

Elevator Communications Requirements

as it pertains to POTS IN A BOX® (90X1, 90X2)

Summary compiled from ASME (American Society of Mechanical Engineers)
Standard A17.1 / CSA B44 – 2009 and 2013 editions, referred to here as A17.1

Introduction:

It should be noted that the POTS IN A BOX® (90X1, 90X2) is used as a direct Telecommunications Network provisioning device to provide the functional equivalent of a Local Exchange Carrier Central Office (LEC) provisioned “dial tone” pathway (POTS line). Considered Network Equipment by function, the POTS IN A BOX® acts as a network portal for access to the Public Switched Telephone Network (PSTN). The 90X1, 90X2 is wired on the Network side of the Standard Network Interface (SNI) or demarcation point. In function, they are considered Network Equipment and not customer premise equipment. The 90X1, 90X2 is provided by an LEC or other carrier as an alternative to copper twisted pair wiring between the customer location and the LEC Central Office. The POTS IN A BOX® provides an electrical signature like a LEC Central Office-based dial tone line. The POTS IN A BOX® enhanced functionality offers alternative routing of signals to reach the PSTN. Both Internet or Wide Area Network (WAN) and Cellular (LTE) Data Network routing is available. Additionally, the POTS IN A BOX® is provisioned to provide either email or text alerting in the event of loss of network registration or signal transfer between the POTS IN A BOX® and the WAN or LTE pathway. This near real time alert is offered as way of alerting monitoring locations of loss of communications connectivity. The POTS IN A BOX® also provides for visual status indication. LED indicators show current operational status. In addition, the POTS IN A BOX® drops FXS port line voltage to zero during loss of registration or connectivity (i.e. indicating POTS line communications failure). No audible indication is provided. Elevator Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®. However, some systems use the loss of line voltage to indicate a communications line failure. This generally will trigger a local annunciation or indication of communications failure. The POTS IN A BOX® is supported by an internal standby battery supplying up to 48 hours back up battery in the event of local power failure.

A17.1 Current National Requirements

Part A17.1, section 2.27.1 Emergency Car Signaling Devices addresses two-way communications. DataRemote's POTS IN A BOX® device meets the requirement for providing communications between the car and the staffed monitoring location. The POTS IN A BOX® is listed with Underwriters Laboratories Inc. (UL) under standard 60950-1 which conforms to the American National Standards Institute (ANSI) safety standard for Information Technology Equipment (ITE). The UL 60950-1 standard is applicable to ITE designated for use as Telecommunication Terminal Equipment and Network Infrastructure Equipment, regardless of the source of power. The UL 60950-1 standard testing considers not only normal operating conditions of the equipment, but also the likely fault conditions, consequential faults foreseeable misuse and external influences such as temperature, altitude, pollution, moisture, as well as over voltages on a main supply, telecom network or cable network.

Most of the A17.1 code is written in prescriptive language, including the code requirement and how it is to be measured or achieved. The section of the code addressing emergency communications is written in performance language, that is, it describes the required outcome but not necessarily how it must be achieved. The national standard in effect for accessible and usable buildings and facilities is ICC/ANSI A17.1. This includes additional requirements for use of buildings and elements by persons with a wide range of abilities. If there is a system or device that can meet the requirements of both the A17.1 and the ICC/ANSI A17.1, the system or device may be used. The requirements have changed over the years with the current requirements summarized as follows (see each code section referenced for exact code language and details):

1. The device must be activated by one push button. The device may not use a handset. **(A17.1, 2.27.1.1.3 (b) and (g))**. This is a direct function of the elevator control and annunciation hardware. The POTS IN A BOX® responds to external requests for service. It does not initiate service or dial independently. Hence, this section does not directly apply.
2. Accessing or operating the button must be performed using one hand without requiring tight grasping, pinching, or twisting of the wrist. The force required to activate shall be 5.0 lbs. maximum. Note: At one time elevator telephone cabinets having a heavily spring-loaded door with a very small handle were common. This requirement prohibits locating a new emergency telephone in a cabinet with such a door. **(ICC / ANSI A17.1, 309.4)**. This section does not directly apply to the POTS IN A BOX® as physical access to initiation or handset/speakerphone devices is a function of the equipment attached to the POTS IN A BOX®.

