the A, B, C, and D keys by partition.

**Optional Output Relays** - A total of 96 relay outputs shall be accommodated using relay modules. Each relay module shall provide four (4) Form C (normally open and normally closed)



relays for general purpose use or two (2) supervised notification appliance circuit outputs, when using the 4204CF module. The relays shall be capable of being:

- Programmed to activate in response to system events.
- Programmed to activate using time intervals.
- Activated manually.
- Assigned an alpha descriptor.
- Used for supervised bell outputs (4204CF module).
- A combination of 4204 (ECP) and 4101SN (polling loop) relays.

Optional Vista Interactive Phone Module - The control shall support the ADEMCO 4285/4286 VIP Modules, which permit access to the security system in order to perform the following functions:

- Obtain system status information.
- Arm and disarm the security system.
- Control relays.

Optional LED Annunciator - The control shall support the ADEMCO FSA-8 and FSA-24 annunciators, which are capable of:

- Visually identifying a zone or point that is in alarm or trouble.
- Programmable for system silence/reset.
- Up to 96 LEDs may be used in one system.
- A total of four (4) FSA-24 or 12 FSA-8 annunciators may be used in one system.
- An optional keys witch, FSAKSM module, shall be available for UL listed Silence and Reset capability.

Integrated Access Control - The control shall be capable of the following:

- Providing a command that activates relays to allow access doors to open (e.g., lobby door), lights to be turned on or off, etc.
- Becoming a fully integrated access control system by using numerous Vista Key Single-Door Access Control Modules.
- Supporting up to eight (8) VistaKey Access Control Modules. The Vista Key Access Control Modules shall use the same Compass Downloader as the Vista- 128BP and shall be programmable from the Compass Downloader or the Keypad Annunciators.
- Assigning any number of access control relays to each partition (up to 96 for the system).
- Supporting up to 250 access card holders using Vista Key.
- Connecting to the ADEMCO Pass Point Access Control System via the Vista Gateway Module (VGM).

CCTV Switching - The System shall be capable of supporting the Vista View 100 CCTV Switching



System. The CCTV system shall be fully integrated and be event driven by Fire, Burglary or Access events. When cameras are not event driven, they shall be driven by an automatic preset dwell time. The system shall also be capable of:

- Activating the CCTV system via a Form-C relay output.
- Operating up to 60 camera inputs and 30 video outputs.

Commercial Wireless Equipment - The Control shall be compatible with UL Listed Commercial Wireless Fire & Security equipment including:

- ADEMCO 5881ENHC Commercial Fire/Burg Receiver. - The receiver shall be capable of receiving as many points as the control panel is rated for Up to two (2) Receivers may be used on any system. Receivers may be remotely located anywhere on the system Keypad/Annunciator bus.
- ADEMCO 5808LST Wireless Photoelectric Smoke and Heat Detector - The device shall be UL 268 listed.
- ADEMCO 5809 Wireless 135D Fixed Temperature and Rate of Rise Heat Detector - The device shall be UL 521 listed for commercial applications.
- ADEMCO 5817CB Wireless Universal Contact Monitoring Transmitter - This device shall be capable of making any conventional UL listed contact device a wireless device. The device shall be UL listed as follows: UL 985 for fire and UL 365, 609, 1023, 1076 and 1610 for security and nurse call.
- ADEMCO 5869 Wireless Hold Up Switch/Transmitter - This device shall be UL 636 listed for commercial burglary applications.

Optional Key switch - The control shall support the ADEMCO 4146 Key switch on anyone of the system's 8 partitions. If used, zone 7 is no longer available as a protection zone.

Voltage Triggers - The system shall provide voltage triggers, which change state for different conditions. Used with LRR (Long Range Radio) equipment or other devices such as a remote keypad sounder, keys with ARMED and READY LEDs, or a printer to print the system's event log.

Event Log - The System shall maintain a log of different event types (enabled in programming). The event log shall provide the following characteristics:

- Stores up to 512 events.
- Viewable at the keypad or through the use of Compass software.
- Printable on a serial printer using a 41 OOSM Module including zone alpha descriptors.
- Stores Pass Point access control events.
- Sends printed events to up to eight alpha numeric pagers.

Scheduling - Provides the following scheduling capabilities:



- Open/close schedules (for control of arming/disarming and reporting).
- Holiday schedules (allows different time windows for open/close schedules).
- Timed events (for activation of relays, auto-bypassing and un- bypassing, auto- arming and disarming, etc.).
- Access schedules (for limiting system access to users by time)
- End User Output Programming Mode (provides 20 timers for relay control).
- The system shall automatically adjust for daylight savings time.

