

# sound without compromise



SOUND & COMMUNICATION



## Preface

Dear Sir or Madam,

If you are holding our catalogue in your hand for the first time, you may be surprised by the extensive variety of our products. TOA has continuously advanced throughout the years and is now representing 3 big business areas:

- "Security & Safety" – security and surveillance technologies from evacuation systems to Intercom systems
- "Information & Communication" – from public address systems for various applications to network audio adaptors and all kinds of conference sites
- "Professional Audio" – for the perfect audio transmission in a variety of venues from theatres to soccer stadiums

Within this catalogue we are presenting an extensive variety of products for each of our 3 business areas. TOA sets itself the standard to always find the perfect acoustic solution for every application.

Additionally you will find a fourth part named "Acoustics" which makes our catalogue much more useful to you. This part contains all important and beneficial facts about public address – basic principles, formulas and precise planning tools.

Above all TOA thrives for the most perfect transmission of information and music. Our new products show how close we get in meeting this ultimate aim:

- New range of EN 54 certified products
- New range of infrared microphones
- Extensive line up of Intercom products
- Comprehensive range of loudspeakers with over 20 new models

We would like to surprise you and appreciate our catalogue being in your hands. If anything remains unclear, your specialist dealer and TOA will be glad to give you any further advice.

**Toshio Sakata**  
Managing Director  
TOA Europe

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## Security & Safety



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# TOA: More than 70 years in the field of communication

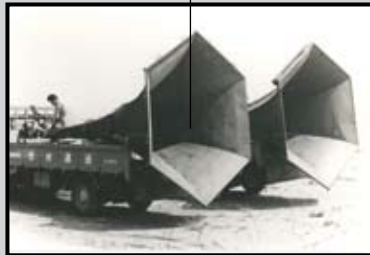


1954

Influenced elections in Japan: The first ever electric Megaphone in the world

To be heard over 12 km.  
After the transmission test with 6 m long horns

1962



1976

The birth of Intercom: TOA developed a 2-Way Speech System

The first cameras - later

1983





CCTV  
only 3 years  
colour CCTV



1992

Caused a sensation among the specialists: The first full Digital Mixing Console

For really big rooms –  
our Line Array Loudspeakers.

2005



Tomorrow

Safety in the future. The first Network Audio Adapter that has got the „IPv6 ready“ Logo

As Tsunetaro Nakatani founded TOA in 1934 and started to produce microphones, he did this with Japanese pioneering spirit. It just didn't interest him to record sounds, he wanted to go to the roots of acoustics and to understand it. It was his target to transmit every kind of music and information as precise and natural as possible.

Around 70 years later his target has almost been reached. TOA's researchers have had a big hand in this. From the first electric megaphone (1954) to the first complete building Audio-Emergency-System (1969), from CCTV Cameras (1983) to Audio Network Technology we have always set new standards.

You will find our systems in thousands of different places, such as schools, concert halls, shopping malls, skyscrapers, airports and sport stadiums. They are not only there to serve the security and surveillance but also for perfect transmission of concerts and music.

Today TOA is a world wide operating company with approximately 300 Mio. Dollar turnover.

Our pride is not only based on these turnover figures, but more on the fact that we can use this knowledge to create acoustic sound fields for millions of people to make their lives safer and more pleasant.



**Our Vision:  
Advancing the Realms of Reassurance, Reliability and Emotion**





At TOA we've built our business on matching close observation of the changing times and trends with product after successful product, reinforced by proactive development that constantly will open doors to new possibilities.



## So far and into the future: TOA takes an active role in meeting social responsibilities

Since its founding, TOA has pursued its business based upon a solid Management Philosophy—at the core of which are the “Three Confidences”—and now more than ever it is these important basic foundations that will carry the company into an even brighter and more prosperous future.

### Basic Management Policy (Three Confidences)

#### <Total confidence>

There is nothing in the world that lasts forever except the heavens and earth. Death is inevitable for everything that lives. “Every tide hath its ebb.”

Even business enterprises must obey this very fundamental rule of life, for isn't a business enterprise a living thing, comprised of its employees who are living? Every enterprise is destined to grow, for the very nature of the business enterprise is to continue to grow. At some point, however, because of events outside the control of its employees, the business enterprise will begin to shrink, even to disappear.

Some enterprises die on their own, as in bankruptcy.

Others are swallowed up by larger or more successful business and just as surely end their existence.

But TOA must be protected by the EFFORTS of its employees, we must strive with every action to preserve TOA and protect it from this final outcome. And our TOTAL CONFIDENCE comes from these EFFORTS to PRESERVE and PROTECT.

No confidence can be obtained without dedicating ourselves to hard work.

When we as employees face difficult situations, we must make every effort to succeed.

In this way we will experience and communicate TOTAL CONFIDENCE.

Thus will we earn peace and tranquility for our company and ourselves.

Total confidence  
of our customers in  
the use of all  
products.

Total confidence  
of our associates in  
all business transac-  
tions.

Total confidence  
of our employees in  
all their efforts.

TOA strives every day to uphold the trust and hopes of customers, shareholders, business associates, employees and all others holding stakes in our company.



Based on the letter T,  
the TOA logo symbolizes  
our four corporate objectives:

<b>PROGRESSIVE</b>	To continuously incorporate the latest technology and pursue a high degree of specialization.
<b>MODERN</b>	To respond appropriately and quickly to rapid changes occurring in society.
<b>INTERNATIONAL</b>	To make a global contribution in the field of communication through sound.
<b>DYNAMIC</b>	To make an effort as individuals to create products of the highest quality and value.





# People-Friendly, Planet-Friendly Quality Assurance and Environmental Policies



TOA's efforts to ensure product quality and support environmentally friendly corporate activity are recognized worldwide.

## World-Renowned TOA Quality ISO 9001 and ISO 14001 Certification

TOA has earned certification under ISO 9001, an international standard recognizing effective quality assurance efforts. From product planning and development to production, installation and service, our total quality management activities ensure that we earn the trust the world has placed in us. Further, regarding environmental preservation as another important operational issue, we work to pursue technological and product development in an environmentally friendly manner, as evidenced by the fact that TOA has also earned certification under ISO 14001, the international standard recognizing effective, sustainable environmental management systems.



JMI-0020



JQA-EM1400



## "Total Assembly"-Based Production System Ensures High Efficiency and Superior Quality

TOA has adopted a unique production system based on the concept of "Total Assembly." Each work station is staffed by several workers who together are responsible for the entire process of assembling each individual product, starting with ordering the necessary parts and ending with shipping the finished product. This system ensures the high quality and good production efficiency, and also allows us to quickly deliver only the required quantities of required products to the market.



**RoHS**  
Compliant 



## Takarazuka Headquarters Environmental Policies

- At our Takarazuka headquarters TOA pursues the development and design of technologies and products, and throughout these activities we endeavor always to correctly assess their environmental impact. At the same time, we also set further environmental objectives and targets within the parameters of our technical and economic capacities, implement these in a planned manner, and remain committed to continual improvement of our environmental protection efforts in general.
- TOA actively considers any and all measures that might be taken to not only minimize the environmental impact of our products at all stages of their life cycles – including design, technology and product development, manufacturing processes, product distribution, actual use, and final disposal – but also to reduce the use of hazardous chemical substances in all these areas.
- TOA establishes an environmental protection system designed to promote environmental protection and improvement and prevention of pollution activities that are economical, effective, and permanent.
- As a member of the communities in each of the regions where we do business, TOA actively cooperates in efforts to save resources and energy and reduce industrial waste.
- TOA endeavors to preserve the environment both through compliance with established environmental laws, regulations and other agreements, and by voluntarily establishing our own in-house environment-related regulations as needed.
- TOA pursues environment-related educational and promotional activities and endeavors to ensure that all members of the TOA staff have a clear and constantly improving understanding of the "TOA Fundamental Environmental Philosophy" and the "Takarazuka Office Environmental Policy."
- Information on environmental technologies and products and environmental management implementation are made public as necessary.

## TOA's Environmental Principles

TOA recognizes preservation of the Earth's environment as an important aspect of doing business in the world today. Our staff as a whole remains actively committed to pursuing all corporate activities in ways that give strong consideration to environmental protection.

## CONSTANTLY INFORMED

Public places – from hotels to airports – the general public need to be supplied with more and more information. TOA ensures that every message reaches the right person at the right time, through public address systems that can be steered to areas where it is needed. Wireless systems that are uncomplicated and very reliable. Network technology through Internet is more flexible than ever before. For a world where human life is more pleasant and easier than ever before.





## Wired Microphone

### Lecture Microphones



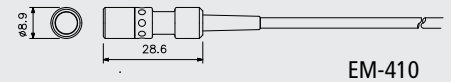
EM-410



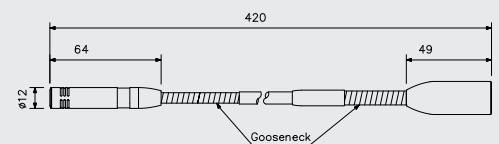
EM-410 capsule



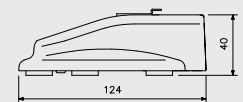
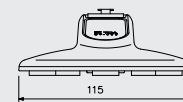
ST-800



EM-410



EM-800



ST-800

### Features

#### EM-800: Gooseneck microphone

- Electret condenser element with cardioid pickup pattern and good off-axis rejection to minimise feedback
- Wide frequency range for well-balanced sound with clarity and a satisfying tonal response
- New gooseneck design with two adjustment points for flexible mic setting angles
- Colour : Black

#### Options:

- Microphone stand: ST-800

#### EM-410: Lavalier Microphone

- Clean and accurate reproduction of voice and maximum intelligibility
- Compact electret condenser element with hyper cardioid pickup pattern and good off-axis rejection to minimise feedback
- Provides the best performance when attached to the chest such as a shirt front
- Minimises noise pickup from clothes rustling and cables
- Capsule freely rotates to allow the best voice pickup even if the EM-410 is attached to the user's lapel
- Colour : Black

### Applications

EM-800: Designed for places of worship, courtrooms and retail stores

EM-410: For lectures, religious services and any voice-oriented application

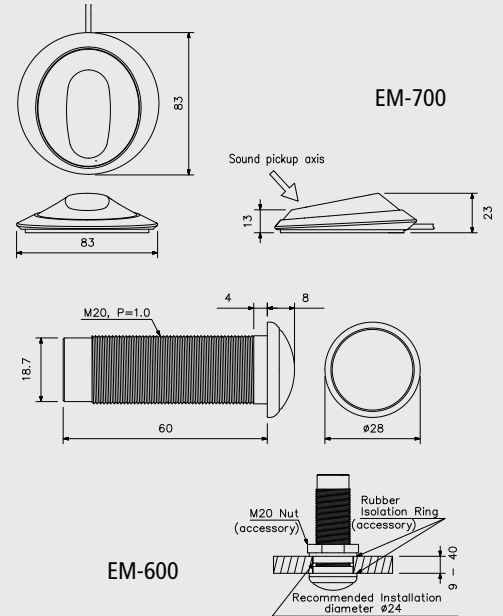
### Specifications

	EM-800	EM-410
<b>Application</b>	Conference	Speech, vocal
<b>Element</b>	Electret condenser	Electret condenser
<b>Polar Pattern</b>	Cardioid	Hypercardioid
<b>Rated Impedance</b>	100 Ohm, balanced	100 Ohm, balanced
<b>Phantom Power</b>	9 – 52 V DC	9 – 52 V DC
<b>Frequency Response</b>	60 ... 20000 Hz	100... 15000 Hz
<b>Sensitivity</b>	-37 dB (0 dB = 1 V/1 Pa, 1 kHz)	-45 dB (0 dB = 1 V/1 Pa, 1 kHz)
<b>Connector</b>	XLR-3-12 or equivalent	Phone plug Cable length: 5.0 m
<b>Weight</b>	135 g	100 g
<b>Dimension</b>	ø12 x 420 mm	ø8.9 x 28.6 mm

## Wired Electret Microphone



### Boundary Microphones



### Features

#### EM-700: Boundary Microphone

- High sound quality for sound reinforcement, professional recording, conferencing
- Frequency response extends over the full range of audible sound and ensures accurate reproduction
- Low-cut filter switch cuts low-frequency ambient noise around the desk
- Cardioid pickup pattern rejects off-axis sound to achieve very high gain until feedback starts
- Small diameter mic capsule positioned close to the mic housing boundary to minimise phase interference

- Design optimised for use on a desk
- Slim, stylish design suits interior decor
- Colour : Black

#### EM-600: Flush-Mount Boundary Microphone

- Unobtrusive design for flush-mounting
- Omnidirectional pickup pattern
- Wide frequency range from 30Hz to 20kHz
- Minimised picking up low frequency sounds that degrade audio performance
- Rubber isolation rings to resist vibrations which also affect audio quality
- Colour : White

### Applications

Conference room recording, A/V conferences as well as use in monitoring for security purposes

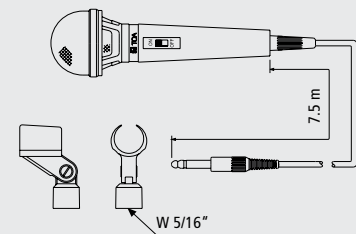
### Specifications

	EM-700	EM-600
<b>Application</b>	Conference	Conference, security monitoring
<b>Element</b>	Electret condenser	Electret condenser
<b>Polar Pattern</b>	Cardioid	Hypercardioid
<b>Rated Impedance</b>	100 Ohm, balanced	100 Ohm, balanced
<b>Phantom Power</b>	9 – 52 V DC	9 – 52V DC
<b>Frequency Response</b>	35 ... 20000 Hz	30 ... 20000 Hz
<b>Sensitivity</b>	-32 dB (0 dB = 1 V/1 Pa, 1 kHz)	-39 dB (0 dB = 1 V/1 Pa, 1 kHz)
<b>Connector</b>	XLR-3-12 or equivalent Cable length: 7.5 m	XLR-3-12 or equivalent
<b>Weight</b>	300 g	85 g
<b>Dimension</b>	83 x 23 x 83 mm	$\varnothing 28$ x 68 mm



## Handheld Dynamic Microphone

### Universal Microphones



### Features

- Handheld microphone for general use
- Short type slide On/Off switch for minimising switching noise
- Robust die-cast aluminium microphone body reduces handling noise
- Adapter for stand mount is provided
- DM-1100 has 7.5 m cable with phone plug
- DM-1300 with (balanced) XLR-connector has 10 m cable with (unbalanced) phone plug

### Options

- ST-65A: Low Desk Stand
- ST-66A: High Desk Stand

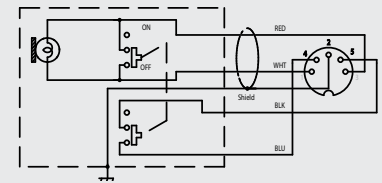
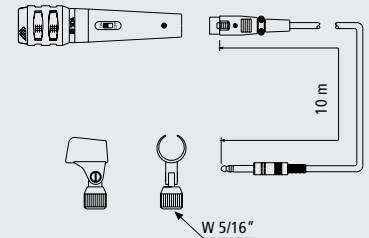
### Specifications

	DM-1100	DM-1300
<b>Application</b>	Paging	Speech, vocal
<b>Microphone Capsule</b>	Dynamic	Dynamic
<b>Directivity</b>	Unidirectional	Unidirectional
<b>Output Impedance</b>	600 Ohm	600 Ohm
<b>Signal Transmission</b>	Unbalanced	Balanced
<b>Frequency Range</b>	100...12000 Hz	70...15000 Hz
<b>Output Level (0 dB=1 V/Pa)</b>	-55 dB	-54 dB
<b>Cables</b>	7.5 m, phone plug	10 m, phone plug
<b>Microphone holder</b>	W 5/16"	W 5/16"
<b>Dimensions (W x H x D)</b>	55 ø x 178 mm	51 ø x 170 mm

## Handheld Dynamic Microphone



### Dynamic Allround Microphones for Daily Use



### Features

- Microphone for speech use
- Robust die-cast zinc microphone body
- Short type slide On/Off switch reduces handling noise
- XLR-connector and a 10 m cable with phone plug
- Adapter for stand mounting is provided
- DM-1200D comes with a remote control function to activate amplifiers power or chime unit and with a 5 m cable with 5-pin DIN plug

### Options

- ST-65A: Low Desk Stand
- ST-66A: High Desk Stand

### Applications

DM-1200: For daily use for presentation, performance or paging  
 DM-1200D: For PA-System and paging (e.g. with pre-announcement gong)

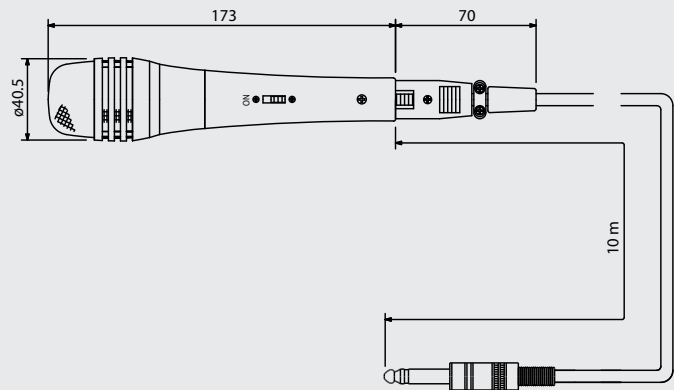
### Specifications

	DM-1200	DM-1200D
<b>Application</b>	Paging, speech	Paging, speech
<b>Directivity</b>	Unidirectional	Unidirectional
<b>Microphone Capsule</b>	Dynamic	Dynamic
<b>Output Impedance</b>	600 Ohm	600 Ohm
<b>Signal</b>	Balanced	Balanced
<b>Frequency Range</b>	50...12000 Hz	50...12000 Hz
<b>Output Level (0 dB=1 V/Pa)</b>	-55 dB	-55 dB
<b>Cables</b>	10 m, phone plug	5 m, 5-pin DIN plug
<b>Microphone Holder</b>	W 5/16"	W 5/16"
<b>Dimensions (W x H x D)</b>	40 ø x 163 mm	40 ø x 163 mm



## High Quality Microphones

### Microphones for Vocal Use



### Features

- DM-1500: Suitable for vocal and speech application
- Robust die-cast microphone body
- Short type slide On/Off switch reduces handling noise
- XLR-connector (balanced) and 10 m cable with phone plug
- Adapter for stand mount is provided

### Options

- ST-65A (Low Desk Stand) ST-66A (High Desk Stand), ST-321B and ST-322B Stands

### Applications

- DM-1500: For vocal and stage use
- EM-400: For speech, presentation and performance

### Specifications

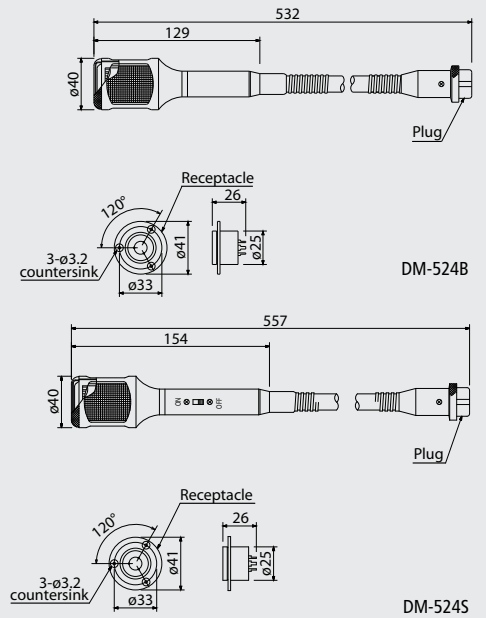
	DM-1500
Application	Speech, vocals
Directivity	Cardioid
Microphone Capsule	Dynamic
Output Impedance	600 Ohm
Signal	Balanced
Input SPL	
S/N Ratio	
Frequency Range	70...15000 Hz
Output level (0 dB=1 V/Pa)	-56 dB
Cables, Connectors	10 m, phone plug
Mounting	W 5/16"
Dimensions	40.5 ø x 173 mm



## Gooseneck Microphones



### Stand-Mount Microphones for Lecture



### Features

- Flexible gooseneck
- Suppresses handling noise
- DM-524S has a built-in On/Off switch
- 600 Ohm impedance (balanced)
- 3-pin connector
- Microphone can be used in conjunction with ST-73A Stand

### Options

- ST-73A: Desk Stand

### Applications

- For lecture desk or for paging

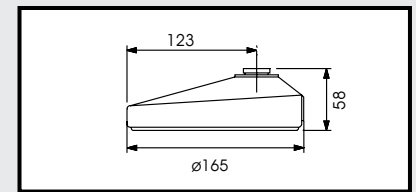
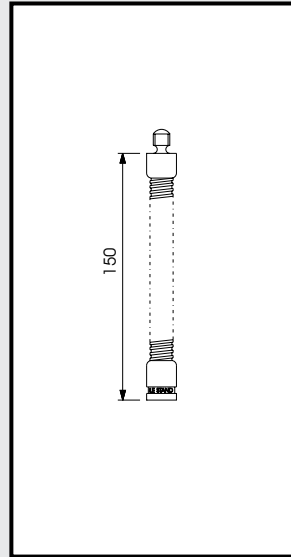
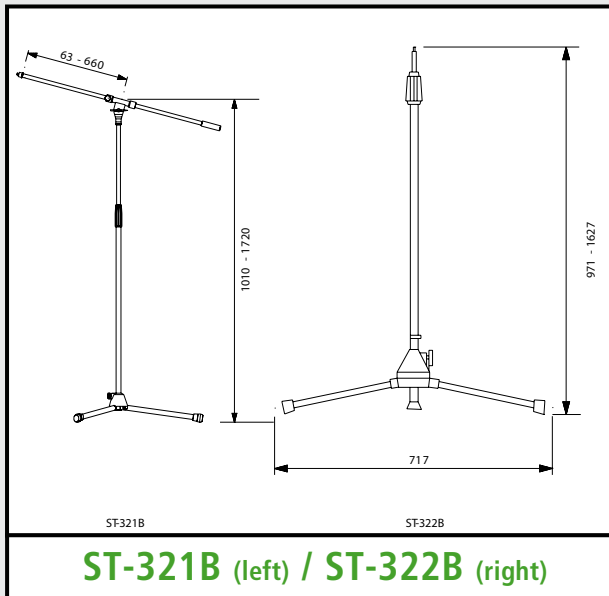
### Specifications

	DM-524B	DM-524S
<b>Application</b>	Paging, speech, lecture	Paging, speech, lecture
<b>Directivity</b>	Cardioid	Cardioid
<b>Microphone Capsule</b>	Dynamic	Dynamic
<b>Output Impedance</b>	600 Ohm	600 Ohm
<b>Signal</b>	Balanced	Balanced
<b>Frequency Range</b>	100...10000 Hz	100...10000 Hz
<b>Output Level</b>	-56 dB (0.16 mV)	-56 dB (0.16 mV)
<b>Cables</b>	3-pin connector ø 21	3-pin connector ø 21
<b>Dimensions</b>	40 ø x 532 mm	40 ø x 557 mm



## Accessories

### Stands and Goosenecks



### Features

- **ST-65A:** Desk Stand, low
- Height 120 ... 175 mm
- 5/16" stand adaptor and 5/8" inner pipe thread
- With microphone holder
- **ST-66A:** Desk Stand, high
- Height 220 ... 347 mm
- 5/16" stand adaptor and 5/8" inner pipe thread
- With microphone holder

### Features

- **ST-321B:** Floor Stand with boom
- Height 1010 ... 1720 mm
- Boom 53 ... 660 mm
- U5/16 adaptor and NS5/8 thread
- **ST-322B:** Floor Stand
- Height 971 ... 1627 mm
- U5/16 adaptor and NS5/8 thread
- **ST-73A:** Desk Stand for DM-524B / DM-524S
- Height 58.5 mm

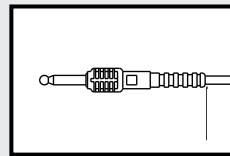
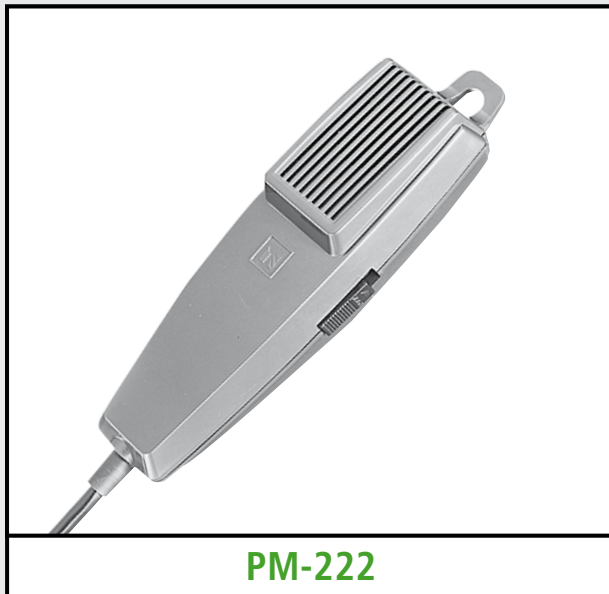
### Features

- **YM-121:** Gooseneck for ST-73A
- Height 367 mm, connector XLR-3-11C
- Non-RoHS product
- **ST-506:** Gooseneck, short
- Height 150 mm, 5/16" thread
- Non-RoHS product
- **ST-507:** Gooseneck, long
- Height 300 mm, 5/16" thread
- Non-RoHS product

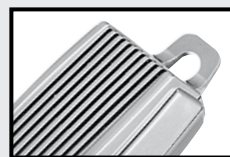
## Paging Microphone



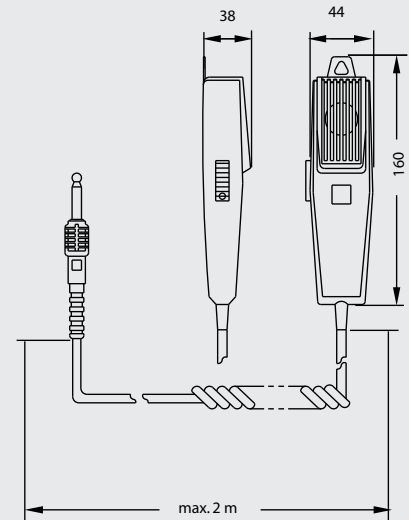
### Rugged Microphone with Phone Plug



Phone Plug



Microphone Holder



### Features

- For announcements in areas with high ambient noise
- Push-to-talk switch with lock
- Heavy duty metallic body
- Colour: grey
- PM-222 with phone plug and 2 m cable
- PM-222D with remote switch and DIN-plug
- PM-222U has no plug
- Output impedance is 600 Ohm, unbalanced

### Applications

Paging

### Specifications

	PM-222
Application	Paging
Directivity	Unidirectional
Microphone Capsule	Dynamic
Output Impedance	600 Ohm
Signal	Unbalanced
Frequency range	100...10000 Hz
Output level	-47 dB
Cables	1 core shielded cable, phone plug
Dimensions (W x H x D)	44 x 160 x 38 mm



## Microphones for Speech

### Heavy Duty Paging Microphones

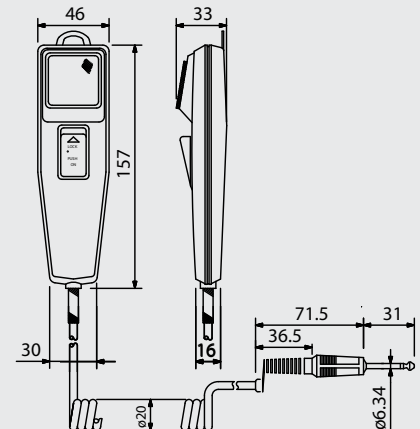


PM-120

#### Features

- Wide frequency response effective in high ambient noise areas
- Push-to-talk switch with lock
- 250 Ohm impedance, unbalanced
- 2.5 m coiled cable with phone plug
- Unidirectional polar pattern

#### Dimensions



PM-306D

#### Features

- Heavy duty microphone
- Metallic body suppresses background and handling noise for high intelligibility
- Push-to-talk-switch
- Coiled cable with 5-pin DIN plug (unbalanced)
- 500 Ohm impedance
- Allows priority overriding when used together with V-1051B

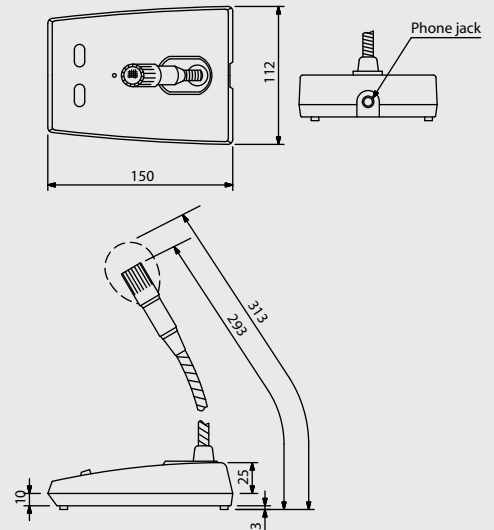
### Specifications

	PM-306D	PM-120
Application	Paging	Paging
Directivity	Omnidirectional	Unidirectional
Microphone Capsule	Dynamic	Dynamic
Output Impedance	500 Ohm	250 Ohm
Signal	Unbalanced	Unbalanced
Frequency range	80...16000 Hz	50...12000 Hz
Output level	-47 dB	-56 dB $\pm$ 3 dB (0 dB = 1 mV /Pa)
Cables	2 m, coiled cable, 5-pin DIN plug	2.5 m coiled cable, phone plug
Dimensions (W x H x D)	40 $\phi$ x 134 mm	46 $\phi$ x 157 mm

## Desk Top Microphone for Paging



### Chime Microphone



### Features

- Unidirectional dynamic microphone
- Built-in electronic chime unit generates 2 series of 4 notes – from low to high and vice versa
- 2 push-buttons for easy operation
- 600 Ohm impedance, unbalanced

### Applications

Reception, cashier station, counter

### Specifications

	EC-100M
Type	Desk top microphone for paging
Power Requirements	3 V DC (2x 1.5 V battery) / 2 mA
Directivity	Unidirectional
Microphone Capsule	Dynamic
Output Impedance	600 Ohm
Signal	Unbalanced
Output Level	-53 dB (Mic), -45 dBV chime
Chime	4-note chime
Controls	On / off switch
Cables	2 m, phone plug
Dimensions (W x H x D)	112 x 293 x 150 mm



## Remote Microphones

### Universal Use Paging Microphone



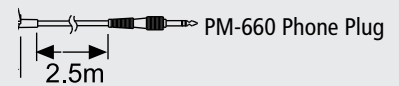
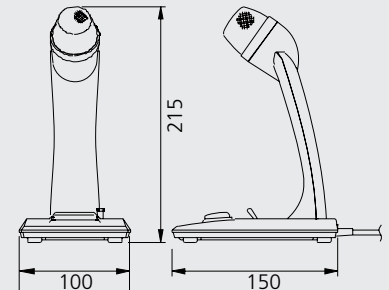
Talk-Switch



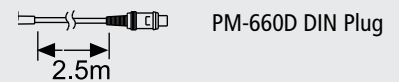
Dynamic Capsule



RU-2001 / 2002



PM-660 Phone Plug



PM-660D DIN Plug

### Features

- Elegant desktop microphone
- Short-off talk switch with locking lever or open-off type switch contact
- Low handling noise
- 600 Ohm impedance
- 2,5 m cable with phone plug (PM-660) or 5-pin DIN-plug (PM-660D) or 2 m without plug (PM-660U)
- Talk-switch with contact for remote control (PM-660D)

### Applications

Paging and announcements at the counter or in the cashier area (e.g. in supermarkets)

### Options

- RU-2001, RU-2002: Microphone Amplifier Control Unit

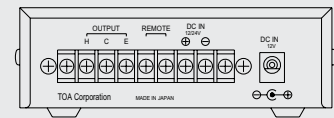
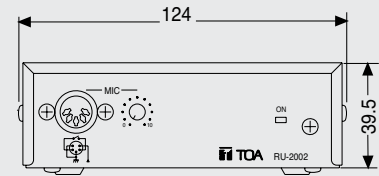
### Specifications

	PM-660	PM-660D	PM-660U
<b>Polar Pattern</b>	Cardioid	Cardioid	Cardioid
<b>Microphone Capsule Type</b>	Dynamic	Dynamic	Dynamic
<b>Output Impedance</b>	600 Ohm	600 Ohm	600 Ohm
<b>Signal</b>	unbalanced	balanced	balanced
<b>Frequency Range</b>	100...10000 Hz	100...10000 Hz	100...10000 Hz
<b>Output Level</b>	-58 dB (1 kHz, 0 dB = 1 V / Pa)	-58 dB (1 kHz, 0 dB = 1 V / Pa)	-58 dB (1 kHz, 0 dB = 1 V / Pa)
<b>Chime</b>	–	from RU-2002	–
<b>Controls</b>	Push-to-talk-switch, locking lever	Push-to-talk-switch, locking lever	Push-to-talk-switch, locking lever
<b>Cables</b>	2.5 m with phone plug	2.5 m with 5-pin DIN plug	2.5 m cable, no plug
<b>Dimensions (W x H x D)</b>	100 x 215 x 150 mm	100 x 215 x 150 mm	100 x 215 x 150 mm

## Amplifier Control Units



### For Microphones with DIN Plug (for remote power control)



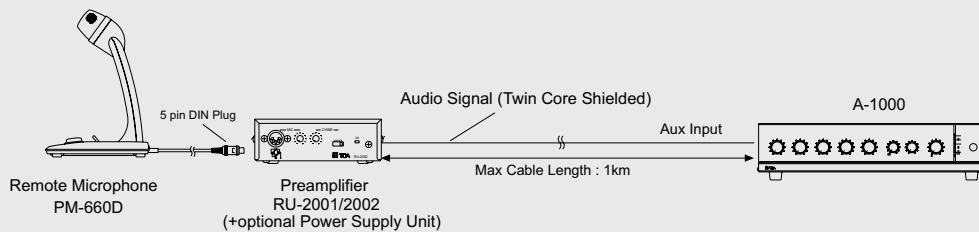
### Features

- For remote power control of main amplifier and for initiating all-call
- Microphone volume control, talk indicator
- Power supply via AC adaptor
- Mounting brackets for wall-mounting are included
- RU-2002 activates 4, 2 or single tone chime plus gong when talk switch is pressed
- Colour: black

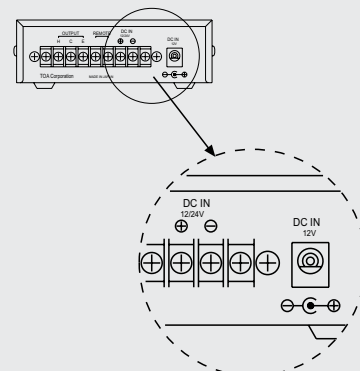
### Options

- PM-660D: Remote Microphone

### Application Example



### Connection



	RU-2001	RU-2002
<b>Power Supply</b>	12...24 V DC, external or 12 V AC adaptor	12...24 V DC, external or 12 V AC adaptor
<b>Power Consumption</b>	60 mA	60 mA
<b>Microphone Input</b>	-62 dBV, 600 Ohm, unbalanced	-62 dBV, 600 Ohm, unbalanced
<b>Output</b>	0 dBV, 600 Ohm, balanced	0 dBV, 600 Ohm, balanced
<b>Chime</b>	—	4, 2 or single tone chime, gong
<b>Dimensions (W x H x D)</b>	124 x 42.5 x 159 mm	124 x 42.5 x 159 mm
<b>Weight</b>	0.7 kg	0.7 kg
<b>Finish</b>	black	black
<b>Accessories</b>	Mounting bracket	Mounting bracket



## Infrared System

### Microphones



IR-200M

#### Features

- Handheld microphone
- Capsule optimised for speech & vocal
- Stable voice transmission
- Intelligent positioning of the emitter avoids drop-outs through user's handling
- Electret condenser microphone unit
- Lightweight
- Infrared light emission adjustable
- 2 channels
- Antibacterial treatment
- Low-battery indicator



Tie Clip Microphone



Headset Microphone



Battery Charger



Ni-MH Battery



IR-300M

#### Features

- Body transmitter microphone
- Ready-to-wear design with neck strap
- Intelligent positioning of the emitter avoids drop-outs through user's handling
- Built-in electret condenser microphone
- Connection of optional external microphone possible
- Infrared light emission adjustable
- 2 channels
- Antibacterial treatment
- Low battery indicator

#### Options

- YP-M101: Tie Clip Microphone
- YP-M301: Headset Microphone
- IR-200BC: Battery Charger
- IR-200BT-2: Ni-MH Battery, 2 pcs./ rechargeable

### Specifications

	IR-200M	IR-300M
<b>Current Consumption</b>	Typ. 250 mA (2.4 V, power selector switch: N) / typ. 340 mA (2.4 V, power selector switch: H)	
<b>Battery</b>	IR-200BT-2 rechargeable battery for the infrared wireless microphone (2 pieces) or AA alkaline dry cell battery (2 pieces)	
<b>Infrared Emitter</b>	870 nm (AM: Brightness modulation) Frequency modulation Channel A: 3.100 MHz/Channel B: 3.350 MHz Approx. 20 m (Power selector switch: H; in an unobstructed space.)/Approx. 15 m (Power selector switch: N; in an unobstructed space.)	
<b>Modulation Sensitivity</b>	±4.8 kHz (1 kHz, when SPL of 84 dB is input)	
<b>Maximum Input Sound Pressure</b>	120 dB SPL	
<b>Input Sensitivity Adjustment</b>	—	Adjustment range: -9 dB to 0 dB (factory-preset: 0 dB)
<b>Microphone</b>	Unidirectional electret condenser microphone	
<b>Frequency Response</b>	100 Hz – 12 kHz	
<b>Preemphasis</b>	300 μs	
<b>Input</b>	—	External microphone input (ø3.5 monaural mini jack)
<b>Battery Operation Time</b>	Approx. 8 hours (when the IR-200BT-2 rechargeable battery for the infrared wireless microphone is used; power selector switch: N) / Approx. 6 hours (when the alkaline battery is used; power selector switch: N)	
<b>Environment Conditions</b>	0°C to +40°C / 30% to 85% RH	
<b>Finish</b>	Control Section: ABS resin, metallic grey, 50% gloss, paint / Filter Section: Polycarbonate, optical cut filter	
<b>Dimensions</b>	ø37 × 241.8 mm	64 (W) × 91.3 (H) × 27.3 (D) mm
<b>Weight</b>	170 g (with batteries)	130 g (with batteries & strap)



## Infrared System



### Receiver



**IR-500R**



**IR-510R**



**IR-520R**

### Features

- Wall-mount receiver
- With wall-mounting bracket
- Installation in electric circuit box possible
- Power indicator LED
- Reception area approx. 15 m
- Adjustable reception angle

### Features

- Ceiling-mount receiver
- Stand mount also possible
- With ceiling mounting bracket
- Power indicator LED
- Reception radius approx. 8 m

### Features

- Wall-mount receiver
- Wall or stand mount
- With stand mounting bracket
- Power indicator LED
- Reception area approx. 15 m

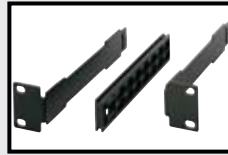
## Specifications

	IR-500R	IR-510R	IR-520R
<b>Power Source</b>	24V DC (supplied from the optional IR-702T)	24V DC (supplied from the optional IR-702T)	24V DC (supplied from the optional IR-702T)
<b>Current Consumption</b>	Max. 40 mA	Max. 60 mA	Max. 30 mA
<b>Infrared Detector</b> <b>Wavelength</b> <b>Carrier Frequency</b> <b>Reception Area</b> <b>Reception Angle</b>	870 nm Channel A: 3.100 MHz/Channel B: 3.350 MHz Approx. 15 m Vertical: 80° (up to 30° movable downward) Horizontal: 80° (up to 30° movable left or right)	Approx. 15 m —	Approx. 15 m —
<b>Connection Terminal</b>	75 Ohm, BNC jack	75 Ohm, BNC jack	75 Ohm, BNC jack
<b>Operating Temperature</b>	0°C to +40°C	0°C to +40°C	0°C to +40°C
<b>Operating Humidity</b>	30% to 85% RH	30% to 85% RH	30% to 85% RH
<b>Finish</b>	Case: Polycarbonate resin, visible light cut filter Base: ABS resin, off-white	Case: Polycarbonate resin, visible light cut filter, Base: ABS resin, black	Case: Polycarbonate resin, visible light cut filter
<b>Dimensions (W x H x D)</b>	70 x 120 x 72 mm	ø120 x 71.3 mm	84.5 x 63.5 x 32 mm
<b>Weight</b>	220 g (unit only)	205 g (unit only)	100 g (unit only)



## Infrared System

### Infrared Wireless Tuner



MB-WT4



MB-WT3

### Features

- 2-channel fixed-frequency tuner
- Up to 4 infrared light receivers per unit
- Two line outputs, one with a MIX output switch allowing output of mixed voices from channels A and B
- Equipped with signal reception light and knob for microphone volume control
- Rack-mountable with optional brackets (MB-WT3/MB-WT4)

### Options

- MB-WT4: Rack-mount bracket kit for 2 IR-702T/700D, consists of 2 brackets and connector
- MB-WT3: 19"-Rack-mount bracket kit for 1 IR-702T/700D consists of 2 brackets, blank box and connector

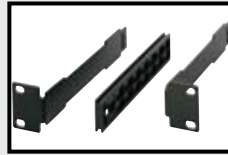
### Specifications

	IR-702T
Power Source	AC mains 50/60 Hz (supplied from the accessory AC adaptor)
Power Consumption	15 W or less
Receiving Frequency	Channel A: 3.100 MHz / Channel B: 3.350 MHz
Receiver Sensitivity	S/N ratio over 50 dB (40 dB $\mu$ V input, 1 kHz modulation, $\pm$ 4.8 kHz deviation)
S/N Ratio	>61 dB (60 dB $\mu$ V input, $\pm$ 4.8 kHz deviation, A-weighted)
Tone Squelch Frequency	32.768 kHz
Infrared Receiver Input	75 Ohm, BNC jack $\times$ 2 (Infrared wireless receiver's power source: 24V DC, max. 220 mA in total of 2 terminals)
Output	Channel A and B: -10 dB ( $\pm$ 4.8 kHz deviation, vol: max.), 600 Ohm, 3 pole phone jack
Frequency Response	100 Hz - 12 kHz
Operating Humidity	30% to 85% RH
Ambient Temperature	-10 °C to +50 °C
Finish	Case: ABS resin, black
Dimensions (W x H x D)	210 $\times$ 44 $\times$ 210.9 mm
Weight	630 g (unit only)



## Infrared System

### Infrared Wireless Distributor



MB-WT4



MB-WT3



YW-1022



YW-1024

### Features

- Equipped with 4 receiver mixing outputs and 2 distribution outputs
- By using the IR-700D in conjunction with IR-702T and YW-1022/1024, a system with up to 16 infrared receivers is configurable
- Rack-mountable with optional brackets (MB-WT3/MB-WT4)

### Options

- YW-1024 Distributor 1 into 4 outputs
- YW-1022 Distributor 1 into 2 outputs
- MB-WT4: Rack-mount Bracket Kit for 2 IR-702T/700D, consists of 2 brackets and connector
- MB-WT3: 19"-Rack-mount Bracket Kit for 1 IR-702T/700D consists of 2 brackets, blank box and connector

### Specifications

	IR-700D
Power Source	AC mains 50/60 Hz (supplied from the accessory AC adaptor)
Power Consumption	25 W or less
Input/Output	4 mixing inputs, 2 distribution outputs
Band-Pass Frequency	3.0 – 6.0 MHz
Gain	0 dB (±3dB)
Infrared Receiver Input	75 Ohm, BNC jack × 4 (Infrared wireless receiver's power source: 24 V DC, 800 mA max. in total of 4 terminals)
Distribution Output	75 Ohm, BNC jack
Operating Humidity	30% to 85% RH
Ambient Temperature	-10 °C to +50 °C
Finish	Case: ABS resin, black
Dimensions (W x H x D)	210 × 44 × 200.9 mm
Weight	640 g (unit only)



## UHF 5000 Series

### Microphones (New!)



**WM-5225**



**WM-5270**



**WM-5265**

### Features

- Electret condenser microphone
- Coverage 5 - 120 m
- 64 transmission channels
- On/Off switch prevents from rolling away
- Maximum input level 126 dB
- Low-battery indicator
- Only 1 AA battery required
- Built-in antenna

### Application

Optimised for speech

### Features

- Dynamic microphone
- Coverage 5 - 120 m
- Optimised PLL synthesizer
- Excellent sound quality
- Cardioid characteristics
- 64 transmission channels
- On/Off switch prevents from rolling away
- Maximum input level 142 dB
- Low-battery indicator
- Only 1 AA battery required
- Built-in antenna

### Application

Optimised for vocals and speech

### Features

- Dynamic microphone
- Optimised PLL synthesizer
- Excellent sound quality
- 64 transmission channels
- On/Off switch prevents from rolling away
- Maximum input level 132 dB
- Low-battery indicator
- Only 1 AA battery required
- Optional rechargeable battery available
- Built-in antenna

### Application

Optimised for speech

### Specifications

	WM-5225	WM-5270	WM-5265
<b>Microphone Element</b>	Electret condenser microphone, unidirectional	Dynamic microphone, cardioid	Dynamic microphone, unidirectional
<b>Frequency Range</b>	830 - 865 MHz (UHF D-Band), 606 - 636 MHz (G-Band + white space) 576 - 865 MHz (different sub-ranges for UHF A,B,C,E,F,G,H-Band)	794 - 830 MHz (UHF C-Band), 830 - 865 MHz (UHF D-Band)	830 - 865 MHz (UHF D-Band), 606 - 636 MHz (G-Band + white space) 576 - 865 MHz (different sub-ranges for UHF A,B,C,E,F,G,H-Band)
<b>Channel Selectable*</b>	64	64	64
<b>RF Carrier Power</b>	< 50 mW	< 50 mW	< 50 mW
<b>Tone Frequency</b>	32.768 kHz	32.768 kHz	32.768 kHz
<b>Modulation System</b>	PLL-Synthesizer	PLL-Synthesizer	PLL-Synthesizer
<b>Max. Input Level</b>	126 dB SPL	142 dB SPL	132 dB SPL
<b>Maximum Deviation</b>	± 40 kHz	± 40 kHz	± 40 kHz
<b>Battery</b>	LR6 (AA)	LR6 (AA)	LR6 (AA)
<b>Battery Life</b>	More than 10 hours (alkaline)	More than 10 hours (alkaline)	More than 10 hours (alkaline)
<b>Indicator</b>	Power/battery indicator	Power/battery indicator	Power/battery indicator
<b>Antenna</b>	Built-in	Built-in	Built-in
<b>Ambient Temperature</b>	- 10°C ... + 50°C	- 10°C ... + 50°C	- 10°C ... + 50°C
<b>Finish</b>	Resin, rubber coating	Resin, rubber coating	Resin, rubber coating
<b>Dimensions (W x H x D)</b>	ø 43.6 x 231.5 mm	ø 48 x 244 mm	ø 50 x 229 mm
<b>Weight</b>	180 g (incl. battery)	340 g (incl. battery)	205 g (incl. battery)
<b>Accessories</b>	Screw driver, pouch, microphone clip holder (incl. stand adaptor)	Screw driver, pouch, microphone holder (incl. stand adaptor), rolling stopper	Screw driver, pouch, microphone holder (incl. stand adaptor), rolling stopper

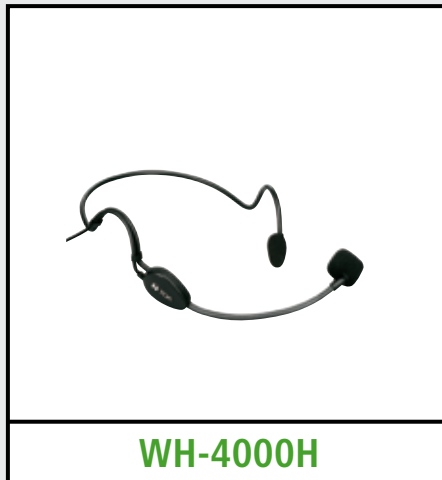
## UHF 5000 Series



### Microphones (New!)



**WM-5325**



**WH-4000H**



**WH-4000A**

### Features

- Wireless transmitter
- 64 transmission channels
- Maximum input level: -14 to -29 dB
- Low-battery indicator
- Only 1 AA battery required
- Built-in antenna
- Neck-strap is provided

### Features

- WH-4000H: Headset Microphone
- WH-4000A: Aerobic Headset Microphone

### Options

- WH-4000H: Headset Microphone
- WH-4000A: Aerobic Headset Microphone
- YP-M5300: Lavalier Microphone
- YP-M5310: Lavalier Microphone

### Specifications

	<b>WM-5325</b>
<b>Connector</b>	ø 3.5 mm plug
<b>Frequency Range</b>	576 - 865 MHz, 830 - 865 MHz (UHF D-Band), 606 - 636 MHz (UHF G-Band + white space)
<b>Channel Selectable*</b>	64
<b>RF Carrier Power</b>	< 50 mW
<b>Tone Frequency</b>	32.768 kHz
<b>Modulation System</b>	PLL-Synthesizer
<b>Max. Input Level</b>	-14 ... -29 dB
<b>Maximum Deviation</b>	± 40 kHz
<b>Battery</b>	LR6 (AA)
<b>Battery Life</b>	More than 10 hours (alkaline)
<b>Indicator</b>	Power/battery indicator
<b>Antenna</b>	Built-in
<b>Ambient Temperature</b>	- 10°C ... + 50°C
<b>Finish</b>	Resin, coating
<b>Dimensions (W x H x D)</b>	62 x 102.5 x 23 mm
<b>Weight</b>	90 g (incl. battery)
<b>Accessories</b>	Screw driver, storage case, neck strap

\* The number of channels may differ from country to country



## UHF 5000 Series

### Microphones (new!)



**YP-M5300**



**YP-M5310**

### Features

- Lavalier Microphone
- Electret condenser microphone
- With 1.3 m cable and plug lock
- High maximum input level
- ø 3.5 mm mini plug
- Only 20 g weight including cable

### Features

- Lavalier Microphone
- Electret condenser microphone
- With 1.3 m cable and plug lock
- Omnidirectional characteristics
- ø 3.5 mm mini plug
- Only 20 g weight including cable

### Specifications

	YP-M5300	YP-M5310
<b>Microphone Element</b>	Electret condenser microphone, unidirectional	Electret condenser microphone, omnidirectional
<b>Connector</b>	ø 3.5 mm plug	ø 3.5 mm plug
<b>Frequency Response</b>	100 Hz - 12000 Hz	100 Hz - 15000 Hz
<b>Sensitivity</b>	-63 dB	-64 dB
<b>Max. Input Level</b>	120 dB SPL	110 dB SPL
<b>Cable Length</b>	1.3 m	1.3 m
<b>Finish</b>	Dark black	Dark black
<b>Weight</b>	20 g (incl. cord)	20 g (incl. cord)

The specifications may change

## UHF 5000 Series



### Receivers



**WT-5800**



**WT-5805**



**WT-5810**

### Features

- UHF-Receiver for rack mounting
- True diversity receiver
- 64 channels
- Triple squelch-function suppresses noise
- Mixing input allows cascading of receivers
- Antenna distribution output
- External antenna inputs
- Battery indicator

### Options

- Mounting brackets for WT-5800:  
MB-WT3 (1 receiver)  
MB-WT4 (2 receivers)

### Features

- UHF receiver for rack mounting
- TOA Space Diversity receiver
- 64 channels
- Triple squelch-function suppresses noise
- Mixing input allows cascading of receivers
- Battery indicator

### Options

- Mounting brackets for WT-5805:  
MB-WT3 (1 receiver)  
MB-WT4 (2 receivers)

### Features

- UHF receiver
- TOA Space Diversity receiver
- 16 channels
- Triple squelch-function suppresses noise
- Mixing input allows cascading of receivers
- 2 antenna
- Output with XLR (balanced) and phone jack (unbalanced)
- Battery indicator

### Specifications

	WT-5800	WT-5805	WT-5810
<b>Power Requirement</b>	230 V AC, 50/60 Hz (using AC-DC adapter)		
<b>Power Consumption</b>	250 mA (12 V DC)	200 mA (12 V DC)	130 mA (12 V DC)
<b>Receiving Frequency</b>	794 - 830 MHz (UHF C-Band), 830 - 865 MHz (UHF D-Band)		
<b>No of Channel Selectable</b>	64	64	16
<b>Audio Output</b>	MIC: -60 dB, 600 Ohm, balanced, XLR-3-31, LINE: -20 dB, 600 Ohm, 1/4" phone jack (unbalanced)		
<b>Mixing Input</b>	-20 dB, 10 kOhm, phone jack (unbalanced)		
<b>Antenna Input</b>	75 Ohm, BNC (phantom power antenna) 9 V DC, 30 mA (max.)	—	—
<b>Antenna Output</b>	75 Ohm, BNC (Gain 0dB)	—	—
<b>Receiving Sensitivity</b>	Better than 90 dB, S/N ratio, (20 dB $\mu$ V input, 40 kHz deviation)		
<b>Squelch Sensitivity</b>	18-40 dB $\mu$ V variable		
<b>Tone Frequency</b>	32.768 kHz		
<b>Indication</b>	Audio (6 Step), RF (6 Step), ANT A/B, Audio (peak), battery	Audio (6 Step), RF (6 Step), ANT A/B, Audio (peak), battery	ANT A/B, Audio (peak), battery
<b>Channel Check</b>	Usable frequencies scanning		
<b>S/N Ratio</b>	> 110 dB (A-weight, unbalanced output)	> 110 dB (A-weight, unbalanced output)	> 104 dB (A-weight, unbalanced output)
<b>Harmonic Distortion</b>	Less than 1%		
<b>Frequency Response</b>	100 ... 15000 Hz, $\pm$ 3 dB		
<b>Ambient Temperature</b>	-10°C ... +50°C		
<b>Finish</b>	Resin, black		
<b>Dimensions (W x H x D)</b>	210 x 44 x 205,1 mm	210 x 44 x 205,1 mm	206 x 40,6 x 152,7 mm
<b>Weight</b>	700 g	700 g	590 g

## UHF Professional Series (64 channels)

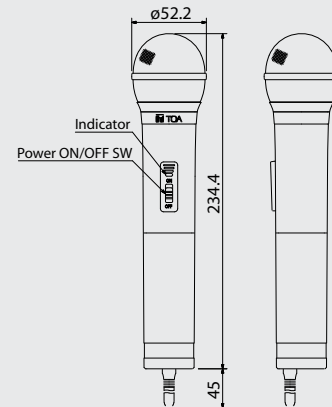
## Handheld Microphone and UHF Lavalier Microphone



WM-4200

## Features

- Dynamic handheld microphone
- Cardioid characteristics
- For vocal use
- Excellent and clear sound
- Compander system offers a wide dynamic range
- High sound pressure level enables singing loud and also singing close to the microphone
- Level can be adjusted to fit to any individual performer
- Rubber coating eliminates handling noise, reflections and allows a good handling of the microphone
- On / off switch prevents from accidental activation
- 64 channels are ideal for bigger events



## Options

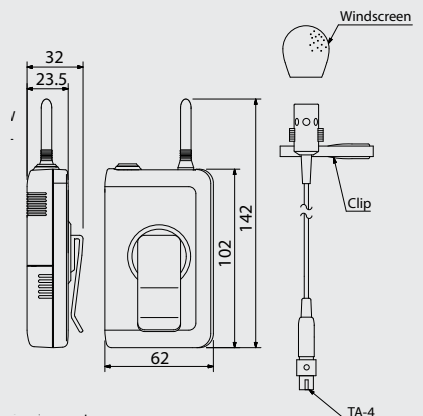
- ST-65: Desk Stand



WM-4300

## Features

- Lavalier microphone
- Cardioid characteristics
- Electret capsule ensuring a high intelligibility
- Rigid TA-4 plug
- Pocket transmitter
- 64 transmission channels
- Low-battery indicator
- Wide dynamic range through the compander circuit
- Belt clip is 360 degree rotatable and allows to fix the microphone capsule in any position at the clothes



## Specifications

	WM-4200	WM-4300
Microphone Element	Dynamic microphone unit, cardioid pickup pattern	Electret condenser microphone, cardioid pickup pattern
Connector	-	TA-4 (XLR-type)
Modulation	FM	FM
Frequency Range	794-830 MHz UHF C-band, 830-865 MHz, UHF D-band	794-830 MHz UHF C-band, 830-865 MHz, UHF D-band
No of Channel Selectable	64	64
RF Carrier Power	Less than 50 mW	Less than 50 mW
Tone Frequency	32.768 kHz	32.768 kHz
Modulation System	PLL synthesizer	PLL synthesizer
Maximum Input Level	145 dB SPL	120 dB SPL
Maximum Deviation	±40 kHz	±40 kHz
Battery	6LR61 (9 V x 1), More than 10 hours (alkaline)	6LR61 (9 V x 1), More than 10 hours (alkaline)
Indication	Power / battery indicator	Power / battery indicator
Antenna	Herical antenna	Herical antenna
Ambient Temperature	-10°C to +50°C	-10°C to +50°C
Finish	Resin, rubber coating	Resin, coating
Dimensions (W x H x D)	ø 52.2 x 279.4 mm	62 x 142 x 32 mm
Weight	270 g (with battery)	150 g (with battery)





## UHF Economy Series (16 channels)

### UHF Wireless Tuner / Handheld Microphone



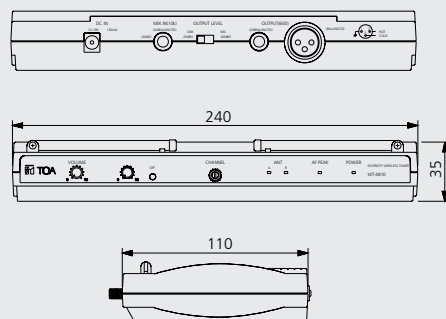
**WT-4820**

#### Features

- UHF Diversity Receiver for 1 or 2 optional UHF modules WTU-4800
- TOA Space Diversity Technology ensuring constant coverage
- Double squelch system supports a clear reception
- Mixing inputs allow cascading of several receivers
- 2 built-in antennas
- Mixing input for combination of receivers
- Rack-mountable

#### Options

- WTU-4800: UHF Tuner Module
- MB-WT3: Rack mounting of one WT-4820
- MB-WT4: Rack mounting of two WT-4820



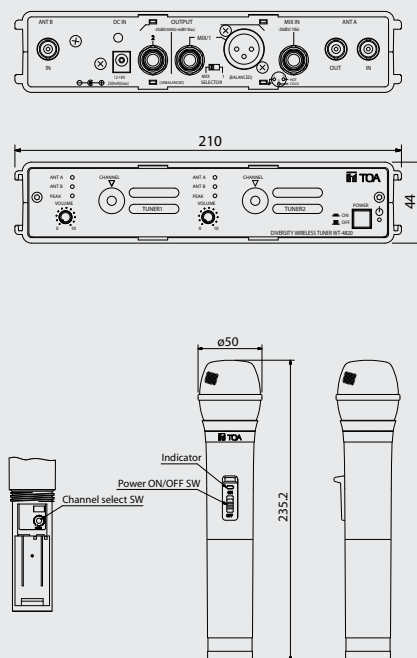
**WM-4210**

#### Features

- 16 channel frequency
- Optimised for vocals/singing
- Dynamic cardioid microphone element
- Maximum input level: 130 dB
- On/off-switch also keeps mic from rolling
- Flashing low-battery indicator
- Mic clip and storage case included
- Also compatible with TOA Professional Series WT-4800 Tuner (64 channel frequency-agile)

#### Options

- ST-65A: Desk Stand



### Specifications

	WT-4820
<b>Power Requirement</b>	230 V AC mains (using AC-DC adapter)
<b>Power Consumption</b>	250 mA (12 V DC, with 2 tuner modules)
<b>Receiving Frequency</b>	794-830 MHz UHF C-band, 830-865 MHz, UHF D-band
<b>Diversity System</b>	TOA Space Diversity
<b>No of Channel Selectable</b>	16 CH
<b>Receiving System</b>	Double super-heterodyne
<b>Audio Output</b>	Mixing/Solo 1: -60 dB phone jack(unbalanced), -14 dB XLR-3-31 type connector (balanced) / Solo 2: -20 dB, 1/4" Phone jack (unbalanced) / 600 Ohm
<b>Mixing Input</b>	-20 dB, 10 kOhm, 1/4" Phone jack (unbalanced)
<b>Antenna Input</b>	75 Ohm, BNC (phantom powering for antenna) 9 V DC, 30 mA
<b>Receiving Sensitivity</b>	Refer to WTU-4800
<b>Squelch Sensitivity</b>	Refer to WTU-4800
<b>Squelch System</b>	Refer to WTU-4800
<b>Indication</b>	ANT A/B, Audio (peak), power
<b>S/N Ratio</b>	Better than 102 dB, (A-weight, balanced output)
<b>Harmonic Distortion</b>	Less than 1 %
<b>Frequency Response</b>	50 ... 18000 Hz, ± 3 dB
<b>Ambient Temperature</b>	-10°C to +50°C
<b>Finish</b>	Resin, black
<b>Dimensions (W x H x D)</b>	210 x 44 x 181 mm
<b>Weight</b>	770 g
<b>Accessory</b>	AC-DC adapter

	WM-4210
<b>Microphone Element</b>	Dynamic microphone unit, cardioid
<b>Modulation</b>	FM
<b>Frequency Range</b>	794-830 MHz UHF C-band, 830-865 MHz, UHF D-band
<b>No of Channel Selectable</b>	16
<b>RF Carrier Power</b>	Less than 50 mW
<b>Tone Frequency</b>	32.768 kHz
<b>Modulation System</b>	PLL synthesizer
<b>Maximum Input Level</b>	130 dB SPL
<b>Maximum Deviation</b>	±40 kHz
<b>Battery</b>	6LR61 (9 V x 1)
<b>Battery Life</b>	More than 10 hours (alkaline)
<b>Indication</b>	Power/battery indicator
<b>Antenna</b>	Internal antenna
<b>Ambient Temperature</b>	-10°C to +50°C
<b>Finish</b>	Resin, coating
<b>Dimensions</b>	ø 50 x 235.2 mm
<b>Weight</b>	270 g (with battery)
<b>Accessory</b>	stand adapter, screw driver, storage case



## UHF 5000 Series

### Accessories



**WTU-4800**



MB-WT3



**YW-4500**



MB-WT4



**WD-4800**



MB-15B

### Features

- UHF Tuner Module for WT-4820, MX-628, ER-2930W and WA-1822

### Options

- WT-4820: Wireless Tuner
- MX-628: Powered Mixer
- WA-1822: Wireless Meeting Amplifier
- ER-2930W: Megaphone

### Features

- YW-4500: UHF Wireless Antenna
- Active antenna with attenuation switch, for wall-mounting
- MB-WT3: 19"-Rack Mounting Bracket Kit for 1 WT-4800, consists of 2 brackets, blank box and connector
- MB-WT4: Rack Mounting Bracket Kit for 2 WT-4800, consists of 2 brackets and connector

### Features

- Power antenna distributor with 2 antenna inputs, 4 antenna outputs and 4 DC power outputs
- Antenna outputs are distributed to the tuner for maximum coverage area and effective clear sound
- Rack mountable with optional mounting brackets (MB-15B)

### Specifications

	WTU-4800
<b>Power Requirement</b>	7-12 V DC
<b>Receiving Frequency</b>	794-830 MHz UHF C-band, 830-865 MHz, UHF D-band
<b>Receiving System</b>	Double super-heterodyne
<b>Diversity System</b>	TOA Space Diversity
<b>Channels</b>	16
<b>S/N Ratio</b>	> 80 dB
<b>Harmonic Distortion</b>	Less than 1%
<b>Frequency Response</b>	100 ... 12000 Hz, ±3 dB
<b>Ambient Temperature</b>	-10°C to +50°C
<b>Finish</b>	Steel
<b>Dimensions (W x H x D)</b>	60 x 25 x 139 mm
<b>Weight</b>	130 g

	YW-4500
<b>Power Requirement</b>	7-12 V DC (supplied from amplifier or tuner)
<b>Current Consumption</b>	Under 24 mA
<b>Receiving Frequency</b>	794-830 MHz UHF C-band, 830-865 MHz, UHF D-band
<b>Dipole Ratio Relative Gain</b>	More than 8 dB (780 MHz)
<b>V.S.W.R</b>	Less than 3.0
<b>Output Impedance</b>	75 Ohm
<b>Mounting Hole Pitch</b>	83.5 mm (dimensions for wiring box)
<b>Ambient Temperature</b>	-10°C to +50°C
<b>Finish</b>	AES resin, off-white
<b>Dimensions (W x H x D)</b>	105 x 140 x 126 mm
<b>Weight</b>	270 g

	WD-4800
<b>Power Requirement</b>	230 V AC
<b>Frequency Range</b>	VHF / UHF
<b>Antenna Input</b>	Dual 2 inputs (front x 1, rear x 1), 75 Ohm, BNC (phantom powering for antenna)
<b>Antenna Output</b>	Dual 4 outputs, 75 Ohm, BNC
<b>DC Power Supply</b>	4 outputs, (13 V DC / 250 mA)
<b>Indication</b>	Power
<b>Ambient Temperature</b>	-10°C to +50°C
<b>Finish</b>	Steel, coating
<b>Dimensions (W x H x D)</b>	420 x 44 x 305.5 mm
<b>Weight</b>	3.55 kg
<b>Option</b>	Rack-mounting bracket: MB-15B



## UHF 5000 Series

### Microphone / Tuner Sets (Basic system bundled in a set)



**WS-5200**

- A set consists of the handheld microphone WM-5220 and the tuner WT-5810
- For specifications of the models please see p. 32 and p. 34



**WS-5300**

- A set consists of the lavalier microphone WM-5320 and the tuner WT-5810
- For specifications of the models please see p. 33 and p. 34



**WS-5300H**

- A set consists of the headset microphone WM-5320H and the tuner WT-5810
- For specifications of the models please see p. 33 and p. 34

### Matching Microphones and Accessories of the UHF 4000 Series



**Handheld Microphones**

#### Models

- WM-4200: Handheld Microphone for speech and vocals with 64 channels, for specifications please see p. 29
- WM-4210: Handheld Microphone for speech and vocals with 16 channels, for specifications please see p. 30



**YW-4500**

#### Features

- YW-4500: UHF Wireless Antenna
- Active antenna with attenuation switch, for wall-mounting
- For specifications please see p. 31



**WD-4800**

#### Features

- WD-4800: Power Antenna Distributor with 2 antenna inputs, 4 antenna outputs and 4 DC power outputs
- Rack mountable with optional mounting brackets (MB-15B)
- For specifications please see p. 31

### Accessories



MB-WT4



MB-WT3

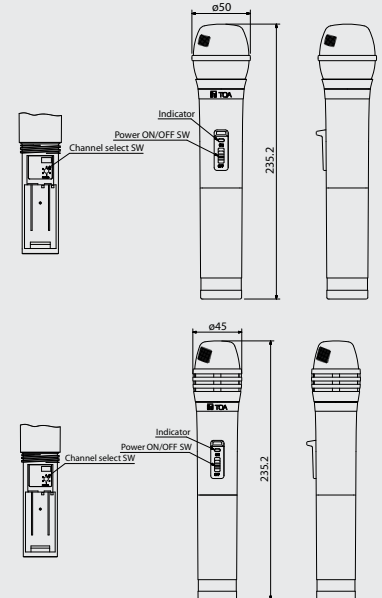


MB-15B



## VHF Series

## Handheld Microphones



## Features

- Handheld Microphone
- 6 transmission channels
- Componder system offers a wide dynamic range
- A nose at the On/Off switch prevents microphone from rolling

- WM-3210: For vocal and speech use
- Cardioid characteristics
- Dynamic microphone element

- WM-3220: For speech use
- Cardioid characteristics
- Electret condenser capsule ensures high intelligibility

## Application

School auditoriums, community centres, houses of worship, restaurants

## Application

Lecture rooms in university or hotel, bingo halls, presenters at POS

## Specifications

	WM-3210	WM-3220
<b>Microphone Element</b>	Dynamic, cardioid	Electret condenser, cardioid
<b>Frequency Range</b>	169 - 216 MHz, VHF	169 - 216 MHz, VHF
<b>Channel Selectable</b>	6	6
<b>RF Carrier Power</b>	< 50 mW	< 50 mW
<b>Tone Frequency</b>	32.768 kHz	32.768 kHz
<b>Modulation System</b>	PLL-synthesizer	PLL-synthesizer
<b>Maximum Input Level</b>	125 dB SPL	120 dB SPL
<b>Maximum Deviation</b>	$\pm 40$ kHz	$\pm 40$ kHz
<b>Battery</b>	9 V (6LR61)	9 V (6LR61)
<b>Battery Life</b>	> 10 h	> 10 h
<b>Indication</b>	Power + battery indicator	Power + battery indicator
<b>Antenna</b>	Internal antenna	Internal antenna
<b>Ambient Temperature</b>	- 10°C ... 50°C	- 10°C ... 50°C
<b>Finish</b>	Resin, coating	Resin, coating
<b>Dimensions</b>	$\phi 50 \times 235.2$ mm	$\phi 45 \times 235.2$ mm
<b>Weight</b>	250 g (incl. battery)	250 g (incl. battery)
<b>Accessory</b>	Stand adapter, screw driver	Stand adapter, screw driver

## VHF Series



### Belt Pack Microphones



**WM-3310H**



**WM-3310**

### Features

- WM-3310: Lavalier microphone with belt clip (360 degree rotatable to fix the microphone capsule in any position on the clothing)
- WM-3310H: Headset microphone
- Cardioid characteristics
- Electret capsule ensuring a high intelligibility
- 3.5 mm phone plug with plug lock
- Pocket transmitter
- 6 transmission channels
- Low-battery indicator
- Wide dynamic range due to the compander circuit

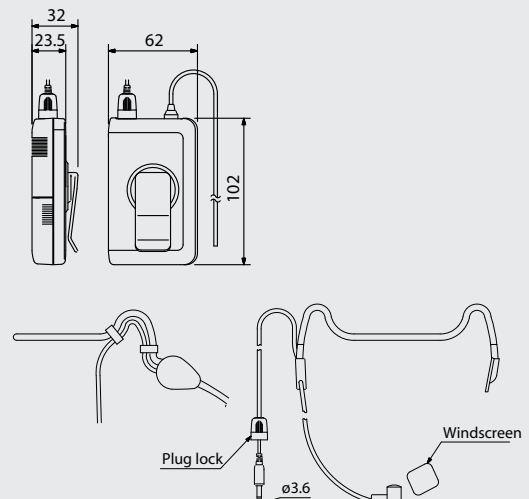
### Application

Fitness studios, gymnasiums, school auditoriums, community centres, houses of worship, restaurants

### Specifications

	WM-3310H	WM-3310
<b>Microphone Element</b>	Electret condenser, cardioid	
<b>Connector</b>	ø 3.5 mm plug	
<b>Frequency Range</b>	169 - 216 MHz, VHF	
<b>Channel Selectable</b>	6	
<b>RF Carrier Power</b>	< 50 mW	
<b>Tone Frequency</b>	32.768 kHz	
<b>Modulation System</b>	PLL-Synthesizer	
<b>Maximum Input Level</b>	120 dB SPL	
<b>Maximum Deviation</b>	± 40 kHz	
<b>Battery</b>	9 V (6LR61)	
<b>Battery Life</b>	> 10 h	
<b>Indication</b>	Power + battery indicator	
<b>Antenna</b>	1/4 lambda wire antenna	
<b>Ambient Temperature</b>	- 10°C ... 50°C	
<b>Finish</b>	Resin, coating	
<b>Dimensions (W x H x D)</b>	62 x 142 x 32 mm, dark grey	
<b>Weight</b>	135 g (with battery)	
<b>Accessory</b>	Screw driver	

### Dimensions





## VHF Series

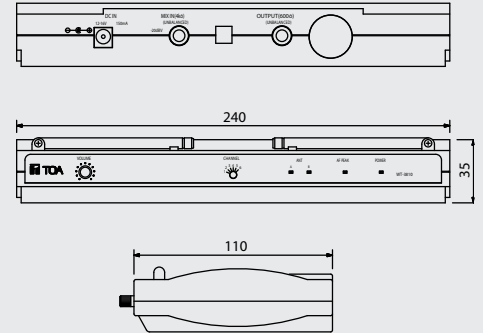
### Wireless Tuners



**WT-3810**

### Features

- VHF receiver
- TOA Space Diversity Technology ensuring constant coverage
- Scan function detects free resp. intermodulation-free channels to secure an undisturbed broadcasting
- Double squelch system supports clear reception
- WT-3800 features audio mixing input
- Receiver can be mounted in 19" racks with optional brackets
- 1 height unit
- 2 built-in antennas
- Colour: black



WT-3810



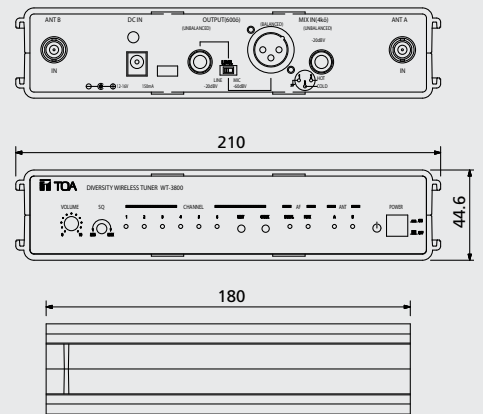
**WT-3800**

### Options

- Rack mounting brackets for WT-3800:  
MB-WT3 (1 unit)  
MB-WT-4 (2 units)

### Applications

Boardrooms, hotels, restaurants, schools, auditoriums, community centres



WT-3800

### Specifications

	WT-3810	WT-3800
<b>Power Requirement</b>	230 V AC (using AC-DC adapter)	230 V AC (using AC-DC adapter)
<b>Power Consumption</b>	150 mA (13.8 V DC)	150 mA (13.8 V DC)
<b>Receiving Frequency</b>	169 - 216 MHz, VHF	169 - 216 MHz, VHF
<b>Channel Selectable</b>	6	6
<b>Antenna</b>	Integrated antenna	Input BNC, 75 Ohm
<b>Receiving Sensitivity</b>	Better than 80 dB	Better than 80 dB
<b>Squelch Sensitivity</b>	18 - 40 dB $\mu$ V variable	18 - 40 dB $\mu$ V variable
<b>Tone Frequency</b>	32.768 kHz	32.768 kHz
<b>Indication</b>	3	3
<b>Channel Check</b>	-	Usable frequencies scanning
<b>Digital Control I/O</b>	-	available
<b>S/N Ratio</b>	>100 dB	>100 dB
<b>Harmonic Distortion</b>	< 1 %	< 1 %
<b>Frequency Response</b>	100 ... 12000 Hz, $\pm$ 3 dB	100 ... 12000 Hz, $\pm$ 3 dB
<b>Ambient Temperature</b>	- 10°C ... 50°C	- 10°C ... 50°C
<b>Finish</b>	Resin, black	Resin, black
<b>Dimensions (W x H x D)</b>	240 x 35 x 110 mm	210 x 44.6 x 180 mm
<b>Weight</b>	380 g	600 g



## VHF Series

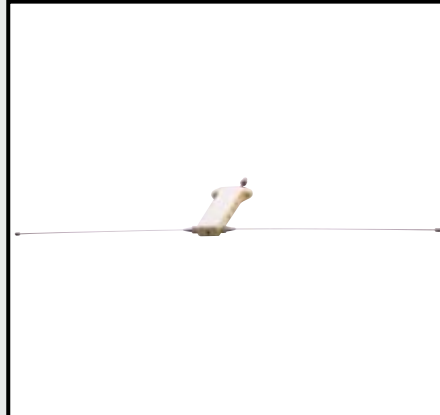
### Accessories for the VHF Series



**WTU-3800**



MB-WT3



**YW-3500**



MB-WT4



**WD-4800**



MB-15B

### Features

- VHF Tuner Module for WT-4820, MX-628 and WA-1822

### Options

- WT-4820: Wireless Tuner
- MX-628: Powered Mixer
- WA-1822: Wireless Meeting Amplifier

### Features

- YW-3500: VHF Wireless Antenna Dipole Antenna: Dipole ratio relative gain more than 6 dB, 75 Ohm output impedance, wall-mountable
- MB-WT3: 19"-Rack Mounting Bracket Kit for 1 WT-4800, consists of 2 brackets, blank box and connector
- MB-WT4: Rack Mounting Bracket Kit for 2 WT-4800, consists of 2 brackets and connector

### Features

- WD-4800: Power Antenna Distributor with 2 antenna inputs, 4 antenna outputs and 4 DC power outputs
- The antenna outputs are distributed to the tuner for maximum coverage area and effective clear sound
- Rack-mountable with optional mounting brackets (MB-15B)

### Specifications

	WTU-3800
Power Requirement	7-12 V DC
Receiving Frequency	169-216 MHz, VHF
Receiving System	Double super-heterodyne
Diversity System	TOA Space Diversity
Channels	6
S/N Ratio	> 80 dB
Harmonic Distortion	Less than 1 %
Frequency Response	100 ... 12000 Hz, ±3 dB
Ambient Temperature	-10°C to +50°C
Finish	Steel
Dimensions (W x H x D)	60 x 25 x 139 mm
Weight	130 g

	YW-3500
Power Requirement	8-10 V DC, (supplied from amplifier or tuner)
Current Consumption	Under 24 mA
Receiving Frequency	169-216 MHz, VHF
Dipole Ratio Relative Gain	More than 6 dB
V.S.W.R	Less than 2.6
Output Impedance	75 Ohm
Mounting Hole Pitch	68.5 mm (dimensions for wiring box)
Ambient Temperature	-10°C to +50°C
Finish	ABS resin, off-white
Dimensions (W x H x D)	197 x 850 x 32 mm
Weight	200 g

	WD-4800
Power Requirement	230V AC / 120 V AC
Frequency Range	VHF/UHF
Antenna Input	Dual 2 inputs (front x 1, rear x 1), 75 Ohm, BNC (phantom powering for antenna)
Antenna Output	Dual 4 outputs, 75 Ohm, BNC
DC Power Supply	4 outputs, (each output 13 V DC, 250 mA)
Indication	Power
Ambient Temperature	-10°C to +50°C
Finish	Steel, coating
Dimensions (W x H x D)	420 x 44 x 305.5 mm
Weight	3.50 kg
Option	Rack mounting bracket: MB-15B



## Power Amplifiers A-2000 Series

### Amplifiers (60 W - 240 W)



**A-2030 / A-2060 / A-2120 / A-2240**

### Features

- 4 wattages available: 30 W (A-2030) / 60 W (A-2060), 120 W (A-2120) or 240 W (A-2240)
- User-friendly front panel allows easy operation
- Excellent frequency response
- 3 electronically balanced microphone inputs, 2 AUX inputs and recording output
- Phantom power is provided to MIC 1, for supplying power to a condenser microphone
- Improved cost-performance level
- Wide tone-control adjustment range of  $\pm 10$  dB for both bass and treble
- Operation on either 230 V AC or 24 V DC
- 100 V / 70 V line or 4 Ohm speaker outputs
- Recording output
- 3 MIC inputs
- 2 AUX inputs for tuner, cassette player or other BGM sources
- Booster Amplifier (P-2240) for additional power
- 2-unit size
- Colour: black

### Applications

Houses of worship, religious facilities, school auditoriums, offices and other small to medium sized locations with the need to connect multiple sound sources like microphones

### Specifications

	A-2030	A-2060	A-2120	A-2240
<b>Rated Output Power</b>	30 W	60 W	120 W	240 W
<b>Power Requirements</b>	230 V AC, 50/60 Hz or 24 V DC	230 V AC, 50/60 Hz or 24 V DC	230 V AC, 50/60 Hz or 24 V DC	230 V AC, 50/60 Hz or 24 V DC
<b>Power Consumption</b>	34 W (AC) or 2 A (DC)	72 W (AC) or 4 A (DC)	124 W (AC) or 8 A (DC)	238 W (AC) or 15 A (DC)
<b>Inputs</b>	MIC 1: -60dB, 600 $\Omega$ , electronically balanced, 5-P DIN type MIC 2, 3: -60dB, 600 $\Omega$ , electronically balanced, phone jack AUX 1, 2: -20dB, 10k $\Omega$ , unbalanced, RCA pin jack Mute: Contact Pin 4 – 5 ,closure input (for MIC 1)			
<b>Speaker Outputs</b>	100 V, 70 V, 4 Ohm	100 V, 70 V, 4 Ohm	100 V, 70 V, 4 Ohm	100 V, 70 V, 4 Ohm
<b>Frequency Response</b>	50...20000 Hz ( $\pm 3$ dB)	50...20000 Hz ( $\pm 3$ dB)	50...20000 Hz ( $\pm 3$ dB)	50...20000 Hz
<b>Distortion</b>	< 1 % (1 kHz)	< 1 % (1k Hz)	< 1 % (1k Hz)	< 1 % (1 kHz)
<b>S/N Ratio</b>	> 60 dB	> 60 dB	> 60 dB	> 60 dB
<b>Tone Controls</b>	Bass $\pm 10$ dB (100 Hz) / Treble $\pm 10$ dB (10000 Hz)	Bass $\pm 10$ dB (100 Hz) / Treble $\pm 10$ dB (10000 Hz)	Bass $\pm 10$ dB (100 Hz) / Treble $\pm 10$ dB (10000 Hz)	Bass $\pm 10$ dB (100 Hz) / Treble $\pm 10$ dB (10000 Hz)
<b>Dimensions (W x H x D)</b>	420 x 100.9 x 280.3 mm	420 x 100.9 x 280.3 mm	420 x 100.9 x 360.3 mm	420 x 100.9 x 360.3 mm
<b>Finish</b>	Panel: ABS resin black, case black steel plate	Panel: ABS resin black, case black steel plate	Panel: ABS resin black, case black steel plate	Panel: ABS resin black, case black steel plate
<b>Weight</b>	5 kg	7 kg	10.8 kg	13.2 kg



## Power Amplifiers A-2000 Series



### Booster Amplifier (240 W)



**P-2240 Booster Amplifier**

### Features

- 240 W output power
- 100 V line input allows connection to speaker output of A-2000 series amplifiers
- Remote power control allows operation independently from A-2000 series amplifiers
- Emergency bypass of master volume
- 2 height units
- Colour: black

### Specifications

	<b>P-2240</b>
<b>Rated Output Power</b>	240 W
<b>Power Requirements</b>	230 V AC, 50/60 Hz or 24 V DC
<b>Power Consumption</b>	520 W (AC) or 15 A (DC)
<b>Inputs</b>	Line-in: 0 dBV, 10 kOhm, balanced, screw terminal 100 V line in: 40 dBV, 330 kOhm, unbalanced, screw terminal Power remote control: Make contact
<b>Output</b>	Loop out: 0 dBV, 10 kOhm, balanced, screw terminal Speaker out: Balanced (floating) High impedance: 42 Ohm (100 V), 21 Ohm (70 V) Low impedance: 4 Ohm (31 V)
<b>Frequency Response</b>	50...20000 Hz (±3 dB)
<b>Distortion</b>	< 1 % (1 kHz)
<b>S/N Ratio</b>	> 60 dB
<b>Tone Controls</b>	Bass ±10 dB (100 Hz) / Treble ±10 dB (10000 Hz)
<b>Dimensions (W x H x D)</b>	420 x 101 x 360 mm
<b>Finish</b>	Panel: ABS resin black, case black steel plate
<b>Weight</b>	13.2 kg



## Power Amplifiers A-1700 Series

### Microphone Mixing Amplifiers (60 W - 240 W)



A-1706 / A-1712 / A-1724

### Features

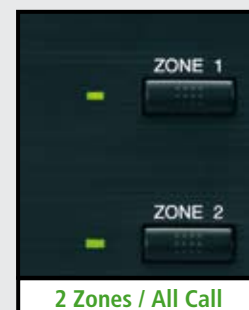
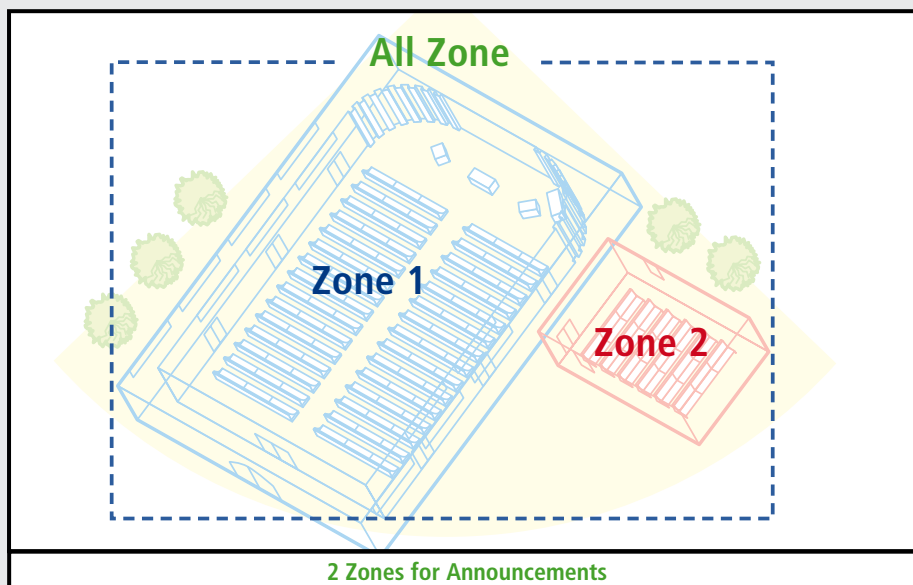
- 3 wattages available: 60 W (A-1706), 120 W (A-1712) or 240 W (A-1724)
- User-friendly front panel allows easy operation
- Individual zone speaker selection buttons enable broadcasting to 2 separate zones
- 6 microphone inputs
- One of 3 different program sources can be broadcasted
- High-quality circuitry for wide frequency response of 50 - 20000 Hz (e.g. for CD music sources and hook-up of FGM / BGM speakers)
- Recording output
- 6 MIC inputs
- AUX-1, 2, 3 inputs for tuner, cassette player or other BGM sources

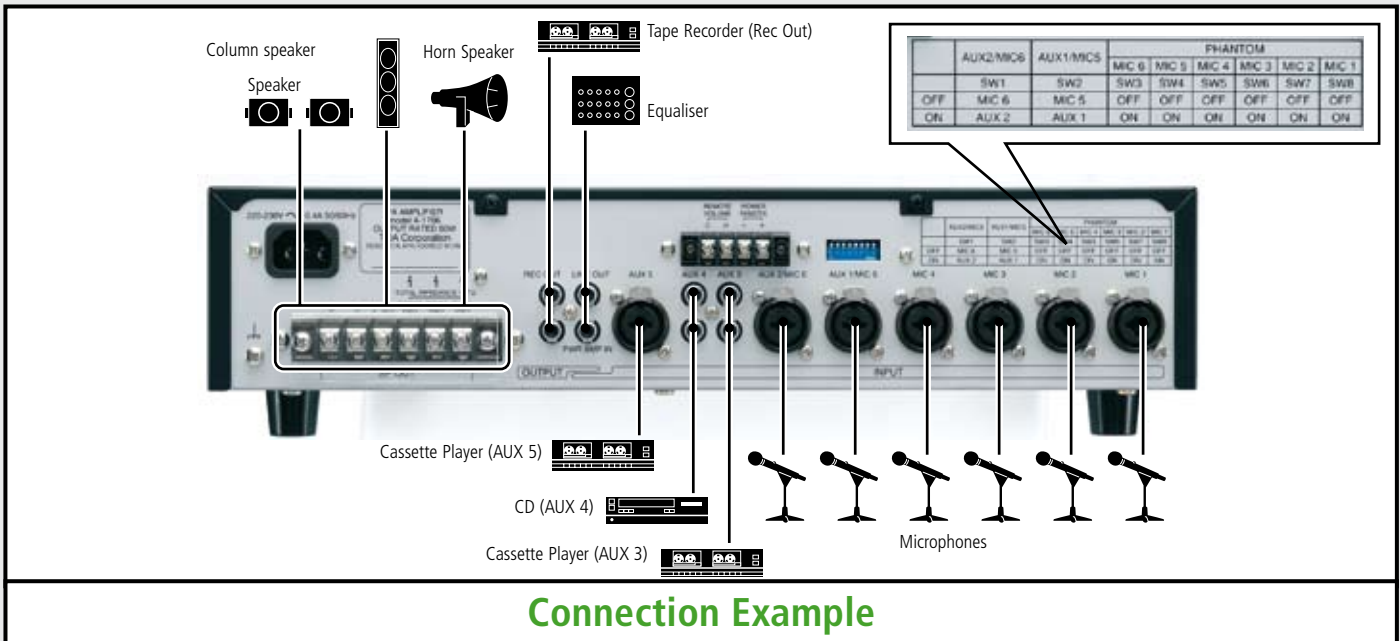
### Applications

Houses of worship, religious facilities, school auditoriums, offices and other small to medium sized locations with the need to connect multiple sound sources like microphones

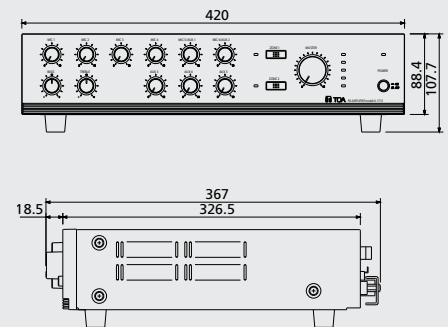
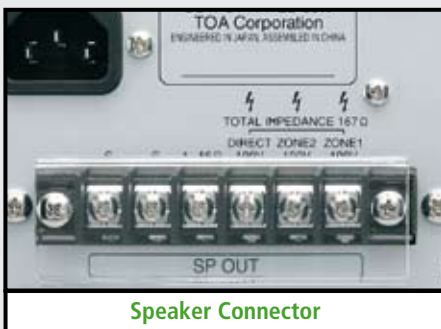
### Options

- MB-25B: Mounting Bracket





## Dimensions



## Specifications

	A-1706	A-1712	A-1724
<b>Rated Output Power</b>	60 W	120 W	240 W
<b>Power Requirements</b>	230 V AC, 50/60 Hz	230 V AC, 50/60 Hz	230 V AC, 50/60 Hz
<b>Power Consumption</b>	150 W	258 W	532 W
<b>Speaker Outputs</b>	100 V (167 Ohm), 4-16 Ohm	100 V (83 Ohm), 4-16 Ohm	100 V (42 Ohm), 4-16 Ohm
<b>Speaker Selection</b>	2 Zones		
<b>Recording Output</b>	0 dBV, 600 Ohm, unbalanced, RCA pin jack		
<b>Inputs: MIC 1-6</b>	-60 dBV, 600 Ohm, balanced, combined XLR phone jack		
<b>AUX 1-2</b>	-20 dBV, 600 Ohm, balanced, combined XLR phone jack		
<b>AUX 3-4</b>	-20 dBV, 10 kOhm, unbalanced RCA pin jack		
<b>AUX 5</b>	-20 dBV, 10 kOhm, unbal. combined XLR phone jack		
<b>PWR Amp In</b>	0 dBV, 600 Ohm, unbalanced RCA pin jack		
<b>Frequency Response</b>	50...20000 Hz ( $\pm 3$ dB)		
<b>Distortion</b>	< 2% (1 kHz)		
<b>S/N Ratio</b>	MIC: > 60 dB; AUX: > 76 dB; Master: > 100 dB (Volume: min.)		
<b>Tone Controls</b>	Bass $\pm 10$ dB (100 Hz) / Treble $\pm 10$ dB (10000 Hz)		
<b>Dimensions (W x H x D)</b>	420 x 107.7 x 367 mm		
<b>Finish</b>	Panel: ABS resin black. Case: black steel plate		
<b>Weight</b>	9.3 kg	12.6 kg	13.5 kg



## Power Amplifiers A-1800 Series

### Mixer Power Amplifiers (30 W - 120 W)



A-1803 / A-1806 / A-1812

### Features

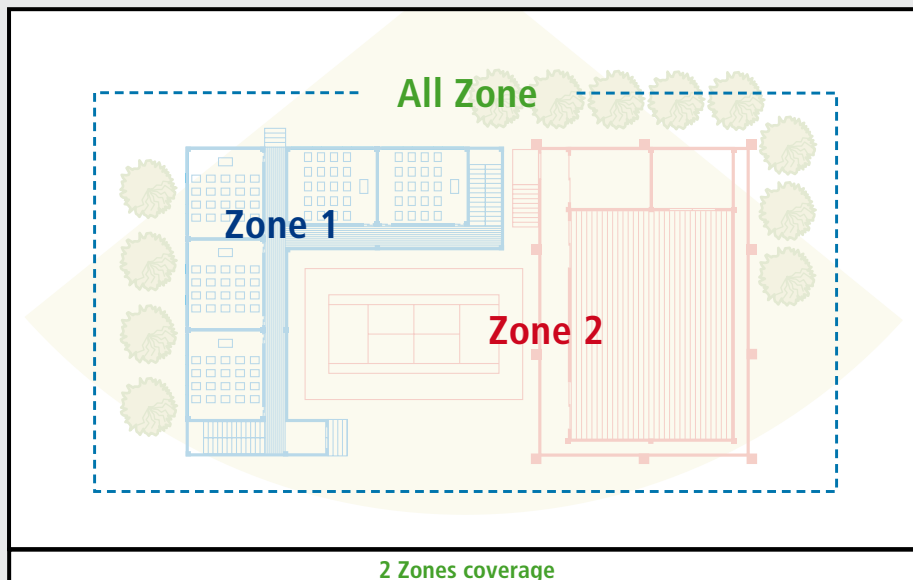
- Either 30 W (A-1803), 60 W (A-1806) or 120 W (A-1812)
- User-friendly front panel for easy operation
- Individual zone speaker selection buttons enable broadcasting to 2 separate zones
- 3 MIC inputs with MIC 1 priority override (priority microphone overrides BGM)
- One of 3 different program sources can be broadcasted
- High-quality circuitry enables wide frequency response of 50 - 20000 Hz (e.g. for CD music sources and for FGM/BGM speakers)
- Recording output
- Built-in MIC 1 chime for use with optional remote microphone PM-660D
- AUX-1, 2, 3 inputs for tuner, cassette player
- Operation on AC or on DC 24 V
- Remote-in terminal for emergency control with automatic setting of default output level for the emergency input
- Colour: black
- Booster amplifier for additional power (e.g. for more speakers in a system), connection to A-1800 Series amplifier's line out

### Applications

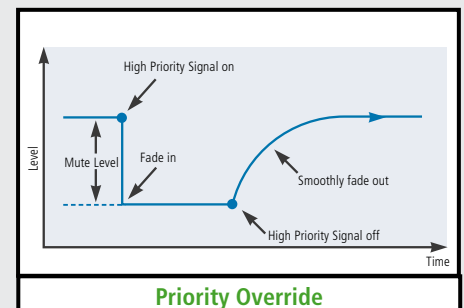
All-in-one PA amplifier (e.g. for small offices, shops, restaurants, etc.)

