

STANDARD INFORMATION

If the project requires a sample for evaluation and/or testing, then this SUN applies.

Standard: ULC S527

Standard ID: Control Units for Fire Alarm Systems [ULC S527:2019 Ed.4]

Previous Standard ID: Control Units for Fire Alarm Systems [ULC S527:2011 Ed.3]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **May 31, 2022**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: No action is required for currently certified products. If modifications to the product after the effective date require an evaluation and/or testing, then the product must undergo re-evaluation to the new requirements.

Overview of Changes:

- New requirements for smoke control system separate from the fire alarm control unit
- Revised Voice Alarm Feature operation requirements
- New Requirements for Uninterruptable Power Supplies (UPS) for fire protective signaling use
- New requirements covering carbon monoxide signalling
- New requirements for battery operated wireless field devices
- New synchronization of signaling devices
- New low frequency signal tone requirements
- New Alarm Verification Feature operation
- New operation requirements
- New requirement for software-controlled control units
- Added requirements for product installation instructions and wiring drawings

Specific details of new/revised requirements are found in table below.

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		<i>Additions to existing requirements are <u>underlined</u> and deletions are shown lined out below.</i>
The following changes reflect 3rd Edition amendment 1 in 2014		
4	Info	System Requirements
4.11	Info	Visual Displays
4.11.3	Info	Annunciator
4.11.3.1		The annunciator, whether used as a component of the control unit or separately enclosed, shall comply with the following: <u>M Each indicator shall have provision for a site-specific custom label, identifying the location of the event or device without the need to consult a separate chart.</u>
6	Info	Software-Controlled Control Units
6.1	Info	General
		<i>New clause added;</i> Where compliance with this Standard is dependent upon the proper selection of software features and parameters which are field programmable, one of the following shall be met: A The software shall not permit any product operation or contain any programming options that are prohibited by this standard; B The software shall be partitioned and identified in the field programming software as complying or not complying with A; or C A summary as described in Clause 7.7 shall be provided in the front of the programming manual describing all programming options and parameters that have the potential for conflicting with the requirements in this Standard and stating the proper program selections that would be in accordance with this Standard. Additionally, information shall also appear throughout the manual where the specific feature or option appears describing the requirements of this Standard.



CLAUSE	VERDICT	COMMENT
--------	---------	---------

7	Info	Instructions and Drawings
---	------	----------------------------------

New clause added;

Where the field-programmable software of a product contains both complying as well as non-complying features or parameters as permitted in Clause 6.1.9, the following (or equivalent presentation) shall be included in the front of the programming manual or the beginning of the program section of the installation manual:

7.7

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, AND OTHER INVOLVED PARTIES			
This product incorporates field-programmable software. In order for the product to comply with the requirements in CAN/ULCS527, Standard for Control Units for Fire Alarm Systems, certain programming features or options must be limited to specific values or not used at all as indicated below.			

Program feature or option	Permitted in CAN/ULC-S527? (Y/N)	Possible settings	Settings permitted in CAN/ULC-S527

9	Info	Marking
---	------	----------------

9.3	Info	Cautions and Warnings
-----	------	------------------------------

New clause added;

9.3.10

In accordance with the Exception to Clause 10.30.1, cord-connected products provided with an electromagnetic radiation suppression filter and having a leakage current in excess of 0.5 or 0.75 milliamperes (whichever applies) but no more than 2.5 mA, shall be marked with the words “WARNING” and “AVERTISSEMENT” and the following or equivalent statement:

- A “To reduce the risk of electric shock, this product is provided with a grounding type power supply cord. Connect product to a grounded receptacle.”; and
- B « Pour réduire les risques de choc électrique, ce produit est pourvu d’un cordon d’alimentation avec mise à la terre. Branchez le produit à une prise mise à la terre. »

New clause added;

9.3.11

If marking is required by Clause 8.6.2.2, the following wording shall be marked in the wiring area:

- A “CAUTION – When making installation, route field wiring away from sharp projections, corners, and internal components.”; and
- B « MISE EN GARDE – Lors de la pose, acheminer le câblage extérieur de manière à éviter les arêtes vives, les coins et les composants internes. »