Communication Features - Supports the following formats and features for the primary and secondary central station receivers:

**Formats**

- ADEMCO Low Speed (Standard or Expanded).
- SESCOA/Radionics.
- ADEMCO Express.
- ADEMCO High Speed.

ADEMCO Contact ID. Backup reporting - The system shall support backup reporting via the following:

- Secondary phone number.
- ECP long range radio (LRR) interface
- Option to select long range radio (LRR) or dialup as the primary reporting method (dynamic signaling feature)

Internet reporting - The system shall be capable of communicating with the central station via the internet using Alarmnet-i. It shall provide the user with the ability to control the system via a browser interface (i.e., AOL, Netscape, and Internet Explorer). All packet data transmitted to the monitoring station shall be encrypted with a minimum of 1024 bits of encryption.

Audio Alarm Verification Option - Provides a programmable Audio Alarm Verification (AA V) option that can be used in conjunction with an output relay to permit voice dialog between an operator at the central station and a person at the premises.

Cross-Zoning Capability - Helps prevent false alarms by preventing a zone from going into alarm unless its cross-zone is also faulted within 5 minutes.

Pager Interface - The Control Panel shall be capable of sending event information to an alphanumeric pager via a V A-8201 pager interface device.

Exit Error False Alarm Prevention Feature - The System shall be capable of differentiating



between an actual alarm and an alarm caused by leaving an entry/exit door open. If not subsequently disarmed, the control panel shall:

- Bypass the faulted E/E zone(s) and/or interior zones and arm the system.
- Generate an Exit Error report by user and by zone so the central station knows it was an exit alarm and who caused it.

**Built-in User's Manual and Descriptor Review** - For end-user convenience, the control panel shall contain a built-in User's Manual. It shall include the following capabilities:

- By depressing any of the function keys on the keypad for five (5) seconds, a brief explanation of that function shall scroll across the alphanumeric display
- By depressing the READY key for five (5) seconds, all programmed zone descriptors shall be displayed (one at a time). This feature shall provide a check for installers and ensure all descriptors have been entered properly.

**Programming** - The Control shall be capable of being programmed locally or remotely using the ADEMCO Compass Downloader and shall be capable of:

- Uploading and downloading all programming information at 300 baud.
- Uploading and displaying firmware revision levels from the control.

**Panel Linking** - The Control shall be capable of being networked together with up to eight other controls and being operated by any keypad within the system. It shall provide the ability for users to:

- Control multiple zones, partitions, and/or buildings from a central location.
- Check status, arm and disarm any partition from any keypad in the system.
- Globally arm or disarm partitions based upon user authority.

**Automation Software** - The Control shall be capable of interfacing with automation software via an RS232 input on a single partition.

#### Keypads

Keypads shall be Touch Screen Vista 6280 Keypads.

#### Door Contacts (Person Doors)

Door contacts shall be Sentrol 1078T 1" door contact or approved equal.

All door contacts shall be concealed unless otherwise approved by the consultant.

Door contacts shall be of a colour to match the colour of the doorframe where possible.

#### Motion Detection (Interior Area Protection)

Motion detectors shall be dual technology consisting of both passive infrared and microwave



technologies and shall be Honeywell Dual Tec Series detectors or approved equal.

Detectors shall have a tampered cover that is wired into the monitored circuit as to cause a trouble condition on the circuit when triggered.

Detector model maximum coverage area shall be suitable to cover intended area unless otherwise specified.

#### Glass Break Detectors

Glass break detectors are recommended wherever there is a glazed area in close proximity to a lock or windows are easily accessible from the exterior. Glass break detectors shall be acoustic technology with a maximum range of 15 feet and shall be Honeywell FG-1625/T Glass break or approved equal.

Glass break detectors shall be tested and approved for installation with 3M Security window film.

Detectors shall have a tampered cover that is wired into the monitored circuit as to cause a trouble condition on the circuit when triggered.

#### High/Low Temperature Sensors

Temperature sensors shall be TS-300 IntelliTemp with programmable alarm delay.

#### Water Sensors

Water sensors shall be Honeywell #470-12.

#### Siren

Siren shall be Honeywell WAVE.

