

## Installation Instructions

### Model ZAM-180

Zone Amplifier Module 180W (500-035600 / S24235-B6-A5 (70V))



Installation Instructions for North America

#### INTRODUCTION

The Model ZAM-180 from Siemens Industry, Inc. is a CAN data bus module that contains two speaker zones and one audio amplifier, capable of operating at 25 (150W) or 70 (180W) VRMS.

The two speaker zones can be wired and operate as either a single Class A zone or a single Class B zone or as two Class B zones independently protected to provide split zone or interleaved speaker zones.

The ZAM-180 can also be used as a backup amplifier to serve as a backup for other ZAM-180 amplifiers in a 1 to 1 backup or 1 to many backup.

The ZAM-180 also contains a local external audio input circuit (0 dB) and a dry contact input to switch on the amplifier and activate the zones as configured via the Zeus tool. The ZAM-180 is capable of amplifying any one of the 8 audio channels that are transmitted from the DAC-NET (Digital Audio Card-NETWORK) via the internal digital Audio bus ASI (Audio Serial Interface).

The ZAM-180 mounts at the back of the enclosure of the system and occupies  $\frac{1}{4}$  of the total space of the Mounting Plate.

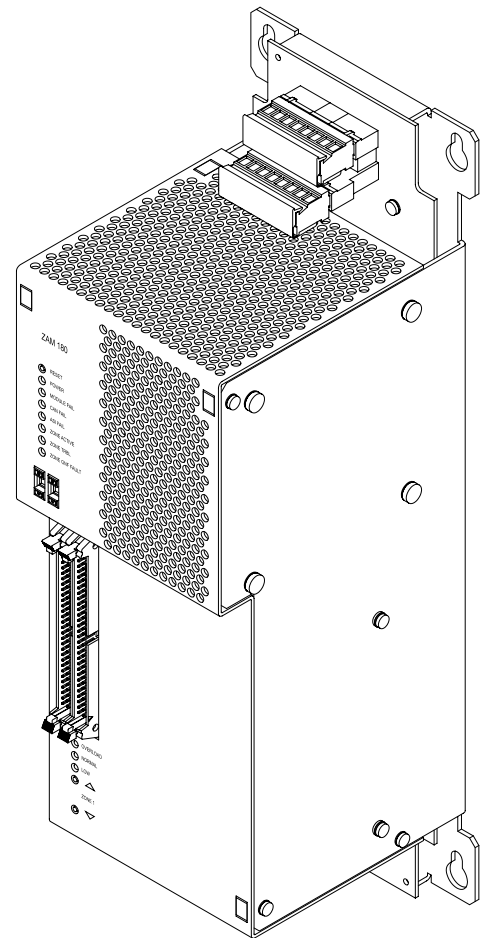


Figure 1  
ZAM-180

#### Features

ZAM-180 features are as follows:

- Digital (Class D) audio power amplifier with 180W RMS output power
- Over all efficiency about 80% under full load
- Amplifier is supervised for functionality
- Amplifier is protected against open, short circuit, over current and over modulation

- Speaker lines are supervised for open, short circuit and ground fault
- The ZAM-180 is micro controller controlled
- A FPGA controls the digital audio data stream (ASI Bus) transmitted by the DAC-NET
- SW update via PMI/PMI-2/PMI-3

OPERATION

The ZAM-180 receives its control and communication data from the DAC-NET and sends its status data to the DAC-NET via the CAN Bus. Therefore it takes 1 sub-address of the DAC-NET.

The transmission of compressed or uncompressed audio data from the DAC-NET to the ZAM-180 is realized via ASI (Audio Serial Interface). Transmission on the ASI is executed with a timeslot method and is synchronized with Frame and Bit Synchronize Signals. Via control data on the CAN Bus, the timeslots are allocated to each ZAM-180. Each ZAM-180 is configured to listen to its corresponding timeslot.