### Options

- P-1812: Booster Amplifier 120 W
- MB-25B: Mounting bracket
- IT-453A: Input transformer
- YA-920: Volume control protection cover



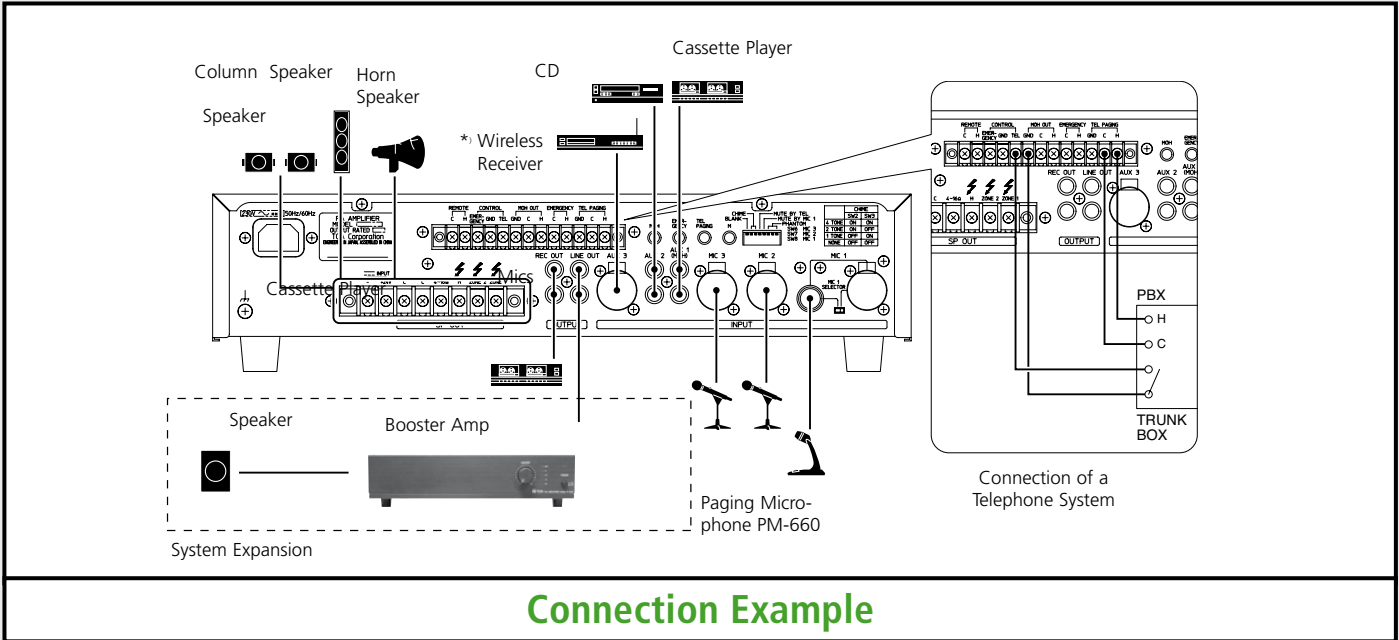
2 Zones coverage



Priority Override

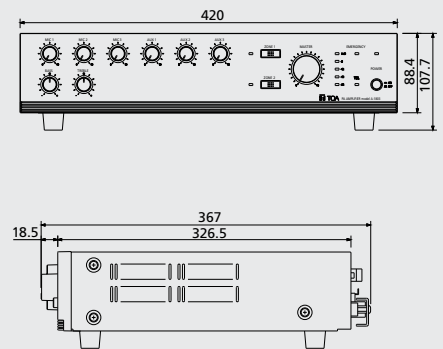
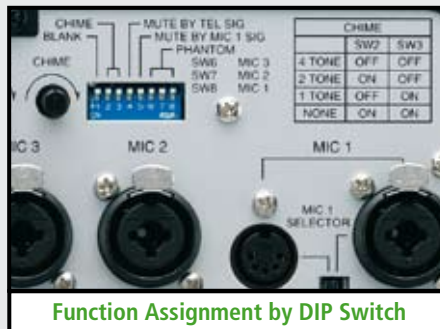


P-1812 Booster Amplifier



### Connection Example

### Dimensions



### Specifications

	A-1803	A-1806	A-1812
Rated Output Power	30 W	60 W	120 W
Power Requirements	230 V AC, 50/60Hz / DC: 24 V	230 V AC, 50/60Hz / DC: 24 V	230 V AC, 50/60Hz / DC: 24 V
Power Consumption	80 W	158 W	260 W
Speaker Outputs	100 V (330 Ohm), 4-16 Ohm	100 V (167 Ohm), 4-16 Ohm	100 V (83 Ohm), 4-16 Ohm
Speaker Selection	2 Zones		
Recording Output	0 dBV, 600 Ohm, unbalanced, RCA pin jack		
MIC 1 Input	-60 dBV, 600 Ohm, balanced, combined XLR phone jack or 5p DIN socket		
MIC 2 & MIC 3 Inputs	-60 dBV, 600 Ohm, balanced, combined XLR phone jack		
AUX 1 (MOH) Input	-20 dBV, 10 kOhm, unbal. RCA		
AUX 2 Input	-20 dBV, 10 kOhm, unbal. RCA		
AUX 3 Input	-20 dBV, 10 kOhm, unbal. combined XLR phone jack		
Chime	1-tone, 2-tone, ascending 4-tone or none		
Frequency Response	50...20000 Hz		
Distortion	< 2 % (1 kHz)		
S/N Ratio	MIC: > 60 dB; AUX : > 76 dB; Tel: > 90 dB		
Tone Controls	Bass ±10 dB (100 Hz) / Treble ±10 dB (10000 Hz)		
Dimensions (W x H x D)	420 x 107,7 x 367 mm		
Finish	Panel: ABS resin black, Case: black steel plate		
Weight	8.1 kg	9.4 kg	12.6 kg



## Power Amplifiers

## Booster Amplifier (120 W)



Rear view



PM-660D



Remote-in terminal



MB-25B



Speaker connection

## Features

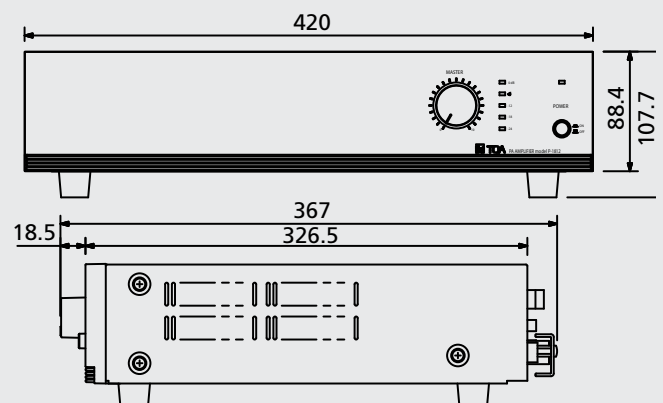
- Booster Amplifier allows more speakers in 1 system
- Connection to an A-1800 Series amplifier's line out
- Operation on AC or on DC 24 V to match installation requirements
- Rear panel remote-in terminal for emergency control
- Remote-control via main volume setting control: Output level for the emergency input
- Switchable input levels: -10 dBV or 0 dBV

## Options

- Basic amplifier: A-1803, A-1806, A-1812
- Mounting brackets: MB-25B

## Specifications

	<b>P-1812</b>
Rated Output Power	120 W
Power Requirements	230 V AC, 50/60 Hz / DC: 24 V
Power Consumption	258 W
Speaker Outputs	100 V (83 Ohm), 4-16 Ohm
Input	Line: 0 / -10 dBV, 10 kOhm, transformer balanced, RCA pin jack
Frequency Response	50...20000 Hz ( $\pm 3$ dB)
Distortion	< 2 % (1 kHz)
S/N Ratio	> 97 dB
Dimensions (W x H x D)	420 x 107,7 x 367 mm
Finish	Panel: ABS resin black, Case: black steel plate
Weight	12.2 kg



## Power Amplifiers



### Power Amplifier Series (60 W - 360 W)



**VP-1361 / VP-1241**



**VP-1121 / VP-1061**

### Features

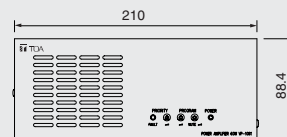
- 1-channel amplifier
- Highest durability
- 4 different wattages : 60 W (VP-1061), 120 W (VP-1121), 240 W (VP-1241), 360 W (VP-1361)
- For PA and emergency announcements
- Operation on AC or on DC 24 V to match both installation requirements and uninterrupted operation
- 2 parallel program inputs and 2 parallel priority inputs
- Relay contact for emergency announcements

- Removable terminal blocks
- Output current limiter
- For rack mount

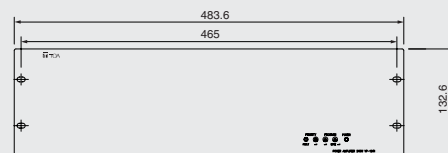
### Options

- YA-1000A Pilot Tone Module
- MB-25B-BK Rack Mounting Kit for one VP-1061 or VP-1121
- MB-25B-J Rack Mounting Kit for two units (VP-1061, VP-1121)

### Dimensions



VP-1061 / VP-1121



VP-1241 / VP-1361

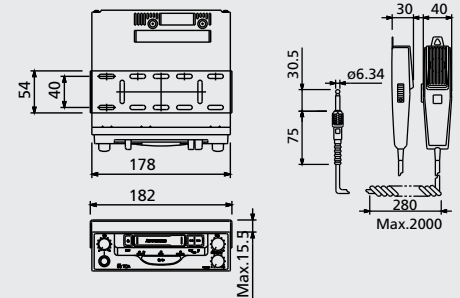
### Specifications

	VP-1061	VP-1121	VP-1241	VP-1361
<b>Rated Output Power</b>	60 W	120 W	240 W	360 W
<b>Power Requirements</b>	230 V AC, 50/60 Hz / DC: 24 V	230 V AC, 50/60 Hz / DC: 24 V	230 V AC, 50/60 Hz / DC: 24 V	230 V AC, 50/60 Hz / DC: 24 V
<b>Power Consumption</b>	170 W / 100 W (EN60065) / DC 4.5 A	320 W / 160 W (EN60065) / DC 8.2 A	537 W / 240 W (EN60065) / DC 14.6 A	768 W / 330 W (EN60065) / DC 20.9 A
<b>Speaker Outputs</b>	100 V (167 Ohm), 4-16 Ohm	100 V (83 Ohm), 4-16 Ohm	100 V (42 Ohm), 4-16 Ohm	100 V (28 Ohm), 4-16 Ohm
<b>Input</b>	2 program inputs (parallel): 0 dB, 20 kOhm, balanced 2 priority inputs (parallel): 0 dB, 20 kOhm, balanced			
<b>Frequency Response</b>	80...16000 Hz (±3 dB)	80...16000 Hz (±3 dB)	80...16000 Hz (±3 dB)	80...16000 Hz (±3 dB)
<b>Distortion</b>	< 1 % (1 kHz)	< 1 % (1 kHz)	< 1 % (1 kHz)	< 1 % (1 kHz)
<b>S/N Ratio</b>	> 80 dB	> 80 dB	> 80 dB	> 80 dB
<b>Dimensions (W x H x D)</b>	210 x 88.4 x 338.7 mm	210 x 88.4 x 338.7 mm	483.6 x 132.6 x 337.8 mm	483.6 x 132.6 x 337.8 mm
<b>Finish</b>	Panel: Aluminium, black, alumite	Panel: Aluminium, black, alumite	Panel: Aluminium, black, alumite	Panel: Aluminium, black, alumite
<b>Weight</b>	6.9 kg	9.3 kg	13.4 kg	16.6 kg



## Car Amplifiers

### Mobile Amplifier with Cassette Deck for easy installation in Vehicles (15 W - 40 W)



## Features

- DC operation from 12 V battery
- Rated output 10 W (CA-107), 20 W (CA-207), 40 W (CA-407)
- Built-in auto reverse cassette deck with pause function
- Unidirectional dynamic microphone with talk switch
- Front pause function
- Rugged construction
- DIN size, easy in-dash installation
- Non-RoHS product

## Applications

Any kind of vehicle e.g. bus, ship, vehicle

## Specifications

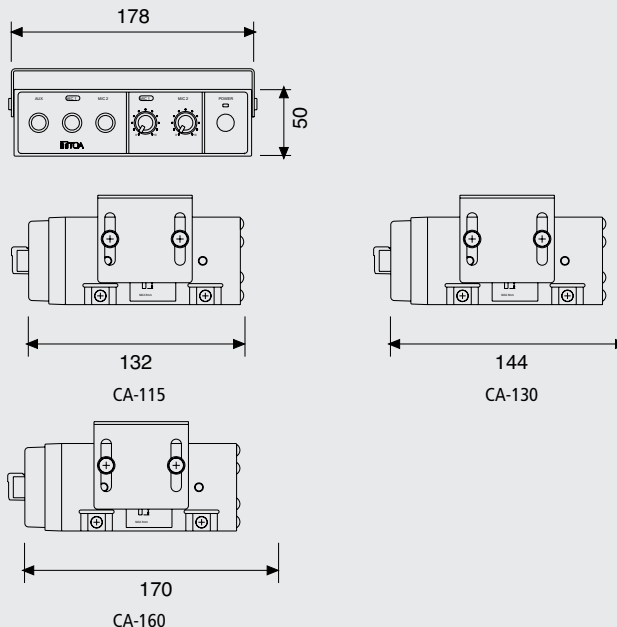
	CA-107	CA-207	CA-407
<b>Power Supply</b>	13.2 V DC (10 - 16 V DC)	13.2 V DC (10 - 16 V DC)	13.2 V DC (10 - 16 V DC)
<b>Current Consumption</b>	1.8 A	3.2 A	5.5 A
<b>Rated Output Power</b>	10 W	20 W	40 W
<b>Output Impedance</b>	8 Ohm	4 Ohm / 8 Ohm	4 Ohm / 8 Ohm
<b>Distortion</b>	< 5 %	< 5 %	< 5 %
<b>Frequency Response</b>	100 ... 10000 Hz $\pm$ 3 dB	100 ... 10000 Hz $\pm$ 3 dB	100 ... 10000 Hz $\pm$ 3 dB
<b>Inputs</b>	MIC: -48 dBV, 600 Ohm	MIC: -48 dBV, 600 Ohm	MIC: -48 dBV, 600 Ohm
<b>Dimensions (W x H x D)</b>	178 x 50 x 181.5 mm	178 x 50 x 181.5 mm	178 x 50 x 181.5 mm
<b>Weight</b>	1.3 kg	1.5 kg	1.7 kg
<b>Finish</b>	Front Panel: ABS Resin, black. Case: zinc gilt steel	Front Panel: ABS Resin, black. Case: zinc gilt steel	Front Panel: ABS Resin, black. Case: zinc gilt steel
<b>Cassette Section</b>	Auto-Reverse	Auto-Reverse	Auto-Reverse
<b>Tape Speed</b>	4.76 cm/s	4.76 cm/s	4.76 cm/s
<b>Wow &amp; Flutter</b>	<0.2 %	<0.2 %	<0.2 %
<b>Microphone</b>	Unidirectional with talk switch	Unidirectional with talk switch	Unidirectional with talk switch
<b>Impedance</b>	600 Ohm	600 Ohm	600 Ohm
<b>Sensitivity</b>	-73 dB $\pm$ 3 dB	-73 dB $\pm$ 3 dB	-73 dB $\pm$ 3 dB



## Car Amplifiers



### Mobile Amplifier for easy installation in Vehicles



### Features

- DC operation from 12 V battery
- Rated output 15 W (CA-115), 30 W (CA-130), 60 W (CA-160)
- 2 MIC inputs
- AUX input for CD player, radio, etc.
- Unidirectional dynamic microphone with talk switch
- Front pause function
- DIN size, easy in-dash installation
- Rugged construction

### Applications

Any kind of vehicle e.g. bus, ship, vehicle

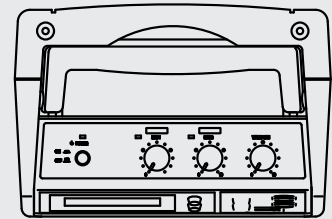
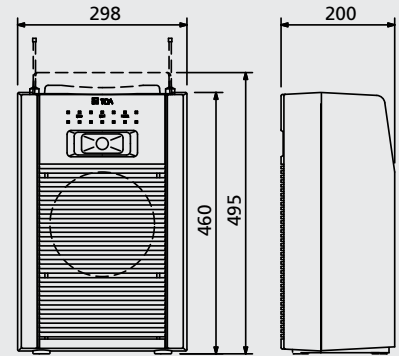
### Specifications

	CA-115	CA-130	CA-160
<b>Power Supply</b>	14 V DC (10 - 16 V DC)	14 V DC (10 - 16 V DC)	14 V DC (10 - 16 V DC)
<b>Current Consumption</b>	< 3 A	< 5 A	< 9 A
<b>Rated Output Power</b>	15 W	30 W	60 W
<b>Output Impedance</b>	4 Ohm / 8 Ohm	4 Ohm / 8 Ohm	4 Ohm / 8 Ohm
<b>Distortion</b>	< 5 %	< 5 %	< 5 %
<b>Frequency Response</b>	100 ... 10000 Hz $\pm 3$ dB	100 ... 10000 Hz $\pm 3$ dB	100 ... 10000 Hz $\pm 3$ dB
<b>Inputs</b>	MIC 1,2: 600 Ohm, 4 mV, phone jack AUX: 10 kOhm, 500 mV, phone jack	MIC 1,2: 600 Ohm, 4 mV, phone jack AUX: 10 kOhm, 500 mV, phone jack	MIC 1,2: 600 Ohm, 4 mV, phone jack AUX: 10 kOhm, 500 mV, phone jack
<b>Finish</b>	Front panel: ABS resin, black. Case: zinc plated steel sheet	Front panel: ABS resin, black. Case: zinc plated steel sheet	Front panel: ABS resin, black. Case: zinc plated steel sheet
<b>Microphone (Accessory)</b>	Unidirectional with talk switch	Unidirectional with talk switch	Unidirectional with talk switch
<b>Impedance</b>	600 Ohm	600 Ohm	600 Ohm
<b>Sensitivity</b>	-53 dB (1 kHz, 0 dB = 1 V/Pa)	-53 dB (1 kHz, 0 dB = 1 V/Pa)	-53 dB (1 kHz, 0 dB = 1 V/Pa)
<b>Dimensions (W x H x D)</b>	178 x 50 x 132 mm	178 x 50 x 144 mm	178 x 50 x 170 mm
<b>Weight</b>	0.9 kg	1.1 kg	1.2 kg



## Wireless Meeting Amplifier

### Portable Amplifier for Mobile Use with and without Cassette Unit



### Features

- Compact and lightweight portable amplifier
- Maximum output power 25 W
- Built-in 2-way speaker, optional UHF (WTU-4800) or VHF (WTU-3800) tuner for wireless microphone operation
- Input volume and tone control for microphone input
- AUX input
- External speaker output
- Continuous operation for approx. 12 hours
- Built-in storage for wireless / wired microphones
- WA-1822C with cassette deck, featuring 2-track
- Battery indicator dims gradually according to battery status
- 1-channel monaural operation with adjustable recording / playback volume adjustment, tape speed control and auto-reverse

### Options

- WTU-4800: Wireless Tuner Module
- WM-4210: Handheld Microphone

### Applications

Ideal for any mobile application in schools, conference rooms, religious facilities and any kind of mobile event

#### Applicable Room Size

Application	Room size
Class room	8 x 14 m
Conference room	8 x 10 m
Outdoor	15 x 15 m
Church	10 x 15 m
Gymnasium	15 x 15 m

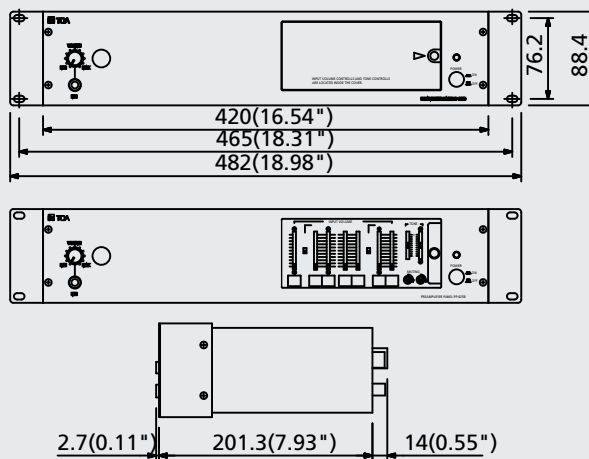
### Specifications

	WA-1822	WA-1822C
<b>Power Requirement</b>	230 V AC, 50/60 Hz, Dry cells: 8 pcs. (R20P or „D“)	230 V AC, 50/60 Hz, Dry cells: 8 pcs. (R20P or „D“)
<b>Power Consumption</b>	AC: 44 W (rated output)	AC: 46 W (rated output)
<b>Rated Output</b>	AC: 20 W (Max. 40 W with external speaker), DC: 8 W	AC: 20 W (Max. 50 W with external speaker), DC: 8 W
<b>Battery Life</b>	Approx. 12 hours, battery indicator dims gradually according to status	Approx. 6 hours, battery indicator dims gradually according to status
<b>Frequency Response</b>	70 ... 10000 Hz (deviation 3 dB)	70 ... 10000 Hz (deviation 3 dB)
<b>Distortion</b>	Under 10 % (rated output)	Under 10 % (rated output)
<b>Input</b>	Wired mic: -48 dBV, 600 Ohm, AUX: -20 dBV, 10 kOhm	Wired mic: -48 dBV, 600 Ohm, AUX: -20 dBV, 10 kOhm
<b>Output</b>	External Speaker: 8-16 Ohm/over 20 W rated input or internal speaker Line/Rec.: -10 dBV, 1 kΩ	External Speaker: 8-16 Ohm/over 20 W rated input or internal speaker Line/Rec.: -10 dBV, 1 kΩ
<b>S/N Ratio</b>	Over 70 dB (rated output)	Over 70 dB (rated output)
<b>Antenna</b>	Rod antenna	Rod antenna
<b>Cassette Deck Section</b>	-	-
<b>Reproduction System</b>	-	Auto-reverse
<b>Usable Tape</b>	-	Normal tape
<b>Tape Speed</b>	-	4.8 cm/sec.
<b>Fast Forward / Rewind Time</b>	-	Approx. 100 sec. (C-60 tape)
<b>Internal Speaker</b>	20 cm full range speaker + tweeter	20 cm full range speaker + tweeter
<b>Operation Temperature</b>	AC: -10°C to +50°C, DC: 0°C to +40°C	AC: -10°C to +50°C, DC: 0°C to +40°C
<b>Finish</b>	ABS resin, light grey	ABS resin, light grey
<b>Dimensions (W x H x D)</b>	298 x 460 x 200 mm	298 x 460 x 200 mm
<b>Weight</b>	6 kg	6.7 kg



## Preamplifier Panel

For Connection of Microphones, CD or Cassette Player



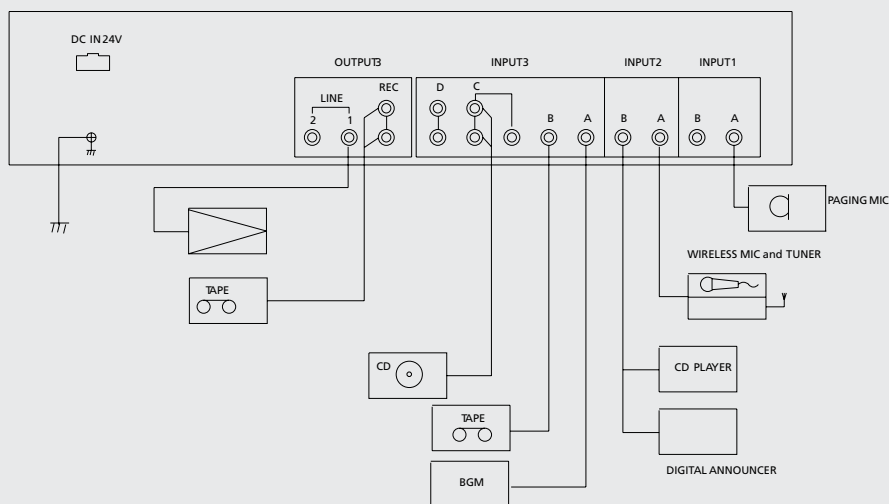
### Features

- 8 inputs (2 x MIC / AUX, 6 x AUX) in 3 groups
- 2x line out/ 1x recording out
- Priority circuit (1>2>3) and individual muting level control (2&3) for input groups 2 and 3

### Options

- EV-350R: Digital Announcer for Playback and Recording
- EV-350P: Digital Announcer for Playback
- VR-1005: Remote Microphone
- PM-660: Remote Microphone

### Application Example



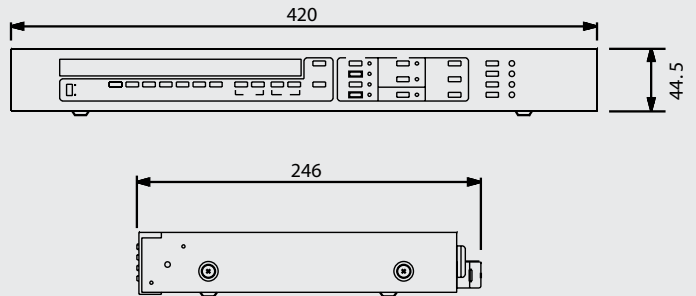
### Specifications

	PP-025B
<b>Power Requirement</b>	24 V DC
<b>Current Consumption</b>	<200 mA
<b>Inputs 1/2</b>	1A: -2 / -62 dBV 600 Ohm    1B: -2 dBV 600 Ohm 2A: -2 / -62 dBV 600 Ohm    2B: -2 dBV 600 Ohm    all balanced
<b>Inputs 3</b>	3A: -2 dBV 20 kOhm    3B: -2 dBV 20 kOhm ; 3C: -2 / -22 dBV 50 kOhm    3D: -22 dBV 50 kOhm    all unbalanced
<b>Connectors</b>	Phone Jack; 3C + 3D: Phone + RCA Jack
<b>Outputs</b>	Line 1: 0 dBV 600 Ohm balanced; Line 2: 0 dBV 600 Ohm + Rec: -10 dBV 5 kOhm unbal.
<b>Frequency Response</b>	50 ... 15000 Hz ±3 dB
<b>Tone Control</b>	100, 10000 Hz, ±10 dB (at 1 kHz)
<b>S/N Ratio</b>	> 60 dB
<b>Distortion</b>	<1 %
<b>Priority</b>	Input 1 > 2 > 3
<b>Dimensions (Height)</b>	482 x 88.4 x 218 mm, 2-unit
<b>Weight</b>	3 kg
<b>Colour</b>	black



## Program Timer

### Timer for Announcements or Gongs



### Features

- 4 independent channels with 30 programmable steps each
- For extension of the time schedule the merge of 4 channels into one is possible
- For holidays, periods or factory shut down, etc. a pause mode is provided
- 19" rack mounting (1 unit) with optional mounting bracket: MB-15B
- Colour: black
- Non-RoHS product

### Applications

- School, shopping mall or production site

### Specifications

	TT-104B
Power Requirement	230 V AC, 50/60 Hz
Power Consumption	3 W
Power Outage Protection	100 h
Program Capacity	30 steps per channel
No of Channels	4
Programmable Items	Day of the week, hour, minute, output channel
Output System	No-voltage (DRY) make contact (5-second pulse make output)
Output Capacity	24 V DC, 0.5 A
Clock Accuracy	±5 sec per month (25°C)
Display	Day of the week, hour, minute
Special Functions	Output switchover, pause mode, entire program cancellation
Dimensions (W x H x D)	1-unit, 420 x 47.5 x 246.5 mm
Weight	2.5 kg
Colour	black

## Digital Sound Repeater



### PC programmable Spot Announcer



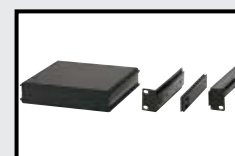
**EV-20R**



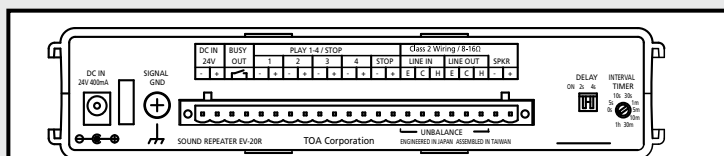
Mode selection



AD-246



MB-WT3



Rear view

### Features

- For repeated high-quality broadcasts and announcements
- Easy to install and to use
- Feed-in BGM e.g. from external CD player possible
- Up to 4 separate messages can be stored and played back
- Built-in USB Interface allows the upload of audio files and announcements from a PC
- Announcements can be made by use of an external microphone
- Control inputs and outputs
- Speaker output
- Monitor output

### Applications

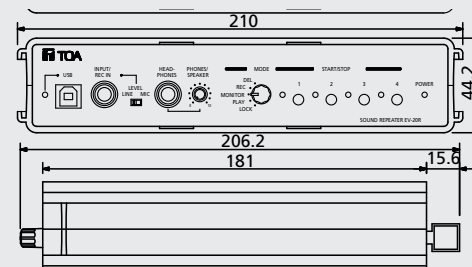
- Supermarket, shopping malls, production sites, train stops

### Options

- AD-246: AC Adaptor
- MB-WT3: Rack Mounting brackets
- MB-WT4: Rack Mounting brackets (2x EV-20R)
- IT-450: Transformer

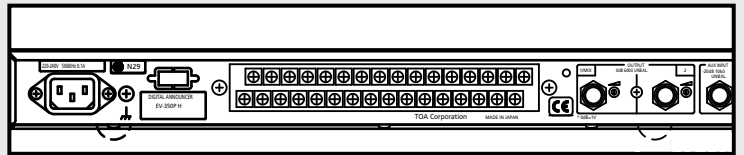
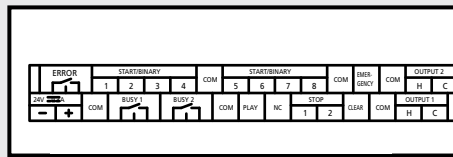
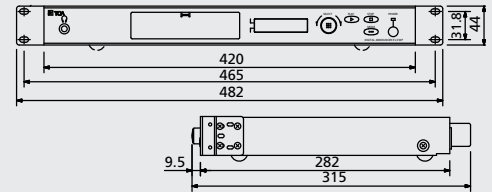
### Specifications

	EV-20R
<b>Power Source</b>	Supplied from an external 24 V DC/400 mA power supply or from an optional AD-246 AC adaptor
<b>Power Consumption</b>	10 W (rated output)
<b>Wave Format</b>	44.1 kHz sampling frequency, 16-bit PCM (monaural)
<b>Frequency Response</b>	20 ... 20000 Hz $\pm$ 3 dB (1 kHz), 50 - 14000 Hz $\pm$ 3 dB (IT-450 mounted, 1 kHz)
<b>Distortion</b>	Under 1 % (1 kHz, rated output)
<b>Recording System</b>	USB data transfer or analog recording
<b>Control Input</b>	Play 1 - 4, stop: No-voltage make contact input, pulse make length : 200 ms, open voltage: 30 V DC, short-circuit current : 10 mA, removable terminal block (22 pins)
<b>Control Output</b>	Busy: Contact capacity: 30 V DC/0.5 A, removable terminal block (22 pins)
<b>Input</b>	Input / Recording input : Mic: -60 dBV, 2.2 kOhm/ Line: -20 dBV, 10 kOhm, (Mic/Line changeable), unbalanced, phone jack/Line input : 0 dBV, 10 kOhm, unbalanced, removable terminal block (22 pins)
<b>Output</b>	Line output: 0 dBV, 600 Ohm, unbalanced, removable terminal block (22 pins) / Headphone output: 0 dBV, 100 Ohm, unbalanced, phone jack / Speaker output: 3 W, 8 Ohm, removable terminal block (22 pins)
<b>LED Indicator</b>	POWER, USB, START/STOP 1-4
<b>Maximum No. of Messages</b>	4
<b>Maximum Recording Time</b>	6 min
<b>Message Delay Time</b>	0, 2 or 4 s (selectable)
<b>Playback Interval Time</b>	endless, 0 s, 5 s, 10 s, 30 s, 1 min, 5 min, 10 min, 30 min or 1 h (selectable)
<b>Finish</b>	Case: ABS resin, black
<b>Dimensions (W x H x D)</b>	210 x 44.2 x 181 mm (excluding projection)
<b>Weight</b>	730 g
<b>Accessory</b>	CD-ROM (USB data transfer software and sample chimes recorded), USB cable (1 m)



# Digital Record/Playback Announcer

## Announcer for Broadcasting programmed Messages and Alarm Texts



### Features

- EV-350R: For message recording and playback
- EV-350P: For playback
- LCD
- Easy operation for simple message recording and playback
- Playback priority modes and monitoring available
- 2 slots for cards for up to 256 programs playback
- Sampling frequencies are 32 and 44.1 kHz
- Internal self-diagnostic routine with failure control output for indication of system failures and missing memory cards

### Specifications

	EV-350R	EV-350P
<b>Power Source</b>	220 – 240 V AC, 50 / 60 Hz, 1 A or 24 V DC, 0.4 A / Power consumption 12 W	220 – 240 V AC, 50 / 60 Hz, 1 A or 24 V DC, 0.3 A / Power consumption 9 W
<b>Output</b>	Output 1, 2: 0 dBV, 600 Ohm, unbalanced, phone jack & screw terminal; Headphone Output: 0 dBV, 100 Ohm, unbalanced, phone jack	Output 1, 2: 0 dBV, 600 Ohm, unbalanced, phone jack & screw terminal; Headphone Output: 0 dBV, 100 Ohm, unbalanced, phone jack
<b>Input</b>	Microphone: –55 dBV, 600 Ohm, unbalanced, phone jack, AUX: –20 dBV, 10 kOhm, unbalanced, phone jack & RCA pin jack	AUX: –20 dBV, 10 kOhm, unbalanced, phone jack
<b>Frequency Response</b>	20 – 20000 Hz (44.1 kHz sampling, 1 kHz reference)	20 – 20000 Hz (44.1 kHz sampling, 1 kHz reference)
<b>Distortion</b>	Under 0.3 % (44.1 kHz, recording method: extremely high)	Under 0.3 % (44.1 kHz, recording method: extremely high)
<b>No. of Mountable Memory Cards</b>	2 (Ports A...B) (option)	2 (Ports A...B) (option)
<b>Capacity</b>	2 cards: 256 or 1024 sentences, max. 4:26 hours	-
<b>Recording Sound Quality</b>	Sampling Frequency: 32 kHz, 44.1 kHz; Recording grade: Long (bit rate: 64 kbps), Normal (bit rate: 96 kbps), High (bit rate: 128 kbps), Extremely High (bit rate: 192 kbps)	-
<b>Recording Time</b>	Max.: 2:13 hours on one card (96 MB)	-
<b>Playback Mode</b>	Single- and dual-source playback (changeable)	Single- and dual-source playback (changeable)
<b>No. of Playback Programs</b>	8 programs (direct mode) or 256 programs (binary mode), 1 emergency message	8 programs (direct mode) or 256 programs (binary mode), 1 emergency message
<b>Control Input</b>	Activation 1...8, playback, pause 1, pause 2, emergency, recording, erasure/clear: No-voltage make-contact (over 50 ms), open voltage: 30 V DC, short circuit current: 10 mA, screw terminal, RS-232C terminal: D-sub connector (9-pin)	Activation 1...8, playback, pause 1, pause 2, emergency, clear: No-voltage make-contact (over 50 ms), open voltage: 30 V DC, short circuit current: 10 mA, screw terminal, RS-232C terminal: D-sub connector (9-pin)
<b>Control Output</b>	Output 1, 2, Error: screw terminal, contact capacity: 30 V DC, 0.5 A	Output 1, 2, Error: screw terminal, 8.2 mm, contact capacity: 30 V DC, 0.5 A
<b>Display</b>	LCD with backlight (16 characters x 2)	LCD with backlight (16 characters x 2)
<b>Ambient Temperature</b>	0°C to +50°C	0°C to +50°C
<b>Humidity</b>	Less than 90 % (must be free from dew condensation)	Less than 90 % (must be free from dew condensation)
<b>Finish</b>	Panel: Aluminum, black, 30 % gloss, paint; Case: Surface treated steel plate, black 30 % gloss	Panel: Aluminum, black, 30 % gloss, paint; Case: Surface treated steel plate, black 30 % gloss
<b>Dimensions (W x H x D)</b>	482 x 44 x 315 mm	482 x 44 x 315 mm
<b>Weight</b>	4 kg	4 kg

### Applications

Alarm, emergency and commercial messages for department store, shop and office building

### Options

- TT-104B: Programmable Timer
- SDP3B-Series: Memory Cards (PCMCIA-Cards are in 5 different sizes available from 8 MB (SDP3B-8) up to 96 MB (SDP3B-96))

## Rack mounted Equipment



### Junction Boxes

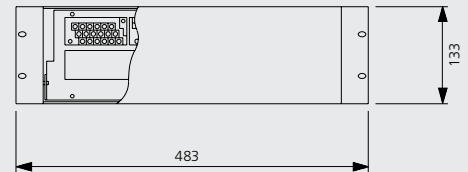
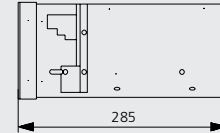


**JB-031B**

#### Features

- Junction box for connecting external components to rack-mounted components
- 4 blocks with 6 x 3 screw terminals each (18 terminals per block)
- Non-RoHS product

#### Dimensions

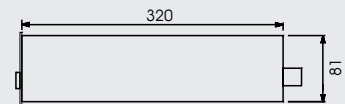
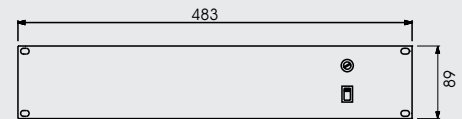


**JP-028B**

#### Features

- Junction Panel
- For connection and control of AC power lines (10 pairs of screw terminals)
- Switched outlets (controlled by front power switch relay or rear remote terminals), 24 V DC regulated, max 0.2 A for preamplifier and relay control
- AC power output is maximum 20 A (switched) or 10 A (unswitched)

#### Dimensions



### Specifications

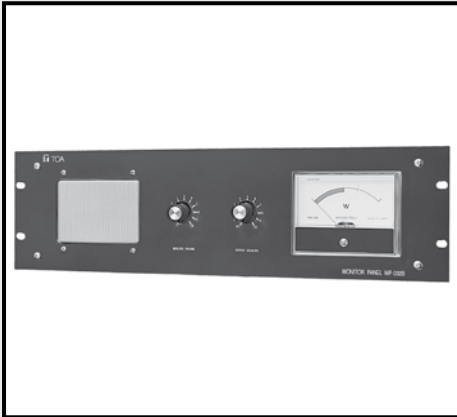
	<b>JB-031B</b>
<b>Number of Terminals</b>	3 terminal blocks x 4 (18 terminals per block)
<b>Current Capacity</b>	250 V/20 A per terminal
<b>Colour</b>	Black
<b>Dimensions (W x H x D)</b>	483 x 132.6 x 285 mm (3 units)
<b>Weight</b>	3.5 kg

	<b>JP-028B</b>
<b>Power requirements</b>	230 V AC, 50/60 Hz, 16 W AC Out: 20 A x 13 switched, 10 A x 5 unswitched DC Out: 24 V max. 0.2 A
<b>No. of Terminals</b>	10 x 2
<b>Switch Capacity</b>	20 A (380 V)
<b>Dimensions (W x H x D)</b>	483 x 89 x 350 mm (2 units)
<b>Weight</b>	5.7 kg
<b>Colour</b>	Black



## Rack mounted Equipment

### Monitor Panel for Sound and Signal Systems



**MP-032B**

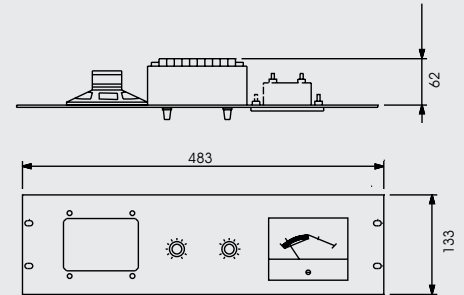
#### Features

- Rack mountable (3 units)
- Passive monitor panel for speaker line level
- Monitors up to 10 separate channels or 10 amplifiers
- Large easy-to-read watt meter for adjusting output level
- Additional audio monitoring with built-in 5" full range speaker.

#### Options

- YA-8: Connection Cable (8P DIN plug, 1 m length)

#### Dimensions

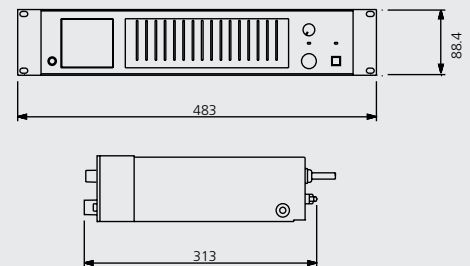


**MP-1216**

#### Features

- Monitor Panel for 16 channels
- Allows visual and aural monitoring of up to 16 audio signal channels with 8 Ohm, 100 V or line level
- 2 units can be linked for up to 32 channels (1 master monitor unit)
- 12-segment LED meter with calibrated scale for each input
- Audio monitoring of each channel through a built-in selector switch and loudspeaker
- All inputs balanced and transformer isolated

#### Dimensions



### Specifications

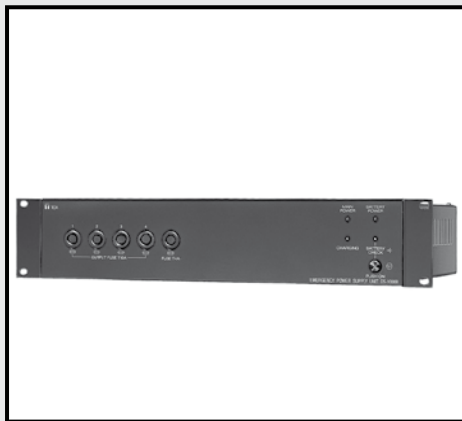
	MP-032B	MP-1216
<b>Input Lines</b>	25 V (625 Ohm), 50 V (2.5 kOhm), 70 V (5 kOhm), 100 V (10 kOhm), switchable	Transformer isolated: +4 dB; 8 Ohm: 49 V; 100 V
<b>Terminals</b>	10 x 2	16 x 4
<b>Controls</b>	Channel selector switch, Volume control, Watt meter, Line voltage selector switch	Channel Selector Switch + Indicator, Output Level: LED Meter + Selected Channel, Power
<b>Power Requirements</b>	230 V AC, 50/60 Hz	230 V AC, 50/60 Hz, 25 W
<b>Dimensions (W x H x D)</b>	482.6 x 133 x 62 mm (3-units)	482.6 x 88.4 x 312.7 mm (2 units)
<b>Weight</b>	2.2 kg	5.3 kg
<b>Colour</b>	Black	Black



## Rack Mounted Equipment



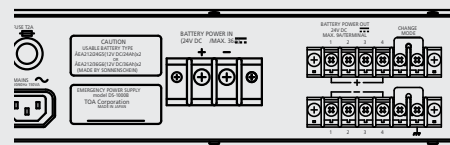
### Emergency Power Supply (dryfit type)



**DS-1000B**

#### Features

- 4 DC power outputs to power amplifiers or emergency equipment in case of AC power failure
- Batteries are automatically charged
- 2 (optional) batteries required with 24 Ah or 36 Ah (12 V) each
- 4 indicators: main power, charging, battery power, battery check
- Non-RoHS product



Rear View

### Blower Panel

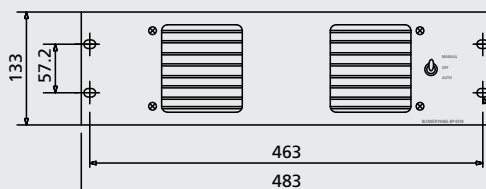
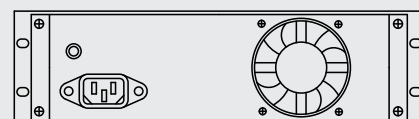


**BP-031B**

#### Features

- For regulating temperatures from 48°C down to 38°C
- The blower panel requires 3 units of rack space

#### Dimensions

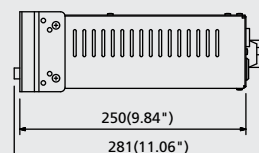
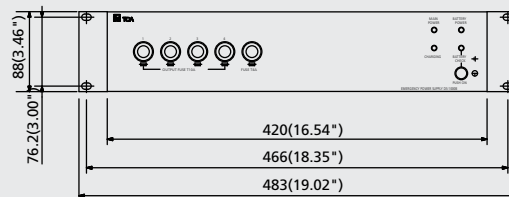


### Specifications

	<b>DS-1000B</b>
Power Consumption	150 VA
Charge Current	Max.: 2.5 A
Dimension (Height)	2-unit
Weight	7 kg
Colour	Black

	<b>BP-031B</b>
Power Consumption	8.5 W
Ventilation	1500 ml/min
Dimension (Height)	3-unit
Weight	3.7 kg
Colour	Black

#### Dimensions (DS-1000B)





## Racks and Accessories

### Racks and Doors



PGD Plexiglass Door



RC Rear Door



STC Rack Cover\*



BC Bottom Panel



CB Caster Base



SB Rack Base



LF Levelling Rack Feet\*



VP Vented Panel

\* Accessory for CR-15 to CR-44

### Type Overview

Model	Description	Dimensions (W x H x D in mm)	Weight in kg
CR-15	Rack 15 units, incl. side panels	650 x 781 x 600	28.00
CR-22	Rack 22 units, incl. side panels	650 x 1092 x 600	35.00
CR-27	Rack 27 units, incl. side panels	650 x 1314 x 600	40.00
CR-35	Rack 35 units, incl. side panels	650 x 1670 x 600	51.00
CR-40	Rack 40 units, incl. side panels	650 x 1892 x 600	62.00
CR-44	Rack 44 units, incl. side panels	650 x 2070 x 600	66.00
CR-301D	Rack 30 units with rotatable frame	750 x 1545 x 500	72,00
CR-421D	Rack 42 units with rotatable frame	750 x 2080 x 500	104 kg
CR-421FD	Rack 42 units with rotatable frame, with door	750 x 2080 x 612	130 kg
RC-15	Rear door for CR-Series 15 units	485 x 666 x 20	3.90
RC-22	Rear door for CR-Serie 22 units	485 x 977 x 20	5.60
RC-27	Rear door for CR-Serie 27 units	485 x 1199 x 20	6.80
RC-35	Rear door for CR-Serie 35 units	485 x 1555 x 20	8.60
RC-40	Rear door for CR-Serie 40 units	485 x 1777 x 20	10.00
RC-44	Rear door for CR-Serie 44 units	485 x 1955 x 20	11.00
PGD-15	Plexiglass door for CR-Serie 15 units	566 x 781 x 25	6.20
PGD-22	Plexiglass door for CR-Serie 22 units	566 x 1092 x 25	8.00
PGD-27	Plexiglass door for CR-Serie 27 units	566 x 1314 x 25	9.00
PGD-35	Plexiglass door for CR-Serie 35 units	566 x 1670 x 25	11.10
PGD-40	Plexiglass door for CR-Serie 40 units	566 x 1892 x 25	12.30
PGD-44	Plexiglass door for CR-Serie 44 units	566 x 2070 x 25	13.30



- 2 versions CR-421D or CR-301D rotatable frame rack, CR-421FD with front door
- Completely mounted
- 2 mm steel plate
- Cable inserts at top and bottom
- Max. 400 mm depth of units
- Easy-to-open door thanks to a glider roll at the bottom of the door
- Holes for wall - and floor fixation
- 42-unit height or 30-unit height
- Colour: light grey, RAL 9035, structured paint

## Racks and Accessories



### Accessories



FAN-KIT Top Cover



PFP Front Vented Panel



SFP Front Panel



UD Drawer



SUS Rack Shelf



SA Sliding rail



FDL Lock



BCK Brush Strip



CR Screw Set M5

### Overview Accessories

Model	Description	Dimensions (W x H x D in mm)	Weight in kg
SB-4	Caster base for CR-Series, height approx. 100...160 mm	650 x 100 x 600	4.50
CB-4	Rolling caster base, closed for CR-Series, height 160 mm	650 x 100 x 600	6.00
BC-3	3-fold bottom plate for CR-Series		
LF-4*	Leveller feet, adjustable		1.10
STC-2*	Top cover for CR-Series		
VP-2	Vented top cover	324 x 72 x 1.25	0.20
BCK-1	Brush strip for CR-Series		
FAN-KIT	Top cover with 2 fans		
SA-1	Sliding rail for heavy units		
FDL-1	Lock for racks		
CR-SS	Accessory Set: captive nut, washers Screws 100 pcs each		
SUS-2	Tray shelf, 2 units, 19 Inch	483 x 88 x 375	3.10
SUS-3	Tray shelf, 3 units, 19 Inch	483 x 88 x 375	3.40
PUS-2	Tray shelf, 2 units, perforated, 19 Inch	483 x 133 x 375	2.80
PUS-3	Tray shelf, 3 units, perforated, 19 Inch	483 x 133 x 375	3.00
UD-2	Drawer 2 units, closed, 19 Inch	483 x 88 x 382	8.00
UD-3	Drawer 3 units, closed, 19 Inch	483 x 133 x 382	9.20
SFP-1	Front panel 1 units, 19 Inch	483 x 44 x 1.5	0.30
SFP-2	Front panel 2 units, 19 Inch	483 x 88 x 1.5	0.56
SFP-3	Front panel 3 units, 19 Inch	483 x 133 x 1.5	0.80
PFP-1	Front panel, perforated, 1 units, 19 Inch	483 x 44 x 1.5	0.26
PFP-2	Front panel, perforated, 2 units, 19 Inch	483 x 88 x 1.5	0.52
PFP-3	Front panel, perforated, 3 units, 19 Inch	483 x 133 x 1.5	0.75

\* Accessory for CR-15 to CR-44



## Network Audio Adapter

### Network Audio Adapter



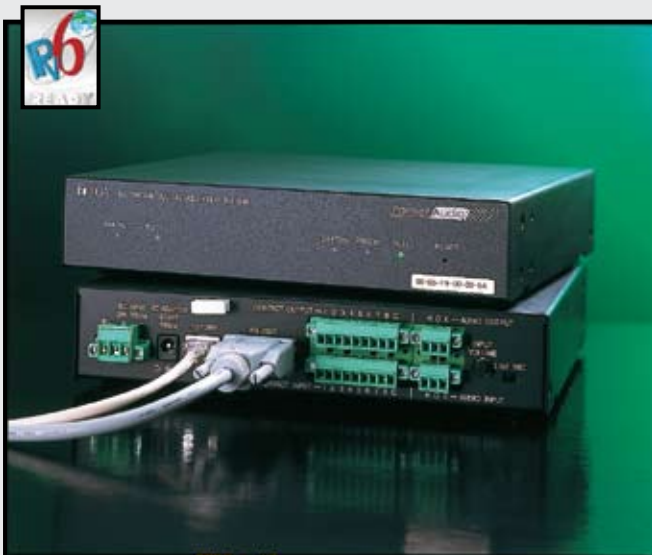
**NX-100 / NX-100S** (small picture)

### Description

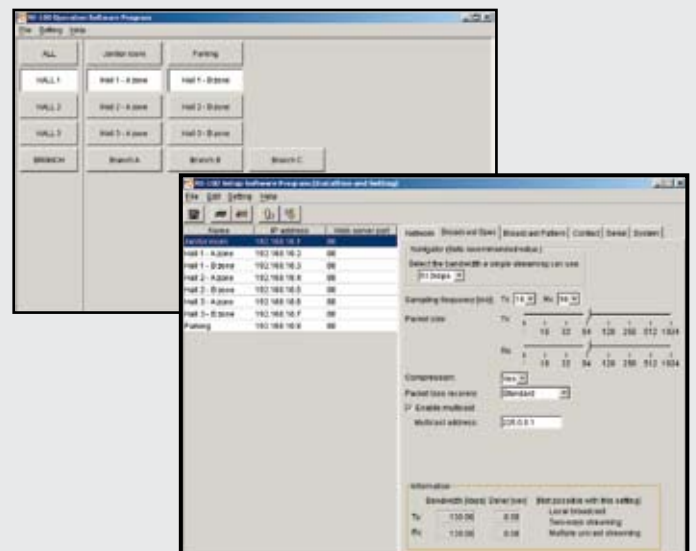
- 2-way audio signal transmission with a single NX-100 unit. Every unit is equipped with an audio input and an audio output
- Simultaneous transmission of audio signals to multiple locations possible
- Unicast: up to 4 locations, multicast: up to 64 locations
- No audio signal degradation or loss, even when transmitting over internet
- Improved data reliability using IP networks with the protocol's ability to prevent data problems during transmission
- Contact input can initiate and terminate audio transmissions without use of a PC
- Operational reliability over only software-driven application
- Low cost operation
- Operation on both AC and DC
- Software-driven operational menu
- Transmission of high quality audio signals of up to 14 kHz and control signals
- Serial data over networks using the IP protocol in real time
- Internet and LANs

- Significant cost reductions when transmitting audio signals to various remote areas as costly dedicated lines do not have to be used
- Differences between NX-100 and NX-100S:

	NX-100	NX-100S
Power source	AC power or DC 24 V	AC power
RS-232C port	Yes	No
Input signal LED	No	Yes
Input peak level LED	No	Yes
Phantom power supply	No	Yes
IPv6-compatible	Yes	No



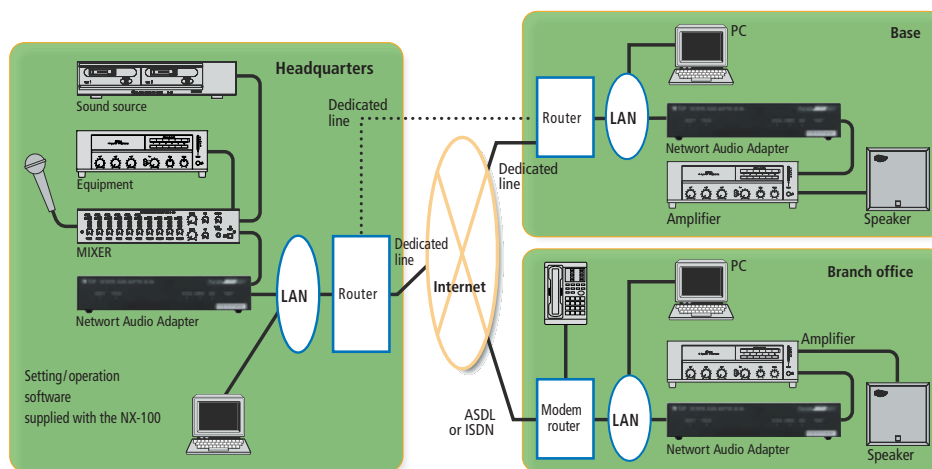
The world's first audio system to boast the „IPv6 Ready“ logo



Setup Software for Easy Access



Rear View NX-100 / NX-100S (small picture)



Application Example

## Specifications

	NX-100	NX-100S
<b>Power Source</b>	24 V DC (removable terminal block 3-pins) or AC adapter AD-246 (optional ) or equivalent	
<b>Power Consumption</b>	4.8 W (DC operation)	7 W (DC operation)
<b>Audio Input</b>	1 channel (isolated transformer), -58 dBV to 0 dBV, balanced (MIC/LINE changeable, volume adjustable with volume control), 2 kOhm, removable terminal block	1 channel (isolated transformer), -58 dBV to 0 dBV, balanced (MIC/LINE changeable, volume adjustable with volume control), 2 kOhm, removable terminal block, 24 V phantom power supply
<b>Audio Output</b>	1 channel (isolated transformer), balanced, 600 Ohm, removable terminal block 3-pins	
<b>Frequency Response</b>	50 ... 14000 Hz (when sampling frequency is 32 kHz)	
<b>Distortion</b>	Under 0.3 % (1 kHz, when sampling frequency 32 kHz)	
<b>Control Input</b>	8 channels, no-voltage make contact input, open voltage: 12 V DC, short-circuit current: 10 mA, removable terminal block 9-pins	
<b>Control Output</b>	8 channels, open collector output, withstand voltage: 30 V DC, control current: 50 mA max., removable terminal block 9-pins	
<b>Network I/F</b>	10BASE-T/100BASE-TX, Auto-Negotiation	
<b>Network Protocol</b>	TCP/IP, UDP, HTTP, RTP, ARP, ICMP, IGMP	
<b>Audio Packet Transmission System</b>	Unicast (up to 4 simultaneous transmissions), Multicast (up to 64 simultaneous transmissions)	
<b>Operating Temperature</b>	0°C to +50°C (0°C to +40°C when AC adapter is in use)	0°C to +40°C (0°C to +40°C when AC adapter is in use)
<b>Operating Humidity</b>	Under 90 % RH (no dew condensation should be produced)	
<b>Finish</b>	Steel plate, black, 30 % gloss	
<b>Dimensions (W x H x D)</b>	210 x 45 x 188 mm	
<b>Weight</b>	1.2 kg	



## Infrared Conference Systems

### Secure Conferences



**TS-800 Series / TS-900 Series**



**Central Unit (TS-800)**



**Delegate Unit (TS-902)**



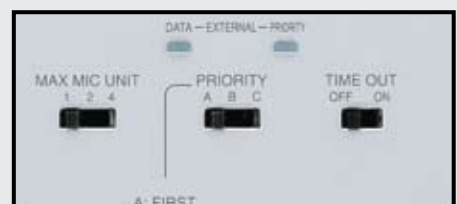
**Infrared Transmitter/Receiver Units (TS-905)**



**3 voting keys (TS-901/TS-902)**



**Translation Channel Selection (TS-901/902)**



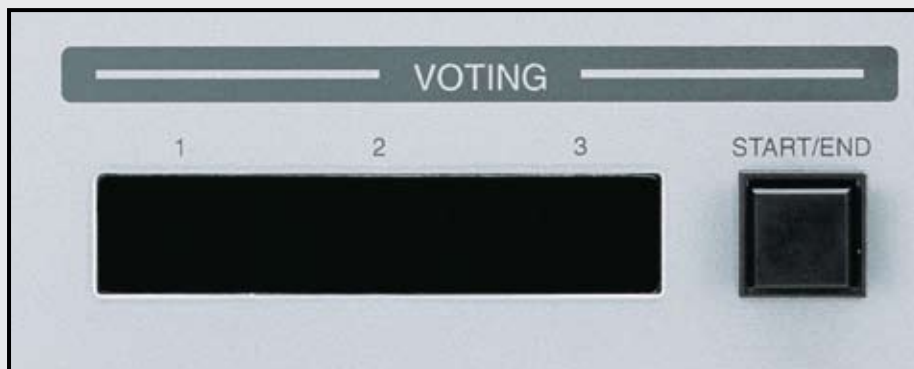
**Function Selection (TS-800/TS-900)**

### Features

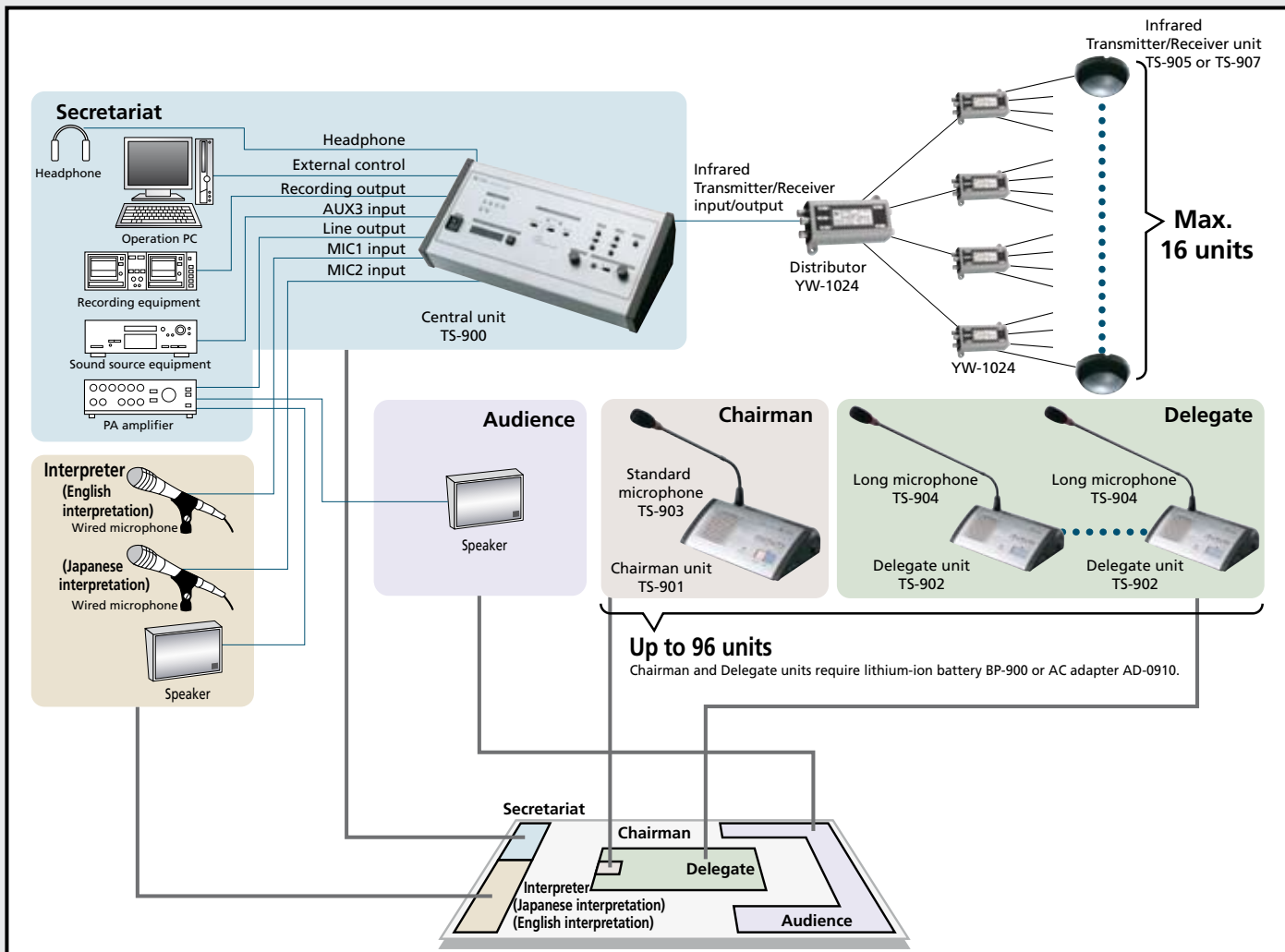
- For efficient communications for each kind of conferences
- System with voting function (TS-900) or standard system (TS-800)
- Safe and secure Infrared wireless technology
- Compact and lightweight chairman and delegate units
- Up to 96 active units (TS-900) and 64 active units (TS-800) per system
- Non-cabling enables easy installations
- Chairman unit features a priority speech key
- Speaker restriction function
- Auto Mic-Off function
- Installation status checkup function
- Conference control software available

### Options

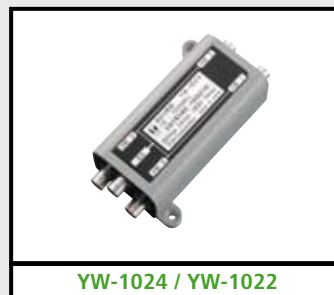
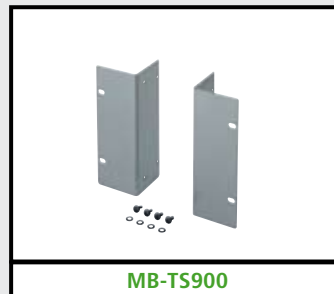
- AD-0910: AC Adapter
- BC-900: Battery Charger for BP-900
- BP-900: Lithium-Ion Battery for the units
- MB-TS900: Rack Mounting Bracket
- Distributor:
  - YW-1022 (1 into 2)
  - YW-1024 (1 into 4)
- TS-905: Infrared Transmitter / Receiver Units with 150° (vert.) x 360° (hor.) reception angle
- TS-907: Infrared Transmitter / Receiver Units with 90° (vert.) x 360° (hor.) reception angle
- TS-903: Standard Microphone
- TS-904: Long Microphone
- TK-906A: Basic Carrying Case
- TK-908A: Expansion Carrying Case



**Voting Result Display**



### TS-900 System Example

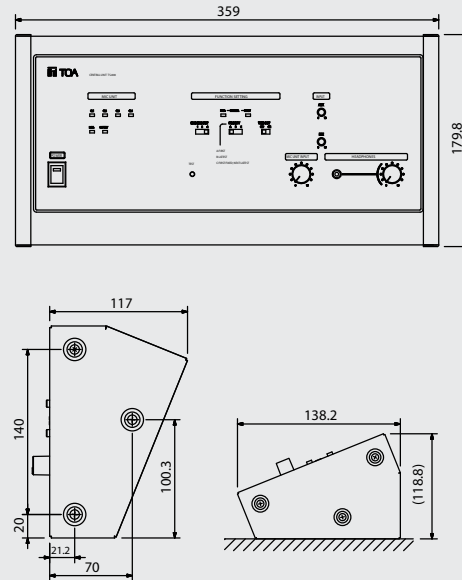


\* without products



## Infrared Conference System

### Central Unit



### Features

- Flexible and easy configuration in different rooms and with varied participant numbers
- Conference control software available
- Up to 64 active units per system
- Non-cabling enables easy installations
- Chairman unit features a priority speech key
- Speaker restriction function
- Auto Mic-Off function
- Installation status checkup function
- Very good coverage of transceivers
- Improved security from eavesdropping or annoying crosstalk
- Exceptional sound quality
- Audio input from a wired microphone or other sound source
- 2 different microphone types
- AC operation available with adaptor
- Colour: panel grey metallic

### Options

- MB-TS900: Rack Mounting Brackets
- TK-908A: Carrying case for 8 units, 2 transceivers battery charger, batteries and microphones
- TK-906A: Carrying case for central unit, 6 units, 1 transceiver, battery charger, batteries and microphones

### Specifications

	TS-800
Power Source	100-240 V AC, 50/60 Hz (supplied from AC adapter (accessory))
Power Consumption	72 W
Input	MIC: -60 dBV, 600 Ohm, unbalanced, phone jack. AUX: -20 dBV, 10 kOhm, unbalanced, phone jack
Output	REC: -20 dBV, 10 kOhm, unbalanced, phone jack, RCA pin jack. Headphone: Mini jack
Number of connectable Chairman / Delegate Units	64 active units
Number of connectable Infrared Transmitter/Receiver Units	4 units (up to 16 units by using 4 YW-1024 distributors)
Infrared Transmitter/Receiver I/O Terminal	4 BNC jacks
External Control Terminal	D-sub connector (9 P, male)
LED Indicator	Audio signal receiving indicators 1-4 CH, data signal receiving indicator, external control priority indicator, external control communication indicator, power indicator, battery indicator (flashes when a chairman / delegate unit's battery nears complete discharge)
Selectable Functions	Simultaneous speaker no. setting switch: 1/2/4. Mic-off setting switch: Time out on/off. speech priority selector switch: A/B/C (A: First-in-first-out priority, B: Last-in-first-out priority, C: Fixed for the first unit, and last-in-first-out for the subsequent units)
Operating Temperature	0°C to +40°C
Finish	Panel: Surface-treated steel plate, grey metallic paint, semi-gloss
Weight	2.7 kg
Accessory	AC adapter (Cord length: 1.8 m DC cord and 2 m detachable AC cord)
Dimensions (W x H x D)	359 x 118.8 x 179.8 mm



## Infrared Conference System



### Chairman's Unit and Delegate's Unit



**TS-801 (+ TS-903)**



**TS-802 (+ TS-904)**

### Features

- Compact and lightweight Chairman and Delegate units
- Attractive unit equipped with removable microphone, speaker and priority switch
- 2 different version for chairman (TS-801) and delegates (TS-802)
- When the speaker is on, the microphone of the chairman's unit is automatically turned off to avoid feedback and vice versa
- One recording output
- Ring shaped in-use LED
- Multiple chairman's units can be operated simultaneously
- TS-801 only: Pressing the priority switch activates the chime and overrides delegate's units
- Easy hook-up

### Options

- BP-900: Lithium Ion Battery
- TS-903: Standard Microphone
- TS-904: Long Microphone
- AD-0910: AC adapter

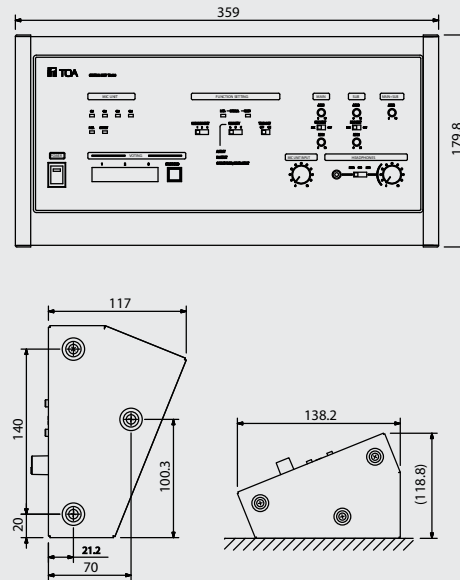
### Specifications

	TS-801	TS-802
<b>Power Source</b>	7.4 V DC (battery), 9 V DC (AC adapter) (supplied from BP-900 battery (option) or AD-0910 AC adapter (option))	7.4 V DC (battery), 9 V DC (AC adapter) (supplied from BP-900 battery (option) or AD-0910 AC adapter (option))
<b>Current Consumption</b>	MAX. 270 mA	MAX. 270 mA
<b>Infrared Emitter/Detector</b>	<b>Wavelength</b>	870 nm (AM: Brightness modulation)
	<b>Modulation Method</b>	Frequency modulation
	<b>Carrier Frequency</b>	Transmission: Audio channel 1: 7.35 MHz, Audio channel 2: 8.10 MHz, Audio channel 3: 8.55 MHz, Audio channel 4: 9.15 MHz, Control channel: 6.45 MHz Reception: Audio channel: 1.95 MHz
	<b>Acceptance Angle</b>	Vertical: 90°, Horizontal: 120°
<b>Emission Angle</b>	Vertical: 90°, Horizontal: 120°	Vertical: 90°, Horizontal: 120°
<b>Covering Range</b>	7 m (radius)	7 m (radius)
<b>Input</b>	Microphone terminal: Combined type of XLR-4-31 (dedicated for connecting the optional TS-903 or TS-904)	Microphone terminal: Combined type of XLR-4-31 (dedicated for connecting the optional TS-903 or TS-904)
<b>Output</b>	Monitor speaker: 8 Ohm, 0.2 W. Headphone: Mini jack x2	Monitor speaker: 8 Ohm, 0.2 W. Headphone: Mini jack x2
<b>LED Indicator (TS-801/802)</b>	Speech indicator (flashes when the unit is out of communication range), Power indicator (flashes when the unit is out of communication range or when the battery level is low)	Speech indicator (flashes when the unit is out of communication range), Power indicator (flashes when the unit is out of communication range or when the battery level is low)
<b>Battery Life</b>	Approx. 10 hours (when the fully-charged BP-900 battery is used with „During Speech“ to „Standby“ ratio of 1:2)	Approx. 10 hours (when the fully-charged BP-900 battery is used with „During Speech“ to „Standby“ ratio of 1:2)
<b>Operating Temperature</b>	0°C to +40°C	0°C to +40°C
<b>Finish</b>	Top panel: ABS resin, Grey metallic, paint, semi-matte	Top panel: ABS resin, Grey metallic, paint, semi-matte
<b>Dimensions (W x H x D)</b>	210 x 65.9 x 152 mm	210 x 65.9 x 152 mm
<b>Weight</b>	630 g	630 g



## Infrared Conference System with Voting Function

### Central Unit



### Features

- 2 channels for 2 languages
- Conference control software available
- Safe and sure Infrared Wireless Technology
- Compact and lightweight Chairman and Delegate units
- Up to 96 units per system
- Non-cabling enables easy installations
- For bilingual conferencing and voting with triple choice vote function
- Chairman unit features a priority speech key
- Speaker restriction function
- Auto Mic-Off function / installation status checkup function
- Good coverage
- Improved security from eavesdropping or annoying crosstalk
- Flexible and easy configuration in different rooms and with varied participant numbers
- Exceptional sound quality
- Audio input from a wired microphone or other sound source
- AC operation available with adaptor
- Colour: panel grey metallic

### Options

- TK-908A: Carrying case for 8 units, 2 transceivers battery charger, batteries and microphones
- TK-906A: Carrying case for central unit, 6 units, 1 transceiver, battery charger, batteries and microphones

### Specifications

	TS-900
<b>Power Source</b>	100-240 V AC, 50/60 Hz (supplied from AC adapter (accessory))
<b>Power Consumption</b>	72 W
<b>Input</b>	MIC1 (base Language): -60 dBV, 600 Ohm, unbalanced, phone jack; MIC2 (translation language): -60 dBV, 600 Ohm, unbalanced, phone jack; AUX1 (base language): -20 dBV, 10 kOhm, unbalanced, phone jack; AUX2 (translation language): -20 dBV, 10 kOhm, unbalanced, phone jack; AUX3 (Base and translation language): -20 dBV, 10 kOhm, unbalanced, phone jack
<b>Output</b>	LINE: -20 dBV, 10 kOhm, unbalanced, phone jack; REC: -20 dBV, 10 kOhm, unbalanced, phone jack, RCA pin jack; headphone: Mini jack
<b>Number of connectable Chairman / Delegate Units</b>	96 units
<b>Number of connectable Infrared Transmitter / Receiver Units</b>	4 units (up to 16 units by using 4 YW-1024 distributors)
<b>Infrared Transmitter/Receiver I/O Terminal</b>	4 BNC jacks
<b>External Control Terminal</b>	D-sub connector (9 P, male)
<b>LED Indicator</b>	Voting result indicators 1-3 (7-segment LED, double-digit number), audio signal receiving indicators 1-4 CH, data signal receiving indicator, external control priority indicator, external control communication indicator, power indicator, battery indicator (flashes when a chairman/delegate unit's battery nears complete discharge)
<b>Selectable Functions</b>	Simultaneous speaker No. setting switch: 1/2/4; mic-off setting switch: TIME OUT, on/off, speech priority selector switch: A/B/C (A: First-in-first-out priority, B: Last-in-first-out priority, C: Fixed for the first unit, and last-in-first-out for the subsequent units)
<b>Microphone Mix / Cut Switch (for the Base Language)</b>	MIC/CUT (Mix): Chairman/delegate units + MIC 1 + AUX 1 + AUX 3 -> base language; (cut): MIC 1 + AUX 1 + AUX 3
<b>Microphone Mix / Cut Switch (for the Translation Language)</b>	MIC/CUT (Mix): Chairman/Delegate units + MIC 2 + AUX 2 + AUX 3 -> translation language; (cut): MIC 2 + AUX 2 + AUX 3
<b>AUX 3 Mixing Select Switch</b>	MIC/CUT (Mix): AUX 3 input is relayed to the line output. (Cut): AUX 3 input is not relayed to the line output
<b>Operating Temperature</b>	0°C to +40°C
<b>Finish</b>	Panel: Surface-treated steel plate, grey metallic, paint, semi-gloss
<b>Weight</b>	2.8 kg
<b>Accessory</b>	AC adapter (cord length: 1.8 m DC cord and 2 m detachable AC cord)
<b>Dimensions (W x H x D)</b>	359 x 118.8 x 179.8 mm

## Infrared Conference System with Voting Function



### Chairman's Unit and Delegate's Unit



**TS-901** (+ TS-903)



**TS-902** (+ TS-904)

### Features

- Attractive unit equipped with removable microphone, speaker and priority switch
- 2 different versions for chairman (TS-901) and delegates (TS-902)
- 3 voting keys
- Channel selector for conference language
- When the speaker is on, the microphone of the unit is automatically turned off to avoid feedback and vice versa
- 1 recording output
- Ring shaped in-use LED
- Multiple chairman's units can be operated simultaneously
- TS-901 only: Pressing the priority switch activates the chime and overrides delegate's units
- Easy hook-up

### Options

- BP-900: Lithium Ion Battery
- TS-903: Standard Microphone
- TS-904: Long Microphone
- AD-0910: AC adapter

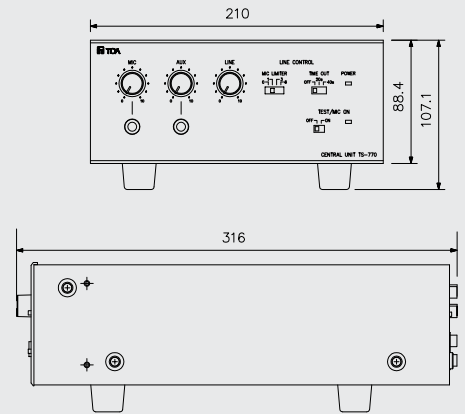
### Specifications

	TS-901	TS-902
<b>Power Source</b>	7.4 V DC (battery), 9 V DC (AC adapter) (supplied from BP-900 battery (option) or AD-0910 AC adapter (option))	7.4 V DC (battery), 9 V DC (AC adapter) (supplied from BP-900 battery (option) or AD-0910 AC adapter (option))
<b>Current Consumption</b>	MAX. 270 mA	MAX. 270 mA
<b>Infrared Emitter/Detector</b>	<b>Wavelength</b>	870 nm (AM: Brightness modulation)
	<b>Modulation Method</b>	Frequency modulation
	<b>Carrier Frequency</b>	Transmission: Audio channel 1: 7.35 MHz, Audio channel 2: 8.10 MHz, Audio channel 3: 8.55 MHz, Audio channel 4: 9.15 MHz, Control channel: 6.45 MHz Reception: Base language channel: 1.95 MHz, Translation language channel: 2.25 MHz
	<b>Acceptance Angle</b>	Vertical: 90°, Horizontal: 120°
	<b>Emission Angle</b>	Vertical: 90°, Horizontal: 120°
	<b>Covering Range</b>	7 m (radius)
<b>Input</b>	Microphone terminal: Combined type of XLR-4-31 (dedicated for connecting the optional TS-903 or TS-904)	Microphone terminal: Combined type of XLR-4-31 (dedicated for connecting the optional TS-903 or TS-904)
<b>Output</b>	Monitor speaker: 8 Ohm, 0.2 W, Headphone: Mini jack x2	Monitor speaker: 8 Ohm, 0.2 W, Headphone: Mini jack x2
<b>LED Indicator</b>	Speech indicator (flashes when the unit is out of communications range), Power indicator, voting status indicator 1-3 (flashes when the unit is out of communications range or when the battery level is low)	Speech indicator (flashes when the unit is out of communications range), Power indicator, voting status indicator 1-3 (flashes when the unit is out of communications range or when the battery level is low)
<b>Battery Life</b>	Approx. 10 hours (when the fully-charged BP-900 battery is used with „During Speech“ to „Standby“ ratio of 1:2)	Approx. 10 hours (when the fully-charged BP-900 battery is used with „During Speech“ to „Standby“ ratio of 1:2)
<b>Operating Temperature</b>	0°C to +40°C	0°C to +40°C
<b>Finish</b>	Top panel: ABS resin, grey metallic, paint, semi-gloss	Top panel: ABS resin, grey metallic, paint, semi-gloss
<b>Dimensions (W x H x D)</b>	210 x 65.9 x 152 mm	210 x 65.9 x 152 mm
<b>Weight</b>	640 g	640 g



## Portable Conference System

### Central Unit



### System

Compact wired conference system with a capacity of up to 210 units. Remote participation via phone or internet is possible. Clear sound, easy set up and convenient storage are self-evident.

