FEDERAL SIGNAL
Safety and Security Systems / Industrial

Models 300VSC-1 and 300VSC-1044SB SelecTone® Command Units®

Model 300VSC-1044SB

Model MNC-1

Model 300VSC-1

Model MSB-1

Installation and Maintenance Manual

2561044G
Rev. G1 1124
Printed in U.S.A.

Limited Warranty

This product is subject to and covered by a limited warranty, a copy of which can be found at www.fedsig.com/SSG-Warranty. A copy of this limited warranty can also be obtained by written request to Federal Signal Corporation, 2645 Federal Signal Drive, University Park, IL 60484, email to info@fedsig.com or call +1 708-534-3400.

This limited warranty is in lieu of all other warranties, express or implied, contractual or statutory, including, but not limited to the warranty of merchantability, warranty of fitness for a particular purpose and any warranty against failure of its essential purpose.

FEDERAL SIGNAL
Safety and Security Systems

2645 Federal Signal Drive
University Park, Illinois 60484-3167

www.fedsig.com

Customer Support	800-344-4634 • +1 708 534-4756
Technical Support	800-755-7621 • +1 708 587-3587

Contents

Tables

Figures

Safety Message to Installers of Federal Signal Products

⚠ WARNING

People's lives depend on your proper installation and servicing of Federal Signal products. It is important to read and follow all instructions shipped with this product. Listed below are some other important safety instructions and precautions you should follow:

- This device is to be installed by a trained electrician who is thoroughly familiar with the National Electric Code and will follow the NEC guidelines as well as local codes.
- Consult the authority having jurisdiction in your area regarding the proper use and installation of this product.
- The selection of the mounting location for the device, its controls and routing of the wiring is to be accomplished under the direction of the Facilities Engineer and the Safety Engineer.
- Read and understand all instructions before installing or operating this equipment.
- Do not connect this unit to the system when power is on.
- Optimum sound distribution will be severely reduced if any objects are in front of the speaker. Ensure that the front of the speaker is clear of obstructions.
- All effective warning speakers produce loud sounds which may cause, in certain situations, permanent hearing loss. You should take appropriate precautions such as wearing hearing protection.
- After installation, test the sound system to ensure proper operation.
- Show these instructions to your Safety Engineer and then file them in a safe place and refer to them when maintaining and/or reinstalling the unit.
- Establish a procedure to routinely check the sound system for proper activation and operation.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

Unpacking the Product

After unpacking the product, examine it for damage that may have occurred in transit. If the 300VSC-1 or the 300VSC-1044B has been damaged, do not attempt to install or operate it. File a claim immediately with the carrier, stating the extent of the damage. Carefully check all envelopes, shipping labels, and tags before removing or discarding them. Disposal of all shipping materials must be carried out in accordance with national and local codes and standards. If any parts are missing, please call Federal Signal Customer Support at 800-344-4634 or 708-534-4756.

An Overview of the Product

The Model 300VSC SelecTone® Command Unit is a central control device that is capable of generating up to four different tone signals on a line that is connected to remote speaker/amplifiers in a SelecTone System. The 300VSC can control signal lines to Federal Signal Models 300GC, 300GCX, 300X, 302GC, 302GCX, 302X, and 50GC speaker/amplifiers and to other devices designed to operate with a SelecTone system. It can also control signals to speakers designed for 25 V_{RMS} line operation. The 300VSC has a public address (PA) function so that voice messages or instructions can be announced over the SelecTone system through an optional Model MSB-1 or MNC-1 microphone. The unit can also be used to play background music generated from an external source over the SelecTone system.

The Model MNC-1 microphone is a hand-held, noise canceling microphone that is ideal for use as a local microphone. The Model MSB-1 microphone is a base-station type microphone designed for desktop operation.

The Model 300VSC-1 is intended to be installed indoors on a desktop or other flat surface.

The Model 300VSC-1044B is a rack-mountable unit complete with mounting hardware. It fits any standard 19-inch rack-mount cabinet.

The Model 300VSC can be used for a variety of prioritized signaling purposes, such as playing background music, auxiliary fire alarm, evacuation alarm, start and dismissal, paging, and other emergency warning applications. The system can be automated if external devices such as heat detectors, switches, or program clocks are connected to the remote control inputs. Additional advantages of the Model 300VSC include economical system expansion along with long-term system flexibility.