A local audio input is provided to connect an external audio source. The audio input is isolated on the ZAM-180 to prevent ground loops. The local audio input is activated via an external contact. The control of this input will be executed by the amplifier directly. The ZAM-180 will send a message informing the DAC-NET that the ZAM-180 has turned on the local input. It is also possible to activate/deactivate the local input on the control panel via CAN bus.

The speaker lines are individually supervised for open and short circuit. Ground fault is detected in common for both speaker lines on each ZAM-180.

The speaker lines are supervised in both the inactive and active state. The speakers must be AC-coupled.

Controls and Indicators

The ZAM-180 has one Reset button, seven diagnostic LEDs, level adaptation of the local external audio input and the CAN address switches, one terminal block, two terminal connections and two 60 pin flat ribbon connections as shown in Figure 2.

A reset switch is located on the top of the front panel. Pushing the reset switch re-initializes the ZAM-180 operation.

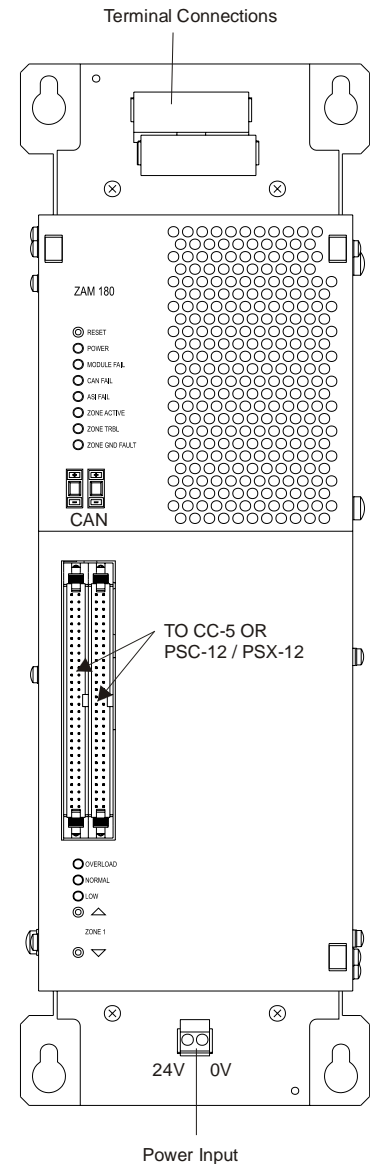


Figure 2  
Terminal Blocks, Controls and Indicators

The LEDs functions are defined as follows:

LED	COLOR	NORMAL STATE	OFF NORMAL STATE	ACTION IN OFF NORMAL STATE
POWER	green	ON	OFF –external voltages fail	Check for failure on PSC-12, CC-5, wiring
MODULE FAIL	yellow	OFF	ON –general trouble at ZAM-180	Failure on ZAM, ZAM-180 needs to be replaced
CAN FAIL	yellow	OFF	ON –CAN interface trouble	Failure on AIC, DAC-NET, CC-5 backplane or other CAN cards/modules
ASI FAIL	yellow	OFF	ON –ASI interface trouble	Failure on “ASI OUT” and/or “ASI IN” at this ZAM-180
ZONE ACTIVE	green	OFF	ON –Speaker zone active	Indicates normal operation on speaker zone
ZONE TRBL	yellow	OFF	ON –Speaker zone trouble, open circuit or short circuit	Check wires to the speakers, EOL resistor(s) and de-coupling capacitors on every speaker
ZONE GND FAULT	yellow	OFF	ON –unwanted earth ground connection on a speaker line	Check wires to the speakers for earth ground connections
OVERLOAD	yellow	OFF	ON	Refers to Local Audio input only: Press “DOWN” push button until “OVERLOAD” LED turns off and “NORMAL” LED turns on
NORMAL	green	ON	OFF	Refers to Local Audio input only: No audio signal or audio signal too high/low
LOW	yellow	OFF	ON	Refers to Local Audio input only: Press “UP” push button until “LOW” LED turns off and “NORMAL” LED turns on

Terminal Connections:

These terminals are used for field wiring as shown in Figure 12-14.