### EXECUTION

#### **General Responsibilities and Requirements**

The quantities of components shall be determined and installed by the Security System Contractor based on the requirement to provide a fully operational Security System, as per the intent of the specification, and as shown on the drawings and recommended by the manufacturer.

Controllers shall be filled to a maximum of 75% of the maximum card reader capacity to allow for future expansion.

All hardware mounted in exterior locations must be weather resistant and designed to maintain the aesthetic beauty of the campus.

Hardware must be durable enough to withstand high traffic locations without frequent failure.

Devices must be hardwired, with all wiring installed in conduit in accordance with written university standards for access system installation. The conduit system and cabling installed must be distinct and separate from the wire way/conduit system housing other systems cables in campus buildings.



Connections to devices must be secured, so that no cords may be easily disconnected from the devices and no cords are left exposed to unauthorized tampering.

The access control panels shall operate on TCP/IP communications protocol unless otherwise noted on the contract drawings that RS-485 communication may be implemented.

The Ethernet communication configurations shall be standard.

All control panels shall operate in local and remote configurations.

When allowed, RS-485 multi-drop total distance shall be 4,000 feet with a maximum of 31 control panels, without the use of modems or line drivers. If installation requires distances greater than listed above, a line driver or modem shall be used, after approval by the consultant.

All control panels shall provide a 12 VDC back-up battery for up to four hours of operation upon loss of AC power. The control panel shall provide a super capacitor to retain database information for up to seven days upon loss of power.

All controllers shall be equipped with the most current firmware available at the time of substantial completion.

All visible or easily accessible screws shall be tamper proof.

All inputs shall employ double end of line resistors.

End of Section



## 16713 Code Blue System

### GENERAL

#### Reference

Read and be governed by the Security System General Requirements Section.

#### Related Work

Comply with relevant Sections of this and other Divisions as required.

#### Related Work

Comply with relevant Sections of this and other Divisions as required.

### Overview

#### GENERAL DESCRIPTION

The unit shall be a vandal-resistant communications device that is a multi-functional, freestanding pedestal constructed of carbon steel, model CB 1-e from Code Blue Corporation, no substitutions. It shall include a high quality, hands-free communications device illuminated by a high intensity faceplate light and a powerful combination blue beacon/strobe light that serves to easily identify it from a distance.

#### CONSTRUCTION

The unit shall be a cylinder constructed of ASTM A500 seamless carbon steel structural tube, schedule 20, 12.75" outside diameter x 0.25" thick wall, at a height of 108" and weigh approximately 330 lbs.

The unit shall have an internal anchor base plate that is MIG welded 2" above the base and fabricated with a minimum of 0.50" thick A-36 grade steel plate. It shall have a 5" diameter center hole for electrical conduit access. The base plate shall have four oblong holes on an 8" circular bolt pattern for attachment.

An access door measuring 14" H x 9.64" W will be placed 10.94" from the bottom of the base to provide access for mounting to the anchor bolts and connectivity to electrical facilities. The opening shall have a cover plate, which mounts flush and is the same steel and radius as the unit. The cover plate shall fit into the opening and have a weather-resistant gasket. The cover plate shall be held in place by two ¼-20 x 1" countersunk proprietary fasteners.

Tamper resistant proprietary fasteners manufactured for Code Blue Corporation shall be used. It shall not be possible to acquire the custom-designed bit from any other source.

A recessed opening shall be cut at a point beginning 36.6" above the bottom of the unit. The opening shall be 15.1" tall at the forward edge and 12.8" tall at the rear edge, creating a 25-degree angle from the horizontal and an arc of 160 degrees in the face.

The opening shall be enclosed by a 7 gauge steel plate with a single opening for a



communication device.

#### **MOUNTING**

The unit shall be mounted onto four anchor bolts that are set .50" above the concrete. Standard 0.75" x 24" galvanized steel anchor bolts, nuts and washers shall be supplied.

The concrete foundation shall measure 24" x 24" minimum and the anchor bolts shall protrude 6" from the foundation.

#### **ELECTRICAL**

All electrical components shall have a modular plug for easy service and replacement, and will be equipped with a fuse for protection from transient voltage conditions.

Requires 1 ampere at 24V AC.

Voltage options shall include: 12-24V AC/DC; 120, 240, 277 and 347V AC.

The unit shall have the option for Power over Ethernet for connectivity to a VoIP network switch with 802.3af (minimum) capabilities. Requires the IP5000 phone for connectivity to ToolVox or SIP/IAX2 compatible VoIP system.

