

**PI**  **SYSTEM™**

The PI logo icon is a silver, three-dimensional hexagonal shape with a central hexagonal void. The text 'PI' is to the left and 'SYSTEM™' is to the right of the icon.

**PERMANENT INSTALLATION LOUDSPEAKER SYSTEMS**

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The Next Phase In

# PERMANENT INSTALLATION

T E C H N O L O G Y



## Permanent Installation Loudspeaker Systems

- Modular designs allow multiple PI-12, PI-15 in the same array.
- 11-ply Baltic Birch cabinets with rabbet and dado joints.
- Cabinets are sanded, ready to finish to match installation environment. Others finishes on special order.
- Coaxial drivers combined with Time Offset Correction (TOC™) and equalization result in smooth phase coherent response with transient accuracy.
- The use of coaxial drivers reduces cabinet size since no separate high frequency device is needed.
- All cabinets contain Air Cargo 20050 hanging points backed by 12 gauge steel reinforcing brackets fastened by structural grade steel bolts and locking nuts.

The PI series is part of the TOC™ systems group. It was developed to satisfy the need for compact high performance loudspeaker systems in installations. Two cabinets form the basis for this series:

**PI-12-1** This is the smallest of the series. Just over 18 inches square in front and 13 inches deep, the PI-12-1 uses the CX-1280C with a one inch exit compression driver.

**PI-15-1** This cabinet is 20 inches square in front and 16 inches deep and uses either the CXL-1580C with a one inch exit compression driver or the CXL-2580C with a two inch exit compression driver.

The PI series from PAS has been popular with consultants and contractors for many years. PAS was one of the first manufacturers to offer trapezoid cabinets and their advantages to the contractor market.



At the heart of these systems are the PAS Coaxial Loudspeakers. Known for its expertise in Coaxial loudspeakers, PAS has continued to improve both its drivers and its dividing networks.

Time Offset Correction delay and equalization remove the effects of the individual driver's phase response. The system's phase response becomes that of the dividing filters. This "ideal phase response" is a characteristic of all TOC™ models.

The coaxial or concentric design radiates both high and low frequencies through the same acoustic "window". When used with Time Offset Correction™ (TOC™), dividing network the result is smooth, phase coherent response with transient accuracy. TOC™ causes all frequencies to appear to radiate from the same plane, IE: the same acoustic source point. PAS has chosen to use a constant-coverage horn for the high frequency section rather than relying on the cone to provide pattern control of the low frequency section as other manufacturers currently do. This provides much better loading of the compression driver at low frequencies. This also reduces the amount of high frequency equalization required by directing the energy where it is needed rather than allowing it to go where it is not.

## **Installation:**

Both the twelve inch cabinet and the fifteen inch cabinet have six Air cargo #20050 anchor points (three on the top and three on the bottom). Three air cargo #11251 tiedowns are shipped with each cabinet for attachment to chains or a mounting frame.



**MODELS:**



**PI-12** Where the most compact system is required or in voice only systems the PI-12 is ideal. With response down to 60 Hz this cabinet can be used full range or as the mid/high component in systems using subwoofers. This cabinet uses a CX-1280C with the DE-45 one inch compression driver plus a passive TOC™ dividing network.

**PI-15** This cabinet has been the mainstay of the PI series. Since it provides bass response to 50 Hz, the PI-15 can be used alone or in multiples. It contains a CXL-1580C with the DE-45 one inch compression driver plus a passive TOC™ dividing network.

**PI-15-1.2** When greater intelligibility and headroom is required, use the PI-15-1.2. Housed in the same cabinet as the PI-15-1, the PI-15-1.2 uses the CXL-2580C and a 2 inch exit compression driver. The higher sensitivity and greater power capacity of this driver high frequency headroom is 9 dB greater (the equivalent of four times the power) than systems with 1 inch drivers. The result is increased clarity, intelligibility and greater throw.

The PI-15-1.2, like the PI-15 cabinet contains a passive TOC™ dividing network that delivers the transient accuracy for which the TOC™ products are known.

**PI-15-2.2** When maximum reliability and SPL is required, the PI-15-2.2 is the choice. Used with the TOC™ S2 processor the PI-15-2.2 contains the same loudspeaker components as the PI-15-1.2 and gets the maximum performance out of them.

The TOC™ S2 processor contains dividing filters, Time Offset Correction (TOC™) delay, precise equalization, compressor/limiters and a SUBwoofer output.



The TOC™ S2 processor is recommended to achieve rated performance of the PI15-2.2





## PI-15

This cabinet has been the mainstay of the PI-series. Since it provides bass response to 50 Hz, the PI15-1 can be used alone or in multiples. It contains a CXL-1580C with the DE45 one inch compression driver plus a passive TOC™ dividing network. It also works well with subwoofers such as the PI-81.