Power Input:

This terminal block is non power limited and can supply up to 12A. This Input is connected to the output terminal TB4 of the PSC-12/PSX-12 as shown in Figure 11.

PRE-INSTALLATION

The ZAM-180 takes one sub-address on the DAC-NET. To configure the CAN address use the two rotary-switches on the front panel (refer to Figure 2)

Remove screws as shown in Figure 3 on the left and the right side of the ZAM-180 housing and remove the front plate.

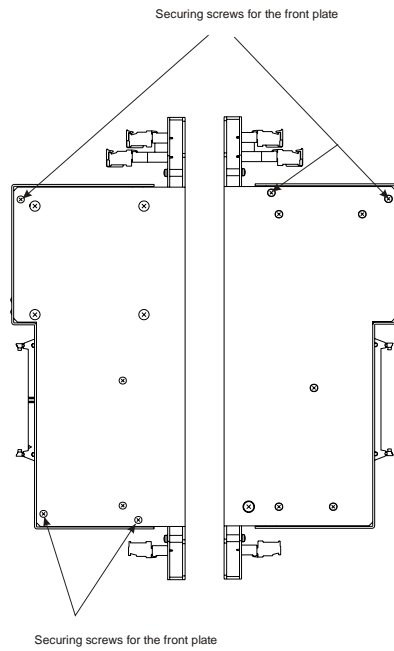


Figure 3 Position Of The Securing Screws

For setting the speaker line voltage and the low frequency cutoff see Figure 4.

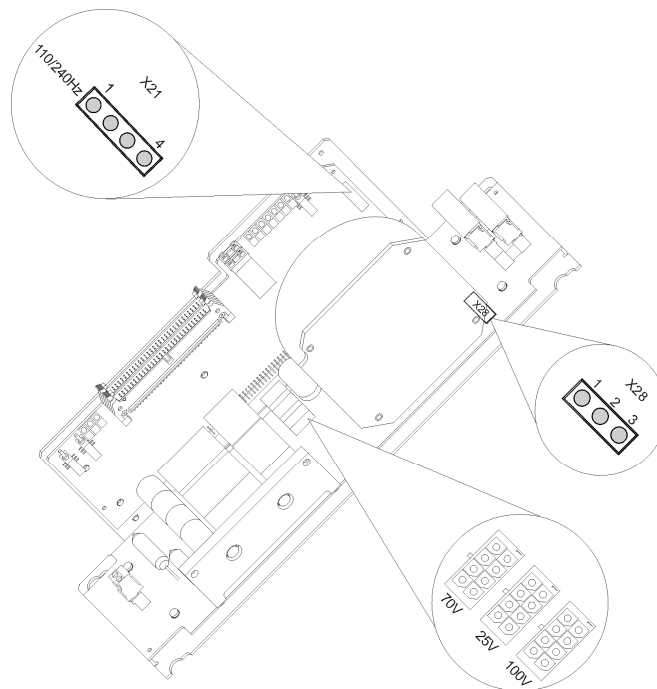


Figure 4 Position Of Connectors And Jumpers For Setting The Speakerline Voltage And The Low Frequency Cutoff

## Setting the Speaker Line Voltage

The amplifier supervision has to be configured for the appropriate line voltage, too. Amplifier supervision is configured with jumpers on header X28.

### Speaker Line Voltage 70V

Plug in the coded connector in the position marked 70 V. and set Jumper X28 position 2-3.

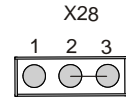
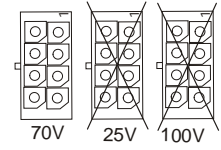


Figure 5 Jumper Position 70V

### Speaker Line Voltage 25V

Plug in the coded connector in the position marked 25 V. There is No jumper on X28.