The Model 300VSC generates and amplifies tone and audio signals and applies them through signal lines to the remote SelecTone® devices in the system. The Model AM25CK Connector Kit is required in each SelecTone device to connect the them to the signal line. Speakers designed for 25-volt operation can connect directly to the 25-volt output. The 300VSC has provisions for up to four SelecTone tone modules of your choice. The tones are designated as **TONE 1**, **TONE 2**, **TONE 3**, and **TONE 4**. Each tone can be manually activated locally by its associated button switch on the front panel or by a contact closure at the associated remote control input. Whenever a tone is activated, either locally or remotely, its associated front panel button LED lights to indicate that the tone has been activated. The LED remains lit until the tone is deactivated and the contact closure is removed. All 300VSC controls are located on the front panel.

Product details and features are described in the next sections. For complete product specifications, see Table 1 on pages 8 through 10.

Chassis Dimensions and Features

The Model 300VSC-1 is assembled in a black, brushed-aluminum, two-piece housing approximately 10.50 in (26.67 cm) wide by 9.25 in (23.50 cm) deep by 2.44 in (6.2 cm) high. It is intended to be placed on any flat horizontal surface, or it can be wall-mounted using the wall mounting brackets supplied in the accessory kit. The housing is held together with four screws: two on the bottom near the front and two at the back near the terminal blocks.

The Model 300VSC-1044SB is assembled in a three-piece aluminum housing. The housing is painted black and is 19.0 in wide x 10.0 in deep and 3.5 in high. This unit is installed in a standard 19-inch rack-mount cabinet.

The 300VSC comes equipped with a US 120 Vac power cord and a 240 Vac (UK-EL210) power cord.

Front Panel Features

The front panel has a green LED to indicate the presence of primary power. The 300VSC can be operated from either a 240 Vac, 120 Vac, or a 24 Vdc power source. The 120 Vac and 240 Vac power is connected via the supplied power cords, and the 24 Vdc power connects via the rear terminals.

The front panel switches are designated as **TONE 1** through **TONE 4**, **AUX**, **TEST**, and **CANCEL**. The tone corresponding to each switch can be labeled in the white area next to the switch with a permanent felt-tip marker. If you are changing a tone or message, remove the marking by lightly rubbing it with a rag dampened with denatured alcohol. To avoid damaging the switches, ensure that the alcohol does not come in contact with them.

Control Circuitry Features

The control circuitry in the 300VSC has a built-in priority-level feature. If a given tone is already sounding when a higher priority tone is locally or remotely activated, the higher priority tone automatically overrides the lower priority tone. However, the button LED for the lower priority tone remains lit to indicate that the lower priority tone remains activated. When the higher priority tone is deactivated, the LED in the button turns off and the lower priority tone resumes sounding.

Pressing the **CANCEL** button deactivates any currently active tones. The local microphone has the highest priority. All of the tones have priority by number sequence and all have priority over remote PA and background music.

Because **TONE 1** has priority over all tones, the TM9 “Slow Whoop” tone module is frequently installed in the Tone 1 position as a “Fire” signal. Whenever the 300VSC is activated and is not in the Test Mode (see "**TEST** Button" below), a built-in relay opens a set of normally closed contacts and closes a set of normally open contacts, which makes it possible to send an alarm signal to other emergency services or circuits. Check local codes for specific requirements regarding the types of tones to use.

CANCEL Button

The **CANCEL** button resets all the manually activated signaling functions of the 300VSC. It also provides a momentary dry contact closure to facilitate remote resetting of any other alarm circuit. The contact stays closed as long as the **CANCEL** button is pressed. Resetting of remote activation will not occur if the closure occurring at the remote input has not been removed.

TEST Button

The **TEST** button enables the testing of tones without activating speakers on the unbalanced signal lines. During the test, the tone is heard only from the monitor speaker inside the enclosure. The **TEST** button also cancels false alarms. Whenever the button is pressed, the LED remains illuminated to remind the operator to press the **CANCEL** button after the test is completed or the false alarm is corrected.

Power Requirements and AC Voltage Selection

⚠ WARNING

SHOCK HAZARD — To prevent power to the 300VSC from being turned off accidentally, it does not have a power switch and remains energized unless power is disconnected. Before performing any installation or maintenance, disconnect power to the 300VSC.