### Features

- TS-770 supplies DC Power to all units
- Lamp indicator
- Jack for microphone input, and AUX input
- Microphone, AUX, line (for conference unit's built-in speaker) and chime (on chairman's unit) volume controls
- Delegate's unit simultaneous operation (1,3, or 6) and automatic mic-off setting (OFF/20-sec/40-sec) switches
- Line 1 & 2 output connection terminals each for 35 conference units
- Equalizer Input
- System expandable to 210 units by connection of 3 central units (70 units per central unit)

### Options

- YR-770-2M / YR-770-10M Extension Cables for connection of a TS-770 expansion amplifier or the connection of two conference units. 8 pin DIN socket / DIN plug. 2 m (YR-770-2M) or 10 m (YR-770-10M) long
- TK-776 / TK-778 Carrying and Storage Case  
TK-776: for 1 central unit, 8 units and the cables  
TK-778: for 12 units and the cables

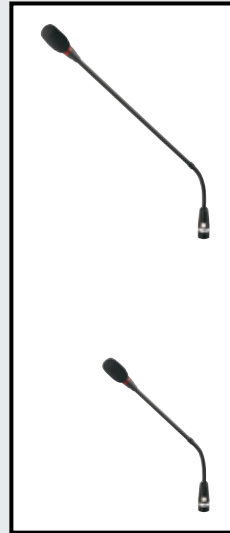
### Specifications

	TS-770
<b>Power Requirements</b>	220 / 230 V AC, 50/60 Hz (selectable)
<b>Power Consumption</b>	Max. 60 W
<b>Input</b>	Mic: 600 Ω, -60 dBV, AUX 1: 10 kΩ, -20 dBV,
<b>Output</b>	Recording; 10 kΩ, -20 dBV, unbal, phone jack, 2x pin jack, unbalanced, phone jack
<b>Controls</b>	Speaker restriction can be set to 1,3 or 6 / automatic mic-off function; off, 20 sec., 40 sec., (selectable)
<b>Connecting Capacity</b>	Max. 70 units per TS-770 / max. 35 units per line (max. 210 units with 3 x TS-770)
<b>Dimensions (W x H x D)</b>	210 x 107.1 x 316 mm
<b>Weight</b>	4 kg
<b>Finish</b>	Case: Pre-coated steel plate, black, 30% gloss, aluminum panel
<b>Options</b>	Extension cable: YR-770-2M / YR-770-10M

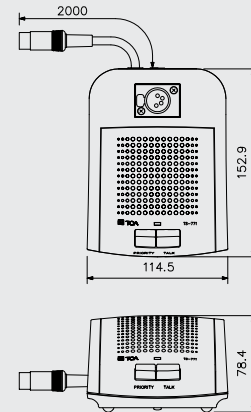
## Portable Conference System



### Chairman's Unit and Delegate's Unit



### Dimensions



### Functions

- TS-771: Chairman's unit
- TS-772: Delegate's unit
- Built-in speaker
- A ring-shaped LED on the optional microphone indicates that the microphone is on
- To prevent howling, the built-in speaker is turned off while the microphone is on
- Press-to-talk priority speech button activates chime and overrides delegate's unit (TS-771 only)
- Press-to-talk button
- Recording output mini-jack for connection to a recording device
- Multiple simultaneous chairman's units operation possible
- 8P quick-lock type mini-DIN socket
- Long or short gooseneck microphone (optional)

### Options

- Microphones for TS-771 and TS-772
- TS-773: 368 mm
  - TS-774: 518 mm
- The microphones fit both chairman's and delegate's unit

### Specifications

	TS-771	TS-772
<b>Power Requirements</b>	35 V DC, under 30 mA supplied from central unit	
<b>Output</b>	Recording: 10 kOhm, -20 dBV, unbalanced, mini jack Internal speaker: 130 Ohm, 200 mW, headphone: 32 Ohm Contact output: 24 V DC, max 50 mA (open collector output)	
<b>Control</b>	Speech button, priority button, chime button	Speech button
<b>Dimensions (W x H x D)</b>	114.5 x 78.4 x 152.9 mm	
<b>Weight</b>	780 g	
<b>Finish</b>	Case: ABS resin, black; panel: grey metallic, semi-gloss paint	
<b>Option</b>	Microphone : TS-773 / TS-774	

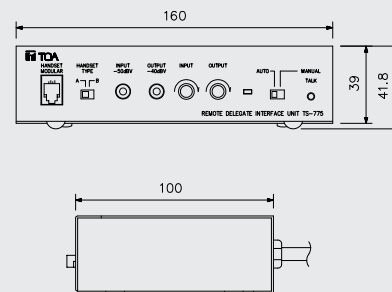


## Portable Conference System

### Remote Delegate Interface



TK-778



### Features

- For connection of external delegates via telephone, IP telephone (up to 70 PCs per TS-770), mobile phone
- Speech method selectable
- Handset connector on the front
- Handset type selectable
- Control output
- Line input for other conference units

### Options

#### Carrying and Storage Cases

- TK-776: for 1 Central Unit, 8 Units and the cables
- TK-778: for 12 Units and the cables

### Specifications

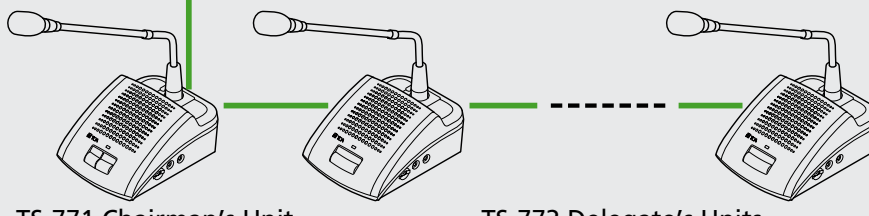
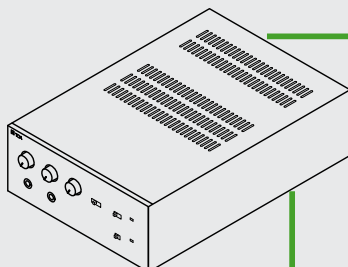
	TS-775
Power Requirements	35 V DC (supplied from optional central unit)
Current Consumption	<30 mA
Input	-60 dBV, 200 Ohm; balanced; mini phone jack with VR control
Output	-60 dBV, 22 Ohm; balanced; mini phone jack with VR control
Metoda mówienia	Auto: Voice-activated automatic switching, Manual: Talk-key activated
Operating Temperature	0°C to +40°C
Operating Humidity	Under 90% RH
Finish	Pre-coated steel plate, black
Dimensions (W x H x D)	160 x 41,8 x 100
Weight	700 g

## Portable Conference System



### TS-770 Series System Example

TS-770 Central Unit

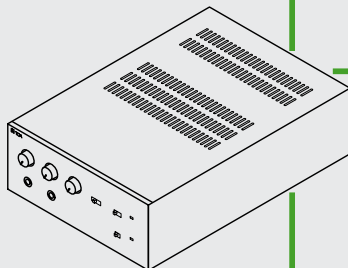


TS-771 Chairman's Unit

TS-772 Delegate's Units

Max. 70 units per Central Unit

TS-770 Central Unit



TS-771 Chairman's Unit

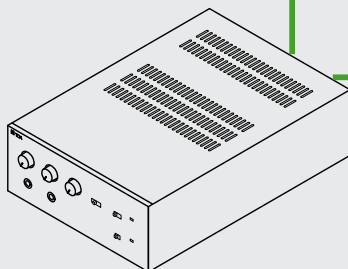
TS-772 Delegate's Unit

TS-775 Remote Delegate Interface Unit

Handset Modular Connector

Telephone Body

TS-770 Central Unit



Telephone



PABX  
C/O

TS-771 Chairman's Unit

TS-772 Delegate's Unit

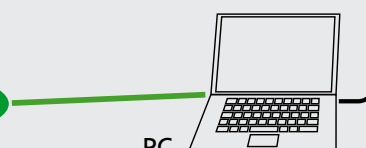
TS-775 Remote Delegate Interface Unit



PC



Internet



PC

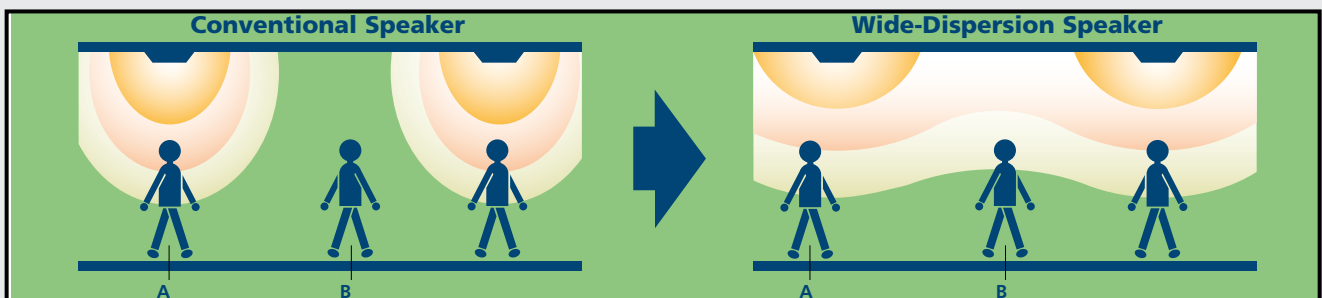


## Ceiling Speakers

### F-Series Wide Dispersion Flush-Mount Ceiling Speakers

TOA introduces a new range of ceiling-mounted speakers that have been designed and engineered to overcome some of the limiting factors that have been associated with conventional ceiling-mount speakers. Most noticeable has always been the high-frequency roll-off that resulted from limited speaker dispersion characteristics. TOA's new ceiling speaker range provides well-balanced audio reproduction without treble attenuation over an expanded listening area thanks to the extra-wide dispersion characteristics that are part of the overall speaker design.

Perceived speaker directionality and beaming tendencies are minimised, resulting in a natural, well-balanced sound over a wide area at all levels. Conventional speakers exhibit high frequency roll-off characteristics as the distance between speaker and listener increases. An ideal ceiling-mounted speaker's response characteristics should include wide dispersion and non-frequency dependent directionality and this ceiling speaker series proves that.

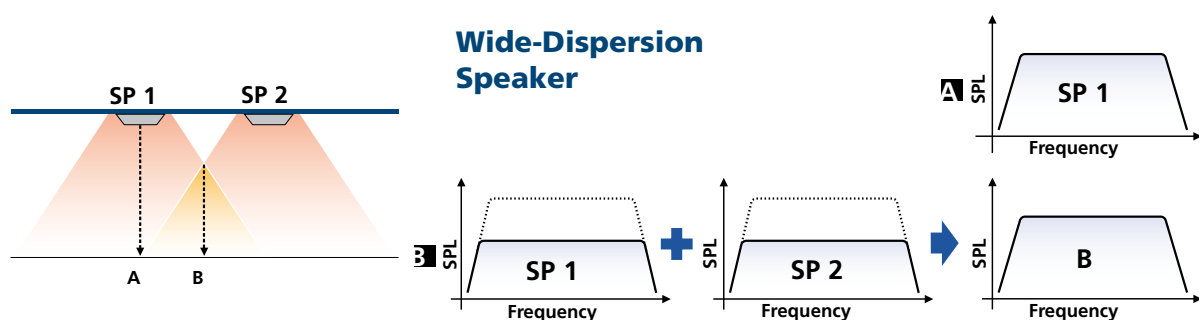
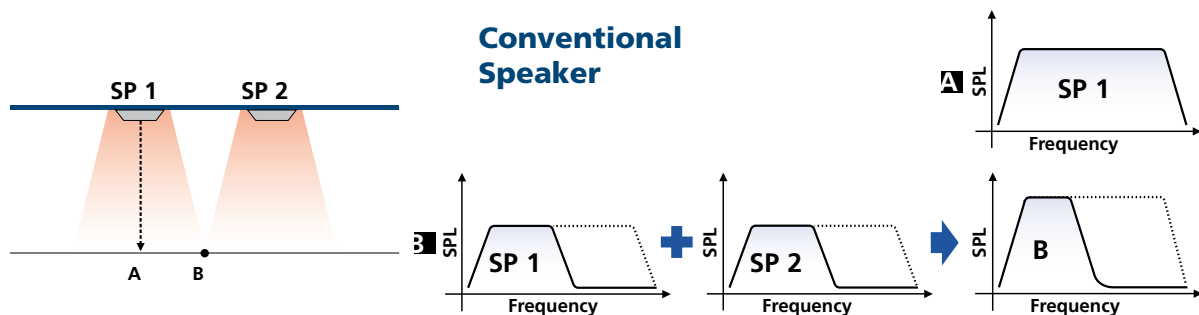


### System Features

- Designed to blend into ceilings with a smooth, low-profile design
- Extra ease of use and higher cost-effectiveness with the metal "back can" enclosure for the speaker rear (F-122C, F-2352C, F-2852C, F-2322C models)
- F-122C arouses increased speaker response control with optional Equalising Speaker Controller (AC-120)
- Minimal high frequency roll-off allows clear and well-balanced sound reproduction over a wide listening area

Expanded listening area coverage thanks to the extra wide dispersion characteristics of TOA's ceiling speakers

enables to utilise fewer speakers to cover a desired area, allowing more cost-effective installations.



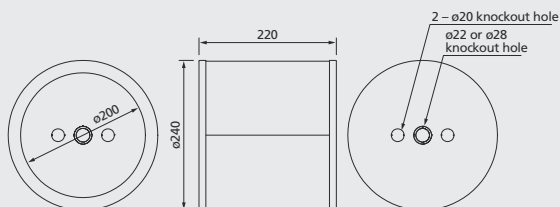
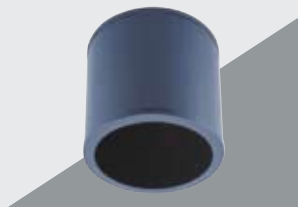




## Ceiling Speakers

### Accessories for F-Series Speakers

**HY-BC1** Back Can

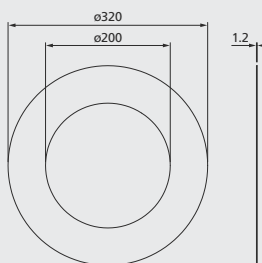


The HY-BC1 Back Can is a metal case attached to flush-mount ceiling speakers when mounted in exposed applications. The Back Can is hung from a ceiling suspension pipe.

**Specifications**

Finish	Surface-treated steel plate, t0.8, black, paint
Weight	1.5 kg
Accessory	Rubber grommet x 2

**HY-TR1** Trim Ring

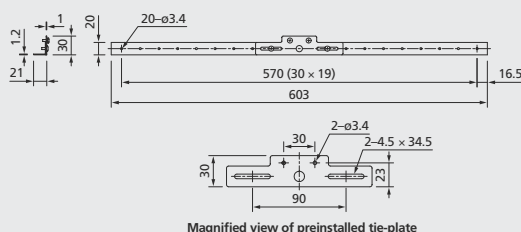
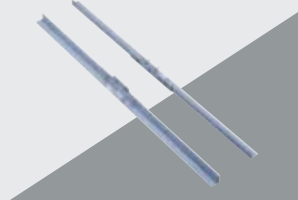


The HY-TR1 Trim Ring allows installation of flush-mounted ceiling speakers in pre-existing ceiling panel holes which are over 200 mm in diameter. The use of 2 Trim Rings allows the speaker to be mounted in holes from 240 mm to 300 mm in diameter.

**Specifications**

Ceiling Hole Diameter	ø 200 – ø 300 mm
Finish	Surface-treated steel plate, white, paint
Weight	500 g

**HY-TB1** Tile Bar Bridge

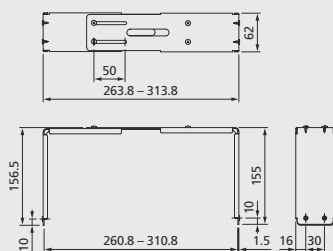
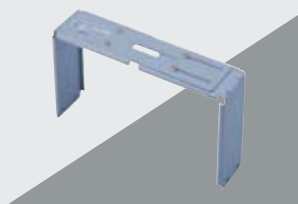


The HY-TB1 is a channel bar to be used when supporting flush-mounted ceiling speakers by way of ceiling bars to prevent their full weight from being directly applied to the ceiling panel during installation. This channel bar is used in conjunction with reinforcement hardware supplied with the speaker. 1 complete set consists of 2 HY-TB1 bars.

**Specifications**

Finish	Steel plate, plating
Weight	500 g (for set of 2 bars)
Accessory	Mounting screw x 4

**HY-AH1** Anchor Hanging Bracket



The HY-AH1 Anchor Hanging Bracket is designed to support ceiling-suspended speakers from an anchor bolt in order to prevent the speaker's full weight from being directly applied to the ceiling panel. It is used in conjunction with reinforcement hardware supplied with the speaker.

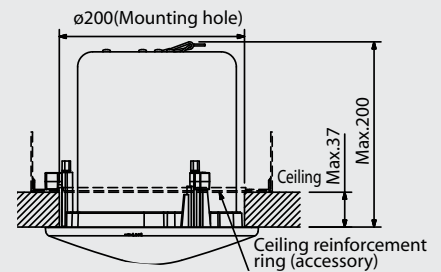
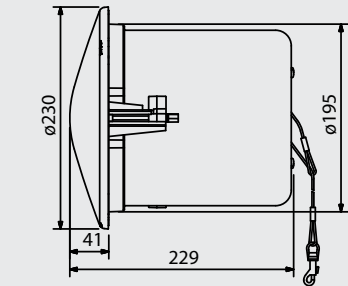
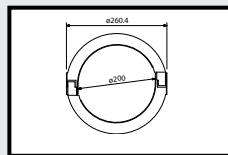
**Specifications**

Finish	Steel plate, plating
Weight	700 g
Accessory	Paper pattern x 1



## Ceiling Speakers

### Extreme Wide Dispersion Ceiling Speaker (30 W)



### Features

- 30 W full range speaker
- Wide dispersion angle
- Dispersion-Control System „DISC“ solves the problem of severe sound quality drop-off effect
- Diffuser of the speaker is developed to tremendously increase the dispersion angle
- High quality sound over a wide area with fewer speakers
- Reduces cabling expenses
- Colour: white (RAL9010)
- Back can made of steel
- Fire-resistant baffle and rim according to UL94 V-0, plus steel punched net
- The „DISC“ consists of the F-122C wide dispersion speaker and the AC-120 electronic controller to optimise sound dispersion pattern of the speaker
- A single AC-120 can control several F-122C speakers
- 8 or 16 Ohm impedance or 100 V line systems

### Applications

- Corridors in shopping malls, hotels and office buildings
- Areas with demanding safety standards (UL94 V-0)

### Options

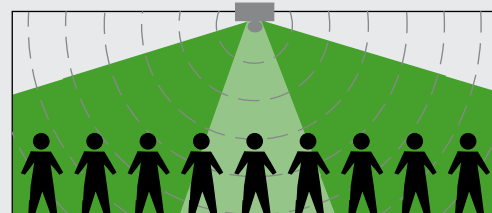
- AC-120: Controller
- HY-AH1: Anchor Hanging Bracket
- HY-BC1: Back Can
- HY-TB1: Tile bar bridge
- HY-TR1: Trim Ring

### Specifications

	F-122C
System	12 cm cone driver, bass-reflex
Power Handling Capacity	120 W (8 Ohm)
Rated Input Power	30 W (High impedance, 16 Ohm)
Tappings 100 V	30 W / 10 W / 3 W / 1 W
Tappings 70 V	30 W / 15 W / 5 W / 1.5 W / 0.5 W
Frequency Response	70 Hz ... 20000 Hz (-10 dB)
SPL (1 W / 1 m)	90 dB
SPL at Rated Input (1 m)	105 dB
Dimensions of Baffle	Ø 230 mm
Mounting Depth	max. 200 mm
Ceiling Hole Diameter	200 mm
Weight	3.7 kg

### Wide dispersion versus conventional dispersion

- Conventional Speaker
- Wide Dispersion Speaker



## Ceiling Speakers



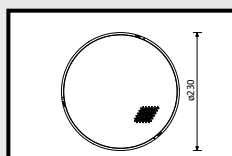
### Wide Dispersion Ceiling Speaker with Flat Front Grille (30 W)



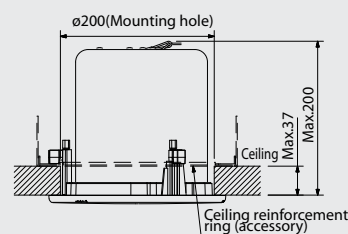
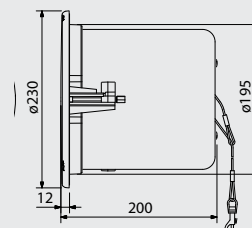
Baffle



Rim and Front Grille



Visible Diameter



Ceiling Mounting

### Features

- Compact bass reflex ceiling speaker
- Flat front panel
- Wide frequency response
- High power
- Quick and easy installation
- Front grille: white (RAL 9010)
- Steel plate back can
- Fire-resistant baffle and rim according to UL94 V-0, plus steel punched net
- Overload protection
- For 8, 16 Ohm impedance and for 100 V / 70 V line systems

### Options

- HY-AH1: Anchor Hanging Bracket
- HY-BC1: Back Can
- HY-TB1: Tile Bar Bridge
- HY-TR1: Trim Ring

	<b>F-2322C</b>
System	12 cm cone driver, bass-reflex
Power Handling Capacity	120 W (8 Ohm)
Rated Input Power	30 W (high impedance, 16 Ohm)
Tappings 100 V	30 W / 10 W / 3 W / 1 W
Tappings 70 V	30 W / 15 W / 5 W / 1.5 W / 0.5 W
Frequency Response	70 Hz...20000 Hz (-10 dB)
SPL (1 W / 1 m)	90 dB
SPL at Rated Input (1 m)	105 dB
Dimensions of Baffle	Ø 230 mm
Mounting Depth	max. 200 mm
Ceiling Hole Diameter	200 mm
Weight	3.7 kg

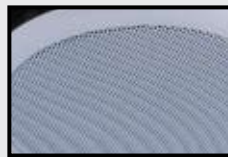


## Ceiling Speakers

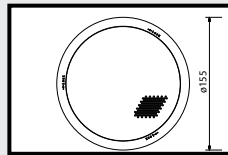
### Compact Wide Dispersion Speaker (6 W)



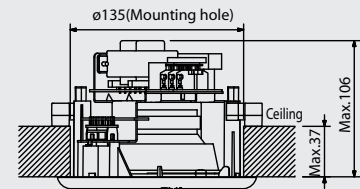
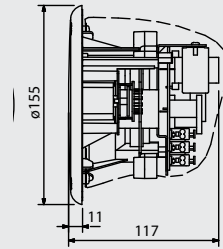
Baffle



Rim and Front Grille



Visible Diameter



Ceiling Mounting

### Features

- Compact ceiling speaker
- Wide range frequency response
- Especially for low profile ceilings with limited depth
- Flat front panel
- For Application with lower power requirement
- Colour: white front grille
- Fire-resistant baffle and rim according to UL94 V-0, plus steel punched net
- Built-in overload protection circuitry for low frequencies
- 8 Ohm, 16 Ohm, 100 V and 70 V systems

### Options

- HY-RR1: Reinforcement Ring for weak ceiling

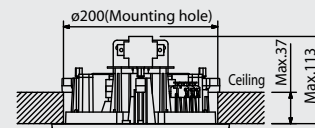
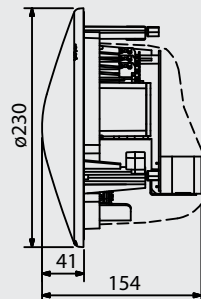
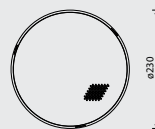
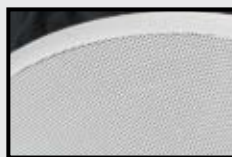
### Specifications

	F-1522SC
System	10 cm cone driver, bass-reflex
Power Handling Capacity	18 W (8 Ohm)
Rated Input Power	6 W (high impedance, 16 Ohm)
Tappings 100 V	6 W / 3 W
Tappings 70 V	6 W / 3 W / 1.5 W
Frequency Response	65 Hz ... 18000 Hz (-10 dB)
SPL (1 W / 1 m)	88 dB
SPL at Rated Input (1 m)	96 dB
Dimensions of Baffle	Ø 155 mm
Mounting Depth	max. 107 mm
Ceiling Hole Diameter	135 mm
Weight	1.0 kg

## Ceiling Speakers



### Low-Depth 2-Way Wide Dispersion Ceiling Speaker (6 W)



Ceiling Mounting

### Features

- 2-way speaker
- For low power use
- Cost-effective
- Without back for low profile ceilings with minimal depth
- With a diffuser for wide dispersion of high frequencies
- Colour: white (RAL 9010)

- 8 or 16 Ohm impedance or for 100 V line
- Rear net for dust protection
- Fire-resistant baffle and rim according to UL94 V-0, plus steel punched net

### Options

- HY-RR2: Reinforcement Ring

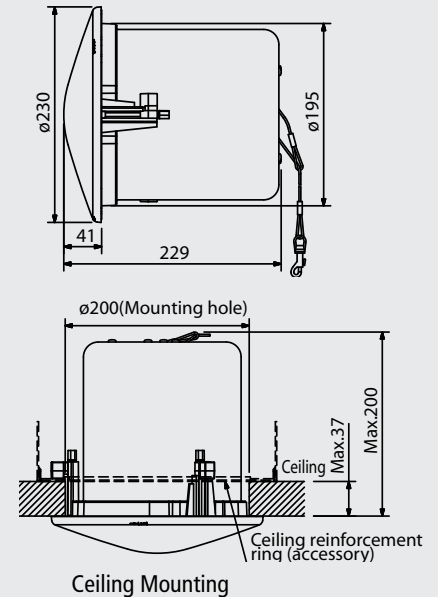
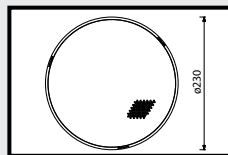
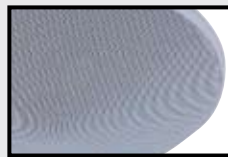
### Specifications

	<b>F-2352SC</b>
System	2-way, 12 cm cone driver, bass-reflex
Power Handling Capacity	18 W (8 Ohm)
Rated Input Power	6 W (high impedance, 16 Ohm)
Tappings 100 V	6 W / 3 W / 1 W / 0.5 W
Tappings 70 V	6 W / 3 W / 1.5 W / 0.5 W / 0.25
Frequency Response	80 Hz ... 20000 Hz (-10 dB)
SPL (1 W / 1 m)	89 dB
SPL at Rated Input (1 m)	97 dB
Dimensions of Baffle	Ø 230 mm
Mounting Depth	max. 113 mm
Ceiling Hole Diameter	200 mm
Weight	1.5 kg



## Ceiling Speakers

### 2-Way Wide Dispersion Ceiling Speaker (30 W)



### Features

- 2-way hi-fi speaker
- 60 W high power
- Diffuser with wide dispersion angle for high quality sound over a wide area
- Less speakers required than in a conventional speaker arrangement
- Colour: white (RAL 9010)
- Steel plate back can
- Fire-resistant baffle and rim according to UL94 V-0, plus steel punched net
- 8 or 16 Ohm impedance or 100 V line

### Options

- HY-AH1: Anchor Hanging Bracket
- HY-BC1: Back Can
- HY-TB1: Tile Bar Bridge
- HY-TR1: Trim Ring

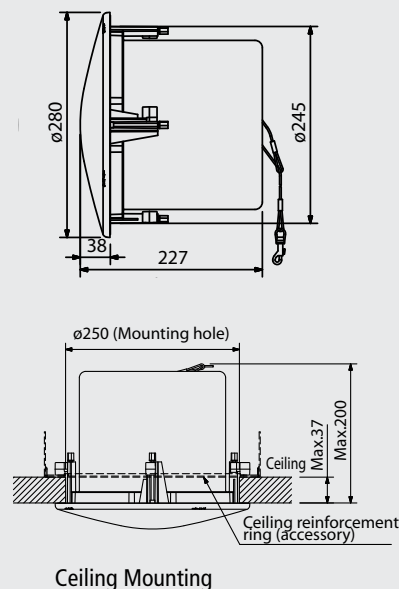
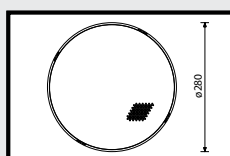
### Specifications

	<b>F-2352C</b>
System	2-way, 12 cm cone driver, bass-reflex
Power Handling Capacity	120 W (8 Ohm)
Rated Input Power	30 W (high impedance, 16 Ohm)
Tappings 100 V	30 W / 10 W / 3 W / 1 W
Tappings 70 V	30 W / 15 W / 5 W / 1.5 W / 0.5 W
Frequency Response	70 Hz...20000 Hz (-10 dB)
SPL (1 W / 1 m)	90 dB
SPL at Rated Input (1 m)	105 dB
Dimensions of Baffle	Ø 230 mm
Mounting Depth	max. 200 mm
Ceiling Hole Diameter	200 mm
Weight	3.7 kg

## Ceiling Speakers



### High Power 2-Way Wide Dispersion Ceiling Speaker (60 W)



### Features

- 2-way speaker
- For high power (60 W) applications
- Locations with higher ceilings (3 to 6 meter)
- Diffuser for wide dispersion of high frequencies
- For 8, 16 Ohm and 100 V line
- Back can made of steel
- Fire-resistant baffle and rim according to UL94 V-0, plus steel punched net

### Applications

Halls, corridors, stairways

### Options

- HY-AH1: Anchor Hanging Bracket
- HY-TB1: Tile Bar Bridge

### Specifications

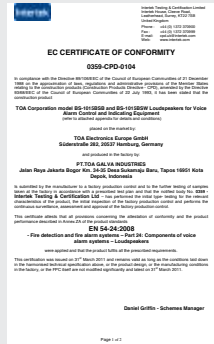
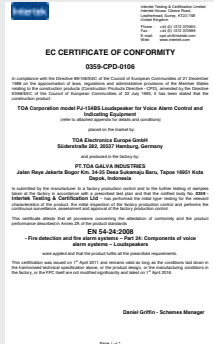
	F-2852C
System	2-way, 16 cm Cone Driver, Bass-Reflex
Power Handling Capacity	180 W (8 Ohm)
Rated Input Power	60 W (High Impedance, 16 Ohm)
Tappings 100 V	60 W / 30 W / 15 W / 3 W
Tappings 70 V	60 W / 30 W / 15 W / 7.5 W / 1.5 W
Frequency Response	60 Hz ...20000 Hz (-10 dB)
SPL (1 W / 1 m)	91 dB
SPL at Rated Input (1 m)	109 dB
Dimensions of Baffle	$\phi 280$ mm
Mounting Depth	max. 227 mm
Ceiling Hole Diameter	250 mm
Weight	5.1 kg



## The EN 54-24 sign for certified speaker



### What is the meaning of this sign?



### TOA only marks devices and speakers which are already certified!

You may already have recognised this EN 54 sign. All speakers and devices passed comprehensive tests resulting in a certificate of an independent notified testing institution.

What is the exact meaning of this sign?

A large number of buildings is equipped with fire detection systems. If a public address system is linked to the fire alarm system it is called voice alarm system – if all components are certified.

In many buildings a voice evacuation system according to EN 54 is mandatory. For this purpose our certified speakers shall be used.

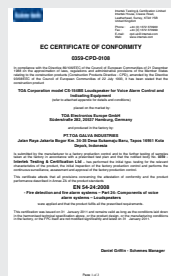
The EN 54 came into force in April 2011. TOA was the first manufacturer to meet all three parts applicable to voice evacuation components already in March 2010:

- EN 54-4: Power Supply Equipment
- EN 54-16: Voice Alarm and Indicating Equipment
- EN 54-24: System Loudspeakers

Our extensive range of certified speakers include:

- Ceiling speakers
- Wall speakers
- Sound projection speakers
- Pendant speakers
- 2-Way speakers
- Design speakers

Furthermore TOA is continuously increasing its certified product range and is offering guidance on the EN 54 and ISO 7240 standards in order to help planning future-proof systems and investments in compliant products.



### TOA Voice Evacuation Systems fit your needs





## Ceiling Speakers



### Certified Firedome Ceiling Mount Speaker



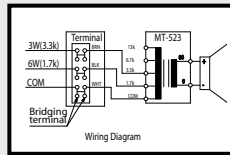
**PC-1867F / PC-1867FC** (EN 54-24 certified)



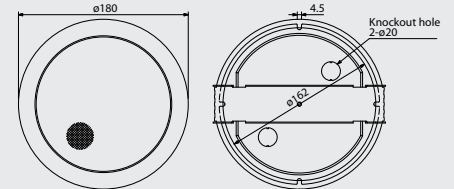
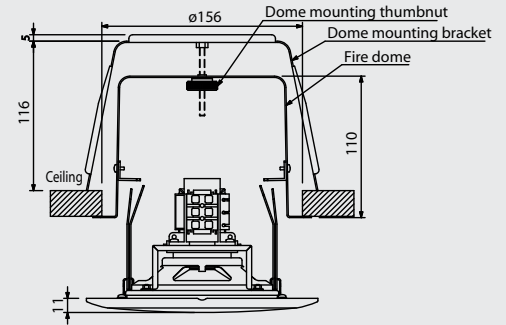
Rim and Grille



Ceramic Screw Terminal



Wiring Diagram



### Features

- Ceiling speakers
- 9 W (continuous program)
- Fire dome
- Easy installation with spring catches
- Baffle, frame, net: aluminium steel
- Colour: off-white (RAL 9010)
- PC-1867FC is EN 54-24 certified and is therefore legalised for a use in conjunction with fire detection systems
- 12 cm speaker
- For mounting in 156 mm holes
- PC-1867F: screw terminals
- PC-1867FC: ceramic screw terminal block (in compliance with British Standard BS5839 Part 8)
- Fire dome made of steel
- Fire-resistant baffle and rim, plus aluminium net

### Applications

Especially for environments with demanding safety requirements of fire protection in public buildings like train terminals, supermarkets, office buildings, hotels and fitness centers  
 PC-1867FC for voice alarm systems according to EN 54-24

### Certificates

- EN 54-24 : 1438/CPD/0183 Type A, ISO 7240-24 , according BS 5839-8

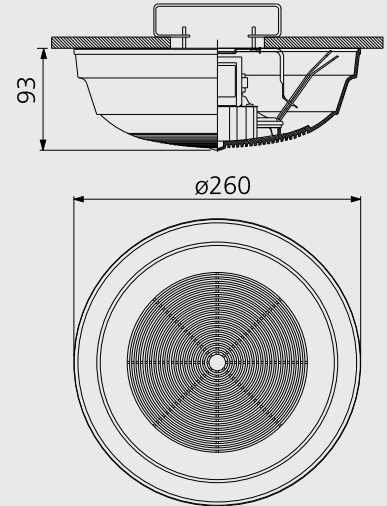
### Specifications

	PC-1867F	PC-1867FC
Dynamic Cone Driver	12 cm	12 cm
Rated Input	6 W (100 V), 3 W (70 V)	6 W (100 V), 3 W (70 V)
Continuous Program	9 W	9 W
Tappings 100 V	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W
Tappings 70 V	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W
Frequency Response	100 Hz ... 16000 Hz	100 Hz ... 16000 Hz
SPL (1W, 1m)	90 dB	90 dB
SPL at Rated Input (1 m)	98 dB	98 dB
Dimension of Baffle	ø 180 mm	ø 180 mm
Mounting Depth	110 mm	110 mm
Ceiling Hole Diameter	156 mm	156 mm
Weight	1300 g	1300 g
Certificates	-	EN 54-24: 1438 /CPD /0183, Type A according to BS 5839-8



## Ceiling Speakers

### Surface Mount Ceiling Speaker



### Features

- Ceiling speaker
- 9 W continuous program
- Colour: off-white (RAL 9010)
- For 100 V and 70 V lines
- Push-in connectors with In/Out bridges
- Easy installation with spring catches
- Vaulted baffle ABS resin

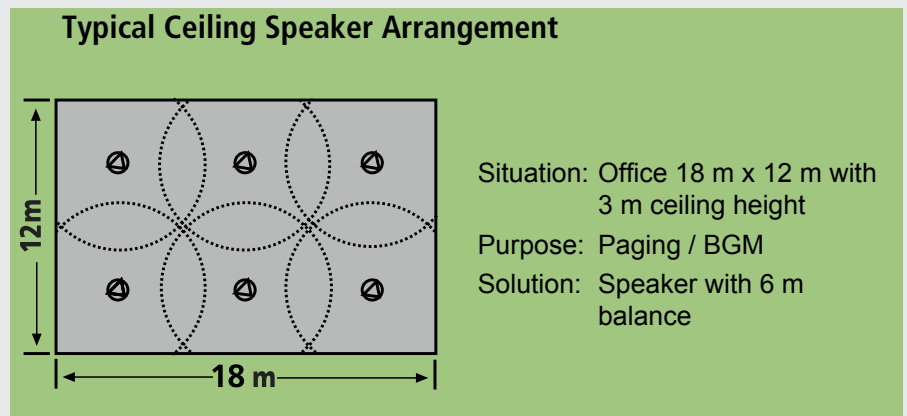
### Applications

Surface mounting e.g. for subsequent installation

### Specifications

	PC-2668
Dynamic Cone Driver	12 cm
Rated Input	6 W
Continuous Program	9 W
Tappings 100 V	6 W / 3 W / 1,5 W / 0,8 W
Tappings 70 V	3 W / 1,5 W / 0,8 W / 0,4 W
Frequency Response	100 Hz ... 16000 Hz
SPL (1 W, 1 m)	90 dB
SPL at Rated Input (1 m)	98 dB
Dimension of Baffle	ø 260 mm
Shape	Round
Weight	650 g / 820 g with bracket

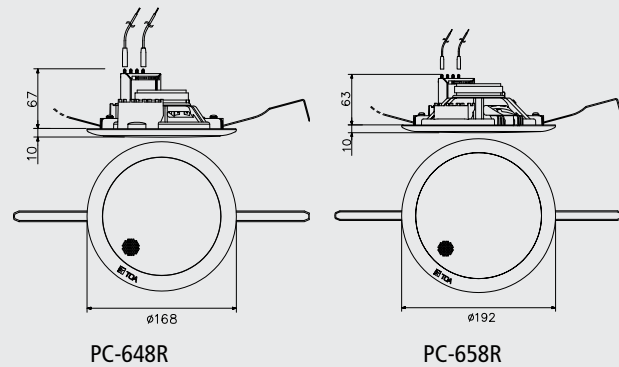
### Application Example



## Ceiling Speakers



### Flush Mount Speaker



### Features

- Thin panel
- Special design for thin ceiling
- Fast & easy installation with spring clamp
- Baffle: PP resin, off-white / SECC punching net, off-white
- Push-in connectors for speaker cables
- In-/Out bridge connection

Amplifier Model	Amplifier Output	Speaker Total Input	Total Quantity of Speakers		
			1 W	3 W	6 W
A-2030 / A-1803	30 W	30 W	30	10	5
A-2060 / A-1706 / A-1806	60 W	60 W	60	20	10
A-2120 / A-1712 / A-1812	120 W	120 W	120	40	20
A-2240 / A-1724	240 W	240 W	240	80	40

### Specifications

	PC-648R	PC-658R
Speaker Component	12 cm	16 cm
Rated Input	6 W (100 V) / 3 W (70 V)	6 W
Tappings 100 V	6 W / 3 W / 1 W	6 W / 3 W / 1 W
Tappings 70 V	3 W / 1.5 W / 0.5 W	3 W / 1.5 W / 0.5 W
Frequency Response	100 Hz ... 18000 Hz	65 Hz ... 18000 Hz
SPL (1W, 1m)	90 dB	90 dB
Dimension	ø 168 mm x 77 mm	ø 192 x 73 mm
Ceiling Hole Diameter	145±5 mm	170±5 mm
Weight	470 g	500 g



## Ceiling Speakers

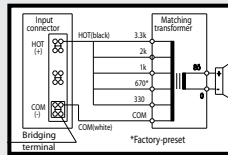
### High Quality Ceiling Mount Speaker



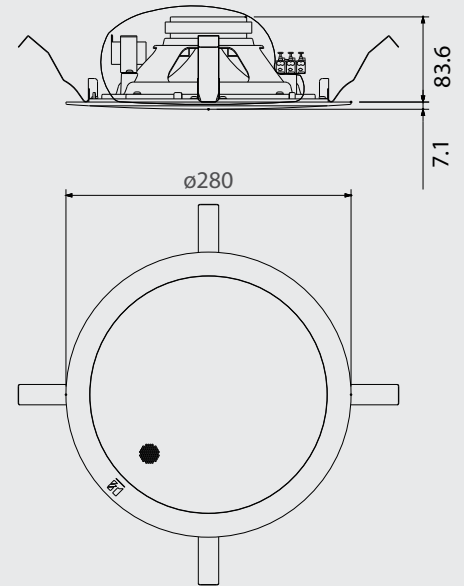
Rim and Grille



Mounting



Wiring Diagram (PC-2852)



### Features

- Ceiling speakers
- Rated input 15 W (PC-2852) or 6 W (PC-2869)
- Very high sound pressure level
- Easy installation with spring catches
- Baffle, frame, net: Steel
- Colour: off-white (RAL 9010)
- 20 cm speaker
- For mounting in 250 mm holes
- Push-in terminals
- Bridge wiring

### Applications

Ideal for use in any kind of public building where paging and BGM are broadcasted

### Specifications

	PC-2869	PC-2852
Speaker Component	20 cm double cone type	20 cm coaxial cone type
Rated Input	6 W	15 W
Tappings 100 V	6 W / 3 W / 1.5 W / 0.8 W	15 W / 10 W / 5 W / 3 W
Tappings 70 V	3 W / 1.5 W / 0.8 W / 0.4 W	15 W / 7.5 W / 5 W / 2.5 W
Frequency Response	40 Hz ...20000 Hz	45 Hz ...20000 Hz
SPL (1W, 1m)	94 dB	96 dB
Dimension	ø 280 x 92 mm	ø 280 x 92 mm
Mounting Depth	83.6 mm	83.6 mm
Ceiling Hole Diameter	250 mm	250 mm
Weight	1400 g	1600 g

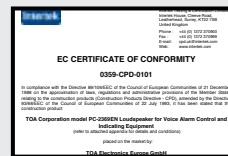
## Ceiling Speakers



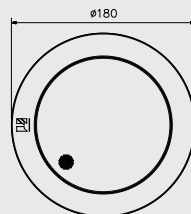
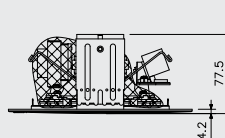
### Certified Ceiling Mount Speaker



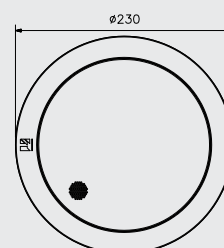
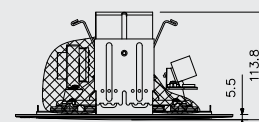
PC-1869 EN



Certificate (Detail)



PC-1869EN



PC-2369EN

### Features

- Flat front panel
- For mounting in 110 mm depth (PC-2369EN) or 80 mm depth (PC-1869EN)
- Ceramic screw terminal block and thermal fuse
- Quick and easy installation

### Certificates

- EN 54-24 : 0359-CPD-0100, Type A, ISO 7240-24 (PC-1869 EN)
- EN 54-24 : 0359-CPD-0101, Type A, ISO 7240-24 (PC-2369 EN)

### Applications

Ideal for use in any kind of public building where pagings and BGM are broadcasted  
PC-1869EN / PC-2369EN for voice evacuation systems according to EN 54

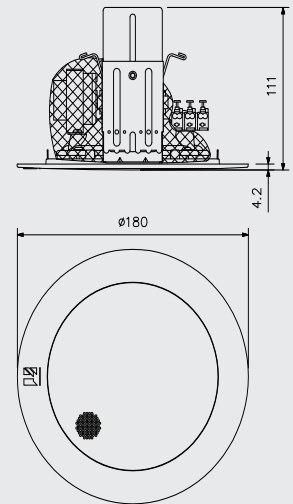
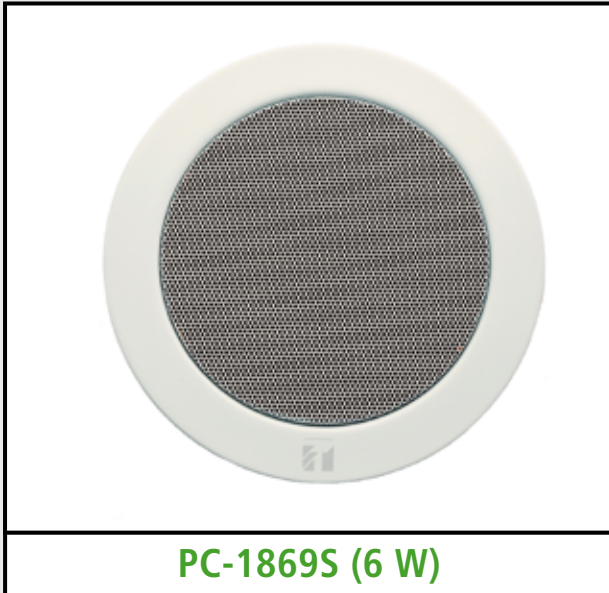
### Specifications

	PC-1869EN	PC-2369EN
Speaker Component	12 cm cone type	16 cm double cone type
Rated Input	6 W (100 V), 3 W (70 V)	6 W (100 V), 3 W (70 V)
Tappings 100 V	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W
Tappings 70 V	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W
Frequency Response	100 Hz ... 18000 Hz	70 Hz ... 18000 Hz
SPL (1 W, 1 m)	94 dB (1 W / 1 m, 500 Hz - 5 kHz)	94 dB (1 W / 1 m, 500 Hz - 5 kHz)
Dimension	ø 180 x 80 mm	ø 230 x 110 mm
Mounting Depth	80 mm	110 mm
Weight	820 g	1.1 kg
Other Features	Ceramic screw terminals, thermal fuse	
Finish	Steel, white paint (equiv. RAL 9010)	
Certificates	EN 54-24: 0359-CPD-0100, Type A ISO 7240-24	EN 54-24: 0359-CPD-0101, Type A ISO 7240-24
IP Grade	IP 21c	IP 21c



## Ceiling Speakers

### Flush Mount Speaker

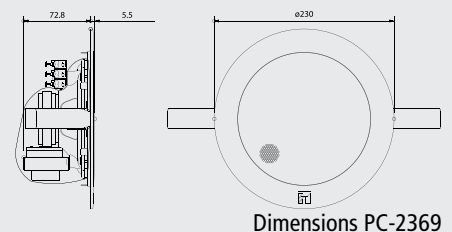
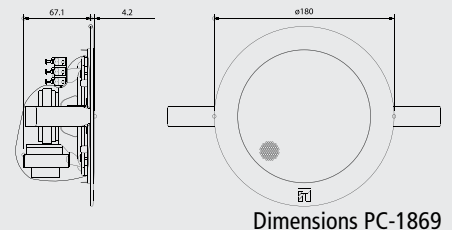


### Features

- Thin panel
- Special design for thin ceiling
- Fast & easy installation with spring catches
- Push-in connectors for speaker cables
- In-/Out bridge connection
- Baffle: Steel plate, off-white paint / Grille: Surface-treated steel plate net, off-white paint (RAL 9010 or equivalent)
- Ceiling Speaker
- 6 W rated input
- Colour: off-white (RAL 9010)
- For 100 V and 70 V lines
- Push-in connectors with In/Out bridges
- Easy installation with spring catches
- Vaulted baffle steel plate

### Specifications

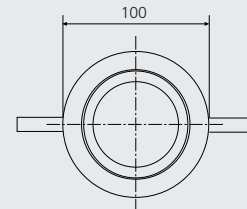
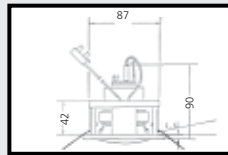
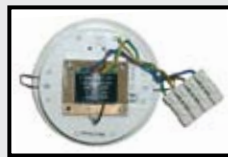
	PC-1869	PC-2369	PC-1869S
<b>Speaker Component</b>	12 cm cone type	16 cm double cone type	12 cm
<b>Rated Input</b>	6 W	6 W	6 W
<b>Tappings 100 V</b>	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W
<b>Tappings 70 V</b>	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W
<b>Frequency Response</b>	55 Hz ...18000 Hz	45 Hz ...20000 Hz	55 Hz ...18000 Hz
<b>SPL (1W, 1m)</b>	90 dB	93 dB	90 dB
<b>Dimension</b>	ø 180 x 72 mm	ø 230 x 79 mm	ø 180 x 111 mm
<b>Ceiling Thickness</b>	67.1 mm	72.8 mm	max. 34 mm
<b>Ceiling Hole Diameter</b>	150 mm	200 mm	150 mm
<b>Weight</b>	620 g	760 g	750 g



## Ceiling Speakers



### Small Diameter Flush-Mount Ceiling Speakers



### Features

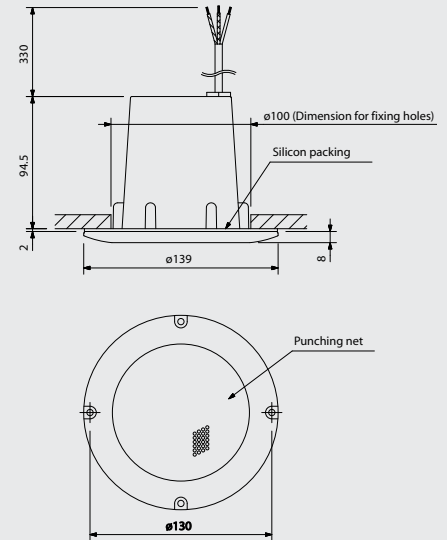
- Smallest diameter for blending into the ceiling without disfiguring the ceiling design
- For 92 mm holes
- Easy snap-in installation
- Baffle ABS resin
- Colour: black (PC-6B/BM) or white (PC-6W/WM) or chrome (PC-6C/CM) or metallic gold (PC-6G/GM)
- 5 pieces per package
- „M“ models for 100 V line: (PC-6BM, PC-6CM, PC-6GM, PC-6WM)

	PC-6B / PC-6C / PC-6G / PC-6W	PC-6BM / PC-6CM / PC-6GM / PC-6WM
Dynamic Cone Driver	6.8 cm	6.8 cm
Rated Input	6 W	6 W
Continuous Program	8 W	8 W
Impedance	4 Ohm	100 V
Tappings 100 V	-	6 W / 3 W / 1,5 W
Frequency Response	150 Hz ...18000 Hz	150 Hz ...18000 Hz
SPL (1 W, 1 m)	85 dB	85 dB
SPL at Rated Input (1 m)	93 dB	93 dB
Dimension of Baffle	ø 100 mm	ø 100 mm
Mounting Depth	96 mm	96 mm
Ceiling Hole Diameter	92 mm	92 mm
Weight	400 g	600 g



## Ceiling Speakers

### Clean Room Speaker / Shower Room Speaker



### Features

- PC-3CL: Clean room / shower room speaker
- 3 W rated input
- For humid or high temperature areas
- Weatherproof in compliance with IP-64
- Resistant against formalin and iodine solutions
- For 100 V line
- Wide temperature range of -20...60°C
- Fits in  $\varnothing 100$  mm holes
- PC-5CL: Clean room speaker
- 5 W rated input
- Sealed high-molecular speaker membrane to prevent floating dust particles from contaminating the environment
- Resistant against formaline

### Applications

PC-3CL: Shower rooms, indoor pools, hospitals, chemical factories

PC-5CL: Laboratories and computer rooms

### Specifications

	PC-3CL	PC-5CL
Dynamic Cone Driver	7.7 cm	8 cm
Rated Input	3 W	5 W
Continuous Program	4.5 W	7.5 W
Impedance	3.3 kOhm (100 V)	2 kOhm (100 V)
Frequency Response	150 Hz ... 20000 Hz	150 Hz ... 20000 Hz
SPL (1 W, 1 m)	87 dB	87 dB
SPL at Rated Input (1 m)	92 dB	94 dB (97 dB siren sound)
Dimension of Baffle	$\varnothing 139$ mm	116 mm
Mounting Depth	104.5 mm	110 mm
Ceiling Hole Diameter	100 mm	98 mm
Temperature Range	-20 ... + 60 °C	-20 °C ... + 55 °C
Weight	550 g	620 g



## Ceiling Speakers



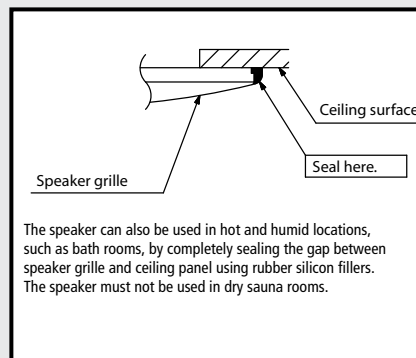
### Shower Room Speaker



**PC-3WR**



Extra Wide Rim



The speaker can also be used in hot and humid locations, such as bath rooms, by completely sealing the gap between speaker grille and ceiling panel using rubber silicon fillers. The speaker must not be used in dry sauna rooms.

Mounting in Steam Rooms

### Features

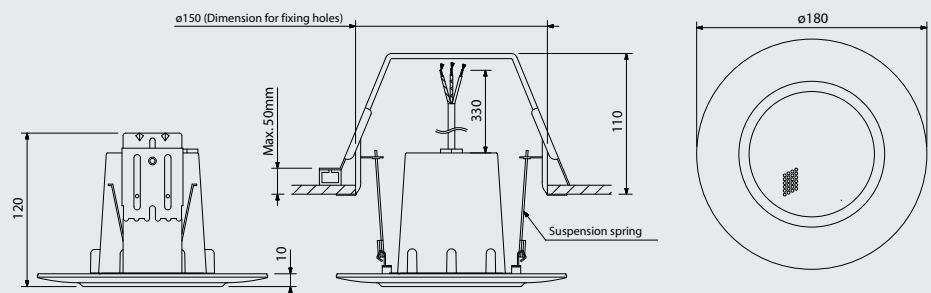
- Ceiling speaker
- For humid or high temperature areas
- In compliance with IP-64
- Wide temperature range of -10...50°C
- For 100 V line
- Fits in 150 mm holes

### Applications

Shower rooms, indoor pools

### Specifications

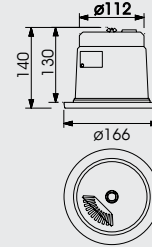
	PC-3WR
Dynamic Cone Driver	7.7 cm
Rated Input	3 W
Continuous Program	4.5 W
Impedance	3.3 kOhm (100 V)
Frequency Response	180 Hz ... 20000 Hz
SPL (1 W, 1 m)	88 dB
SPL at Rated Input (1 m)	93 dB
Dimension of Baffle	ø 180 mm
Mounting Depth	110 mm
Ceiling Hole Diameter	150 mm
Temperature Range	-10° ... + 50°C
Weight	700 g



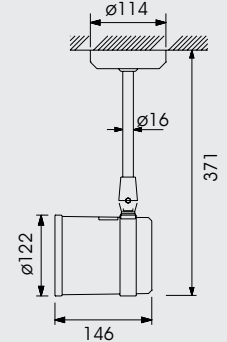


## Ceiling Speakers

### Heat-Resistant Ceiling Speakers



PC-129



PC-139

### Features

- Heat-resistant speakers
- PC-129: ceiling speaker
- PC-139: pendant ceiling speaker
- High SPL
- Colour: ivory
- Withstand 380 °C air stream for 15 minutes
- Dielectric strength of 1000 V AC (1 minute) between terminal and body
- Insulation resistance >10 MOhm, 500 V DC
- Non-RoHS product

### Applications

Production areas with high temperature

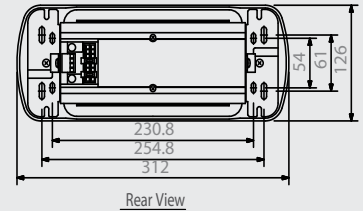
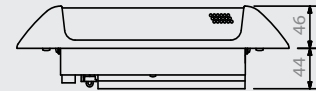
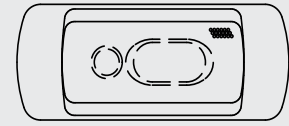
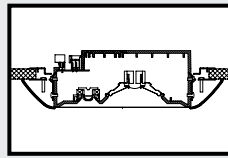
### Specifications

	PC-139	PC-129
Dynamic Cone Driver	8 cm	7.7 cm
Rated Input	1 W	1 W
Continuous Program	1.5 W	1.5 W
Impedance	10 kOhm	10 kOhm
Frequency Response	500 Hz ... 10000 Hz	500 Hz ... 8000 Hz
SPL (1 W, 1 m)	100 dB	100 dB
SPL at Rated Input (1 m)	100 dB	100 dB
Dimensions (dia. x D / length)	ø122 x 146 / 371 mm	ø 166 x 140 mm
Dimension of Baffle	-	166 mm
Mounting Depth	-	130 mm
Ceiling Hole Diameter	-	123 mm
Temperature Range	max. 380°C, 15 Min.	max. 380°C, 15 Min.
Weight	1.7 kg	1.6 kg

## Harmonised Engineering Speaker



### Designer Speaker System



### Features

- Sleek and attractive 2-way design speaker
- 90 W
- Ferrofluid-cooled balanced dome tweeters and neodymium magnet cone woofers
- Narrow coverage area allows a controlled sound
- Speaker axis can be mounted to match with the room axis
- Sound direction can be adjusted within 90°
- Colour: white
- Built-in transformer allows both high and low impedance: 4 Ohm, 16 Ohm or 70 V, 100 V-line
- High power handling
- Easy installation in standard electrical gang boxes
- Fire-rated ABS enclosure (UL Standard 94: V-0 grade)
- HY-H1: Adapter frame included

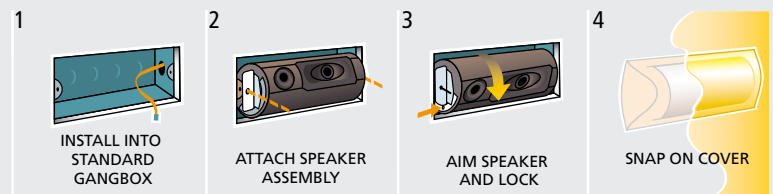
### Applications

Houses of worship, hotels, offices, museums, restaurants, retail stores, residential spaces

### Specifications

	<b>H-1</b>
Enclosure	Sealed
Rated Input 4 Ohm / 100 V	30 W / 12 W
Continuous program 4 Ohm/ 100 V	90 W / 18 W
Impedance	4 Ohm / 16 Ohm
Tappings	100 V: 830 Ohm (12 W), 1.7 kOhm (6 W), 3.3 kOhm (3 W) 70 V: 420 Ohm (12 W), 830 Ohm (6 W), 1.7 kOhm (3 W), 3.3 kOhm (1.5 W)
Frequency Response	120 Hz ... 20000 Hz
SPL (1 W, 1 m)	85 dB
Dimensions (W x H x D)	312 x 126 x 90 mm
Weight	1.5 kg
Colour	white

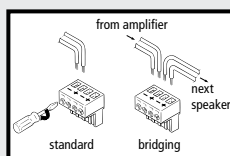
### Installation Procedure



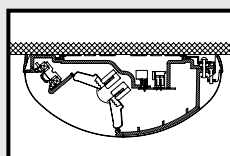


## Harmonised Engineering Speaker

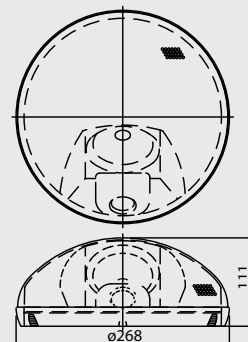
### Designer Speaker System



Connection



Ceiling Mount



### Features

- 2-way design speaker
- Pleasant design
- Excellent acoustic properties
- High power handling of 120 W (continuous program)
- Fire-rated ABS enclosure (UL standard 94: V-0 grade)
- H-2WP: Weatherproof IP 64 certified, matches the requirements for outdoor application
- Ferrofluid-cooled balanced dome tweeters, neodymium magnet cone woofers
- Narrow coverage area allows a controlled sound
- Speaker axis can be mounted to match with the room axis
- Sound direction can be adjusted within 360°
- Easy installation in standard electrical gang boxes

### Applications

Hotels, houses of worship, office buildings, museums, shops

Weatherproof version: terraces, gardens, patios and swimming pools

### Specifications

	H-2	H-2WP
Enclosure	Sealed	Sealed
Rated Input 4 Ohm / other	40 W / 12 W	40 W / 12 W
Continuous program 4 Ohm / other	120 W / 18 W	120 W / 18 W
Impedance	4 Ohm / 16 Ohm / 70 V / 100 V	4 Ohm / 16 Ohm / 70 V / 100 V
Tappings	100V: 830 Ohm (12 W), 1.7 kOhm (6 W), 3.3 kOhm (3 W) 70V: 420 Ohm (12 W), 830 Ohm (6 W), 1.7 kOhm (3 W), 3.3 kOhm (1.5 W)	100V: 830Ohm (12 W), 1.7kOhm (6 W), 3.3 kOhm (3 W) 70V: 420 Ohm (12 W), 830 Ohm (6 W), 1.7 kOhm (3 W), 3.3 kOhm (1.5 W)
Frequency Response	100 Hz...20000 Hz	100 Hz...20000 Hz
SPL (1 W, 1 m)	88 dB	88 dB
Dimensions (W x H x D)	ø 268 x 111 mm	ø 268 x 111 mm
Weight	2.1 kg	2.1 kg
Colour	White	White

### Installation Procedure



## Harmonised Engineering Speaker



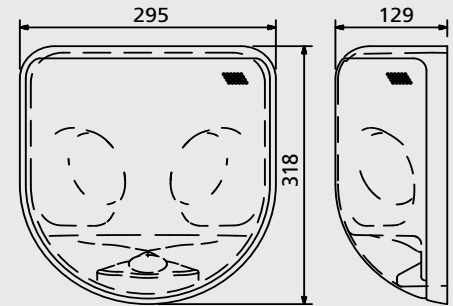
### Designer Speaker System



Inside View



H-3



### Features

- 2-way speaker
- Stylish design
- Quality audio between the speakers as well as directly in front of each speaker unit
- Ideal for long but narrow areas such as corridors
- H-3WP: weatherproof version for outdoor applications
- Dome tweeters and neodymium magnet cone woofers
- Easy unobtrusive installation at above head-height
- On-wall installation
- 180 degree coverage pattern, eliminating dead audio spaces
- Either low impedance (8 Ohm / 16 Ohm) or high impedance (70 V / 100 V)
- Fire-resistant ABS according to UL94: V-0

### Applications

Ideal for corridors. One version for indoor and one for outdoor installation

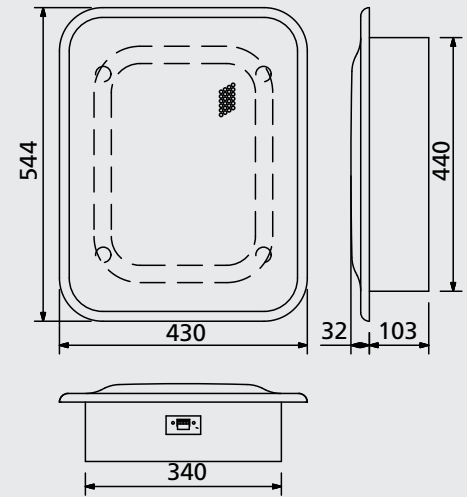
### Specifications

	H-3	H-3WP
<b>Enclosure</b>	Sealed, 2-way speaker	Sealed, 2-way speaker
<b>Speaker</b>	2 x 4" (10 cm) cone speaker, dome tweeter (neodymium magnet)	2 x 4" (10 cm) cone speaker, dome tweeter (neodymium magnet)
<b>Impedance</b>	8 Ohm / 16 Ohm / 100 V / 70 V	8 Ohm / 16 Ohm / 100 V / 70 V
<b>Tappings 100 V</b>	30 W (330 Ohm), 15 W (670 Ohm), 7.5 W (1.3k Ohm)	30 W (330 Ohm), 15 W (670 Ohm), 7.5 W (1.3k Ohm)
<b>Tappings 70 V</b>	30 W (170 Ohm), 15 W (330 Ohm), 7.5 W (670 Ohm), 3.75 W (1.3 kOhm)	30 W (170 Ohm), 15 W (330 Ohm), 7.5 W (670 Ohm), 3.75 W (1.3 kOhm)
<b>SPL (1 W, 1 m)</b>	89 dB	89 dB
<b>Power Handling Capacity</b>	150 W ( 8 Ohm), Rated: 50 W (8 Ohm) or 30 W (16 Ohm and high impedance)	150 W ( 8 Ohm), Rated: 50 W (8 Ohm) or 30 W (16 Ohm and high impedance)
<b>Frequency Response</b>	100 Hz...20000 Hz	100 Hz...20000 Hz
<b>Connectors</b>	Phoenix-screw terminals (2x2-p)	Phoenix-screw terminals (2x2-p)
<b>Finish</b>	Fire-resistant ABS resin black (UL 94 V-0), grille: stainless plate, white paint, grille frame; fire-resistant ABS resin, white, paintable; base frame: steel plate	Fire-resistant ABS resin black (UL 94 V-0), grille: stainless plate, white paintable, grille frame; fire-resistant ABS resin, white; base frame: steel plate
<b>Dimensions (W x H x D)</b>	295 x 318 x 129 mm	295 x 318 x 129 mm
<b>Weight</b>	3.3 kg	3.3 kg
<b>Water Resistance</b>	-	IPx4
<b>Accessory</b>	Base frame	Base frame



## Harmonised Engineering Speaker

### Flush-mount Subwoofer with minimum depth



### Features

- For undisturbed interior aesthetics
- Compact dimensions
- Extremely small depth for flush-mounting
- Acoustic Super Woofer enclosure
- High volume for an excellent low frequency audio response
- Easy installation in a wall or a ceiling

### Option

- MT-S0601 Transformer (for 100 V / 70 V)

### Applications

Flush-mount installation in the wall and in ceilings

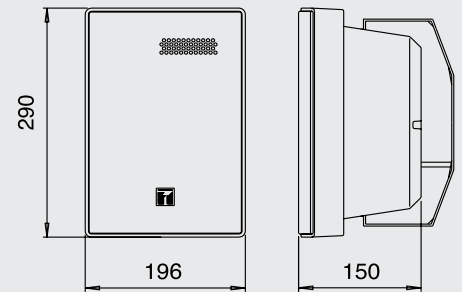
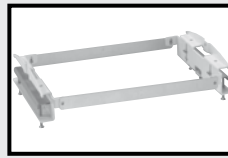
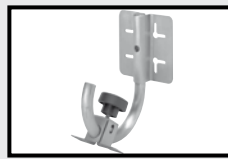
### Specifications

	<b>HB-1</b>
<b>Enclosure</b>	Acoustic Super Woofer (ASW)
<b>Speaker</b>	8" (20 cm) Woofer
<b>Impedance</b>	8 Ohm
<b>SPL (1 W, 1 m)</b>	91 dB (1 W/1 m, 1/2 free sound space)
<b>Power Handling Capacity</b>	240 W (40 -200 Hz), rated: 80 W (40 -200 Hz)
<b>Frequency Response</b>	45 Hz ... 200 Hz (-10 dB, 1/2 free sound space)
<b>Connectors</b>	Phoenix-screw terminals (2x2-pin)
<b>Finish</b>	Fire resistant, ABS (UL 94 V-0) enclosure: steel plate, black, grille: steel plate, white, grille frame Fire-resistant ABS resin, white
<b>Dimensions (W x H x D)</b>	430 x 544 x 135 mm
<b>Weight</b>	11 kg (incl. mounting brackets)
<b>Accessory</b>	Mounting brackets
<b>Optional Accessory</b>	Transformer MT-S0601 (for 100 V / 70 V)

## Universal Speaker



### 2-Way Bass-Reflex Speaker (30 W)



### Features

- Aesthetic design
- Solid sound performance
- Various installation options
- Smooth sound characteristics for excellent sound quality and speech clarity
- 2-way bass reflex speaker
- 30 W
- Colour: black (BS-1030B) or white (BS-1030W)
- 8 Ohm / 100 V selectable
- Splash-proofed (IPx4)
- Mounting: directly to a wall either vertically or horizontally or with mounting brackets (U-bracket or optional bracket SP-410) or flush-mount (optional frame SP-420 required)
- Switchover control for high (70 V/100 V) or low (8 Ohm) impedance built-in on the back-side of the box

### Applications

Matches with aesthetic environments e.g. in hotel receptions, shops, restaurants

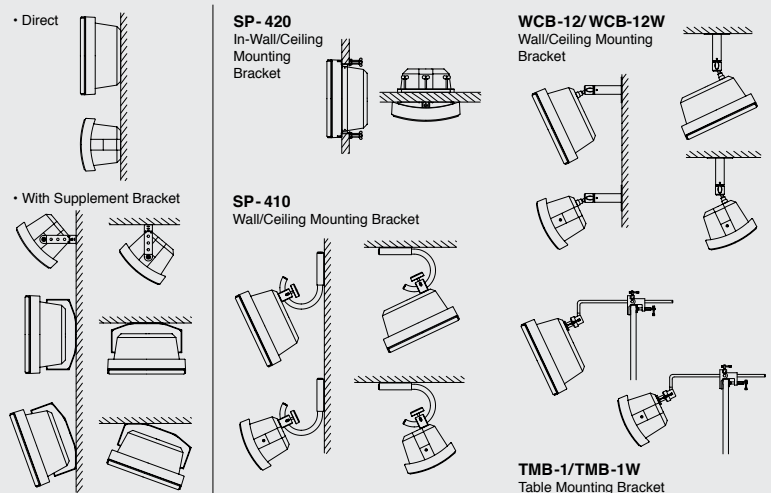
### Options

- SP-410: Wall/Ceiling Mounting bracket
- SP-420: Flush Mounting Frame
- ST-16A: Speaker Stand
- TMB-1: Table Mounting Bracket (Non-RoHS product)
- BS-1030B: WCB-13B Wall Mounting Bracket
- BS-1030W: WCB-13W Wall Mounting Bracket

### Specifications

	BS-1030B / BS-1030W
Enclosure	2-way bass reflex type
Rated Input	30 W
Impedance	8 Ohm
Tappings (100 V / 70 V)	30 W / 20 W / 15 W / 10 W / 5 W
SPL (1 W / 1 m)	90 dB
Frequency Response	80 Hz ... 20000 Hz
Speaker Components	12 cm dynamic cone-type speaker, 2.5 cm balanced dome tweeter
Speaker Cable	2-core cabtyre cable (diameter 6 mm)
Operating Temperature	-10°C to +50°C
Water Resistance	IPx4 (can be installed vertically or horizontally)
Material/Finish	BS-1030B: Enclosure; ABS resin, black, paint, grille; surface treated steel plate, black, powder coating, bracket; surface treated steel plate, black, powder coating, BS-1030W: white
Dimensions (W x H x D)	196 x 290 x 150 mm (without bracket)
Weight	2.5 kg (without bracket)

### Mounting Examples





## Wall Flush-Mount Speaker

### Speaker for Unobtrusive Installation in wall or furniture



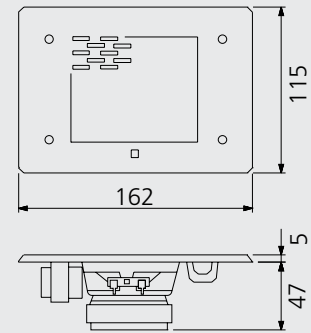
PC-391



PC-391T



YC-150E



### Features

- Small rectangular speaker
- For in-wall installation
- Stainless steel baffle, silver
- Flush-mounting
- PC-391T with attenuator

### Applications

Hotels, hospital rooms, reception counters

### Options

- YC-150E: Back Box (Non-RoHS product)  
Please note: the YC-150E back box has to be installed 5...30 mm deeper behind the surface of the wall.