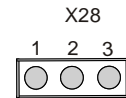
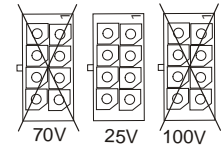


Figure 6 Jumper Position 25V

## Setting the low frequency cutoff

Low frequency cutoff can be set for 240Hz or 110Hz. This setting acts on both local audio input and on all digital channels.

Setting for 240 Hz protects small speakers from being overload with bass impulses. Speech intelligibility may be improved. This setting is not recommended for higher quality music reproduction.



For 520 Hz low frequency usage, use the 110 Hz setting.

110Hz: Set no jumper on X21

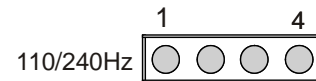


Figure 7 Jumper Position 110 Hz

240Hz: For 240Hz low frequency cut-off two jumpers have to be set.



Never set only one jumper.

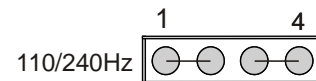


Figure 8 Jumper Position 240 Hz

After having done these pre-installations install the front plate and secure it again.

## INSTALLATION



Remove ELECTRICAL POWER prior to working on equipment.

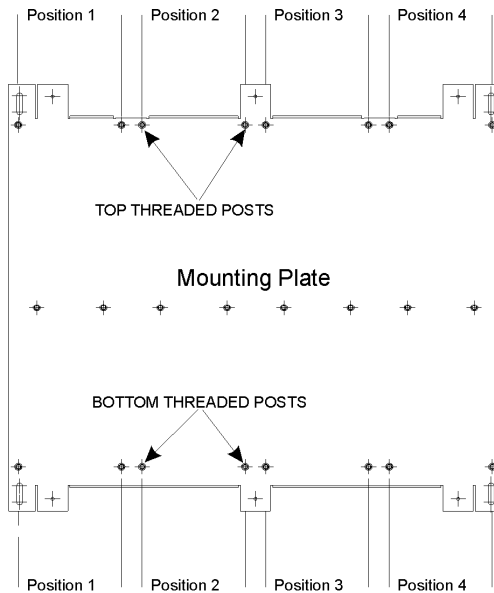


Figure 9  
Location Of The ZAM-180 On The Mounting Plate

The ZAM-180 can occupy any position on the mounting plate (Refer to Figure 9). When the ZAM-180 is mounted correctly on the Mounting Plate it will be flush on the top, bottom, and right with the Mounting Plate and the mounting screw holes of the PSC-12 will align with the threaded posts.

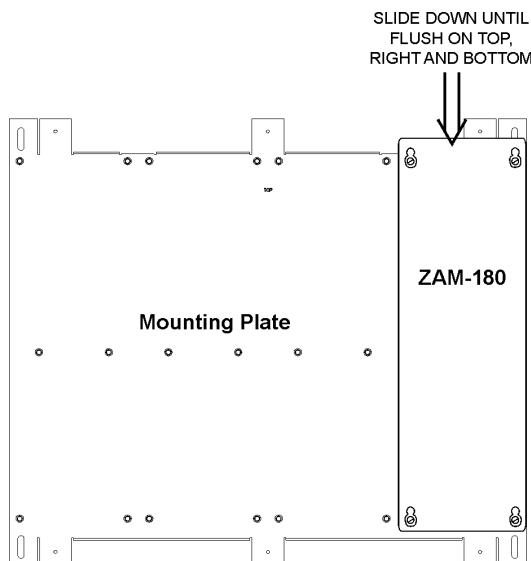


Figure 10  
Mounting the ZAM-180 On The Mounting Plate

1. Install four M5 screws in the threaded posts at the mounting position. Screw each of the M5 screws into the threaded posts 5-6 turns.
2. Place the ZAM-180 over the four screws on the Mounting Plate and slide it down or towards you to rest on the four screws. (Refer to Figure 10.) When the ZAM-180 is in the correct position it will be flush with the top, bottom and right side of the Mounting Plate.
3. Tighten the four screws.