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
		In accordance with the Exception to Clause 10.20.1.4, the following wording shall be marked on the product:
9.3.12		A “Caution: For continued protection against risk of fire, replace only with same type and rating of fuse.”; and B « MISE EN GARDE – Pour une protection continue contre le risque d’incendie, remplacer seulement par des fusibles du même type et calibre.»
10	Info	Performance Tests
10.15	Info	Electrostatic Discharge Test
10.15.3		A product is to be mounted in its intended mounting position on a 19 mm thick unpainted exterior grade plywood surface and connected to a source of supply in accordance with 10.1, General. The enclosure is to be connected to earth ground, A series combination of a 250 picofarad low leakage capacitor, rated 20 000 V DC minimum, and a 1500 W resistor, is to be connected to two high voltage insulated leads, 0.9 m long, and stripped 25.4 mm at each end. The end of each lead is to be attached to a 12.7 mm diameter metal test probe with a spherical end mounted on an insulating rod. The capacitors are to be charged by touching the ends of the test leads to a source of 10 000 V DC for at least 2 s for each discharge, as described in the installation instructions for the product. When a product under test is intended to be installed in a metal electrical junction box, the junction box is to be connected to earth ground. An electrostatic discharge simulator with a capacitive resistive network of 250 pF and 1.5 KW is to be charged to 10 000 V for a minimum of 2 s before each discharge. The tip of the probe used to contact the unit under test is to be spherical in shape, either half or full, and 12.7 mm ± 1.0 mm (0.5 inch ± 0.04 inch) in diameter.
10.15.4		Twenty discharges, with at least 3 discharges for each mode of operation, are to be applied to different points on the exposed surface of the product operator interface and/or manual controls , and the capacitors are to be recharged prior to each discharge. Ten discharges are to be made with one lead connected to earth ground and the other lead brought into contact with the product surface, followed by ten discharges with the polarity reversed.
10.16		Radio Frequency Interference Test
10.16.1		Control units, transponders, display and control centres and annunciators that require the opening of a door to gain access to the operating controls and display shall be tested with the door(s) in an open position. <u>Products utilizing a microprocessor shall be subjected to the testing described in Clauses 10.16.2 through 10.16.5.</u>



CLAUSE	VERDICT	COMMENT
10.16.2		<p>When subjected to the tests described in Clause 10.16.5, and while energized from a source of supply in accordance with Clause 10.1.4, a product shall:</p> <p>A Not falsely annunciate alarms or troubles; B Not falsely actuate outputs or releasing device(s); C Not reset during an alarm condition; <u>C Not interrupt the execution of non-supplementary program operation;</u> D Experience no electrical or mechanical failure of any components of the product; E Operate as intended following the test; and F As appropriate, retain required stored memory (such as date, type, and location of a signal transmission) within the unit.</p>
10.16.4		<p>To determine compliance with Clause 10.16.2, the product is to be energized from a source of rated voltage and frequency, interconnected as described in the installation wiring diagram/instructions, and subjected to the radio-frequency interference described in Clauses 10.16.5 <u>and 10.16.6 when the test method is based upon the power output from the antenna or Clauses 10.16.5 and 10.16.7 when the test method is based upon the field strength measured at the product under test.</u></p>
10.16.5		<p>The radio-frequency interference, using either power or field strength, shall be as specified in Table 30, Radio Frequency Interference Levels. The radiating antennas shall be placed 30 cm from the nearest edge of the product under test. The test is to be conducted with each antenna <u>directed at the product under test, in both the horizontal and vertical orientations</u>, centered on the product. A total of six energizations in each of the two orientations are to be applied for each nominal frequency $\pm 2\%$, five to consist of 5 s on and 5 s off, followed by one consisting of a single 15 s energization.</p>
10.16.6	Info	<p>Power Output from the Antenna</p> <p><i>New clause added;</i></p>
10.16.6.1		<p>The forward power to the antenna shall be compensated by the measured reflective power and the calibrated gain of the antenna to produce the minimum output power level specified in Table 30 for each frequency.</p>
10.16.7	Info	<p>Field Strength</p> <p><i>New clause added;</i></p>
10.16.7.1		<p>The forward power with carrier only modulation, required to produce the field strength at a given point in a room as measured by a field probe shall be recorded without the product under test in the room. The product under test shall replace the field probe in the room and the amount of power needed to produce the required field strength shall be put into the antenna to produce the minimum field at the product under test. Amplifiers employed to produce the forward power shall not be in saturation when the required AM or FM modulation is utilized.</p>