### Specifications

	PC-391	PC-391T
Dynamic Cone Driver	7.7 cm	7.7 cm
Rated Input	3 W	3 W
Continuous Program	4.5 W	4.5 W
Impedance	3.3 kOhm, 10 kOhm (100 V)	3.3 kOhm (100 V)
Frequency Response	150 Hz ... 18000 Hz	150 Hz ... 18000 Hz
SPL (1 W, 1 m)	86 dB	86 dB
SPL at Rated Input (1 m)	91 dB	91 dB
Dimensions (W x H x D)	162 x 115 x 46 mm	162 x 115 x 56 mm
Weight	560 g	600 g
Special Features	–	With attenuator: OFF, 12, 6, 0 dB



## Box Speakers



### 2-way Cabinet Speaker



**BS-20W**(black) / **BS-20W-WHT** (white)



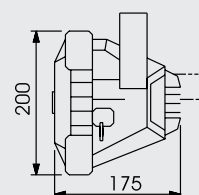
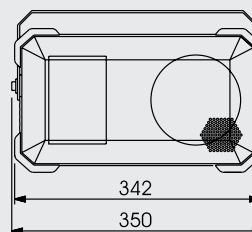
BS-20W-WHT (white)



Bracket



Front Grille



### Features

- 20 W rated input
- For both BGM and FGM applications
- UV-resistant paint
- Colour: black (BS-20W) and white (BS-20W-WHT)
- Non-RoHS product
- CD Horn for constant directivity (piezo driver): 90° vertical x 30° horizontal
- Splashproof sealed IPx4 equivalent
- Enclosure ABS resin, punched net grille
- Mounting bracket: Zinc coated steel plate with stainless steel bolts
- For 100 V Systems

### Applications

Locations with high humidity and temperature, for outdoor use

### Specifications

	BS-20W	BS-20W-WHT
Dynamic Cone Driver	13 cm + CD-Horn	13 cm + CD-Horn
Rated Input	20 W	20 W
Continuous Program	30 W	30 W
Tappings 100 V	20W / 15W / 10W / 5W	20W / 15W / 10W / 5W
Frequency Response	100 Hz ... 20000 Hz	100 Hz ... 20000 Hz
SPL (1 W, 1 m)	94 dB	94 dB
SPL at Rated Input (1 m)	107 dB	107 dB
Dimensions* (W x H x D)	350 x 225 x 213 mm	350 x 225 x 213 mm
Weight	3.6 kg	3.6 kg
Other Features	IPx4 equivalent	IPx4 equivalent

\* without bracket

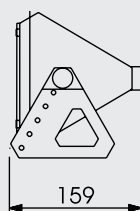
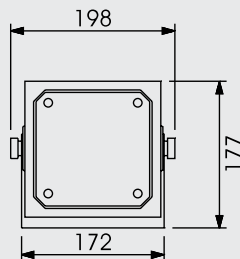


## Box Speakers

### Splashproof Speaker



**BS-10WL (8Ω) / BS-5W (100V)**



### Features

- Splashproof (IPx4 equivalent)
- 360° rotatable box speaker
- For damp and high humidity temperature areas
- For BGM and FGM applications
- Finish: metal, grey
- BS-5W for 100 V systems
- BS-10WL for 8 Ohm

### Applications

Shower-room, swimming pool

### Specifications

	BS-5W	BS-10WL
Speaker	10 cm	10 cm
Rated Input	5 W	10 W
Continuous Program	7.5 W	30 W
Tappings 100 V	5 W, 3 W, 2 W	–
Low Impedance	–	8 Ohm
Frequency Response	120 Hz ... 18000 Hz	80 Hz ... 18000 Hz
SPL (1 W, 1 m)	90 dB	90 dB
SPL at Rated Input (1 m)	97 dB	100 dB
Operation Temperature	-20 °C ... + 55 °C	-20 °C ... + 55 °C
Dimensions (W x H x D)	198 x 177 x 159 mm	198 x 177 x 159 mm
Weight	1.4 kg	1.5 kg
Finish	Polypropylene, aluminium grille, steel bracket	Polypropylene, aluminium grille, steel bracket
Other Features	IPx4 equivalent	IPx4 equivalent

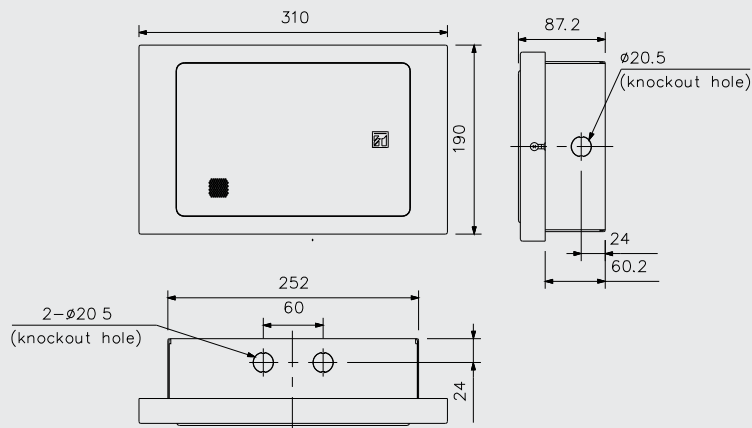
## Wall Mount Speakers



### Certified Metal Cabinet Speaker



**BS-680F / BS-680FC** (EN 54-24 certified)



### Features

- Surface or flush-mounting
- 6 W rated input
- High sound quality through 16 cm double cone speaker
- High sound pressure level
- Colour: off-white (RAL 9010 or equivalent)
- BS-680 FC is EN 54-24 certified and is therefore legalised for a use in conjunction with fire detection systems
- Bridge wiring possible
- Two ceramic screw terminal blocks and thermal fuse (BS-680FC)
- In compliance with BS 5839 part 8 (BS-680FC)
- Enclosure metal, punched net grille
- Mounting bracket: Zinc coated steel plate with stainless steel bolts
- For 100 V / 70 V Systems

### Applications

Public Address Systems in public buildings and hotels  
 BS-680FC: Voice Evacuation Systems according to EN 54-24

### Certificate

- BS-680FC: EN 54-24 : 1438/CPD/0178 Type A, ISO 7240-24, according BS 5839-8

### Specifications

	BS-680F	BS-680FC
<b>Speaker Element</b>	16 cm double cone type	16 cm double cone type
<b>Rated Input</b>	6 W (100 V) / 3 W (70 V)	6 W (100 V) / 3 W (70 V)
<b>Tappings 100 V</b>	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W
<b>Tappings 70 V</b>	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W
<b>Frequency Response</b>	150 Hz ... 20000 Hz	150 Hz ... 20000 Hz
<b>SPL (1 W, 1 m)</b>	94 dB	94 dB
<b>Connector</b>	Push-in connector (bridging terminal)	Screw terminal (ceramic) bridging available
<b>Dimensions (W x H x D)</b>	310 x 190 x 87.2 mm	310 x 190 x 87.2 mm
<b>Weight</b>	3 kg	2.6 kg
<b>Certificate</b>	-	EN 54-24 : 1438/CPD/0178 Type A, ISO 7240-24, according BS 5839-8



## Wall Mount Speakers



### Modern design box speaker (certified)



BS-634 / BS-634T



BS-1034S



Certificate (detail)

### Features

- Flat rectangular box speaker
- 6 W (BS-634) or 10 W (BS-1034) rated input
- High sound quality and clarity
- Vertical or horizontal mounting
- For wall-mount installation
- Colour: off-white, BS-1034S: silver
- Case: HIPS resin, punching net: SECC
- BS-634T with attenuator
- Bridge wiring available

### Applications

Hotels, restaurants, conference rooms and department stores  
 BS-1034EN: Voice Evacuation Systems according to EN 54-24

### Certificate

- BS-1034EN: EN 54-24: 0359-CPD-0102, Type A, ISO 7240-24

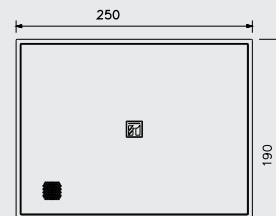
### Specifications

	BS-634	BS-634T	BS-1034	BS-1034S	BS-1034EN
<b>Speaker Component</b>	LF: 12 cm cone type HF: 2.5 cm balanced dome tweeter	LF: 12 cm cone type HF: 2.5 cm balanced dome tweeter	12 cm cone type	LF: 12 cm cone type HF: 2.5 cm balanced dome tweeter	LF: 12 cm cone type HF: 2.5 cm balanced dome tweeter
<b>Rated Input</b>	6 W	6 W	10 W	10 W	10 W
<b>Tappings 100 V</b>	6 W / 3 W	6 W	10 W / 5 W / 3 W / 1 W	10 W / 5 W / 3 W / 1 W	10 W / 5 W / 3 W / 1 W
<b>Tappings 70 V</b>	3 W / 1.5 W	3 W	10 W / 5 W / 2.5 W / 1.5 W / 0.5 W	10 W / 5 W / 2.5 W / 1.5 W / 0.5 W	10 W / 5 W / 2.5 W / 1.5 W / 0.5 W
<b>Frequency Response</b>	120 Hz ... 18000 Hz	120 Hz ... 18000 Hz	120 Hz ... 20000 Hz	120 Hz ... 20000 Hz	120 Hz ... 20000 Hz
<b>SPL (1 W, 1 m)</b>	90 dB	90 dB	90 dB	90 dB	89 dB
<b>Connectors</b>	Push-in terminal	Push-in terminal	Push-in terminal	Push-in terminal	Push-in terminal
<b>Dimensions (W x H x D)</b>	210 x 330 x 80 mm	210 x 330 x 80 mm	210 x 330 x 80 mm	210 x 330 x 80 mm	210 x 330 x 80 mm
<b>Weight</b>	1.3 kg	1.3 kg	1.4 kg	1.4 kg	1.4 kg
<b>Certificates</b>	–	–	–	–	EN 54-24: 0359-CPD-0102, Type A ISO 7240-24

## Wall Speakers



### Cabinet Speaker for Wall Mounting



### Features

- 6 W rated input
- Wooden cabinet with PVC sheet and HIPS baffle
- Colour off-white (RAL 9010 or equivalent)
- BS-678T / BS-678BT with attenuator (Off, -12 dB, -6 dB, 0 dB)
- Vertical or horizontal installation
- For wall-mount installation
- Easy impedance selection
- Bridge wiring possible
- Push-in connector

### Applications

Universal use box for every kind of PA system

### Specifications

	<b>BS-678</b>	<b>BS-678T</b>	<b>BS-678B</b>	<b>BS-678BT</b>
<b>Speaker Component</b>	16 cm double cone type	16 cm double cone type	16 cm double cone type	16 cm double cone type
<b>Rated Input</b>	6 W	6 W	6 W	6 W
<b>Tappings 100 V</b>	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W
<b>Tappings 70 V</b>	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W
<b>Attenuator</b>	—	Off, -12 dB, -6 dB, 0 dB	—	Off, -12 dB, -6 dB, 0 dB
<b>Frequency Response</b>	150 Hz ... 20000 Hz	150 Hz ... 20000 Hz	150 Hz ... 20000 Hz	150 Hz ... 20000 Hz
<b>SPL (1 W, 1 m)</b>	94 dB	94 dB	94 dB	94 dB
<b>Connector</b>	Push-in connector (bridging terminal)	Push-in connector (bridging terminal)	Push-in connector (bridging terminal)	Push-in connector (bridging terminal)
<b>Dimensions (W x H x D)</b>	250 x 190 x 110 mm	250 x 190 x 110 mm	250 x 190 x 110 mm	250 x 190 x 110 mm
<b>Color</b>	white	white	black	black
<b>Weight</b>	1.7 kg	1.7 kg	1.7 kg	1.7 kg



## Wall Speakers



### Certified Cabinet Speaker for Wall Mounting (New!)



BS-678BSB



Certificate (detail)

### Features

- 6 W rated input
- Wooden cabinet with PVC sheet and HIPS baffle
- Colour off-white (BS-678BSW : RAL 9010 or equivalent) or black (BS-678BSB)
- Vertical or horizontal installation
- For wall-mount installation
- Easy impedance selection
- Bridge wiring possible
- 2 Ceramic screw terminals
- Thermal fuse
- According British standard

### Applications

Voice Evacuation Systems according to EN 54-24  
Universal use in VA systems. Especially if a future expansion of the system is expected

### Certificate

- EN 54-24 : 0359-CPD-0103 Type A, ISO 7240-24, according BS 5839-8

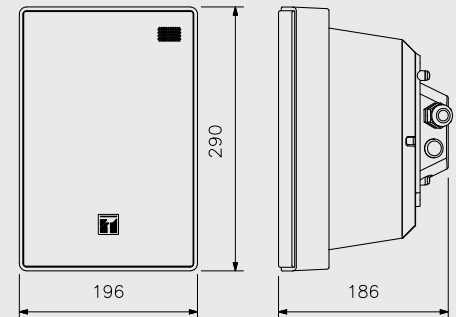
### Specifications

	BS-678BSW	BS-678BSB
Speaker Component	16 cm speaker	16 cm speaker
Rated Eingang	6 W (100 V) / 3 W (70 V)	6 W (100 V) / 3 W (70 V)
Tapping 100 V	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W
Tapping 70 V	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W
Frequency Response	150 Hz ... 18000 Hz	150 Hz ... 18000 Hz
SPL (1 W, 1 m)	94 dB	94 dB
Connection	Screw terminals (bridging possible)	Screw terminals (bridging possible)
Dimensions (W x H x D)	250 x 190 x 108 mm	250 x 190 x 108 mm
Colour	white	black
Weight	1.7 kg	1.7 kg
Certificate	EN 54 -24: 0359-CPD-0103, Type A, ISO 7240-24, according BS 5839-8	EN 54 -24: 0359-CPD-0103, Type A, ISO 7240-24, according BS 5839-8
Protection	IP 21c	IP 21c

## Wall Speakers



### Certified 2-Way Speaker (New!)



### Features

- Aesthetic design
- Various installation options
- Mounting: directly to a wall either vertically or horizontally or with mounting brackets (U-bracket or optional bracket SP-410) or flush-mount (optional frame SP-420 required)
- Colour: black (BS-1015BSB) or white (BS-1015BSW)
- Optimised for music reproduction and sound clarity
- Additional PG gland available
- Ceramic screw terminal
- Thermal fuse

### Options

- SP-410: Wall/Ceiling Mounting Bracket
- SP-420: Flush Mounting Frame
- ST-16A: Speaker Stand

### Applications

Voice Evacuation Systems according to EN 54-24  
 Fits architecturally sophisticated environments.  
 For music distribution or announcements e.g. in public buildings, traffic terminals, supermarkets, office towers, hotels and health clubs

### Certificate

- EN 54-24 : 0359-CPD-0104, Type A, ISO 7240-24, according to BS 5839-8

### Specifications

	<b>BS-1015BSB / BS-1015BSW</b>
<b>Enclosure</b>	2-way bass reflex type
<b>Rated Input</b>	15 W
<b>Impedance</b>	100 V / 70 V
<b>Tappings (100 V / 70 V)</b>	15 W / 10 W / 5 W
<b>SPL (1 W / 1 m)</b>	90 dB (1 W / 1 m)
<b>Frequency Response</b>	80 Hz ... 20000 Hz
<b>Speaker Components</b>	12 cm dynamic cone-type speaker, 2.5 cm balanced dome tweeter
<b>Speaker Cable</b>	2-core cabtyre cable (diameter 6 mm)
<b>Operating Temperature</b>	-10°C ... +50°C
<b>Protection</b>	IP X3 (can be installed vertically or horizontally)
<b>Material/Finish</b>	BS-1015BSB: Enclosure; ABS resin, black, paint, grille; surface treated steel plate; BS-1015BSW: white
<b>Dimensions (W x H x D)</b>	196 x 290 x 186 mm (without bracket)
<b>Weight</b>	2.0 kg (without bracket)
<b>Certificates</b>	EN 54 -24: 0359-CPD-0104, Type A, ISO 7240-24, according to BS 5839-8

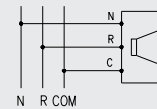
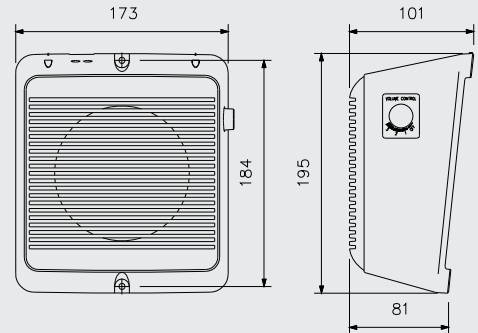


## Wall Speakers

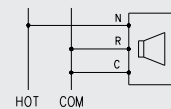
### Cabinet Speaker for Wall Mounting



BS-633AT



3-wire connection



2-wire connection

### Features

- 6 W rated input
- HIPS resin speaker
- For highly intelligible sound reproduction
- Budget friendly speaker
- Colour off-white (RAL 9010 or equivalent)
- Wide operating temperature range: -10 °C ... + 50 °C
- Surface mount
- BS-633AT with built-in attenuator for OFF, -12 dB, -6 dB, 0 dB (3W) or OFF, -13 dB, -7 dB, 0 dB (6W)
- Easy impedance selection
- 2-wire or 3-wire connection (BS-633AT)
- Bridge wiring possible
- Push-in connector

### Specifications

	BS-633A	BS-633AT
Speaker Component	12 cm cone type speaker	12 cm cone type speaker
Rated Input	6 W	6 W
Tappings 100 V	6 W / 3 W / 1 W	6 W / 3 W
Tappings 70 V	3 W / 1.5 W / 0.5 W	3 W / 1.5 W
Frequency Response	120 Hz ... 15000 Hz	120 Hz ... 15000 Hz
SPL (1 W, 1 m)	91 dB	91 dB
Operating Temperature	-10 °C ... +50 °C	-10 °C ... +50 °C
Connector	Push-in connector (bridging terminal)	Push-in connector (bridging terminal)
Dimensions (W x H x D)	173 x 195 x 101 mm	173 x 195 x 101 mm*
Weight	780 g	810 g
Other Features	-	Attenuator OFF, -12 / -6 / 0 dB (6 W) Attenuator OFF, -13 / -7 / 0 dB (3 W)

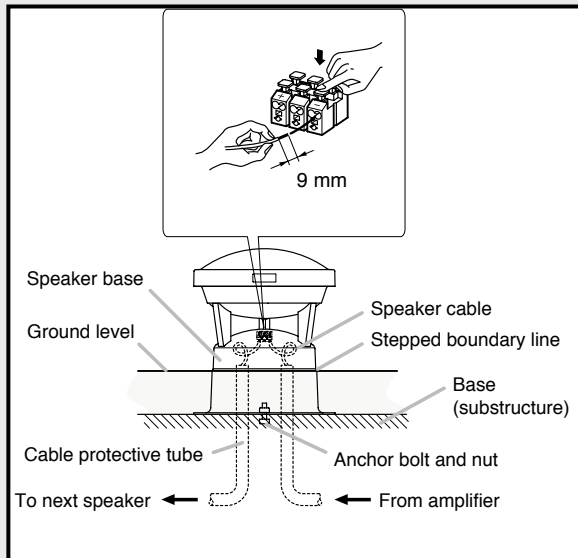
\* excl. volume control



## Garden Speaker



### Outdoor Speaker for Convenient Installation



Easy Connection

### Features

- Stylish, attractively designed outdoor speaker
- Blending well into the surroundings of various locations
- Highly reliable performance
- Fullfills IPX4 requirements
- High performance
- Compact speaker
- Ideal for paging and background music
- Positioning e.g. in garden shrubbery
- Enclosure made of FRP resin
- Exceptional resistance to corrosion and moisture (IPX4)
- Ideal for outdoor installations
- Speaker wiring and base unit can be installed in the ground
- High impedance

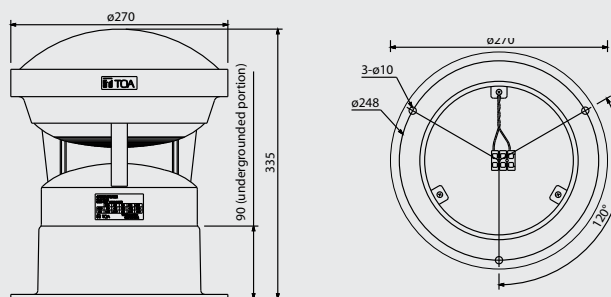
### Applications

Gardens, theme parks, resort facilities

### Specifications

	<b>GS-302</b>
<b>Enclosure</b>	Sealed type
<b>Rated Input</b>	30 W (100 V line), 15 W (70 V line)
<b>Rated Impedance</b>	100 V line: 330 Ω (30 W), 670 Ω (15 W), 1 kΩ (10 W), 2 kΩ (5 W), 3.3 kΩ (3 W) / 70 V line: 330 Ω (15 W), 670 Ω (7.5W), 1 kΩ (5 W), 2 kΩ (2.5 W), 3.3 kΩ (1.5 W)
<b>SPL (1 W / 1 m)</b>	87 dB
<b>Frequency Response</b>	100 ... 8,000 Hz
<b>Speaker Component</b>	12 cm splash-proof cone type
<b>Input Terminal</b>	Push-in terminal
<b>Applicable Cable</b>	Solid copper wire: $\phi 0.8 - \phi 1.6$ mm Stranded copper wire: 0.75 - 1.25 mm <sup>2</sup>
<b>Water Capability</b>	Meets IPX4 requirements
<b>Finish</b>	Top cover and base: FRP resin, speaker panel: ABS resin, legs: aluminum, dark grey, semi-gloss, paint
<b>Dimensions</b>	$\phi 270 \times 335$ (H) mm
<b>Weight</b>	2.4 kg

### Dimensions





## Pendent Speakers

### Speaker for Ceiling Suspension Installation



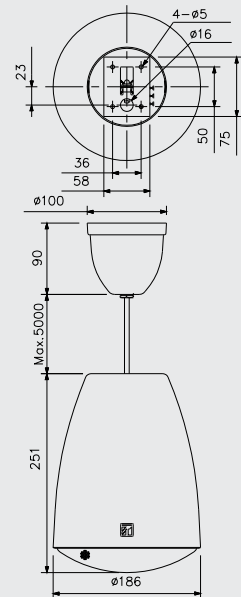
**PE-64 / PE-304**



Speaker



Ceiling Cover



### Features

- Special design to blend with lighting equipment
- 30 W (PE-304) or 6 W (PE-64) rated input
- Rugged HIPS resin enclosure
- Excellent sound quality
- Colour: off-white (RAL 9010 or equivalent)
- Paintable
- 12 cm dynamic cone speaker plus balanced dome tweeter
- Inputs for 100 V and 70 V systems, PE-304 additionally with 8 Ohm input
- Easy impedance selection
- Equipped with 5 m cord

### Applications

Supermarkets, shopping malls, lobby, rooms without suspended ceilings

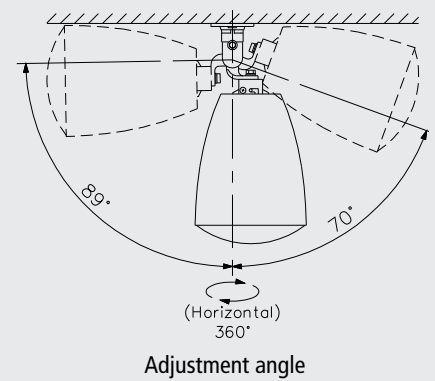
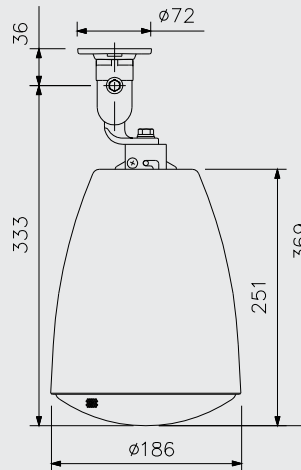
### Specifications

	PE-64	PE-304
Dynamic Cone Driver	12 cm	12 cm
Rated Input	6 W	30 W
Impedance	100 V / 70 V	100 V / 70 V / 8 Ohm
Tappings 100 V	6 W / 3 W / 1 W	30 W / 20 W / 15 W / 10 W / 5 W
Tappings 70 V	3 W / 1.5 W / 0.5 W	30 W / 20 W / 15 W / 10 W / 5 W
Frequency Response	100 Hz...18000 Hz	70 Hz...20000 Hz
SPL (1 W, 1 m)	90 dB	91 dB
Connection	Push-in connector (bridging terminal, 2-branch)	Push-in connector (bridging terminal, 2-branch)
Dimensions	ø 186 x 251 mm	ø 186 x 251 mm
Weight	1.5 kg	2.1 kg

## Projection Speakers



### Projection Speaker for Ceiling and Wall Installation



### Features

- Indoor speaker
- Wide range frequency response
- Housing: HIPS resin, grille: steel net
- Easy to mount
- Colour off-white (RAL 9010 or equivalent)
- Projection speaker
- For 100 V, 70 V systems, PJ-304 additionally for 8 Ohm systems
- Complete with mounting bracket for easy installation

### Applications

For buildings with high noise level

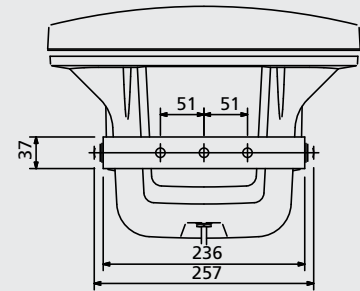
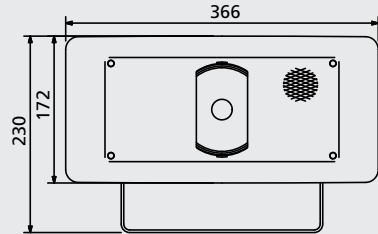
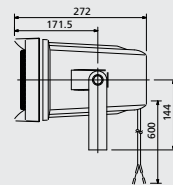
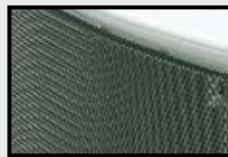
### Specifications

	PJ-64	PJ-304
Speaker Component	12 cm	12 cm
Rated Input	6 W	30 W
Impedance	100 V / 70 V	100 V / 70 V / 8 Ohm
Tappings 100 V	6 W / 3 W / 1 W	30 W / 20 W / 15 W / 10 W / 5 W
Tappings 70 V	3 W / 1.5 W / 0.5 W	30 W / 20 W / 15 W / 10 W / 5 W
Frequency Response	100 Hz ... 18000 Hz	70 Hz ... 20000 Hz
SPL (1 W, 1 m)	90 dB	91 dB
Dimensions (with bracket)	ø 186 x 369 mm	ø 186 x 369 mm
Weight	1.5 kg	2.1 kg



## Projection Speakers

### Splashproof Projection Speaker



### Features

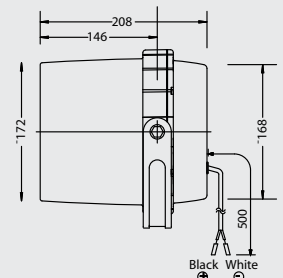
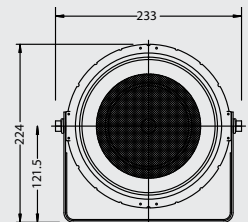
- Square splashproof speaker (IP 64) for outdoor use (CS-154 / CS-304) or round splashproof speaker (CS-64)
- 6 W (CS-64), 15 W (CS-154) or 30 W (CS-304)
- High SPL
- Weatherproof polyurethane resin paint
- Impact-proof light weight ABS resin enclosure
- Complete with stainless steel mounting bracket for easy installation
- For 100 V, 70 V and 8 Ohm systems with rotary impedance selector switch
- Constant directivity coverage (90 degree in horizontal)

### Applications

Outdoor use e.g. in industrial environments or on ships

### Specifications

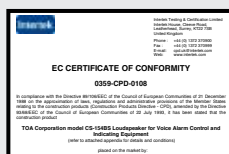
	CS-64	CS-154	CS-304
Dynamic Cone Driver	12 cm	12 cm	12 cm
Rated Input	6 W	15 W	30 W
Continuous Program	9 W	22.5 W	45 W
Tappings 100 V	6 W / 3 W / 1 W	15 W / 10 W / 5 W	30 W / 20 W / 10 W
Tappings 70 V	6 W / 3 W / 1.5 W / 0.5 W	15 W / 7.5 W / 5 W / 2.5 W	30 W / 15 W / 10 W / 5 W
Frequency Response	130 Hz ... 13 kHz	150 Hz ... 15000 Hz	120 Hz ... 15000 Hz
SPL (1 W, 1 m)	96 dB	97 dB	98 dB
Dimensions	233 x 224 x 208 mm	366 x 230 x 272 mm	366 x 230 x 272 mm
Weight	1.5 kg	2.8 kg	3.1 kg
Protection	IP x4	IP 65 weatherproof	IP 65 weatherproof
Finish	ABS resin, off-white, punched net: dark grey, bracket, screws: stainless steel	ABS resin, off-white, punched net: dark grey, bracket, screws: stainless steel	ABS resin, off-white, punched net: dark grey, bracket, screws: stainless steel



## Projection Speakers



### Certified Splashproof Projection Speaker (New!)



### Features

- Projection speaker
- 6 W (CS-64BS) or 15 W (CS-154BS) rated power
- Splash proof for outdoor use
- Lightweight and rugged construction
- High SPL
- 100 V or 70 V
- PG gland
- Ceramic screw terminals
- Thermal fuse
- Stainless steel bracket for easy installation
- Stainless steel screws

### Applications

Voice Evacuation Systems according to EN 54-24  
Plants, park houses, stations, stadiums, swimming pools and outdoor areas, etc.

### Certificate

- EN 54-24 : 0359-CPD-0108 Type B, ISO 7240-24, according BS 5839-8 (CS-154BS)
- EN 54-24 : 0359-CPD-0107 Type B, ISO 7240-24, according BS 5839-8 (CS-64BS)

### Specifications

	CS-64BS	CS-154BS
<b>Dynamic Cone Driver</b>	12 cm cone type speaker	12 cm cone type speaker
<b>Rated Power</b>	6 W (100 V / 70 V)	15 W (100 V / 70 V)
<b>Continuous Program</b>	9 W	22,5 W
<b>Tapping 100 V</b>	6 W / 3 W / 1 W	15 W / 10 W / 5 W
<b>Tapping 70 V</b>	6 W / 3 W / 1,5 W / 0,5 W	15 W / 7,5 W / 5 W / 2,5 W
<b>Frequency Response</b>	130 Hz ... 13000 Hz	150 Hz ... 15000 Hz
<b>SPL (1 W, 1 m)</b>	96 dB	97 dB
<b>Operation Temperature</b>	-20°C ... + 55°C	-20°C ... + 55°C
<b>Dimensions (B x H x T)</b>	233 x 224 x 249 mm	366 x 230 x 310 mm
<b>Weight</b>	1.7 kg	3.0 kg
<b>Connection</b>	Ceramic screw terminals, thermal fuse	Ceramic screw terminals, thermal fuse
<b>Finish</b>	ABS resin, white Front grille: Steel, dark grey	ABS resin, white Front grille: Steel, dark grey
<b>Certificate</b>	EN 54-24: 0359-CPD-0107, Type B, ISO 7240-24, according BS 5839-8	EN 54-24: 0359-CPD-0108, Type B, ISO 7240-24, according BS 5839-8
<b>Protection</b>	IP 34c	IP 65c



## Projection Speakers



### Certified Projection Speakers (New!)



PE-154EN / PE-154BS



PJ-154BS



Certificate (PJ-154BS)



Certificate (PE-154EN/BS)

### Features

#### PE-154BS / PE-154EN

- 15 W rated power
- 2-way speaker
- Rugged HIPS enclosure
- Excellent sound quality
- Colour: White (RAL 9010 or equivalent)
- 100 V or 70 V
- 5 m cable (PE-154EN) or 3 m fire resistant cable (PE-154BS)
- PE-154BS: 2 Ceramic screw terminals, thermal fuse, fire resistant cable, 5-core

#### PJ-154BS

- 15 W rated power
- 2-way projection speaker
- Wide frequency response
- Enclosure: Resin, grille: Steel
- Easy installation (mounting bracket included)
- Colour white (RAL 9010 or equivalent)
- 100 V or 70 V
- External connection box with PG-Gland
- 2 Ceramic screw terminals, thermal fuse
- Fire resistant cable, 5-core

### Applications

Voice Alarm Systems according to EN 54. Supermarkets, shopping malls, lobbies, rooms with great ceiling height, restaurants, bars, public buildings and schools, etc.

### Certificates

- PE-154EN, PE-154BS  
EN 54-24 : 0359-CPD-0105 Type A, ISO 7240-24, PE-154BS: BS 5839-8
- PJ-154BS:  
EN 54-24 : 0359-CPD-0106 Type A, ISO 7240-24, BS 5839-8

### Specifications

	PE-154BS	PE-154EN	PJ-154BS
<b>Speaker</b>	2-way speaker 12 cm cone type, 2.5 cm tweeter	2-way speaker 12 cm cone type, 2.5 cm tweeter	2-way speaker 12 cm cone type, 2.5 cm tweeter
<b>Rated Power</b>	15 W (100 V), 7.5 W (70 V)	15 W (100 V), 7.5 W (70 V)	15 W (100 V), 7.5 W (70 V)
<b>Impedance</b>	100 V / 70 V	100 V / 70 V	100 V / 70 V
<b>Tapping 100 V</b>	15 W / 10 W / 5 W	15 W / 10 W / 5 W	15 W / 10 W / 5 W
<b>Tapping 70 V</b>	7.5 W / 5 W / 2.5 W	7.5 W / 5 W / 2.5 W	7.5 W / 5 W / 2.5 W
<b>Frequency Response</b>	70 Hz...20000 Hz	70 Hz...20000 Hz	70 Hz ... 20000 Hz
<b>SPL (1 W, 1 m)</b>	91 dB	91 dB	91 dB
<b>Connection</b>	Ceramic screw terminals, thermal fuse, 3 m fire resistant cable, 5-core	Ceramic screw terminals, thermal fuse, 5 m cable, 2-core	Ceramic screw terminals, thermal fuse, fire resistant cable, 5-core, external connection box
<b>Dimensions</b>	ø 186 x 251 mm	ø 186 x 251 mm	ø 186 x 251mm
<b>Weight</b>	2.1 kg	2.1 kg	2.1 kg
<b>Certificate</b>	EN 54-24: 0359-CPD-0105, Type A ISO 7240-24, BS 5839-8	EN 54-24: 0359-CPD-0105, Type A	EN 54-24: 0359-CPD-0106, Type A ISO 7240-24, BS 5839-8
<b>Protection</b>	IP 21c	IP 21c	IP 21c



## Horn Speakers

### Reflex Horn Speaker for Individual Drivers



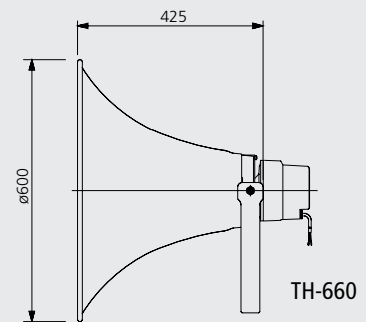
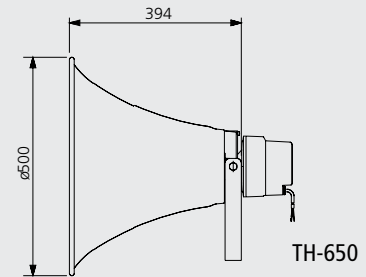
TH-660



TH-650



TU-631M



### Features

- Weatherproof construction for outdoor use
- Durable construction provides reliable operation over a long time
- Round shape ensures high speech clarity and sound quality and symmetrical sound dispersion - also suitable for music reproduction
- Shock-resistant
- Aluminium horn with durable powder coating
- Use with (optional) TU-Series Driver
- High or low impedance depending on driver
- Colour: off-white (corresponding RAL 9010) and grey (corresponding RAL 7042)

### Applications

Outdoor use e.g. for train stations or on ships

### Options

- TU-631 (30 W), TU-631M (30 W, 100 V), TU-651 (50 W), TU-651M (50 W, 100 V): Drivers
- UC-200A: Driver Unit Cover

### Specifications

	TH-650	TH-660
<b>Sound Pressure Level</b>	110 dB (1 W, 1 m) (When operated with a driver)	110 dB (1 W, 1 m) (When operated with a driver.)
<b>Frequency Response</b>	200 Hz ... 6,000 Hz (When operated with a driver)	200 Hz... 6,000 Hz (When operated with a driver)
<b>IP Code</b>	IP65 (When operated with a driver)	IP65 (When operated with a driver)
<b>Driver Coupling</b>	1 3/8 18 threads (inch screw)	1 3/8 18 threads (inch screw)
<b>Finish</b>	Off-white, horn flare and flange: aluminum, powder coating; reflector horn: ABS resin; bracket holder: aluminum, grey, powder coating; bracket: steel, grey, powder coating; screws and bolts: stainless steel	
<b>Dimensions</b>	ø 500 x 394 (D) mm	ø 600 x 425 (D) mm
<b>Weight</b>	2.9 kg	3.6 kg

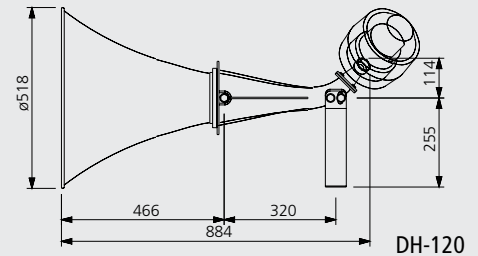
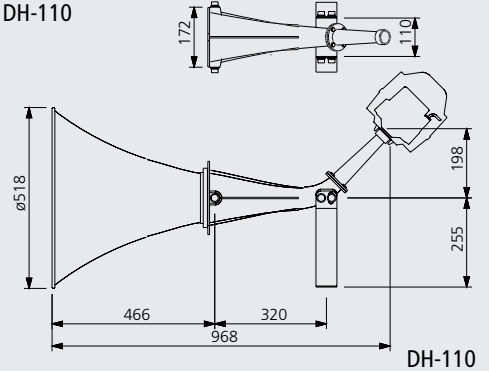


## Horn Speakers

### Straight Horn



DH-110



### Features

- Classic design horn
- Provides clear, highly articulate sound in high noise environments
- Ultra high sound pressure level
- Metal horn
- Colour ivory
- For use with drivers TU-631, TU-651 or TU-631M / TU-651M
- DH-110 for 1 driver  
DH-120 for 2 drivers
- Including bird net, bolts and gaskets
- Drivers are not included

### Applications

Long distance voice broadcasting at construction sites or at large gatherings of people

### Options

- TU-631, TU-651: Drivers 30 or 50 W for low impedance
- TU-631M, TU-651M: Drivers 30 or 50 W for high impedance

### Specifications

	DH-110	DH-120
Frequency Response	180 Hz ... 6000 Hz (with driver)	180 Hz ... 6000 Hz (with driver)
SPL (1 W, 1 m)	110 dB (with driver)	110 dB (with driver)
Dimensions	ø 518 x 968 mm (w/o driver)	ø 518 x 884 mm (w/o driver)
Weight	5.3 kg	5.3 kg
Required Optional Drivers	1x TU-651 or TU-651M/TU-631/ TU-631M (option)	2 x TU-651 or TU-651M/TU-631/ TU-631M (option)



## Horn Speakers



### Reflex Horn Speaker with Very High Sound Pressure Level



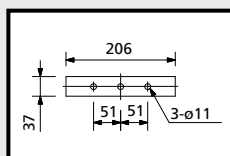
**TC-615/ TC-631/ TC-615M/ TC-631M**



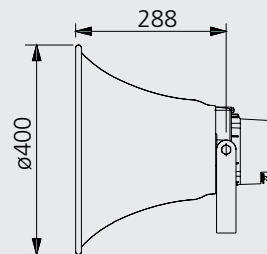
Reflex Horn



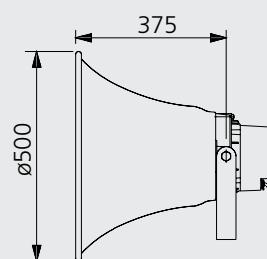
Durable Construction



Bracket



TC-615



TC-631

### Features

- Weatherproof for outdoor use
- High efficiency 15 W (TC-615) or 30 W (TC-631) horn speaker
- Very rugged and durable construction ensures long term reliable operation
- High sound pressure level
- Good quality sound reproduction
- Colour: off-white/dark grey
- Aluminium horn and ABS reflex horn and driver housing
- 8 Ohm (TC-615), 16 Ohm (TC-631) or 100 V / 70 V line (TC-615M, TC-631M)
- With 600 mm cable

### Applications

Paging (indoor / outdoor), BGM (outdoor)

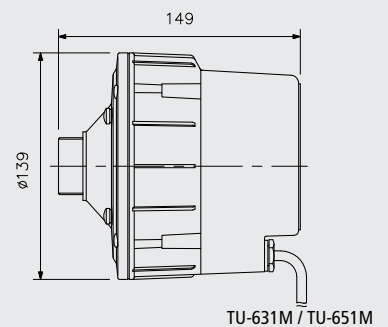
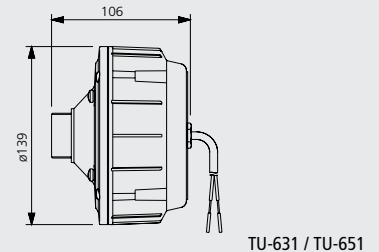
### Specifications

	TC-615	TC-631	TC-615M	TC-631M
Rated Input	15 W	30 W	15 W	30 W
Low Impedance	8 Ohm	16 Ohm	–	–
Line Voltage Tappings 100 V Tappings 70 V	–	–	100 V line or 70 V line 15 W / 10 W / 5 W / 3 W 15 W / 7.5 W / 5 W / 2.5 W / 1.5 W	100 V line or 70 V line 30 W / 15 W / 10 W / 5 W 30 W / 15 W / 7.5 W / 5 W / 2.5 W
SPL (1 W, 1 m)	108 dB	110 dB	108 dB	110 dB
Frequency Response	250 Hz... 7000 Hz	200 Hz ... 6000 Hz	250 Hz... 7000 Hz	200 Hz ... 6000 Hz
Operating Temperature	-20 °C ... + 55 °C	-20 °C ... + 55 °C	-20 °C ... + 55 °C	-20 °C...+ 55 °C
Finish	Horn flare: aluminum, off-white, powder coating; reflector horn: ABS resin, off-white; bracket holder: aluminum, grey, powder coating; bracket: steel, grey, powder coating; rear cover: ABS resin, grey, screw and bolts: stainless steel			
Speaker Cable	600 mm in length, 6 mm in diameter, polyvinyl chloride insulated cabtyre cable			
Dimensions (W x D)	ø 400 x 376 mm	ø 500 x 463 mm	ø 400 x 376 mm	ø 500 x 463 mm
Weight	3 kg	4.1 kg	3.2 kg	4.5 kg
Features	IP 65 weatherproof	IP 65 weatherproof	IP 65 weatherproof	IP 65 weatherproof



## Horn Speakers

### Driver Unit for Horn Speakers



### Features

- 4 different types: TU-651 (50 W, low impedance) TU-651M (50 W, high impedance) TU-631 (30 W, low impedance), TU-631M (30 W, high impedance)
- High efficiency driver units for horns
- Weatherproof
- Excellent frequency response
- Available as low impedance 16 Ohm or 100 V / 70 V line („M“-models)
- Rated input of 50 W (TU-651/651M) or 30 W (TU-631/TU-631M)

### Options

- TH-650: Speaker, TH-660 Speaker
- DH-110: Speaker, DH-120 Speaker

### Specifications

	TU-651	TU-651M	TU-631	TU-631M
Rated Input	50 W	50 W	30 W	30 W
Continuous Program	75 W	75 W	45 W	45 W
Low Impedance	16 Ohm	–	16 Ohm	–
Tappings 100 V	–	50 W / 30 W / 15 W	–	30 W / 15 W / 10 W / 5 W
Tappings 70 V	–	50 W / 25 W / 15 W / 7.5 W	–	30 W / 15 W / 7.5 W / 5 W / 2.5 W
Frequency Response	150 Hz ... 6000 Hz	150 Hz ... 6000 Hz	150 Hz ... 6000 Hz	150 Hz ... 6000 Hz
SPL (1 W, 1 m)	110 dB	110 dB	110 dB	110 dB
SPL at Rated Input (1 m)	127 dB	127 dB	125 dB	125 dB
Coupling (inch)	1-3/8"	1-3/8"	1-3/8"	1-3/8"
Dimensions	ø 139 x 106 mm	ø 139 x 148.5 mm	ø 139 x 106 mm	ø 139 x 148.5 mm
Weight	2.0 kg	2.7 kg	1.4 kg	1.9 kg

## Horn Speakers



### Certified Reflex Horn Speaker (New!)



Certificate (detail)

**SC-615BS**

### Features

- Weatherproof for outdoor use IP-65
- Legalised for Voice Alarm Systems
- Very rugged and durable construction ensures long term reliable operation
- Oval horn for good intelligibility
- Wide frequency response
- Aluminium horn
- ABS driver housing
- Colour: white (RAL 9010 or equivalent)
- Extreme high SPL 109 dB (1 W / 1 m)
- 100 V or 70 V system
- Additional PG gland available
- Ceramic screw terminals
- Thermal fuse
- Stainless steel mounting brackets
- Shock resistant horn
- Easy impedance selection

### Applications

Voice Alarm Systems according to EN 54. Outdoor areas, factory premises, ships, park houses, stations, stadiums, open air pools, etc.

### Options

- YS-151S Mounting Bracket

### Certificate

- EN 54-24 : 0359-CPD-0109 Type B, ISO 7240-24, according BS 5839-8

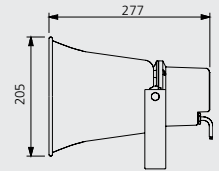
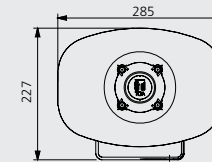
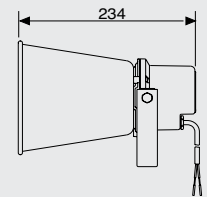
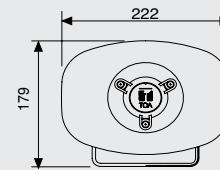
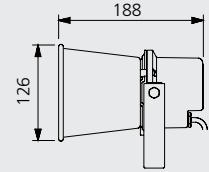
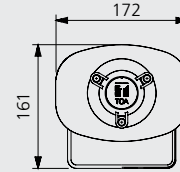
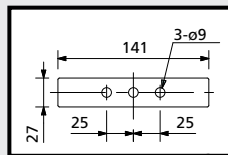
### Specifications

	SC-615BS
Rated Power	15 W (100 V / 70 V)
Tapping 100 V	15 W / 10 W / 5 W / 3 W
Tapping 70 V	15 W / 7,5 W / 5 W / 2,5 W / 1,5 W
SPL (1 W, 1 m)	109 dB
Frequency Response	315 Hz... 12500 Hz
Operating Temperature	-20 °C ... + 55 °C
Connection	Ceramic screw terminals, thermal fuse
Finish	Horn: Aluminium white coated, driver housing ABS Resin, stainless steel bracket
Dimensions (W x H x D)	172 x 200 x 229 mm
Weight	1,5 kg
Certificate	EN 54-24 : 0359-CPD-0109 Type B, ISO 7240-24 according BS 5839-8
Protection	IP-65c



## Horn Speakers

### Reflex Horn Speaker with Wide Frequency Response (low impedance)



### Features

- 3 different wattages available: 10 W (SC-610), 15 W (SC-615) or 30 W (SC-630)
- Weatherproof
- IP65, for outdoor use
- Very rugged speaker with durable construction ensures long term reliable operation
- High quality sound
- High efficiency horn speaker
- Wide frequency response
- Easy impedance selection through switch
- Aluminium horn and ABS driver housing
- Colour: off-white (RAL 9010 equivalent)
- High SPL 110 - 113 dB (1 W, 1 m)
- Low impedance 8 Ohm
- Stainless steel bracket
- Shock resistant oval horn

### Applications

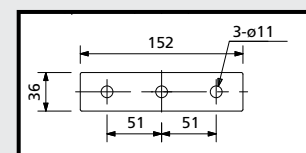
Specially for outdoor use e.g. in train stations, parkings

### Options

- YS-151S: Swivel Bracket

	SC-610	SC-615	SC-630
<b>Rated Input</b>	10 W (mobile mount use: 5 W)	15 W (mobile mount use: 10 W)	30 W (mobile mount use: 15 W)
<b>Rated Impedance</b>	8 Ohm	8 Ohm	8 Ohm
<b>Frequency Response</b>	315 Hz... 12500 Hz	280 Hz ... 12500 Hz	250 Hz... 10000 Hz
<b>SPL (1 W, 1 m)</b>	110 dB (at 500 to 2500 Hz peak level)	112 dB (at 500 to 2500 Hz peak level)	113 dB (at 500 to 2500 Hz peak level)
<b>Sensitivity when used as Microphone</b>	-24 dB at 1 kHz	-22 dB at 1 kHz	-20 dB at 1 kHz
<b>Operating Temperature</b>	-20°C ... + 55°C*	-20°C ... + 55°C*	-20°C ... + 55°C*
<b>Speaker Cable</b>	600 mm in length, 6 mm in diameter, polyvinyl chloride insulated cable	600 mm in length, 6 mm in diameter, polyvinyl chloride insulated cable	600 mm in length, 6 mm in diameter, polyvinyl chloride insulated cable
<b>Dimensions</b>	172 x 161 x 188 mm	222 x 179 x 234 mm	285 x 227 x 277 mm
<b>Weight</b>	1 kg	1.1 kg	1.7 kg
<b>Features</b>	IP 65 weatherproof	IP 65 weatherproof	IP 65 weatherproof

\* must be free from dew condensation



## Horn Speakers



### Reflex Horn Speaker with Wide Frequency Response (high impedance)



**SC-610M / SC-615M / SC-630M**

#### Features

- 3 different versions available: 10 W (SC-610M), 15 W (SC-615M) or 30 W (SC-630M)
- High impedance 100 V line
- All other features are identical to the SC-610 / SC-615 / SC-630 series

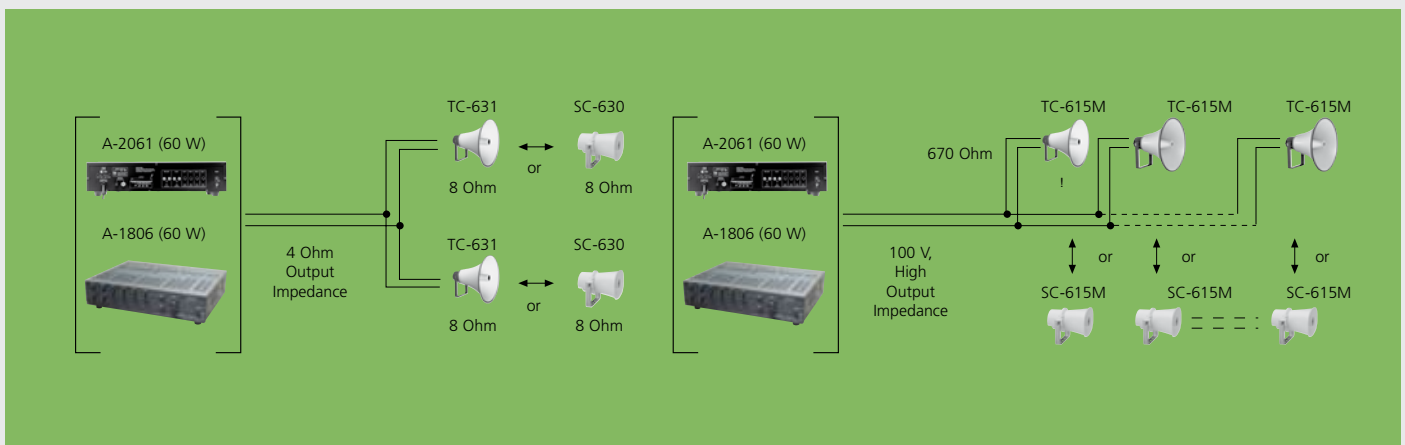
#### Options

- YS-151S: Swivel Bracket

### Specifications

	SC-610M	SC-615M	SC-630M
<b>Rated Input</b>	10 W	15 W	30 W
<b>Rated Impedance 100 V</b>	10 W / 5 W / 3 W / 1 W	15 W / 10 W / 5 W / 3 W	30 W / 15 W / 10 W / 5 W
<b>Rated Impedance 70 V</b>	10 W / 5 W / 2.5 W / 1.5 W / 0.5 W	15 W / 7.5 W / 5 W / 2.5 W / 1.5 W	30 W / 15 W / 7.5 W / 5 W / 2.5 W
<b>SPL (1 W, 1 m)</b>	110 dB (at 500 to 2500 Hz peak level)	112 dB (500 to 2500 Hz peak level)	113 dB (at 500 to 2500 Hz peak level)
<b>Frequency Response</b>	315 Hz... 12,500 Hz	280 Hz... 12,500 Hz	250 Hz... 10,000 Hz
<b>Sensitivity when used as Microphone</b>	-24 dB at 1 kHz	-22 dB at 1 kHz	-20 dB at 1 kHz
<b>Operating Temperature</b>	-20°C ... +55°C (must be free from dew condensation)	-20°C ... +55°C (must be free from dew condensation)	-20°C ... +55°C (must be free from dew condensation)
<b>Speaker cable</b>	600 mm in length, 6 mm in diameter, Polyvinyl chloride insulated cable	600 mm in length, 6 mm in diameter, Polyvinyl chloride insulated cable	600 mm in length, 6 mm in diameter, Polyvinyl chloride insulated cable
<b>Dimensions (W x H x D)</b>	172 x 161 x 188 mm	222 x 179 x 234 mm	285 x 227 x 277 mm
<b>Weight</b>	1.2 kg	1.3 kg	2 kg
<b>Features</b>	IP65 weatherproof	IP65 weatherproof	IP65 weatherproof

### Typical Connection of Low Impedance and High Impedance Speakers



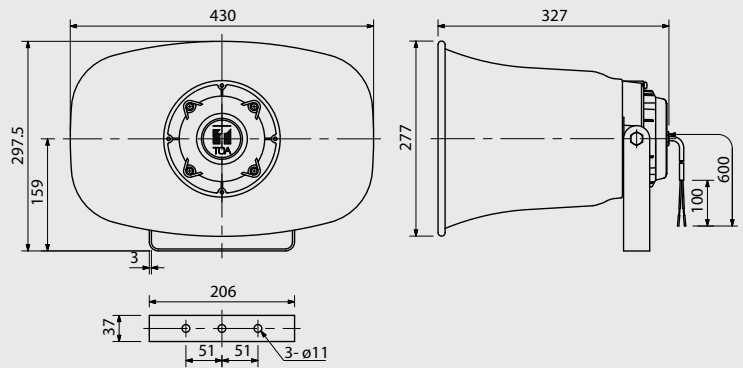


## Horn Speakers

### Reflex Horn Speaker



SC-651



### Features

- 50 W rated input
- Anti-shock construction
- High sound pressure level
- Fully weatherproof IP65
- Colour: ivory, dark brown painted steel bracket
- Aluminium and ABS resin construction with special powder coating
- Including 600 mm cable

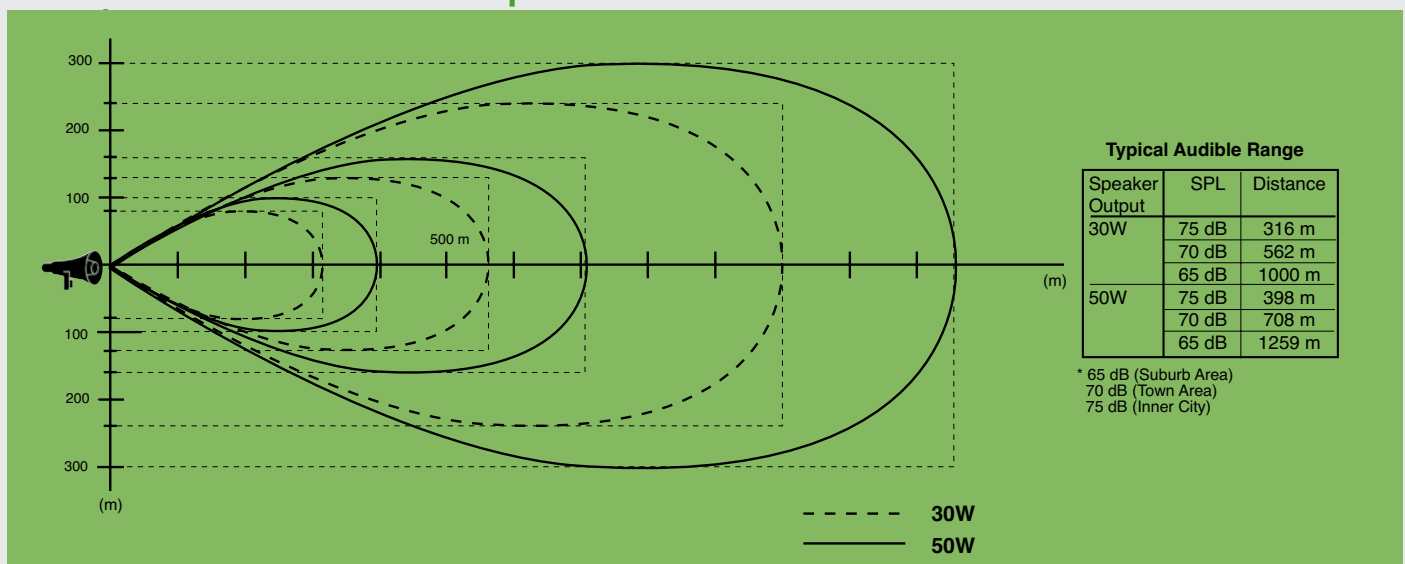
### Applications

Outdoor use in manufacturing plants, vehicles.

### Specifications

	SC-651
Rated Input	50 W (mobile mount use: 30W)
Low Impedance	16 Ohm
Frequency Response	250 Hz ... 6000 Hz
SPL (1 W, 1 m)	109 dB
Operating Temperature	-20°C ... + 55°C (must be free from dew condensation)
Speaker Cable	600 mm in length, 6 mm in diameter, polyvinyl chloride insulated cable
Dimensions (W x H x D)	430 x 297.5 x 327 mm
Weight	3.4 kg
Protection	IP 65

### Distribution Pattern of Horn Speakers



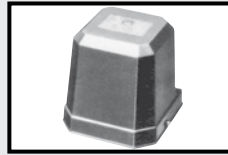
## Horn Speakers



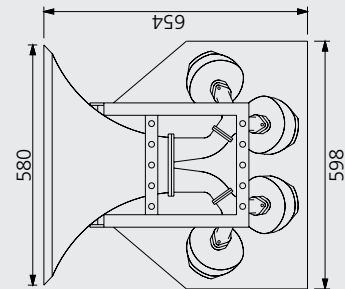
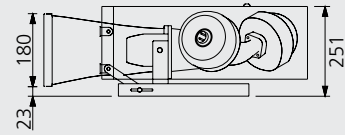
### Ultra High Power Speaker



**SC-240**



TM-60T



### Features

- Uniform dispersion for intelligible sound
- Extremely high sound pressure level
- Ideal for signal and voice transmission over long distances or in noisy environments
- Wide directivity
- 360 W continuous program
- Horn vertically adjustable
- 131 dB SPL at rated input
- Aluminium die casting
- Directional speaker
- Outdoor use
- Bracket, driver units included
- Colour: Ivory
- Non-RoHS product

### Applications

For public address announcements e.g. on large industrial areas, beaches (life guard)

### Options

- TM-60T: 60 W Transformer for 100 V lines (secondary impedances: 4/8/16 Ohm), weight 1.3 kg, non-RoHS product

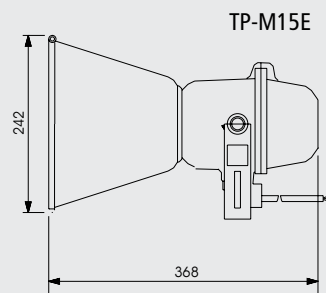
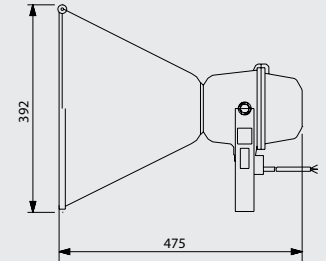
### Specifications

	SC-240
Driver Type	included, 4 drivers
Rated Input	240 W
Continuous Program	360 W
Rated Impedance	8 Ohm x 4
Frequency Response	250 Hz ... 5000 Hz
SPL (1 W, 1 m)	107 dB
SPL at Rated Input (1 m)	131 dB
Dimensions (W x H x D)	598 x 251 x 654 mm
Weight	28 kg



## Horn Speakers

### Explosion-Proof Speaker



### Features

#### TP-M15E:

- Explosion-proof according to eG4 Standard (JIS-C0903)
- Aluminium horn
- Ivory and dark grey finish
- Excellent frequency response
- High sound pressure level
- Mounting brackets are supplied for easy installation

#### TP-M15D:

- Explosion-proof according to eG4 Standard (JIS-C0903)
- 20 W
- Power aluminium horn
- Colour: ivory and dark grey
- Excellent frequency response
- High sound pressure level
- Mounting brackets are supplied for easy installation
- Non-RoHS product

### Applications

For hazardous and explosion sensitive areas

### Specifications

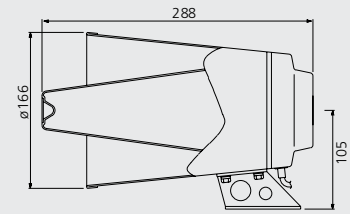
	TP-M15E	TP-M15D
Rated Input	15 W	15 W
Continuous Program	22.5 W	22.5 W
Tappings 100 V	15 W / 10 W / 5 W	15 W / 10 W / 5 W
Frequency Response	300 Hz ... 5500 kHz	350 Hz ... 4500 Hz
SPL (1 W, 1 m)	104 dB	104 dB
SPL at Rated Input (1 m)	116 dB	116 dB
Dimensions	ø 392 x 475 mm	ø 242 x 368 mm
Weight	4.9 kg	4.3 kg
Protection	Explosion-proof: eG4 / JIS-C0903	Explosion-proof: eG4 / JIS-C0903



## Horn Speakers



### Reflex Horn for Mobile Applications



TC-35P

TC-35P

### Features

- Trumpet type reflex horn speaker
- Anti-shock construction
- Small horn with low wind resistance, ideal for mobile applications
- 35 W power
- Weatherproof
- Colour: horn white, silver bracket
- Aluminium construction
- 8 Ohm
- Non-RoHS product

### Applications

For mounting on vehicles

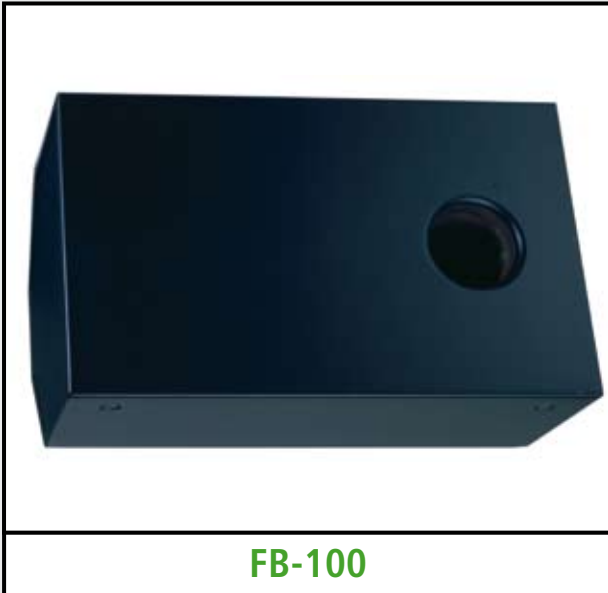
### Specifications

	TC-35P
Rated Input	35 W
Continuous Program	53 W
Low Impedance	8 Ohm
Frequency Response	250 Hz ... 8000 Hz
SPL (1 W, 1 m)	104 dB
SPL at Rated Input (1 m)	120 dB
Dimensions (W x H x D)	∅ 166 x 288 mm
Weight	2 kg
Protection	Weatherproof, anti-shock

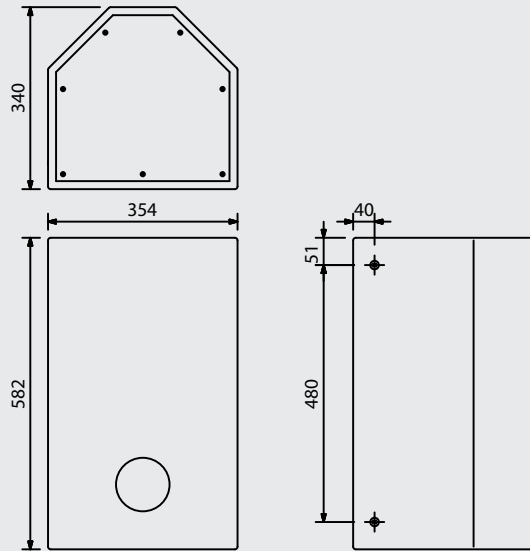


## Subwoofer

### Design Subwoofer



**FB-100**



### Features

- Compact subwoofer
- For mounting on floor, wall, corner or ceiling
- 450 W high-power subwoofer system
- 6 rigging points for suspended mounting
- MDF enclosure, paintable
- Optional matching transformer MT-S0601 for high impedance operation
- 25 cm woofer with large  $\varnothing$  120 mm ferrite magnet and extended voice coil for distortion free bass response
- Acoustic band pass filter for smooth low frequency response and high efficiency
- Detachable Phoenix screw terminal blocks ready for loop-through parallel connection of multiple speakers

### Applications

Restaurants, shops, conference rooms, AV-presentation rooms

### Options

- MT-S0601: (rated 60 W) 100 V-Transformer

### Specifications

	<b>FB-100</b>
Enclosure	Acoustic Super Woofer (ASW)
Rated Input	150 W (40 ... 200 Hz)
Continuous Program	450 W (40 ... 200 Hz)
Impedance	8 Ohm
SPL (1W, 1m)	94 dB (installation in 1/2 free sound field)
Frequency Response	35 Hz... 160 Hz (-10 dB)
Speaker Component	25 cm cone speaker
Input Terminal	Detachable screw terminal, (+)/(-) 2 each (for bridging connection)
Usable cable	Solid cable, stranded cable: 0.2 ... 2.5 mm <sup>2</sup> (AWG No. 24 ... 14)
Finish	MDF, black, paint
Dimensions (W x H x D)	354 x 582 x 340 mm
Weight	16 kg

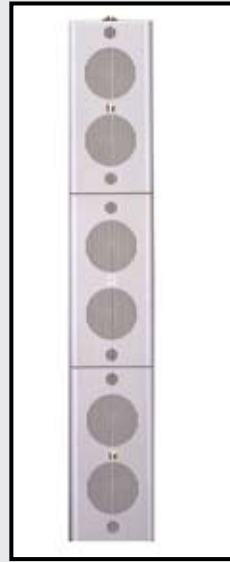
## Column Speakers



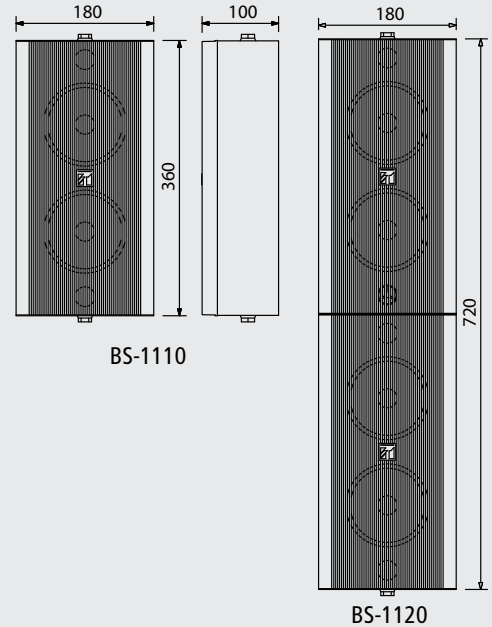
### Speaker for Universal Use



**BS-1110W / BS-1120W**



Vertical Array



### Features

- 10 W (BS-1110W) or full range 20 W (BS-1120W) column speaker
- Wooden enclosure
- Indoor use
- Robust construction and impact resistance
- Wide coverage dispersion
- Colour: white (RAL 9010)
- Mounting options: Wall-mount, tilt brackets or on a stand
- BS-1110 W with 2 x 12 cm cone speaker and BS-1120 W with 4 x 12 cm cone speaker and dome tweeter
- Wide horizontal and narrow vertical dispersion angle
- Low impedance (4 or 8 Ohm) or high impedance (100 V).
- Vertical array possible

### Applications

Religious facilities, school auditoriums  
BS-1110 for indoor use especially in sports facilities due to robust construction and impact resistance

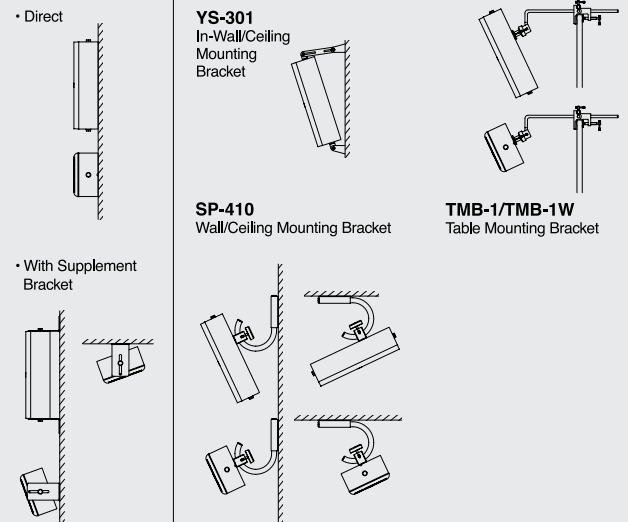
### Options

- YS-301: Mounting Bracket (Non-RoHS product)
- SP-410: Wall/Ceiling Mounting Bracket
- TMB-1: Table Mounting Bracket (Non-RoHS product)
- ST-16A: Speaker Stand

### Specifications

	BS-1110W	BS-1120W
Dynamic Cone Driver	2 x 12 cm	4 x 12 cm
Rated Input	10 W	20 W
Continuous Program	15 W	30 W
Impedance	4 Ohm, 100 V, 70 V Tappings 100V / 70 V: 10 W / 5 W	8 Ohm, 100 V, 70 V Tappings 100V / 70 V: 20 W / 10 W
Frequency Response	150 Hz ... 14000 Hz	150 Hz ... 20000 Hz
SPL (1 W, 1 m)	92 dB	95 dB
SPL at Rated Input (1 m)	102 dB	105 dB
Temperature	-10 °C ... +55 °C	-10 °C ... +55 °C
Dimensions (W x H x D)	180 x 360 x 100 mm	180 x 720 x 100 mm
Weight	2.9 kg	5.1 kg

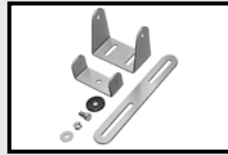
### BS-1110 Mounting Options





## Column Speakers

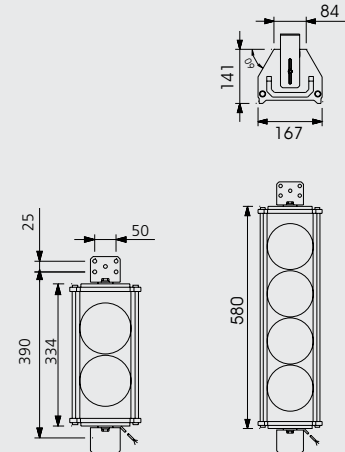
### Splashproof Column Speaker



YS-301



YS-302



### Features

- Splashproof column speakers suitable for outdoor use (not weatherproof)
- Speakers coming complete with wall mounting brackets or can be fitted to a speaker stand
- Constructed from extruded aluminium, in silver grey finish and with a black punched metal net grille
- For 100 V systems

### Options

- YS-301: Outdoor Mounting Brackets with small adjustment of the vertical angle (Non-RoHS product)
- YS-302: Mounting Brackets (Non-RoHS product)

### Applications

Halls, churches and other religious facilities, auditoriums

### Specifications

	TZ-105	TZ-205
Dynamic Cone Driver	2 x 12 cm	4 x 12 cm
Rated Input	10 W	20 W
Continuous Program	15 W	30 W
Rated Impedance	100 V Tappings 10 W / 5 W	100 V Tappings 20 W / 10 W
Frequency Response	150 Hz ... 10000 Hz	150 Hz ... 10000 Hz
SPL (1 W, 1 m)	90 dB	93 dB
SPL at Rated Input (1 m)	100 dB	106 dB
Dimensions (W x H x D)	167 x 334 x 141 mm	167 x 580 x 141 mm
Weight	3.4 kg / 4 kg incl. brackets	5.1 kg / 5.7 kg incl. brackets

## Accessories



### Flush Mount Volume Controls / Attenuators



**AT-12UP / AT-50UP**



**AT-12UPR / AT-50UPR**



**AT-063P/AT-303P/AT-603P**

#### Features

- Volume control for 100 V line
- Flush mounting: DIN 49037
- Continuous attenuation in 12 steps
- Suitable with GIRA switch accessories
- AT-12UP: 12 W, mounting depth: 26 mm
- AT-50UP: 50 W, mounting depth: 40 mm

#### Options

- Gira Switch Accessories

#### Features

- Volume control for 100 V Line
- Flush mounting: DIN 49037
- Continuous attenuation in 12 steps
- Suitable with GIRA switch accessories
- AT-12UPR: 12W, with priority relay, mounting depth: 26 mm
- AT-50UPR: 50 W, with priority relay, mounting depth: 40 mm

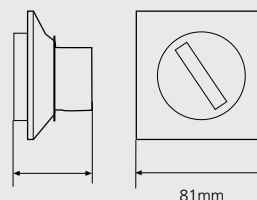
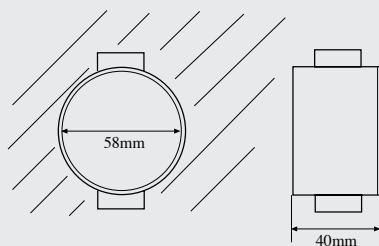
#### Options

- Gira Switch Accessories

#### Features

- Attenuators with 5 step attenuation: „OFF“ -18 dB, -12 dB, -6 dB, 0 dB
- Push-in connector allows quick terminal-cable connection
- 2 or more attenuators can be bridged
- Useable cables are IV (indoor vinyl) or HIT (heat resistant vinyl)  $\varnothing$  0.8 - 1.2 mm or standard cable with cross-sectional area of 0.75-1.25 mm<sup>2</sup>
- For emergency call transmission (3-wire)
- Knob, panel, plate: ABS resin, milk white, case: ABS resin, black
- AT-063P: 6 W
- AT-303P: 30 W
- AT-603P: 60 W

### Flush Mounting





## Accessories

### Program Selector and Preamplifier for PA Speakers



**PGW-6 / PGW-6R**



**UP-MV-206**

#### Features

- Program selector
- Flush mounting DIN 49037
- One of 6 programs selectable
- PGW-6R with priority relay
- Mounting depth: 30 mm

#### Options

- Gira Switch Accessories

#### Features

- Flush mount amplifier (DIN 49037)
- Pre-amplifier with microphone (XLR) and AUX (RCA pin) input
- Phantom voltage for microphone on PCB selectable
- Volume control for microphone and AUX separately
- For flush mounting 3 flush mount boxes are required according to DIN 49037
- Finish: off-white

### Specifications

	UP-MV206
Output (bal.)	6 dBu, 600 Ohm, screw terminal
Microphone Input (bal.)	-64 dBu ... -36 dBu (XLR)
Phantom to Microphone	24 V
Aux Input (unbal.)	2x -20 dBu ... +6 dBu, pin jack, cinch
Frequency Response	Microphone: 130 Hz ... 25000 Hz, Aux: 40 Hz ... 25000 Hz
Operation Voltage	17,5 V ... 28,5 V, DC (30 mA)
Standard	UP55 DIN 49037
Dimensions (W x H x D)	224 x 81 x 33 mm

## Personal PA System



### Belt Megaphone with Headset (New!)



**ER-1000 (10 W)**



Volume Control



Microphone



Speaker

### Features

- Ultra-light weight 480 g
- Easy to wear and easy to operate
- Elastic waist belt extendable to up to 120 cm. A 30 cm extension belt and a pouch for audio player included
- Headset-type lightweight and comfortable-to-wear microphone
- Large rotating volume control and independent power on/off switch
- Audio player input
- AUX input terminal allows public address announcements to be made while BGM is being played
- Low power consumption for long operation time
- Six alkaline AA dry batteries provide up to 8 hours of use
- Battery spacers for operation with four AA batteries, to save batteries

### Applications

Museum, Guided Tour

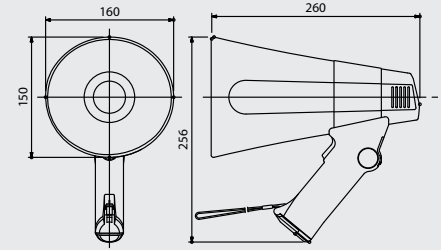
### Specifications

	ER-1000
<b>Power Requirement</b>	10 W (6 batteries) / 4 W (4 batteries)
<b>Battery</b>	6 x 1.5 V or 4 x 1.5 V (LR6 / AA)
<b>Battery Life</b>	Approx. 8 hours / AUX stereo input operation: Approx. 4.5 hours
<b>Audible Range</b>	80 m (with 6 batteries)
<b>Frequency Response</b>	300 Hz – 14 kHz (deviation: -26 dB)
<b>Headset Microphone</b>	Headset type, electret condenser microphone
<b>Finish</b>	Front case: ABS resin, light grayish purple / Rear case: ABS resin, dark grayish purple / Grille: Surface-treated steel plate, dark grayish purple, paint. Waist belt: Elastic rubber, black
<b>Dimensions</b>	133 (W) × 96 (H) × 222 (D) mm (belt excluded)
<b>Weight</b>	480 g main PA unit (belt included, batteries excluded); / Headset microphone: 50g / Extension belt: 40g



## Compact Handmegaphones

### 10W Handheld Megaphone



### Features

- Compact megaphone
- Cost-effective model
- Reflex trumpet horn
- Unidirectional dynamic microphone with press-to-talk switch
- Operates on 8 x R6 type batteries (option)
- ER-520W with built-in whistle signal
- ER-520S red fireman's megaphone with built-in siren
- Colour: ER-520, ER-520W: white and grey  
ER-520S: red, carry strap: black
- Finish: ABS-resin

### Applications

For security service, police, fireworkers and for each kind of demonstration

### Specifications

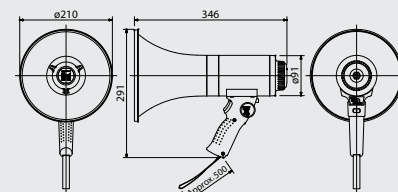
	ER-520	ER-520W	ER-520S
Output Power max.	10 W	10 W	10 W
Rated Output	6 W	6 W	6 W
Signals	-	Whistle	Siren
Audible Range approx.	Voice 250 m	Voice 250 m, Signal 315 m	Voice 250 m, Signal 315 m
Batteries: Qty / Type	8 x 1,5 V (AA/R6P)	8 x 1,5 V (AA/R6P)	8 x 1,5 V (AA/R6P)
Battery Life	Approx. 10 hours (voice)	Approx. 10 hours (voice)	Approx. 10 hours (voice)
Battery Life on Signal	-	30 min	40 min
Dimensions (W x H x D)	160 x 256 x 260 mm	160 x 256 x 260 mm	160 x 256 x 260 mm
Weight (without batteries)	620 g	650 g	650 g



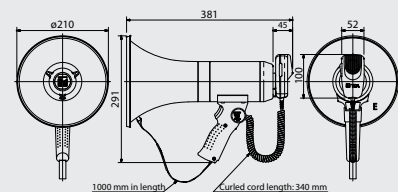
## Handmegaphones



### Megaphones with High-Range Audibility



ER-1215



ER-3215

### Features

- Compact megaphone with instant-on amplifier
- Good sound quality due to wide frequency response
- High audible range
- Neodym magnet for high power
- Polyimide diaphragm
- Low power consumption
- Rugged enclosure
- Howl-free unidirectional dynamic microphone with press-to-talk switch
- Antibacterial treatment for sanitary use
- 6 x R14 (C) type batteries
- Improved endurance
- Finish: ABS-resin H
- ER-1215: Horn light grey, other: grey
- ER-1215S with built-in siren signal  
Colour: red
- ER-3215 with additional handheld microphone. Colour: Horn light grey, other: grey

### Applications

For security service, police, fireworkers, trade union and for each kind of demonstration

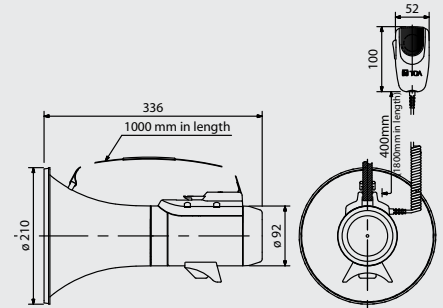
### Specifications

	ER-1215	ER-1215S	ER-3215
Output Power max.	23 W	23 W	23 W
Rated Output	15 W	15 W	15 W
Signals	–	Siren	–
Audible Range approx.	Voice 315 m	Voice 315 m, signal 500 m	Voice 400 m
Batteries: Qty / Type	6 x 1,5 V (R 14)	6 x 1,5 V (R 14)	6 x 1,5 V (R 14)
Battery Life	voice 14 hours	voice 14 hours	voice 9 hours
On Signal	–	20 minutes	–
Dimensions (W x H x D)	210 x 291 x 346 mm	210 x 291 x 346 mm	210 x 291 x 381 mm
Weight (without batteries)	1.1 kg	1.2 kg	1.3 kg (incl. microphone)



## Shoulder Type Megaphones

### Megaphones with High-Range Audibility



### Features

- Compact megaphone with shoulder strap
- Anti-bacterial treatment
- Handheld microphone
- High audible range
- ER-2215W with whistle signal
- Finish: ABS-resin
- Colour: grey / light grey
- Instant-on amplifier
- Howl-free unidirectional dynamic microphone with press-to-talk switch
- 6 x R14 type batteries
- Improved endurance

### Options

- ST-16A: Stand

### Applications

For security service, police and for each kind of demonstration

### Specifications

	ER-2215	ER-2215W
Output Power max.	23 W	23 W
Rated Output	15 W	15 W
Signals	–	Whistle
Audible Range	Approx. 400 m	Approx. 400 m (500 m whistle)
Batteries: Qty / Type	6 x 1.5 V (R 14)	6 x 1.5 V (R 14)
Battery Life	Voice approx. 9 hours	Voice approx. 9 hours
Battery Life On Signal	–	Approx. 20 min
Dimensions (W x H x D)	ø 210 x 336 mm	ø 210 x 336 mm
Weight (without batteries)	1.2 kg (with microphone)	1.3 kg (with microphone)

## Shoulder Type Megaphones



### Megaphone with Extreme High Audible Range



ST-16A



Control Panel

### Features

- High power shoulder megaphone for extreme long distance messages
- Whistle signal
- Anti-bacterial treatment
- Microphone lock switch
- Colour: light grey / grey
- Finish of horn: aluminium, case top: die-cast aluminium, others: ABS-resin
- Splash-proof cover included
- Auxiliary-input with volume control for tape or radio and earphone output
- 10 x R20P type batteries or external 12 V power supply
- Power plug cord (for 12 V battery) included
- Mountable on stand

### Options

- ST-16A: Stand
- DM-1100, DM-1300: Microphones

### Specifications

	ER-2230W
Output Power max.	45 W
Rated Output	30 W
Signals	Whistle
Audible Range approx.	800 m, whistle 1000 m
Batteries: Qty / Type	10 x 1,5 V (R 20P)
External DC	10 V ... 13.8 V
Battery Life	Voice: 17 hours
Battery Life On Signal	1.5 hours
AUX Input	-10 dBv, 30 kOhm
Dimensions	ø 351 x 512 mm
Weight (without batteries)	3.75 kg (incl. microphone)

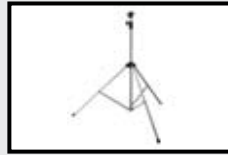


## Shoulder Type Megaphones

### Megaphone for Wireless Microphone Use



**ER-2930W**



ST-16A



Control Panel



WTU-4800



Standard Microphone



WM-5220



Fold-down Flex Antenna

### Features

- High power megaphone with shoulder strap
- For extreme long distance messages
- Antibacterial treatment
- 10 x D-type battery or external 12 V power supply (with optional YR-69B connection cable)
- Colour grey / light grey
- Finish of horn: aluminium, case top: die-cast aluminium, others: ABS-resin
- Splash-proof cover included
- Whistle signal
- Equipped with a receptacle for optional wireless microphone module
- For TOA tuner modules WTU-4800 and WTU-3800
- Built-in antenna
- Auxiliary-input with volume control for tape or radio and earphone output
- 10 x R20P type batteries or external 12 V power supply
- External power input (12 V battery)
- Mountable on stand

### Options

- ST-16A: Stand
- WTU-4800: UHF Tuner Module
- UHF Microphones e.g. WM-5220
- WTU-3800: VHF Tuner Module
- VHF Microphones e.g. WM-3220

### Specifications

	ER-2930W
Output Power max.	45 W
Rated Output	30 W
Signals	Whistle
Audible Range approx.	800 m, whistle approx. 1000 m
Batteries Qty / Type	10 x 1,5 V (R 20P)
External DC	10 V – 13,8 V
Battery Life	17 hours
Battery Life On Signal	1,5 hours
AUX Input	-10 dBv, 30 kOhm
Dimensions (Diameter x L)	ø 351 x 512 mm
Weight (without batteries)	3,95 kg (incl. microphone)
Features	Wireless microphone application

## Measuring Instrument



### Impedance Meter



**ZM-104A**



Big display



Function keys



Test leads

### Features

- For easy and exact measurement of speaker impedances including long cable length
- Battery driven for mobile use (4 Mignon (AA) batteries)
- One set of batteries for 30 - 60 hours operation time (depending on the measurement range)
- Graphic conversion table impedance - power
- Oscillator generates 1 kHz frequency
- Measurement range of 5 to 100 kOhm.
- The ZM-104A comes with a case and one set of test leads

### Specifications

	ZM-104A
Scale	Ohm
Measurement Range	x1 : 5 - 1,000 Ohm x10 : 50 - 10,000 Ohm x100 : 500 - 100,000 Ohm
Accuracy	±10 %
Oscillation Frequency	1000 Hz ±10 %
Power Requirement	4 x R6 batteries (6 V)
Dimensions (without case)	110 x 58 x 180 mm 120 x 220 x 63 mm (incl. case)
Weight	700 g (incl. case)



## EVERYTHING UNDER CONTROL

Due to the fact that we are living in a world that is getting more and more unsafe, TOA provides combined solutions of audio & video technology: Video surveillance systems that can see just as good throughout the night as they can during daytime and alarm systems that start at the push of a button.