The 300 VSC is factory-set for 120 Vac, 50/60 Hz operation. If 240 Vac operation is required, open the housing and slide the voltage selector switch **SW1** to the **240V** position. The switch is located near the line fuses and the transformer on the motherboard.

Audio Inputs

A microphone can be connected directly to the 300VSC through modular jacks provided in the front of the 300VSC. The microphone has the highest priority. There are, however, screw terminals for a low-level, low-impedance audio signal to be input in the back of the 300VSC. The terminals enable audio to be coupled from a PBX telephone system with the proper interface equipment supplied by the phone company. This input is designed to also enable the direct connection of a low-impedance remote microphone with separate PTT, which has a priority below the tones. An RCA jack in the back of the chassis accepts a standard 1-volt audio signal from a background music source such as a radio receiver, CD player, or a tape player.

Table 1 Product specifications

Power Input	
Input Voltage	120/240 Vac, 50 Hz to 60 Hz
Standby Current	50 mA, 120 Vac
Operating Current	210 mA (max)
Power Consumption	26 W (max.)
Emergency Power Source Input	
Input Voltage	22 Vdc to 32 Vdc
Standby Current	90 mA
Operating Current	760 mA
Audio Inputs	
Local PA (use optional Model MSB-1 microphone)	
Input Impedance	5 kΩ
Input Voltage	16 mVrms (max)
Remote Microphone	
Input Impedance	5 kΩ
Input Voltage	16 mVrms (max)
Auxiliary Input	
Input Impedance	5 kΩ
Input Voltage	500 mVrms (max.)
Audio Outputs	
Output Impedance	
Unbalanced Signal Line	25 Ω (max.)
Unbalanced Signal Line, Standby	120 Ω
Balanced Signal Line	40 Ω (max.)
Low-Level Signal Line	600 Ω
Output Voltage Levels, No Load (< 3% THD)	
Unbalanced Signal Line	9 Vrms
Balanced Signal Line	17 Vrms
Low-Level Signal Line	1 Vpp
Output Voltage Levels, Max. Load (< 3% THD)	
Unbalanced Signal Line	8 Vrms (25 Ω load)
Balanced Signal Line	15 Vrms (40 Ω load)
Low-Level Signal Line	1 Vpp (600 Ω load)

Table 1 Product specifications (continued)

Output Voltage Levels, No Load (sq. wave)	
Unbalanced Signal Line	12 Vrms
Balanced Signal Line	25 Vrms
Low-Level Signal Line	1 Vpp
Tone Output Levels Max. Load (sq. wave)	
Unbalanced Signal Line	12 Vrms (25 Ω load)
Balanced Signal Line	20 Vrms (40 Ω load)
Low-Level Signal Line	0.56 Vrms (600 Ω load)

Audio Frequency Response, Balanced Signal Line

40 Ω Max. Load, from 250 Hz to 80 kHz	
(Reference 1 kHz)	-3 dB
40 Ω Max. Load, from 450 Hz to 60 kHz	
(Reference 1 kHz)	-1 dB
No Load, from 100 Hz to 90 kHz	
(Reference 1 kHz)	-3 dB
No Load, from 200 Hz to 60 kHz	
(Reference 1 kHz)	-1 dB
Signal to Noise Ratio (< 3% THD)	
Local PA	60 dB
Remote Mic	40 dB
Aux. Input	80 dB
Audio Distortion from Aux. Input to Balanced Signal	
Line Output (40 Ω Load)	2 %

Internal Speaker

Sound Level at 1 meter	65 dB

Remote Tone Activation Circuit

Type	Dry contact closure
Line Impedance	100 Ω (max.)
Circuit Current	50 mA (max.) (12 Vdc)

Remote Microphone Activation Circuit (PTT)

Type	Dry contact closure
Line Impedance	100 Ω (max.)
Circuit Current	10 mA (max.) (12 Vdc)

Table 1 Product specifications (continued)