## WIRING



Remove ELECTRICAL POWER prior to working on equipment.

All field wiring of the ZAM-180 is connected to the terminal blocks on the upper side of the ZAM-180.

The screw terminals can accommodate one 12-18 AWG ( $\varnothing$  0,5mm-2,5mm<sup>2</sup>) or two 16-18 AWG, ( $\varnothing$  0,5mm-1,0mm<sup>2</sup>).

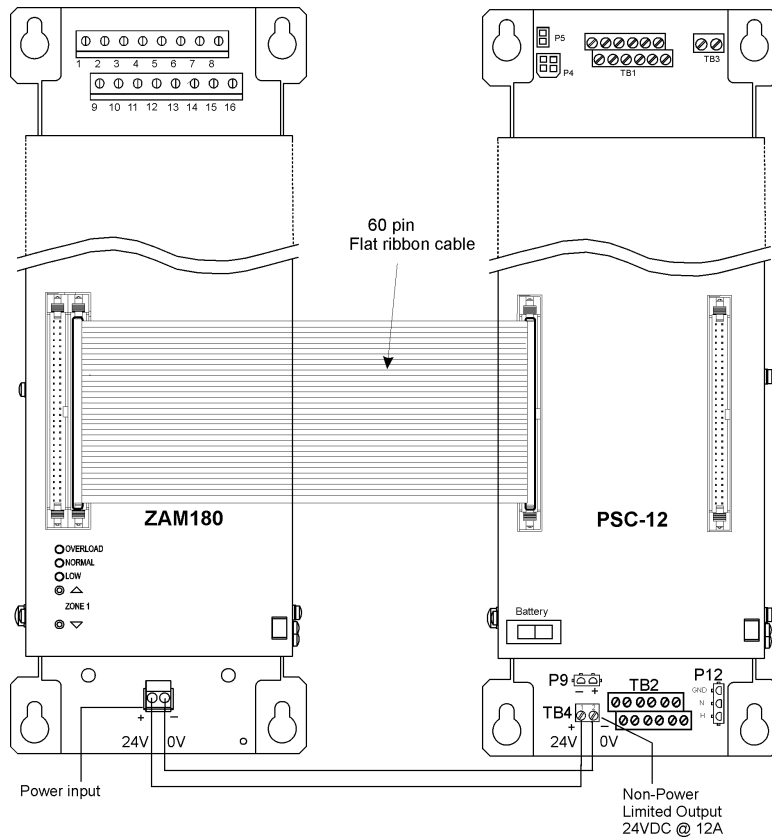
To connect external wiring

Loosen the screw of the terminal by turning it counterclockwise.

Insert the wire into the side of the terminal block.

Tighten the screw of the terminal block by turning it clockwise

### Input Power Wiring



#### NOTES

1. 14-18 AWG ( $\varnothing$  1,0mm -1,5mm<sup>2</sup>)
2. Not power limited.