#### **LIGHTS**

LED Beacon/Strobe: Located in the dome top assembly with a rating of no less than 270 Lumens/92 candela, it shall have a factory-set flash rate of up to 375 flashes per minute and be programmable. A deep blue UV-rated polycarbonate prismatic refractor shall surround the LED Beacon/Strobe and be used to distribute the light in a horizontal pattern for maximum brightness and visibility.

The communication device shall be factory programmed to activate the LED Beacon/Strobe for the duration of a call.

The LED Beacon/Strobe shall be 5.10" tall and 5.50" in diameter.

Faceplate light: LED will direct light onto the communications device and be vandal resistant.

The opening shall measure 4.50" W x .50" H.

The light shall have a lifetime of 100,000 hours and a rating of 100 Lumens.

#### **COMMUNICATIONS**

The unit shall have a speakerphone communication device.

IP5000 - VoIP: Refer to the IP5000 Architect and Engineering Specification for further information.

IA4100 - Analog: Refer to the IA4100 Architect and Engineering Specification for further information.

The unit shall be capable of communicating via third party IP wireless and cellular devices, which can be housed within the unit.

EIA/TIA, ANSI, CSA and BICSI cabling or similar standards shall be adhered to for proper



operation of devices connected to copper or fiber infrastructure.

#### FINISH

Four-coat paint process, with zinc-rich primer for corrosion resistance and baked-on polyurethane enamel for maximum gloss and shine.

Optional clear coating process available to provide additional environmental protection.

Substrate preparation shall be as required to comply with applicable ASTM impact and adhesion standards: D2794 Direct and Reverse Impact, D523 Gloss @ 60 Degrees, D3359B Cross hatch Adhesion, D1654 Corrosion Creep, D714 Scribe Blisters and D714 Field Blisters.

The finish shall be available in 12 standard colors: Safety Blue, Safety Red, Safety Yellow, Midnight Blue, Gloss White, Gloss Black, Medium Bronze, Dark Bronze, British Racing Green, Cardinal Red, Bright Silver and Tiger Orange. Custom colors shall be available.

Minimum coverage thickness of 2.0 mils.

#### COMPLIANCE

- Americans with Disabilities Act (ADA) compliant
- UL 60950-1 and UL 2017 listed
- NFPA 72 Chapter 24 (2010) compliant
- Meets NEMA 4X and IP56 requirements

#### GRAPHICS

Engineering grade reflective vinyl for high visibility and legibility.

Standard 3.25" tall and 30" long graphics text offerings: Emergency, Assistance, Security, Courtesy, Police, Information or Help Point.

Standard graphics color offerings: Reflective White, Reflective Blue, Reflective Black, Reflective Green, Reflective Red and Reflective Yellow.

Custom text, length and color options shall be available.

#### OPTIONS

- Active Vent Solar Powered Fan for improved air flow
- Overhead Camera Mount
- 360° Public Address Speakers
- Night Charge® power system
- Mounting Rings for housing and mounting third party security and communication products

#### WARRANTY

The CB 1-e shall be warrantied against any defects in material and workmanship, under normal



use, for a period of 2 years from date of installation. If system is found by manufacturer to be defective within the warranty period, manufacturer shall repair and/or replace any defective parts, provided the equipment is returned to manufacturer.

#### MANUFACTURER

The Manufacturer shall be Code Blue Corporation. 800-205-7186, 259 Hedcor Street, Holland, Michigan 49423. [www.codeblue.com](http://www.codeblue.com). THERE ARE NO EQUIVALENTS.

#### TYPES AND LOCATIONS

- CB 2-s Signature wall mount – outdoors or exposed areas
- CB 4-s Signature Wall/pole mount – outdoor or indoor exposed areas
- IP1501 & IP2500-s VoIP Speakerphones – in areas other than Elevators Lobbies - VoIP Buildings.
- IA4100 Single Button Analogue Speakerphone – in Elevator Lobbies - Analogue or VoIP Buildings
- IA4100 Dual Button Analogue Speakerphone – in Elevator Lobbies – Analogue or VoIP Buildings
- IA500-s Single Button Analogue Surface mounted – in Analogue Buildings
- IA501-s Single Button Analogue Flush Mount – in Analogue Buildings.

Verify locations, finish, wording and colour with Campus Police.

#### TOOLVOX

Analogue or VoIP with standard 2 analogue line cards. To be determined in consultation with Telecommunications Services and Campus Police as part of the Campus Assist Devices program.