CLAUSE	VERDICT	COMMENT
10.26	Info	Frequency Response
		The frequency response of the voice amplification system, as measured from the microphone input to the speaker zone output, of a control unit shall comply with the following:
10.26.1		<p><u>A The frequency response within 400 to 4000 Hz bandwidth shall not deviate from the response at 1000 Hz by more than ± 3 dB;</u></p> <p>B The response at frequencies below 400 Hz and above 4000 Hz shall not exceed the 1000 Hz response by more than 3 dB;</p> <p>C The requirements of Items A and B shall be met with the input frequencies at rated input voltage and at 10% of rated input voltage; and</p> <p>D The design of the voice amplification system shall include a low frequency cut-off filter such that input signals to the amplifier below 100 Hz are attenuated by -12 dB/octave and are not transmitted to the field devices connected to the output of the amplifiers.</p>
10.27	Info	Two-Way Telephone communication
		<i>New clause added;</i>
10.27.4		The sound pressure level from the mouth simulator shall be calibrated on the axis of the mouth simulator, 25 mm away from the protection grid of the mouth simulator. The axis of the microphone for calibration shall be oriented 90 degrees to the mouth simulator axis. The sound pressure level from the mouth simulator shall be adjusted to an input of -5 dBPa (89 dB SPL). Background noise shall be at least 20 dB SPL below the sound pressure level of the input to the mouth simulator.
		<i>New clause added;</i>
10.27.5		The mouth simulator with sound pressure level calibrated in accordance with Clause 10.27.4 shall be placed 50 - 100 mm away from the microphone of the two-way telephone under test to provide input during the measurement.
		<i>New clause added;</i>
10.27.6		The measurements of total harmonic distortion are to be made at frequencies spaced consistent with ISO 3, Preferred Numbers – Series of Preferred Numbers, over the range of 800 – 2800 Hz.
		<i>New clause added;</i>
10.27.7		Controls used to adjust the volume of the telephone handset system shall be adjusted to the maximum selectable level(s).
		<i>New table added;</i>
Table 2A		<p>Cautions and Warnings</p> <p>A “Caution” or “Warning” notice shall be provided in situations where hazards such as electric shock, could cause personal injury, or where identified as required elsewhere in this Standard (see standard for details).</p>



CLAUSE	VERDICT	COMMENT
		Visual Display Status Change Indication by Illumination State
Table 7		Revised Table 7 to provide details for both latching and non-latching indication sequences for supervisory input circuit (see standard for details).
		Visual Display Trouble by illumination State
Table 8		Revised Table 8 to add acknowledged-return-to-normal operation and identify the required indicators for it (see standard for details).
The following changes reflect the 4th Edition dated April 5, 2019		
4	Info	System Requirements
4.3	Info	Secondary Power Supply
4.3.1	Info	General
		Where an electronic uninterruptible power supply (UPS) is used as an emergency power supply, the following requirements shall apply:
		a) <u>The UPS shall meet the requirements of CSA-C22.2 No. 107.3, Standard for Uninterruptible Power Systems and the applicable requirements of this Standard;</u>
		b) <u>The UPS shall have capacity to maintain fire alarm system operation in accordance with Clause 4.3.1.6;</u>
		c) <u>The UPS system shall provide a trouble signal to the fire alarm system indicating the following abnormal conditions;</u>
		<u>1) UPS switches from the primary power source to the secondary power source; and</u>
		<u>2) UPS trouble.</u>
		d) <u>The input and output of a UPS system shall have a means for permanent connections except where the UPS system and the connections are provided in a lockable enclosure. The permanent connections shall be in accordance with CSA-C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, Section 32, with the exception of Clause 4.16.4;</u>
4.3.1.3		<u>e) The installation instructions shall specify that in order to perform maintenance and repair service, a means for disconnecting the UPS while maintaining continuity of power to the fire alarm system, when applicable, shall be provided;</u>
		<u>f) The disconnecting means as described in (e) shall be fitted with a locking device to prevent unauthorized operation;</u>
		<u>g) The off-normal position of the UPS disconnecting means as described in (e) shall result in a nonlatching supervisory signal or trouble signal at the fire alarm display and control centre interface; and</u>
		<u>h) The installation instructions shall specify that the UPS shall be installed in accordance with CSAC22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, Section 46 – Emergency Power Supply, Unit Equipment, Exit Signs, and Life Safety Systems.</u>