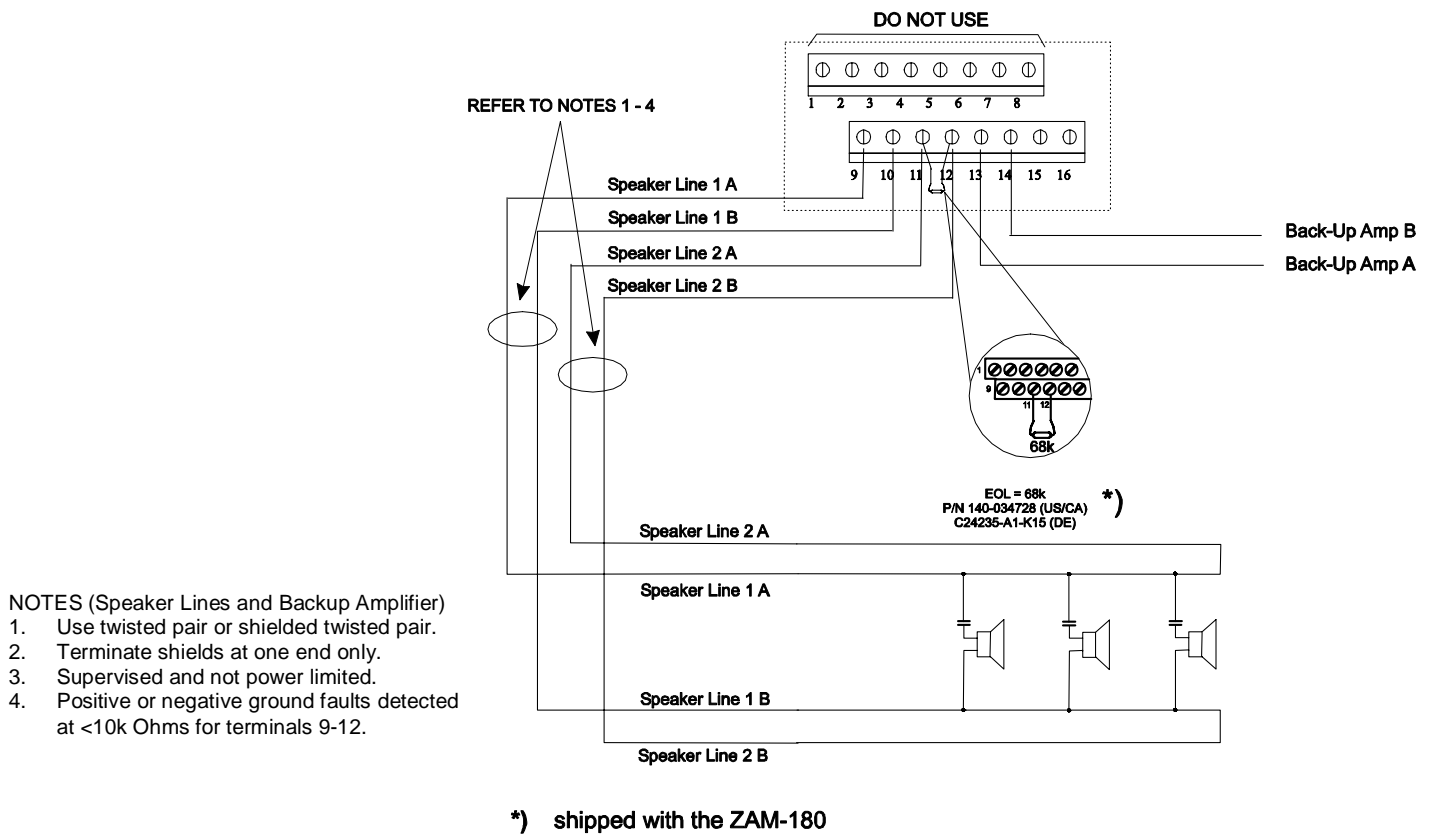
Figure 11  
ZAM-180 Input Power Wiring

## Speaker Line Wiring

The configuration of the speaker lines is selectable between Class A, Class B, or 2 x Class B.

NOTE: For U.S. installation only, reference to Power Limited is deemed Class 2 and reference to Power Limited 70V speaker circuits is deemed Class 3. Class 2 and Class 3 designations do not apply to Canadian installations. Please refer to the appropriate product installation instructions for further details.

Class A: The speaker line is looped back to the system. The end of line resistor (EOL) is connected directly at the ZAM-180 (CC-5/-2). In this configuration the line works during an open circuit condition by feeding it from both sides. In the short circuit condition, the speaker line is not functional.