3. The button must be located on or adjacent to the car operating panel. The highest operable part must be between 35" and 48" above the elevator or vertical platform lift floor. **(A17.1, 2.27.1.1.3 (b) and ICC / ANSI A117.1, 407.4.10.1.4)).** This section does not apply to the CDS90XX for reasons stated above.
4. The button must be identified as "PHONE" using tactile characters and symbols. Operating instructions must be included. **(A17.1, 2.27.1.1.3 (b) and (i) and ICC / ANSI A117.1, 407.4.10.2.5)).** This section does not apply to the POTS IN A BOX® for reasons stated above.
5. Actuating the device must initiate a call for help and establish two-way voice communication with authorized personnel who can take appropriate action. The device may not reach an answering system. **(A17.1, 2.27.1.1.2 (a) and 2.27.1.1.3 (b) and (h)).** The POTS IN A BOX® will react to an external request for communications by providing "dial tone" to the connected device. However, as stated previously, this section does not apply as it is a function of the elevator communications control and annunciation equipment.
6. If the device does not reach authorized personnel within 45 seconds, the call must automatically be directed to another on or off-site location to reach authorized personnel. **(A17.1, 2.27.1.1.2 (b)).** This is a function of the elevator communications hardware and not the POTS IN A BOX® and therefore, does not apply.
Note: By combining the information in # 5 and # 6, it is acceptable for the device to reach an automated system if the device reaches authorized personnel within 45 seconds.
7. The two-way voice communication means must provide the authorized personnel with the location of the building, the elevator (or lift) number (or location) and a request for assistance.
Note: This is typically on a message recorded in the telephone and played for the authorized personnel once the call is answered. **(A17.1, 2.27.1.1.3 (d)).** The POTS IN A BOX® provides physical address information as required by the National E-911 alerting requirements. Each POTS IN A BOX® is programmed accordingly at installation. Any movement of the device requires notification prior to move. DataRemote® maintains the database for E-911 reporting purposes. Customers are individually responsible for ensuring accuracy of address information. Any fines for violation are the direct responsibility of the end customer and not DataRemote®.

8. The authorized personnel must activate a visual indication on the "PHONE" panel in the elevator or platform lift acknowledging that the call has been established. Note: This is mainly for the benefit of the hearing impaired. **(A17.1, 2.27.1.1.3 (c))**. Not a direct function of the CDS90XX but rather the initiation hardware associated with the elevator communications controls. The POTS IN A BOX® will provide traditional POTS line voltages and associated telephone line characteristics to the connected equipment. The POTS IN A BOX® LED indicators will indicate when a line is in use.
9. After the call has been established and the acknowledgement sent to the car or platform, twoway voice communication shall be available between the car or platform and the authorized personnel. **(A17.1, 2.27.1.1.3 (e))**. This section does not apply to the POTS IN A BOX® for reasons stated above. The POTS IN A BOX® will respond to a request for service and maintain the channel for the required duration of the call. Control is a function of the elevator communication control hardware and not the POTS IN A BOX®.
10. The two-way voice communications shall be ended only when the authorized personnel terminate the call or after a minimum of 3 minutes. See this section for details. **(A17.1, 2.27.1.1.3 (f))**. This section does not apply to the POTS IN A BOX® for reasons stated above. The POTS IN A BOX® will respond to a request for service and maintain the channel for the required duration of the call. Control is a function of the elevator communication control hardware and not the POTS IN A BOX®.
11. The visual indicator described in # 8 above may be extinguished only after the two-way voice communication is terminated. **(A17.1, 2.27.1.1.3)**. This section does not apply to the POTS IN A BOX® for reasons stated above. The POTS IN A BOX® will respond to a request for service and maintain the channel for the required duration of the call. The POTS IN A BOX® LED indicators will show line status. Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®.