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
		Where a combination system includes carbon monoxide signaling, the minimum carbon monoxide alarm period shall comply with one of the following:
4.3.1.8		a) After the initial 5 min of maximum carbon monoxide alarm load, the maximum carbon monoxide alarm load shall continue to be applied for a period of not less than 12 h. The 5-s "off" time of the carbon monoxide alarm signal shall be permitted to be changed to 60 s, plus or minus 10% after the initial 5 min of carbon monoxide alarm; b) After the initial 5 min of the maximum carbon monoxide alarm load, the 12 h period is permitted to be eliminated when the product's installation instructions stipulate the system be monitored by a fire signal receiving centre with emergency response; and NOTE: For the purpose of this Standard, emergency response means organizations providing law enforcement, emergency medical, fire, rescue, communications, and related services, as may be appropriate. c) The 12 h carbon monoxide alarm period is met by a self-powered wireless signaling device meeting CAN/ULC-S525 or by a CO detector with integral sounder meeting CAN/ULC-S525 sound output.
		<i>New section added;</i>
4.3.2		Primary Batteries This section contains requirements for conditions for primary batteries (see standard for details).
4.4	Info	Circuit Protection
		<i>New clause added;</i>
4.4.7		A single fault (open circuit fault, short circuit fault or ground fault) on a circuit that initiates isolation between isolated segments shall not prevent the normal operation of devices in: a) Any input zones other than the faulted zone for more than 10 s; and b) Any output zones other than the faulted zone for more than 30 s.
		<i>New clause added;</i>
4.4.8		The testing for the operations described in Clauses 4.4.1 and 4.4.7 shall be conducted with the product in the normal standby condition and in the alarm condition.
4.6	Info	Input Circuit Operation
		Fire alarm input circuits shall comply with the following:
4.6.2		<u>g) When the delay of the waterflow alarm device is controlled by the fire alarm system, the combined delay of the waterflow device activation and the fire alarm system shall not exceed 90 s.</u>



CLAUSE	VERDICT	COMMENT
4.8	Info	Output Circuit Operation
		An output circuit or circuits intended to provide synchronization of signaling devices shall comply with the following:
4.8.4		a) Audible Signals – The temporal pattern of the alarm signal shall be in accordance with Article 3.2.4.18 of the National Building Code of Canada, <u>and shall be synchronized on a system basis; and</u> b) Visible Signals – <u>The parameters specified in CAN/ULC-S526, Visible Signaling Device for Fire Alarm Systems, Including Accessories.</u>
		<u>Exception: When a system is intended to provide signaling to more than one signaling zone, synchronization of the alarm signal pattern on a signaling circuit basis in lieu of a system basis is acceptable. Specifics covering the installation constraints shall be clearly detailed in the installation wiring diagram / instructions for the control unit.</u>
		<i>New clause added;</i>
4.8.5		An output circuit or circuits intended to provide synchronization of visible signaling devices shall comply with the parameters specified in CAN/ULC-S526, Visible Signaling Device for Fire Alarm Systems, Including Accessories.
		Exception: When a system is intended to provide signaling to more than one signaling zone, synchronization of the visible alarm signal pattern on a signaling circuit basis in lieu of a system basis is acceptable. Specifics covering the installation constraints shall be clearly detailed in the installation wiring diagram /instructions for the control unit.
		<i>New clause added;</i>
4.8.6		A fault in a control unit of a networked system or a fault in the interconnection between control units shall not affect the intended synchronization of visual or audible signaling devices of another control unit.
4.12	Info	Sequential Displays
		Controls
4.12.1		4.12.1 All manual controls shall comply with the following:
		b) Physically protected <u>within a locked cabinet or equivalent</u>