- NOTES (Speaker Lines and Backup Amplifier)
1. Use twisted pair or shielded twisted pair.
  2. Terminate shields at one end only.
  3. Supervised and not power limited.
  4. Positive or negative ground faults detected at <10k Ohms for terminals 9-12.

Figure 12  
ZAM-180 Class A Wiring



Class B: A configuration, where the end of line resistor is at the end of the speaker line. The ZAM-180 is capable of single Class B wiring if the unused speaker line is connected to an EOL .

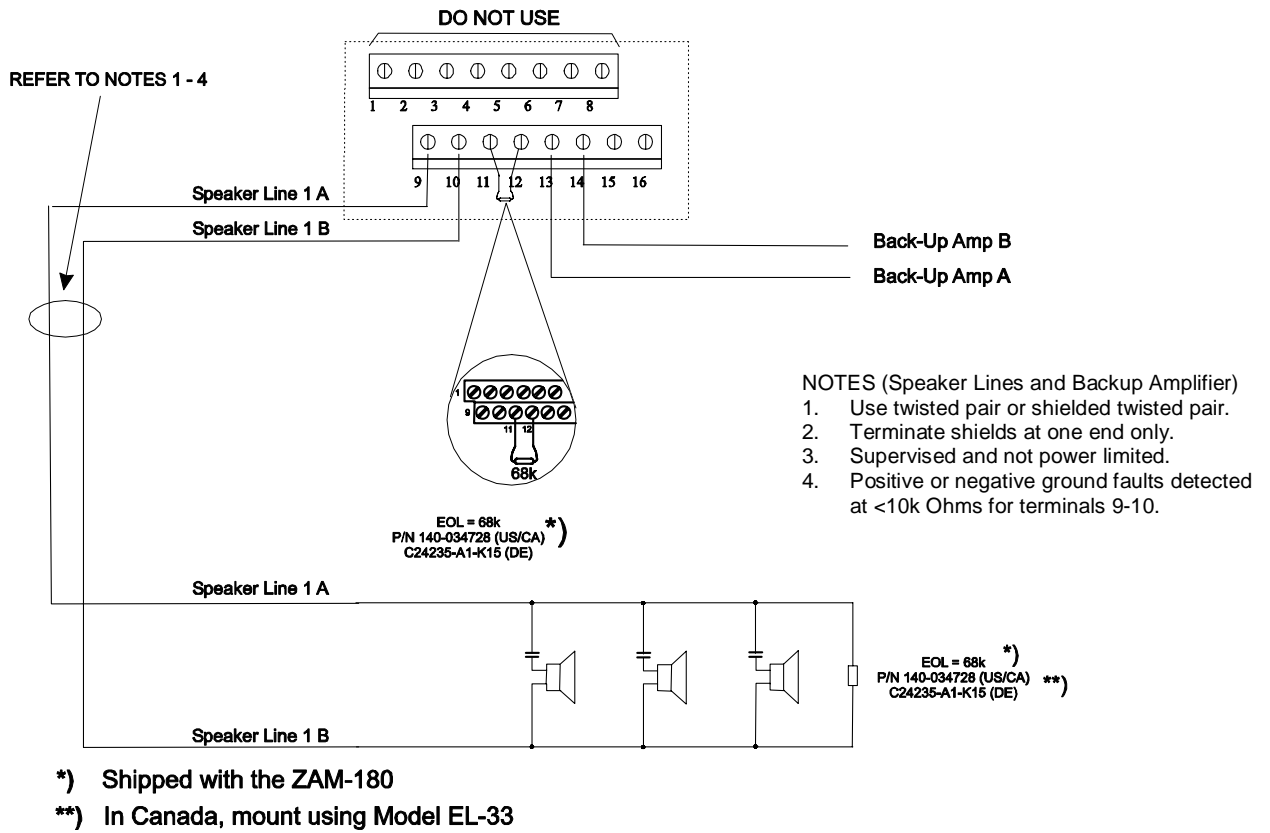
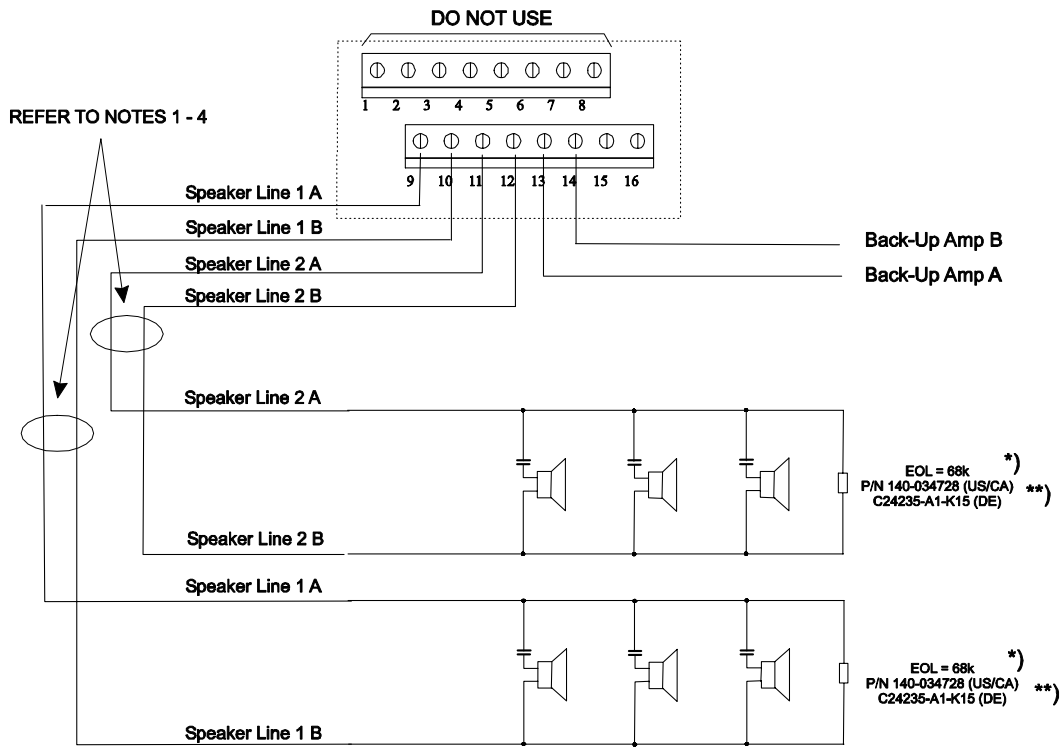