The PI-15 features:

- Concentric 15" loudspeaker.
- Extended high frequency 1" compression driver.
- Passive dividing network with Time Offset Correction (TOC™) and Equalization.
- Sanded, unfinished Baltic Birch cabinet.
- Double-knit fabric grille.
- 6 Air Cargo 20050 anchor points (3 on both top and bottom).

### PI-15-1 specifications:

**Frequency Response:** 50 to 16 kHz

**Power Rating:** \*300 watts

**Nominal Impedance:** 8 ohms

**Sensitivity:** 99 dB

**Maximum SPL:** 124 dB @ 1 meter  
(@ rated power)

**Nominal Coverage Angles:**  
60° H x 40° V or 40° H x 60° V  
above 2 kHz

**Crossover frequency:** 1.2 kHz

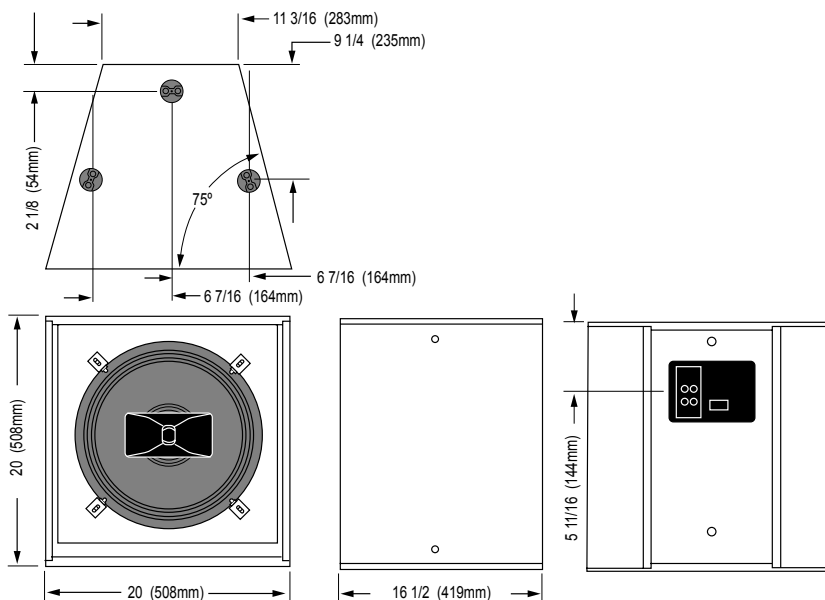
**L.F. Driver:** CXL-I 550C

**H.F. Driver:** DE-45/8

**Input Connectors:** 2 sets of dual binding posts

**Dimensions:** 20" H x 20" W x 16"

**Weight:** 56 lbs



*Due to limitations of the passive dividing networks the long term average power rating of the PI-15-1 and PI-15-1.2 is limited to 200 watts (40 volts into 8 ohms). This in no way affects their transient capabilities. PAS recommends amplifiers that produce at least twice this power (400 watts into 8 ohms) for these cabinets. Since the PI-15-2.2 does not contain a dividing network, it does not have this limitation.*

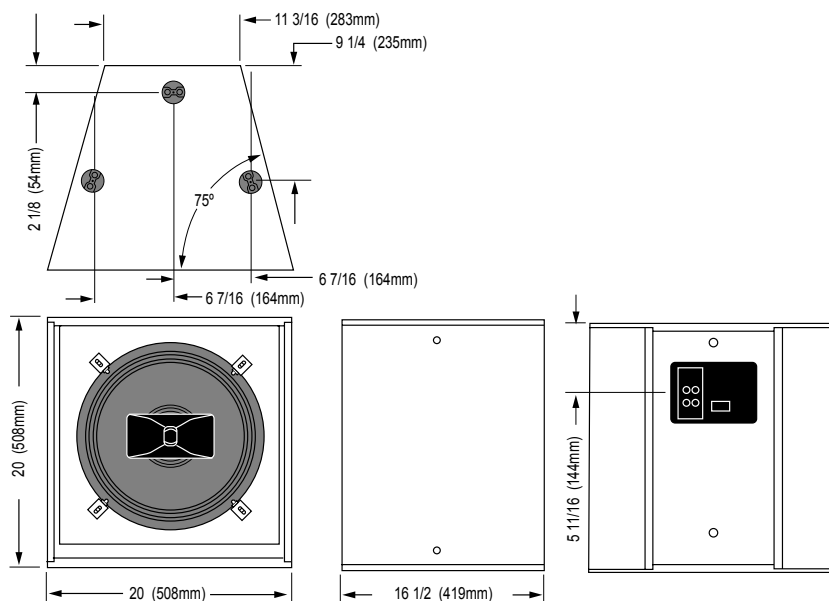


**PI-15-1.2**

When greater intelligibility and headroom is required use the PI-151.2. Housed in the same cabinet as the PI-15-1, the PI-15-1.2 uses the CXL-2580C and a 2 inch exit compression driver. The higher sensitivity and greater power capacity of this driver means the high frequency headroom is 9 dB greater (the equivalent of four times the power) than systems with 1 inch drivers. The results are increased clarity, intelligibility and greater throw.