CLAUSE	VERDICT	COMMENT
4.12.4		<p>Manual signal silence or deactivation controls shall comply with the following:</p> <ul style="list-style-type: none">a) A means for silencing an alarm may <u>signal shall</u> be integral to the control unit or the display and control centre and shall be secured against operation by unauthorized personnel;b) Actuation of the means shall result in a specific indication which shall be continuously displayed. The manual control shall be marked in accordance with, or equivalent to, Table 4.1;c) Actuation of the means shall not prevent subsequent alarms from another alarm input zone from re-initiating signals, as programmed;<u>d) The system shall be capable of simultaneously deactivating both the visible signal devices and audible signal devices when the means is actuated; and</u><u>e) There shall be a means to reactivate the alarm signals and visible signal devices.</u> <u>NOTE: The means for reactivating the alarm signals and visible signal devices can be the same as the means for silencing, but Sub-clauses (b), (c) and (d) shall be maintained as not to confuse the operator.</u><u>f) An alarm signal that has been deactivated shall:</u><ul style="list-style-type: none"><u>1) Automatically reactivate the audible and visible alarm signal or common trouble signal at the operator interface (s) every 24 hr or less until alarm signal conditions are restored to normal; and</u><u>2) The audible and visible alarm signal or common trouble signal shall operate until it is manually silenced or acknowledged; and</u><u>3)The cycle shall continue until the trouble condition is corrected and the product is restored to the normal supervisory condition.</u>
4.12.5		<p>A supervisory signal silence shall comply with the following:</p> <ul style="list-style-type: none"><u>c) A supervisory signal that has been silenced shall be automatically reactivated at the operator interface(s) every 24 hours or less, and once reactivated, shall operate until it is manually silenced or acknowledged. The cycle shall continue until the supervisory is corrected and the product is restored to the normal supervisory condition.</u>
4.12.6		<p>Trouble silence shall comply with the following:</p> <ul style="list-style-type: none"><u>c) An audible trouble signal that has been silenced shall be automatically reactivated every 24 hours or less, and once reactivated, shall operate until it is manually silenced or acknowledged. The cycle shall continue until the trouble condition is corrected and the product is restored to the normal supervisory condition; and</u><u>d) Where multiple display and control centres are provided in accordance with Clause 4.16.1(c), this manual control shall be permitted to perform the trouble silence function at each individual display and control centre even if that display and control centre is not in control of the entire fire alarm system. A manual control which can perform the trouble silence function at all display and control centres simultaneously from any display and control centre in the fire alarm system, even if that display and control centre is not in control of the entire fire alarm system, is also permitted.</u>



CLAUSE	VERDICT	COMMENT
4.12.7		System reset shall comply with the following: b) <u>An indication that the system is restoring to its normal condition if the restoration time to normal exceeds 200 s;</u>
4.13	Info	Signal Silence Inhibit Feature <i>New clause added;</i>
4.13.5		Live voice paging or automated voice messaging shall not override this feature.
4.17	Info	Voice Alarm Feature
4.17.5- 4.17.16		These clauses have been greatly revised, see standard for new requirements.
4.20	Info	Optional Features <i>New clauses added;</i> 4.20.6: Calibrated detector sensitivity testing 4.20.7: Mass notification system interconnection 4.20.8: Smoke Alarms or Smoke Detectors in Suites of Residential Occupancy 4.20.9: Carbon Monoxide Signaling 4.20.10: Low-Power Radio-Frequency Signaling 4.20.11: Pre-signal Feature 4.20.12: Safety Functions See standard for details.
4.20.6- 4.20.12		
4.21	Info	Data Communication Link (DCL) <i>New clause added;</i> A pathway designated as data communication link(s) Style N (DCLN) shall perform as follows: a) It includes two or more pathways where operational capability of the primary pathway and a redundant pathway to each device shall be verified through end-to-end communication; Exception: When only one end field device is served, only one pathway shall be required. b) A loss of intended communications between endpoints (DCLN) shall be annunciated as a trouble signal; c) A single open, ground, short, or combination of faults on one pathway shall not affect any other pathway; d) Conditions that affect the operation of the primary pathway(s) and redundant pathway(s) shall be annunciated as a trouble signal when the system's minimal operational requirements cannot be met; and e) Non-endpoint field devices shall have provisions for connection of at least two separate pathways.
4.21.6		