Figure 13  
ZAM-180 Class B Wiring

2x Class B: Both lines are used and have the end of line resistor at the end of the speaker line



\*) Shipped with the ZAM-180

\*\*) In Canada, mount using Model EL-33

NOTES (Speaker Lines and Backup Amplifier)

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Figure 14  
2x Class B Configuration

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ELECTRICAL RATINGS

Input Power	
24V Back Plane Current	0mA
24V Screw Terminal Current	
@ 180W	9.5A
@ 90W	4.9A
@ 45W	2.7A
@ 0W	0.3A
6.2V Back Plane Current	0mA
24V Standby Current	300mA

Maximum Output Power	
25 VRMS	150W
70 VRMS	180W

Dry Contact Input	24V/10mA power limited
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## Cyber security disclaimer

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It is, however, necessary to implement and maintain a comprehensive, state-of-the-art security concept that is customized to individual security needs. Such a security concept may result in additional site-specific preventive action to ensure that the building comfort, fire safety, security management or physical security system for your site are operated in a secure manner. These measures may include, but are not limited to, separating networks, physically protecting system components, user awareness programs, defense in depth, etc.

For additional information on building technology security and our offerings, contact your Siemens sales or project department. We strongly recommend customers to follow our security advisories, which provide information on the latest security threats, patches and other mitigation measures.

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