End of Section



## 16730 Security and Access Control System, Testing and Commissioning

### GENERAL

#### Reference

Read and be governed by the Security System General Requirements Section.

#### Related Work

Comply with relevant Sections of this and other Divisions as required.

#### Overview

The purpose of this section is to describe the commissioning process specific to the security systems and equipment. This includes the card access system, door monitoring and locking system, intercom system, closed circuit television system, and control room console. All punch items must be resolved and finished prior to the Contractor calling for the formal testing.

The contractor, prior to final acceptance commissioning, shall test all system to ensure a functioning system.

The contractor shall be responsible to coordinate with all other trades required to complete system testing and final commissioning.

The contractor is responsible to report any deficiencies of equipment, not under the contract, that affect the function of the equipment installed under the security contract.

#### Test Equipment

The contractor shall provide all test equipment required to properly demonstrate a complete and functional system including, but not limited to:

Portable two-way radios

All proprietary test equipment. The manufacturer's representative shall provide the equipment, demonstrate use of the test equipment and assist the commissioning agency in the commissioning process. Proprietary test equipment shall become the property of the owner upon completion of commissioning.

The Contractor shall perform all tests, furnish all test equipment and consumable supplies necessary and perform any work as required to establish performance levels for the system in accordance with the specifications.

#### Documentation

The contractor shall provide, prior to acceptance commissioning, final versions of all testing documentation for approval.

Documentation shall be completed by controller and include:



- Controller identification and location.
- All devices connected to the controller and indicate all labeling for devices and cables.
- All tests performed on the devices.
- Dates of testing and/or re-testing.
- Name of all technicians conducting the testing.

## TESTING

The Owner and/or the Owner's Representative may stop testing/commissioning if it is deemed that the systems are not fully functional and require re-work.

All testing shall conform to Manufacturers recommendations for installation and testing.

When the Contractor has completed system tests to his/her satisfaction and when the system record documents, including drawings, operation and maintenance manuals, are complete, the Owner and/or the Owner's Representative are to be notified in writing that the system fulfills the specifications and is ready for acceptance testing.

Upon satisfactory on-line operation of the system software, the entire installation including all subsystems shall be inspected. Each device shall be tested as a working component of the completed system. All system controls shall be inspected for proper operation and response. The scope of the inspection work shall include, but not be limited to, the following:

Document all measured values and control settings for the system. These values and settings shall be recorded in the as-built drawings and shall be made available at the time of acceptance testing, following the indicated testing procedures.

Check each system including all inputs and outputs for compliance with the performance standards.

Function of all remote sensors for proper operations and testing of all wiring. The test shall include operating each device as it should operate in normal usage. No operations are to be simulated for this test.

Check each control and monitoring function from all origination points to all controlled locations for proper operation.

Adjust each piece of equipment as required for optimum quality and to meet the manufacturer's published specifications.

Establish tentative normal settings for all systems controls. All setup controls shall be adjusted for optimum system performance and shall be marked for reference.

Demonstrate the power-up and power-down procedure for each system.

All tests shall be documented by the Contractor and shall be witnessed by the Owner and/or the Owner's Representative. Following the system test and inspection, the Owner and/or the Owner's Representative shall prepare a list of any outstanding work, which must be completed by the Contractor prior to issuance of the certificate of substantial completion.

Upon receipt of the Contractor's written notice that all punch list items from previous



inspections are complete, the Owner and/or the Owner's Representative shall re-inspect the work for final acceptance. The Contractor shall provide all test equipment, materials and personnel as required to assist in final acceptance.

The final acceptance test shall consist of the following:

The Contractor shall verify that all record documentation is complete.

The operation of all system and equipment shall be demonstrated by the Contractor to comply with the contract documents. Both subjective and objective tests may be required by the Owner and/or the Owner's Representative to determine compliance with the specifications.

Upon completion of the re-inspection, the Owner and/or the Owner's Representative shall either accept the system as being substantially complete or advise the Contractor of work not completed or obligations not fulfilled as required for final acceptance. If necessary, the entire procedure shall be repeated.

The inspections and tests may be suspended at the option of the Owner and/or the Owner's Representative if it is their opinion that major components of the system are defective. The Contractor shall have personnel available at the job site to make adjustments and repairs and take corrective action during the tests.