Remote Contact Closure Outputs	
Tone 1, Tone 2, Tone 3, Tone 4, Sig. Out, Aux., Test and Cancel Relays	
Type	Dry contact closure
Rating	24 Vdc, 1 A, resistive
Signal to Noise Ratio (< 3% THD)	
Local PA	60 dBA
Remote Mic	40 dBA
Aux Input	80 dBA
Audio Distortion From Aux Input to Balanced Signal	
Line Output (40 Ω load)	2 %
Fuses	
F1	Type GMC-1, 1 A, 250 V
F2	Type GMC-1/2, 1/2 A, 250 V
Dimensions and Weight	
Model VSC-1	
Weight	4.125 lb (1.88 kg)
Dimensions (WDH)	10.5 in x 9.25 in x 2.44 in 26.67 cm x 23.50 cm x 6.20
Model VSC-1044SB	
Weight	7.9 lb (3.58 kg)
Dimensions (WDH)	19.0 in x 10.0 in x 3.5 in 48.26 cm x 24.40 cm 8.89 cm

Recommendation for the Signal Lines

⚠ WARNING ***REDUCED SOUND OUTPUT — If too small a diameter cable is used, unacceptable signal voltage drop in the signal line will cause reduced sound output from the remote signal device. Only use a cable having wire diameter greater than 22 AWG.***

The signal lines transfer tone signals and verbal messages from the 300VSC to the remote SelecTone® devices. To reduce the possibility of cross talk, hum, and static noise pickup, the signal lines must be twisted-pair, shielded audio cable. In the majority of systems, use AWG 18 shielded twisted-pair audio cables. Federal Signal does not recommend that new or existing telephone lines be used as signal lines in a SelecTone system for the following reasons:

- Interference from other services or systems, or interference from the system to other services
- Cross talk, interference, or hum induced by other telephone lines
- Extended downtime because of the second party involvement required to service the lines
- The additional cost of installation, interfacing devices and monthly charges as opposed to a one-time cost of performing the installation

Connecting Signal Lines

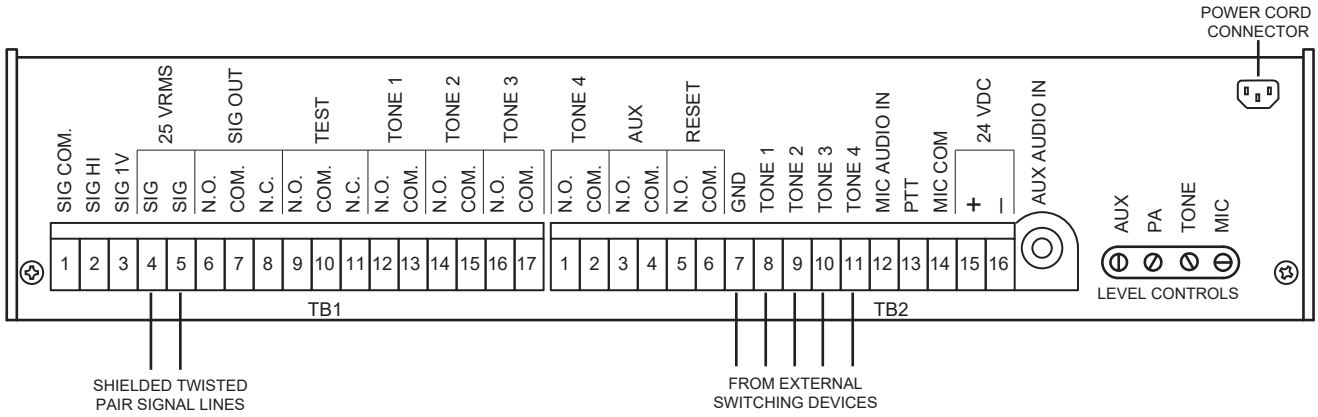
⚠ WARNING ***CROSSTALK/INTERFERENCE HAZARD — Mixing power lines with signal lines can cause cross talk, interference, or hum in the signal lines, which interferes with the emergency warning capability of this equipment. Do not install power lines in the same conduit as signal lines.***

⚠ WARNING ***SHOCK HAZARD — Do not install signal lines in the same conduit with power lines. Avoid routing signal lines on cable trays with high voltage power lines.***

To connect the signal lines of the SelecTone® system to the 300VSC, connect a color-coded twisted pair of audio cables having conductors no smaller than 18 AWG to the **TB1-4** and **TB1-5** terminals on **TB1**. Every remote SelecTone signaling device in the system can be connected in parallel or series to these lines. See Figure 1.

For non-SelecTone 25 V_{RMS} speakers, such as ceiling speakers, connect the signal lines directly to **TB1-4** and **TB1-5** of terminal block **TB1**. Signal line losses must be considered when calculating how many speakers can be connected to the 300VSC.