**PI-15-1.2 specifications:**

- Frequency Response:** 50 to 16 kHz
- Power Rating:** \*400 watts
- Frequency Response:** 70 to 16 kHz
- Nominal Impedance:** 8 ohms
- Sensitivity (1w/1m):** 99 dB
- SPL:** 126 dB @ 1 meter
- Maximum SPL:** 125 dB
- Nominal Coverage Angles:**  
60° H x 40° V or 40° H x 60° V above 2 kHz.z
- Crossover frequency:** 1.2 kHz
- L.F. Driver:** CXL-2580C
- H.F. Driver:** DE-750-8
- Input Connectors:** 2 sets of dual binding posts
- Dimensions:** 20" H x 20" W x 16" D
- Weight:** 66 lbs





## PI-15-2.2

When maximum reliability and SPL is required, the PI-15-2.2 is the choice. Used with the TOC™ S2 processor, the PI-15-2.2 contains the same components as the PI-15-1.2 (minus the passive network) and gets the maximum performance out of them.

The TOC™ S2 processor is used with PAS stage monitors. It contains dividing tilers, Time Offset Correction (TOC™) delay, precise equalization, compressor/ limiters and a SUBwoofer output. The PI-15-2.2 features are similar to PI-15-2 with these differences:

- The PI152.2 contains no passive dividing network since the system is intended to be biamplified.

### PI15-2.2 Specifications:

**Frequency Response:** 50 to 16kHz

**Power Rating:** LF: \*500 watts

HF: 100 watts

**Frequency Response:** 70 to 16kHz

**Nominal Impedance LR:** 8 ohms

HF: 8 ohms

**Sensitivity (1 w/l m):** 99 dB

**Maximum SPL:** 126 dB

**Nominal Coverage Angles:**

60° H x 40° V or 40° H x 60° V  
above 2 kHz.z

**Crossover frequency:** 1.2 kHz

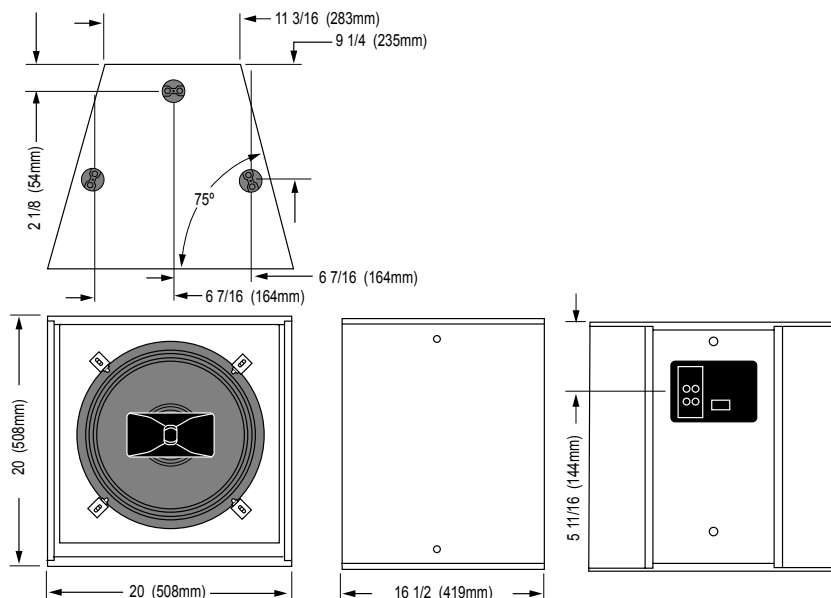
**L.F. Driver:** CXL-2580C

**H.F. Driver:** DE-750-8

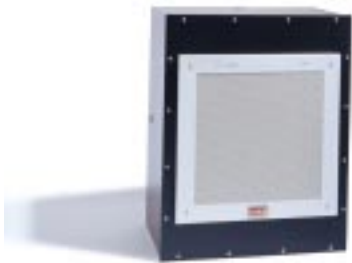
**Input Connectors:** 2 sets of dual  
binding posts

**Dimensions:** 20" H x 20" W x 16" D

**Weight:** 66 lbs



## A NEW PAGE IN CEILING-MOUNT LOUDSPEAKERS



The TOC™ 360 series are high powered coaxial systems in fireproof metal enclosures for installation in plenum or suspended ceilings in large facilities. Their high power capacity and controlled dispersion makes them appropriate in areas with high noise levels and very high ceilings. Each model contains a dividing network with Time Offset Correction (TOC™) optimized for the coaxial driver used. Passive time delay and equalization are used to allow the high and low frequency components to accurately combine for the best transient performance.