Or even evacuation systems that lead people safely and without stress out of buildings in a short period. Through our long years of experience TOA does stand for reliability. Talking about security, one thing is for sure the technology must be secure.



## EN 54 for Voice Evacuation Systems

### More Security with EN 54 certified products



### TOA offers the first fully EN 54 certified voice alarm system

Nowadays, security and safety is a very precious item that is constantly challenged by external influences.

Wherever humans are gathering it is essential to have the right messages in the right spot. Even more so, there are several things that distract the positive atmosphere in this environment – fire danger, bomb threats and amok shootings.

These incidences are unforeseen and therefore precaution needs to be taken in order to have appropriate measures in place and provide clear instructions through voice messages.

TOA's history and experience in providing systems for communication and safety makes it self understanding to meet and even exceed high demands of life protection and safety standards. As a result TOA products are certified according to the EN 54 standards.

EN 54 stipulates the product and testing requirements for voice alarm components in fire detection and alarm systems. The norm is put in place in order to improve the communication of installed systems with the outside world – users, installers, firemen and, most importantly, the public. Also, EN 54 states the availability of system functionality in most adverse operating environments.

TOA is the first manufacturer of voice evacuation systems that offers a fully certified system consisting of system manager, amplifiers, speakers and emergency power supply. We thrive for offering not only the best, but also the most secure solution as the right message at the right time is crucial for increased personal safety.

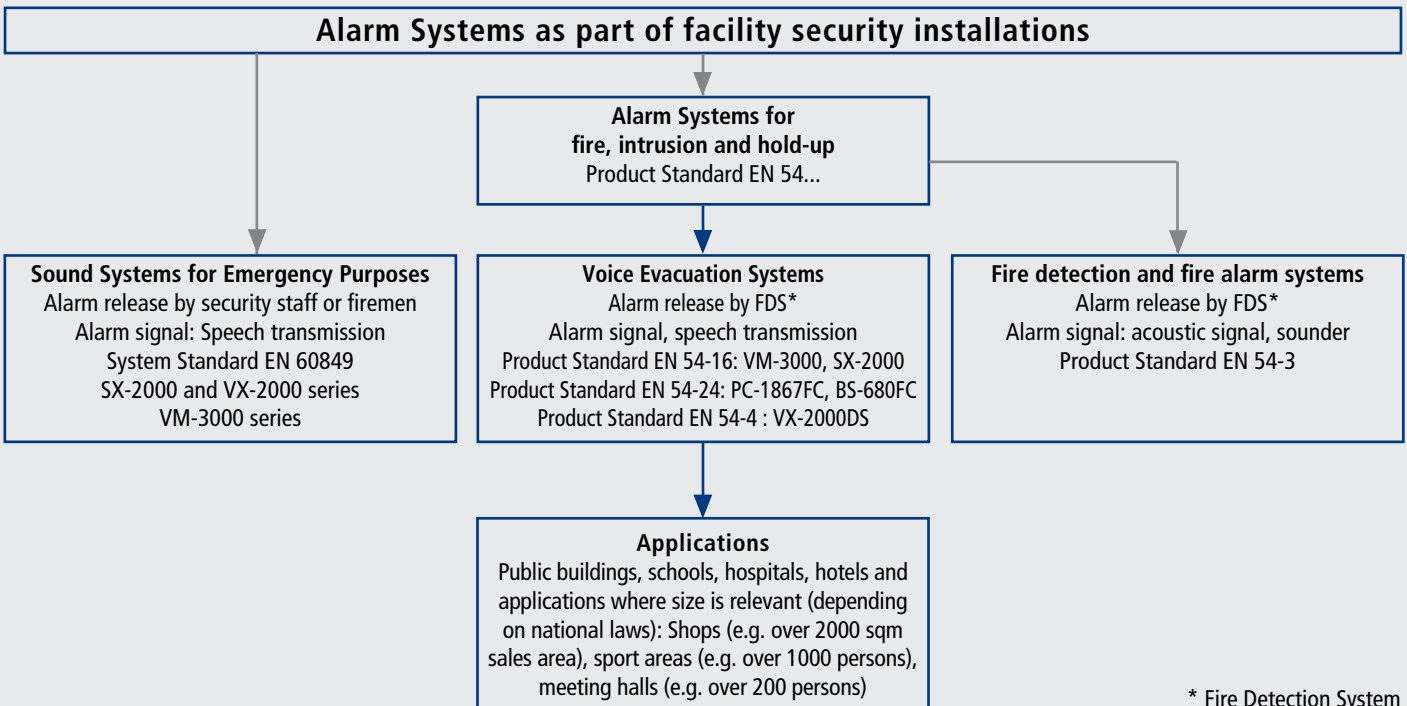
All EN 54 standards will become effective across the member states of the European Union in March 2011. TOA was the first manufacturer to

meet all three parts applicable to voice evacuation components already in March 2010:

- EN 54-4: Power Supply Equipment
- EN 54-16: Voice Alarm and Indicating Equipment
- EN 54-24: System Loudspeakers

Not living in a country, where EN 54 is applicable? The standards ISO 7240-4, ISO 7240-16 and ISO 7240-24 are the international equivalents. Our EN 54 certified systems are compliant with these standards as well.

Furthermore TOA is continuously increasing its certified product range and is offering guidance on the EN 54 and ISO 7240 standards in order to help planning future-proof systems and investments in compliant products.



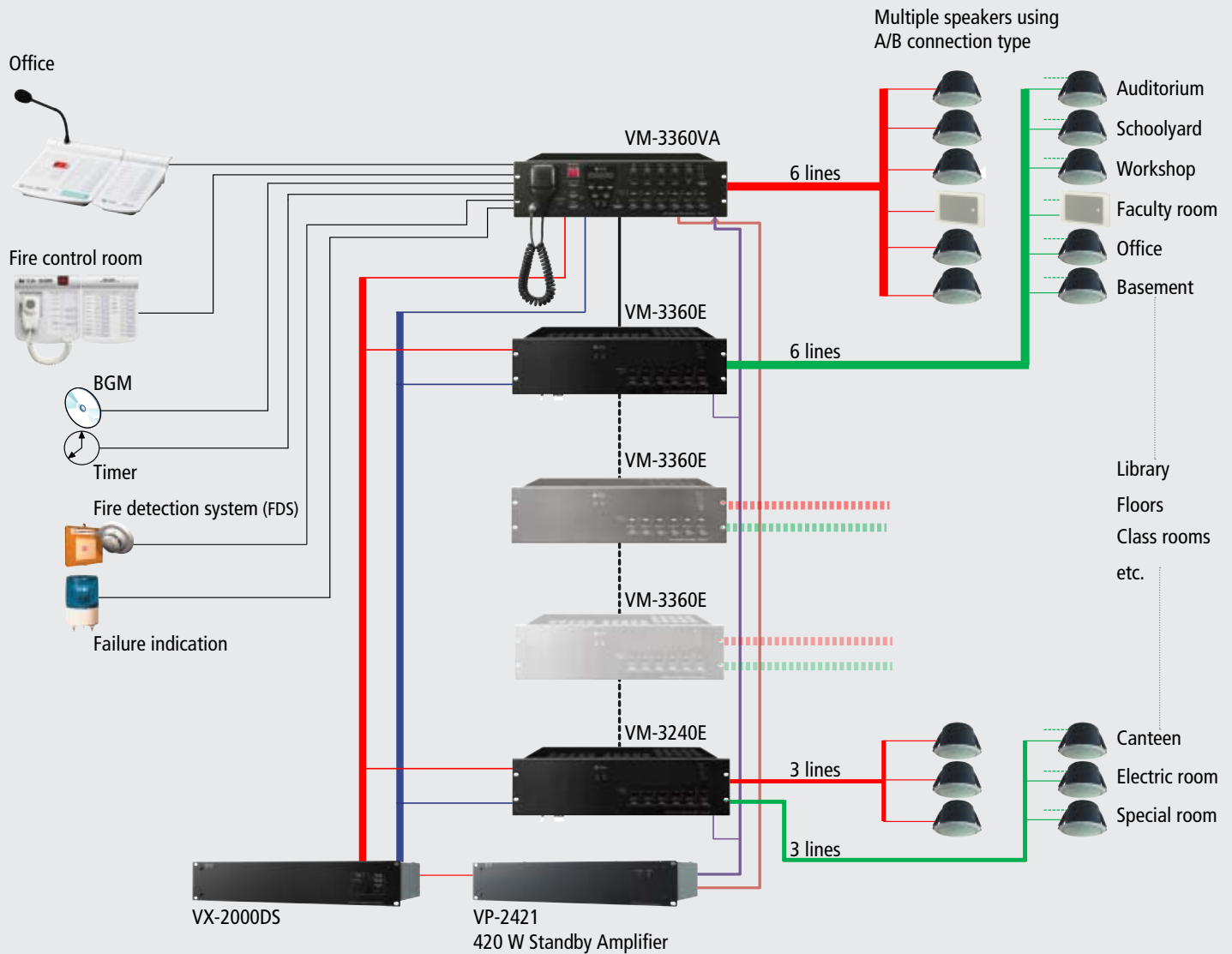
\* Fire Detection System





## EN 54 for Voice Evacuation Systems

### System Example according to EN 54



### TOA Voice Evacuation Systems that suit your needs





## VM-3000 Series



### PA Management System



**VM-3000 Series**

### Description

The VM-3000 Series has digital audio processing and control, with fully digital audio mixing and a built-in high-quality electronic voice message feature. The system may be set up directly using the controls and LCD display on the front panel, which also enables easy operation of the system. Operational versatility is further enhanced by a dedicated PC software configuration capability for uploading and downloading settings via LAN.

The incorporation of wide-ranging functional capabilities, superb reliability and versatility make the VM-3000 a highly cost-effective emergency broadcast and public address system.

The system is EN 54-16 certified.

Certificate No : 1438/CPD/0180

### System Features

- Max. 4 MIC/LINE inputs
- 2 BGM inputs
- Up to 4 Fireman's/Remote Microphones connectable (max. 2 Fireman's Microphones)
- Max. 60 assignable speaker zone outputs (6 zones per amplifier)
- Volume setting possible for each zone
- Digital audio processed & controlled with full digital audio mixing (DSP)
- Built-in high quality electronic voice message
- Intuitive configuration
- Zone setting, priority setting, failure detection setting by dedicated PC software
- LCD display shows current status and configuration setting of system units

### Functions

#### Emergency functions

- Continuous speaker line monitoring without interruption of BGM distribution or paging announcements
- Complete fault detection and indication
- Off-site log check capability via LAN
- Both built-in and remote Fireman's Microphones
- Built-in voice alarm message
- 2-phase voice alarm message (Alert and Evacuation) broadcasting

#### Paging functions

- 2 Remote Microphone interface lines
- Paging (All zones/Group/Individual)
- 2-channel broadcast with external amplifier (Paging/BGM)



**First fully EN 54 certified voice alarm system**

including the power supply and matching speakers!

## VM-3000 Series



### System Management Amplifier



**VM-3240VA / VM-3360VA**

#### Features

- System management amplifier
- Power outputs 240 W (VM-3240VA) and 360 W (VM-3360VA)
- 1 management amplifier per system
- Front panel-mounted LCD display for settings and operation status
- Automatic message function
- Playback of up to 6 recorded general

- announcements and 2 recorded emergency announcements
- Up to 2 RM-300MF Emergency Remote Fireman's Microphones can be connected
- Up to 4 RM-200M General Broadcast Remote Microphones and RM-300MF Fireman's Microphones can be connected
- EN 54-16 certified. Certificate No : 1438/CPD/0180

#### Options

- **VM-3240E:** 240 W Extension Amplifier
- **VM-3360E:** 360 W Extension Amplifier
- **RM-300MF:** Fireman's Microphone
- **RM-320F:** Fireman's Microphone Extension
- **RM-200M:** Remote Microphone
- **RM-210:** Remote Microphone Extension
- **IT-450:** Input Transformer, 600 Ohm

#### Specifications

	VM-3240VA	VM-3360VA
<b>Power Requirement</b>	230 V AC, 50/60 Hz	
<b>Power Consumption (AC mains)</b>	600 W (with rated output signal), 260 W (according to EN60065)	850 W (with rated output signal), 380 W (according to EN60065)
<b>Rated Output</b>	240 W	360 W
<b>Frequency Response</b>	50 – 20,000 Hz, ±3 dB (at 1/3 rated output)	
<b>Distortion</b>	< 0.7% (at rated output, 1 kHz)	
<b>Signal-to-Noise Ratio</b>	Over 85 dB	
<b>Inputs</b>	Input 1 – 3: -50 dB* (MIC)/-10dB (LINE) (changeable) 600 Ohm, electronically balanced combined XLR connector (female)/ phone jack Input 4: -50 dB* (MIC) / -10 dB (LINE) (changeable) 600 Ohm, electronically balanced, removable terminal block (14 pins) BGM 1 – 2: -10 dB, 10 kOhm unbalanced, RCA pin jack External amplifier Input: 100 V Line removable terminal block (14 pins)	
<b>Outputs</b>	Speaker output 1 – 6: Total load within rated output, removable terminal block (14 pins), Direct output from internal or external amplifier, removable terminal block (16 pins) Recording output BGM / Paging 0 dB*, 10 kOhm, unbalanced, RCA pin jack	
<b>Controls</b>	Input 1 – 8: No-voltage make contact input, open voltage: 24 V DC, short-circuit current: under 2 mA, removable terminal block (14 pins) Output 1 – 8: Isolated open collector output, withstand voltage: 30 V DC, operating current: under 10 mA, removable terminal block (14 pins)	
<b>Emergency Controls</b>	Input 1 – 5: No-voltage make contact input, open voltage : 24 V DC, short-circuit current: under 2 mA, RJ45 female connector Input 6: Isolated voltage input: Inactive: -24V ±20%/Active: +24 V ±20%, RJ45 female connector Status out: Relay contact output, withstand voltage: 40 V DC, operating current: 2 – 300 mA, RJ45 female connector	
<b>DC-24 V-Output</b>	24 V DC, maximum feeding current 0.3 A	
<b>Dimensions (W x H x D)</b>	482 x 132.6 x 431.2	
<b>Weight</b>	16.5 kg	19 kg



## VM-3000 Series



## Extension Amplifier



VM-3240E / VM-3360E

## Features

- Extension amplifier
- Up to 9 VM-3240E or VM-3360E Extension Amplifiers
- 240 W (VM-3240E) or 360 W (VM-3360E)
- 6 speaker line outputs
- 8 control inputs and 8 control outputs for general broadcasts
- 6 inputs and 3 outputs for emergency broadcasts
- Connected to the VM-3240VA or VM-3360VA via the VM Link connector (CAT5)
- EN 54-16 certified. Certificate No : 1438/CPD/0180

## Options

- VM-3240VA: 240 W System Amplifier
- VM-3360VA: 360 W System Amplifier

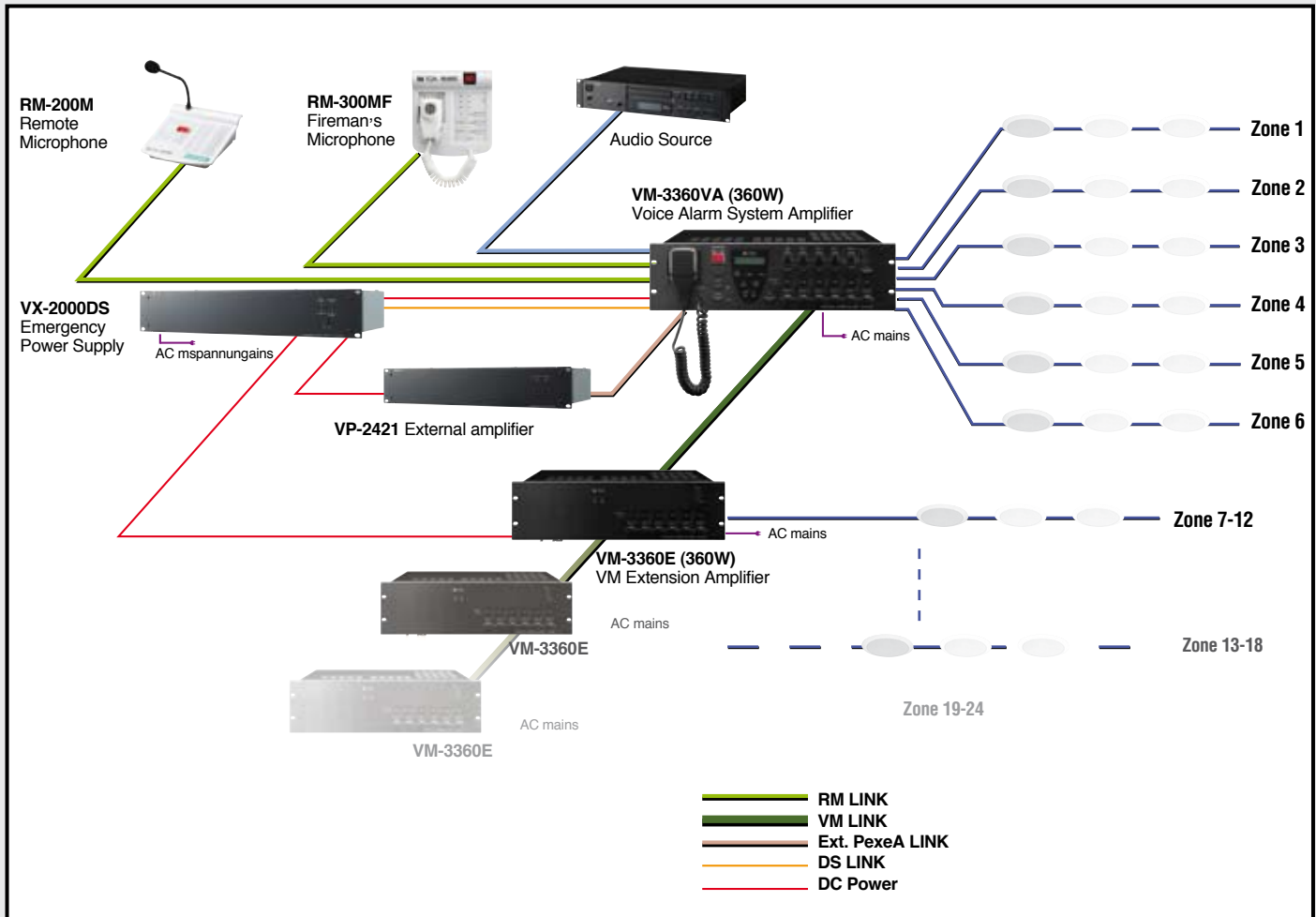
## Specifications

	VM-3240E	VM-3360E
<b>Power Requirement</b>	230 V AC, 50/60 Hz	
<b>Power Consumption (AC mains)</b>	600 W (with rated output signal), 260 W (according to EN60065)	850 W (with rated output signal), 380 W (according to EN60065)
<b>Rated Output</b>	240 W	360 W
<b>Frequency Response</b>	50 – 20,000 Hz, ±3dB (at 1/3 rated output)	
<b>Distortion</b>	Under 0.7% (at rated output, 1 kHz)	
<b>Signal-to-Noise Ratio</b>	Over 85 dB	
<b>Inputs</b>	External amplifier Input: 100 V line, removable terminal block (14 pins)	
<b>Outputs</b>	Speaker output 1 – 6: Total within rated output, removable terminal block (14 pins) Direct output from internal or external amplifier, removable terminal block (16 pins)	
<b>Control</b>	Input 1 – 8: No-voltage make contact input, open voltage: 24 V DC, short-circuit current: under 2 mA, removable terminal block (14 pins) Output 1 – 8: Isolated open collector output, withstand voltage: 30 V DC, operating current: under 10 mA, removable terminal block (14 pins)	
<b>Emergency Control</b>	Input 1 – 5: No-voltage make contact input, open voltage : 24 V DC, short-circuit current: under 2 mA, RJ45 female connector Input 6: Isolated voltage input: Inactive; -24V ±20%/ Active; +24 V ±20%, RJ45 female connector Status out: Relay contact output, withstand voltage: 40 V DC, operating current: 2 – 300 mA, RJ45 female connector	
<b>DC-24 V-Output</b>	24 V DC, maximum feeding current 0.3 A	
<b>Dimensions (W x H x D)</b>	482 x 132.6 x 407	
<b>Weight</b>	18 kg	19 kg

## VM-3000 Series



### Application Example

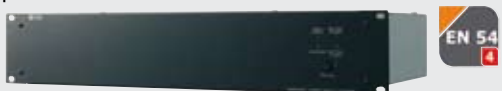


### Options



#### Power Amplifier

VP-2241: 1 x 240 W  
 VP-2421: 1 x 420 W  
 Power Amplifier uses the VP-200VX Power Amplifier Input Module per channel.



#### VX-2000DS Emergency Power Supply

The VX-2000DS Emergency Power Supply Unit supplies the DC power to each equipment in the VM-3000 system by connecting the VX-200PS Power Supply Unit. EN 54-16 certified. Certificate No : 1134-CPD-083

#### VX-200PS Power Supply Unit

The VX-200PS Power Supply Unit is mounted in the VX-2000PF Power Supply Frame when in use.



#### VX-2000PF Power Supply Frame

The VX-2000PF permits the VX-200PS Power Supply Unit to be mounted in an equipment rack. Up to 3 VX-200PS units can be installed in the unit.



**Certified according to EN 54-4 by notified body pursuant to Construction Products Directive 89/106/EWG.**

Since August 2009 only certified power supplies are allowed to built-in in voice alarm systems (connected to a fire alarm system)



## VM-3000 Series



### Fireman's Microphone



**RM-300MF / RM-320F**



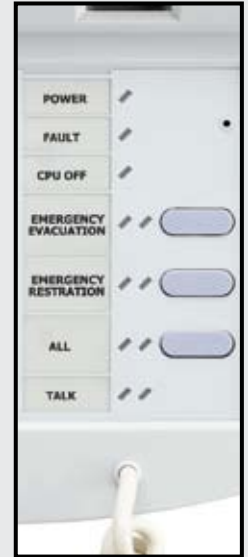
RM-320F



Alarm-Switch



Microphone



Function Keys

### Features

#### RM-300MF:

- For emergency broadcasts made by firemen to evacuate
- For activation of emergency mode, start and stop of automatic emergency announcements, reset emergency signals, and live microphone announcements
- CPU OFF switch allows all-zone calls (simultaneous attenuator-free all calls). No general broadcasts can be made.
- EN 54-16 certified. Certificate No : 1438/CPD/0180

#### RM-320F:

- The Fireman's Microphone Extension enables zone selection or failure indication/ reset function.
- Up to 3 RM-320F can be connected to the Fireman's Microphone, expanding the available keys up to 20 per unit.
- 20 function keys per unit.
- Zone selection (1 – 20) and failure indication/ acknowledgement functions can be assigned to each function key using the dedicated software.

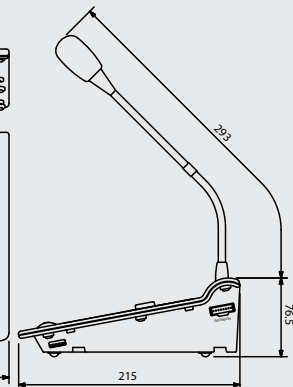
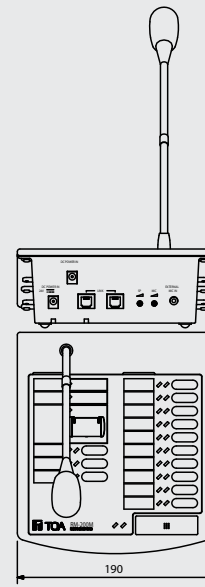
### Specifications

	RM-300MF	RM-320F
<b>Power Requirement</b>	24 V DC (Operating range: 15 – 40 V DC)	From RM-200MF
<b>Current Consumption</b>	100 mA (up to 550 mA with 3x RM-320F)	155 mA max. (in terms of DC power inputs of RM-300MF)
<b>Distortion</b>	< 1%	-
<b>Frequency Response</b>	200 – 15,000 Hz	-
<b>Signal-to-Noise Ratio</b>	> 55 dB	-
<b>Audio Output</b>	0 dBV, 600 Ohm, balanced	-
<b>Microphone</b>	Unidirectional dynamic microphone, compression circuit	-
<b>Volume Control</b>	Microphone, buzzer	-
<b>Operation key</b>	Emergency key, Evacuate key, Alert key, Emergency reset key, CPU switch, Reset switch	-
<b>Key Extension</b>	By RM-320F	20
<b>Connection Cable</b>	Shielded CPEF cable or Category 5 STP cable, M3 screw terminal	Connection by way of dedicated cable
<b>Finish</b>	ABS resin, bluish grey	ABS resin, bluish grey
<b>Dimensions (W x H x D)</b>	200 x 215 x 82.5 mm	175 x 215 x 70 mm
<b>Weight</b>	1.1 kg	700 g



## VM-3000 Series

### Remote Microphone



### Features

- Elegant design
- Zone, group and all-call paging, and initiating of pre-recorded messages
- Indication of communication failure, busy zones etc.
- Extraordinary clarity and lowest distortion through built-in compression circuit
- Up to 4 remote microphones can be connected to the VM-3000 system amplifier
- Up to 800 m total cable length
- RM-210: Allows zone selection of up to 10 zones
- Colour: Bluish grey

### Options

- AD-246: AC Adapter
- WH-4000A: Headset
- WB-RM200: Wall-mounting bracket

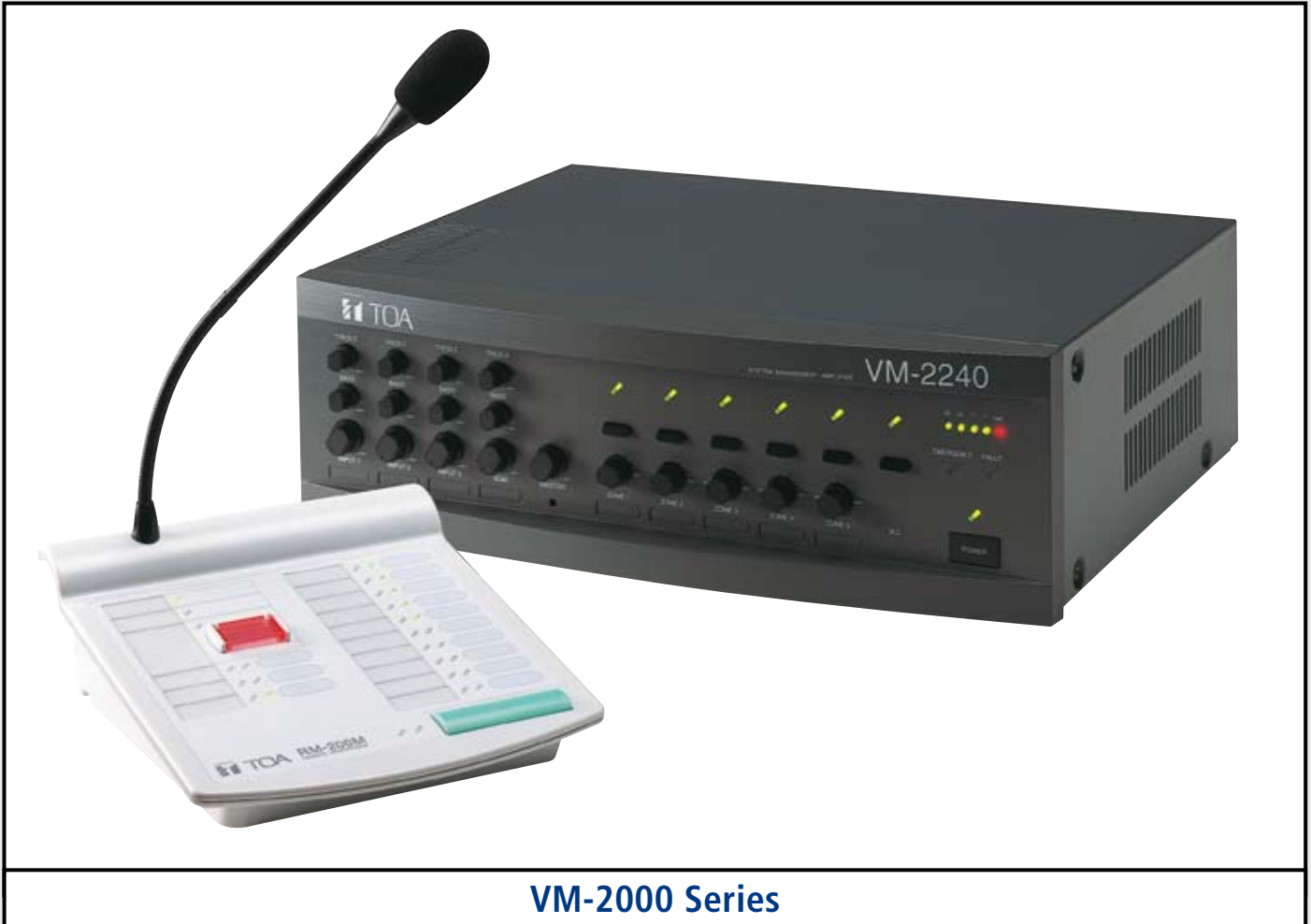
### Specifications

	RM-200M	RM-210
<b>Power Requirement</b>	24 V DC (Operating range: 14 – 28 V DC)	From RM-200M
<b>Current Consumption</b>	100 mA maximum	20 mA max. (in terms of DC power inputs of RM-200M)
<b>Distortion</b>	< 1%	-
<b>Frequency Response</b>	100 – 20000 Hz	-
<b>Signal-to-Noise Ratio</b>	> 60 dB	-
<b>Audio Output</b>	0 dBV, 600 Ohm, balanced	-
<b>Microphone</b>	Unidirectional electret condenser microphone	-
<b>Emergency Broadcast</b>	Activation of Emergency Broadcast (pre-recorded announcement or live microphone announcement) by Emergency Broadcast Switch	-
<b>Key Extension</b>	By RM-210	10
<b>Connection Cable and Connector</b>	Category 5 STP cable, RJ45 connector	Connection to RM-200M, RM-200X or RM-200XF by way of dedicated cable
<b>Finish</b>	ABS resin, bluish gray	ABS resin, bluish grey (PANTONE 538 or its equivalent)
<b>Dimensions (W x H x D)</b>	190 x 76.5 x 215 mm (Gooseneck microphone excluded)	110 x 76.5 x 215 mm
<b>Weight</b>	750 g	350 g



## VM-2000 Series

### PA Management System



VM-2000 Series

### Description

Taking advantage of TOA's long-accumulated technological expertise and knowledge in security and audio, the VM-2000 Series is part of a selected range of sound management equipment. Featuring outstanding audio performance, this range of equipment satisfies a growing need for reliable and efficient communications for various applications including office buildings, schools, shopping malls, retail shops, factories, hospitals and transportation terminals.

#### Communication Expert

Targeted at medium-sized facilities, every VM-2000 Series unit offers 3 mic/line inputs, 2 BGM inputs and remote microphone capability as well as telephone paging. All controls and indicators are laid out in a logical, easy-to-use manner that supports operation. Tonal preferences may be set for each channel in order to op-

imize the sound for speech or music signals. The processed input signals can then be sent to any of 5 independent loudspeaker zones as desired, or automatically to all in the case of an emergency. Operation is simple and trouble-free for site staff. And the VM-2000 Series' clean, attractive design makes it well-suited for installation in a building's operation center equipment rack or even on a desk in the reception area.

#### Built to expand with your requirements

The VM-2000 Series is designed with cost-effectiveness in mind, allowing for expansion as your needs grow. For instance, if the standard 5 loudspeaker zones are not enough, the main unit can be linked by up to 8 units for servicing up to 45 zones. The VM-2000 Series' cost-effectiveness allows installation to be basic at first, then expanded as particular requirements dictate. Optional

accessories and related equipment are available to meet specific requirements and enhance the operational scope. The VM-2000 Series conforms to most international emergency sound system standards and requirements.

#### Remote microphone extends system control

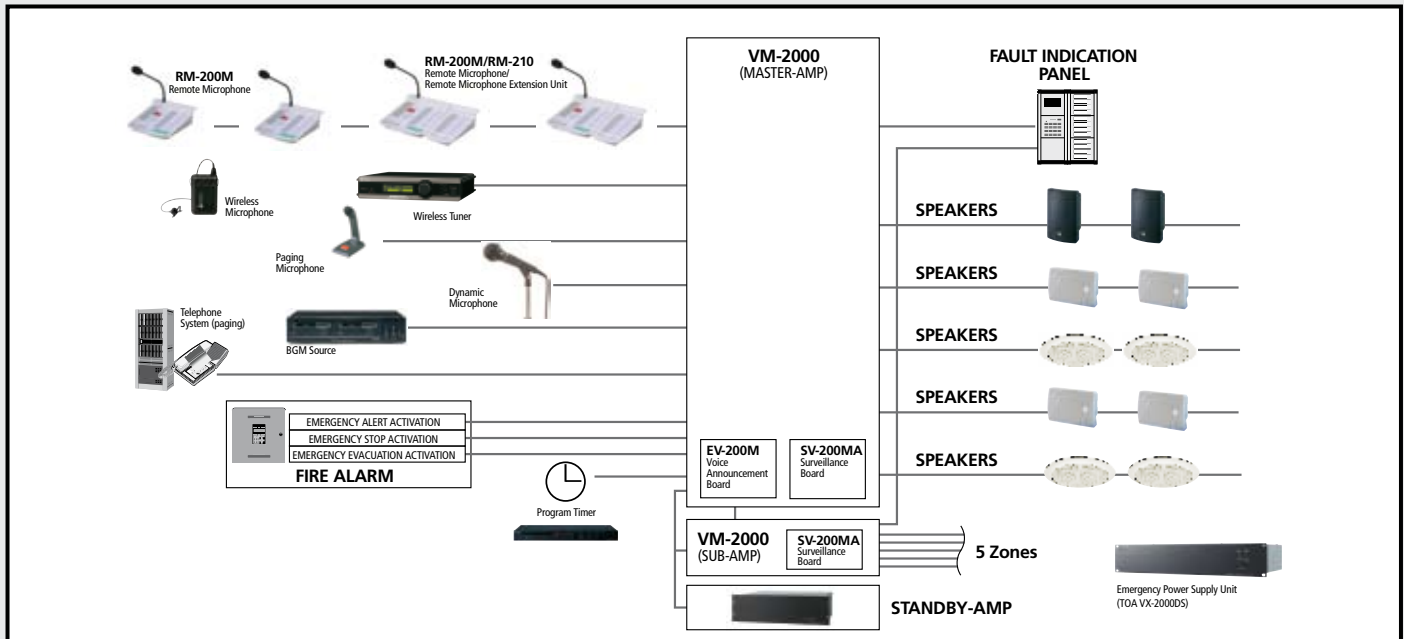
Adding convenience to a communication system is the RM-200M Remote Microphone that allows announcements to be made to any speaker zone and emergency announcements to all zones. These announcements can be made live or pre-recorded announcements can be activated. The remote microphone can be connected to the RM-210 Remote Microphone Extension unit.





## VM-2000 Series

### Application Example



### Specifications

	VM-2120	VM-2240
<b>Power Requirement</b>	AC: mains, 50/60 Hz, DC: 24 V DC/7.5 A	AC: mains, 50/60 Hz, DC: 24 V DC/15 A
<b>Power Consumption (AC mains)</b>	Under normal operating conditions according to EN60065: 107 W	Under normal operating conditions according to EN60065: 255 W
<b>Current Consumption (24V DC Power Input)</b>	Under normal operating conditions according to EN60065: 2.1 A	Under normal operating conditions according to EN60065: 5 A
<b>Rated Output</b>	120 W	240 W
<b>Output Voltage/Impedance</b>	100 V/83 Ohm, 70 V/42 Ohm, 50 V/21 Ohm	100 V/42 Ohm, 70 V/21 Ohm, 50 V/10 Ohm
<b>Frequency Response</b>	50 – 16000 Hz	50 – 16,000 Hz
<b>Distortion</b>	< 1%	
<b>Signal-to-Noise Ratio</b>	> 60 dB	
<b>Tone Control</b>	Bass: 100 Hz ±10 dB, Treble: 10 kHz ±10 dB (Inputs 1 – 3 and BGM individually adjustable)	
<b>Remote Microphone/Expansion Amplifier Connection</b>	2 RJ45 female connectors for connecting the RM-200M remote microphone and the VM-2120 or VM-2240 unit used as an expansion amplifier; maximum distance: 800 m in total, Link cable: category 5 shielded number of connectable RM-200M's: Up to 4 twisted-pair straight cable (TIA/EIA-568A standard)	
<b>Inputs</b>	1-3 for MIC, LINE XLR connector /phone jack, Input 1 is additionally DIN connector, telephone paging: Push-in terminal, BGM 1-2 and power amp: RCA pin jack, external speaker line: 100V	
<b>Speaker output</b>	Plug-in screw connector, 5-zone selector with attenuator (all zones simultaneously selectable)	
<b>Direct speaker line output</b>	Direct output from the power amplifier output transformer (attenuator bypassed), Plug-in screw connector	
<b>Other Outputs</b>	Line, recording, preamplifier: 0 dB*1, 10 kΩ, RCA pin jack	
<b>Control Input</b>	For controlling Inputs 1 – 3, push-in terminal block no-voltage make contact input, open voltage: 3.3 V DC, short-circuit current: under 1 mA	
<b>Control Input and Output</b>	D-sub connector (25-pin, female)	
<b>External Attenuator Control Output</b>	Plug-in screw connector, relay	
<b>Surveillance Input and Output</b>	D-sub connector (25-pin, female)	
<b>Power Supply</b>	24 V DC/0.1 A, for supplying power to an optional amplifier control Unit RU-2001/2002, push-in terminal block*4	
<b>Chime Tone</b>	Built-in chime: 2-tone chime/2-tone chime (fast repeat)/4-tone chime (Up)/Single-tone chime/4-tone chime (up & down)/gong/off	
<b>Function</b>	Voice announcement board sound source: pre-recorded chime, 2 unit stacking (VM-2120 or VM-2240), emergency broadcast (sequential control), broadcast priority control, surveillance (failure detection) function, power supply to only 1 remote microphone (RM-200M), line resistance: Under 24 (one way)	
<b>Operating Temperature</b>	0°C to +40°C	
<b>Finish</b>	Panel: ABS resin, dark grey, paint, case: steel plate, dark grey, paint	
<b>Dimensions (W x H x D)</b>	419 x 143.3 x 355.7 mm	
<b>Weight</b>	12.5 kg	14.5 kg



## VM-2000 Series

### System Management Amplifier and Optional Accessories



**VM-2120 / VM-2240**



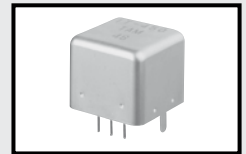
EV-200



SV-200M



MB-36



IT-450

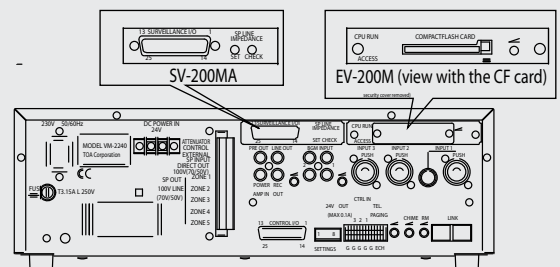
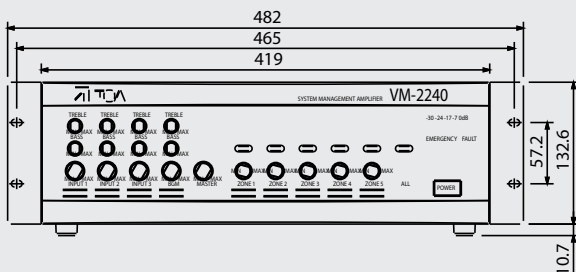
### Features

- Programmable system management amplifier
- VM-2120 (120 W) or VM-2240 (240 W)
- 5 switchable high impedance speaker zones with adjustable attenuators
- 9 units can be combined to increase the output power and number of zones
- 4 input channels come with volume and bass/ treble control on the front panel
- Both BGM inputs with level pre-adjustment
- The routing to the zones of the 3 microphone/ line level inputs and the telephone paging input can be pre-set
- Additional features: Emergency power input, remote power control, 7 built-in chimes etc.
- 19" rack mountable (3 units, optional MB-36 brackets required)

### Options

- **EV-200M:** Voice Announcement Board for installation in the VM-2000 system management amplifier
- Playback of pre-recorded messages, 2 for emergency and 5 for commercial purpose plus 1 individual chime
- Messages are stored on CF memory cards
- Playback duration depends on the the memory card's capacity
- The unit checks the availability of the messages and memory card automatically
- **SV-200MA:** Surveillance Board for installation in the VM-2000 system management amplifier
- Monitoring of 5 speaker lines on short circuit, break and earth leakage as well as power amplifier

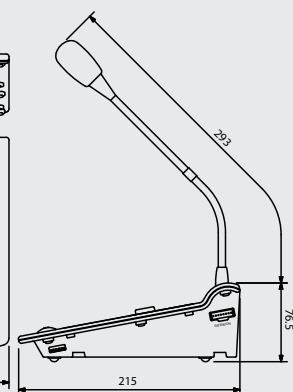
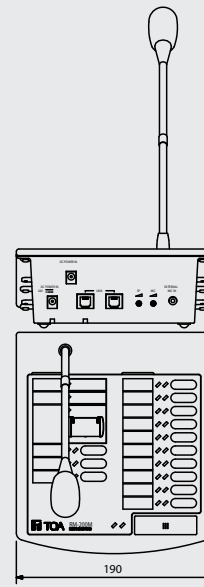
- In case of failure, it controls the common failure indicators and offers detailed failure information on separate outputs
- In case of a short circuit on certain speaker lines, it cuts this line from the amplifier to avoid affecting other speaker lines
- **MB-36:** Mounting Brackets for cabinet rack mounting of VM-2000 series amplifiers
- **IT-450:** Input Transformer, 600 Ohm
- **SDCF-03:** Compact Flash Adaptor for recording the memory cards with the EV-350 or by means of PC software





## VM-2000 Series

### Remote Microphone



### Features

- Attractive design
- Zone, group and all-call paging, and starting pre-recorded messages
- Emergency sequence can be started by pressing the alarm button which is covered by a hinged lid
- Indication of system failure, line failure, busy zones etc.
- Extraordinary clarity and extraordinary low distortion due to built-in compression circuit
- Up to 4 remote microphones can be connected to the VM-2000 system amplifier
- Up to 800 m total cable length
- RM-210: Allows announcements in up to 10 zones
- Up to 4 RM-210 possible
- When 2 VM-2000 are combined, then a RM-210 is required to start a pre-recorded announcement from the EV-200M
- Colour: bluish grey

### Options

- AD-246: AC adapter
- WH-4000A: Headset
- WB-RM200: Wall-mounting bracket

### Specifications

	RM-200M	RM-210
<b>Power Requirement</b>	24 V DC (Operating range: 14 – 28 V DC)	From RM-200M
<b>Current Consumption</b>	100 mA maximum	20 mA max. (in terms of DC power inputs of RM-200M)
<b>Distortion</b>	< 1%	-
<b>Frequency Response</b>	100 – 20000 Hz	-
<b>Signal-to-Noise Ratio</b>	> 60 dB	-
<b>Audio Output</b>	0 dBV, 600 Ohm, balanced	-
<b>Microphone</b>	Unidirectional electret condenser microphone	-
<b>Function Keys</b>	Speaker Zones 1 – 5 or Zones 1 – 10 (2 stacked amplifiers connection), Microphone: volume control, Groups 1 – 2, and All-Zone Broadcast	-
<b>Emergency Broadcast</b>	Activation of Emergency Broadcast (pre-recorded announcement or live microphone announcement) by Emergency Broadcast Switch	-
<b>Voice Message Control</b>	Activation of 5 messages	-
<b>Key Extension</b>	By RM-210	10
<b>Connection Cable and Connector</b>	Category 5 STP cable, RJ45 connector	Connection to RM-200M, RM-200X or RM-200XF by way of dedicated cable
<b>Finish</b>	ABS resin, bluish gray	ABS resin, bluish grey (PANTONE 538 or its equivalent)
<b>Dimensions (W x H x D)</b>	190 x 76.5 x 215 mm (Gooseneck microphone excluded)	110 x 76.5 x 215 mm
<b>Weight</b>	750 g	350 g



## VX-2000 Series

### VX-2000 System



System with Remote Mic and Fireman's Mic

### Description

The VX-2000 Series is a versatile voice alarm and public address system that fulfills the requirements of EN 60849 standard for general purpose and emergency broadcasts. It is configured for simple as well as for complex installations. The total system is composed of Amplifiers, Power Supply, Emergency Power Supply, Fireman's Microphone and user-specified number of Remote Microphones.

The most important factor in an emergency system is total reliability. The VX-2000 features include multiple failure detection measures that constantly check components and speaker lines for any faults or abnormalities which are informed via visual and sound indicators. The VX-2000 features a scalable architecture that can be easily expanded as requirements grow. Its fully modular configuration facilitates assembling a system that is ideally optimized for a particular application with specific modules. The VX-2000 offers a high-performance cost-effective solution to any environment's broadcast and public address requirements.

### Features

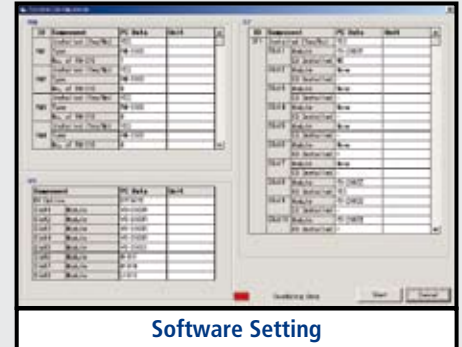
- Full compliance with the EN 60849 standards
- System status can be confirmed on Remote Microphones
- Fireman's Microphone is available
- Simultaneous dual-source pre-recorded message broadcasts
- Convenient multi-language configuration
- Continuous non-interruptive surveillance, even during broadcast

### Applications

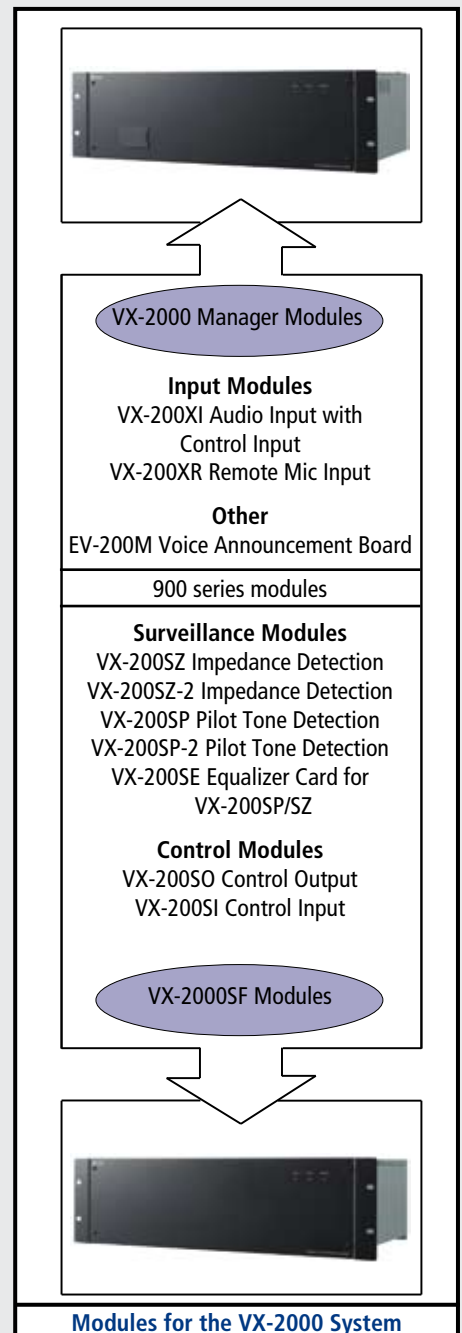
Public buildings for example schools, train stations, shopping malls or administrative buildings which need to fulfill the demanding requirements of emergency evacuation according to EN 60849 as well as standard PA requirements

### Options

- EV-200M: Voice announcement board
- IT-450: Input transformer (600 Ohm)

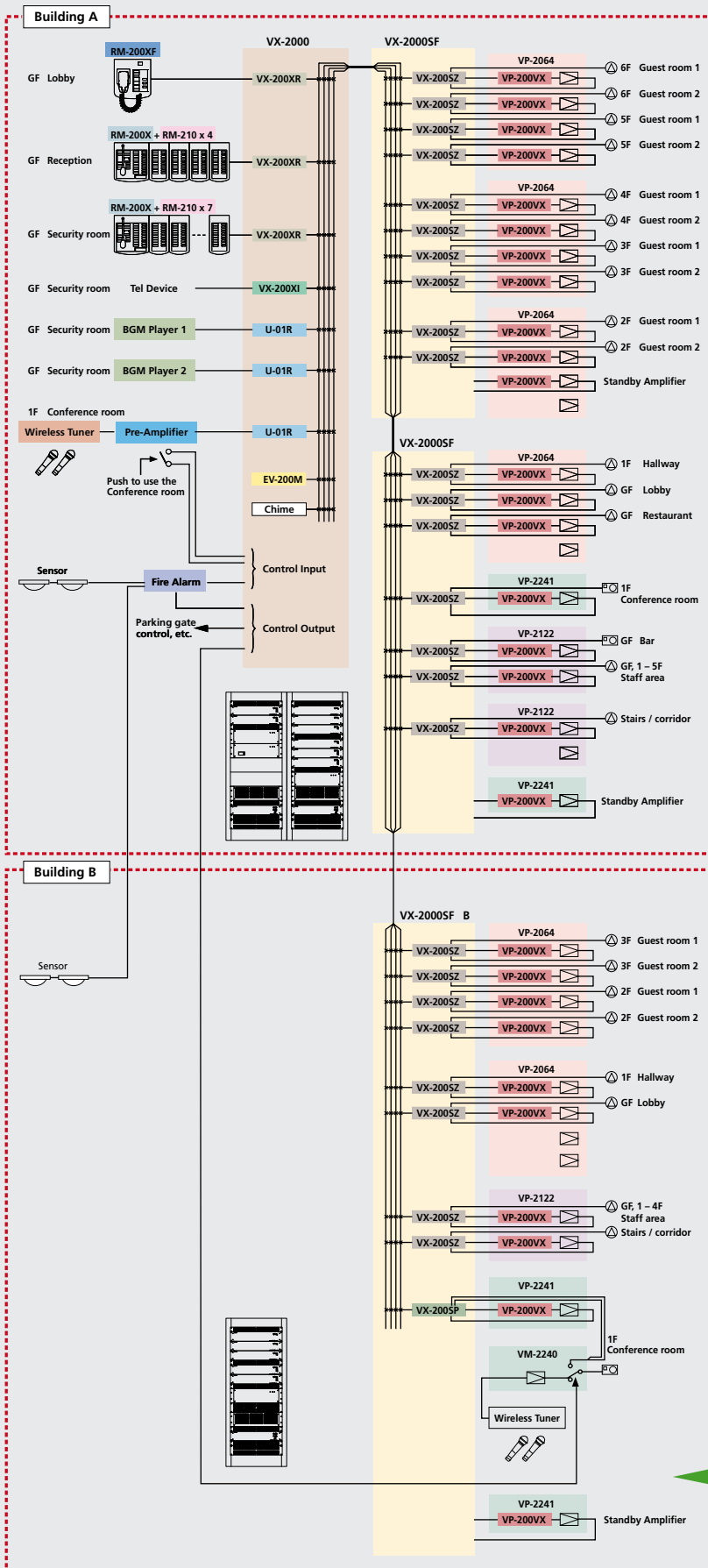


Software Setting



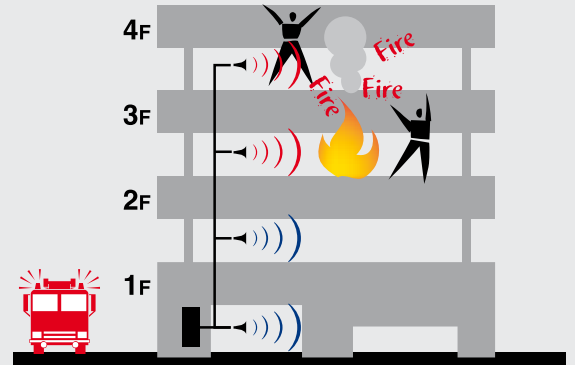


## VX-2000 Series



### System Configuration

Using the input matrix VX-2000 (System Manager) and the output matrix VX-2000SF (Surveillance Frame)



### Automatic dual broadcasting

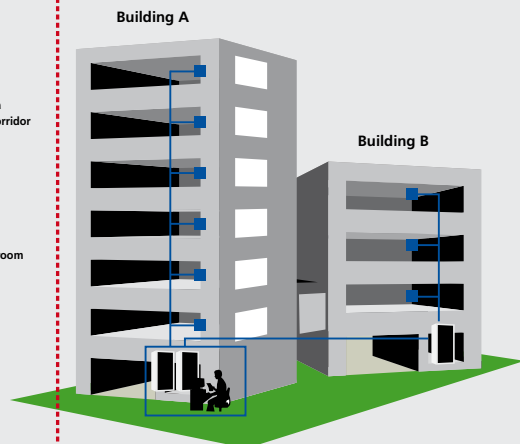
When activated by a remote microphone or fire detection system link, simultaneous dual broadcasting is possible by using 2 voice announcement cards to allow different messages\* to be available at the same time such as alert and evacuation messages

\*A maximum of 4 broadcasts are simultaneously possible

Simultaneous Dual Broadcast Example  
(2 EV-200M voice announcement boards installed in the VX-2000)

**Red )))**  
In an emergency the system automatically broadcasts an evacuation message to the building's 3rd and 4th floors

**Blue )))**  
Along with the evacuation message the system automatically broadcasts an alert message to the 1st and 2nd floor simultaneously



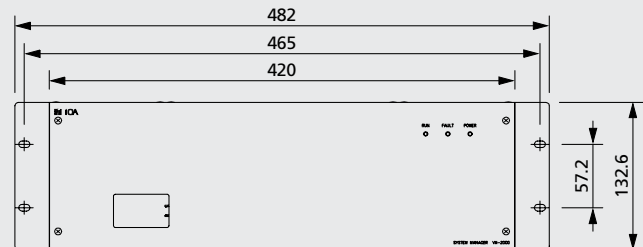


## VX-2000 Series

### System Manager



Rear View



### Features

- Input matrix unit that assigns input signals to 4 audio buses
- Central manager of the VX-2000 System
- Up to 8 units of the VX-200XI, VX-200XR, and 900 Series input modules can be mounted into the System Manager
- The VX-2000 controls audio signal routing, priorities, and peripheral equipment
- Input and output control settings are performed by way of a PC software
- Up to 2000 system events and failures can be logged with a PC, and the log can be viewed

### Options

- VX-200XR: Remote Mic Input Module
- VX-200XI: Audio / Control Input Module
- 900 series plug-in modules:  
 M-01F, U-01F, U-01R, U-03R  
 (M-01M, M-01P, M-03P, M-51F, M-61F, U-01P, U-03S, U-61S, S-20S non-RoHS products)

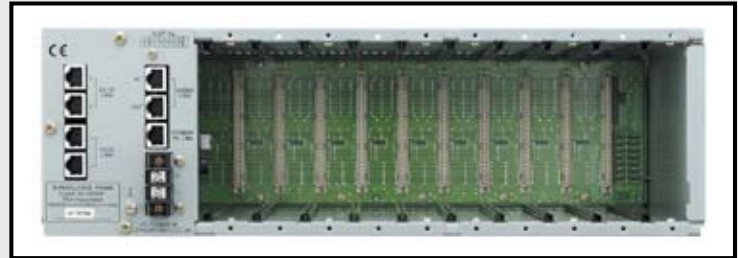
### Specifications

	VX-2000
Power Source	24 V DC (operating range: 20 – 40V DC)
Current consumption	Under 650 mA (20 V DC)
Input	-20 dBV, unbalanced
Number of module slots	8
Audio Link Output	Number of audio buses: 4, 0 dBV, electronically balanced, RJ45 female connector
Monitor Output	0 dBV, electronically balanced, XLR receptacle (3 pins)
Frequency Response	20 – 20000 Hz
S/N Ratio	> 60 dB
Distortion	< 0.5 %
Cross Talk	< -60 dB (1 kHz, 0 dB)
Control Input	16 inputs, RJ45 connector x 2
Control Output	16 outputs, RJ45 connector x 2
Chime Tone	Built-in chime: 4-tone chime (up)/4-tone chime (down)/2-tone chime/Gong
Communication System	PC (setting software to be installed): D-sub connector (9 pins), cross cable, RS-232C, VX-2000SF: RJ45 connector, twisted-pair straight cable (TIA/EIA-568A standard), LONWORKS RS-485
Operating Temperature	0° C to +40° C
Finish	Panel: Surface-treated steel plate, black, 30 % gloss, paint
Dimensions (W x H x D)	482 x 132.6 x 337 mm
Weight	6.4 kg

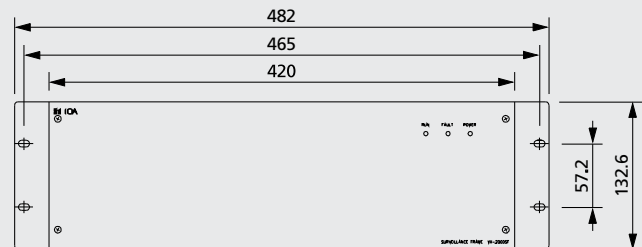


## VX-2000 Series

### Surveillance Frame



Rear View



### Features

- Surveillance Frame is the output matrix of the VX-2000 system
- A total of 10 units of output modules and control modules can be installed
- Assigns audio signals to individual zones from 4 audio buses
- Up to 5 units per system
- Rack-mountable, 3 units height
- 1 standby amplifier per VX-2000SF
- In case of power amplifier failure, output is automatically switched to the standby amplifier
- Output volume setting with PC system software
- 6 types of modules can be inserted

### Options

- Pilot Tone Detection Modules: VX-200SP-2, VX-200SP
- Impedance Detection Modules: VX-200SZ, VX-200SZ-2
- VX-200SI: Control Input Module
- VX-200SO: Control Output Module

### Specifications

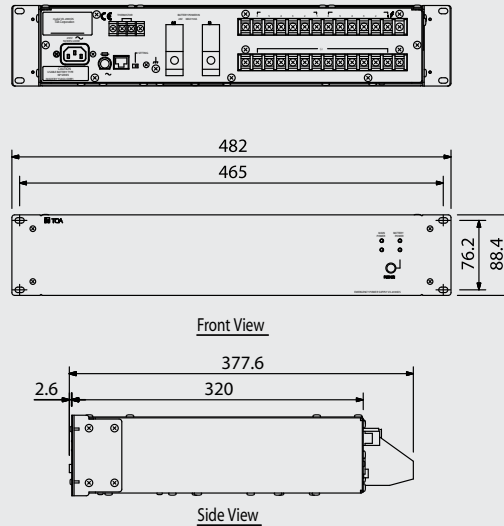
	VX-2000SF
Power Source	24 V DC (operating range: 20 – 40V DC)
Current Consumption	Under 2 A (40V DC)
Number of Module Slot	10, usable modules: VX-200SZ, VX-200SP, VX-200SI, VX-200SO
Frequency Response	20 Hz ... 20000 Hz (when use VX-200SZ: 120 Hz ... 20000 Hz)
S/N Ratio	> 60 dB
Distortion	< 0.5 %
Cross Talk	< -60 dB (1 kHz, 0 dBV)
Audio Link Input/Output	Number of audio buses: 4, 0 dBV, electronically balanced, RJ45 connector
Standby Amplifier Link	RJ45 female connector for connecting the VP-2064, VP-2122, VP-2241, VP-2421 Power Amplifier.
Communication System	VX-2000, VX-2000SF: RJ45 female connector x 2, LONWORKS RS-485 VX-2000DS; RJ45 connector x 2
Operating Temperature	0° C to +40° C
Finish	Panel: Surface-treated steel plate, black, 30% gloss, paint
Dimensions (W x H x D)	482 x 132.6 x 337 mm
Weight	5.6 kg
Accessory	Pre-installed rack mounting bracket (pre-installed on the unit), blank panel x 9, standby amp. cable (3m) x 1



## VX-2000 Series



## Emergency and Standard Power Supply



## Features

- Supplies the DC power to each component in the VX-2000 system by connecting the VX-200PS Power Supply Unit
- Continuous surveillance and charging of batteries (2 x 12 V, sealed lead batteries)
- Temperature-based compensation of charging voltage
- Automatic switchover to backup battery in case of AC mains failure
- EN 54-4 certified  
Certificate No : 1134-CPD-083

## Specifications

	VX-2000DS
Power Source	230 V AC, 50/60 Hz
Power Consumption	240 W max.
Battery	24V (12V x 2)*
Charging Method	Trickle charging
Charging Current	5 A max
Charging Output Voltage	27.3 V $\pm$ 0.3 V (at 25°C) Temperature correction coefficient: -40 mV/°C
Power Supply Input	6 M4 screw terminal, distance between barriers: 11 mm
DC Power Output	6 (25 A max. each) M4 screw terminal, distance between barriers: 11 mm
Control Connector	RJ45 female connector for connecting the VX-2000SF. Twisted-pair straight cable (TIA/EIA-568A standard) Type of control signal: Battery check, AC power status, DC power status, charging circuit failure, and battery failure
Battery Connection	1 pair of positive and negative terminals, applicable cable diameter: AWG 6 – AWG 1/0
Operating Temperature	0°C to +40°C
Finish	Panel: Surface-treated steel plate, black, 30% gloss, paint
Dimensions (W x H x D)	482 x 88.4 x 377.6 mm
Weight	10.5 kg

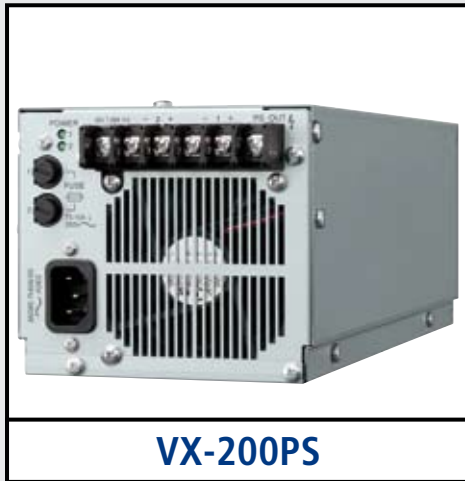
\*We recommend Panasonic LC-X1265PG / APG(65 Ah)



## VX-2000 Series



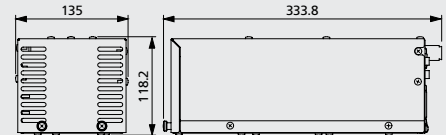
### Power Supply



#### Features

- Up to 3 VX-200PS Power Supply units can be mounted in the VX-2000PF Power Supply Frame
- 2 DC output channels per unit
- EN 54-4 certified.  
Certificate No : 1134-CPD-083

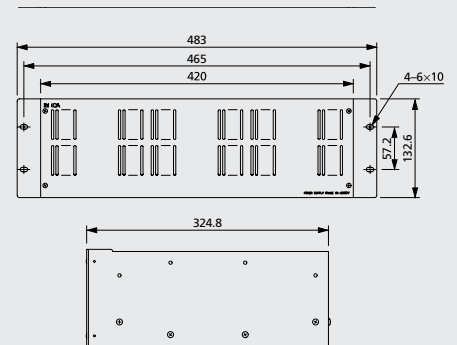
#### Dimensions



#### Features

- VX-2000PF frame for rack mounting of up to 3 VX-200PS Power Supply Units
- EN 54-4 certified.  
Certificate No : 1134-CPD-083

#### Dimensions



### Specifications

	VX-200PS	VX-2000PF
Power Source	230 V AC, 50/60 Hz	-
Power Consumption	580 W	-
PS OUT	Rated output: 210 W (29 V, 7.25 A) x 2, Peak output: 400 W x 2, M4 screw terminal	-
Operating Temperature	0° to +40°C	-
Finish	Surface-treated steel plate	Panel: Surface-treated steel plate, black, 30 % gloss, paint
Dimensions (W x H x D)	135 x 118.2 x 333.8 mm	483 x 132.6 x 324.8 mm
Weight	13.2 kg	5.5 kg
Product Composition	Fuse (T3.15A L) x 1, Power cable x 1	Side panel x 2, Chassis x 1, Front panel x 1
Accessory	-	Rack mounting screw x 4, Fiber washer x 4
Usable Unit	-	VX-200PS (up to 3)



## VX-2000 Series

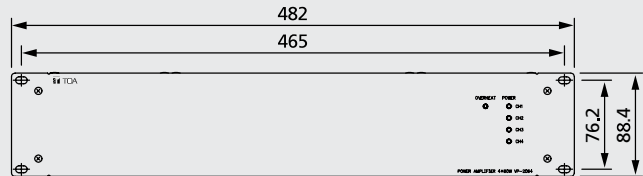
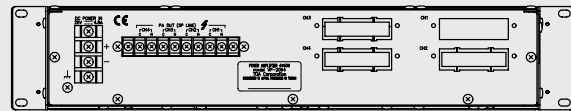
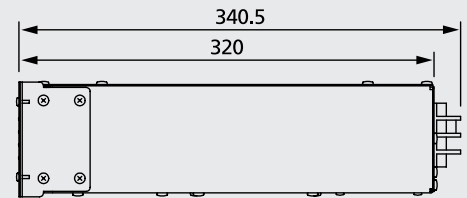
### Power Amplifiers



VP-2064/VP-2122/VP-2241/VP-2421



VP-200VX



### Features

- 4 different power configurations:
  - 60 W x 4 Channels (VP-2064)
  - 120 W x 2 Channels (VP-2122)
  - 240 W x 1 Channel (VP-2241)
  - 420 W x 1 Channel (VP-2421)
- Usable as program, priority and as standby amplifier for emergency switchover
- Power Amplifier uses 1 VP-200VX Power Amplifier Input Module per channel
- Programmable power amplifier standby function maximizes battery-powered operation time

### Options

- VP-200VX: Amplifier Input Module
- VP-200VX-BGM: Amplifier Input Module with additional input for BGM

### Specifications

	VP-2064	VP-2122	VP-2241	VP-2421
<b>Type</b>	Power Amplifier 4 x 60 W	Power Amplifier 2 x 120 W	Power Amplifier 1 x 240W	Power Amplifier 1 x 420 W
<b>Power Source</b>	28 V DC (operating range: 20 to 40 V DC) M4 screw terminal, distance between barriers: 12 mm	28 V DC (operating range: 20 to 40 V DC) M4 screw terminal, distance between barriers: 12 mm	28 V DC (operating range: 20 to 40 V DC) M4 screw terminal, distance between barriers: 12 mm	28 V DC (operating range: 20 to 40 V DC) M4 screw terminal, distance between barriers: 12 mm
<b>Current Consumption (EN60065)</b>	4.8 A in total	4.8 A in total	4.8 A	7.6 A
<b>Rated Output Power</b>	60 W x 4	120 W x 2	240 W	420 W
<b>Output Voltage/Impedance</b>	100 V/167 Ohm, 70 V/83 Ohm, 50 V/41 Ohm (selectable by the internal wiring change)	100 V/83 Ohm, 70 V/41 Ohm, 50 V/21 Ohm (selectable by the internal wiring change)	100 V/41 Ohm, 70 V/21 Ohm, 50 V/10 Ohm (selectable by the internal wiring change)	100 V/24 Ohm, 70 V/12 Ohm, 50 V/6 Ohm (selectable by the internal wiring change)
<b>Number of Channels</b>	4	2	1	1
<b>Input</b>	Specified by input module VP-200VX	Specified by input module VP-200VX	Specified by input module VP-200VX	Specified by input module VP-200VX
<b>Number of Module Slots</b>	4, usable module: VP-200VX	2, usable module: VP-200VX	1, usable module: VP-200VX	1, usable module: VP-200VX
<b>Output</b>	Power amplifier output (speaker line): M3.5 screw terminal	Power amplifier output (speaker line): M3.5 screw terminal	Power amplifier output (speaker line): M3.5 screw terminal	Power amplifier output (speaker line): M3.5 screw terminal
<b>Frequency Response</b>	40 to 16,000 Hz, $\pm 3$ dB (at 1/3 rated output)	40 to 16,000 Hz, $\pm 3$ dB (at 1/3 rated output)	40 to 16,000 Hz, $\pm 3$ dB (at 1/3 rated output)	40 to 16,000 Hz, $\pm 3$ dB (at 1/3 rated output)
<b>Distortion</b>	< 1% (at rated output, 1kHz)	< 1% (at rated output, 1kHz)	< 1% (at rated output, 1kHz)	< 1% (at rated output, 1kHz)
<b>S/N Ratio</b>	> 80 dB	> 80 dB	> 80 dB	> 80 dB
<b>Panel Indicator</b>	Channel power indicator: 4 channels, dual colour LED Overheat indicator: Yellow LED	Channel power indicator: 2 channels, dual colour LED Overheat indicator: Yellow LED	Channel power indicator: 1 channel, dual colour LED Overheat indicator: Yellow LED	Channel power indicator: 1 channel, dual colour LED Overheat indicator: Yellow LED
<b>Operating Temperature</b>	0° ... +40°C	0° ... +40°C	0° ... +40°C	0° ... +40°C
<b>Finish</b>	Panel: Surface-treated steel plate, black, 30% gloss, paint	Panel: Surface-treated steel plate, black, 30% gloss, paint	Panel: Surface-treated steel plate, black, 30% gloss, paint	Panel: Surface-treated steel plate, black, 30% gloss, paint
<b>Dimensions (W x H x D)</b>	482 x 88.4 x 340.5 mm	482 x 88.4 x 340.5 mm	482 x 88.4 x 340.5 mm	482 x 88.4 x 340.5 mm
<b>Weight</b>	11.2 kg	9.1 kg	8.1 kg	9.5 kg
<b>Accessory</b>	Rack mounting screw x 4, Fiber washer x 4	Rack mounting screw x 4, Fiber washer x 4	Rack mounting screw x 4, Fiber washer x 4	Rack mounting screw x 4, Fiber washer x 4

## VX-2000 Series



### Fireman's Remote Microphone



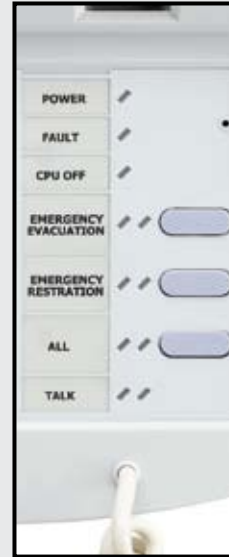
**RM-200XF**



Alarm-Switch



Microphone



Function Keys



RM-210

### Features

- Special microphone for fireman's use
- For emergency broadcast and general purpose broadcast applications
- Push-button zone selection
- PC-programmable system software allows assignment of functions to the individual keys (each with 2 LED)
- Each RM-200XF handles up to 10 extensions of RM-210
- Up to 4 Fireman's microphones per 1 system
- CPU OFF switch for emergency broadcast to all zones even in case of a CPU error
- Automatic failure detection of emergency keys and in the signal path (control and audio signals) between microphone (including microphone element) and system manager

### Options

- RM-210: Extension Unit
- YC-301: Back box
- YS-11A: Back box
- WB-RM200: Wall-mounting bracket for RM-200XF, RM-200X, RM-200M and RM-210

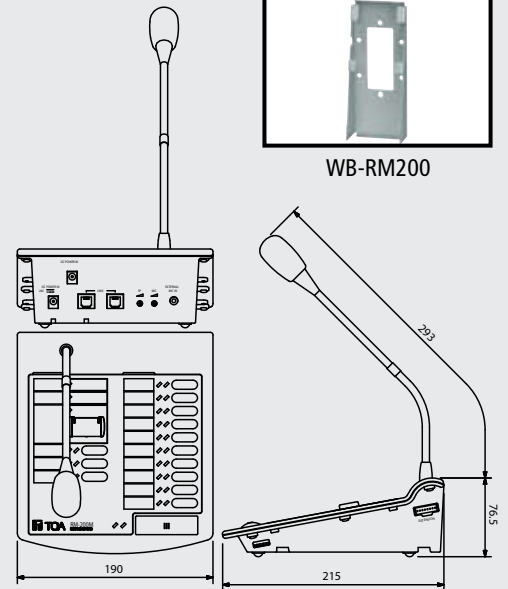
### Specifications

	RM-200XF
Power Source	24 V DC (operating range: 16 – 40 V DC)
Current Consumption	Under 200 mA (RM-200XF), 850 mA (with 10 RM-210s connected)
Audio Output	0 dBV, 600 Ohm, balanced
Hand-Held Microphone	Dynamic microphone, function switch (default: press-to-talk), microphone element fault detection
Frequency Response	200 – 15,000 Hz
S/N Ratio	> 55 dB
Functions	Internal monitor speaker 200 mW/Volume control; microphone, monitor speaker
Number of Function Keys	5 (including hand-held microphone's switch), extendable up to 105 (with 10 RM-210s connected)
Key Extension	10 keys extension per RM-210, EXTENSION connector
Number of Connectable Units	4
Communication System	LONWORKS twisted pair free topology transceiver
Connection Cable and Connector	Category 5 STP cable, plug-in screw connector
Communication Distance	500 m (Free topology wiring)
Finish	ABS resin, bluish grey (PANTONE 538 or equivalent)
Dimensions (W x H x D)	200 x 215 x 82.5 mm (excluding the coiled cord)
Weight	1.2 kg



## VX-2000 Series

### Remote Microphone



### Features

- RM-200X: System remote microphone
- For both emergency and general purpose broadcasts
- Zone, group and all-call paging, and starting pre-recorded messages
- PC-programmable system software permits desired functions to be assigned to individual function keys (equipped with 2 LED indicators)
- Up to 8 units of RM-200X and RM-200XF units can be connected within one system

### Features

- RM-210: Key extension unit
- 10 additional keys
- Up to 9 RM-210 Remote Microphone Extension units can be used with each RM-200X Remote Microphone

### Options

- WB-RM200: Wall mounting bracket for RM-200X, RM-200XF and RM-210
- WH-4000A: Headset

### Specifications

	RM-200X	RM-210
<b>Power Source</b>	24 V DC (operating range: 16 – 40 V DC), supplied from RJ45 connector or power input jack (non-polarity type)	From RM-200X/MXF
<b>Current Consumption</b>	Under 200 mA (RM-200X), 750 mA (with 9 RM-210s connected)	20 mA max. (in terms of DC power inputs of RM-200X and RM-200XF)
<b>Audio Output</b>	0 dBV, 600 Ohm, balanced, RJ45 connector	-
<b>External Microphone Input</b>	-40 dB, 2.2 kΩ, unbalanced, mini jack, phantom powering	-
<b>Distortion</b>	<1 %	-
<b>Frequency Response</b>	100 ... 20000 Hz	-
<b>S/N Ratio</b>	> 60 dB	-
<b>Internal Monitor Speaker</b>	200 mW	-
<b>Volume Control</b>	Microphone volume control, Monitor speaker volume control	-
<b>Number of Function Keys</b>	15, extendable up to 105 (with 9 RM-210s connected, 10 keys each)	10
<b>Number of Connectable Units</b>	8 (including RM-200XF)	-
<b>Communication</b>	System: LONWORKS twisted pair free topology transceiver, Distance: max. 500 m (Free topology wiring)	-
<b>Connection Cable and Connector</b>	Category 5 STP cable, RJ45 connector	Connection to RM-200M, RM-200X or RM-200XF by way of dedicated cable
<b>Finish</b>	ABS resin, bluish grey (PANTONE 538 or its equivalent)	ABS resin, bluish grey (PANTONE 538 or its equivalent)
<b>Dimensions (W x H x D)</b>	190 x 76.5 x 215 mm (gooseneck microphone excluded)	110 x 76.5 x 215 mm
<b>Weight</b>	850 g	350 g



## VX-2000 Series

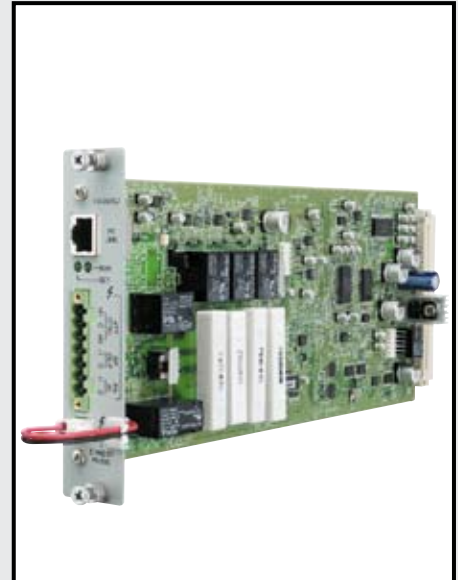
### Modules



**VX-200XI** (For VX-2000)



**VX-200XR** (For VX-2000)



**VX-200SZ** (For VX-2000SF)

### Features

- Audio Input Module with Control Input
- Control input terminals
- Low-cut and high-cut filters
- Gain controls
- Connects e.g. to paging microphone or other sound source equipment with both audio and control outputs
- Audio input sensitivity  $-70$  dB or  $-20$  dB by internal switch
- For VX-2000 frame's input module slot

### Features

- Remote Microphone Input Module for RM-200X Remote Microphone or RM-200XF Fireman's Microphone
- For VX-2000 frame's input module slot

### Features

- Audio output module with impedance detection
- Speaker line impedance detection
- For VX-2000SF Surveillance Frame
- Detection of speaker line short circuits, open circuits by comparing impedance values, and ground fault

### Specifications

	VX-200XI	VX-200XR
<b>Power Source</b>	Supplied from VX-2000	Supplied from VX-2000
<b>Current Consumption</b>	Under 30 mA	Under 17 mA
<b>Connectable Microphones</b>	–	RM-200X and RM-200XF
<b>Input Sensitivity</b>	MIC: $-70$ to $-42.5$ dBV LINE: $-20$ to $+7.5$ dBV MIC or LINE with selector switch	
<b>Control Input</b>	No-voltage make contact, open voltage: 17 V DC, short circuit current: Under 5 mA	–
<b>Input Connector</b>	RJ45 female connector	RJ45 female connector
<b>Finish</b>	Panel: Aluminium, hairline	Panel: Aluminium, hairline
<b>Dimensions (W x H x D)</b>	35 x 78 x 88 mm	35 x 78 x 88 mm
<b>Weight</b>	70 g	70 g
<b>Applicable Model</b>	VX-2000	VX-2000

	VX-200SZ	VX-200SZ-2 (s. next page)
<b>Power Source</b>	Supplied from VX-2000SF	Supplied from VX-2000SF
<b>Current Consumption</b>	Under 150 mA	Under 170 mA
<b>Speaker Output</b>	Plug-in screw connector	2 outputs (A, B), plug-in screw connector
<b>Power Amplifier Input</b>	Plug-in screw connector for connecting the VP-2064, VP-2122, VP-2241, VP-2421 power amplifier	
<b>Fault Detection System</b>	Short circuit, open circuit (impedance detection method), ground fault	
<b>Finish</b>	Panel: Surface-treated steel plate	
<b>Dimensions (W x H x D)</b>	30.5 x 132.6 x 290.3 mm	
<b>Weight</b>	320 g	335 g
<b>Applicable Model</b>	VX-2000SF	VX-2000SF



## VX-2000 Series

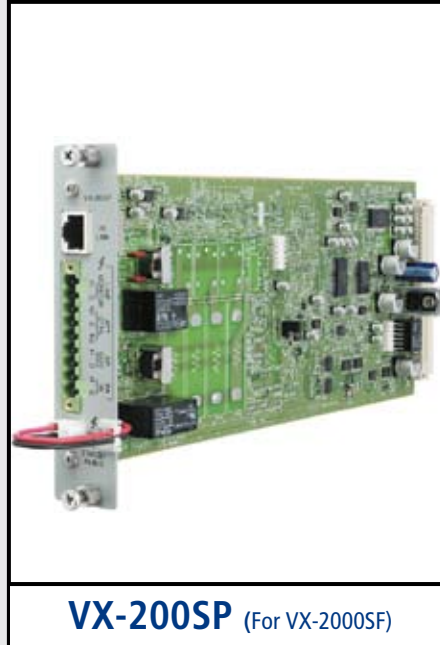
### Modules



**VX-200SZ-2** (For VX-2000SF)

#### Features

- Audio Output Module with Impedance Detection
- 2 speaker outputs (A and B), broadcasts can be maintained even if 1 of the 2 outputs fails
- Failures indication by LED on the panel



**VX-200SP** (For VX-2000SF)

#### Features

- Audio Output Module with Pilot Tone Detection
- For speaker line monitoring
- Detection of speaker line short circuits, open circuits by monitoring for the presence of a pilot signal, and ground fault



**VX-200SP-2** (For VX-2000SF)

#### Features

- Consists of Audio Output Module with Pilot Tone Detection + End of Line Module
- Connected to the end of the speaker line
- Eliminates the necessity of using the speaker line for line monitoring
- Shielded cable must be used for the speaker line

### Specifications

	VX-200SP	VX-200SP-2
<b>Power Source</b>	Supplied from VX-2000SF	Supplied from VX-2000SF
<b>Current Consumption</b>	Under 100 mA	Under 100 mA
<b>Power Amplifier Link</b>	RJ45 female connector for connecting the VP-2064, VP-2122, VP-2241, VP-2421	Power Amplifier.
<b>Line Monitor</b>	Plug-in screw connector	Plug-in screw connector
<b>External Attenuator</b>	Plug-in screw connector, relay, no-voltage make contact output	Plug-in screw connector, relay, no-voltage make contact output
<b>Control Output</b>	Transfer type, withstand voltage: 30 V DC, 250 V AC, contact current: Under 7A	Transfer type, withstand voltage: 30 V DC, 250 V AC, contact current: Under 7A
<b>Speaker Output</b>	Plug-in screw connector	Plug-in screw connector
<b>Power Amplifier Input</b>	Plug-in screw connector for connecting the VP-2064, VP-2122, VP-2241, VP-2421	Power Amplifier
<b>Fault Detection System</b>	Short circuit, open circuit (pilot tone detection method), ground fault	Short circuit, open circuit (pilot tone detection method), ground fault
<b>Finish</b>	Panel: Surface-treated steel plate	Panel: Surface-treated steel plate
<b>Dimensions (W x H x D)</b>	30.5 x 132.6 x 290.3 mm	30.5 x 132.6 x 290.3 mm
<b>Weight</b>	240 g	235 g
<b>Applicable Model</b>	VX-2000SF	VX-2000SF
<b>End Of Line Unit (Accessory)</b>	-	Power supplied from the VX-200SP-2, speaker line connection: Plug-in connector, weight: 22 g



## VX-2000 Series

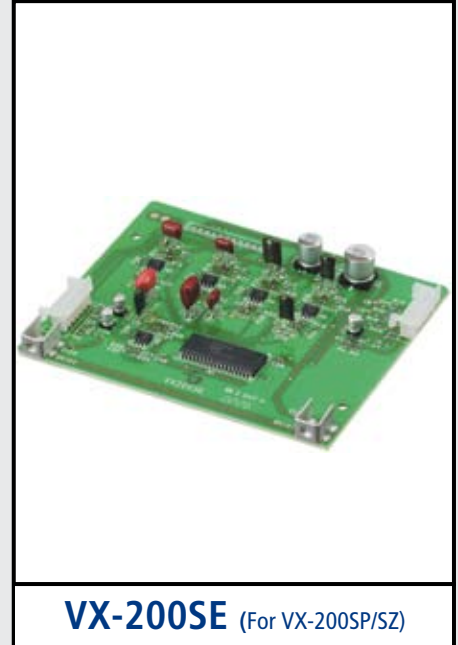
### Modules



**VX-200SO** (For VX-2000SF)



**VX-200SI** (For VX-2000SF)



**VX-200SE** (For VX-2000SP/SZ)

### Features

- Control Output Module
- Increases the number of control outputs in the VX-2000 system
- 16 control outputs
- No-voltage "make" contacts can be output to external equipment depending on the internal event
- Up to 128 control outputs per system

### Features

- Control Input Module
- Increases the number of control inputs
- 16 control inputs
- Receives a contact signal from connected external equipment and controls the system
- Up to 128 control inputs per system

### Features

- Equalizer Card
- 9-band, 1-channel equalizer
- To be mounted on the circuit board of VX-200SP Pilot Tone Detection module
- VX-200SP-2 Pilot Tone Detection module
- VX-200SZ Impedance Detection module
- VX-200SZ-2 Impedance Detection module
- Settings are performed by using the VX-2000 setting software

### Specifications

	VX-200SO	VX-200SI	VX-200SE
<b>Power Source</b>	Supplied from VX-2000SF	Supplied from VX-2000SF	Supplied from VX-2000SZ/ SZ2, VX-2000SP/ SP2
<b>Current Consumption</b>	<150 mA	< 100 mA	< 50 mA
<b>Equalizer Centre Frequency</b>	–	–	80 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 12 kHz
<b>Gain Range</b>	–	–	±12 dB, adjustable in 2 dB steps
<b>Control Output</b>	16 outputs, no-voltage make contact, contact capacity: 28 V DC, 1A, RJ45 connector	16 inputs, no-voltage make contact, open voltage: 24 V DC, short circuit current: under 10mA, RJ45 connector	–
<b>Finish</b>	Panel: Surface-treated steel plate	Panel: Surface-treated steel plate	
<b>Dimensions (W x H x D)</b>	30.5 x 132.6 x 290.3 mm	30.5 x 132.6 x 290.3 mm	110 x 90 x 21.4 mm
<b>Weight</b>	250 g	200 g	50 g
<b>Applicable Model</b>	VX-2000SF	VX-2000SF	VX-2000SZ, VX2000SZ2, VX-2000SP, VX-2000SP2



## VX-2000 Series

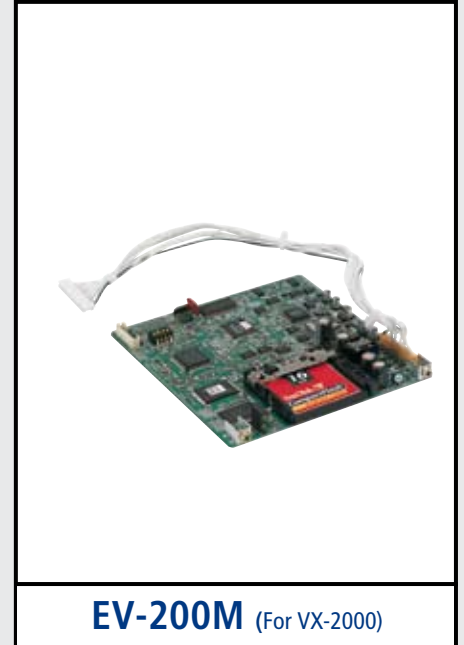
### Modules



**VP-200VX** (For VP-2000 Amps)



**VP-200VX BGM** (For VP-2000 Amps)



**EV-200M** (For VX-2000)

### Features

- Power Amplifier Input Module
- For transmission of status and audio signal between amplifier and control module
- To be built-in in the VP-2064, VP-2122, VP-2241 or VP-2421 power amplifier

### Features

- Power Amplifier BGM Input Module
- For mixing the audio signal of the VX-2000 system with an audio signal of an external input

### Features

- Voice Announcement Board for playback
- Up to 2 modules for a VX-2000 system
- Up to 8 programs
- Includes compact memory flash card (128MB)

### Specifications

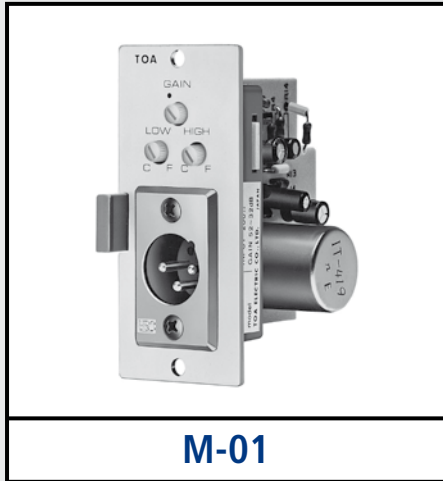
	VP-200VX	EV-200M
<b>Power Source</b>	Supplied from VP-2064, VP-2122, VP-2241 or VP-2421	24 V DC, 0.2 A
<b>Power Consumption</b>	< 30 mA	5 W
<b>Output</b>	—	0 dBV
<b>Frequency Response</b>	—	20 Hz ... 20000 Hz (44.1 kHz sampling)
<b>Power Amplifier Link</b>	RJ45 connector for connecting the VX-2005P/SP2 or VX-2005Z/SZ2 audio output module	—
<b>Distortion</b>	—	Under 0.3% (44.1 kHz, recording method: Extremely high)
<b>Playback Mode</b>	—	Single source playback
<b>No. of Playback Program</b>	—	8 programs
<b>Operating Temperature</b>	—	0°C to +50°C
<b>Finish</b>	Panel: Surface-treated steel plate	—
<b>Dimensions (W x H x D)</b>	88 x 25.8 x 83.2 mm	120 x 18.6 x 121 mm
<b>Weight</b>	50 g	110 g
<b>Applicable Model</b>	VP-2064, VP-2122, VP-2241, VP-2421	VX-2000



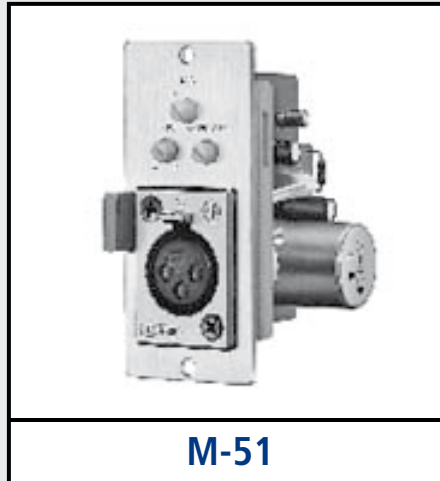


## VX-2000 Series

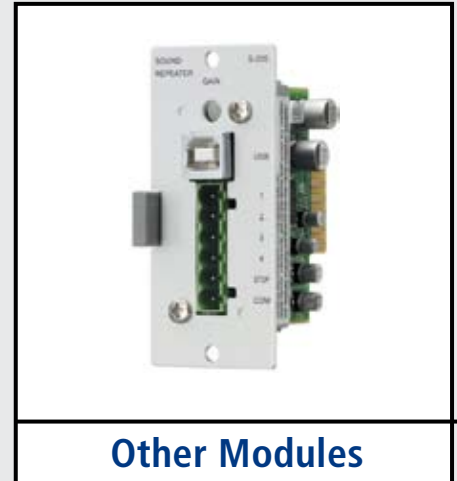
### Accessory Modules



**M-01**



**M-51**



**Other Modules**

### Features

- Microphone input module
- Phantom power
- Balanced, low impedance
- Filter: High pass, low pass
- Connector:  
M-01M: XLR  
M-01P: 1/4" phone plug  
M-01S: Screw terminal
- Non-RoHS product

### Features

- Microphone input module
- Phantom power
- Balanced, low impedance
- Filter: High pass, low pass
- Voice gate function, sensitivity adjustable
- Connector:  
M-51F: XLR  
M-51S: Screw terminal
- Non-RoHS product

### Features

- U-03R Module  
Input (for VX-2000)
- U-01F Module  
Aux input (for VX-2000)
- U-01S Module  
Input (for VX-2000)
- S-20S  
Voice Announcement Board (for VX-2000SF)  
Non-RoHS product

### Specifications

	M-01	M-51	U-01	U-03
<b>Input Impedance</b>	200 Ohm, balanced	200 Ohm, balanced	220 kOhm, unbalanced	220 kOhm, unbalanced
<b>Current Consumption</b>	9 mA	27 mA	—	< 8 mA
<b>Sensitivity</b>	-60 dBV	-60 dBV	-20 dBV	-20 dBV
<b>Frequency range</b>	25 Hz ... 20000 Hz	25 Hz ... 20000 Hz	20 Hz ... 20000 Hz	20 Hz ... 20000 Hz
<b>Finish</b>	Front: Steel plate	Front: Steel plate	Front: Steel plate	Front: Steel plate
<b>Dimensions (W x H x D)</b>	35 x 78 x 88 mm	35 x 78 x 88 mm	35 x 78 x 88 mm	35 x 78 x 88 mm
<b>Weight</b>	110 g	110 g	75 g	50 g
<b>Applicable Model</b>	VX-2000	VX-2000	VX-2000	VX-2000



## SX-2000 Series

### Network Audio Management System for large-scale system installations



**SX-2000 Series**

## Description

The SX-2000 is a scalable system used for versatile and highly effective PA systems. The system features new matrixing capabilities, so that a single system can have its components distributed across different locations under centralized control. Ideal for large scale installations ranging from local systems to multiple buildings, the SX-2000 Series is particularly suitable for use in airports, railway stations, factories, shopping malls and large offices. The system's redundancy such as dual power source and system connections enables fail-safe operation. At the same time it is a cost-effective solution for any specific installation without long lead times and the expense of custom systems.