Figure 1 Connections on the back of Model 300VSC



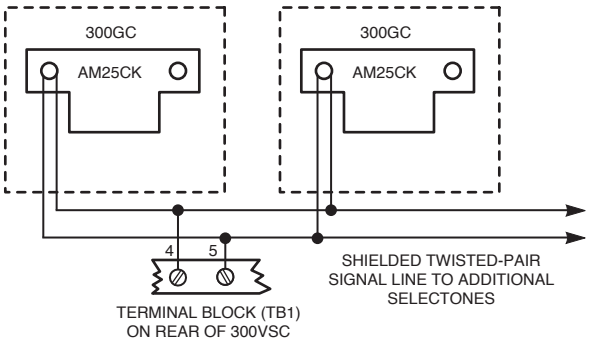
Connecting to Remote Devices

Install the remote SelecTone device(s) following the instructions included with the device.

Balanced Line Application

For 300GC, 300GCX, 300X, 302GC, 302GCX, 302X, or 50GC speakers, an AM25CK Connector Kit is required for connection to the balanced signal output of the 300VSC. The AM25CK properly terminates the balanced signal lines to the amplifier in the 300GC, 300GCX, 300X, 302GC, 302GCX, 302X and 50GC. As shown in Figure 2 on page 12, connect the white input wires on the AM25CK to the terminals **TB1-4** and **TB1-5** of terminal block **TB1** on the 300VSC. The AM25CK and AM70CK Connector Kits are NOT polarity sensitive, but you must observe polarity when placing speakers in close proximity to each other.

Figure 2 Model AM25CK connections (balanced line)



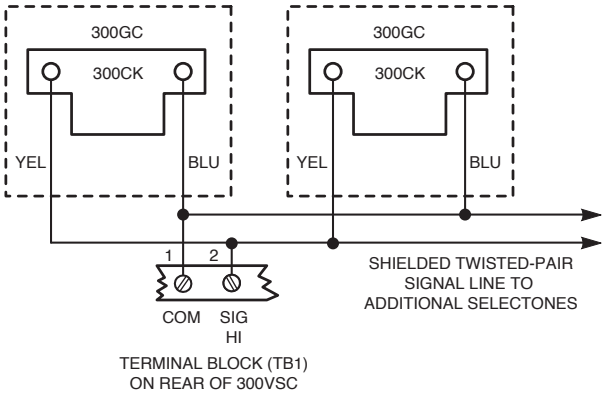
For 25 V_{RMS} line-operated speakers, connect them directly to the balanced signal output of the 300VSC. Connect the speakers in parallel to terminals **TB1-4** and **TB1-5** of terminal block **TB1** on the 300VSC. Unlike the unbalanced line output, this output is not switched.

IMPORTANT: Use the balanced signal output only if there are no SelecTone system devices connected to the unbalanced signal output (across **TB1-1** and **TB1-2**).

Unbalanced Line Application

For existing SelecTone® systems using the 300CK Connector Kit, use the unbalanced signal outputs on the 300VSC. A 300CK Connector Kit is required to connect a 300GC, 300GCX, 300X, 302GC, 302GCX, 302X or 50GC to the unbalanced signal lines. The 300CK properly terminates the signal lines to the amplifier in the 300GC, 300GCX, 300X, 302GC, 302GCX, 302X and 50GC. Connect the blue wire on the 300CK to the **SIG COM** wire from the 300VSC. Connect the yellow wire on the 300CK to the **SIG HI** wire from the 300VSC. See Figure 3.

Figure 3 Model 300CK connections (unbalanced line)



Connecting a Low-Level Audio Output

The 300VSC also has a 1-volt peak-to-peak audio output that can be coupled to the audio input of another amplifier. This low-level output is available across terminals **TB1-1** and **TB1-2**. It can also be connected to an analog fiber optic transmitter so that audio can be transmitted over a fiber-optic link in an electrically noisy environment.

Connecting to Remote Switches for Tone Activation

The 300VSC tones can be activated remotely by any normally open, low-current switch contacts with a current capacity of at least 50 mA inductive. Figure 4 illustrates the connection of switch contacts to the 300VSC. The designations **S1**, **S2**, **S3** and **S4** represent remote switch contacts such as those found in flow switches, program clocks, heat detectors, and smoke detectors. The remotely activated tone sounds as long as the activating contacts remain closed.