12. For elevators only (not required for vertical platform lifts) a means shall be provided to verify the operability of the means of two-way voice communications. The verification must occur automatically and at least daily. **(A17.1, 2.27.1.1.6)**. This section does not apply to the POTS IN A BOX® for reasons stated above. The POTS IN A BOX® will respond to a request for service and maintain the channel for the required duration of the call. Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®. It must be noted that the POTS IN A BOX® family of equipment is communicating network registration information as part of the network supervision and traffic management function of the architecture. Loss of registration or connectivity will trigger notification via email or text to a programmed addressee.
13. Additional vertical height requirements:
- a. For elevators having travel of less than 60 feet and for vertical platform lifts, any need to re-establish two-way voice communication once a call has been terminated is only required to be available to persons in the elevator or lift. This section does not apply to the POTS IN A BOX® for reasons stated above. The POTS IN A BOX® will respond to a request for service and maintain the channel for the required duration of the call. Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®.
 - b. For elevators having travel of 60 feet or more, a means must be provided for emergency personnel within the building to establish two-way voice communication to each elevator individually. This must occur without action by a person in the elevator. This must override attempts by a person in the elevator to re-establish two-way voice communication to authorized personnel outside the building. **(A17.1, 2.17.1.1.4)**. This section does not apply to the POTS IN A BOX® for reasons stated above. However, the POTS IN A BOX® will respond to a request for service and maintain the channel for the required duration of the call. Externally initiated calls may be placed to the individual elevator by dialing the appropriate 10-digit telephone number from any PSTN accessible device. Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®.

- c. **Note:** The 60-foot travel is an important distinction. For elevators and platform lifts described in # 13a, there is no requirement for a means to call back into the elevator or platform lift. If two-way voice communication is to be re-established, it is only required to be re-established by a person in the elevator or lift. This makes use of a line-seizure device or similar switching system more likely to comply and makes a dedicated telephone line for the elevator or lift (and associated cost) less likely to be necessary. For elevators described in # 13b (with travel of 60 feet or more), the need to provide a means for personnel on-site to re-establish voice communication to each elevator may require dedicated telephone lines or other switching means or equipment to allow establishing two-way communication. This section does not apply to the POTS IN A BOX® for reasons stated above. However, the POTS IN A BOX® will respond to a request for service and maintain the channel for the required duration of the call. Externally initiated calls may be placed to the individual elevator by dialing the appropriate 10-digit telephone number from any PSTN accessible device. Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®.

Also note, the 60-foot travel limit is not affected by the number of stories or the location of the stories related to grade level for the building or structure. Travel is measured from the lowest landing served to the uppermost landing served.

14. If the means of two-way voice communication is powered by building power, not by telephone line power, the device must transfer to an alternate power supply after normal power fails. Power must be provided to operate the visual indicator addressed in **8) above (A17.1, 2.27.1.1.3 (c))** and the means of two-way voice communication for at least 4 hours. The POTS IN A BOX® provides an internal standby battery up to 48 hours. It is suggested that the customer provide their own Uninterruptable Power Supply to augment the internal capability of the POTS IN A BOX® if additional power is required during local power loss.

Note: Codes do not prohibit the use of any technology. Cellular, VoIP (Voice over Internet Protocol), PBX (Private Branch Exchange), satellite and other technology may be used if it meets all the above requirements listed in # 1 through # 14 above and the codes the list is based on. The POTS IN A BOX® conforms to UL 60950-1. As a network side device, The POTS IN A BOX® provides optional tertiary pathway access to the PSTN (dual cellular carrier capable plus WAN internet access, depending on model) as well as alerting via text or email of communications loss. The POTS IN A BOX® provides visual indication of status via LED indicators but does not provide remote annunciation to other elevator devices. No audible annunciation is provided. The POTS IN A BOX® will drop FXS line voltage to zero upon loss of line registration. This generally will trigger Elevator control equipment to annunciate locally a communications loss.

Additional carryover requirements from the 2009 code not addressed above:

2.27.1 Car Emergency Signaling Devices-A17.1b-2009 2.27.1.1.6 (a)

The two-way communications technology within the car shall include a means to verify operability of the telephone line, where:

1. Verification of the telephone line operability shall be automatically performed.
2. Verification may be continuous or periodic.
3. Periodic verification shall be at least daily.
4. Verification shall not require activation of the two-way communications link(s).

If technology other than a telephone line (e.g., VOIP, network, intercom, etc.) is used for the two-way communications, similar verification of this equivalent means shall be performed.