### SX-2000 system configuration

The basic system comprises one SX-2100AI Audio Input Unit, one SX-2000AO or SX-2100AO Audio Output Unit and the SX-2000SM System Manager. It enables from 4 inputs/outputs right

up to 64 inputs and 256 outputs, with further expansion to 1416 control inputs/outputs if needed. The SX-2000 Series makes it simple to control an expanded system by use of networking with standard switching hubs and cables, IP Intercom Network audio adaptor(s) can also be used in the same network. It features functions such as feedback suppressor, compressor/auto-leveler, equalizer/filters, and auto mixing (with ducker) to ensure high sound quality. The SX-2100AI modular construction simplifies system configuration as it reduces use of plug-in modules. Therefore it allows flexibility of use with a wide range of input devices such as CD player, FM etc. to suit any particular application.

### Fail-safe operation

The system features a self-surveillance to continuously monitor its status as well as speaker lines and connections. It generates alerts and email notifications to the system administrator along

with a failure log. Power failure protection is provided by two power supply channels plus a battery back-up which keeps the system operational without requiring an UPS. An additional analog backup line from the microphone to the amplifier allows simultaneous broadcasting even during a breakdown of the system's digital functions. The SX-2000 system can be password-protected and front keys can be locked.

### Operational simplicity and easy maintenance

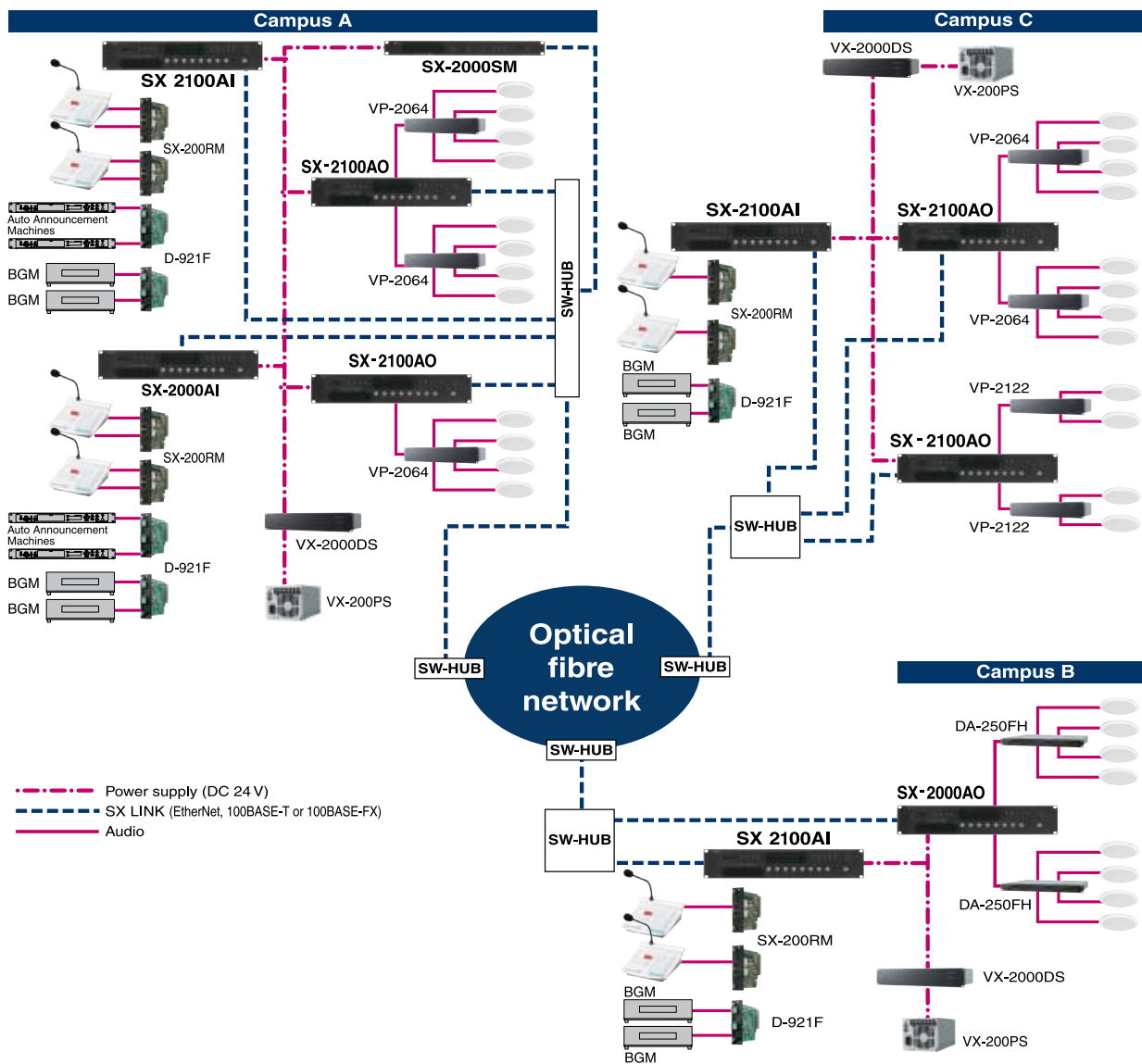
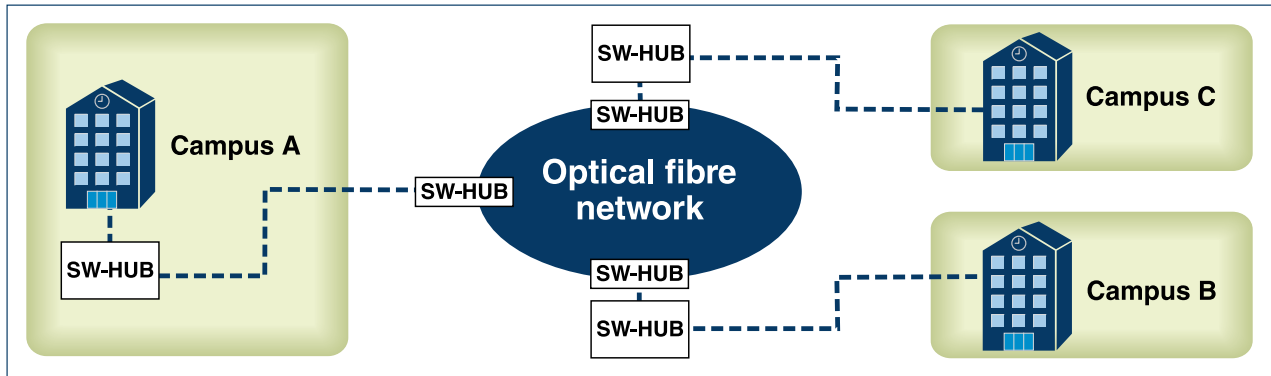
Control over the entire system is software-driven. Operation tasks are performed easily through menu and function buttons assisted by an LCD and status LEDs. Operation and maintenance tasks are easier compared to conventional systems.



## SX-2000 Series

### Application Example

#### Distributed Control System Example (University)





## SX-2000 Series

## System Manager



SX-2000SM

## Features

- Matrix system for Public Address and Voice Alarm
- Audio signal routing and priority control
- 8 control inputs, 8 control outputs
- Failure status outputs, failure data inputs/ switches
- Access indicators, mode indicators and failure indicators enabling a wide range of controls and status monitoring
- CF card slot
- Operations can be recorded on a CF card
- Redundant power system
- Automatic voice announcement for emergency purpose available
- System settings via LAN connection

## Options

- VP-2064: 60 W by 4 channels amplifier
- VP-2122: 120 W by 2 channels amplifier
- VP-2241: 240 W by 1 channel amplifier
- VP-2421: 420 W by 1 channel amplifier
- VX-2000DS: Emergency Power Supply
- VX-200PS: Power Supply Unit
- VX-2000PF: Power Supply Frame
- DA-250FH: Multichannel Power Amplifier

## Specifications

	SX-2000SM
Power Source	24 V DC; 2 power inputs
Current Consumption	Under 0.8 A
SX Link Network I/F	2 100BASE-TX circuits
Matrix System Specification	Bus: 16; audio input: Max. 64 ch, audio output: Max. 256 zones Contact input, contact output: Max. 1416 Priority control: 512 steps. Event log: Max. 1000 x 32 events
Matrix System Configuration	Connectable SX-2000AI No.: Max. 8 units. Connectable SX-2100AO No.: Max. 32 units. Connectable RM-200S No.: Max. 64 units (up to 8 RM-200S per SX-2000AI) Connection cable / device shielded category 5 twisted pair cable for LAN (CAT5-STP)
LAN	Network I/F 1 10BASE-T/100BASE-TX circuit. Network Protocol TCP/IP. Connection Cable Shielded Category 5 twisted pair cable for LAN (CAT5-STP)
Analog Link	Input/output connector output: 2. Connection cable shielded category 5 twisted pair cable for LAN (CAT5-STP)
Failure Data	3 inputs (ACK/RESET/LAMP TEST) and 4 outputs (CPU FAULT/GENERAL FAULT/CPU OFF/BUZZER)
Memory Card Slot	1 (supplied CF card (128MB))
Control	8 control outputs, 8 control inputs
Finish	Panel: Aluminium, black, alumite, case: Surface-treated steel plate
Dimensions (W x H x D)	482 x 44 x 333 mm
Weight	3.8 kg



## SX-2000 Series

### Audio Input Unit



**SX-2100AI** (front view / rear view)

### Features

- Modular audio input unit
- 2 up to 8 inputs per unit
- Multiple units can be decentralized in a whole system
- Audio signals are transmitted digitally to the audio output unit
- Analog audio output function (1 channel) enables simultaneous all-zone calls for use in emergency situations
- Level meters for each input channel

- Volumes can be adjusted for each channel using the volume controls on the front panel or the SX-2000 software
- Volume controls can be locked using the SX-2000 software
- Internal monitoring speaker
- Dual-redundant power supply system

### Options

- **SX-200RM**: Remote Microphone Interface Module
- **RM-200SF**: Remote Microphone
- **RM-200SA**: Remote Microphone
- **RM-210**: Extension Unit
- **D-921E**: Mic/Line Input Module
- **D-921F**: Mic/Line Input Module
- **D-922E**: Mic/Line Input Module
- **D-922F**: Mic/Line Input Module
- **D-936R**: Stereo Select Input Module

### Specifications

	<b>SX-2100AI</b>
<b>Power Source</b>	24 V DC (2 independant power inputs)
<b>Current Consumption</b>	Under 1.5 A
<b>Audio Input</b>	8 inputs, for up to 4 modules
<b>Audio Input Characteristics</b>	Sampling frequency: 48 kHz
<b>Analog Link Input / Output Connector Connection Cable / Device</b>	1 input, 1 output, CAT5-STP, max. cable length 800m, 2 x RJ45 connector
<b>SX Link Network I/F Connection Cable / Device</b>	2 x 100Base TX CAT5-STP, maximum cable length 100m to hub
<b>Operating Temperature</b>	0°C ... +40°C
<b>Finish</b>	Panel: Aluminium, black, alumite, case: Surface-treated steel plate
<b>Dimensions (W x H x D)</b>	482 x 88.4 x 349 mm
<b>Weight</b>	7.2 kg



## SX-2000 Series

### System Remote Microphones and Input Modules for SX-2100AI




**RM-200SA  
Remote Microphone**

The RM-200SA is a remote microphone designed for TOA's Matrix System. It is equipped with: 13 function switches (which can be used to select individual zones or zone groups), a covered switch, and corresponding indicators.


**RM-210  
Remote Microphone Extension**

The RM-210 is an extension unit for increasing the number of function keys of RM-200S, Remote Microphones.


**SX-2100AI (Rear)**




**SX-200RM  
Remote Microphone Interface Module**  
The SX-200RM is a dedicated remote microphone module for the SX-2000 Series audio input unit and can be used to connect two remote microphones. Input sensitivity can be adjusted.




**D-921E  
Mic/Line Input Module (24 bits monaural type)**  
The D-921E is a dedicated 2-channel microphone/line input module designed for use with the SX-2000AI and equipped with removable terminal block type connectors.




**D-921F  
Mic/Line Input Module (24 bits monaural type)**  
The D-921F is a dedicated 2-channel microphone/line input module designed for use with the SX-2000AI and equipped with XLR connectors.



**D-922E  
Mic/Line Input Module (20 bits monaural type)**  
The D-922E is a dedicated 2-channel microphone/line input module designed for use with the SX-2000AI and equipped with removable terminal block type connectors.



**D-922F  
Mic/Line Input Module (20 bits monaural type)**  
The D-922F is a dedicated 2-channel microphone/line input module designed for use with the SX-2000AI and equipped with XLR connectors.



**D-936R  
Stereo Select Input Module**  
The D-936R is a dedicated 4 stereo input module designed for use with the SX-2000AI and equipped with standard RCA pin jacks.

## SX-2000 Series



### Audio Output Unit



**SX-2000AO**

### Features

- Audio output unit
- Multiple units can be decentralised in a system
- 8 audio outputs and 2 inputs can be mixed
- 8 control inputs and 8 control outputs
- Receives audio signals from the audio input unit via LAN
- Analog audio input function (1 channel) enables simultaneous all-zone calls for use in emergency situations
- Level meters for each output channel
- Key lock function for volume controls
- Volumes adjustable for each channel by front volume controls or the SX-2000 software
- The volume controls can be locked by SX-2000 software
- Internal monitoring speaker
- Emergency audio input and 24V emergency cut-off input
- 2 power inputs for dual-redundant power supply system

### Options

- **VP-2064:** 60 W by 4 channels amplifier
- **VP-2122:** 120 W by 2 channels amplifier
- **VP-2241:** 240 W by 1 channel amplifier
- **VP-2421:** 420 W by 1 channel amplifier
- **VX-2000DS:** Emergency Power Supply
- **VX-200PS:** Power Supply Unit
- **VX-2000PF:** Power Supply Frame

### Specifications

	<b>SX-2000AO</b>
<b>Power Source</b>	24 V DC (operating range: 20 – 40V DC from VX-200PS)
<b>Current Consumption</b>	Under 0.79 A
<b>Audio Output</b>	8 outputs, 0 dB, load: 600 Ohm or more
<b>Audio Output Characteristics</b>	Frequency Response: 20 Hz ... 20000 Hz , sampling frequency 48 kHz, D/A converter 24 bit
<b>Control Input / Control Output</b>	8 inputs / 8 outputs, removable terminal blocks (6 pins)
<b>Emergency Line Input</b>	Emergency signals switched and sent to input 1 (H,C,E) by relay, removable terminal blocks (3 pins)
<b>Emergency-Cutoff 24 V Input</b>	1 input, input current < 5 mA, removable terminal block (2 pins)
<b>Analog Link</b>	1 input, 1 output, connection cable CAT5-STP, max. cable length 800m, 2 x RJ45 connector
<b>SX Link</b>	2 x 100 Base TX with RJ 45 connector. Connection cable CAT5-STP, maximum cable length of 100m to hub
<b>Operating Temperature</b>	0° C ... +40° C
<b>Finish</b>	Panel: Aluminium, black, alumite, case: Surface-treated steel plate
<b>Dimensions (W x H x D)</b>	482 x 88.4 x 349 mm
<b>Weight</b>	6.2 kg



## SX-2000 Series

## Audio Output Unit



SX-2100AO

## Features

- Multiple units can be decentralised in a system
- 8 audio outputs
- 8 control inputs and 8 control outputs
- 1 SX-2000CI Control Input Unit and 1 SX-2000CO Control Output Unit can be connected
- 2 local audio inputs with control inputs
- Emergency switchover to a standby amplifier
- Analog transmission path (1 channel) enables all-zone calls for use in emergency situations
- 2 channels of link connection terminals for connecting 2 VX-2000DS
- 2 inputs can be mixed and output.
- 2 power inputs for redundant power supply
- Level meters for each output channel allow monitoring of audio output levels
- Output volumes adjustable on the front panel
- Internal monitoring speaker
- Key-lock function

## Options

- VP-2064: 60 W by 4 channels amplifier
- VP-2122: 120 W by 2 channels amplifier
- VP-2241: 240 W by 1 channel amplifier
- VP-2421: 420 W by 1 channel amplifier
- VX-2000DS: Emergency Power Supply
- VX-200PS: Power Supply Unit
- VX-2000PF: Power Supply Frame

## Specifications

	SX-2100AO
Power Source	24 V DC (operating range: 20 – 40V DC from VX-200PS)
Current Consumption	Under 1.2 A
Audio Output	8 outputs, 0 dB, load: 600 Ohm or more
Audio Output Characteristics	Frequency Response: 20 Hz ... 20000 Hz, sampling frequency 48 kHz, D/A converter 24 bit
CI/CO Link	SX-2000CI / SX-2000CO: 1 interface, connection cable CAT5-STP, RJ45 connector
Local Audio Input	2 audio inputs, 0 dB, 10 kOhm, electronically balanced, RJ45 connector Frequency Response: 20 Hz ... 20000 Hz, sampling frequency 48 kHz, D/A converter 24 bit 2 Control inputs Connection cable CAT5-STP,
DS Link	VX-2000DS: 2 interface links, connection cable CAT5-STP, RJ45 connector
Analog Link	1 input, 1 output, connection cable CAT5-STP, RJ45 connector
SX Link	2 x 100 Base TX with RJ 45 connector. Connection cable CAT5-STP
Control Inputs / Outputs	8 / 8
Operating Temperature	0° C to +40° C
Finish	Panel: Aluminium, black, alumite, case: Surface-treated steel plate
Dimensions (W x H x D)	482 x 88.4 x 349 mm
Weight	7.1 kg



## SX-2000 Series



### Control Input Unit



**SX-2000CI**

#### Features

- Decentralised installation possible
- 32 control inputs
- Control input line failure detection
- Front panel LED for line status monitoring
- Supply of stabilized 24 V DC
- 2 independent power inputs
- RJ45 connectors

#### Options

SX-2100AI Audio Input Unit

#### Application

Airports, Exhibiton Centres, Event Centres, Hotels

### Specifications

	<b>SX-2000CI</b>
<b>Power Source</b>	24 V DC, (operating range: 20 – 40V DC from VX-200PS)
<b>Current Consumption</b>	Under 0.55 A (when operated on 24 V DC)
<b>Control Inputs</b>	32 inputs, no-voltage make contact input, open voltage: 24V DC, short-circuit current: 2mA, photo coupler input, removable terminal block (16 pins)
<b>CI/CO Link</b>	Input: 1 input, output: 1 output, input/output connector : RJ45 connector Connection cable: Shielded category 5 twisted pair cable (CAT5-STP)
<b>Maximum Cable Distance</b>	800 m
<b>Finish</b>	Panel: Aluminium black, alumite, Case: Steel plate
<b>Dimensions (W x H x D)</b>	482 x 44 x 331.5 mm
<b>Weight</b>	3.6 kg



## SX-2000 Series

### Control Output Unit



### SX-2000CO

#### Features

- Decentralised installation possible
- 32 control outputs
- Control input line failure detection
- Front panel LED for line status monitoring
- Supply of stabilized 24 V DC
- 2 independent power inputs
- RJ45 connectors

#### Options

SX-2000AO Audio Output Unit

#### Application

Airports, Exhibiton Centres, Event Centres, Hotels

### Specifications

	SX-2000CO
Power Source	24 V DC, (operating range: 20 – 40V DC from VX-200PS)
Current Consumption	Under 0.29A (when operated on 24V DC)
Control Outputs	32 outputs no-voltage make contact output, relay contact output (withstand voltage: 40V DC, control current 2 mA to 300 mA), removable terminal block (16 pins)
CI/CO Link	Input: 1 input, output: 1 output, input/output connector : RJ45 connector Connection cable: Shielded category 5 twisted pair cable (CAT5-STP)
Maximum Cable Distance	800 m
Finish	Panel: Aluminium black, alumite, Case: Steel plate
Dimensions (W x H x D)	482 x 44 x 331.5 mm
Weight	3.6 kg

## SX-2000 Series



### Remote Microphone Input Module



**SX-200RM**

#### Features

- Input Module for mounting in the SX-2100AI
- 2 independent power inputs
- RJ45 connectors
- Input sensitivity separately adjustable

#### Options

- SX-2100AI: Audio Input Unit
- RM-200SA: Remote Microphone
- RM-200SF: Fireman's Microphone
- RM-210: Microphone Extension

### Specifications

	<b>SX-200RM</b>
<b>Power Source</b>	Supplied from SX-2100AI
<b>Input</b>	Monaural x 2, 0 dB (0 dB=0.775V), 10 Ohm, RCA pin jack
<b>A/D Converter</b>	24 bits
<b>Sampling Frequency</b>	48 kHz
<b>Finish</b>	Panel: Pre-coated steel plate, black, 30% gloss
<b>Dimensions (W x H x D)</b>	35 x 119.5 x 178.4 mm
<b>Weight</b>	190 g
<b>Applicable Model</b>	SX-2100AI



## SX-2000 Series

### Remote Microphone



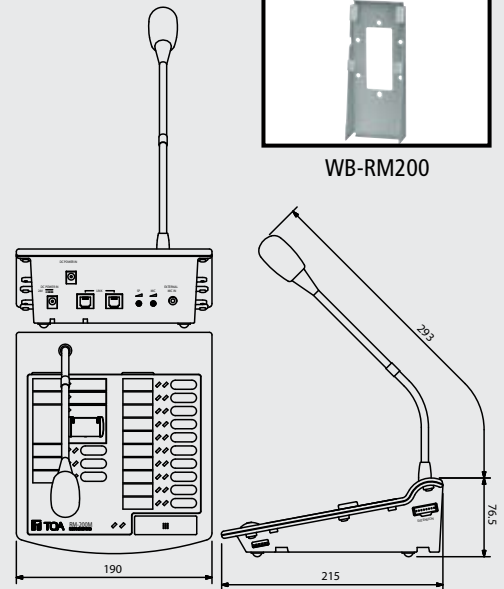
**RM-200SA / RM-210**



RM-200S



Function Keys



WB-RM200

### Features

- Elegant design
- 13 function switches
- Zone, group, all-call paging, and start of pre-recorded messages
- Emergency sequence can be started with the alarm button which is covered by a hinged lid
- Indication of system failure, line failure, busy zones etc.
- Extraordinary clarity and distortion-free reproduction through built-in compression circuit
- Up to 64 remote microphones can be connected
- Covered switch prevents against accidental use
- Up to 800 m total cable length
- RM-210: Keyboard extension with 10 buttons
- Colour: Bluish grey

### Options

- SX-200RM: Input Module
- WH-4000A: Headset
- WB-RM200: Wall mounting bracket

### Specifications

	RM-200SA	RM-210
<b>Power Requirement</b>	24 V DC (Operating range: 15 – 40 V DC)	From RM-200SA
<b>Current Consumption</b>	290 mA maximum	20 mA max. (in terms of DC power inputs of RM-200SA)
<b>Distortion</b>	< 1%	-
<b>Frequency Response</b>	100 – 20,000 Hz	-
<b>Signal-to-Noise Ratio</b>	> 60 dB	-
<b>Audio Output</b>	0 dBV, 600 Ohm, balanced	-
<b>Microphone</b>	Uni directional electret condenser microphone, AGC	-
<b>Monitor Speaker</b>	Built-in	-
<b>Emergency Broadcast</b>	Activation of emergency broadcast (pre-recorded announcement or live microphone announcement) by emergency broadcast switch	-
<b>Voice Message Control</b>	Activation of 5 messages	-
<b>Key Extension</b>	Max. 4 extensions	10 keys
<b>Connection Cable and Connector</b>	Category 5 STP cable, RJ45 connector	Connection to RM-200SA by way of dedicated cable
<b>Finish</b>	ABS resin, bluish grey	ABS resin, bluish grey (PANTONE 538 or its equivalent)
<b>Dimensions (W x H x D)</b>	190 × 76.5 × 215 mm (Gooseneck microphone excluded)	110 × 76.5 × 215 mm
<b>Weight</b>	880 g	350 g

## SX-2000 Series



### Fireman's Microphone



**RM-200SF**



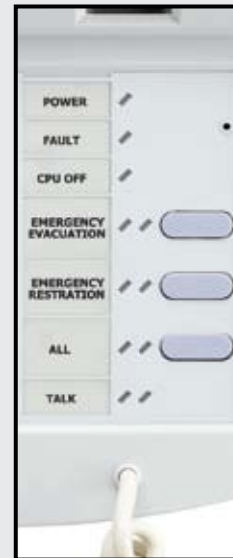
RM-210



Alarm-Switch



Microphone



Function Keys

### Features

- Only for emergency broadcasts made by firemen for evacuation
- For activation of emergency mode, start and stop of automatic emergency announcements, reset emergency signals, and live microphone announcements
- CPU OFF switch allows all-zone calls (simultaneous all calls with attenuator override). No general broadcasts can be made.
- The RM-200SF Fireman's Microphone Extension enables zone selection or failure indication/failure reset function.
- Additional 10 function keys per RM-210 extension unit.

### Specifications

	<b>RM-200SF</b>
<b>Power Requirement</b>	24 V DC (Operating range: 15 – 40 V DC)
<b>Current Consumption</b>	240 mA maximum
<b>Distortion</b>	< 1%
<b>Frequency Response</b>	200 – 15,000 Hz
<b>Signal-to-Noise Ratio</b>	> 55 dB
<b>Microphone</b>	Unidirectional dynamic microphone with AGC
<b>Volume Control</b>	Microphone, buzzer
<b>Operation key</b>	Emergency key, Evacuate key, Alert key, Emergency reset key, CPU switch, Reset switch
<b>Key Extension</b>	10 keys with RM-210, max. 5x RM-210, extension connector
<b>Connection Cable</b>	Shielded CPEF cable or Category 5 STP cable, M3 screw terminal
<b>Finish</b>	ABS resin, bluish gray
<b>Dimensions (W x H x D)</b>	200 x 215 x 95 mm
<b>Weight</b>	1.48 kg (with bracket)



## Ceiling Speaker



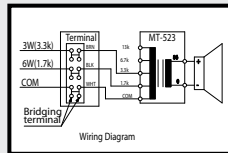
### Firedome Ceiling-Mount Speaker (EN 54 certified model!)



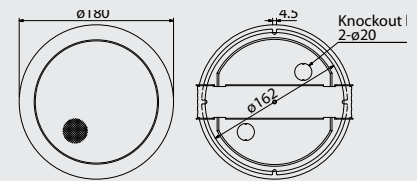
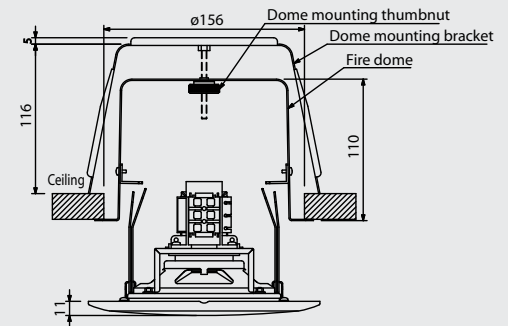
Rim and Grille



Ceramic Screw Terminal



Wiring Diagram



### Features

- Ceiling Speaker
- 6 W (rated input)
- Steel fire dome
- Easy installation with spring catches
- For mounting in 156 mm holes
- Baffle, frame, net: Aluminium
- Colour: Off-white (equivalent RAL 9010)
- PC-1867FC is EN 54-24 certified and is therefore legalised for a use in conjunction with fire detection systems.
- 12 cm speaker
- Ceramic screw terminal block (In compliance with British Standard BS5839 Part 8)

### Applications

Especially for environments with demanding safety requirements of fire protection in public buildings like train terminals, supermarkets, office buildings, hotels and fitness centers  
For voice alarm systems according to EN 54-24

### Certificates

- EN 54-24 : 1438/CPD/0183 Type A, ISO 7240-24 , according BS 5839-8

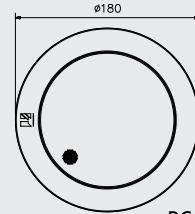
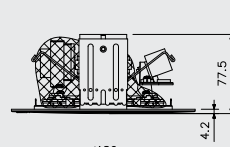
### Specifications

	PC-1867FC
Dynamic Cone Driver	12 cm
Rated Input	6 W (100 V), 3 W (70 V)
Tappings 100 V	6 W / 3 W / 1.5 W / 0.8 W
Tappings 70 V	3 W / 1.5 W / 0.8 W / 0.4 W
Frequency Response	100 Hz ... 16 kHz
SPL (1W, 1m)	90 dB
SPL at Rated Input (1 m)	98 dB
Dimension of Baffle	$\phi$ 180 mm
Mounting Depth	110 mm
Ceiling Hole Diameter	156 mm
Weight	1.3 kg (with bracket, firedome)

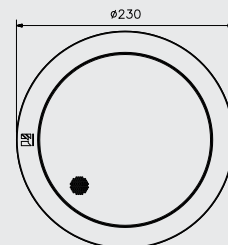
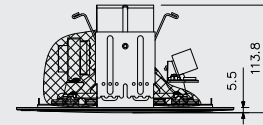
## Ceiling Speakers



### Certified Ceiling Mount Speaker



PC-1869EN



PC-2369EN

### Features

- Flat front panel
- For mounting in 110 mm depth (PC-2369EN) or 80 mm depth (PC-1869EN)
- Ceramic screw terminal block and thermal fuse
- Quick and easy installation

### Certificates

- EN 54-24 : 0359-CPD-0100, Type A, ISO 7240-24 (PC-1869 EN)
- EN 54-24 : 0359-CPD-0101, Type A, ISO 7240-24 (PC-2369 EN)

### Applications

Ideal for use in any kind of public building where pagings and BGM are broadcasted  
 PC-1869EN / PC-2369EN for voice evacuation systems according to EN 54

### Specifications

	PC-1869EN	PC-2369EN
<b>Speaker Component</b>	12 cm cone type	16 cm double cone type
<b>Rated Input</b>	6 W (100 V), 3 W (70 V)	6 W (100 V), 3 W (70 V)
<b>Tappings 100 V</b>	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W
<b>Tappings 70 V</b>	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W
<b>Frequency Response</b>	100 Hz ... 18 000 Hz	70 Hz ... 18 000 Hz
<b>SPL (1 W, 1 m)</b>	94 dB (1 W / 1 m, 500 Hz - 5 kHz)	94 dB (1 W / 1 m, 500 Hz - 5 kHz)
<b>Dimension</b>	ø 180 x 80 mm	ø 230 x 110 mm
<b>Mounting Depth</b>	80 mm	110 mm
<b>Weight</b>	820 g	1.1 kg
<b>Other Features</b>	Ceramic screw terminals, thermal fuse	
<b>Finish</b>	Steel, white paint (equiv. RAL 9010)	
<b>Certificates</b>	EN 54-24: 0359-CPD-0100, Type A ISO 7240-24	EN 54-24: 0359-CPD-0101, Type A ISO 7240-24
<b>IP Grade</b>	IP 21c	IP 21c



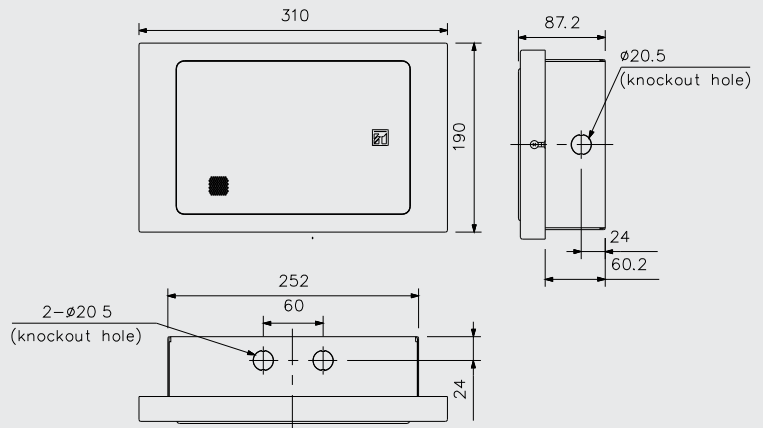
## Wall Mount Speakers



### Metal cabinet speaker (certified)



**BS-680FC** (EN 54-24 certified)



### Features

- Surface- or flush-mounting
- High sound quality through 16 cm double cone speaker
- High sound pressure level
- Colour: off-white (RAL 9010 or equivalent)
- BS-680FC is EN 54-24 certified and is therefore eligible for use in conjunction with fire detection systems.  
Certificate No : 1438/CPD/0178
- In compliance with BS 5839 part 8 (BS-680FC)
- Bridge wiring possible
- Two ceramic screw terminal blocks and thermal fuse (BS-680FC)
- Enclosure metal, punched net grille
- Mounting bracket: Zinc coated steel plate with stainless steel bolts
- For 100 V / 70 V Systems

### Applications

Voice Evacuation Systems according to EN 54-24  
Public Address Systems in public buildings and hotels

### Certificate

- BS-680FC: EN 54-24 : 1438/CPD/0178 Type A, ISO 7240-24, according BS 5839-8

### Specifications

	BS-680FC
Speaker Element	16 cm double cone type
Rated Input	6 W (100 V) / 3 W (70 V)
Tappings 100 V	6 W / 3 W / 1.5 W / 0.8 W
Tappings 70 V	3 W / 1.5 W / 0.8 W / 0.4 W
Frequency Response	150 Hz ... 20000 Hz
SPL (1 W, 1 m)	94 dB
Connector	Screw terminal (ceramic) bridging + thermal fuse
Dimensions (W x H x D)	310 x 190 x 87.2 mm
Weight	2.6 kg
Other Features	EN 54 certified, BS 5839-8 equivalent



## Wall Mount Speakers



### Modern design box speaker (certified)



**BS-1034EN**



Certificate (detail)

### Features

- Flat rectangular box speaker
- 10 W rated input
- High sound quality and clarity
- Vertical or horizontal mounting
- For wall-mount installation
- Colour: off-white
- Case: HIPS resin, punching net: SECC
- Bridge wiring available

### Applications

Voice Evacuation Systems according to EN 54-24  
Hotels, restaurants, conference rooms and department stores

### Certificate

- EN 54-24: 0359-CPD-0102, Type A, ISO 7240-24

### Specifications

	<b>BS-1034EN</b>
<b>Speaker Component</b>	LF: 12 cm cone type HF: 2.5 cm balanced dome tweeter
<b>Rated Input</b>	10 W
<b>Tappings 100 V</b>	10 W / 5 W / 3 W / 1 W
<b>Tappings 70 V</b>	10 W / 5 W / 2.5 W / 1.5 W / 0.5 W
<b>Frequency Response</b>	120 Hz ... 20000 Hz
<b>SPL (1 W, 1 m)</b>	89 dB
<b>Connectors</b>	Push-in terminal
<b>Dimensions (W x H x D)</b>	210 x 330 x 80 mm
<b>Weight</b>	1.4 kg
<b>Certificates</b>	EN 54-24: 0359-CPD-0102, Type A ISO 7240-24



## Wall Speakers



### Certified Cabinet Speaker for Wall Mounting (New!)



BS-678BSB



Certificate (detail)

### Features

- 6 W rated input
- Wooden cabinet with PVC sheet and HIPS baffle
- Colour off-white (BS-678BSW : RAL 9010 or equivalent) or black (BS-678BSB)
- Vertical or horizontal installation
- For wall-mount installation
- Easy impedance selection
- Bridge wiring possible
- 2 Ceramic screw terminals
- Thermal fuse
- According British standard

### Applications

Voice Evacuation Systems according to EN 54-24  
Universal use in VA systems. Especially if a future expansion of the system is expected

### Certificate

- EN 54-24 : 0359-CPD-0103 Type A, ISO 7240-24, according BS 5839-8

### Specifications

	BS-678BSW	BS-678BSB
Speaker Component	16 cm speaker	16 cm speaker
Rated Eingang	6 W (100 V) / 3 W (70 V)	6 W (100 V) / 3 W (70 V)
Tapping 100 V	6 W / 3 W / 1.5 W / 0.8 W	6 W / 3 W / 1.5 W / 0.8 W
Tapping 70 V	3 W / 1.5 W / 0.8 W / 0.4 W	3 W / 1.5 W / 0.8 W / 0.4 W
Frequency Response	150 Hz ... 18000 Hz	150 Hz ... 18000 Hz
SPL (1 W, 1 m)	94 dB	94 dB
Connection	Screw terminals (bridging possible)	Screw terminals (bridging possible)
Dimensions (W x H x D)	250 x 190 x 108 mm	250 x 190 x 108 mm
Colour	white	black
Weight	1.7 kg	1.7 kg
Certificate	EN 54 -24: 0359-CPD-0103, Type A, ISO 7240-24, according BS 5839-8	EN 54 -24: 0359-CPD-0103, Type A, ISO 7240-24, according BS 5839-8
Protection	IP 21c	IP 21c

## Wall Mount Speakers



### Certified 2-Way Speaker (New!)



**BS-1015BSB / BS-1015BSW**



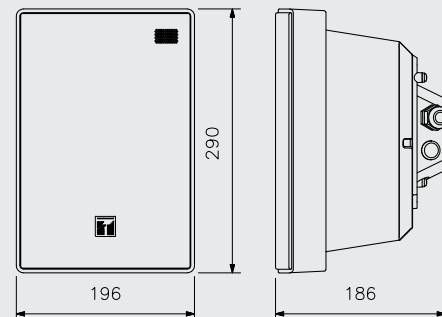
BS-1015BSW Detail



BS-1015BSB



Certificate (detail)



### Features

- Aesthetic design
- Various installation options
- Mounting: directly to a wall either vertically or horizontally or with mounting brackets (U-bracket or optional bracket SP-410) or flush-mount (optional frame SP-420 required)
- Colour: black (BS-1015BSB) or white (BS-1015BSW)
- Optimised for music reproduction and sound clarity
- Additional PG gland available
- Ceramic screw terminal
- Thermal fuse

### Options

- SP-410: Wall/Ceiling Mounting Bracket
- SP-420: Flush Mounting Frame
- ST-16A: Speaker Stand

### Applications

Voice Evacuation Systems according to EN 54-24  
Fits architecturally sophisticated environments.  
For music distribution or announcements e.g. in public buildings, traffic terminals, supermarkets, office towers, hotels and health clubs

### Certificate

- EN 54-24 : 0359-CPD-0104, Type A, ISO 7240-24, according to BS 5839-8

### Specifications

	BS-1015BSB / BS-1015BSW
Enclosure	2-way bass reflex type
Rated Input	15 W
Impedance	100 V / 70 V
Tappings (100 V / 70 V)	15 W / 10 W / 5 W
SPL (1 W / 1 m)	90 dB (1 W / 1 m)
Frequency Response	80 Hz ... 20 000 Hz
Speaker Components	12 cm dynamic cone-type speaker, 2.5 cm balanced dome tweeter
Speaker Cable	2-core cabtyre cable (diameter 6 mm)
Operating Temperature	-10°C ... +50°C
Protection	IP X3 (can be installed vertically or horizontally)
Material/Finish	BS-1015BSB: Enclosure; ABS resin, black, paint, grille; surface treated steel plate; BS-1015BSW: white
Dimensions (W x H x D)	196 x 290 x 186 mm (without bracket)
Weight	2.0 kg (without bracket)
Certificates	EN 54 -24: 0359-CPD-0104, Type A, ISO 7240-24, according to BS 5839-8



## Projection Speakers



### Certified Projection Speakers (New!)



PE-154EN / PE-154BS



PJ-154BS



Certificate (PJ-154BS)



Certificate (PE-154EN/BS)

### Features

#### PE-154BS / PE-154EN

- 15 W rated power
- 2-way speaker
- Rugged HIPS enclosure
- Excellent sound quality
- Colour: White (RAL 9010 or equivalent)
- 100 V or 70 V
- 5 m cable (PE-154EN) or 3 m fire resistant cable (PE-154BS)
- PE-154BS: 2 Ceramic screw terminals, thermal fuse, fire resistant cable, 5-core

#### PJ-154BS

- 15 W rated power
- 2-way projection speaker
- Wide frequency response
- Enclosure: Resin, grille: Steel
- Easy installation (mounting bracket included)
- Colour white (RAL 9010 or equivalent)
- 100 V or 70 V
- External connection box with PG-Gland
- 2 Ceramic screw terminals, thermal fuse
- Fire resistant cable, 5-core

### Applications

Voice Alarm Systems according to EN 54. Supermarkets, shopping malls, lobbies, rooms with great ceiling height, restaurants, bars, public buildings and schools, etc.

### Certificates

- PE-154EN, PE-154BS  
EN 54-24 : 0359-CPD-0105 Type A, ISO 7240-24, PE-154BS: BS 5839-8
- PJ-154BS:  
EN 54-24 : 0359-CPD-0106 Type A, ISO 7240-24, BS 5839-8

### Specifications

	PE-154BS	PE-154EN	PJ-154BS
<b>Speaker</b>	2-way speaker 12 cm cone type, 2.5 cm tweeter	2-way speaker 12 cm cone type, 2.5 cm tweeter	2-way speaker 12 cm cone type, 2.5 cm tweeter
<b>Rated Power</b>	15 W (100 V), 7.5 W (70 V)	15 W (100 V), 7.5 W (70 V)	15 W (100 V), 7.5 W (70 V)
<b>Impedance</b>	100 V / 70 V	100 V / 70 V	100 V / 70 V
<b>Tapping 100 V</b>	15 W / 10 W / 5 W	15 W / 10 W / 5 W	15 W / 10 W / 5 W
<b>Tapping 70 V</b>	7.5 W / 5 W / 2.5 W	7.5 W / 5 W / 2.5 W	7.5 W / 5 W / 2.5 W
<b>Frequency Response</b>	70 Hz...20000 Hz	70 Hz...20000 Hz	70 Hz ... 20000 Hz
<b>SPL (1 W, 1 m)</b>	91 dB	91 dB	91 dB
<b>Connection</b>	Ceramic screw terminals, thermal fuse, 3 m fire resistant cable, 5-core	Ceramic screw terminals, thermal fuse, 5 m cable, 2-core	Ceramic screw terminals, thermal fuse, fire resistant cable, 5-core, external connection box
<b>Dimensions</b>	ø 186 x 251 mm	ø 186 x 251 mm	ø 186 x 251mm
<b>Weight</b>	2.1 kg	2.1 kg	2.1 kg
<b>Certificate</b>	EN 54-24: 0359-CPD-0105, Type A ISO 7240-24, BS 5839-8	EN 54-24: 0359-CPD-0105, Type A	EN 54-24: 0359-CPD-0106, Type A ISO 7240-24, BS 5839-8
<b>Protection</b>	IP 21c	IP 21c	IP 21c

## Projection Speakers



### Certified Splashproof Projection Speaker (New!)



CS-154BS



Front grille



Certificate (detail)

**CS-64BS / CS-154BS**

### Features

- Projection speaker
- 6 W (CS-64BS) or 15 W (CS-154BS) rated power
- Splash proof for outdoor use
- Lightweight and rugged construction
- High SPL
- 100 V or 70 V
- PG gland
- Ceramic screw terminals
- Thermal fuse
- Stainless steel bracket for easy installation
- Stainless steel screws

### Applications

Voice Evacuation Systems according to EN 54 Plants, park houses, stations, stadiums, swimming pools and outdoor areas, etc.

### Certificate

- EN 54-24 : 0359-CPD-0108 Type B, ISO 7240-24, according BS 5839-8 (CS-154BS)
- EN 54-24 : 0359-CPD-0107 Type B, ISO 7240-24, according BS 5839-8 (CS-64BS)

### Specifications

	CS-64BS	CS-154BS
<b>Speaker</b>	12 cm cone type	12 cm cone type
<b>Rated Power</b>	6 W (100 V / 70 V)	15 W (100 V / 70 V)
<b>Continuous Program</b>	9 W	22,5 W
<b>Tapping 100 V</b>	6 W / 3 W / 1 W	15 W / 10 W / 5 W
<b>Tapping 70 V</b>	6 W / 3 W / 1,5 W / 0,5 W	15 W / 7,5 W / 5 W / 2,5 W
<b>Frequency Response</b>	130 Hz ... 13000 Hz	150 Hz ... 15000 Hz
<b>SPL (1 W, 1 m)</b>	96 dB	97 dB
<b>Ambient temperature</b>	-20°C ... + 55°C	-20°C ... + 55°C
<b>Dimensions (B x H x T)</b>	233 x 224 x 249 mm	366 x 230 x 310 mm
<b>Weight</b>	1.7 kg	3.0 kg
<b>Connection</b>	Ceramic screw terminals, thermal fuse	Ceramic screw terminals, thermal fuse
<b>Finish</b>	ABS resin, white Front grille: Steel, dark grey	ABS resin, white Front grille: Steel, dark grey
<b>Certificate</b>	EN 54-24: 0359-CPD-0107, Type B, ISO 7240-24, accordings BS 5839-8	EN 54-24: 0359-CPD-0108, Type B, ISO 7240-24, according BS 5839-8
<b>Protection</b>	IP 34c	IP 65c



## Horn Speakers



### Certified Reflex Horn Speaker (New!)



Certificate (detail)

### Features

- Weatherproof for outdoor use IP-65
- Legalised for Voice Alarm Systems
- Very rugged and durable construction ensures long term reliable operation
- Oval horn for good intelligibility
- Wide frequency response
- Aluminium horn
- ABS driver housing
- Colour: white (RAL 9010 or equivalent)
- Extreme high SPL 109 dB (1 W / 1 m)
- 100 V or 70 V system
- Additional PG gland available
- Ceramic screw terminals
- Thermal fuse
- Stainless steel mounting brackets
- Shock resistant horn
- Easy impedance selection

### Applications

Voice Alarm Systems according to EN 54. Outdoor areas, factory premises, ships, park houses, stations, stadiums, open air pools, etc.

### Options

- YS-151S Mounting Bracket

### Certificate

- EN 54-24 : 0359-CPD-0109 Type B, ISO 7240-24, according BS 5839-8

### Specifications

	SC-615BS
Rated Power	15 W (100 V / 70 V)
Tapping 100 V	15 W / 10 W / 5 W / 3 W
Tapping 70 V	15 W / 7,5 W / 5 W / 2,5 W / 1,5 W
SPL (1 W, 1 m)	109 dB
Frequency Response	315 ... 12 500 Hz
Operating Temperature	-20 °C ... + 55 °C
Connection	Ceramic screw terminals, thermal fuse
Finish	Horn: Aluminium white coated, driver housing ABS Resin, stainless steel bracket
Dimensions (W x H x D)	172 x 200 x 229 mm
Weight	1,5 kg
Certificate	EN 54-24 : 0359-CPD-0109 Type B, ISO 7240-24 according BS 5839-8
Protection	IP-65c

## IP Intercom System N-8000



### N-8000 IP-Intercom and Voice Security System



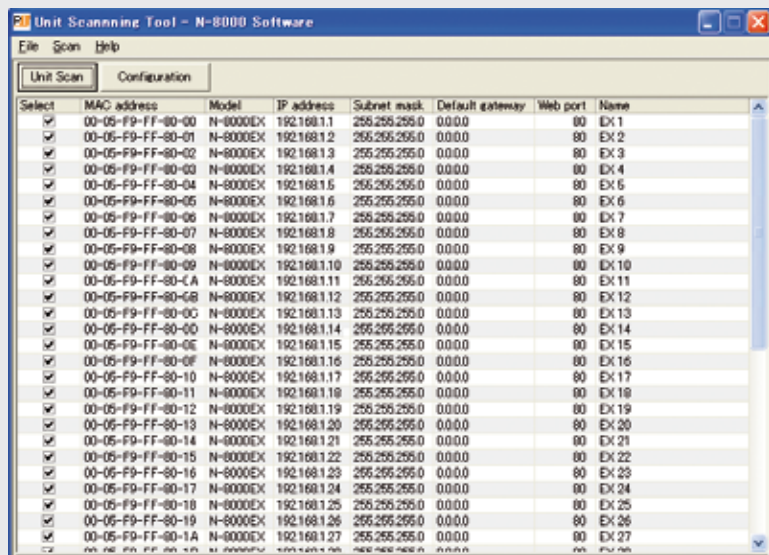
**N-8000 Series**

### Description

- IP network-compatible intercom system
- Efficient wide area connections even between remote locations
- Consists of exchange unit, interface units and dedicated stations
- From 2 up to 3072 stations and up to 16 stations per exchange
- Various types of stations: Master station with or without LCD display, hands-free stations, sub-stations, IP stations and heavy duty type, dust- and water-resistant (IP54) stations
- System maintenance by PC software available
- Mountable in EIA standard rack (1-unit size) or to a wall using the included brackets
- Echo canceller function for easy hands-free full-duplex conversation between stations
- Stations with built-in speaker which allows station paging
- Dial functions: Redial, recall, short / automatic dialing, group call, busy / no answer / no response call forwarding, call hold, and scan monitor
- High quality audio with frequencies up to 7 kHz

### Features

- for extra clarity
- PA paging by external PA systems
- Total broadcast capabilities of up to 192 zones with paging and all-zone paging
- Employs packet audio technology
- Network interface allowing up to 192 exchanges to be connected over a network using additional network intercom exchanges
- Simple system setup with only 2 IP stations possible



Automatic Unit Detection for Easy Access also in large systems

### Applications

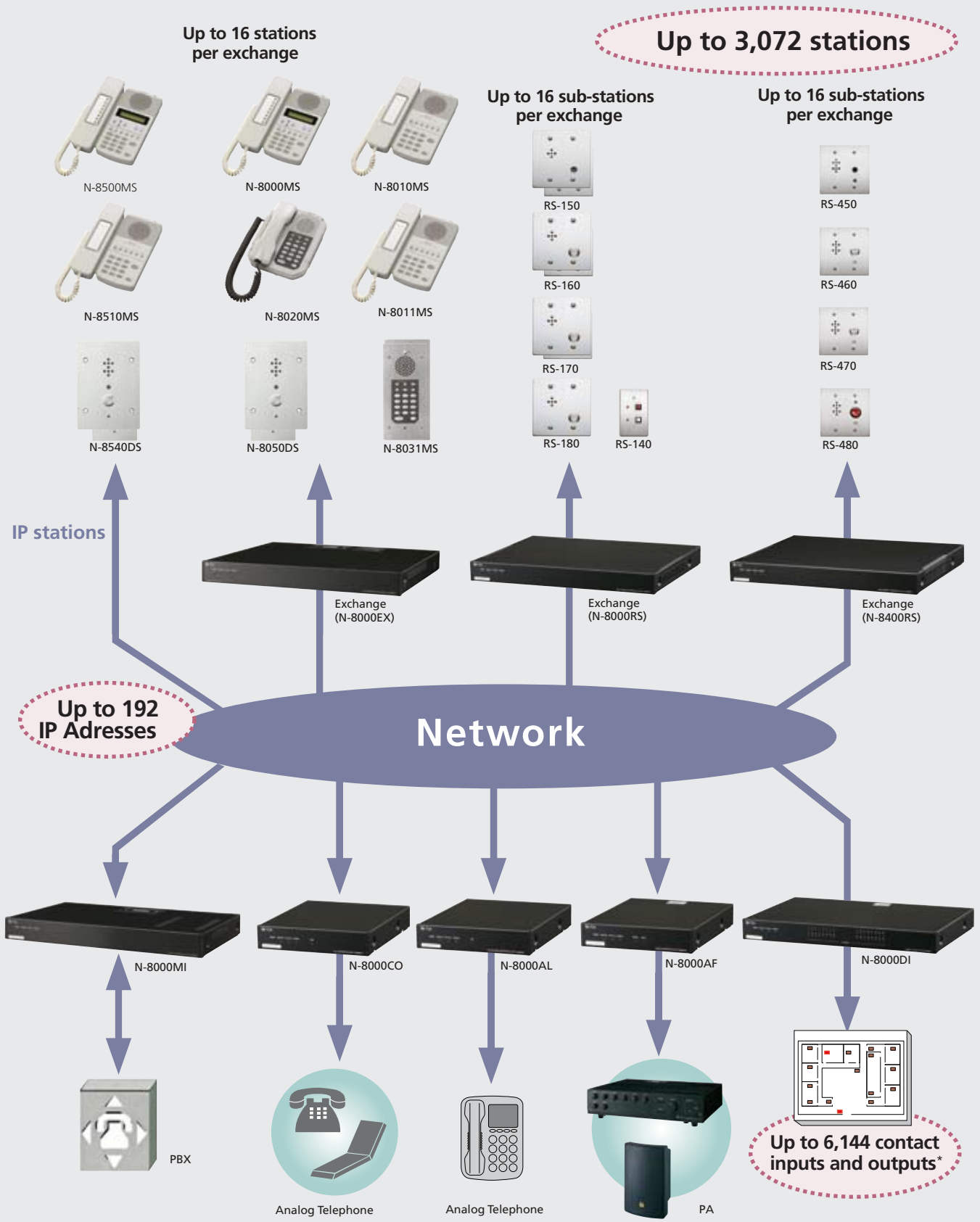
- Transportation
- Schools
- Parking lots
- Prisons
- Stadiums
- Hospitals
- Office Towers and Offices

For further information please request for the N-8000 catalogue.



## IP Intercom System N-8000

### System Overview





## IP Intercom System N-8000



### Exchanges / Sub-Station Interfaces



**N-8000EX**

#### Features

- IP Network Intercom Exchange
- 10/100Base-TX Ethernet network connection
- Occupies one network node (192 max.)
- 16 station capacity
- Stations connect to exchange via twisted pair cable
- 4 internal/8 external speech links
- 2 audio paging outputs
- 2 relay outputs
- Dimensions: 420 x 44.3 x 349 mm, 4.2 kg



**N-8010EX**

#### Features

- IP Network Intercom Exchange
- 10/100Base-TX Ethernet network connection
- Occupies one network node (192 max.)
- 16 station capacity
- 2-wire connection between stations and exchange
- 1 internal/2 external speech links
- Dimensions: 420 x 44.3 x 349 mm, 4.2 kg



**N-8000RS**

#### Features

- Sub-station Interface Unit
- 10/100Base-TX Ethernet network connection
- Occupies one network node (192 max.)
- 16 sub-station capacity
- 3-wire connection between stations and unit
- 2 speech links
- Dimensions: 420 x 44.3 x 325.5 mm, 3.9 kg



**N-8010RS**

#### Features

- Sub-station Interface Unit
- 10/100Base-TX Ethernet network connection
- Occupies one network node (192 max.)
- 16 sub-station capacity
- 3-wire connection between stations and unit
- 1 speech link
- Dimensions: 420 x 44.3 x 325.5 mm, 3.8 kg



**N-8400RS**

#### Features

- Sub-station Interface Unit
- 10/100Base-TX Ethernet network connection
- Occupies one network node (192 max.)
- 16 sub-station capacity
- 4-wire connection between stations and unit
- 2 speech links
- Dimensions: 420 x 44.3 x 325.5 mm, 4 kg



## IP Intercom System N-8000

### Interface Units



**N-8000AL**

#### Features

- Telephone Interface Unit
- 10/100Base-TX Ethernet network connection
- Occupies one network node (192 max.)
- Single telephone line allowing one analogue telephone to be connected
- 210 x 44.3 x 267 mm, 1.7 kg



**N-8000AF**

#### Features

- Audio Interface Unit
- 10/100Base-TX Ethernet network connection
- Occupies one network node (192 max.)
- 1 MIC/LINE audio line input
- 1 audio line output
- 8 contact inputs and 8 contact outputs
- Time synchronization input
- Built-in timer and chime
- 210 x 44.3 x 267 mm, 1.7 kg



**N-8000MI**

#### Features

- Multi Interface Unit
- 10/100Base-TX Ethernet network connection
- Occupies one network node (192 max.)
- Audio Inputs for BGM, External Tone or PA
- 2 audio line inputs (0 dBV) with 2 trigger inputs
- 2 audio line outputs (0 dBV) with 2 relay outputs
- Contact Bridge
- 16 contact inputs and 16 contact relay outputs
- Telephone Interface (E&M type), 2 channels
- Surveillance of system line and network status
- 420 x 44.3 x 239.5 mm, 2.8 kg



**N-8000DI**

#### Features

- Direct Select Unit
- 10/100 Base-TX Ethernet network connection
- Occupies one network node (192 max.)
- 32 contact inputs
- 32 contact outputs
- Function to diagnose system line and network status
- 420 x 44.3 x 267 mm, 2.8 kg



**N-8000CO**

#### Features

- C/O Interface Unit
- 10/100 Base-TX Ethernet network connection
- Occupies one network node (192 max.)
- Analog central office line circuit allowing the stations to make and receive calls to and from the telephone line
- 210 x 44.3 x 267 mm, 1.7 kg



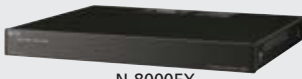








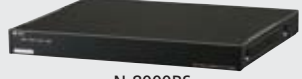






#### Accessories for N-8000 series

Model	Description
YC-280	Wall Mount Brackets for N-8000MS, N-8010MS and N-8020MS, Wall Mount Brackets for N-8011MS
AD-1210P	AC Adapter for N-8500MS, N-8510MS and N-8540DS
YC-850	Wall Mount Bracket for N-8000RS, N-8010RS, N-8400RS, N-8000DI, N-8000AF, N-8000AL, N-8000CO units.
YC-251	Surface Mount Back Box for N-8031MS
YC-241	Flush Mount Back Box for N-8031MS
YC-801	Flush Mount Box for RS-140
YC-802	Wall Mount Box for RS-140 (white)
YC-150	Flush Mount Back Box for N-8050DS and N-8540DS
YS-13A	Surface Mount Back Box for N-8050DS and N-8540DS
YC-302	2-Gang Electrical Box (flush mount)
E-7000TB	Terminal Board



## IP Intercom System N-8000

### Station Selection Chart

	Station	with bracket	Wall-mount	Applicable Exchange / Interface
<b>Master / Door Stations</b>	 N-8000MS		<b>Outdoor type</b>  N-8050DS	 N-8000EX
	 N-8010MS		 N-8050SB	
	 N-8011MS		 N-8031MS	 N-8010EX
	 N-8020MS		 N-8031SB	
<b>RS Sub-stations</b>	3-wire shielded type station		<b>Vandal-resistant type</b>  RS-150	 N-8000RS
	4-wire type station		 RS-160	 N-8010RS
<b>IP Stations</b>	 N-8500MS		 N-8540DS	
	 N-8510MS		<b>Outdoor type</b>	 N-8400RS



## IP Intercom System N-8000

### Master Stations



**N-8000MS**

#### Features

- Master station with LCD display
- Hands-free or handset conversation
- Auto-dialer function
- Headset terminal
- External speaker terminal
- High sound quality

#### Options

- YC-280: Wall Mounting Bracket



**N-8010MS**

#### Features

- Master station
- Hands-free or handset conversation
- High sound quality

#### Options

- YC-280: Wall Mounting Bracket



**N-8011MS**

#### Features

- Hands-free master station
- Space saving design
- High sound quality

#### Options

- YC-290: Wall Mounting Bracket



**N-8020MS**

#### Features

- Industrial use master station
- Dustproof and waterproof construction IP54
- Wide ambient temperature range
- Connection of external speaker

#### Options

- YC-280: Wall Mounting Bracket



**N-8031MS**

#### Features

- Flush-mount master station
- Hands-free operation
- One-touch dialing with external optional switch

#### Options

- RS-191: Hand-Set



**RS-191**

#### Features

- Handset for N-8031MS



## IP Intercom System N-8000

### IP Stations, Door Stations and Board Units



**N-8500MS**

#### Features

- IP Multifunctional master station
- For network connection (LAN / WAN)
- Can be used in conjunction with N-8000MI
- Powered by PoE switching hub or 12 V DC (with optional AC adaptor)

#### Options

- AD-1210P: AC Adaptor
- YC-280: Wall Mounting Bracket



**N-8540DS**

#### Features

- IP Door station for indoor use
- Flush-mount
- For network connection (LAN / WAN)
- Can be used in conjunction with N-8000MI
- Powered by PoE switching hub or 12 V DC (with optional AC adaptor)

#### Options

- AD-1210P: AC Adaptor
- YC-150: Wall Mounting Box



**N-8510MS**

#### Features

- IP Master station
- For network connection (10/100 Base TX)
- Hands-free or handset conversation
- High sound quality
- Powered by PoE switching hub or 12 V DC (with optional AC adaptor)

#### Options

- AD-1210P: AC Adaptor
- YC-280: Wall Mounting Bracket



**N-8050DS**

#### Features

- Door station for indoor use
- Hands-free conversation
- Contact output for controlling an electronic lock

#### Options

- YC-150: Back Box



**N-8031SB**

#### Features

- Hands-free master station board unit
- For custom made solutions
- Features like N-8031MS

#### Options

- RS-191: Handset



**N-8050SB**

#### Features

- Hands-free door station board unit
- For custom made solutions
- Features like N-8050DS



## IP Intercom System N-8000

### Sub-Stations



**RS-150**

#### Features

- Cost-effective
- Indoor use
- Half-duplex conversation
- Dimensions: 120 (W) × 120 (H) × 48.5 (D) mm



**RS-160**

#### Features

- Vandal-proof
- Indoor use
- Heavy duty stainless steel faceplate
- Half-duplex conversation
- Dimensions: 120 (W) × 120 (H) × 57.5 (D) mm



**RS-170**

#### Features

- Vandal-proof and weather-resistant
- Outdoor/Indoor use
- Heavy duty stainless steel faceplate
- Half-duplex conversation
- Dimensions: 120 (W) × 120 (H) × 57.5 (D) mm



**RS-180**

#### Features

- Vandal-proof and weather-resistant
- Outdoor / Indoor use
- Heavy duty stainless steel faceplate
- Allows connecting to a remote alarm light or siren
- Call lamp
- Half-duplex conversation
- Dimensions: 120 (W) × 120 (H) × 58.5 (D) mm



**RS-140**

#### Features

- Switch Panel with call and privacy button
- For talk back conversation
- Handset conversation (with optional RS-141)
- Half-duplex conversation
- Use 100 V speaker for input / output



**RS-141**

#### Features

- Handset for RS-140 switch panel
- Half-duplex conversation

## IP Intercom System N-8000



### Sub-Station



**RS-450**

#### Features

- Cost-effective
- Indoor use
- Connection to N-8400RS Interface Unit
- Half-duplex conversation
- Dimensions: 120 (W) × 120 (H) × 48.5 (D) mm



**RS-460**

#### Features

- Vandal-resistant call button
- Half-duplex communication
- Heavy duty stainless steel faceplate
- Indoor use
- Dimensions: 120 (W) × 120 (H) × 57.5 (D) mm



**RS-470**

#### Features

- Vandal-resistant call button
- Half-duplex communication
- Heavy duty stainless steel faceplate
- Weather-resistant for outdoor/indoor use (IP54)
- Connection to N-8400RS Interface Unit
- Dimensions: 120 (W) × 120 (H) × 57.5 (D) mm



**RS-480**

#### Features

- Vandal-resistant red call button
- Half-duplex communication
- Heavy duty stainless steel faceplate
- Weather-resistant for outdoor/indoor use (IP54)
- Control output
- Connection to N-8400RS Interface Unit
- Dimensions: 120 (W) × 120 (H) × 58.5 (D) mm



**RS-481**

#### Features

- Handset for RS-480
- Full-duplex conversation





## SOUND TRANSFERS EMOTIONS

Your personal experience is directly connected to your hearing. TOA has developed Professional Sound Systems that provide the perfect sound effect in every environment. Whether it is a concert hall where the smallest sound has to be transmitted to the furthest points or a sports stadium, where 10'000's are shouting, screaming and celebrating, or a conference or meeting where every single person has to be heard. We guarantee feelings that not just reach the ears but touch the hearts of humans.



## Digital Amplifiers

### 4-Channel Power Amplifiers



**DA-250F (top) / DA-250FH (bottom)**

### Features

- Fully digital
- Real 1000 W R.M.S. power
- 4 channels
- Compact size with only 1 unit height
- Efficiency of 85% max.
- Ideal for fixed installation
- 2 configurations: DA-250F for low impedance application, DA-250FH for 70 V / 100 V application
- Each channel with independent power supply
- Control covers eliminate tampering
- Low-noise constant speed fans
- Stacking possible
- Bridged mode for DA-250F possible
- Protection circuitry
- Pulse width modulation with controlled power supply

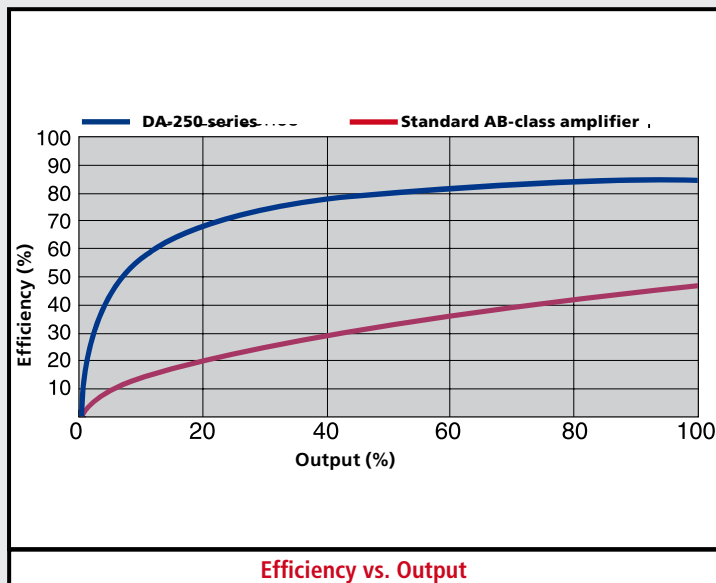
### Applications

DA-250F for multi-zone application such as presentation and press conference rooms, restaurants, etc.

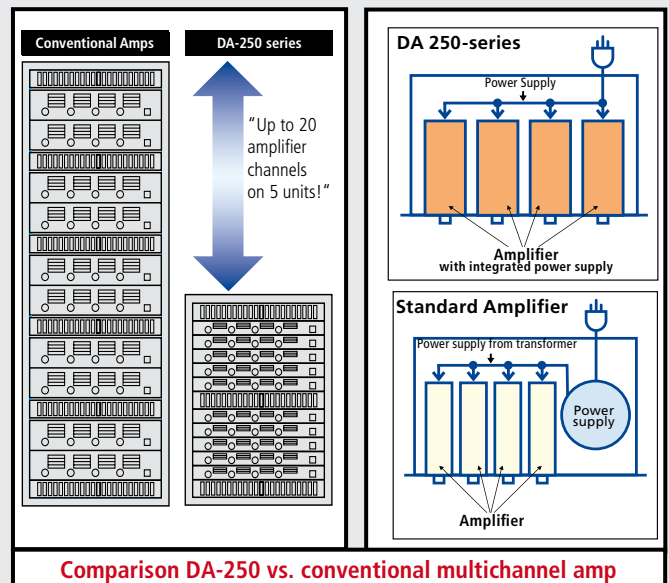
DA-250FH for exhibition halls, sports facilities and gymnasiums, houses of worship, meeting halls

### Options

- MT-251H: Transformer



**Efficiency vs. Output**



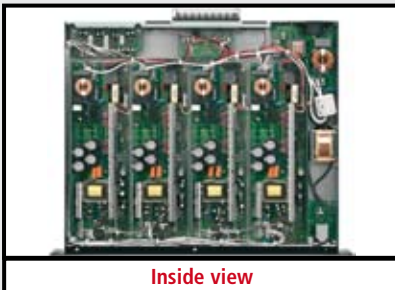
**Comparison DA-250 vs. conventional multichannel amp**



## Connection of inputs and outputs

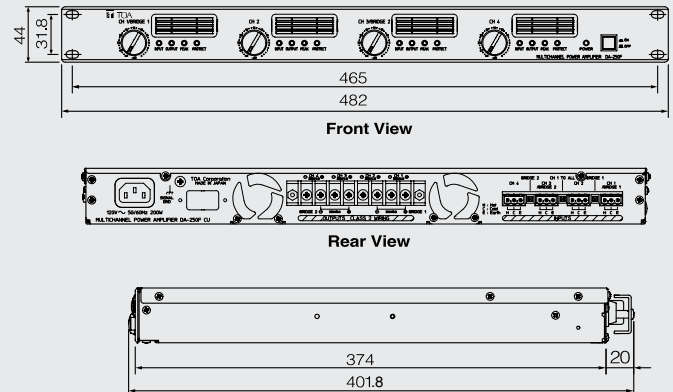
### Transformer

### Dimensions



Inside view

	MT-251H
Load	0 – 250 W
Primary Impedance	100 V : 40 Ohm / 66.6 Ohm 70 V : 19.6 Ohm / 32.6 Ohm
Secondary Impedance	100 V : 40 Ohm / 66.6 Ohm 70 V : 19.6 Ohm / 32.6 Ohm 50 V : 10 Ohm / 16.6 Ohm 35 V : 4.9 Ohm
Frequency response	30 Hz ... 18000 Hz (+0 dB, -3 dB)
Connector	Screw terminals (M3)
Weight	2.4 kg



## Specifications

	DA-250F	DA-250FH
Power Source	230 V AC, 50 / 60Hz	230 V AC, 50 / 60 Hz
Number of Channels	4	4
Total Output (all channels driven)	1000 W (1 kHz, 4 Ohm)	1000 W (1 kHz, 40 Ohm)
Power Output	4 x 250 W (4 Ohm) / 4 x 170 W (8 Ohm) / 2 x 500 W (8 Ohm, bridged)	4 x 250 W (70 V / 100 V)
Power Consumption (IEC 60065)	200 W	200 W
Frequency Response	20 Hz ... 20000 Hz, ±1dB	50 Hz ... 20000 Hz, -3dB, 0dB
Total Harmonic Distorsion (1kHz)	0,1 %	0,1 %
S/N Ratio (A weighted)	100 dB	100 dB
Damping Factor	100	120
Input Impedance	10 kOhm (unbalanced), 20 kOhm (balanced)	10 kOhm (unbalanced), 20 kOhm (balanced)
Controls	Volume control, LEDs : Indicator for each channel: input, output, peak, protection, in-use	
Connection	Inputs: Detachable terminal block (electronically balanced). Outputs: screw terminals (M4). For AWG 14-22	
Protection Circuit	Amplifier section: DC output, overheat protection, load shorting, overload current, maximum output; Power supply section: overheat protection, AC rush current	
Dimensions (W × H × D)	482 mm × 44 mm × 401.8 mm (EIA standard rack)	
Weight	6.8 kg	
Finish	Front: Aluminum, alumite process, black; Case: plated steel sheet	
Accessories	Terminal block connector (3-pins) × 4, cover volume control × 4	



## Digital Amplifiers

### 2-Channel Power Amplifiers



### DA-250D / DA-250DH

#### Features

- 2 Versions: 4 Ohm (DA-250D) or 100 V (DA-250DH)
- 2 x 250 W output power
- Class D design 85 % efficient
- Independent power supply for each channel
- Light weight and compact
- Ideal for professional audio systems which require a reliable operation
- Colour: Black
- Rack mountable, 2 units height
- Stack up to 5 units without open spaces between units
- Selectable stereo or bridge operation (DA-250D)
- Forced-air cooling system
- Low heat dissipation
- Comprehensive protection circuitry
- Removable dust filters for easy maintenance

#### Options

- MT-251H: Matching output transformer

#### Applications

Arena, gymnasium, health club, stadium, auditorium, multi-purpose hall, convention centre, shopping mall, house of worship, restaurant / bar / pub

#### Specifications

	DA-250D	DA-250DH
Power Source	230 V AC, 50 / 60Hz	230 V AC, 50 / 60 Hz
Number of Channels	2	2
Power Output	2 x 250 W (4 Ohm) / 2 x 170 W (8 Ohm)	2 x 250 W (70 V / 100 V)
Power Consumption (EN standard)	120 W	120 W
Frequency Response	20 Hz ... 20000 Hz, $\pm 1$ dB	50 Hz ... 20000 Hz, -3dB, 0dB
Total Harmonic Distorsion (1kHz)	0,1 %	0,1 %
S/N Ratio (A weighted)	100 dB	100 dB
Input Impedance	10 kOhm (electronically balanced)	
Controls	Volume level control (per channel), LEDs : Power, Indicator for each channel: input, output, peak, protection	
Connection	Input: Detachable terminal block (3 pins), XLR-3-31 / Output: screw terminals (M4)	
Protection Circuit	Overheat, short circuit, overload, unusual DC voltage output	
Dimensions (W x H x D)	482 mm x 44 mm x 401.8 mm (EIA standard rack)	
Weight	5.3 kg	
Finish	Front: Aluminum, alumite process, black; Case: plated steel sheet	

## Digital Amplifiers



### 4-Channel Power Amplifiers



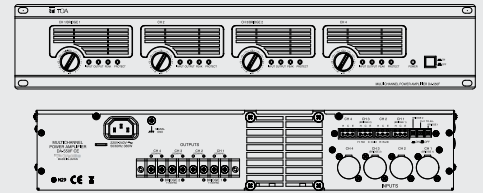
**DA-550F / DA-500FH**



Independent Operation



MT-251H



Outline



Rear Connection DA-500F

### Features

- 2 Versions: 4 Ohm (DA-550F) or 100 V (DA-500FH)
- 4 x 500 W (DA-500FH), or 4 x 550 W (DA-550F) output power
- Class D design 85 % efficient
- Independent power supply for each channel
- Light weight and compact
- Ideal for professional audio systems which require a reliable operation
- Colour: Black
- Rack mountable with 2 units
- Stack up to 5 units without open spaces between units
- Selectable stereo or bridge operation (DA-550F)
- Forced-air cooling system
- Low heat dissipation
- Comprehensive protection circuitry
- Removable dust filters for easy maintenance

### Options

- MT-251H: Matching output transformer for DA-500FH

### Applications

Arena, gymnasium, health club, stadium, auditorium, multi-purpose hall, convention centre, shopping mall, house of worship, restaurant / bar / pub

### Specifications

	DA-550F	DA-500FH
Power Source	230 V AC, 50 / 60Hz	230 V AC, 50 / 60 Hz
Number of Channels	4	4
Power Output	4 x 550 W (4 Ohm) / 4 x 370 W (8 Ohm) / 2 x 1100 W (8 Ohm, bridged)	4 x 500 W ( 70 V / 100 V)
Power Consumption (EN standard)	380 W	380 W
Frequency Response	50 Hz ... 20000 Hz, ±1dB	50 Hz ... 20000 Hz, -3dB, +0dB
Total Harmonic Distorsion (1kHz)	0,1 %	0,1 %
S/N Ratio (A weighted)	100 dB	100 dB
Input Impedance	10 kOhm ( electronically balanced)	
Controls	Volume level control (per channel), LEDs : Power, Indicator for each channel: input, output, peak, protection	
Connection	Input: Detachable terminal block (3 pins), XLR-3-31, output: screw terminals (M4)	
Protection Circuit	Overheat, short circuit, overload, unusual DC voltage output	
Dimensions (W x H x D)	482 mm x 88 mm x 401.4 mm (EIA standard rack)	
Weight	9 kg	
Finish	Front: Aluminum, alumite process, black, case: plated steel sheet	
Accessories	Terminal block connector (3-pins) x 4, cover volume control x 4	



## Digital Mixing System

### D-2000 Series Digital Mixer



**D-2000 Series**

### Features

- Expandable to 128 input/output
- Various modules and peripherals can be combined to create the best possible sound in small to medium-size venues of all types
- User-specific configurations
- Fully modular design makes it a simple matter to create a configuration that meets specific user requirements
- The system is featuring a 24-bus matrix

#### Auto-mixing :

- NOM (Number of Open Microphones)
- Ducker function (Auto-Mute function)

#### Highly effective feedback suppression

- Feedback elimination for up to 4 channels
- Each channel can control 12 problem frequencies.