PAS has been manufacturing coaxial systems with TOC™ for many years. The transient accuracy of these products enables voices to be intelligible at

higher ambient sound levels than those without TOC™. Incorporating this into systems for distributed use brings a new level of performance to paging systems for large facilities.

The high frequency coverage angle is a cone with an included angle of 70° at -6 dB. This coverage angle reduces reflections from walls which waste power and are detrimental to intelligibility. In large installations where the ceiling is very high, a moderate coverage angle minimizes overlap of the coverage patterns of adjacent loudspeakers. This reduces articulation loss due to differing arrival times.

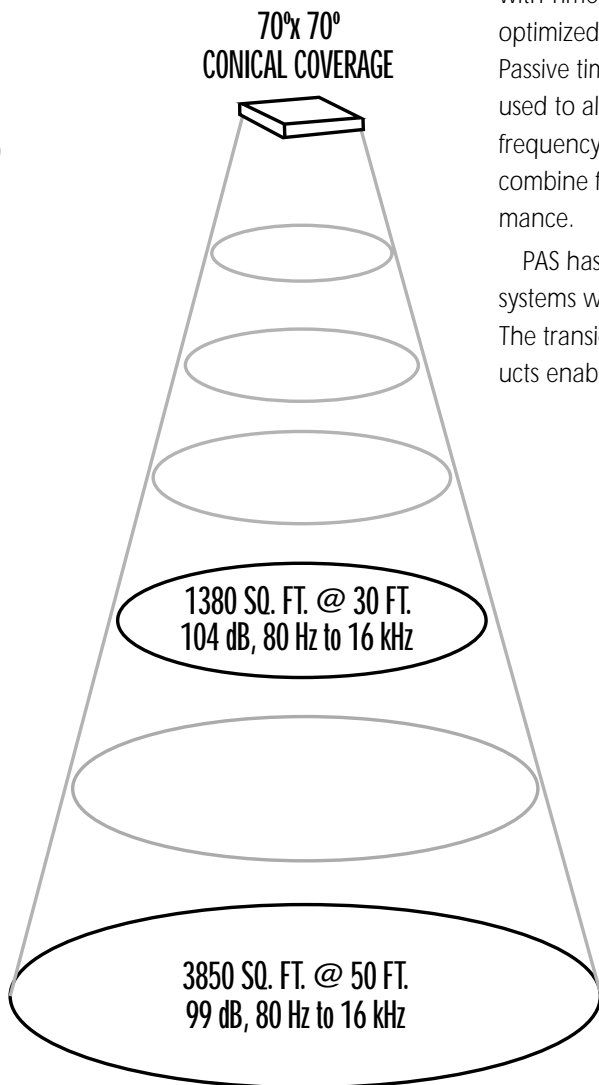
High power capacity and sensitivity produces spl peaks of greater than 106 dB at 30 feet or 103 dB at 50 feet.

The TOC™ 360 series comes in metal enclosures constructed of 18 gauge cold rolled steel with walls damped with acoustic fiberboard. They are lined with 1.5" thick glass wool and have conduit knockouts on all four sides. Mounting tabs are on parallel sides to facilitate recessed mounting. Each is supplied with a beveled white metal grille.

All models are available with an optional 200 watt, 70 volt matching transformer.

**Transformer Frequency Response:**  
+/- 2dB @ 50-15,000 Hz

9|10





### 12 CX SPECIFICATIONS

**Frequency Response:** 80 to 16Hz  
**Power Rating:** \*300 watts  
**Nominal Impedance:** 8 ohms  
**Sensitivity (1w/1m):** 100 dB  
**Maximum SPL:** 126 dB @1 meter  
**Nominal Coverage Angle:** 70°  
**Crossover frequency:** 2 kHz  
**L.F. Driver:** 12 inch  
**H.F. Driver:** 1 inch throat  
**Dimensions:** 23" L x 18"W x 12"D  
**Weight:** 54 lbs

### 15CX SPECIFICATIONS

**Frequency Response:** 60 to 16Hz  
**Power Rating:** \*350 watts  
**Nominal Impedance:** 8 ohms  
**Sensitivity (1w/1m):** 99 dB  
**Maximum SPL:** 125 dB @1 meter  
**Nominal Coverage Angle:** 70°  
**Crossover frequency:** 2 kHz  
**L.F. Driver:** 15 inch  
**H.F. Driver:** 1 inch throat  
**Dimensions:** 29.5" L x 18"W x 15"D  
**Weight:** 91 lbs