The POTS IN A BOX® will respond to a request for service and maintain the channel for the required duration of the call. Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®. The POTS IN A BOX® LED indicators will show line status. The POTS IN A BOX® will drop FXS line voltage to zero upon loss of line registration. This generally will trigger Elevator control equipment to annunciate locally a communications loss. It must be noted that the POTS IN A BOX® family of equipment is communicating network registration information as part of the network supervision and traffic management function of the architecture. Loss of registration or connectivity will trigger notification via email or text to a programmed addressee.

2.27.1 Car Emergency Signaling Devices-A17.1b-2009 2.27.1.1.6 (b)

If the verification means in **2.27.1.1.6(a)** determines that the telephone line or equivalent technology is not functional, an audible and illuminated visual signal shall be activated. A minimum of one visual and one audible signal shall be provided for each group of elevators controlled by a "FIRE RECALL" switch. The POTS IN A BOX® provides visual indication of status indicators but does not provide remote annunciation to other elevator or elevator control devices. No audible indication is provided. The POTS IN A BOX® LED indicators will show line status. The POTS IN A BOX® provides for text or email notification when loss of registration or change of communications pathway state. The POTS IN A BOX® will respond to a request for service and maintain the channel for the required duration of the call. The POTS IN A BOX® will drop FXS line voltage to zero upon loss of line registration. This generally will trigger Elevator control equipment to annunciate locally a communications loss. Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®.

1. The visual signal shall(a) be located at the designated landing in the vicinity of the "FIRE RECALL" switch and visible to elevator user(s) AND
2. Be labeled "ELEVATOR COMMUNICATIONS FAILURE" in red letters a minimum of 5 mm (0.25 in.) high AND
3. Illuminate intermittently AND
4. Continue illuminating intermittently until the telephone line or equivalent technology is functional
5. A minimum of one visual and one audible signal shall be provided for each group of elevators controlled by a "FIRE RECALL" switch AND
6. The audible signal shall
 - a. Be 10 dBA minimum above ambient, but shall not exceed 80 dBA measured at the designated landing "FIRE RECALL" switch
 - b. Sound at least once every 30 s with a minimum duration of half a second AND
 - c. Continue to sound until silenced by authorized personnel or the telephone line or equivalent technology is functional.

The POTS IN A BOX® provides visual indication of status via LED indicators but does not provide remote annunciation to other elevator devices. No audible indication is provided. The POTS IN A BOX® provides for text or email notification when loss of registration or change of communications pathway state. The POTS IN A BOX® will respond to a request for service and maintain the channel for the required duration of the call. The POTS IN A BOX® will drop FXS line voltage to zero upon loss of line registration. This generally will trigger Elevator control equipment to annunciate locally a communications loss. Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®. It must be noted that the POTS IN A BOX® family of equipment is communicating network registration information as part of the network supervision and traffic management function of the architecture. Loss of registration or connectivity will trigger notification via email or text to a programmed addressee.

A means to silence the audible signal shall be provided and shall be accessible only to authorized personnel. The signal when silenced shall remain silent for a period of no less than 12 hours until activated by the next failed periodic verification. POTS IN A BOX® function, operation, indication and annunciation same as above. The POTS IN A BOX® LED indicators will show line and system status. No audible annunciation is provided. The POTS IN A BOX® will drop FXS line voltage to zero upon loss of line registration. This generally will trigger Elevator control equipment to annunciate locally a communications loss. Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®. It must be noted that the POTS IN A BOX® family of equipment is communicating network registration information as part of the network supervision and traffic management function of the architecture. Loss of registration or connectivity will trigger notification via email or text to a programmed addressee.

The verification means in **2.27.1.1.6(a)** shall continue to monitor the operability of the telephone line or equivalent technology while the telephone line or equivalent technology is not functional on a continuous basis or periodically with intervals of not more than 5 minutes (2013 code). When the verification determines that the operability of the telephone line or equivalent technology has been restored after being nonfunctional, the audible signal shall be silenced unless the signal has already been silenced in accordance with **2.27.1.1.6(b)(3)** and the illuminated visual signal shall be extinguished (2013). POTS IN A BOX® capability is the same as above. The POTS IN A BOX® LED indicators will show line and system status. No audible annunciation is provided. The POTS IN A BOX® will drop FXS line voltage to zero upon loss of line registration. When registration is returned, the FXS line voltages will be re-established. This generally will trigger Elevator control equipment to annunciate locally a communications loss or restoral. Control and annunciation are a function of the elevator communication control hardware and not the POTS IN A BOX®. It must be noted that the

POTS IN A BOX® family of equipment is communicating network registration information as part of the network supervision and traffic management function of the architecture. Loss of registration or connectivity will trigger notification via email or text to a programmed addressee.