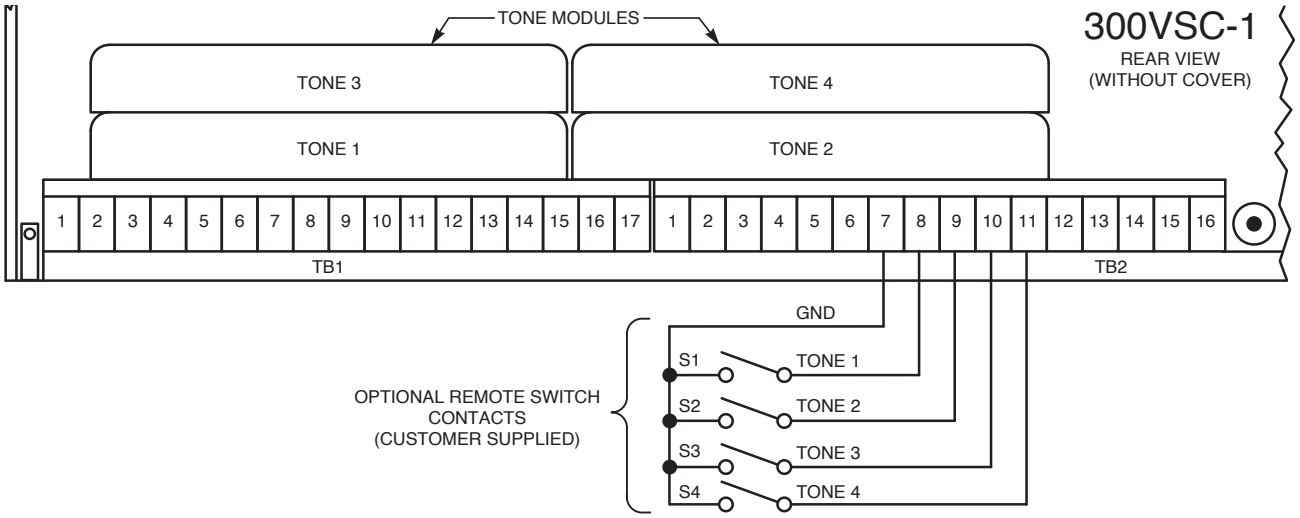
Installing SelecTone Tone Modules

⚠ WARNING

SHOCK HAZARD — Do not perform any installation or maintenance on this system when power is on. Because the 300VSC does not have a power switch, ensure that the power is disconnected before proceeding. Failure to heed this warning may cause serious injury or death.

The 300VSC can accommodate up to four SelecTone® tone modules of your choice. To install the tone modules, insert them into the desired receptacles on the printed circuit board. The receptacles for **TONE 1** module and **TONE 2** module are located on the motherboard. Receptacles for **TONE 3** module and **TONE 4** modules are located on the card that plugs into the motherboard. See Figure 4.

Figure 4 Remote switch contacts for tone modules 1 through 4



Two Methods of Supplying Power to the SelecTone® System

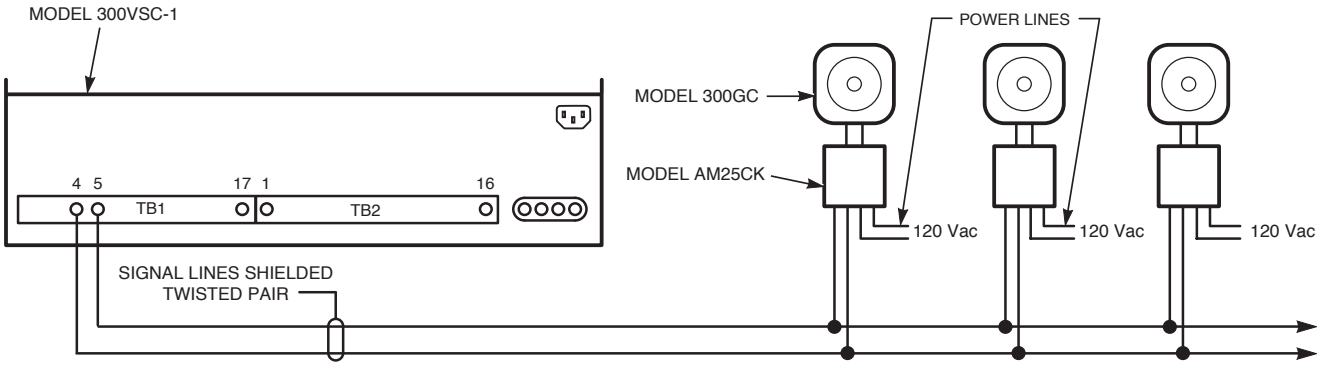
The two basic methods of supplying power to a SelecTone system are 120/240 Vac, 50/60 Hz local power, and 24 Vdc central power. The next paragraphs describe each method along with the advantages and disadvantages.