### 22CX SPECIFICATIONS

**Frequency Response:** 80 to 16Hz  
**Power Rating:** \*600 watts  
**Nominal Impedance:** 8 ohms  
**Sensitivity (1w/1m):** 100 dB  
**Maximum SPL:** 128 dB @ 1 meter  
**Nominal Coverage Angle:** 70°  
**Crossover frequency:** 1.4 kHz  
**L.F. Driver:** 12 inch  
**H.F. Driver:** 2 inch throat  
**Dimensions:** 23" L x 18"W x 15"D  
**Weight:** 63 lbs

### 25CX SPECIFICATIONS

**Frequency Response:** 50 to 16Hz  
**Power Rating:** \*600 watts  
**Nominal Impedance:** 8 ohms  
**Sensitivity (1w/1m):** 99 dB  
**Maximum SPL:** 127 dB @ 1 meter  
**Nominal Coverage Angle:** 70°  
**Crossover frequency:** 1.2 kHz  
**L.F. Driver:** 15 inch  
**H.F. Driver:** 2 inch throat  
**Dimensions:** 29.5" L x 23"W x 15"D  
**Weight:** 96 lbs



*Due to limitations of the passive dividing networks the long term average power rating of these products is limited to 200 watts (40 volts into 8 ohms). This in no way affects their transient capabilities. PAS recommends amplifiers that produce at least twice this power (400 watts into 8 ohms) for these cabinets. For the 70 volt option the power rating is limited to the transformer.*

## Target Systems for Permanent Installations

- New higher performance models use 1" compression drivers and constant coverage horns.
- 11-ply Baltic Birch cabinets are sanded and ready to finish to match the installation environment. Other finishes on special order.
- New Low Frequency drivers enable extended response.
- New High Frequency protection circuit.
- The models intended for suspended mounting contain Air Cargo 20050 hanging points backed by 12 gauge steel reinforcing brackets fastened by structural grade steel bolts and locking nuts.

This popular line has been redesigned for higher performance and value. New drivers, horns and dividing networks make these improved models similar in appearance only. They remain the choice for quality and performance on a limited budget.

Reliability has been improved through the use of a new 1 inch exit compression driver and high frequency protection circuit.

The line has been consolidated to three models. They offer improved low frequency response.

These models are:

**T-1220I** This model is the smallest of the series. It replaces both the T-1200I and the T-1200IU. The T-1220I uses a new cast frame 12 inch loudspeaker with a 2 inch voice coil. The high frequency component is a one inch exit compression driver with a titanium diaphragm on a 120° by 60° constant coverage horn.

**T-1540I** This model replaces the T-1530I. A new one inch exit compression driver with a titanium diaphragm is used on a new 90° by 40° horn significantly increases the high frequency power capacity and provides extended high frequency output. A 15 inch cast frame loudspeaker with a three inch voice coil is used as the low frequency component.

**T-1222I** This model is the replacement for the T-1212 stage wedge. It contains the same components as the T-1220 wedge monitor cabinet.

## Dividing Networks:

These new models contain improved dividing networks. They use fixed resistor pads rather than a variable L-pad. This improves reliability and eliminates the possibility of misadjustment. A new high frequency protection circuit improves reliability as well. Like the PI series, the Target™ systems make extensive use of 250 volt film capacitors and 18 AWG inductors.

## Installation:

With the exception of the the T-1222I the Target™ installation series have two Air Cargo #20050 anchor points on the cabinet top and one at the center of the back. Three air cargo #11251 tiedowns are shipped with each cabinet for attachment to chains or a mounting frame.





## T-1220I

When the job requires the most compact system or is voice only the T-1220I is the logical choice. The T-1220I uses a new cast frame 12 inch loudspeaker with a 2 inch voice coil. The high frequency component is a one inch exit compression driver with a titanium diaphragm on a 120° by 60° constant coverage horn. The T-1220I has these features:

- Cast frame 12" loudspeaker with 2 inch voice coil.
- Extended high frequency 1" compression driver on a 120° by 60° constant coverage horn.
- Sanded, unfinished Baltic Birch cabinet.
- Double-knit fabric grille.
- 3 Air Cargo 20050 anchor points (2 on top and 1 on the back).