#### 2 versatile suppression modes

- Either presetable auto mode or realtime dynamic mode

#### Essential audio processing

- Delay, high pass, low pass and notch filters, parametric equalizers, compression/auto leveller, gate, crossover frequencies and input trim gain

The dedicated software's graphic, visually attractive user interface helps streamline settings and adjustments

### Application

Hotel banquet and function rooms, indoor sports facilities, multipurpose halls and houses of worship

### Software Requirements

	D-2000 Series
PC-Type	PC-AT compatible
Hardware	CPU: Pentium4 2GHz or more Memory: 1GB or more (2GB or more recommended) Display adapter: XGA (1024 x 768) or more Network adapter: 10BASE-T or more
Operating System	Windows Vista, Windows XP (SP2) or later
Software	NET Framework 3.5 (included in the supplied CD) installation required



## Digital Mixing Processor Unit



### D-2008SP

## Features

- 32 preset memories for user convenience
- Up to 32 different routing and parameter configurations can be stored for frequent changes in staging, seating and speaker arrangements
- Intuitive GUI
- Mixing console option offers easy user operation (D-2008SP can be connected via network to the D-2012C mixing)
- User-friendly VCA control
- D-2000 Series units used in conjunction with the optional D-911 VCA Fader Unit provides more of an analog mixer user interface
- A RS-232C port allows external control by third party A/V control units

## Specifications

	D-2008SP
<b>Power Supply</b>	220 – 240 V AC, 50 Hz
<b>Power Consumption</b>	76 W
<b>Frequency Response</b>	20Hz – 20000 Hz, $\pm 1$ dB (+4 dB Input)
<b>Sampling Frequency</b>	48 kHz
<b>Inputs and Outputs</b>	Input: Max. 32 channels, modular construction (modules optional) Output: Max. 32 channels, modular construction (modules optional) Monitor bus; 1 stereo input, 1 stereo output, headphone: 1 stereo
<b>Signal Processing</b>	Feedback suppression function, auto mixing function, auto mixing group, parametric equalizer high-pass filter, low-pass filter, notch filter, all-pass filter, high shelving filter, low shelving filter, horn equalizer, crossover filter, compressor/auto-leveler, output delay, BUS delay, matrix, CobraNet matrix, crosspoint gain
<b>Presets</b>	32
<b>Aux Functions</b>	Key lock function
<b>LAN</b>	10BASE-T/100BASE-TX,(Automatic-Negotiation) connected via a switching hub Network protocol: TCP/IP Connection cable: Shielded Category 5 or higher twisted pair LAN cable (CAT5-STP) Maximum cable distance: 100m (between D-2008SP and switching sub)
<b>Control</b>	RS-232C, D-sub connector (9 pins) Used for external control Module: Remote control module slot: 2
<b>Operating Temperature</b>	+5 °C ... +40 °C
<b>Dimensions</b>	482 x 132,6 x 343,4 mm
<b>Weight</b>	6,3 kg



## Digital Mixing System

### Modules

#### Input Modules

##### Mic/Line Input (monaural type)



#### D-2000AD1

- 4-channel, XLR connectors
- A/D converter: 24 bit
- Phantom power supply (48V)
- THD : 0.008% or less



#### D-921E

- 2-channel, removable terminal block
- A/D converter: 24 bit
- Phantom power supply (15V)
- THD : 0.05% or less



#### D-921F

- 2-channel, XLR connectors
- A/D converter: 24 bit
- Phantom power supply (15V)
- THD : 0.05% or less



#### D-922E

- 2-channel, Removable terminal block
- A/D converter: 20 bit
- Phantom power supply (15V)
- THD : 0.05% or less



#### D-922F

- 2-channel, XLR connectors
- A/D converter: 20 bit
- Phantom power supply (15V)
- THD : 0.05% or less

##### Mic/Line Input (stereo type)

#### D-936R

- 4-channel, RCA pin jack
- A/D converter: 24 bit
- THD : 0.05% or less



##### Digital Input

#### D-923AE

- 2-channel line input
- Applicable Format: AES/EBU



#### D-937SP

- 1-channel stereo line input
- Applicable Format: S/PDIF



#### Output Modules

##### Line Output



#### D-2000DA1

- 4-channel, XLR connectors
- D/A converter: 24 bit
- THD : 0.008% or less



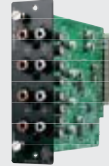
#### D-971M

- 4-channel, XLR connectors
- D/A converter: 24 bit
- THD : 0.05% or less



#### D-971E

- 4-channel, Removable terminal block
- D/A converter: 24 bit
- THD : 0.05% or less



#### D-971R

- 4-channel, RCA pin jack
- D/A converter: 24 bit
- THD : 0.05% or less



#### D-961SP

- 2-channel stereo line output
- Coaxial RCA jack
- Applicable Format: S/PDIF



#### D-972AE

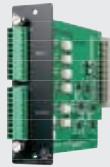
- 4-channel line output
- XLR connectors
- Applicable Format: AES/EBU

#### Remote Control Module

##### Remote Control

#### D-981

- 8 inputs/8 outputs
- Removable terminal block connectors



#### D-983

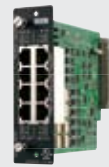
- 24 inputs/16 outputs
- RJ45 connectors



##### VCA Control

#### D-984VC

- Interface to D-911 Remote Controller
- 8 RJ-45 connectors
- Control up to 12 inputs, 8 outputs



#### CobraNet\* Interface Module



\*CobraNet was developed by Cirrus Logic, a US company and is a network protocol utilizing Ethernet networks to perform high-quality multi-channel digital transmission. It allows using existing Ethernet equipment such as CAT-5 switching hubs.

#### D-2000CB

- Allows audio transmission among D-2008SPs.

#### VCA Fader Unit



#### D-911

VCA Fader Unit for controlling 12 inputs/ 8 outputs, channel gains and 8 contact controls when used with the D-984VC.



## Digital Mixing System



### Remote Console Unit



**D-2012C**

### Features

- Mixing console option offers easy user operation
- The digital mixing processor D-2008SP can be connected via network to the mixing console D-2012C
- 12 motorized faders and 8 rotary encoders
- Access to up to 80 channels
- Simplified mixing operation that suit non-professional users
- Monitoring of input and output channel signal levels
- Recalling preset memory settings
- Contact control

### Specifications

	D-2012C
<b>Power Supply</b>	AC mains, 50 / 60 Hz
<b>Power Consumption</b>	18 W
<b>Volume Adjustment</b>	100 mm motorized fader × 12, Rotary encoder × 8
<b>Line Input</b>	1 channel (stereo), +10 to -20 dB*1, 10 kΩ, unbalanced, RCA Pin-jack
<b>Headphone Output</b>	Stereo 100 mW + 100 mW (32 Ω load), standard stereo phone-jack
<b>Monitor-Bus</b>	1 stereo input, 1 stereo output
<b>LAN</b>	Network I/F: 10BASE-T/100BASE-TX (Automatic-Negotiation) RJ45 connector, Connected via a switching hub Network protocol: TCP/IP Connection cable: Shielded twisted pair (STP) Category 5 or higher LAN cable Maximum cable distance: 100m (109.36 yd) (between D-2008SP and switching sub)
<b>Control</b>	RS-232C, D-sub connector (9 pins) Used for maintenance use
<b>Dimensions</b>	482 × 266 × 138 mm
<b>Weight</b>	6.6 kg



## Digital Modular Mixer

### High-resolution sound quality and remote functions in a compact mixer



**D-901**

### Description

**Ready for any requirement.** The new TOA D-901 digital mixer is a fully modular, cost-effective digital mixer featuring a 12-input, 8-bus, 8-output channel configuration (12 x 8 matrix) with easy operation that can be expanded as application requires.

**All-in-one design.** The compact D-901 is just 3U-sized but incorporates several of the most important functions. These include a digital mixer, feedback suppression, auto mixing, parametric EQ, compression, delay and echo. Its remarkable operational scope allows it to do the work that conventionally requires several different pieces of equipment, providing a cost-effective solution that is perfect for any requirement.

**Feedback suppressor.** This sophisticated and TOA proprietary function automatically processes feedback at certain frequencies through constant monitoring, then automatically attenuates precisely the problematic frequencies, keeping the audio sounding natural.



**Interface for AMX / Crestron**

**Automatic mixing function.** The D-901's automatic mixing function adjusts input level automatically to make operating easier. It features smart "number of open microphones" (NOM) attenuation that sets the gain for all microphone inputs according to the number of microphone inputs utilized. This allows satisfactory levels to be set without feedback problems. A "Ducker" function operates when an input channel is open, to enable that channel's priority to initiate the low channel signal that will attenuate the other channels.

**Sound processing.** As a full-featured digital mixer, the D-901 incorporates several useful built-in functions to ensure maximum performance without requiring other equipment. A compressor can be switched in, to reduce the dynamic range between the smallest and largest signals, preventing amplifier clipping at high levels. The flexible crossover function allows setting speaker crossover points and filter slopes to optimize multichannel speaker systems. Full equalization and filter setting configurations can be saved in up to 16 memories for instant recall. The time delay function can be used to align remote speakers or to drive delay speakers.

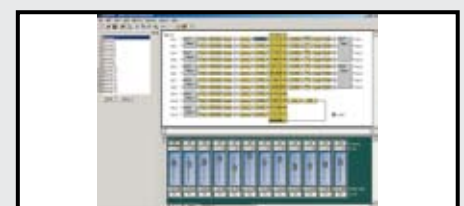
**Ergonomic control layout.** Convenient front panel controls and display make it easy to perform all functions and confirm parameter settings without requiring a PC. Another advantage is the

ability to store up to 16 sound parameter setting configurations in memory for instant recall when required. These include crossover, EQ, filter slope settings, time delay and other parameters. Control settings can also be locked to prevent unauthorized tampering.

**Wide application scope and remote control ability.** The D-901 can be externally controlled with an external signal trigger or the RS-232C port on the back panel which enables the D-901 to easily interface with external equipment.



**Easy Front Panel Operation**



**or Software Control**

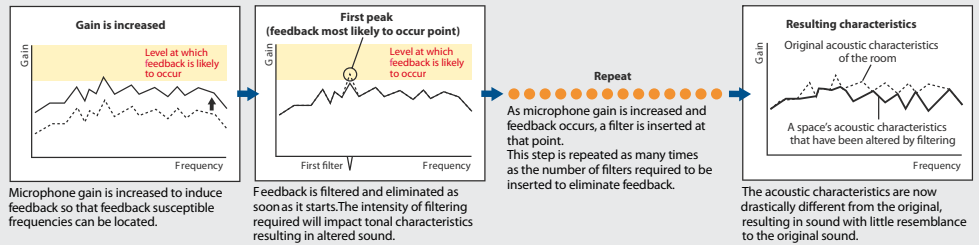


## Two out of Multiple Functions

### Feedback Suppression

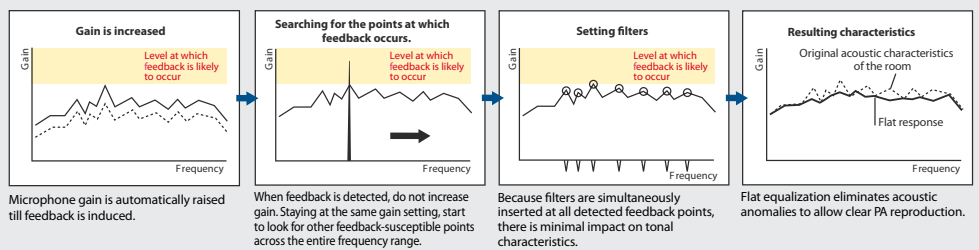
#### Conventional suppression

Manual cancellation of feedback is imprecise as filtering problematic frequencies affects neighboring frequencies as well. This tonally impacts the signal and often results in audio that does not sound natural.

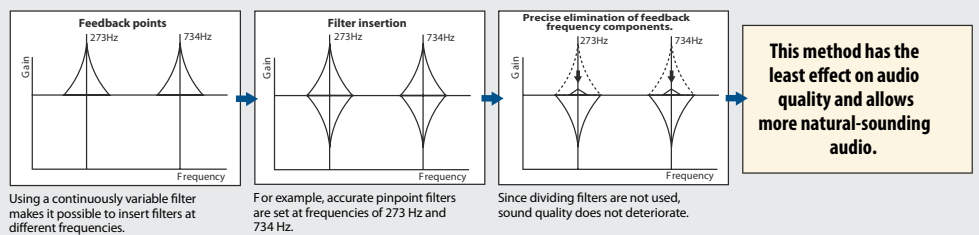


#### TOA feedback suppressor

This proprietary technique works by automatically detecting the frequencies where acoustic feedback is occurring. Once these frequencies are detected, the suppressor automatically sets precisely notch filters that drastically attenuate only those frequencies with accurate pinpoint filtering.



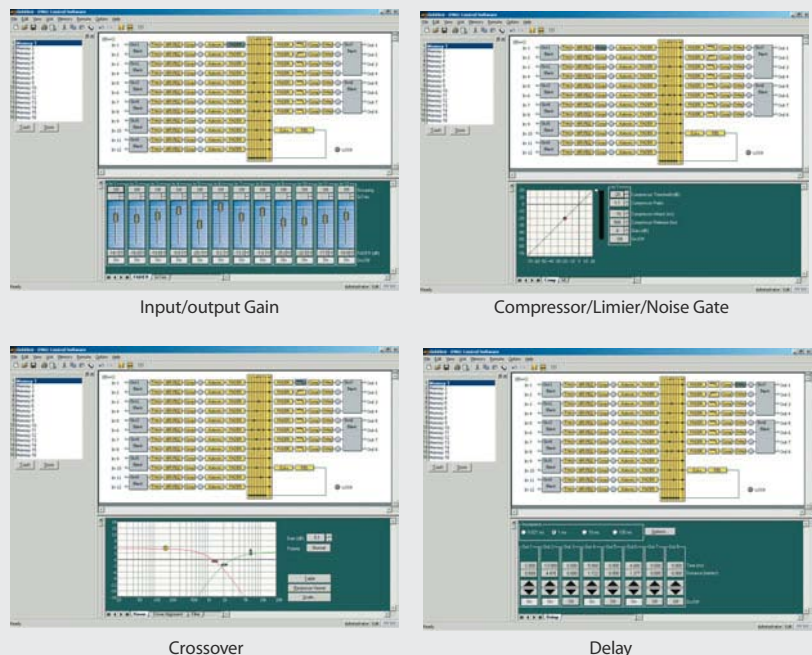
Audio signals are therefore minimally affected because only the problematic frequencies are attenuated to negligent levels by suppressor's action.



### D-901 PC Software

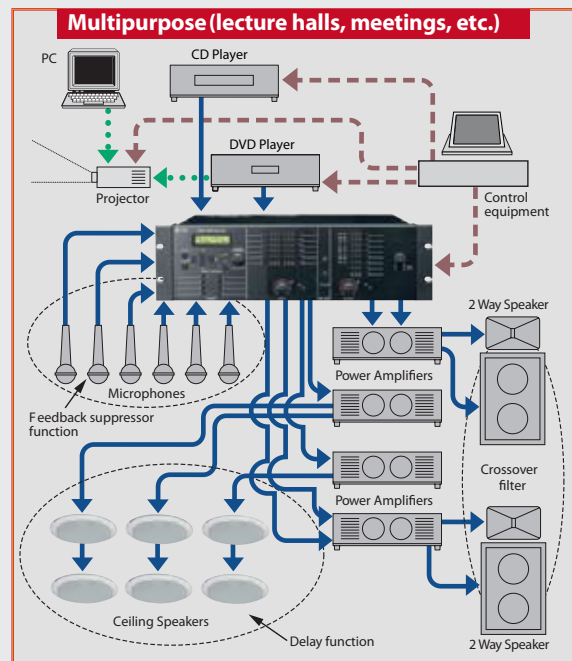
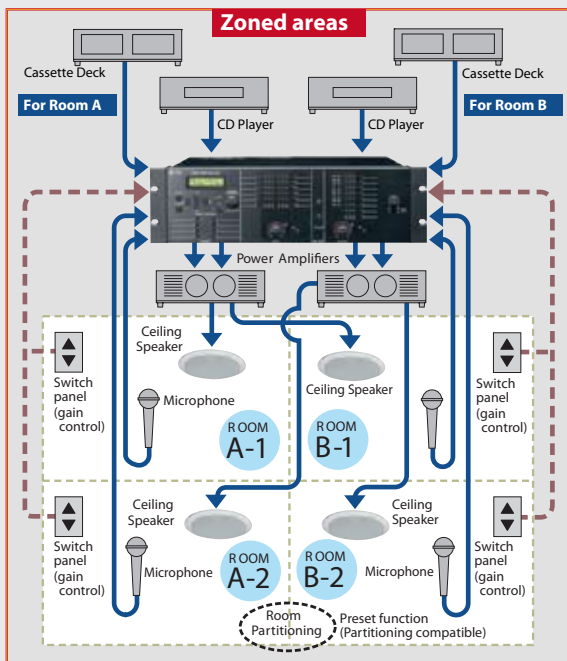
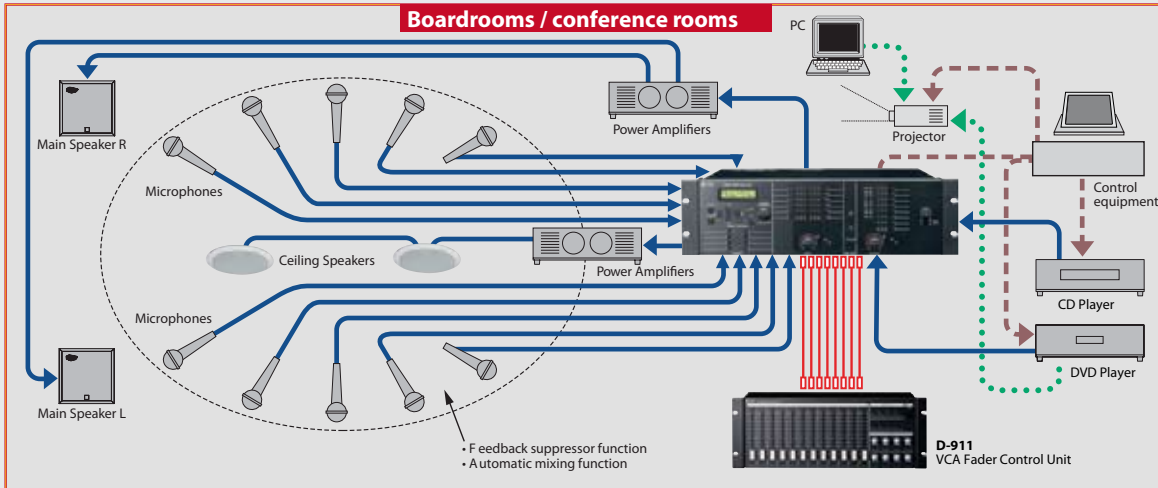
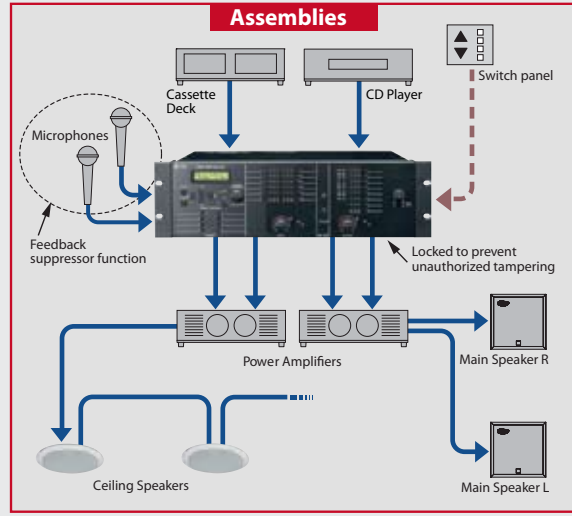
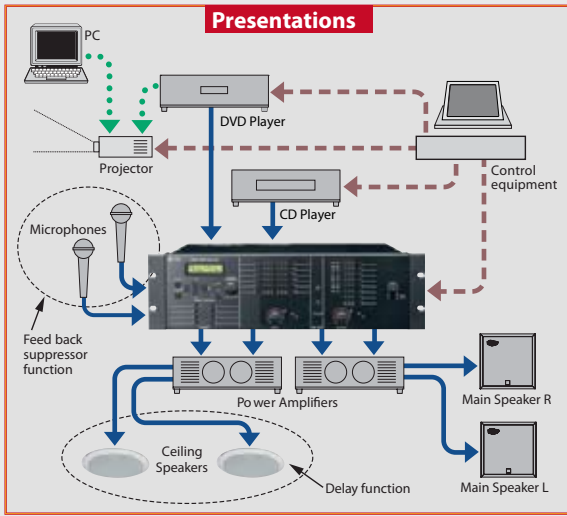
The D-901 comes standard with dedicated software to assist in D-901 system configuration, parameter setting and general setup using a PC. The software features menu-driven operation with an easy to understand GUI. The software offers comprehensive control over virtually every possible function. For set up these include crossover slopes, combinations, and storing crossover configurations. For operation, menus offer dedicated pages for viewing and adjusting matrix, trim, EQ, compression, automix, gating, filtering, delay, echo and feedback suppression settings as well as mic/line input modules and many others. Presets can be configured and stored for immediate recall when desired. In addition, the software allows determining user level as well as preparing the D-901 for remote control. Lastly, a full assortment of protection functions can be utilized.

\* Download installation program from TOA's homepage (<http://www.toa-products.com/international/>) and save it to the desktop.





## Digital Modular Mixer



Video Control Sound

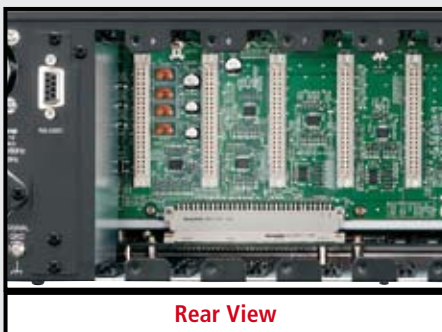
## Application Examples

## Digital Modular Mixer

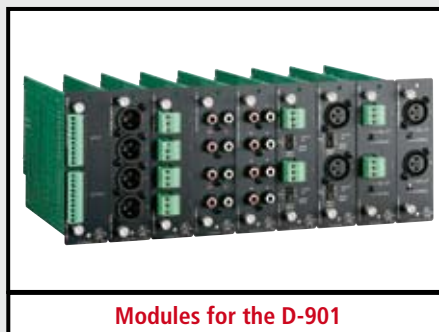


Rear View (equipped with optional modules)

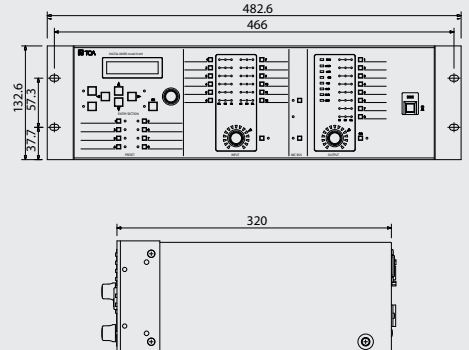
### Dimensions



Rear View



Modules for the D-901



### Specifications

	D-901
Power Source	100 – 120 V, 230 V AC, 50 / 60 Hz
Power Consumption	40 W
Operating Temperature	+5° C ... +40° C
Frequency Response	20 – 20000 Hz, ±1 dB (±4 dBu 1 Input)
Input	Max. 12 channels, modular construction (modules optional)
Output	Max. 8 channels, modular construction (modules optional)
Signal Processing	Feedback suppression function: 12 filters (auto/dynamic), auto mixing function: ducker (automatic muting), NOM attenuation, equalizer / filter: parametric equalizer: 20 – 20000 Hz, ±15 dB, Q: 0.267 – 69.249, filtering: high-pass filter 20 – 20000 Hz, 6 dB/oct., 12dB/oct. low-pass filter 20 – 20000 Hz, 6 dB/oct, 12 dB/oct, notch filter 20 – 20000 Hz, Q: 8.651 – 69.249 all-pass filter 20 – 20000 Hz, Q: 0.267 – 69.249, high shelving filter 6 – 20000 Hz, ±15 dB low shelving filter 20 – 500Hz, ±15 dB, horn equalizer 20000 Hz, 0 to +18 dB (1 dB steps), compressor: crossover filter: LR / BW / BE 20 – 20000 Hz, 6 dB/oct, 12 dB/oct, 18 dB/oct, 24 dB/oct, threshold: –20 dB to +20 dB, ratio: 1:1, 2:1, 3:1, 4:1, 8:1, 12:1, 20:1, infinite:1, attack time : 0.2 ms – 5 s, release time: 10 ms to 5 s, Delay gain: – infinite to +10 dB, delay time: 0 – 682.6 ms (0.021 ms steps), matrix: 12 x 8
Preset Memory	16
Auxiliary Function	System locking function
Control	RS-232C, D-sub connector (9 pins), remote control module (option)
Front Panel Section	Preset memory recall key: 8, LCD screen, screen shift key (up/down/left/right), setting knob, Input level indicator: dual colour LED, output level indicator: dual colour LED, channel selector key: 12 (input channel selection) 8 (output channel selection), Channel volume control: 1 (input channel selection) 1 (output channel selection)
Rear Panel	Input module slot: 6 (input/output module slot: 2), Output module slot: 2 Remote control module slot: 1
Finish	Panel: aluminum, hair-line finish, black, others: pre-coated steel plate, black, 30 % gloss
Dimensions	482.6 x 132.6 x 320 mm (excluding projection), 3 units
Weight	6.9 kg



## Digital Modular Mixer

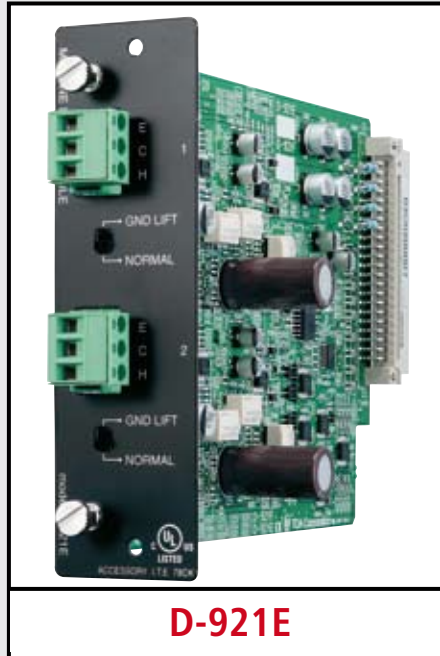
### Microphone / Line Input Modules



**D-921F**

#### Features

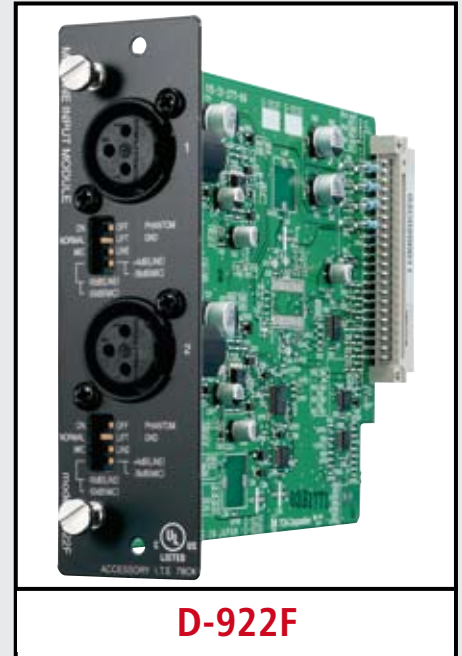
- 2-channel Microphone / Line Input Module (24 bits monaural type)
- With XLR connectors
- Input sensitivity and phantom power settings can be performed at the front panel



**D-921E**

#### Features

- 2-channel Microphone / Line Input Module (24 bits monaural type)
- With removable terminal block type connectors
- Input sensitivity and phantom power settings can be performed at the front panel



**D-922F**

#### Features

- 2-channel Microphone / Line Input Module (20 bits monaural type)
- With XLR connectors
- The D-901's 4-pole DIP switch is used to set the input sensitivity, phantom power supply, and ground lifting

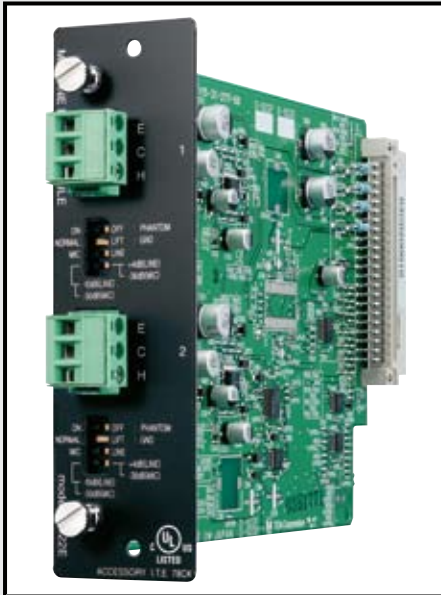
### Specifications

	D-921F	D-921E	D-922F
<b>Input</b>	2 channels, Mic / Line changeable Mic: $-50/-36$ dB, 4.7 k $\Omega$ m, electronically-balanced, equivalent to XLR-3-31 type Line: $-10/+4$ dBV, 10 k $\Omega$ m, electronically-balanced, equivalent to XLR-3-31 type Phantom power supply (+15 V, can be used when set for the microphone), Ground lift switch	2 channels, Mic / Line changeable Mic: $-50/-36$ dB, 4.7 k $\Omega$ m, electronically-balanced, removable terminal block type connector Line: $-10/+4$ dBV, 10 k $\Omega$ m, electronically-balanced, removable terminal block type connector Phantom power supply (+15 V, can be used when set for the microphone), Ground lift switch	2 channels, $-50/-36/-10/+4$ dB (Selectable with the DIP switch), 4.7 k $\Omega$ m, electronically-balanced, equivalent to XLR-3-31 type Phantom power supply (15 V, can be set with DIP switch) Ground lift switch (can be set with the DIP switch)
<b>A/D Converter</b>	24 bits	24 bits	20 bits
<b>Frequency Response</b>	20...20000 Hz, $\pm 1$ dB (+4 dBu input)	20 ... 20000 Hz, $\pm 1$ dB (+4 dBu input)	20 ... 20000 Hz, $\pm 1$ dB (+4 dBu input)
<b>Sampling Frequency</b>	48 kHz	48 kHz	48 kHz
<b>Dynamic Range</b>	Over 100 dB (IHF-A weighted) (+4 dBu input)	Over 100 dB (IHF-A weighted) (+4 dBu input)	Over 85 dB (IHF-A weighted) (+4 dBu input)
<b>Total Harmonic Distortion</b>	Under 0.05% (+4 dBV input)	Under 0.05 % (+4 dBV input)	Under 0.2 % (+4 dBV input)
<b>Finish</b>	Panel: Pre-coated steel plate, black, 30 % gloss	Panel: Pre-coated steel plate, black, 30 % gloss	Panel: Pre-coated steel plate, black, 30 % gloss
<b>Dimensions (W x H x D)</b>	35 x 119.5 x 178.4 mm	35 x 119.5 x 178.4 mm	35 x 119.5 x 178.4 mm
<b>Weight</b>	150 g	140 g	135 g
<b>Accessory</b>		Removable terminal block type connector (preinstalled on the unit) x 2	



## Digital Modular Mixer

### Microphone / Line Input Modules



**D-922E**



**D-936R**

#### Features

- 2-channel Microphone / Line Input Module (20 bits monaural type)
- With removable terminal block type connectors
- The D-901's 4-pole DIP switch is used to set the input sensitivity, phantom power supply, and ground lifting

#### Features

- Stereo Select Input Module
- 4 stereo inputs
- With standard RCA pin jacks
- 2 stereo transmission modes:
  - 1) Selection of one of the 4 stereo inputs for transmission to the D-901
  - 2) Mixing of all 4 stereo inputs, transmitting the mixed signal to the D-901 through left / right channel outputs
- Mode settings and stereo selection are performed on the front panel

### Specifications

	D-922E	D-936R
<b>Input</b>	2 channels, -50/-36/-10/+4 dBV (Selectable with the DIP switch), 4.7 kOhm, electronically-balanced, removable terminal block type connector Phantom power supply (15 V, can be set with the DIP switch) Ground lift switch (can be set with the DIP switch)	4 stereo inputs (selection of 1 stereo or mixing of all 4 stereo inputs) -10 dB, 10 kOhm, RCA pin jack
<b>A/D Converter</b>	20 bits	24 bits
<b>Frequency Response</b>	20 ... 20000 Hz, ±1 dB (+4 dBV input)	20 ... 20000 Hz, ±1 dB (+4 dBV input)
<b>Sampling Frequency</b>	48 kHz	48 kHz
<b>Dynamic Range</b>	Over 85 dB (IHF-A weighted) (+4 dBu input)	Over 100 dB (IHF-A weighted)
<b>Total Harmonic Distortion</b>	Under 0.2 % (+4 dBV input)	Under 0.05 %
<b>Finish</b>	Panel: Pre-coated steel plate, black, 30 % gloss	Panel: Pre-coated steel plate, black, 30 % gloss
<b>Dimensions (W x H x D)</b>	35 x 119.5 x 178.4 mm	35 x 119.5 x 178.4 mm
<b>Weight</b>	125 g	145 g
<b>Accessory</b>	Removable terminal block type connector (preinstalled on the unit) x 2	

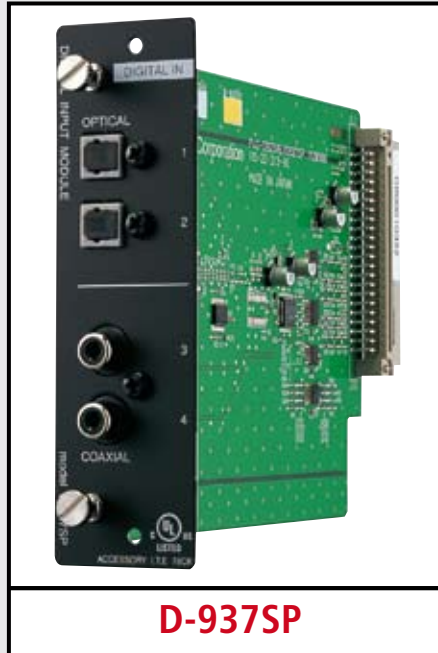


## Digital Modular Mixer

### Digital Input Modules



**D-923AE**



**D-937SP**

### Features

- 2-channel Line Digital Input Module
- Digital signals can be input, permitting direct connection of the D-901 Digital Mixer to equipment having a digital output
- AES/EBU-Format
- Owing to the built-in sample rate converter, the module can handle signals of various sampling frequencies

### Features

- Stereo 1-channel Line Digital Input Module
- For digital signal input, permitting direct connection of the D-901 Digital Mixer to equipment having a digital output
- S/PDIF-Format
- Owing to the built-in sample rate converter, the module can handle signals of various sampling frequencies
- When this module is used, one of the 4 stereo inputs is selected for output to the D-901
- Input selection can be performed at the front panel, by PC software or through a remote control module

### Specifications

	D-923AE	D-937SP
<b>Input</b>	2 channels, 2.0 – 7.0 V (p-p), 110 Ohm, XLR-3-31 or equivalent	Stereo 1 channel line (Selectable 1 of 4 inputs), 0.5 V (p-p), 75 Ohm, coaxial RCA jack × 2 Square optical connector × 2
<b>Applicable Format</b>	AES/EBU (2 channel multiplexed)	S/PDIF (2 channel multiplexed)
<b>Sampling Frequency</b>	32 – 48 kHz	32 – 48 kHz
<b>Finish</b>	Panel: Pre-coated steel plate, black, 30% gloss	Panel: Pre-coated steel plate, black, 30% gloss
<b>Dimensions (W x H x D)</b>	35 x 119.5 x 178.4 mm	35 x 119.5 x 178.4 mm
<b>Weight</b>	130 g	130 g





## Digital Modular Mixer

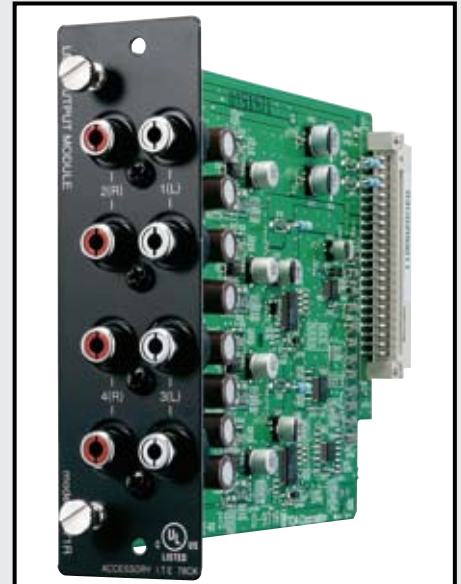
### Line Output Modules



**D-971M**



**D-971E**



**D-971R**

#### Features

- 4-channel Line Output Module
- With XLR connectors
- 2 Line Output Modules may be used at the same time

#### Features

- 4-channel Line Output Module
- With removable terminal block type connectors
- 2 Line Output Modules may be used at the same time

#### Features

- 4-channel Line Output Module
- With standard RCA pin jacks

### Specifications

	D-971M	D-971E	D-971R
<b>Output</b>	4 channels, +4 dBu, adaptable load of over 600 Ohm, electronically-balanced, equivalent to XLR-3-32 type	4 channels, +4 dBu, adaptable load of over 600 Ohm, electronically-balanced, removable terminal block type connector	4 channels (2 outputs for each channel), -10 dBu, adaptable load of over 600 Ohm, RCA pin jack
<b>D/A Converter</b>	24 bits	24 bits	24 bits
<b>Frequency Response</b>	20 ... 20000 Hz, ±1 dB	20 ... 20000 Hz, ±1 dB	20 ... 20000 Hz, ±1 dB
<b>Sampling Frequency</b>	48 kHz	48 kHz	48 kHz
<b>Dynamic Range</b>	Over 100 dB (IHF-A weighted)	Over 100 dB (IHF-A weighted)	Over 100 dB (IHF-A weighted)
<b>Total Harmonic Distortion</b>	Under 0.05 %	Under 0.05 %	Under 0.05 %
<b>Finish</b>	Panel: Pre-coated steel plate, black, 30 % gloss	Panel: Pre-coated steel plate, black, 30 % gloss	Panel: Pre-coated steel plate, black, 30 % gloss
<b>Dimensions (W x H x D)</b>	35 x 119.5 x 178.4 mm	35 x 119.5 x 178.4 mm	35 x 119.5 x 178.4 mm
<b>Weight</b>	165 g	140 g	150 g



## Digital Modular Mixer

### Digital Output Modules



**D-961SP**

#### Features

- 2-Stereo-Channel Digital Output Module
- Digital signals can be output, permitting direct connection of the D-901 Digital Mixer to equipment having a digital input
- S/PDIF-Format
- Each pair of optical output and coaxial output is output in parallel



**D-972AE**

#### Features

- 4-Channel Digital Output Module
- With the use of this module, digital signals can be output, permitting direct connection of the D-901 Digital Mixer to equipment having a digital input
- AES/EBU-Format

### Specifications

	D-961SP	D-972AE
<b>Output</b>	2-stereo-channel line (with splitter, can be output to each pair of optical output and coaxial output in Parallel), 0.5 V (p-p), 75 Ohm, Coaxial RCA jack × 2 Square optical connector × 2	4 channels, 5.0 V (p-p), 110 Ohm, XLR-3-32 or equivalent × 2
<b>Applicable Format</b>	S/PDIF (2 channel multiplexed)	AES/EBU (2 channel multiplexed)
<b>Sampling Frequency</b>	48 kHz	48 kHz
<b>Finish</b>	Panel: Pre-coated steel plate, black, 30 % gloss	Panel: Pre-coated steel plate, black, 30 % gloss
<b>Dimensions (W x H x D)</b>	35 x 119.5 x 178.4 mm	35 x 119.5 x 178.4 mm
<b>Weight</b>	130 g	130 g

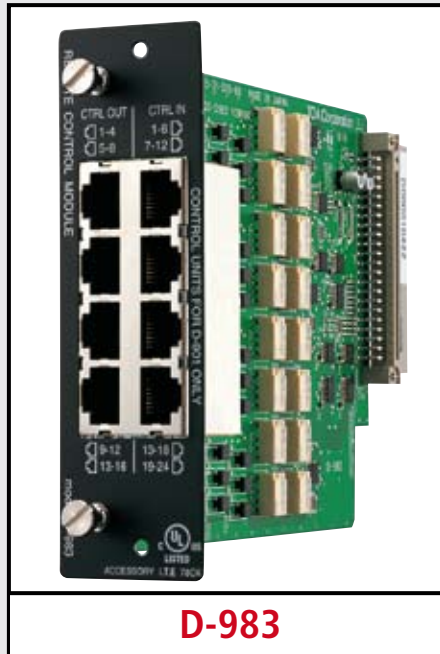
## Digital Modular Mixer



### Remote Control Modules



**D-981**



**D-983**

#### Features

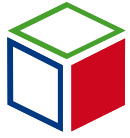
- 8 contact inputs, 8 contact outputs
- Permits preset memory recall, input/output channel volume control, stereo input selection and channel ON/OFF operation to be remotely controlled from external equipment
- Tally output can also be provided for external control

#### Features

- 24 contact inputs, 16 contact outputs
- Permits preset memory recall, input/output channel volume control, stereo input selection and channel ON/OFF operation to be remotely controlled from external equipment
- Tally output can also be provided for external control

### Specifications

	D-981	D-983
<b>Control input</b>	COM + terminals 1 – 8: Open voltage: 5 V DC, short-circuit current: 5 mA removable terminal block type connector	COM + terminals 1-24: Open voltage: 5 V DC, short-circuit current: 5 mA RJ45 connector x 4
<b>Control</b>	Any preset memory can be recalled	Any preset memory can be recalled
<b>Preset Memory Selection</b>	Control method: No-voltage make of over 100 ms/no-voltage make single pulse of over 100 ms	Control method: No-voltage make of over 100 ms/no-voltage make single pulse of over 100 ms
<b>Volume</b>	Volume can be turned UP or Down for any input and output channels. Control method: 1 step variation for no-voltage make single pulse of over 100 ms 1 step continuous operation for every 70 ms for no-voltage make of over 100 ms. Can be reset when at break. Variable range: -∞ dB to +10 dB. Any input/output channels can be turned ON and OFF.	Any input/output channel volume can be turned UP or DOWN. Control method: 1 step variation for no-voltage make single pulse of over 100 ms, 1 step continuous operation for every 70 ms for no-voltage make of over 100 ms. Can be reset when at break. Variable range: -∞ dB to +10 dB Any input/output channels can be turned ON and OFF.
<b>Channel</b>	Control method: No-voltage make of over 100ms/ no-voltage make single pulse of over 100 ms	Control method: No-voltage make of over 100 ms/no-voltage make single pulse of over 100 ms Input channel lines of the D-936R (optional) or the D-937SP (optional)
<b>Stereo selection</b>	Any stereo input can be selected. Control method: No-voltage make of over 100 ms/ no-voltage make single pulse of over 100 ms	(4 stereo input module) can be selected. Control method: No-voltage make of over 100 ms/ no-voltage make single pulse of over 100 ms
<b>Control output</b>	COM + terminals 1 – 8: No-voltage make contact input, contact capacity: 24 V DC, 100 mA removable terminal block type connector	COM + terminals 1-16: No-voltage make contact, contact capacity: 24 V DC, 100 mA RJ45 connector x 4
<b>Finish</b>	Panel: Pre-coated steel plate, black, 30 % gloss	Panel: Pre-coated steel plate, black, 30 % gloss
<b>Dimensions (W x H x D)</b>	35 x 119.5 x 178.4 mm	35 x 119.5 x 178.4 mm
<b>Weight</b>	125 g	170 g



## Digital Modular Mixer

### VCA Control Module



**D-984VC**

### Features

- 20 VCA control inputs, 8 contact inputs and 8 contact outputs
- By using VCA controls from external equipment, this module permits the D-901's volumes of 12 inputs and 8 outputs to be controlled
- By using contact input controls from external equipment, this module permits the preset memory recall, input/output channel gains, stereo input selection, and channel ON/OFF to be controlled
- By using contact output controls, tally outputs can also be provided for external control

### Specifications

	<b>D-984VC</b>
<b>VCA Control Input</b>	+5 V GND, terminal 1 - 20 (12 input channels, 8 output channels), RJ45 connector x 4, control contents: volume control of each input/output channel, variable range: $-\infty$ dB to +0 dB
<b>Contact Input</b>	COM + terminal 1-8: open voltage: 5 V DC, short-circuit current: 5 mA, RJ45 connector x 2
<b>Preset Memory Selection</b>	Any preset memory can be recalled. Control method: No-voltage make of over 100ms/ No-voltage make single pulse of over 100ms
<b>Volume control</b>	Any input/output channel volume can be turned UP or DOWN. Control method: 1 step variation for no-voltage make single pulse of over 100ms 1 step continuous operation for every 70ms for no-voltage make of over 100 ms. Can be reset when at break. Variable range: $-\infty$ dB to +10 dB
<b>Channel</b>	Any input/output channel can be turned ON and OFF. Control method: No-voltage make of over 100 ms / no-voltage make single pulse of over 100 ms
<b>Stereo Selection</b>	Input channel lines of the D-936R (optional), or the D-937SP (optional) (4 stereo input module) can be selected. Control method: No-voltage make of over 100 ms/ No-voltage make single pulse of over 100 ms
<b>Contact Output</b>	COM + terminal 1-8: No-voltage make contact, contact capacity: 24 V DC, 100mA, RJ45 connector x 2
<b>Finish</b>	Panel: Pre-coated steel plate, black, 30 % gloss
<b>Dimensions (W x H x D)</b>	35 x 119.5 x 178.4 mm
<b>Weight</b>	170 g

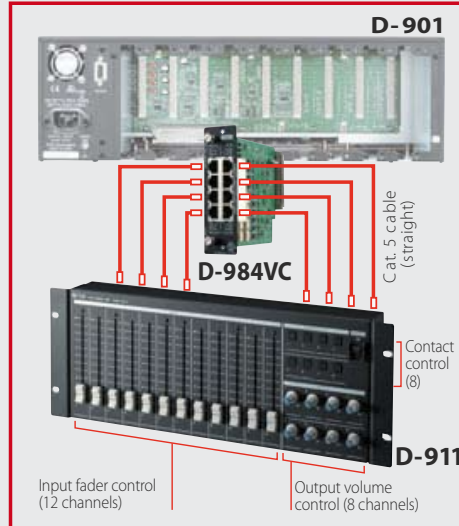


## Digital Modular Mixer

### VCA Fader Unit



**D-911**



Interconnection D-911 and D-901

### Features

- 100 mm fader
- Volume control of all channels and contact controls
- 12 Fader for input channels
- 8 output volume controls
- 8 LED-illuminated switches
- Remote power control
- Optional D-984VC module required
- Rack mountable

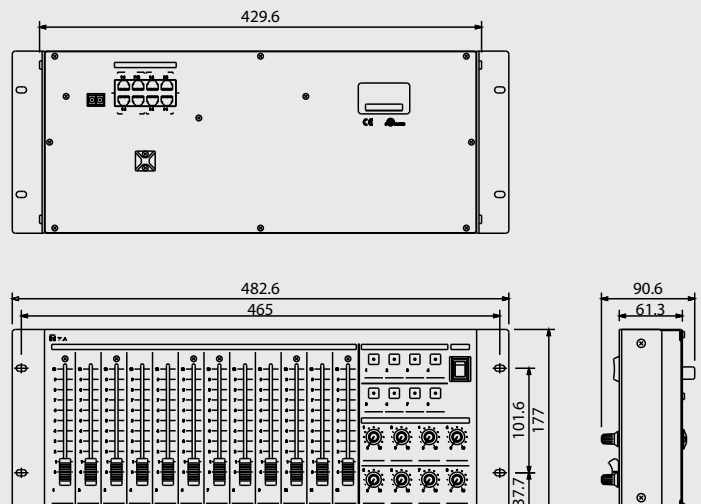
### Options

- D-984VC: VCA control module

### Specifications

	D-911
<b>Power Supply</b>	5 V DC (supplied from the optional D-984VC)
<b>Connector</b>	RJ45 connector × 8
<b>Input Fader Control</b>	Input fader (100 mm) × 12
<b>Output Volume Control</b>	Output volume control × 8
<b>Contact Control</b>	Illuminated switch × 8
<b>Remote Switch</b>	Seesaw switch for activating the remote function of the power distributor
<b>Remote Output</b>	No-voltage make contact output (contact capacity: 30 V DC, 4A)
<b>Finish</b>	Panel: Pre-coated steel plate, black, 30% gloss
<b>Dimensions (W × H × D)</b>	482.6 × 177 × 61.3 mm (excluding projection)
<b>Weight</b>	2.7 kg
<b>Accessory</b>	Fader knob (Red, Yellow) × 3 each, Volume knob (Red) × 2, Rack mounting screw × 4, Rack mounting fiber washer × 4, Rack mounting bracket (preinstalled on the unit) × 2

### Dimensions





## Digital Mixer

### Digital Matrix Mixer



**M-9000M2**

### Features

- Combination of Matrix and Mixer Mode
- 8 slots for modules
- 4 priorities selectable
- 2 DSP output channels included
- 10-band parametric equalizer
- Ducker-function (priority)
- Aluminum front panel and steel case
- For rack-mounting, 2 units height
- Colour: black
- Up to 16 panels can be connected to 1 M-9000M2 by using a RC-001T control module
- Panels can be cascaded
- Different modules, remote panels and a

- sensing microphone for individual adjustment to the ambient noise
- Easy to use software with new functions

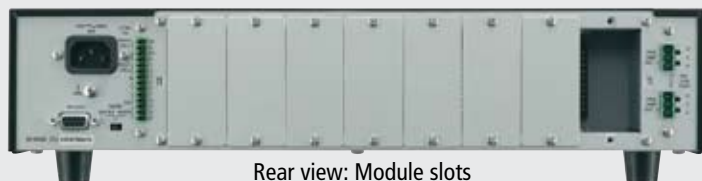
### Applications

Restaurants, bars, hotels, conference rooms and board rooms, auditoriums, offices, museums, fitness clubs and theme parks

### Options

- D-001T: Input module
- ZP-001T: Telephone module
- T-001T: Output module
- AN-001T: Ambient noise control module
- C-001T: Input / output control module
- AN-9001: Sensor microphone
- RC-001T: RS-485 control module
- SS-9001: Speaker selection module
- D-001R: Line input module with DSP
- Various Remote Panel:  
ZM-9001, ZM-9002, ZM-9003,  
ZM-9011, ZM-9012, ZM-9013, ZM-9014

### Specifications



Rear view: Module slots

	<b>M-9000M2</b>
<b>Audio Input</b>	Max. 8 channels, modular (modules optional)
<b>Audio Output</b>	Preamplifier outputs 1 and 2: 0 dBV, 600 Ohm, balanced, removable terminal blocks (3-pins), max. 8 outputs
<b>Control Inputs and Outputs</b>	RS-232C, D-sub connector (9-pins); 4 control inputs and outputs each, remote volume control, removable terminal blocks.
<b>Crosstalk</b>	> 64 dB (20000 Hz)
<b>Functions</b>	Tone control (bass, treble: $\pm 12$ dB), 10-bands parametric equalizer (31 steps, Q: 0,3 ...5), 15 speaker equalizer, high pass (-12 dB / Oct), low pass (-12 dB / Oct), Compressor (depth 1 to 5), Delay ( 0 ... 40 ms in 1ms steps), 32 scene/event memories, 2 operation modes: mixer or matrix, key-lock
<b>Frequeny Range</b>	20 Hz ... 20000 Hz
<b>Total Harmonic Distorsion</b>	< 0,008 %
<b>S/N Ratio</b>	90 dB
<b>Power Supply</b>	230 V (50 / 60 Hz)
<b>Power Consumption</b>	40 W
<b>Finish</b>	Front: Aluminum, black, case: steel plate, black
<b>Dimensions (W x H x D)</b>	420 x 107.6 x 353 mm, 2 units
<b>Weight</b>	6 kg (without modules)



## M-9000 Modules

### D-001T

#### Dual Mic /Line Input Module with DSP

2 balanced mic / line Inputs  
 Digital signal processing:  
 10-band parametric EQ  
 Bass / treble, loudness  
 High pass / low pass filters, compressor  
 Adjustable sensitivity (-60 ... -10 dB, 9-steps)  
 Phantom power (24 V DC)  
 Detachable terminal block  
 Max. 4 input modules / chassis  
 Required for VOX-function and input measure



### T-001T

#### Dual Line Output Expansion Module with DSP

2 balanced line outputs  
 Digital signal processing:  
 -10-band parametric EQ  
 -Bass / treble, loudness  
 -High pass / low pass filters, compressor  
 Detachable terminal block  
 Max. 3 output modules / chassis



### AN-9001

#### Ambient Noise Sensor Microphone

Ceiling or wall mount condenser microphone.  
 Fits one gang electrical box  
 Use with AN-001T module or DP-L2 processor



### ZP-001T

#### Telephone Zone Paging Module

Telephone paging to up to 8 zones. Uses DTMF dialing access outputs  
 Dial up to 8 output zones in one operation. Compatible with analog extension or page port.  
 Page port operation requires closed contact. RJ-11 telephone plug or detachable screw terminals  
 Max. 1 telephone module / chassis



### C-001T

#### Input / Output Control Module

8 assignable control inputs for activation  
 Event / volume / mute / remote power on-off  
 Emergency mute  
 8 assignable control outputs for activating external relays  
 Detachable screw terminals  
 Max. 1 control module / chassis



### SS-9001

#### Speaker Selection Module

Up to 4 speaker lines switchable  
 2 amplifier inputs for announcements and BGM  
 Interconnectable to other TOA systems



### AN-001T

#### Ambient Noise Control Module

Automatic adjusts output gain to compensate for changes in ambient noise level  
 2 microphone inputs with 24 V phantom power  
 14 preset gain ratios  
 Each input can be assigned to control a specific output  
 Only in combination with AN-9001 sensor microphone  
 Max. 2 modules per chassis



### RC-001T

#### RS-485 Control Module

For up to 16 RS-485 remote control panels  
 Bi-directional RS-485 communication  
 Control, status feedback display for each remote function  
 Dual ports for up to 8 modules  
 24V DC power adapter (optional AD-246) required for each port  
 May be used in any control option slot in addition with C-001T



### D-001R

#### Line Input Module with DSP

Two RCA phone inputs per channel provides stereo summing  
 Digital Signal Processing  
 -10-Band Parametric EQ  
 -Bass / Treble, Loudness  
 -High and Low Pass Filters  
 -Compressor  
 Detachable screw terminals  
 Max. 4 modules / chassis



### ZM-9001

#### Remote Panel with 6 Buttons

6 buttons to activate preset selection or volume up/down  
 Wiring: single conductor shielded cable  
 Max loop resistance 50 Ohm per line  
 Mounting in one gang electrical box  
 Maximum 2 remote panels per chassis



### ZM-9002

#### Remote Panel with 4 Buttons and Volume Control

4 buttons to activate preset selection or volume up/down  
 Volume control knob  
 Wiring: single conductor shielded cable  
 Max loop resistance 50 Ohm per line  
 Mounting in one gang electrical box  
 Maximum 2 remote panels per chassis



### ZM-9003

#### Remote Panel with 4 interlocking selection buttons and 2 momentary buttons

Max. loop resistance: 250 ohms per line  
 Removable Terminal Block  
 Maximum two ZM-9003 per chassis



### ZM-9011

#### Assignable Remote Button Panel

Four assignable buttons with LED status indicator for Xpoint settings (on/off, select), paging activation, scene, relay activation  
 Assignable ID rotary adjustment on box.  
 RC-001T required



### ZM-9012

#### Assignable Volume Controller

Rotary Encoder can be assigned to control any input or output volume  
 RC-001T required



### ZM-9013

#### Assignable Remote Button Panel

Eight assignable buttons with LED status indicator for Xpoint settings (on/off, select), paging activation, scene, relay activation. Assignable ID rotary adjustment on box. RC-001T required



### ZM-9014

#### Assignable Remote Button Panel

Four assignable buttons with LED status indicator for Xpoint settings (on/off, select), paging activation, scene, relay activation. Assignable ID rotary adjustment on box. RC-001T required





## Digital Mixer

### Smart One-Touch Digital Stereo Mixer



**M-633D**

### Features

- One-touch operation
- Automatic resonance control (ARC) with room mode frequency detection and inverse response curve for compensation
- Automatic clippguard (ACG)
- Automatic feedback suppressor (FBS)
- Automatic mute function
- Clearly, highly articulate sound
- 1 unit height
- 12 input channels
- 6 output channels
- 2 monaural channel and 1 stereo channel bus
- Rack-mountable with optional brackets, 2 units height
- Colour: black

### Applications

Meeting rooms, gymnasiums, houses of worship

### Specifications

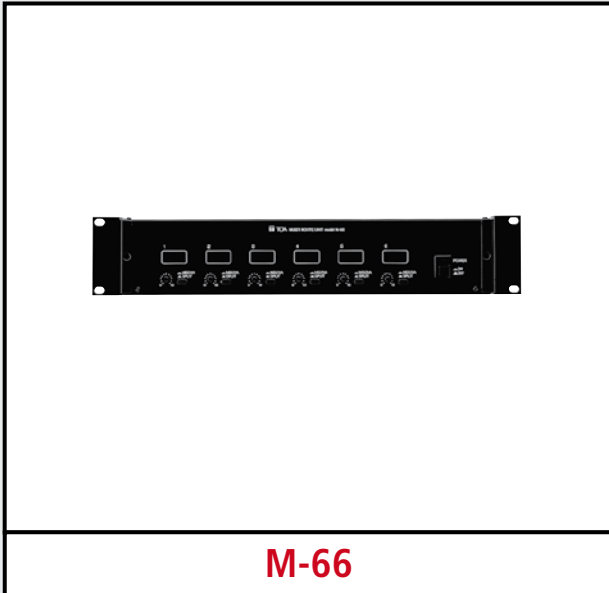
	M-633D
<b>Input</b>	6 monaural input channels, switchable LINE, MIC or PHANTOM: LINE : -10 dB*, 2.4 kOhm, MIC : -46 dB*, 2.4 kOhm, PHANTOM : -46 dB*, 2.4 kOhm, supplies +24V DC / 10 mA, electronically balanced Removable terminal block (3 pins), phone jack 3 stereo inputs (L, R): -10 dB* / 10 kOhm, RCA jack, stereo mini jack
<b>Output</b>	2 monaural outputs: 0 dB*, electronically balanced, removable terminal block (3 pins) 1 stereo output (L, R): 0 dB*, electronically balanced, removable terminal block (3 pins) 1 stereo recording output (L,R): -10 dB*, RCA jack
<b>Bus Line</b>	Monaural channel x 2, stereo channel x 1
<b>THD</b>	< 0.03%
<b>Sampling Frequency</b>	48 kHz / 24 bits
<b>Signal Processing</b>	Automatic Resonance Control (ARC), Feedback Suppressor (FBS), Automatic Clippguard (ACG), Automatic Mute
<b>Dynamic Range</b>	>90 dB
<b>Frequency Range</b>	20 Hz ... 20000 Hz
<b>S/N Ratio</b>	90 dB or more (IHF-A weighted)
<b>Power Supply</b>	230 V (50 / 60 Hz)
<b>Power Consumption</b>	14 W
<b>Finish</b>	Front: Aluminum, black, case: steel plate, black
<b>Dimensions (W x H x D)</b>	420 x 44 x 341.3 mm, 1 unit
<b>Weight</b>	4 kg





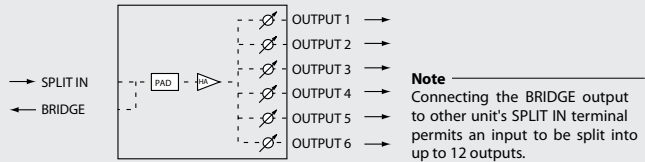
## Multi-Route Unit

### 6 Channel Router



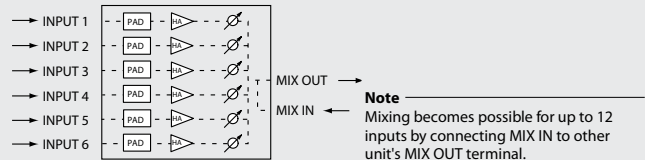
#### Functions as a splitter

- One input can be split into up to 6 outputs per unit.
- Split outputs can be expanded by connecting multiple units.
- Signal level can be individually adjusted for each output.



#### Functions as a mixer

- Up to 6 inputs can be mixed together and sent out from 1 output per unit.
- Inputs can be expanded by connecting multiple units.
- Sensitivity level (-60,-40,-10,+10 dB) can be individually set for each input.
- Signal level can be individually adjusted for each input.



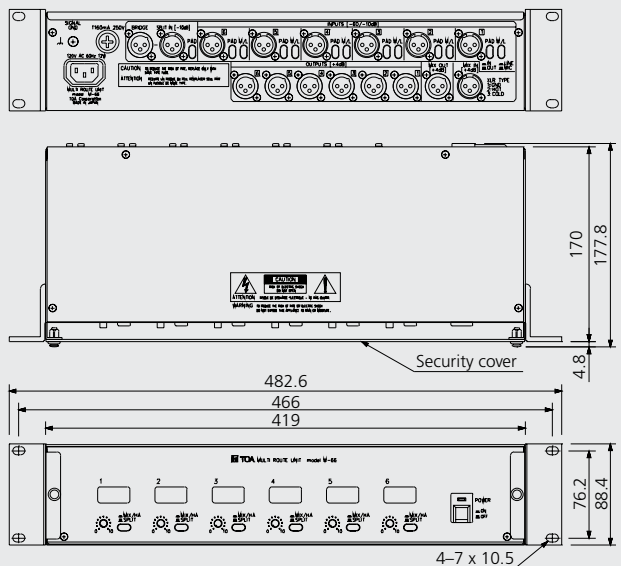
### Features

- Unit can be operated as a 6-input-6-output microphone preamplifier / line driver or splitter / combiner (mixer)
- Front panel switch for assigning signal configurations
- Mountable on the EIA standard equipment rack (2-unit size)
- Colour: black
- Mic/Line level selector switch and 20 dB PAD on each input channel for a wide range of precise signal settings from microphone to line levels
- Cascading multiple units for increasing the number of inputs and outputs
- Simultaneous use of multiple functions (i.e. different functions can be assigned to different channels)
- Electrically-balanced inputs and outputs
- Security cover protects the unit against accidental changes

### Specifications

	M-66
<b>Power Source</b>	230 V AC, 50 / 60 Hz
<b>Power Consumption</b>	12 W
<b>Input</b>	6 inputs, mic / line changeable, 2 kOhm, XLR-3-31 compatible (electrically balanced); -60 dBu (Mic), -10 dB (Line)
<b>Split Input</b>	-10 dBu, 2 kOhm, XLR-3-31 compatible (electrically balanced)
<b>Mix Input</b>	+4 dBu, 10 kOhm, XLR-3-31 compatible (electrically balanced)
<b>Output</b>	6 outputs, +4 dBu (appropriate impedance not less than 600 Ohm)
<b>Mix Output</b>	+4 dBu ( impedance > 600 Ohm), XLR-3-32 compatible
<b>Other</b>	Bridging output: XLR 3-32 compatible; Input sensitivity selector switch: Input 1 to 6 (Line, Mic); pad switch: Input 1 to 6, split input (20 dB); function selector switch: 1 to 6 (MIX / HA, Split)
<b>Frequency Response</b>	20 ... 20000 Hz (+1, -3 dB)
<b>Distortion</b>	< 0,01 % (1 kHz, line level nominal input, output)
<b>Noise</b>	Output: Less than -100 dBu (band pass filter, vol. minimal)
<b>Temperature Range</b>	0°C - 40°C
<b>Finish</b>	Panel, case: Pre-coated steel plate, black, 30 % glossy; security cover: acrylic, grey (smoke)
<b>Dimensions (W x H x D)</b>	482.6 x 88.4 x 177.8 mm
<b>Weight</b>	3 kg

### Dimensions





## Digital Audio Processor

### Automatic resonance control for optimising the sound field



**DP-K1**

### Description

Do you know this situation? The parameters of the sound system have been measured and adjusted and after 4 weeks you receive the call: "The announcements cannot be understood?" You enter your car, drive to the location and repeat the complete procedure. Stop now! TOA again leads the way in ensuring optimised commercial sound audio with an easy-to-operate digital audio processor outfitted with an 8-input/8-output capability. It's no longer necessary to puzzle the sound. The ARC (Auto Resonance Control) system of the DP-K1 recognises automatically the resonance frequencies in a room and suppresses its transmissions for providing ideal room acoustics - even if a layman operates the system. The DP-K1 additionally features equalizer, crossover filter, compressors, delay and matrix, whose parameter can be easily configured by PC.

### Features

- Digital signal processor with max. 8 inputs and outputs
- Antiresonance function for 8 channels
- A variety of filters, dynamic (noise gate, compressor), delay, crossover, matrix
- Modular inputs and outputs for easy adjustment of the system
- Different input and output modules available
- Adjustment by PC via LAN possible
- Easy to use and many automatic functions
- Rack-mountable

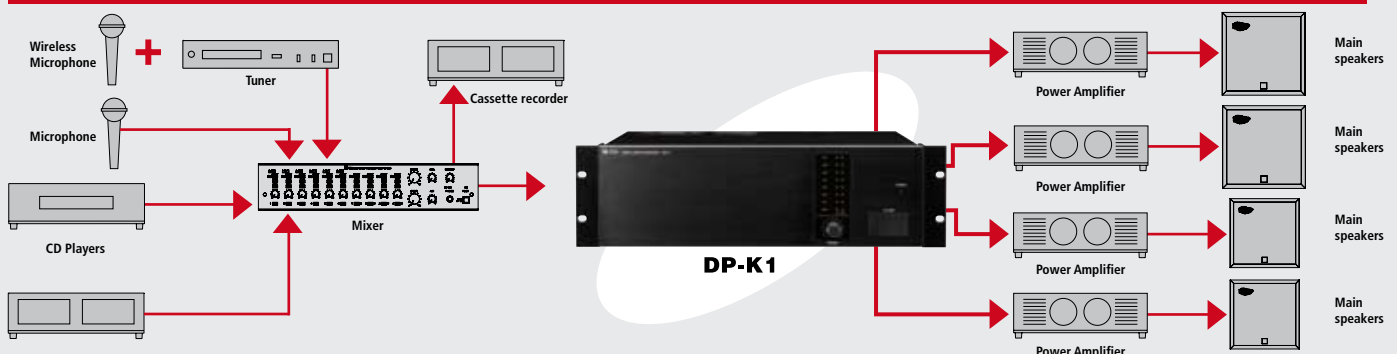
### Applications

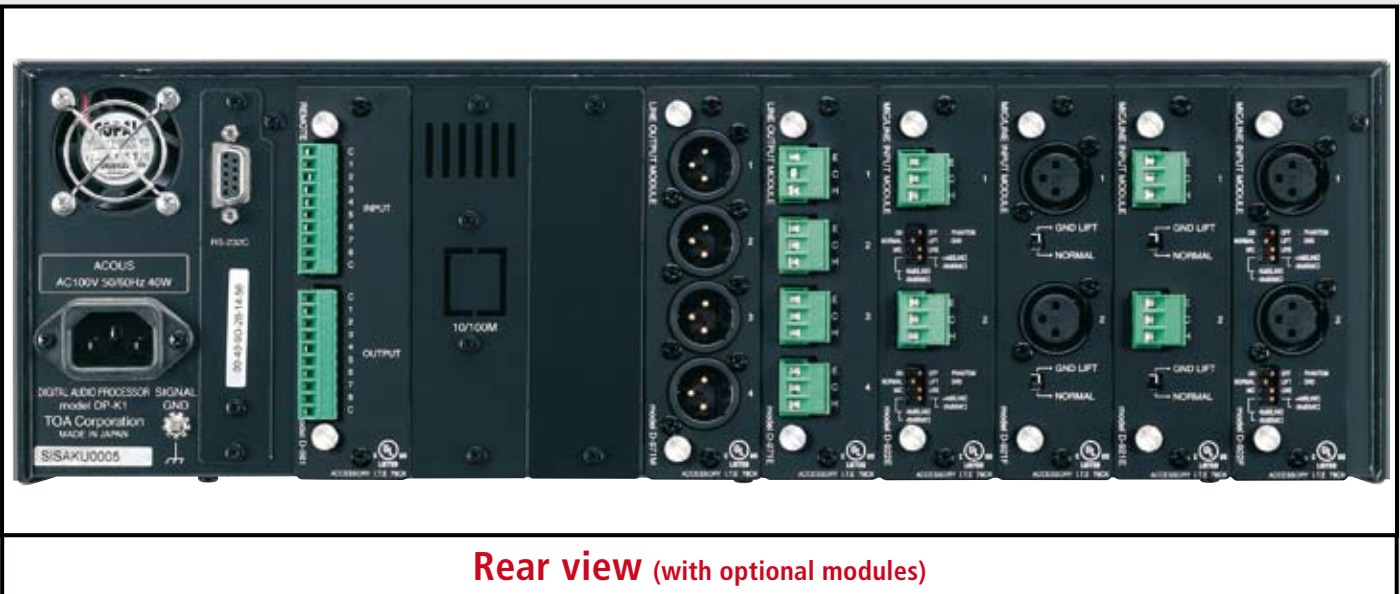
Churches, stadiums, halls, conference rooms, convention centers, airports and many other buildings where a high intelligibility is mandatory

### Options

- Mic / Line Input Modules: D-921E, D-921F, D-922E, D-922F
- Stereo input module: D-936R
- Digital input modules: D-923AE, D-937SP
- Analog output modules: D-971E, D-971M, D-971R
- Digital output modules: D-972AE, D-961SP
- Control modules: D-981, D-983

### System example





Rear view (with optional modules)

## Specifications

	DP-K1
Power Supply	230 V, 50 / 60 Hz
Power Consumption	40 W
Frequency Response	20 ... 20000 Hz, $\pm 1$ dB (+4 dBu)
Inputs	Up to 8 channels, modular (modules optional)
Outputs	Up to 8 channels, modular (modules optional)
Signal Processing	
Auto Resonance Control Function	Parametric equalizer: 20 ... 20000 Hz, $\pm 12$ dB, Q: 0,267 - 69,249
Equalizer / Filter	Parametric equalizer: 20 ... 20000 Hz, $\pm 12$ dB, Q: 0,267 - 69,249 Filter: (total amount of filters depends on the number of input and output channels) High pass filter: 20 ... 20000 Hz, 6 dB/Oct., 12 dB/Oct Low pass filter: 20 Hz ... 20000 Hz, 6 dB/Oct., 12 dB/Oct Notch filter: 20 Hz ... 20000 Hz, Q: 8,651 - 69,249 All pass filter: 20 Hz ... 20000 Hz, Q : 0,267 -- 69,249 High shelving filter: 6000 ... 20000 Hz, $\pm 15$ dB Low shelving filter: 20 ... 500 Hz, $\pm 15$ dB Horn-Equalizer: 20000 Hz, 0 bis +18 dB,(1dB steps) Crossover filter: 20 Hz ... 20000 Hz, 6 dB/Oct, 12 dB/Oct, 18 dB/Oct, 24 dB/Oct (LR, BW, BE)
Compressor	(Compressor mode) threshold: -16 to +24 dB (1 dB steps) Compression ratio: 1 : 1; 2 : 1; 3 : 1; 4 : 1; 8 : 1; 12 : 1; 20 : 1; $\infty$ : 1 Attack time: 0,02 ms ... 100 ms, release time: 10 ms - 5 s Delay: 0 - 682,6 ms (0,021 ms steps)
Delay	Delay time: 0 ... 682,6 ms (0,021ms steps)
Matrix	Matrix 8 $\times$ 8
Gain control	$-\infty$ to 0 dB (1 dB steps)
Presets	8
Other Functions	Key-lock
PC Software	OS: Windows*1 2000/XP Control via: LAN (Ethernet) 10/100 BASE-T, auto negotiation, RJ45 connector
Front Panel Section	Preset memory recall knob, input signal indicator: green LED, output signal indicator: green LED
Module Slots (rear)	Input modules: 4, output modules: 2, remote control module: 1
Ambient Temperature	+5 ... + 40 °C
Finish	Front: Aluminum, hair-line, black, others: pre-coated steel plate, black, 30% gloss
Dimensions (W x H x D)	482,6 $\times$ 132,6 $\times$ 320 mm
Weight	7,4 kg
Accessories	Power cord (2 m), 19" rack mounting brackets x 2, rack mounting screws x 4, blank panels x 8, module mounting screws x 4, CD (Software)

\*1 Windows is a registered trademark of Microsoft Corporation.



## Monitor Panel

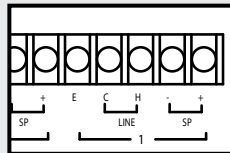
### Monitoring of Sound and Signal



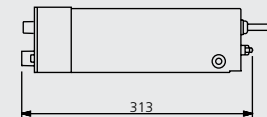
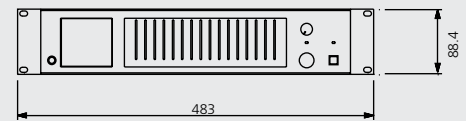
Rear



Volume + channel selector



Channel 1 connection



### Features

- Monitor Panel for 16 channels
- Allows visual and aural monitoring of up to 16 audio signal channels with 8 Ohm, 100 V or line level
- 2 units can be linked for up to 32 channels (with optional cable YA-8: 1 master monitor unit)
- 12-segment LED meter with calibrated scale for each input
- Audio monitoring of each channel through a built-in selector switch and loudspeaker
- All inputs balanced and transformer isolated

### Options

- YA-8: Connection Cable (8P DIN plug, 1m)

### Specifications

	<b>MP-1216</b>
<b>Nominal Input Levels</b>	Transformer isolated : +4 dB; 8 Ohm: 49 V; 100 V
<b>Terminals</b>	16 channels x 5 terminals (2 x for speaker, 3 x for line)
<b>Controls</b>	Channel Selector Switch + Indicator, Output Level: LED Meter + Selected Channel, Power
<b>Power Requirements</b>	230 V 50 Hz, 25 VA
<b>Dimension (W x H x D)</b>	483 x 80.4 x 313, 2-unit height
<b>Weight</b>	5.3 kg
<b>Colour</b>	Black

## Equalizer



### Graphic Equalizer


**E-232**

**E-1231**

### Features

#### E-1231

- 28 filters on ISO 1/3 octave
- Center frequencies 31.5 Hz ... 16 kHz
- Cut variable coverage
- Calibrated scales with dB-factors
- Security cover
- Colour: black
- Additional high- and low-pass filters with variable frequencies from 15 Hz to 300 Hz (6 or 12 dB oct) and 2.5 kHz to 30 kHz
- Variable ( $\pm 12$  dB) input level control for a variety of input levels and sources
- LED peak monitoring of input and output levels, for proper gain structuring
- Bypass switch

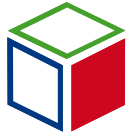
#### E-232

- 14 filters on ISO 2/3 octave
- Center frequencies from 40 Hz to 16 kHz
- Active bandpass
- Bandreject summed-in-parallel filters with minimum phase shift
- Security cover
- Colour: black
- Variable independent 6 dB or 12 dB boost or cut at each center frequency
- Precision calibrated linear scales with dB-factors
- Continuously variable high pass filter (15...300 Hz)

- Manual bypass and automatic bypass at power loss
- LED peak monitoring of input and output levels, for proper gain structuring

### Specifications

	E-1231	E-232
<b>Application</b>	Equalizer	Equalizer
<b>Input Impedance</b>	10 kOhm	30 kOhm
<b>Input Level</b>	max. +20 dBm (1 kHz)	+4 dBu (max. +32 dBu)
<b>Output Impedance</b>	600 Ohm	1 kOhm
<b>Output Level</b>	max. +20 dBm (600 Ohm load)	+4 dBu (max. +20 dBu)
<b>Frequency Response</b>	20 Hz ... 20000 Hz ( $\pm 1$ dB)	20 Hz ... 20000 Hz (+1 / -2 dB)
<b>Distortion</b>	<0,01 % (1 kHz)	<0,01%
<b>Dynamic range</b>	114 dB	118 dB
<b>Center Frequencies (Hz)</b>	31.5, 40, 50, 63, 80, 100, 125, 160, 250, 315, 500, 400, 630, 800, 1 k, 1.25 k, 1.6 k, 2 k, 2.5 k, 3.15 k, 4 k, 5 k, 6.3 k, 8 k, 10 k, 12.5 k, 16 k	40, 63, 100, 160, 250, 400, 630, 1 k, 1.6 k, 2.5 k, 4 k, 6.3 k, 10 k, 16 k
<b>Gain</b>	$\pm 12$ dB	$\pm 12$ dB switchable
<b>Dimensions (W x H x D)</b>	483 x 88 x 317 mm	483 x 44 x 311 mm
<b>AC-Mains</b>	230 V, 50 / 60 Hz	230 V AC, 50 / 60 Hz
<b>Power Consumption</b>	11 W	13 W
<b>Standard Rack Height (U)</b>	2	1
<b>Weight</b>	4.5 kg	3.8 kg



## Digital Ambient Noise Controller

### Automatic Volume Adjustment of BGM and Announcements by Ambient Noise



DP-L2

## Description

The TOA DP-L2 Digital Ambient Noise Controller is the easy, automatic solution to the problem of keeping BGM and announcements audible and understandable when the ambient noise levels at an airport check-in counter or boarding gate, or a shopping mall, restaurant or pub, are higher because a large number of people are present. Furthermore, the DP-L2 also works to keep music and information audio from reaching levels that are irritating to customers and staff when the surrounding ambient noise levels are not so high.

### Automatic and Accurate Input and Output Sound Level Adjustment

The DP-L2 is a digital audio processor with an ambient noise control (ANC) function that makes automatic changes in its output sound levels de-

pending on the amount of surrounding noise, and an automatic level control (ALC) function that automatically adjusts the input signal level so it is appropriate at all times.

BGM and announcements remain audible and understandable at all times, with no annoying loudness for customers and employees.

**Output Signal excluded from Ambient Noise Sensing**  
The ambient noise sensor microphone enables accurate measurement of BGM/announcement listening-area noise levels.

In addition, for complete accuracy, a DP-L2 feature exclusive to TOA automatically separates the unit's own output signal from the calculation of the ambient sound level, instead of just mixing all sound sources together, meaning that the volume

control is not affected by the broadcast signal. This allows to install the microphone everywhere where appropriate. Additionally, a monitoring feature makes it possible to check the sound collected by the ambient noise sensor microphone.

### Easy, Quick Installation and Simple Operation

The DP-L2 fits on a standard 1U size rack, so there is no time-consuming, complex installation procedure. All functions can be easily set from the unit's front panel, thanks to the LCD, keys and knobs.

A key-lock function prevents accidental incorrect front-panel key settings, and there are also front-mounted LED meters for input/output signal levels, as well as ALC and ANC levels.