120/240 Vac 50/60 Hz Local Power

⚠ WARNING ***INSTALLATION PRECAUTION — Improper installation could render this system inoperable, interfering with the warning nature of this product. The installation must conform to applicable local and/or National Electrical codes.***

In this system, power is supplied to each remote SelecTone device by connecting it to a 120 Vac supply in the immediate vicinity of the device. If an emergency power source is required, a central power system as described below should be employed. See Figure 5.

Figure 5 Typical local power system



24 Vdc Central Power

See Figure 6 on page 15. In the central power system, all of the remote amplifier power lines are connected in parallel to one or more centrally located power sources that are 24 Vdc.

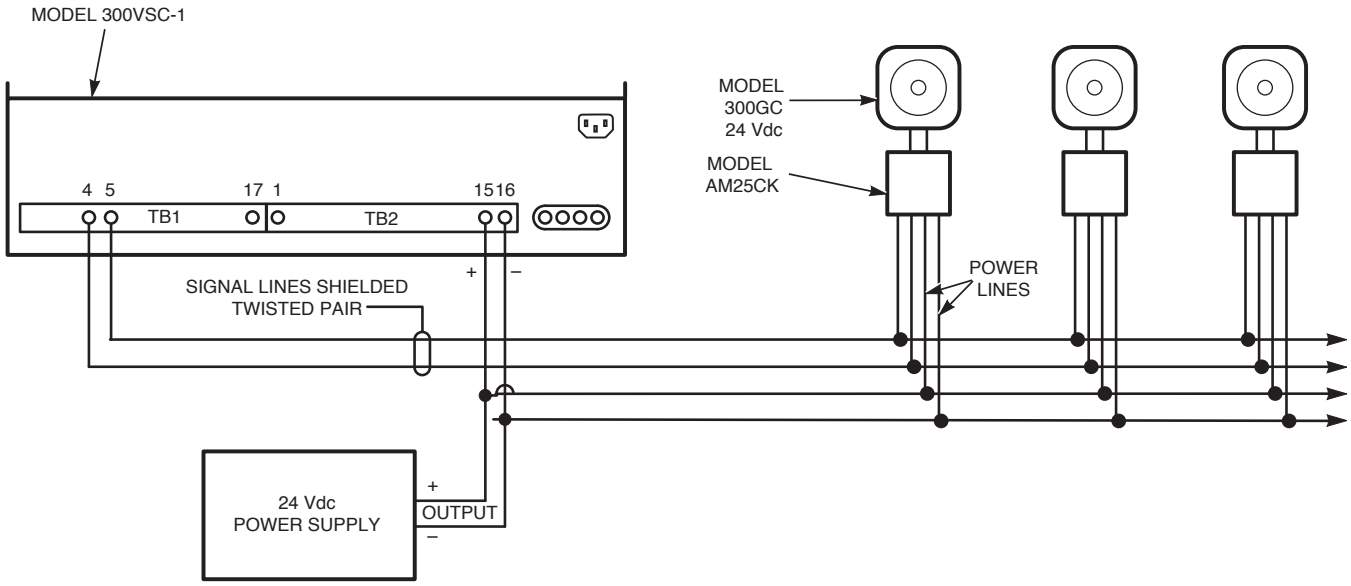
The advantages of a central power system are:

- The entire system may be independent of local line voltage.
- The entire system can be switched to an emergency standby power source in the event of a power failure.
- The central power system has the added advantage that an auxiliary power supply, such as the Federal Signal Model PS600 can be used to power the remote devices in the SelecTone system. If the PS600 is used, it is not necessary to switch the power source if a power failure occurs.