### T-1220I specifications:

**Frequency Response:** 70 to 16 kHz

**Power Rating:** \*250 watts

**Nominal Impedance:** 8 ohms

**Sensitivity (1w/1m):** 98 dB

**Maximum SPL:** 122 dB @ 1 meter  
(@ rated power)

**Nominal Coverage Angles:**

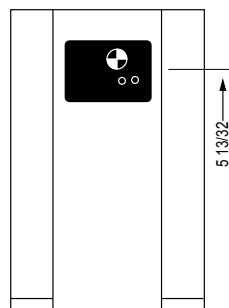
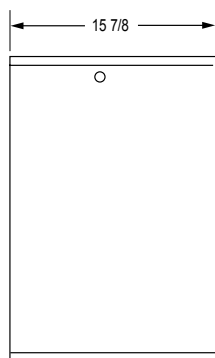
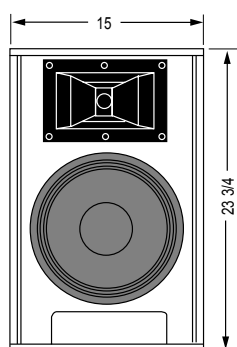
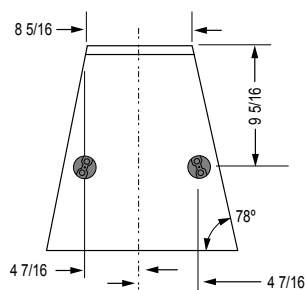
120° H x 60° V, above 3 kHz

**Crossover frequency:** 3 kHz

**Input Connectors:** Dual binding posts

**Dimensions:** 24" H x 15" W x 16" D

**Weight:** 42 lbs





## T-1222I

A high performance stage wedge at a budget price, the T-1222I contains the same components as the T-1220 in wedge monitor cabinet. The T-1222I has these features:

- Cast frame 12" loudspeaker with 2 inch voice coil.
- Extended high frequency 1" compression driver on a 120° by 60° constant coverage horn.
- Sanded, unfinished Baltic Birch cabinet.
- Double-knit fabric grille.

### T-1222I specifications:

**Frequency Response:** 80 to 16 kHz

**Power Rating:** \*250 watts

**Nominal Impedance:** 8 ohms

**Sensitivity (1w/1m):** 98 dB

**Maximum SPL:** 122 dB @ 1 meter  
(@ rated power)

### Nominal Coverage Angles:

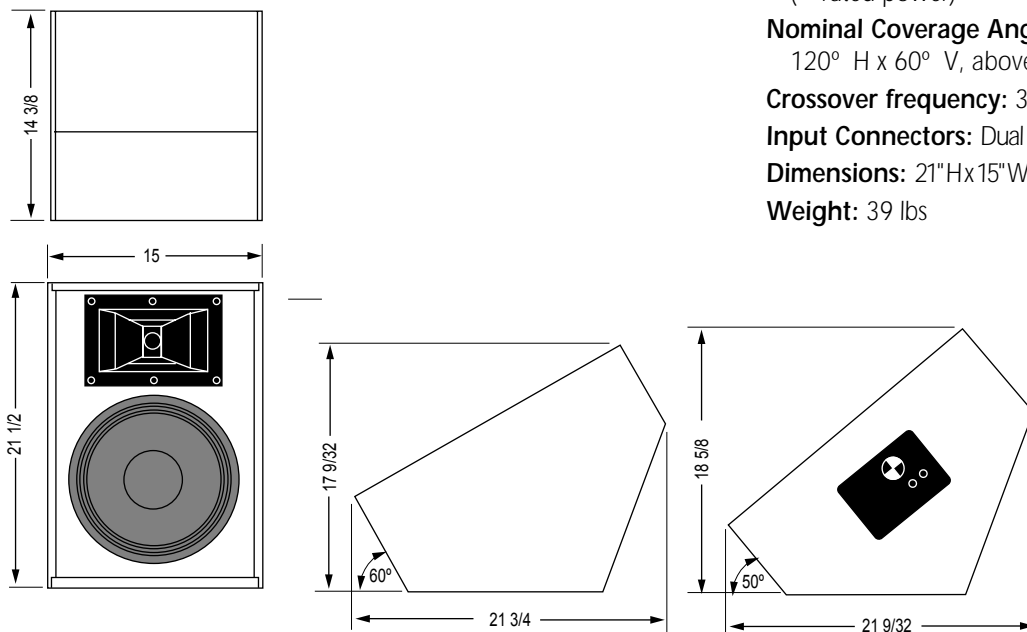
120° H x 60° V, above 3 kHz

**Crossover frequency:** 3 kHz

**Input Connectors:** Dual binding posts

**Dimensions:** 21" H x 15" W x 14 3/8" D

**Weight:** 39 lbs





### T-1540I

When higher average levels and extended low end are required The T-1540I delivers. A new one inch exit compression driver with a titanium diaphragm is used on a new 90 by 40 horn significantly increases the high frequency power capacity and provides extended high frequency output. A 15 inch cast frame loudspeaker with a three inch voice coil is used for the low frequency component.