CLAUSE	VERDICT	COMMENT
4.24	Info	Remote Connection Feature
		<i>New clause added;</i>
4.24.3		Products intended to interconnect to a transmission interface shall comply with the following: a) The combination of the product and the interconnected transmission interface unit shall have capability to delay the loss of primary power specific trouble transmission from 1 h to 3 h; b) Primary power failure transmission is not required if primary power is restored within the delay time.
4.26	Info	Smoke Control
4.26.1	Info	General
		These requirements cover smoke control system equipment that is:
4.26.1.1		a) Integral to the fire alarm system control unit; or <u>b) A system which is separate from the fire alarm system.</u>
4.26.3	Info	Firefighter's Smoke-Control Station (FSCS)
		<i>New clause added;</i>
4.26.3.6		The status indicators may be of any colour and each status indicator shall be clearly and individually identified relative to their function. Colour used to identify a smoke control function shall be consistent. NOTE: If the smoke control functions are combined with the fire alarm system status display, red visual indicators for smoke control cannot be used. Refer to Table 4.4, Visual Indicators – Colour Code.
		<i>New section added;</i>
4.30		Fault Isolators
		This section contains requirements for fault isolators (see standard for details).
6	Info	Software-Controlled Control Units
6.1	Info	General
		<i>New clause added;</i>
6.1.9		Software and firmware within a fire alarm control system that interfaces to other required software shall be functionally compatible and the compatibility shall be indicated in the installation instructions of one or both of the compatible products/systems.



CLAUSE	VERDICT	COMMENT
7	Info	Instructions And Drawings
7.1		Each product (other than an end-of-line device) shall be furnished with installation instructions and wiring drawings. <u>The information shall be attached to the unit or, when separate, shall be referenced in the marking attached to the unit by the name or trademark of the manufacturer, drawing number, and issue date and/or revision level. When separate, a copy shall be supplied with each individual product or with each single shipment when multiples of the same product are shipped directly to an end customer in a single shipment.</u>
7.3		<p>The installation wiring drawings shall cover the following:</p> <p><u>h) Identify system configuration(s) to meet the maximum time requirements specified in Table 4.11, Maximum System Response Times;</u></p> <p><u>i) For signaling circuits, the following information shall be included:</u></p> <p><u>1) Each circuit shall be identified by the one of the rating designations shown in Table 9.1, Voltage Types and Ratings. Circuits identified as special application shall describe by manufacturer's name and model designation the specific appliance(s) and device(s), along with the maximum number intended to be connected to the circuit;</u></p> <p><u>2) Maximum RMS operating current for any single signaling device that may be connected to the circuit, where synchronized signaling devices may not be employed; and</u></p> <p><u>3) Each circuit shall identify whether synchronized signaling devices are permitted to be connected. When synchronized signaling devices are to be employed, the maximum number that may be connected per circuit shall be specified.</u></p> <p><u>j) Identify system configuration to meet the extended alarm 12 h period when combination systems include carbon monoxide signaling. See 4.3.1.8.</u></p>
7.6		<p><i>New section added;</i></p> <p>This section contains requirements for control units (see standard for details).</p>
8	Info	Construction
8.17		<p><i>New section added;</i></p> <p>Location Considerations</p> <p>This section contains requirements for indoor/outdoor installations (see standard for details).</p>
10	Info	Performance Tests
10.7		Section 10.7 has been greatly revised. See standard for new requirements.



CLAUSE	VERDICT	COMMENT
		<i>New section added;</i>
10.19		Strain Relief Test This section contains requirements for the strain relief test (see standard for details).
		<i>New section added;</i>
10.34		Compatibility Tests This section contains requirements for the compatibility test (see standard for details).