The system shall be accepted as complete when all base contract work has been completed and all remedial work is performed and all documentation is complete, accurate and accepted, the Owner's personnel have received the specified training and the system passed final commissioning.

The Contractor shall retain complete logs of tests for inspection and review at any time after the testing has started. Upon final completion of system tests the log records shall be submitted.

Complete field tests shall be performed on all sub-systems. Each individual function shall be tested and proven correct in function and response a minimum of two times with not less than two month time between individual tests.

Provide the services of fully qualified technicians. Tests shall be performed after the system is adjusted and operating in accordance with specification requirements.

### **Access Control/Burglar Alarm Testing**

Card access control and burglar system performance testing shall include, for each control panel:

Demonstrate the ability for the system to come back "online" after losing all power (except internal memory battery back-up).

Demonstrate system function under AC power loss.

Individual device/door testing to include:

2-second maximum response time on card readers shall be demonstrated.

Read range test for each card reader.

Valid/invalid card reads on each card reader.

Door Forced open alarms for each door contact.



Door Held open alarms for each door contact.

Valid exit test for each door.

Walk test of Request to Exit Motions to ensure proper coverage.

Alarm initiation of each interior/exterior protection device including, but not limited to, duress buttons, door contacts, motion detectors and glass-break detectors.

Open circuit and short circuit tests for each monitored device.

Door locking and unlocking by time schedule and operator command.

Elevator floor control for each floor by time schedule and operator command.

Call button control for each floor. One selection per card read.

Tamper alarms for all devices.

### **Surveillance Testing**

Resolution Test - To measure camera resolutions, an EIA Standard Resolution Test Pattern shall be placed in front of the camera being tested. Observing the wedges of the pattern on a monitor and noting the reading at the point where the lines are no longer discernible shall measure the limiting resolution. Vertical wedges shall provide the measurement of horizontal resolution and horizontal wedges shall provide the measurement of vertical resolution from 200 to 800 lines. Resolution measurements shall be taken at different light levels since resolution will vary with the change in light level.

Gray scale responses shall also be measured with this chart. The gray scale shall provide a guide to measure to the ability of each camera to differentiate shaded from black to white.

Sequence Camera Tests - Manually activate each camera via the system keyboard on a sequence monitor and on the alarm monitor. Set up an automatic sequence for all cameras based on 6 camera per each sequence monitor. Demonstrate different sequence rates and camera combination.

Quad Camera Test - Display the 4 dedicated camera inputs for each Quad system on the Quad monitors. Demonstrate blowing up any one of the camera Quad images to full screen. Demonstrate the same image and a different image displayed on the Quad monitor and also display on the alarm monitor.

Quad DVR Test - Demonstrate the Quad DVR's are recording all four images as seen on the monitors (and a full screen image).

Alarm Input Test - Demonstrate an alarm input from the Security Intercom Card Access System by projecting on the alarm monitor and recording on the Alarm DVR the camera image for the associated camera. This test must be performed with an individual standing at the respective card reader or intercom to verify field of view for each camera location. Perform the same alarm input test for all doors with door status switches.

Keyboard Control/PTZ Test - Demonstrate via the keyboard controls the pan, tilt, and zoom function for all PTZ cameras. Camera viewing shall include the entire zoom focal length for all areas.



Preposition Test - Demonstrate each pre-position location for each PTZ camera based on activation of alarms per the CCTV points list.

Low-Light Level Tests - Demonstrate exterior Surveillance coverage during diminishing daylight hours to verify scene illumination starting at dusk and proceeding at intervals of every 30 minutes until total darkness. Test shall include looking at areas of the parking lot, walkways and all buildings perimeter areas of high contrast and extreme low light level areas. Demonstrate recording these areas while a person is walking through the fields of view. Playback must be of a quality to identify the individual.

Integrated Test - Demonstrate a fully operational system test by activating simultaneous multiple alarms from the security systems for both the Quads and sequenced camera locations to verify proper system component integration. System operation test shall include acknowledgment of all alarms and a return to normal status.

## ACCEPTANCE

Acceptance is based on the successful completion of the testing requirements and therefore not open for deficiency items. It is understood that the tests may be conducted over a period of time; therefore each test may be accepted individually. Final acceptance and release will be when all tests are completed and accepted. Failure of a test requires that a specific test be re-run but does not affect any test already accepted with the exception of the Integrated Test. Failure of the integrated test may require the retest of one or more individual tests.

The Contractor will carry sufficient costs to cover any retesting required.

End of Section