The T-1540I has these features:

- Cast frame 15" loudspeaker with 3 inch voice coil.
- Extended high frequency 1" compression driver on 90° by 40° constant coverage horn.
- Sanded, unfinished Baltic Birch cabinet.
- Double-knit fabric grille.
- 3 Air Cargo 20050 anchor points (2 on top and 1 on the back).

### T-1540I specifications:

**Frequency Response:** 50 to 16 kHz

**Power Rating:** \*400 watts

**Nominal Impedance:** 8 ohms

**Sensitivity (1w/1m):** 99 dB

**Maximum SPL:** 125 dB @ 1 meter  
(@ rated power)

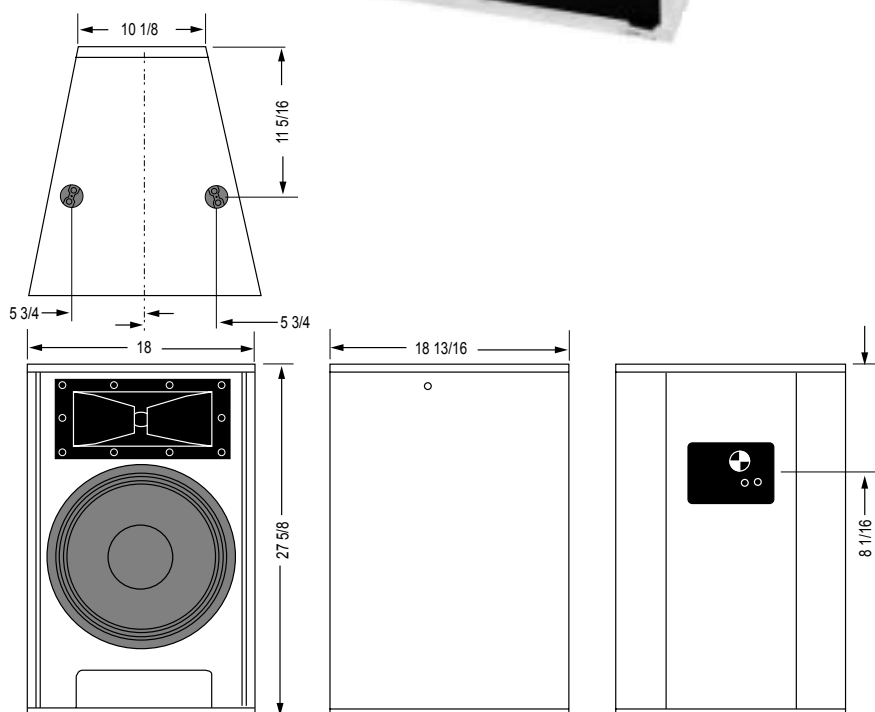
**Nominal Coverage Angles:**  
90° H x 40° V, above 2 kHz

**Crossover frequency:** 2 kHz

**Input Connectors:** Dual binding posts

**Dimensions:** 27 5/8" H x 18" W x 18 7/8" D

**Weight:** 65 lbs



## Weather Resistant-Outdoor

The PermTec™ P-100 is a two-way passive environmentally resistant loudspeaker system. It contains two 5" inch cast frame low frequency drivers and a 1 inch horn loaded high frequency device. It has exceptional sensitivity and smooth response from 110 Hz to 20 kHz.

The P-100 is ideal for outdoor foreground/background music and paging systems. It is used in under balcony systems for theaters and houses of worship, delay systems and where larger systems would interfere with sight lines.

An optional internally mounted 70 volt transformer (30 watt standard, 60 watt on special order) is available for distributed systems.

### P-100 Specifications:

**Frequency Response:** 110 Hz to 20 kHz

**Power Rating:** \*100 watts

**Nominal Impedance:** 8 ohms

**Sensitivity (1w/1m):** 97 dB

**Maximum SPL:**

118 dB @ 1 meter (@ rated power)