The disadvantages of a central power system are:

- Heavy power lines are required from the power source to the remote devices in the system. The size of the power lines is dependent upon the number of amplifiers and the total distance of the power loop in order to minimize the voltage drop while a tone signal is being generated.
- Future expansion is limited by the current capacity of the power source and the power lines that were initially installed.
- Central power installations must comply with local electrical codes. Most power circuits are Class I circuits. Therefore, conduit will probably be required. Installation costs are higher than a local power system.

Figure 6 Typical central power system



Connecting Power to the SelecTone System

⚠ WARNING

INSTALLATION PRECAUTION — This device is to be installed by a trained electrician who is thoroughly familiar with the national electrical code and local codes and will follow the guidelines.

⚠ WARNING

SHOCK HAZARD — Do not perform any installation or maintenance on this system when power is on. Because the 300VSC does not have a power switch, ensure that the power is disconnected before proceeding. Failure to heed this warning may cause serious injury or death.

⚠ WARNING

CROSSTALK/INTERFERENCE HAZARD — Cross talk, interference, or hum can be induced in signal lines, causing poor audio output or confusing messages, which interferes with the emergency warning capability of this equipment. Do not install power lines in the same conduit as signal lines.

To connect power:

1. Connect one end of the supplied power cord to the AC power connector on the back of the 300VSC.

   NOTE: Two power cords are included for 120 Vac or 240 Vac operation. Select the proper cord for your installation.

2. Connect the other end to any standard 120 Vac 50/60 Hz or 240 Vac 50/60 Hz outlet. The 300VSC is factory-set for 120 Vac 50/60 Hz operation. For instructions on how to change the input voltage, refer to "Power Requirements and AC Voltage Selection" on page 7

3. If you are using 24 Vdc either as a primary or auxiliary source of power, connect the "+" terminal of 24 Vdc power supply to the terminal **TB2-15** (+24 Vdc) and "–" terminal of the 24 Vdc power supply to the terminal **TB2-16** (–24 Vdc) of the **TB2** terminal block located in the back of 300VSC.

Safety Messages to Maintenance Personnel

⚠ WARNING

This device is to be serviced by a trained electrician who is thoroughly familiar with the National Electric Code and will follow the NEC guidelines as well as local codes.

This service information is for qualified personnel only. To avoid electric shock, do not perform any servicing other than changing fuses, unless qualified to do so. Refer all servicing to qualified service personnel.

Listed below are some important safety instructions and precautions you should follow:

Read and understand all instructions before operating this system.

- Do not perform any maintenance on this system when power is on. Because the 300VSC does not have a power switch, ensure that the power is disconnected before proceeding.
- Always insure that the power to the 300VSC is disconnected before removing the metal cover.
- Do not disconnect or connect this unit to the system when power is on.
- All effective warning speakers produce loud sounds that may cause, in certain situations, permanent hearing loss. You should take appropriate precautions such as wearing hearing protection.
- After installation, test the sound system to ensure proper operation.
- Establish a procedure to routinely check the sound system for proper activation and operation.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

Getting Replacement Parts

Typical replacement parts are listed below. To order the accessories and replacement parts in Table 2, please call Federal Signal Customer Support at 800-344-4634 or 708-534-4756.

Table 2 Replacement parts

Description	Part Number
Motherboard	K2001154
Switch board (300VSC-1)	K2001147
Tone card connector board	K2001164
Connector plug, TB1, 17-position	K140A332-17
Connector plug, TB2, 16-position	K140A332-16
Power cord, 240 Vac (EL210) (UK)	Q17501252A
Power cord, AC, European (EL211)	Q917501253A

Getting Technical Assistance or Repair Service

The Federal Signal Factory provides technical assistance with any problems that cannot be handled locally. Any unit returned to federal Signal for service, inspection, or repair must be accompanied by a return Material authorization (RMA). Obtain an RMA from a local distributor or manufacturer's representative. Please provide a brief explanation of the service requested or the nature of the malfunction.

For technical support and service, visit signaling.fedsig.com

FEDERAL SIGNAL
Safety and Security Systems / Industrial

Industrial Systems
2645 Federal Signal Drive • University Park, IL 60484-3167
Tel: 708-534-4756 • 1-800-755-7621
Email: signalsupport@fedsig.com • signaling.fedsig.com