Authorized Personnel for Answering Passenger Elevator or Vertical Platform Lift Calls

Telephones in elevators and vertical platform lifts to reach persons trained to take appropriate action in an emergency. Not applicable to POTS IN A BOX®. However, the POTS IN A BOX® is used as a direct Telecommunications Network provisioning device to provide the functional equivalent of a Local Exchange Carrier Central Office (LEC) provisioned “dial tone” pathway (POTS line). Considered Network Equipment by function, the POTS IN A BOX® acts as a network portal for access to the Public Switched Telephone Network (PSTN).

Thereby enabling voice communications with authorized personnel. The POTS IN A BOX® provides for text or email notification when loss of registration or change of communications pathway state.

In Buildings With 24-Hour Staffing

In buildings where authorized personnel are trained to respond to an emergency in an elevator or vertical platform lift at any time (24 hours/day, 7 days/week including holidays), calls are required to reach those trained individuals. Such authorized personnel are common in hospitals (information desk or building superintendent for example), nursing homes (nurse's station), hotels (front desk), some office and apartment buildings (security desk) and college campuses and other campuses (campus police or campus security). Not applicable to POTS IN A BOX®. As stated above, the POTS IN A BOX® acts as a portal for access to the Public Switched Telephone Network (PSTN). Thereby enabling voice communications with authorized personnel. The POTS IN A BOX® provides for text or email notification when loss of registration or change of communications pathway state.

In Buildings Without 24-Hour Staffing

In buildings that do not have authorized personnel on site 24 hours/day, 7 days/week including holidays, calls from elevators and vertical platform lifts must reach someone trained to take appropriate action in an emergency. After hours calls must go to authorized personnel off-site, commonly to a telephone answering service, security company or elevator company.

Elevator or platform lift calls may not go only to an individual or telephone number affiliated with the owner or the organization for multiple reasons.

1. Individual(s) often at that number may be unavailable at times. This has been suggested where a church has a pastor, caretaker or trustee who is willing to take such calls. This has been suggested where an apartment building or other building has an on-site or off-site manager. Also, an individual intending to be available 24/7 via a personal cellular telephone or with call forwarding may not always be available, may not have cell service everywhere or may have a discharged battery. Not applicable to POTS IN A BOX®. As stated above, the POTS IN A BOX® acts as a portal for access to the Public Switched Telephone Network (PSTN). Thereby enabling voice communications with authorized personnel. The POTS ON A BOX® provides for text or email notification when loss of registration or change of communications pathway state.
2. The individual expected to answer all calls from the elevator or lift telephone may be the one stuck in the elevator or lift after hours. POTS IN A BOX® response same as above including text/email notification.
3. An individual not part of an answering service may be preoccupied and unable to locate the appropriate elevator personnel to respond appropriately to the call. Code requires the individual answering the call to be able to take appropriate action immediately. POTS IN A BOX® response same as above including text/email notification.

911 or Other Local Emergency Service as Authorized Personnel

A local police or fire department may, with permission, accept calls from elevator or platform lift emergency telephones. Many local services may accept such calls while others may have an ordinance or policy prohibiting such calls. Permission to direct calls to the local emergency service would include the number the service would require the call to go to. In some communities, calling 911 from an elevator or lift telephone may be a misdemeanor and subject to fines or other penalties. As stated above, the POTS IN A BOX® acts as a portal for access to the Public Switched Telephone Network (PSTN). Thereby enabling voice communications with authorized personnel. The POTS IN A BOX® complies with Federal E-911 address registration requirements. Each device is programmed to reflect location to meet E-911 standards. Movement of a POTS IN A BOX® device requires prior notification to DataRemote®. This confirms physical location information critical to accurate dispatching of aid to the location. Failure to comply with proper registration or providing incorrect addressing information may result in fines and other penalties from the responsible agency. The end customer is responsible for providing DataRemote® with current and accurate address and location information. DataRemote® is not responsible for fines or other penalties created by non-compliance of the requirement.