**Nom. Coverage Angles:** 90° H x 60° V

**Crossover frequency:** 3 kHz

**Input Connections:** Barrier strip and NL4 speakon (P-100), Barrier strip only on P-100I

**Dimensions:** 19 5/8" H x 7" W x 7 9/16" D (P-100), 19 1/4" H x 7 7/8" W x 1" D (P-100I)

**Weight:** 24 lbs (P-100), 21 lbs (P-100I)

**Transformer Frequency Response:** ± 2dB @ 50-12,000 Hz

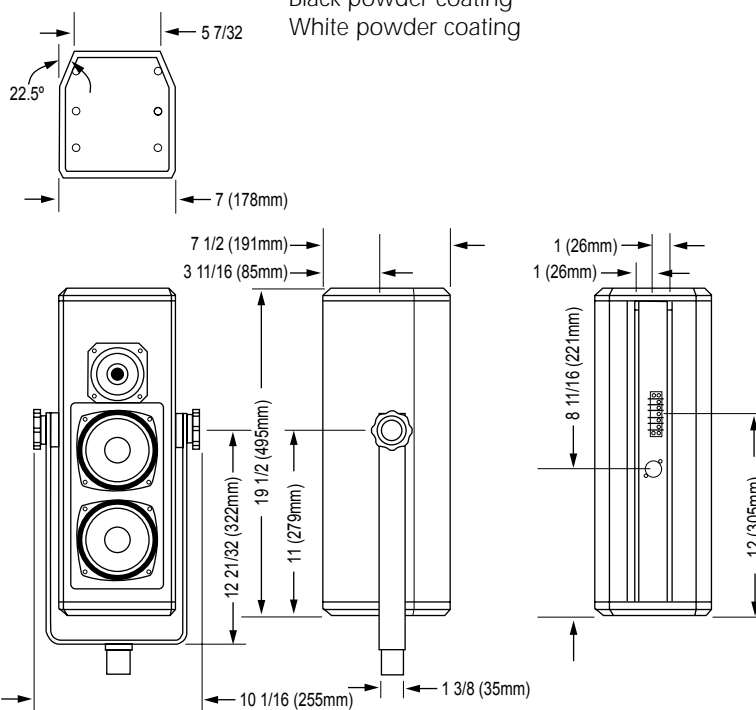


### P-100 Finish Options:

Black powder coating

White powder coating

15 | 16



## ARCHITECT SPECIFICATIONS

The Loudspeaker shall be a two-way passive system, featuring two five-inch cast aluminum frame woofers with a one-inch voice coil, 40 oz. magnet assembly and a one-inch phenolic diaphragm horn tweeter. The woofer cone shall be water resistant and be impervious to environmental conditions. The system shall be capable of handling 100 continuous watts of pink noise. The enclosure shall be constructed of heavy duty weather sealed aluminum extrusion, ABS plastic end caps, powder coated finish and features an aluminum grille backed with polyether foam. Dimensions shall be 19.62 inches high, 7.56 inches deep and 7.05 inches wide. The system shall weigh 25.5 lbs. The loudspeaker system shall be the PAS P-100.

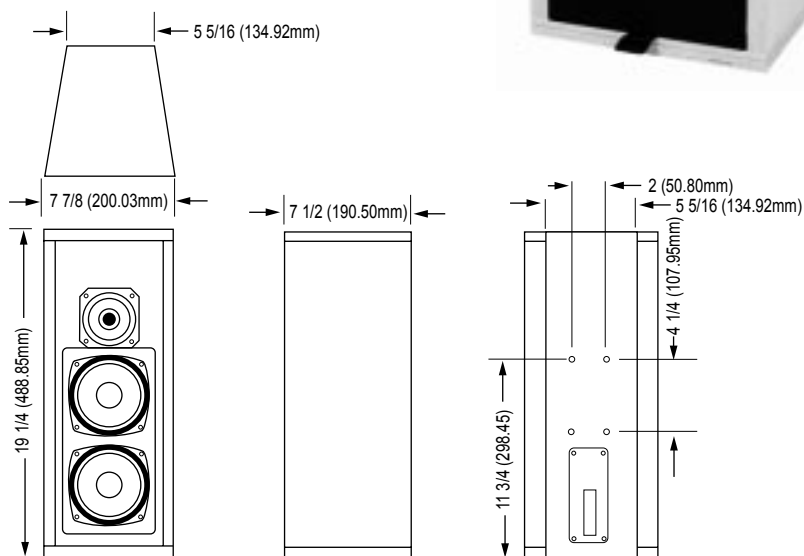
## Indoor Installation

For indoor applications the P-100I provides similar performance in a non weather-resistant wooden cabinet. This cabinet has T-nuts in the foot-print of a 75 series Omnimount on the rear. The P-100I has a double-knit fabric grille.



### P100I Finish Options:

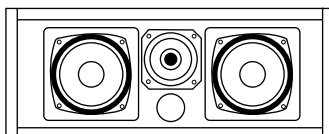
- Black paint
- White paint
- Unfinished



When the application requires horizontal (such as under balcony systems) both types are available with the high frequency driver mounted between the low frequency drivers.

This option is:

P-100H (weather-resistant) and  
P-100IH (indoor).



# FINISH OPTIONS

## Permanent Install™

---



Black paint



White paint



Unfinished

## Target Install™

---



Black paint



White paint



Unfinished

17 | 18

## PermTec Series™ - outdoors

---



Black powder coating



White powder coating

## PermTec Series™ - indoors

---



Black paint



White paint



Unfinished



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