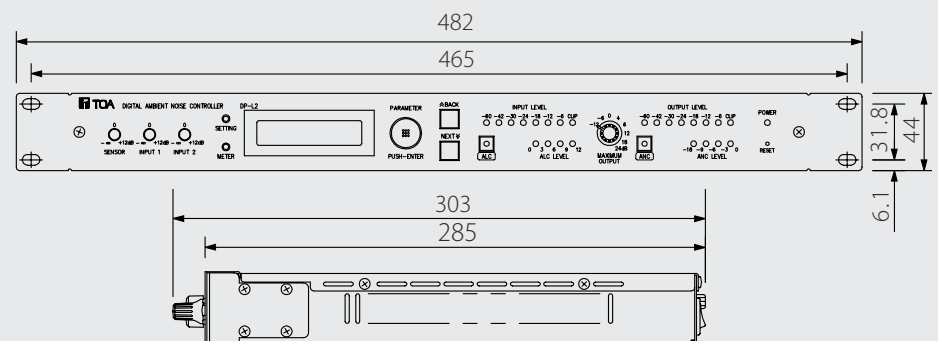
## Features

- Digital audio processor adjusts BGM / announcement sound volume to match changes of ambient noise
- Automatic and accurate input and output sound level adjustment
- Output excluded from ambient noise sensing
- Easy, quick installation and simple operation
- 1-unit size
- Colour: black

## Applications

Airport check-in counters, boarding gates, shopping malls, restaurants or pub,s railway stations

## Dimensions



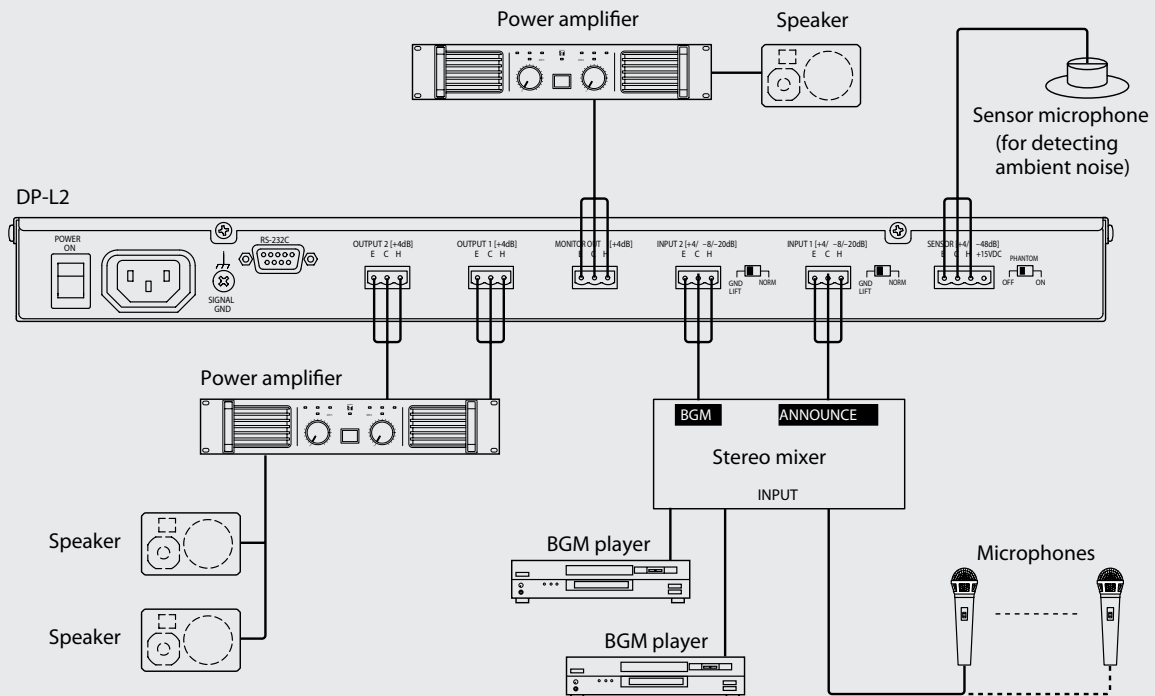


## Consistently Pleasant-Sounding BGM and Information



DP-L2 (Rear View)

## Application Example



## Specifications

	DP-L2
Power Source	AC mains, 50 / 60 Hz
Power Consumption	20 W
Sampling Frequency	48 kHz
Frequency Response	20 Hz ... 20000 Hz, $\pm 1$ dB
Dynamic Range	Over 108 dB (IHF-A weighted)
Distortion	Under 0.006 %, 1 kHz, + 4 dB input/output (20 ... 20000 Hz BPF)
Input	Sensor Input, Input 1 & 2 (removable terminal blocks)
Output	Monitor Output, Output 1 & 2 (removable terminal blocks 3 pins)
A/D, D/A Converter	24 bit
Signal Processing	Automatic level control, ambient noise control, maximum output signal level control, input level indicator, output level indicator
Other Features	Phantom power switch (sensor input), key lock function, ground lift switch (INPUT 1, INPUT 2), input/output bypass function in power off
Operating Temperature	0°C to +40°C
Operating Humidity	Under 90 % RH (no condensation)
Finish	Pre-coated steel plate, black, 30 % gloss
Dimensions (W x H x D)	482 x 44 x 303 mm
Weight	3.7 kg



## TOA Digital Audio Control

### Digital Signal Processor, 2 Inputs and 6 Outputs



DQ-A01



DQ-A02



DQ-C01

### Features

- 2 inputs and 6 outputs
- Digital signal processing and digital control of complex analog devices
- Easy, versatile installation
- Windows™-based software program with real-time processing, matrix unit configuration and parameter settings
- The software is highly intuitive with graphic display of the frequency and phase response
- Editing and data file storage can be done online or offline
- Configuration in a wide range of system setups matching most installation requirements
- 16 presets
- Single or linked in multiples, processing for systems of any size or configuration can be easily designed and adjusted
- Analog and digital inputs and outputs
- Powerfully precise array of operating functions
- Configuration can be expanded by input and output modules each selectable either digital (AES/EBU) or analog (20-bit converters)
- CLEAR Conversion Technology for optimised sound quality
- Up to 30 DP-0206 can be connected and controlled with a PC
- System interface
- Three module slots for expansion modules

### Applications

Ideal for the use in halls with a variety of different requirements or for rental companies

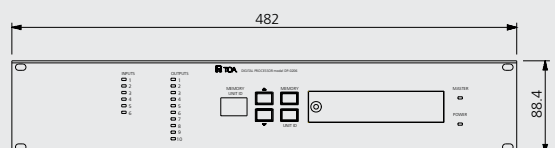
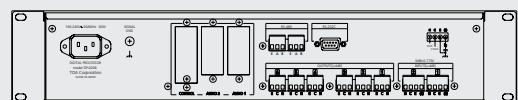
### Options

- DQ-A01 (2- channel input),
- DQ-A02 (2-channel output)
- DQ-C01 for remote recall of presets and output levels and output mute

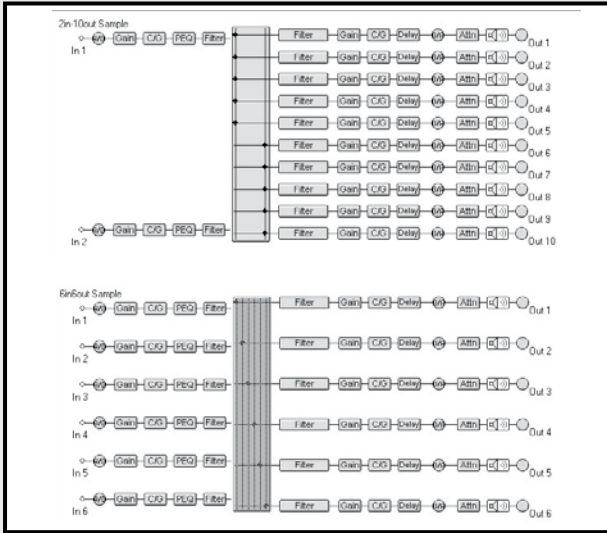
### Specifications

	DP-0206
Power Consumption	30 W
Power Source	100...240 V AC, 50 / 60 Hz
Inputs	2 (max. 6 with 2x DQ-A01), 10 kOhm, +4 dBm (max. +24 dBm), electronically balanced connector: 4-pole terminal block type
Outputs	6 (max. 10 with 2x DQ-A01) +4 dBm (max. +24 dBm), 600 Ohm, electronically balanced connector: 3-pole terminal block type
AD/DA converter	24 bit
Sampling rate	48 kHz
Interfaces	RS232C, RS485
Control	PC software Windows®95/98/NT
Remote Control	With DQ-C01: Presets, Volume, Mute
Preset Memories	16
Frequency Response	20 ... 20000 Hz (±1 dB)
Dynamic Range	110 dB (IHF-A)
THD	< 0.05 % (at +4 dBm)
Dimensions (W x H x D)	482 x 88.4 x 331.1 mm (2 units)
Weight	4.65 kg

### Dimensions



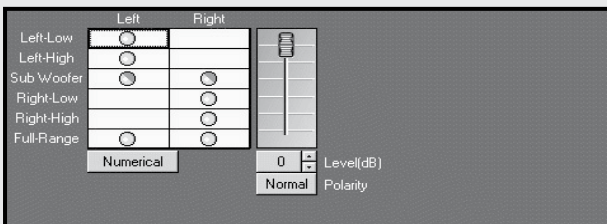




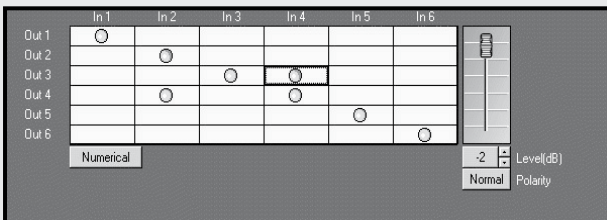
**DP-0206 Signal Flow Diagram**



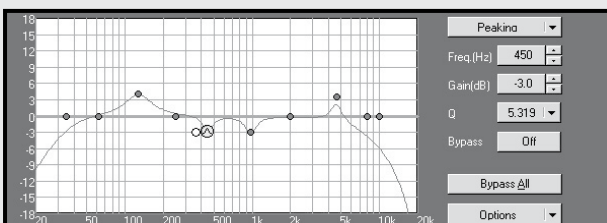
DP-0206 Rear View



Software Control: Matrix 2 in / 6 out



Software Control: Matrix 6 in / 6 out



Software Control: Equalizer

The high performance capabilities of the TOA Digital Audio Control represent a major advance in digital signal processing and in digital control of complex analog devices. The 2-in by 6-out DP-0206 provides over 20 signal processing functions.

All units are accessed by a Windows™\* based software program with real-time processing, matrix unit configuration and parameter settings. The software is highly intuitive and therefore easy to use.

Editing and data file storage can be done off-line and on-line in real time. Settings are software-driven and delivered via the system interface to the independently operation hardware.

The units also feature 16 presets for remote control without a computer. By using units either singly or linked in multiples, processing for systems of any size or configuration can be easily designed and tuned.

The TOA CLEAR-Conversion® technology of the signal processor's 24-bit AD-converter provides minimum quantisation errors and excellent sound quality. The matrix unit has a 64-point switching matrix for its 8 input mix buses and a 64-point level controlled matrix for the 8 output mix buses, both electronically balanced.

The systems can be used at several performance places which provide different requirements for the sound system because each setting can easily be restored by simply pressing a button.

### Control Software

Both the matrix DX-0808 and the processor DP-0206 are software controlled. The programs are running on Windows™ on a PC and therefore they are highly intuitive and easy to use. The installation can easily be done with the setup program.

Setting of parameters can be done on-line or off-line. The on-line operation runs in real-time and can be done over a long distance via RS-485 interface.

Additionally to the online mode complete data sets can be transmitted among PC and the device. Up to 16 different parameter settings can be stored in 1 file and in 1 unit.

The user configures the signal processing devices and then sets the parameters for the processor. The matrix can be defined as a single or a cascaded one consisting of up to 4 units. The connection points can be set for the input and output matrix (latter with volume adjustment).

The settings of the filters can be checked through the graphic display of the amplitude- /phase- /group delay- frequency response. The access can be protected against unauthorized access by setting passwords in three levels.

\*Windows™ is a trademark of Microsoft Corporation in the USA and other countries.



## Line Arrays

### True Line Array in Slim Tower Configuration



**Slim Line Array**

### Description

TOA Line Array Speaker Systems are designed to perform perfectly with ideal sound dispersion characteristics in spaces that pose difficulties for conventional speaker systems. Available in different configurations and with a wide range of mounting possibilities to suit particular requirements precisely. These slim tower configured speakers and modular speaker systems offer perfect solutions for difficult sound reinforcement problems that require effective coverage.

**Driver complement.** The speakers are 2-way line array speakers, each containing 32 speaker elements – 8 x 10 cm woofers and 24 high frequency drivers. Driver units are installed vertically and with minimal space between units in order to create a continuous linear sound source for a uniform sound pressure that resists attenuation with distance.

**Sound dispersion characteristics.** The speaker features a linear shaped speaker for distance sound transmission and a gently curved speaker

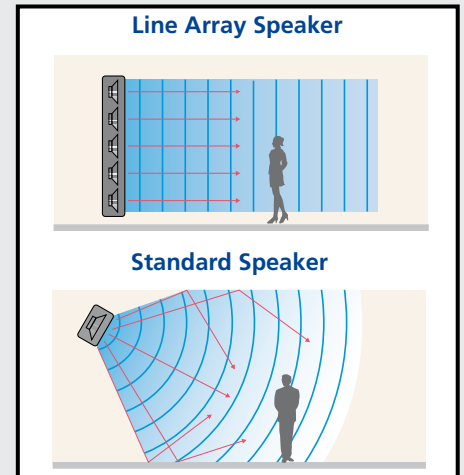
designed for a 10° vertical coverage area which offers ideal sound coverage over a shorter distance. Directed sound dispersion speakers limit vertical sound dispersion in order to focus directivity at the targeted listening area.

**Multi-speaker array-configurable.** Both systems can be combined. Less difference in sound level is perceived whether close to or somewhat distant from the speakers, providing an uniform response.

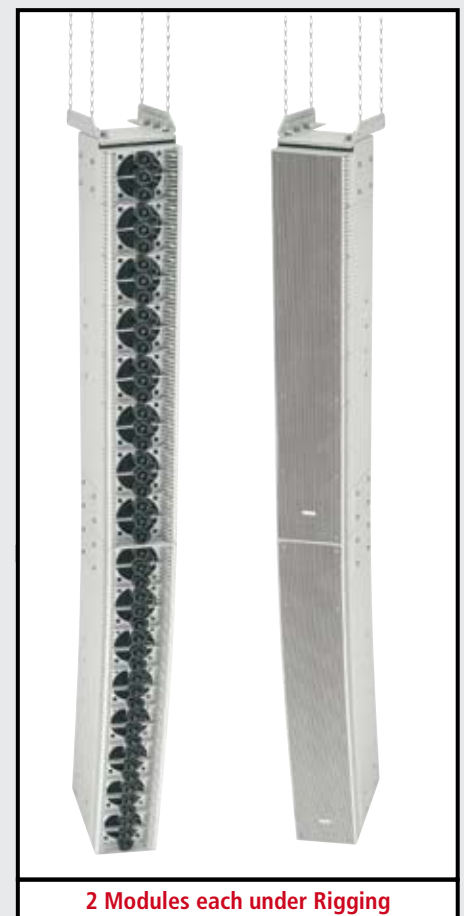
**Reflection-free.** The speakers' construction and characteristics make them resist floor- and ceiling-originating reflections, enhancing clarity even in reverberant spaces and other problematic environments.

**Feedback-resistant.** The design of the speakers also makes them highly resistant against annoying feedback because volume levels are not extraordinarily high even close to the speakers and makes setting gain levels easier.

**Biamp or single amp drive.** Factory-set for single amplifier driving, the speakers can sim-



**Principle of Line Arrays vs Standard Speaker**



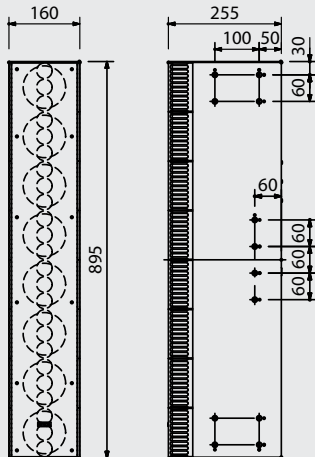
**2 Modules each under Rigging**

ply be set for biamping by making a simple internal wiring change. For optimal biamping, a digital signal processor can be employed to set crossover frequency points. **High impedance-compatible.** The speaker can also be conveniently set for high-impedance application by using the optional MT-S0601 matching transformer.

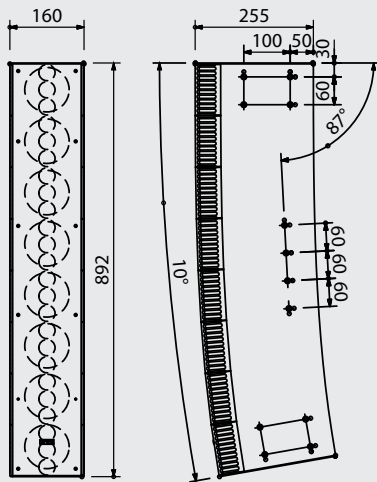


SR-S4L

## Dimensions



SR-S4S

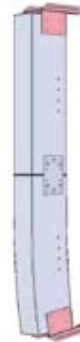
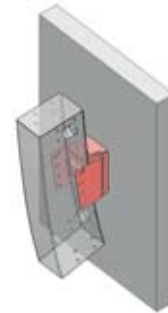


## Variable Mounting

SR-EP4

SR-WB4  
+ SR-EP4

SR-FS4 + SR-EP4

SR-FB-4  
SR-TB4

SR-TB4



SR-SA4 + ST-34B

## Protection Pad / SR-PP4



## Specifications

	SR-S4L	SR-S4LWP	SR-S4S	SR-S4SWP
<b>Enclosure</b>	Bass-reflex type	Sealed type	Bass-reflex type	Sealed type
<b>Power Handling Capacity</b>	Continuous program: 600 W	Continuous program: 600 W	Continuous program: 600 W	Continuous program: 600 W
<b>Rated Impedance</b>	8 Ohm	8 Ohm	8 Ohm	8 Ohm
<b>Sensitivity</b>	94 dB (1W, 1m)	94 dB (1W, 1m)	93 dB (1W, 1m)	93 dB (1W, 1m)
<b>Frequency Response</b>	70 ... 20000 Hz (with optional DP-0206 Digital processor)	70 ... 20000 Hz (with optional DP-0206 Digital processor)	70 ... 20000 Hz (with optional DP-0206 Digital processor)	70 ... 20000 Hz (with optional DP-0206 Digital processor)
<b>Crossover Frequency</b>	3500 Hz	3500 Hz	3500 Hz	3500 Hz
<b>Directivity Angle</b>	Horizontal: 90°, vertical: 0°	Horizontal: 90°, vertical: 0°	Horizontal: 90°, vertical: 10°	Horizontal: 90°, vertical: 10°
<b>Speaker Component</b>	Low frequency: 10 cm cone-type × 8, High frequency: 2.5 cm balanced dome-type × 24	Low frequency: 10 cm cone-type × 8, High frequency: 2.5 cm balanced dome-type × 24	Low frequency: 10 cm cone-type × 8, High frequency: 2.5 cm balanced dome-type × 24	Low frequency: 10 cm cone-type × 8, High frequency: 2.5 cm balanced dome-type × 24
<b>Input Connector</b>	M5 screw terminal and Neutrik NL4MP × 2 (usable cable connector: Neutrik NL4FC)	...	M5 screw terminal and Neutrik NL4MP × 2 (usable cable connector: Neutrik NL4FC)	...
<b>Connected Cable</b>	...	Direct cable withdrawal from internal speaker: ø 8.6mm, conductor cross section: 1.25 mm <sup>2</sup> , 4-core cable, 3 m	...	Direct cable withdrawal from internal speaker: ø 8.6mm, conductor cross section: 1.25 mm <sup>2</sup> , 4-core cable, 3 m
<b>Water Protection</b>	...	IPx4	...	IPx4
<b>Finish</b>	MDF, white (equivalent RAL 9010), paint	Plywood, white (equiv. RAL 9010), urethane coating	MDF, white (equivalent RAL 9010), paint	Plywood, white (equiv RAL 9010), urethane coating
<b>Front Grille</b>	Punched steel plate, paint white	Punched stainless steel (SUS304), acrylic paint white	Punched steel plate, paint white	Punched stainless steel (SUS304), acrylic paint white
<b>Dimensions (W x H x D)</b>	160 x 895 x 255 mm	160 x 895 x 255 mm	160 x 892 x 303 mm	160 x 892 x 303 mm
<b>Weight</b>	16 kg	16 kg	16 kg	16 kg



## Line Arrays

### Middle Line Arrays for Fixed Installation with High SPL



**SR-A12L / SR-A12LWP / SR-A12S / SR-A12SWP**

#### Description

- Line Arrays for indoor (SR-A12L, SR-A12S) and for outdoor use (SR-A12L WP, SR-A12S WP)
- Ideal coverage by 2 different enclosures (linear: SR-A12L and curved SR-A12S)
- High fidelity sound
- Wide frequency range
- Compact but powerful 2-way constructions
- Wide range of mounting brackets for flexible speaker mounting
- Combination possible for uniform sound coverage in various environments

#### Features

- 12" woofer and a high-frequency horn connected to 2 high-performance compression drivers
- Horn features a phase front wave control throat for best performance from the compression drivers
- 5-degree taper to transmit sound over distance / 15-degree taper provides wider short range coverage
- Easy maintenance and servicing
- Replacement of defective drivers from the rear within seconds

#### Applications

For any kind of stage for concert halls as well as for open air concerts

#### Options

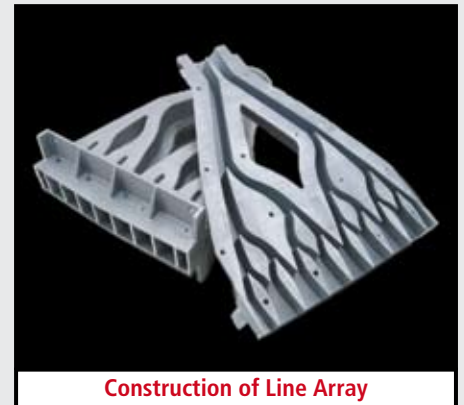
- SR-RF12: Rigging Frame
- DP-0206: Digital Sound Processor
- SR-RF12WP: Weather Proof Rigging Frame



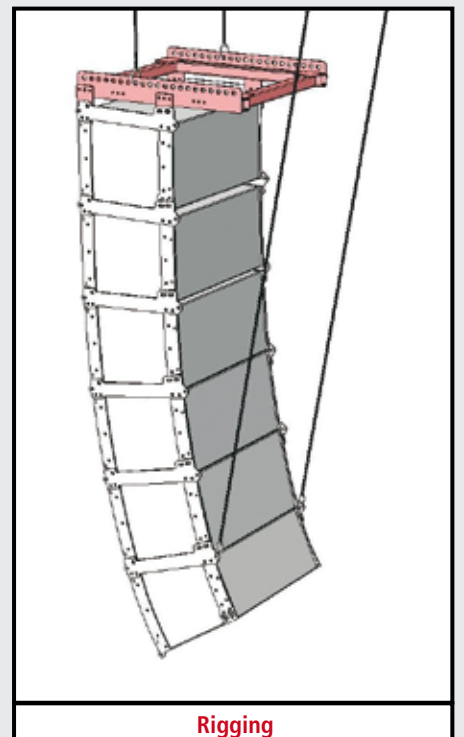
**SR-A18 Subwoofer**



**Line Arrays for each kind of Events**



**Construction of Line Array**



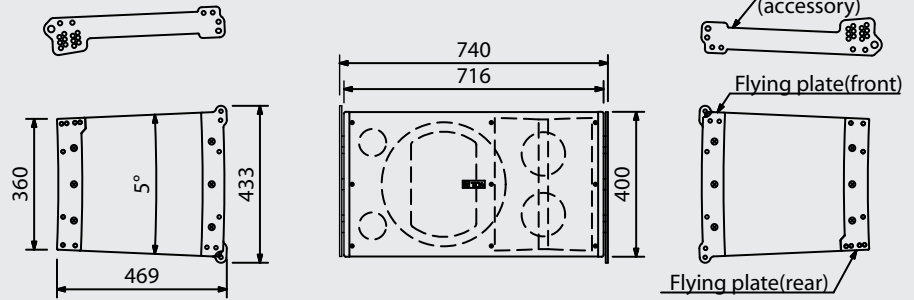
**Rigging**



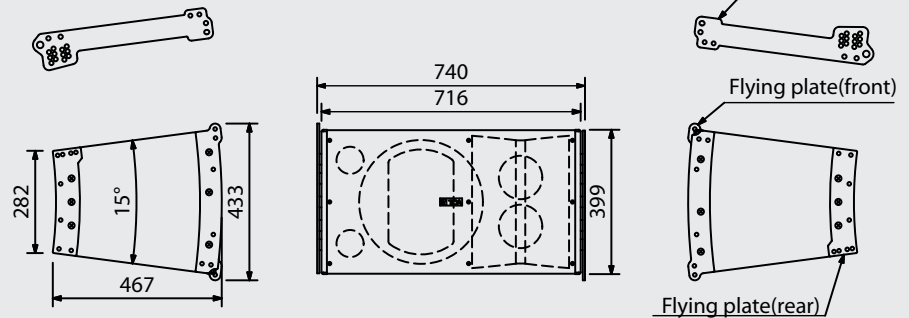
**Rigging**

## Dimensions

**SR-A12L**



**SR-A12S**



## Specifications

	<b>SR-A12L</b>	<b>SR-A12LWP</b>	<b>SR-A12S</b>	<b>SR-A12SWP</b>
<b>Enclosure</b>	Bass-reflex type	Sealed type	Bass-reflex type	Sealed type
<b>Power Handling Capacity</b>	Continuous program: low frequency 450 W, high frequency 180 W	Continuous program: low frequency 450 W, high frequency 180 W	Continuous program: low frequency 450 W, high frequency 180 W	Continuous program: low frequency 450 W, high frequency 180 W
<b>Rated Impedance</b>	Low frequency 8 Ohm, high frequency 16 Ohm	Low frequency 8 Ohm, high frequency 16 Ohm	Low frequency 8 Ohm, high frequency 16 Ohm	Low frequency 8 Ohm, high frequency 16 Ohm
<b>Sensitivity</b>	Low frequency 98 dB (1W, 1m), HF 110 dB	Low frequency 98 dB (1W, 1m), HF 110 dB	Low frequency 98 dB (1W, 1m), HF 109 dB	Low frequency 98 dB (1W, 1m), HF 109 dB
<b>Frequency Response</b>	50 Hz ... 20000 Hz (with optional DP-0206 Digital processor)	50 Hz ... 20000 Hz (with optional DP-0206 Digital processor)	50 Hz ... 20000 Hz (with optional DP-0206 Digital processor)	50 Hz ... 20000 Hz (with optional DP-0206 Digital processor)
<b>Crossover Frequency</b>	1000 Hz	1000 Hz	1000 Hz	1000 Hz
<b>Coverage Angle</b>	Horizontal: 90°, vertical: 5°	Horizontal: 90°, vertical: 5°	Horizontal: 90°, vertical: 15°	Horizontal: 90°, vertical: 15°
<b>Speaker Component</b>	Low frequency: 30 cm cone-type, High frequency: wave front control horn 90° (hor) x 5° (ver) + 2x compression driver	Low frequency: 30 cm cone-type, High frequency: wave front control horn 90° (hor) x 5° (ver) + 2x compression driver	Low frequency: 30 cm cone-type, High frequency: wave front control horn 90° (hor) x 15° (ver) + 2x compression driver	Low frequency: 30 cm cone-type, High frequency: wave front control horn 90° (hor) x 15° (ver) + 2x compression driver
<b>Input Connector</b>	M5 screw terminal and Neutrik NL4MP x 2 (usable cable connector: Neutrik NL4FC)	...	M5 screw terminal and Neutrik NL4MP x 2 (usable cable connector: Neutrik NL4FC)	...
<b>Connected Cable</b>	...	Direct cable withdrawal from internal speaker: ø 8.6mm, conductor cross section: 1.25 mm <sup>2</sup> , 4-core cable, 3 m	...	Direct cable withdrawal from internal speaker: ø 8.6mm, conductor cross section: 1.25 mm <sup>2</sup> , 4-core cable, 3 m
<b>Water Protection</b>	...	IPx4	...	IPx4
<b>Finish</b>	Plywood, black, urethane painting	Plywood, black, urethane painting	Plywood, black, urethane painting	Plywood, black, urethane painting
<b>Front Grille</b>	Punched steel plate, paint black	Punched stainless steel (SUS304), acrylic paint black	Punched steel plate, paint black	Punched stainless steel (SUS304), acrylic paint black
<b>Dimensions (W x H x D)</b>	740 x 433 x 469 mm	740 x 433 x 469 mm	740 x 433 x 469 mm	740 x 433 x 469 mm
<b>Weight</b>	49 kg	51 kg	47 kg	48 kg

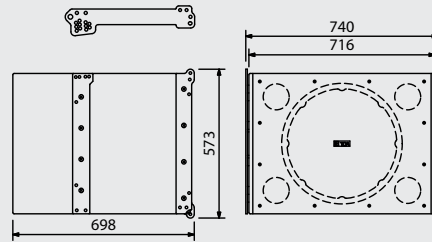


## Line Arrays

### Subwoofer for the Line Arrays



Inside View



### Features

- Subwoofer adjusted with SR-A12 Line Array series
- Employs multi amplifier drive system
- Ideal in conjunction with DP-0206 signal processor
- 46 cm cone speaker
- 80 Hz crossover frequency
- 720 W continuous program

### Options

- DP-0206: Digital Signal Processor

### Specifications

	SR-A18B
Enclosure	Bass-reflex type
Power Handling Capacity	Continuous program: 720 W
Rated Impedance	8 Ohm
Sensitivity	95 dB (1 W, 1 m)
Frequency Response	40 ... 400 Hz (when using the optional DP-0206 Digital Processor)
Crossover Frequency	80 Hz (when using the optional DP-0206 Digital Processor)
Speaker Component	46 cm cone-type
Input Connector	M5 screw terminal, distance between barriers: 12.2 mm and Neutrik NL4MP x 2 (usable cable connector: Neutrik NL4FC)
Finish Enclosure	Plywood black, paint
Front Grille	Punched steel plate, black, acrylic paint
Dimensions (W x H x D)	740 x 573 x 698 mm
Weight	66 kg (including accessories)
Accessory	Joint plate x 2, Joint plate mounting bolt (M10) x 16

## Line Arrays



### Accessories for the Line Array Speaker Systems

#### Accessories for Slim Line Array Speakers



**SR-FS4**  
Floor Stand



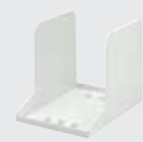
**SR-EP4**  
Extension Plate  
for indoor use



**SR-TB4**  
Wall Tilt Bracket  
for indoor use



**SR-WB4**  
Wall Mounting Bracket  
for indoor use



**SR-SA4**  
Stand Adapter



**SR-PP4**  
Protection Pad



**SR-EP4WP**  
Extension Plate  
for outdoor use



**SR-TB4WP**  
Wall Tilt Bracket  
for outdoor use



**SR-WB4WP**  
Wall Mounting Bracket  
for outdoor use



**SR-FB4**  
Flying Bracket

#### Accessories for Middle Line Array Speakers



**SR-RF12**  
Rigging Frame  
for indoor use



**SR-RF12WP**  
Rigging Frame  
for outdoor use

#### Accessory for both series

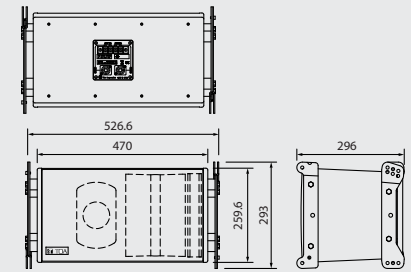
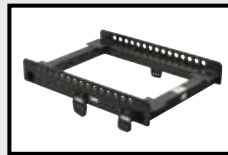


**DP-0206**  
Digital Processor

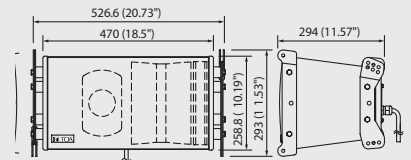


## Line Arrays

### Middle Line Array Type C



SR-C8L



SR-C8S

### Features

- Sync-Drive wave guide technology
- Uniform, high frequency sound field with excellent sound clarity and minimal interference
- Phase wave-front control technology for a high-frequency sound range that is attenuation-free and high fidelity
- Focus on the targeted listening area for precise sound directivity
- Adjustable speaker overlap angles (0 to 5 degrees), for more flexible speaker directivity control
- Adjustable sound coverage by connecting a number of speakers and combining speakers with different dispersion angles
- Feedback resistant - reflection-free operation
- Single or bi-amp mode
- Stacking possible
- Splash-proof speaker models : SR-C8LWP/SR-C8SWP
- Drivers can be quickly replaced from the rear of the speaker enclosure

### Options

- SR-CL8: Cluster Bracket
- SR-RF8: Rigging Frame
- SR-RF8WP: Weatherproof Rigging Frame
- SR-SB8: Rigging Support Bracket
- SR-TP8: Tilt Joint Bracket
- D-2000: Digital Mixer

### Specifications

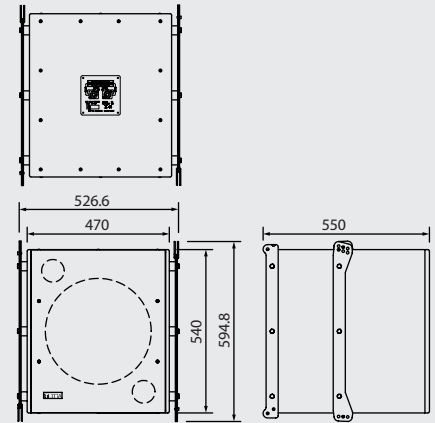
	SR-C8L	SR-C8S	SR-C8LWP	SR-C8SWP
<b>Enclosure</b>	Bass-reflex type			
<b>Power Handling Capacity</b>	Continuous program: 360 W (single-amp mode) / low frequency: 360 W, high frequency: 180 W (bi-amp mode)			
<b>Rated Impedance</b>	16 Ω (single-amp mode), low frequency: 16 Ω, high frequency: 16 Ω (bi-amp mode)			
<b>Sensitivity</b>	98 dB (1 W, 1 m) (single-amp mode); low: 95 dB (1W, 1m), high: 110 dB (1W, 1m) (bi-amp mode)			
<b>Frequency Response</b>	65 – 20000 Hz (when equalised at recommended parameters)			
<b>Crossover Frequency</b>	1600 Hz (when equalized at recommended parameters)			
<b>Directivity Angle</b>	Horizontal: 110°, vertical: 5°	Horizontal: 110°, vertical: 15°	Horizontal: 110°, vertical: 5°	Horizontal: 110°, vertical: 15°
<b>Speaker Component</b>	Low frequency: 20 cm (8") cone type / High frequency: Wave-front control horn + compression drivers × 2			
<b>Input Connector</b>	M5 screw terminal, distance between barriers: 12.2 mm and Neutrik NL4MP × 2		Direct cable, 3 m	
<b>Operating Temperature</b>	—		-10°C to +50°C	
<b>Dust/Water Protection</b>	—		IPX4	
<b>Finish</b>	Enclosure: Plywood, black, urethane paint Plywood, black, urethane coating Front grille: Punched steel plate, black, paint Punched stainless steel, black, paint			
<b>Dimensions (W x H x D)</b>	526.6 × 293 × 296 mm	526.6 × 29 × 294 mm	526.6 × 293 × 296 mm	526.6 × 293 × 294 mm
<b>Weight</b>	17 kg	16 kg	17 kg	16 kg





## Line Arrays

### Middle Line Array Type C Subwoofer



### Features

- 38cm (15") subwoofer
- Uniform, high frequency sound field
- Input connectors include screw terminal connections and two Neutrik NL4 type sockets
- High power handling of 450 W continuous program
- Plywood enclosure with black urethane paint
- Speaker grille punched steel plate with black paint
- Enclosure equipped with M8 threaded steel plates for the secure attachment of optional accessory brackets
- Accessory brackets for suspension and stand mounting
- Splash-proof speaker model: SR-C15BWP

### Options

- SR-CL8: Cluster Bracket
- SR-RF8: Rigging Frame
- SR-RF8WP: Weatherproof Rigging Frame
- SR-SB8: Rigging Support Bracket
- SR-TP8: Tilt Joint Bracket
- D-2000: Digital Mixer

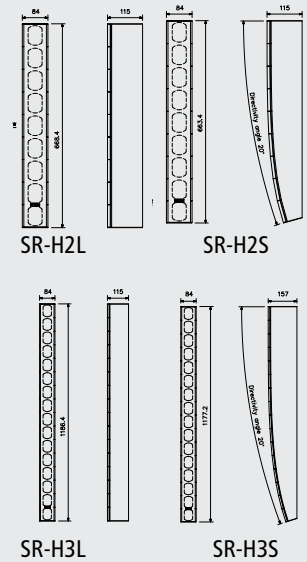
### Specifications

	SR-C15B	SR-C15WP
Enclosure	Bass-reflex type	
Power Handling Capacity	Continuous program: 450 W	
Rated Impedance	8 Ω	
Sensitivity	93 dB (1 W, 1 m)	
Frequency Response	40 – 400 Hz (when equalized at recommended parameters)	
Crossover Frequency	125 Hz (when equalized at recommended parameters)	
Speaker Component	38 cm (15") cone type	
Input Connector	M5 screw terminal, distance between barriers: 12.2 mm and Neutrik NL4MP x 2	—
Connected Cable	—	Direct cable withdrawal from internal speaker: ø8.6 mm conductor cross section: 1.25 mm <sup>2</sup> , 4-core cable, 3 m
Operating Temperature	—	-10°C to +50°C
Dust / Water Protection	—	IPX4
Finish	Enclosure: Plywood, black, urethane paint, Front grille: Punched steel plate, black, paint	Enclosure: Plywood, black, urethane coating, Front grille: Punched stainless steel plate, black, paint
Dimensions (W × H × D)	526.6 × 594.8 × 550 mm	
Weight	41 kg	



## Line Arrays

### Small Slim Line Arrays



### Features

- Small Line Array with excellent directivity
- Narrow 84 mm design
- 4 models: 180 W (SR-H2S/SR-H2L) or 360 W (SR-H3S/SR-H3L) and straight (SR-H2L/SR-H3L) or curved design (SR-H2S/SR-H3S)
- Sync-Drive (Synchronous Nexus Control) technology create an ideal linear sound source
- Clear sound with reduced attenuation over distance
- Reflection-free and feedback resistant
- Unique aperture front grille structure enhances the horizontal dispersion
- Speakers are designed for optimally precise vertical directivity
- Curved speaker models for improved vertical dispersion
- Up to two straight units can be connected
- Optional mounting brackets available, for wall-mounting, rigging and stand mounting
- Removable input terminal connectors for easy hook-ups

### Options

- MT-S0301: Matching transformer for high-impedance operation
- SR-TB3: Wall Tilt Bracket
- SR-WB3: Wall Mounting Bracket
- SR-FB3: Flying Bracket
- SR-EP3: Extension Plate
- SR-SA3: Stand Adapter
- ST-34B: Speaker Stand

### Specifications

	SR-H2L	SR-H2S	SR-H3L	SR-H3S
<b>Enclosure</b>	Bass-reflex type			
<b>Power Handling Capacity</b>	Continuous program: 180 W		Continuous program: 360 W	
<b>Rated Impedance</b>	8 Ohm			
<b>Sensitivity</b>	92 dB (1 W, 1 m equivalent, measured at 4 m)	90 dB	95 dB	92 dB (1 W, 1 m equivalent, measured at 8 m)
<b>Frequency Response</b>	80 – 18000 Hz (-10 dB)	90 – 17000 Hz (-10 dB)	110 – 18000 Hz (-10 dB)	90 – 17000 Hz (-10 dB)
<b>Directivity Angle</b>	Horizontal: 90°, vertical: 0° (within the range of speaker height)	Horizontal: 90°, vertical: 20° (within the range of speaker height)	Horizontal: 90°, vertical: 0° (within the range of speaker height)	Horizontal: 90°, vertical: 20° (within the range of speaker height)
<b>Speaker Component</b>	7 cm (2.8") cone-type × 9		7 cm (2.8") cone-type × 16	
<b>Input Connector</b>	Removable input connector			
<b>Finish Enclosure</b>	MDF, white, urethane paint. Front grille: Punched steel plate, white, acrylic paint			
<b>Dimensions (W x H x D)</b>	84 x 668.4 x 115 mm	84 x 663.4 x 115 mm	84 x 1186.4 x 115 mm	84 x 1177.2 x 157 mm
<b>Weight</b>	4.4 kg	4.2 kg	7.6 kg	7.9 kg



## Line Arrays

### Slim Line Array Accessories

#### Various Mounting Possibilities



**SR-WB3**  
Wall Mounting Bracket

**SR-TB3**  
Wall Tilt Bracket

**SR-FB3**  
Flying Bracket



**SR-EP3**  
Extension Plate

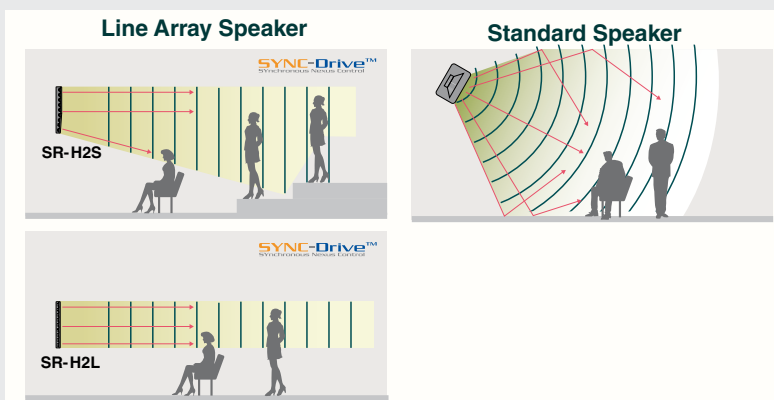
**ST-34B**  
Speaker Stand

**SR-SA3**  
Stand Adapter

**MT-S0301**  
Matching Transformer



#### Directivity comparison





## Compact Array

### A whole new Angle on Sound!



**HX-5B / HX-5W / HX-5B-WP / HX-5W-WP**

### Description

The HX-5 is an innovative modular speaker design that incorporates the best characteristics of the traditional, cumbersome woofer enclosure combined with a CD horn-loaded high frequency driver and the full-range compact speaker enclosure without the drawbacks associated with each type. The HX-5 features remarkably easy to control coverage characteristics including problematic low frequencies and can be installed in a multitude of ways while maintaining a modern, unobtrusive appearance.

This system fills an important need for versatile public address equipment that can provide high quality reinforcement for a wide range of venues. Available in black and white finish to complement a venues interior colour scheme, the HX-5 is ideal for medium size venues of all different shapes. These include auditoriums, places of worship, banquet halls, community centres as well as dance halls, sport bars, shopping malls, boardrooms, gyms, health clubs and many others.

**Adjustable sound dispersion** A system is configured by vertically stacking of 4 speaker modules with a total driver complement of 4 woofers and 12 tweeters positioned along the baffle surface. This configuration allows the variable directivity control and low-frequency dispersion control comparable to use a large constant-directivity

horn speaker. A choice of 4 directivity angles – 15, 30, 45 and 60 degrees– can be employed as needed. For instance, a specific directivity angle, or each module can have its directivity independently set for a specific coverage requirement. If 2 or multiple modules are connected to configure an arc, they effectively function as an immense single speaker controlling directivity for considerably lower frequencies. As a result, public address functions demonstrate optimal intelligibility even in environments with long reverb times.

**Minimal reflective effects** Whether mounted on the wall or ceiling, the HX-5 is remarkably free from the comb filter and interference effects often encountered with other speaker designs. It can therefore produce more low frequency output even when mounted on the wall or ceiling.

**Versatile mounting options** Compared to many other speaker designs, the HX-5 Series is remarkably easy to install in several ways. It can be hung with chains, strong wires and cables using the accessory brackets. There are also options for hanging with a pre-install frame by itself or configured with a subwoofer. And of course, as an option, ceiling and wall brackets as well as an adapter for use with a dedicated stand are provided.



**HX-5 Rigging**



**HX-5W / HX-5W-WP**

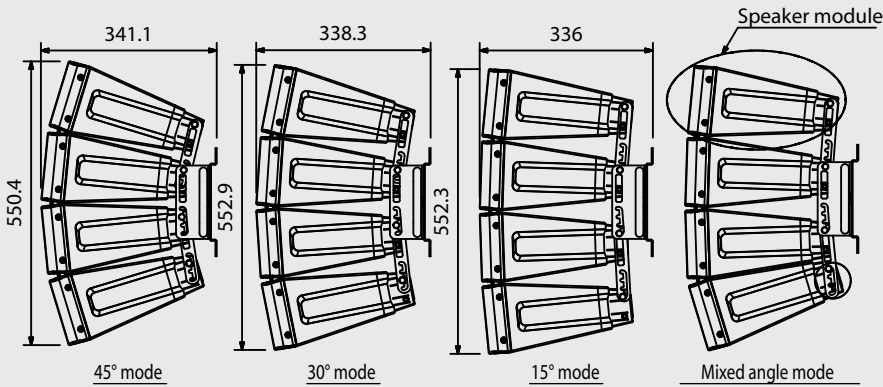


**HX-5B / HX-5B-WP**

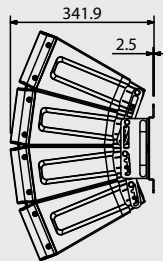
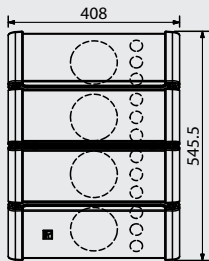
## Compact Array



Adjustment of the directivity angle

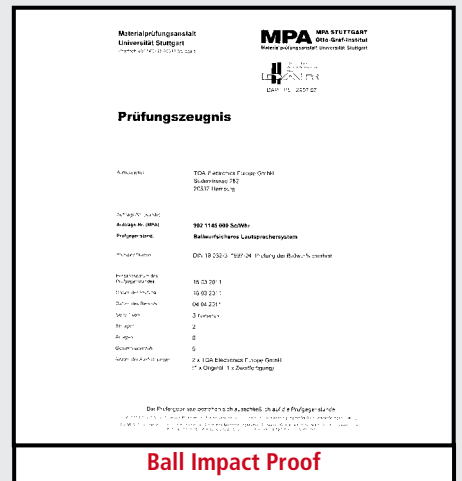
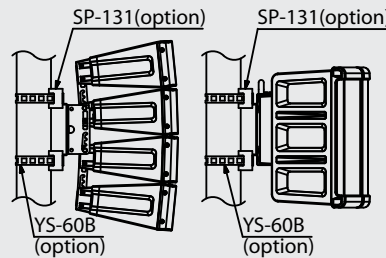


### Dimensions



### Mounting Example

Pole mounting



### Specifications

	HX-5B	HX-5W	HX-5B-WP	HX-5W-WP
<b>Enclosure</b>	Bass-reflex type	Bass-reflex type	Sealed type	Sealed type
<b>Power Handling Capacity</b>	Continuous pink noise: 200 W, Continuous program: 600 W			
<b>Rated Impedance</b>	8 Ohm			
<b>Sensitivity (1W, 1m)</b>	96 dB (60° mode), 97 dB (45° mode), 98 dB (30° mode), 99 dB (15° mode)			
<b>Frequency Response</b>	70 ... 20000Hz (-10dB) (60°mode) 75 ... 20000Hz (-10dB) (45°mode) 80 ... 20000Hz (-10dB) (30°mode) 85 ... 20000Hz (-10dB) (15°mode)	70 ... 20000Hz (-10dB) (60°mode) 75 ... 20000Hz (-10dB) (45°mode) 80 ... 20000Hz (-10dB) (30°mode) 85 ... 20000Hz (-10dB) (15°mode)	95 ... 20000Hz (-10dB) (60°mode) 100 ... 20000Hz (-10dB) (45°mode) 105 ... 20000Hz (-10dB) (30°mode) 110 ... 20000Hz (-10dB) (15°mode)	95 ... 20000Hz (-10dB) (60°mode) 100 ... 20000Hz (-10dB) (45°mode) 105 ... 20000Hz (-10dB) (30°mode) 110 ... 20000Hz (-10dB) (15°mode)
<b>Crossover Frequency</b>	4kHz			
<b>Directivity Angle</b>	Horizontal: 100°(over 2000 Hz) Vertical: 60°(over 800 Hz), 45°(over 1.2 kHz), 30°(over 1.6 kHz), 15°(over 3.2 kHz) variable			
<b>Speaker Component</b>	Low frequency: 12 cm cone-type x 4, High frequency: Balanced dome-type x 12			
<b>Input Terminal</b>	Speakon NL4MP x 2 and M4 screw terminal	Speakon NL4MP x 2 and M4 screw terminal	—	—
<b>Speaker Cord</b>	—	—	2-core cabtyre cord with diameter of 6 mm	2-core cabtyre cord with diameter of 6 mm
<b>Water Protection</b>	—	—	IP-X4 (Install with every speaker module downward)	IP-X4 (Install with every speaker module downward)
<b>Operating Temperature</b>	—	—	-15°C ... +50°C	-15°C ... +50°C
<b>Finish</b>	Enclosure: Polypropylene, black	Enclosure: Polypropylene, white	Enclosure: Polypropylene, black	Enclosure: Polypropylene, white
<b>Dimensions</b>	408 (W) x 546 (H) x 342 (D) mm			
<b>Weight</b>	16 kg			
<b>Accessory</b>	Hanging bracket x 2, Hex. wrench x 1			



## Compact Array

### Accessories for the HX-5 Series Speaker

#### For HX-5B:



**HY-PF1B**  
Rigging Frame  
for indoor use



**HY-CW1B**  
Ceiling Mounting Bracket  
for indoor use



**HY-WM1B**  
Mounting Bracket  
for indoor use



**HY-WM2B**  
Mounting Bracket  
for indoor use



**HY-CN1B**  
Extension Bracket  
for indoor use

#### For HX-5W:



**HY-PF1W**  
Rigging Frame  
for indoor use



**HY-CW1W**  
Ceiling Mounting Bracket  
for indoor use



**HY-WM1W**  
Mounting Bracket  
for indoor use



**HY-WM2W**  
Mounting Bracket  
for indoor use



**HY-CN1W**  
Extension Bracket  
for indoor use

#### For HX-5B-WP and HX-5W-WP:



**HY-PF1WP**  
Rigging Frame  
for outdoor use



**HY-CW1WP**  
Ceiling Mounting Bracket  
for outdoor use



**HY-WM1WP**  
Mounting Bracket  
for outdoor use



**HY-WM2WP**  
Mounting Bracket  
for outdoor use



**HY-CN1W-WP**  
Extension Bracket  
for outdoor use of  
HX-5W-WP



**HY-CN1B-WP**  
Extension Bracket  
for outdoor use of  
HX-5B-WP

#### For HX-5 Series:



**HY-ST1**  
Speaker Stand  
Adapter

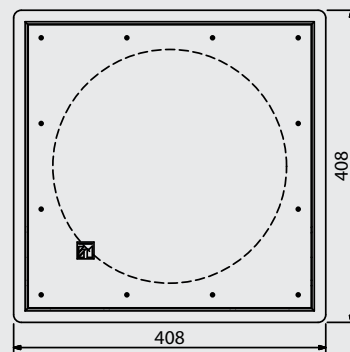
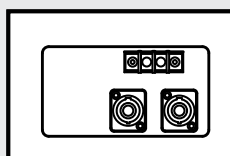


**MT-200**  
Matching  
Transformer

## Subwoofer



### Perfect Matching with the HX-5 Series Speaker



### Features

- Compact Subwoofer
- 30 cm (12") woofer
- Ideal in conjunction with HX-5 speaker
- Extremely wide frequency range
- For floor-, wall-, corner- or ceiling-mount
- 600 W high-power subwoofer system
- Carry handle
- For rigging
- Colour: Black(FB-120B) or white (FB-120W)

- Speakon® connector
- Cascading of multiple units

### Options

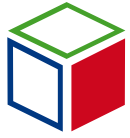
- Rigging Frame:  
HY-PF1B (black) or  
HY-PF1W (white)

### Applications

Medium-sized installations, (e.g. clubs, stages for live performances, houses of worship, auditoriums, youth centers or multi-purpose halls)

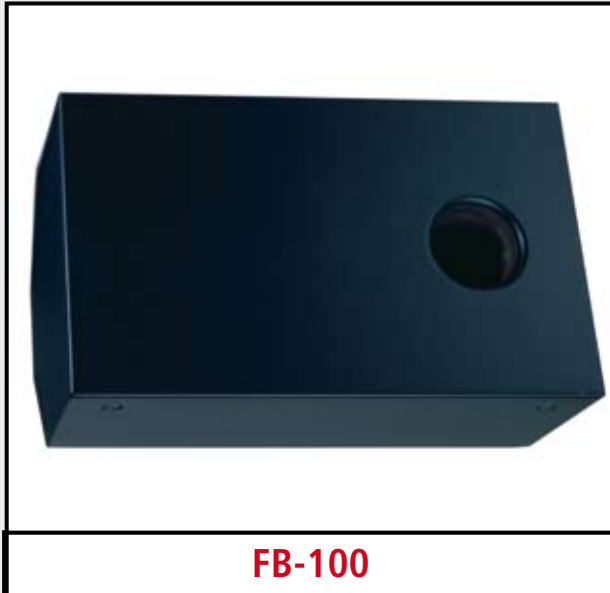
### Specifications

	FB-120B / FB-120W
Rated Input	600 W
Impedance	8 Ohm
Sound Pressure Level	90 dB (1 W, 1 m) resp. 96 dB (1 W, 1 m) 1/2 free sound field
Frequency Response	40 ... 1200 Hz (-10 dB)
Speaker Component	30 cm cone-type speaker
Input Terminal	Speakon NL4MP x 2 and M4 screw terminals
Finish	Enclosure plywood, metal front grille black (FB-120B) or white (FB-120W)
Dimensions (W x H x D)	408 x 408 x 450 mm
Weight	15 kg

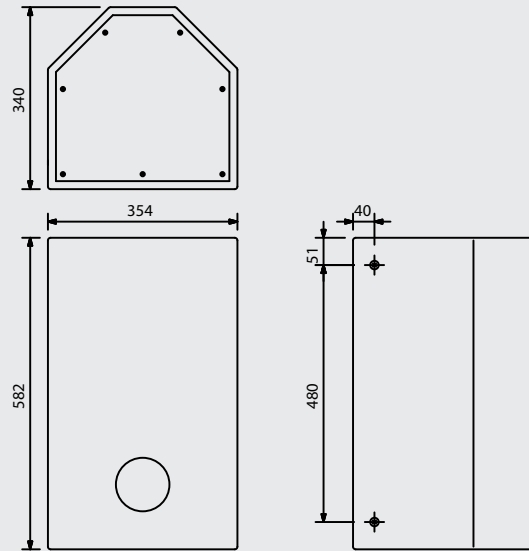


## Subwoofer

### Design Subwoofer



**FB-100**



### Features

- Compact subwoofer
- For floor-, wall-, corner- or ceiling-mount
- 450 W high-power subwoofer system
- 6 rigging points for suspended mounting
- MDF enclosure, paintable
- Optional matching transformer MT-S0601 for high-impedance operation
- 25 cm speaker with large 120 mm diameter ferrite magnet and extended voice coil for distortion-free bass response
- Acoustic band pass filter for smooth low frequency response and high efficiency
- Detachable Phoenix screw terminal blocks ready for loop-through parallel connection of multiple speakers

### Applications

Restaurants, shops, conference rooms, AV-presentation rooms

### Options

- MT-S0601: 100V-Transformer / rated 60 W

	<b>FB-100</b>
Enclosure	Acoustic Super Woofer (ASW)
Rated Input	150 W (40 – 200 Hz)
Continuous Program	450 W (40 – 200 Hz)
Impedance	8 Ohm
Sound Pressure Level	94 dB (1 W, 1 m) installation in 1/2 free sound field
Frequency Response	35 – 160 Hz (–10 dB) installation in 1/2 free sound field
Speaker Component	25 cm cone speaker
Input Terminal	Detachable screw terminal, (+)(–) 2 each (for bridging connection)
Usable cable	Solid cable, stranded cable: 0.2 – 2.5 mm <sup>2</sup> (AWG No. 24 – 14)
Finish	MDF, black, paint
Dimensions (W x H x D)	354 x 582 x 340 mm
Weight	16 kg
Option	Matching transformer: MT-S0601 (rated 60 W)



## Harmonized Engineering Speaker



### Design Speaker System



**H-Series Speaker**

### Description

**Invisible High Performance** The H-Series may be perfectly integrated into the environment, evolving the high TOA sound quality. Whichever model selected, the 2-way H-Series speakers can be relied on to deliver accurate, highly qualitative sound reproduction that enhances any program.

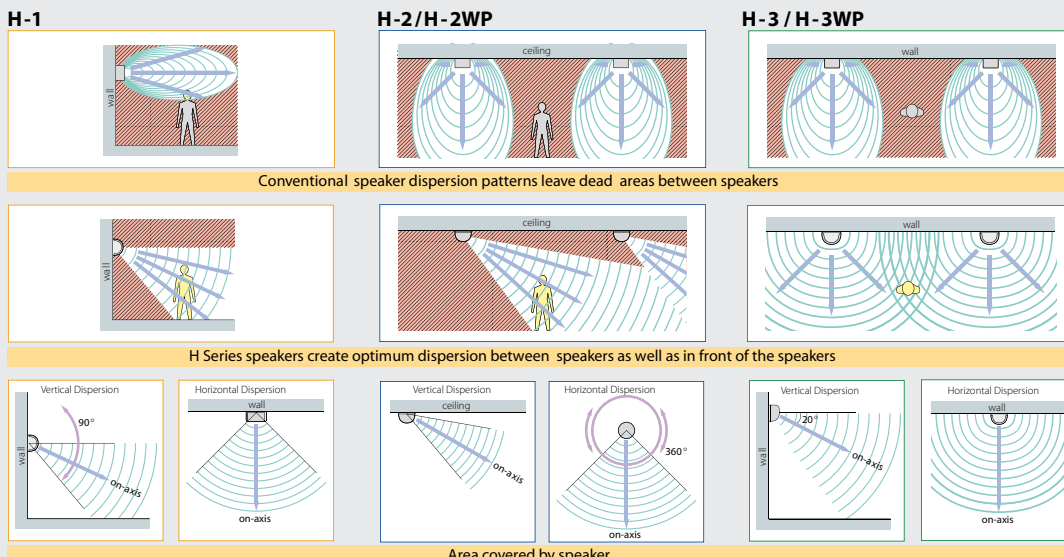
- Every H-Series model utilizes a passive crossover with optimized filter slopes built-in

- Natural boost at frequencies between 200 Hz to 300 Hz due to reinforcement of those frequencies with half- and quarter-space loading of enclosures after installation
- Enclosures have been designed to minimize reflections and since brackets are not required for installation, common problems such as out-of-phase wall or ceiling reflections can be minimized

- Easily paintable exterior grille and frame to match surrounding decor
- For easy use in distributed speaker systems, each speaker has a built-in 70 V/100 V matching transformer
- A removable terminal block accepts up to 14 AWG speaker wires and loop-through terminations are provided when wiring a distributed speaker system

### The principle of harmonized engineering speakers

#### Speaker sound dispersion characteristics



**H-1**

Up to 90° locking driver positioning adjustment

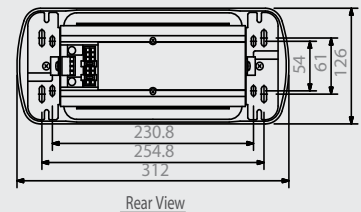
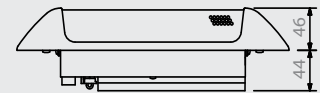
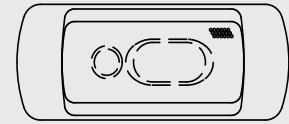
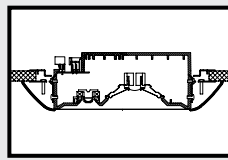
**H-2**

Up to 360° locking driver positioning adjustment



## Harmonized Engineering Speaker

### Design Speaker System



### Features

- Attractive 2-way design speaker
- 90 W (continuous program)
- Ferrofluid-cooled, balanced dome tweeters and neodymium magnet cone woofers
- Narrow coverage area allows a controlled sound
- Speaker axis can be mounted to match with the room axis
- Sound direction can be adjusted within 90°
- Colour: White
- Built-in transformer allows both high and low impedance: 4 Ohm, 16 Ohm or 70 V, 100 V
- Easy installation in standard electrical gang boxes
- Fire-rated ABS enclosure (Standard UL 94 V-0 grade)

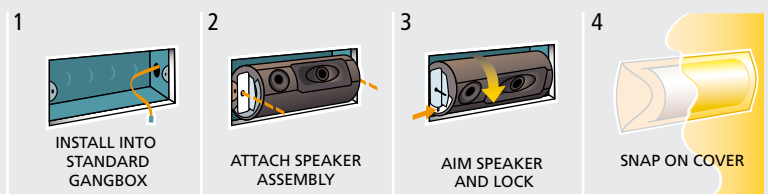
### Applications

Houses of worship, hotels, offices, museums, restaurants, retail stores, residential spaces

### Specifications

	H-1
Enclosure	Sealed type
Rated Input 4 Ohm/other	30 W / 12 W
Continuous Program 4 Ohm/other	90 W / 18 W
Impedance	4 Ohm / 16 Ohm
Tappings	100 V: 830 Ohm (12 W), 1.7 kOhm (6 W), 3.3 kOhm (3 W) / 70 V: 420 Ohm (12 W), 830 Ohm (6 W), 1.7 kOhm (3 W), 3.3 kOhm (1.5 W)
Frequency Response	120...20000 Hz
SPL (1W, 1m)	85 dB (installation in 1/2 free sound field)
Dimensions (W x H x D)	312 x 126 x 90 mm
Weight	1.5 kg (incl. adapter frame)
Colour	White

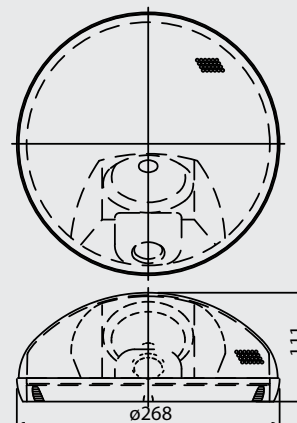
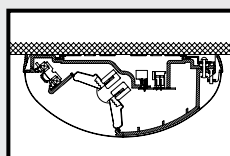
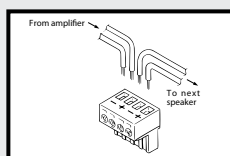
### Installation Procedure



## Harmonized Engineering Speaker



### Design Speaker System



### Features

- 2-way design speaker
- Pleasant design
- Excellent acoustical characteristics
- High power handling of 120 W (continuous program)
- Fire-rated ABS enclosure (Standard UL 94 V-0 grade)
- H-2WP: Weatherproof IP 64 certified, matches the requirements for outdoor applications
- Ferrofluid-cooled, balanced dome tweeters, neodymium magnet cone woofers
- Narrow coverage area allows controlled sound
- Speaker axis can be mounted to match the room axis
- Sound direction can be adjusted within 360°
- Easy installation in standard electrical gang boxes

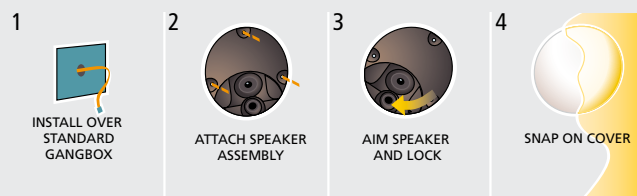
### Applications

- Hotels, houses of worship, office buildings, museums, shops
- Weatherproof version: Terraces, gardens, patios, swimming pools

### Specifications

	H-2	H-2WP
Enclosure	Sealed type	Sealed type
Rated Input 4 Ohm / other	40 W / 12 W	40 W / 12 W
Continuous Program 4 Ohm / other	120 W / 18 W	120 W / 18 W
Impedance	4 Ohm / 16 Ohm	4 Ohm / 16 Ohm
Tappings 100 V	830 Ohm (12 W), 1.7 kOhm (6 W), 3.3 kOhm (3 W)	830 Ohm (12 W), 1.7 kOhm (6 W), 3.3 kOhm (3 W)
Tappings 70 V	420 Ohm (12 W), 830 Ohm (6 W), 1.7 kOhm (3 W), 3.3 kOhm (1.5 W)	420 Ohm (12 W), 830 Ohm (6 W), 1.7 kOhm (3 W), 3.3 kOhm (1.5 W)
Frequency Response	100...20000 Hz	100...20000 Hz
SPL (1 W, 1 m)	88 dB	88 dB
Dimensions (W x H x D)	ø 268 x 111 mm	ø 268 x 111 mm
Weight	2.1 kg	2.1 kg
Colour	White	White

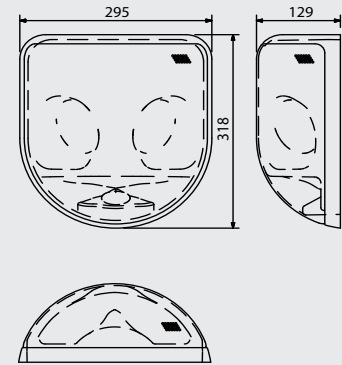
### Installation Procedure





## Harmonized Engineering Speaker

### Designer Speaker System



### Features

- 2-way speaker
- Stylish design
- High quality sound between and in front of each speaker unit
- Ideal for long but narrow areas such as corridors or tea gardens
- H-3WP: Weatherproof version for outdoor applications
- Dome tweeters and neodymium magnet cone woofers
- Easy, unobtrusive installation at above head-height
- Installation directly to wall
- 180 degree coverage pattern, eliminating acoustically dead areas
- Either low impedance (8 Ohm / 16 Ohm) or high impedance (70 V / 100 V)
- Fire resistant ABS according to UL 94 V-0

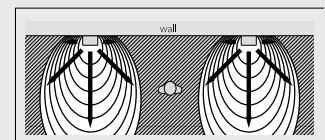
### Applications

Ideal for corridors  
One version each for indoor and outdoor installation

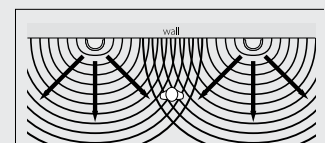
### Specifications

	H-3	H-3WP
<b>Enclosure</b>	Sealed type, 2-way speaker	Sealed type, 2-way speaker
<b>Speaker</b>	2 x 4" (10 cm) cone speaker, dome tweeter (neodymium magnet)	2 x 4" (10cm) cone speaker, dome tweeter (neodymium magnet)
<b>Impedance</b>	8 Ohm / 16 Ohm, 100 V, 70 V	8 Ohm / 16 Ohm, 100 V, 70 V
<b>Tappings 100 V</b>	100 V: 30 W (330 Ohm), 15 W (670 Ohm), 7,5 W (1.3k Ohm)	100 V: 30 W (330 Ohm), 15 W (670 Ohm), 7,5 W (1.3k Ohm),
<b>Tappings 70 V</b>	70 V: 30 W (170 Ohm), 15 W (330 Ohm), 7,5 W (670 Ohm), 3,75 W (1.3 kOhm)	70 V: 30 W (170 Ohm), 15 W (330 Ohm), 7,5 W (670 Ohm), 3,75 W (1.3 kOhm)
<b>SPL (1 W, 1 m)</b>	89 dB	89 dB
<b>Power Handling</b>	150 W (continuous program, 8 Ohm) 50 W (rated, 8 Ohm)	150 W (continuous program, 8 Ohm) 50 W (rated, 8 Ohm)
<b>Frequency Response</b>	100...20000 Hz	100...20000 Hz
<b>Connectors</b>	Phoenix-screw terminals (2 x 2-p)	Phoenix-screw terminals (2 x 2-p)
<b>Finish</b>	Fire-resistant ABS resin black (UL 94 V-0), grille: stainless steel plate, white, paintable, grille frame: fire-resistant ABS resin, white, paintable; base frame: steel plate	Fire-resistant ABS resin black (UL 94 V-0), grille: stainless steel plate, white, paintable, grille frame: fire-resistant ABS resin, white, paintable; base frame: steel plate
<b>Water Resistance</b>	–	IPx4
<b>Dimensions (W x H x D)</b>	295 x 318 x 129 mm	295 x 318 x 129 mm
<b>Weight</b>	3.3 kg	3.3 kg
<b>Accessory</b>	Base frame	Base frame

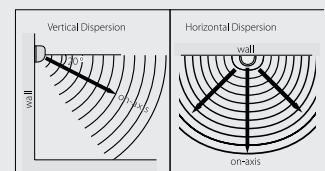
### Speaker Sound Dispersion Characteristics



Conventional speaker dispersion patterns leave dead areas between speakers.



H Series speakers create optimum dispersion between speakers as well as in front of the speakers.

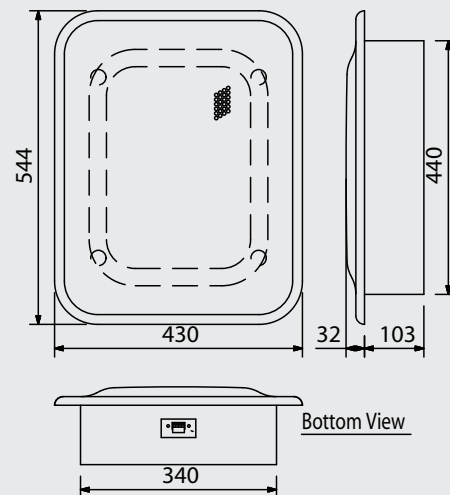


Area covered by speaker.

## Harmonized Engineering Speaker



### Flush Mount Subwoofer with Minimum Depth



### Features

- Unobtrusive design
- Compact dimensions
- Very low installation depth for flush-mounting
- Acoustic super woofer enclosure
- Frequency response exactly matches with H-1, H-2 and H-3
- Large volume for an excellent low frequency audio response
- Easy installation

### Applications

Flush-mount installation into the wall and into ceilings

### Specifications

	<b>HB-1</b>
<b>Enclosure</b>	Acoustic Super Woofer (ASW)
<b>Speaker</b>	8" (20 cm) Woofer
<b>Impedance</b>	8 Ohm
<b>SPL (1W, 1m)</b>	91 dB (1 W / 1 m, 2 PI Space)
<b>Power Handling</b>	240 W (continuous program), 80 W (rated)
<b>Frequency Response</b>	45 ... 200 Hz (-10 dB, 2PI Space)
<b>Connectors</b>	Phoenix-Screw Terminals (2x2-p.)
<b>Finish</b>	Fireresistant, ABS (UL 94 V-0) Enclosure: steel plate, black, Grille: Steel plate, white, Grille frame: Fire resistant ABS resin, white
<b>Dimensions (W x H x D)</b>	430 x 544 x 135 mm
<b>Weight</b>	11 kg (incl. mounting brackets)
<b>Accessory</b>	Mounting brackets
<b>Optional Accessory</b>	Transformer MT-S0601 (for 100 V / 70 V)



## Fashion Speaker for Foreground Music

### Wide-Dispersion Speaker System (15 W / 30 W)



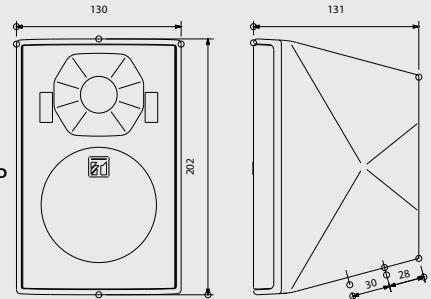
F-1000W / F-1000WT / F-1000WTWP



View inside



Rear view F-1000WTWP



### Features

- Compact speaker
- 3 different versions available: Low impedance, high impedance ("T") for 100 V line and weatherproof version ("WP")
- Up to 90 W continuous program (F-1000B / F-1000W)
- Great variety of brackets available
- 2-way speaker with high quality 10 cm woofer and balanced dome tweeter
- Paintable
- Colour:  
F-1000B / F-1000BT / F-1000BTWP: Black  
F-1000W / F-1000WT / F-1000WTWP: White
- Dispersion angle of 90° x 90°
- Octagonal horn for clear, wide-area sound coverage
- Easy impedance selection by rotary switch
- Rugged HIPS enclosure
- Covered rear-mounted terminal block (WP version)
- Built-in speaker protection for low impedance models
- Speaker bracket, joint bracket, wall bracket, bracket fixing screw included

### Options

- HY-CM10B: Black ceiling mounting bracket
- HY-CM10W: White ceiling mounting bracket
- HY-BH10B: Board hanger bracket
- HY-CL10B: Cluster bracket
- ST-16A: Speaker stand
- Especially for F-1000BTWP/F-1000WTWP:  
YS-60B pole mounting bracket (Non-RoHS)

### Specifications

	F-1000B / F-1000W	F-1000BT / F-1000WT	F-1000BTWP / F-1000WTWP
<b>System</b>	2-Way, bass-reflex enclosure	2-Way, bass-reflex enclosure	2-Way, bass-reflex enclosure
<b>Rated Input</b>	30 W	15 W	15 W
<b>Continuous Program</b>	90 W	-	-
<b>Tappings 100V</b>	-	15 W / 5 W / 3 W / 1 W	15 W / 5 W / 3 W / 1 W
<b>Tappings 70V</b>	-	15 W / 7.5 W / 2.5 W / 1.5 W / 0.5 W	15 W / 7.5 W / 2.5 W / 1.5 W / 0.5 W
<b>Low Impedance</b>	8 Ohm	-	-
<b>Frequency Response</b>	85 ... 20000 Hz (-10dB)	85 ... 20000 Hz (-10dB)	85 ... 20000 Hz (-10dB)
<b>Crossover Frequency</b>	5 kHz	5 kHz	5 kHz
<b>SPL (1W, 1m)</b>	87 dB	87 dB	87 dB
<b>Connector</b>	Push-in terminal	Push-in terminal	Push-in terminal
<b>Water Protection</b>	-	-	IPx4
<b>Temperature</b>	-	-	-10 °C to + 50 °C
<b>Finish</b>	Enclosure: HIPS resin, punched net: surface treated steel plate	Enclosure: HIPS resin, punched net: surface treated steel plate	Enclosure: HIPS resin, punched net: surface treated steel plate
<b>Dimensions (W x H x D)</b>	130 x 202 x 131 mm	130 x 202 x 131 mm	130 x 202 x 131 mm
<b>Weight</b>	1.8 kg	1.8 kg	2 kg

## Fashion Speaker for Foreground Music



### Wide-Dispersion Speaker System (30 W / 50 W)



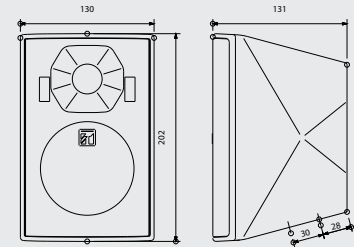
F-1300B / F-1300BT / F-1300BTWP



F-1300W / F-1300WT / F-1300WTWP



HY-CM10W



**F-1300B / F-1300BT / F-1300BTWP**

### Features

- Compact speaker
- 3 different versions available: Low impedance, high impedance ("T") for 100 V line and weatherproof version ("WP")
- Up to 150 W continuous program (F-1300B / F-1300W)
- Great variety of brackets available
- 2-way speaker with high quality 20 cm woofer and balanced dome tweeter
- Paintable
- Colour:  
F-1300B / F-1300BT / F-1300BTWP: Black  
F-1300W / F-1300WT / F-1300WTWP: White
- Dispersion angle of 90° x 90°
- Octagonal horn for clear, wide-area sound coverage
- Easy impedance selection by rotary switch
- Rugged HIPS enclosure
- Covered rear-mounted terminal block (WP version)
- Built-in speaker protection for low impedance models
- Speaker bracket, joint bracket, wall bracket, bracket fixing screw included

### Options

- HY-CM10B: Black ceiling mounting bracket
- HY-CM10W: White ceiling mounting bracket
- HY-BH10B: Board hanger bracket
- HY-CL10B: Cluster bracket
- ST-16A: Speaker stand
- Especially for F-1000BTWP/F-1000WTWP: YS-60B pole mounting bracket (Non-RoHS)

### Specifications

	F-1300B / F-1300W	F-1300BT / F-1300WT	F-1300BTWP / F-1300WTWP
<b>System</b>	2-Way, bass-reflex enclosure	2-Way, bass-reflex enclosure	2-Way, bass-reflex enclosure
<b>Rated Input</b>	50 W	30 W	30 W
<b>Continuous Program</b>	150 W	-	-
<b>Tappings 100V</b>	-	60 W / 30 W / 15 W / 3 W	60 W / 30 W / 15 W / 3 W
<b>Tappings 70V</b>	-	60 W / 30 W / 15 W / 7.5 W / 1.5 W	60 W / 30 W / 15 W / 7.5 W / 1.5 W
<b>Low Impedance</b>	8 Ohm	-	-
<b>Frequency Response</b>	80 ... 20000 Hz (-10dB)	80 ... 20000 Hz (-10dB)	80 ... 20000 Hz (-10dB)
<b>Crossover Frequency</b>	2 kHz	2 kHz	2 kHz
<b>SPL (1W, 1m)</b>	90 dB	90 dB	90 dB
<b>Connector</b>	Push-in terminal	Push-in terminal	Push-in terminal
<b>Water Protection</b>	-	-	IPx4
<b>Temperature</b>	-	-	-10 °C to + 50 °C
<b>Finish</b>	Enclosure: HIPS resin, punched net: surface treated steel plate	Enclosure: HIPS resin, punched net: surface treated steel plate	Enclosure: HIPS resin, punched net: surface treated steel plate
<b>Dimensions (W x H x D)</b>	162 x 250 x 161 mm	162 x 250 x 161 mm	162 x 250 x 161 mm
<b>Weight</b>	3.1 kg	3.6 kg	3.6 kg



## Fashion Speaker for Foreground Music

### Wide-Dispersion Speaker System (60 W)



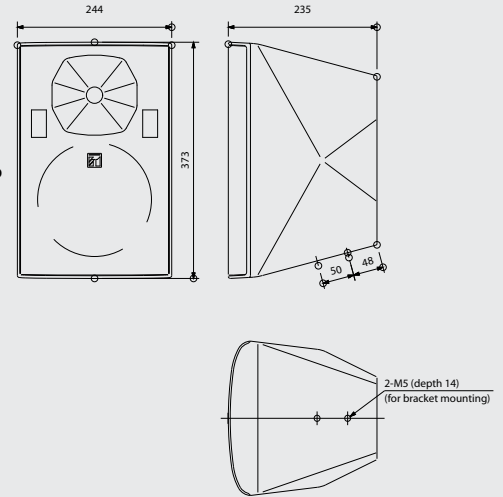
F-2000B / F-2000BT / F-2000BTWP



HY-CL20B



HY-CM20W



### Features

- Compact speaker
- 3 different versions available: Low impedance, high impedance ("T") for 100 V line and weatherproof version ("WP")
- Up to 180 W continuous program (F-2000B / F-2000W)
- Great variety of brackets available
- 2-way speaker with high quality 20 cm woofer and balanced dome tweeter
- Paintable
- Colour:  
F-2000B / F-2000BT / F-2000BTWP: Black  
F-2000W / F-2000WT / F-2000WTWP: White
- Dispersion angle of 110° x 100°
- Easily mountable 80° x 80° horn adapter for increased dispersion control included
- Octagonal horn for clear, wide-area sound coverage
- Easy impedance selection by rotary switch
- Rugged HIPS enclosure
- Covered rear-mounted terminal block (WP version)
- Built-in overload protection for low impedance models
- Speaker bracket, joint bracket, wall bracket, bracket fixing screw included

### Options

- HY-CM20B: Black ceiling mounting bracket
- HY-CM20W: White ceiling mounting bracket
- HY-CL20B: Cluster bracket
- ST-16A: Speaker stand
- Especially for F-2000BTWP/F-2000WTWP:
- SP-131: Speaker mounting bracket
- YS-60B: Pole mounting bracket (Non RoHS)

### Specifications

	F-2000B / F-2000W	F-2000BT / F-2000WT	F-2000BTWP / F-2000WTWP
<b>System</b>	2-Way, bass-reflex enclosure	2-Way, bass-reflex enclosure	2-Way, bass-reflex enclosure
<b>Rated Input</b>	60 W	60 W	60 W
<b>Continuous Program</b>	180 W	-	-
<b>Tappings 100V</b>	-	60 W / 30 W / 15 W / 3 W	60 W / 30 W / 15 W / 3 W
<b>Tappings 70V</b>	-	60 W / 30 W / 15 W / 7.5 W / 1.5 W	60 W / 30 W / 15 W / 7.5 W / 1.5 W
<b>Low Impedance</b>	8 Ohm	-	-
<b>Frequency Response</b>	65 ... 20000 Hz (-10dB)	65 ... 20000 Hz (-10dB)	65 ... 20000 Hz (-10dB)
<b>Crossover Frequency</b>	2.5 kHz	2.5 kHz	2.5 kHz
<b>SPL (1W, 1m)</b>	92 dB	92 dB	92 dB
<b>Connector</b>	Push-in terminal	Push-in terminal	Push-in terminal
<b>Water Protection</b>	-	-	IPx4
<b>Temperature</b>	-	-	-10 °C to + 50 °C
<b>Finish</b>	Enclosure: HIPS resin, punched net: surface treated steel plate	Enclosure: HIPS resin, punched net: surface treated steel plate	Enclosure: HIPS resin, punched net: surface treated steel plate
<b>Dimensions (W x H x D)</b>	244 x 373 x 235 mm	244 x 373 x 235 mm	244 x 373 x 235 mm
<b>Weight</b>	6.5 kg	7.4 kg	7.4 kg



## Fashion Speaker for Foreground Music



### Optional Accessories

#### Mounting Brackets for F-1000 / F-1300 Series

##### HY-BH10B

Board Hanger Bracket

- For F-1000 Series
- Colour: Black
- Weight 210 g
- Dimensions (W x H x D) 48 x 100 x 108 mm



##### HY-CL10B and HY-CL10W

Cluster Bracket

- HY-CL10B: Black
- HY-CL10W: White



##### HY-CM10B and HY-CM10W

Wall / Ceiling Bracket

- Weight 210 g
- Dimensions (W x H x D) 48 x 100 x 108 mm
- HY-CM10B: Black
- HY-CM10W: White



#### Mounting Brackets for F-2000 Series

##### HY-CL20B and HY-CL20W

Cluster Bracket

- HY-CL20B: Black
- HY-CL20W: White



##### HY-CM20B / HY-CM20W

Wall / Ceiling Bracket

- For F-2000 Series
- Weight 610 g
- Dimensions (W x H x D) 84 x 135 x 175 mm
- HY-CM20B: Black
- HY-CM20W: White



#### Stand

##### ST-16A

Speaker Stand

- Height 1130...1660 mm
- Max. Load 6 kg
- Colour: Silver



### Various Installation Options



Wall mounting



Ceiling mounting



Ceiling mounting



Stand mounting



Ceiling mounting



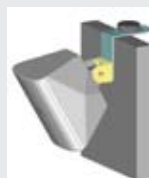
Cluster mounting



Pole mounting



Pole mounting



Board hanger

### Matching Subwoofers

##### FB-120B / FB-120W

Subwoofer (600 W)

- For F-1300 / F-2000 Series
- FB-120B: Black
- FB-120W: White



##### FB-100

Subwoofer (450 W)

- For F-1300/ F-2000 Series
- Colour: Black



##### HB-1

Subwoofer (240 W)

- For F-1000 Series
- Colour: White





## Coaxial Array Speaker

### Compact Integrated 2-Way Speaker



**HS-120B/HS-120W/HS-1200BT/HS-1200WT**



Rear view



Front view



ST-34B

### Features

- For mobile or fixed installation e.g. in clubs, banquet rooms or schools, etc.
- Easy to carry and easy to install, with handle for easy transportability
- Rubber feet for straight positioning
- Can be used as a floor monitor
- Twin input terminal connections (Speakon® and screw terminals) for fixed and mobile installation
- Well-controlled sound coverage: 90° horizontal x 40° vertical
- 12" LF speaker
- 2-way unit system equipped with a large-diameter woofer and array tweeter
- Size and weight have been reduced thanks to the use of the array tweeter
- Compact and versatile design enables a broad range of applications
- Multi-purpose speaker designed for both permanent installations and mobile PA
- A model with a built-in matching transformer, for use in high-impedance applications
- Colour black or white

### Options

- HY-1200HB / HY-1200HW: Horizontal orientation, mounting on wall/ceiling
- HY-1200VB / HY-1200VW: Vertical orientation, mounting on wall/ceiling
- HY-C0801\* / HY-C0801W\* Ceiling mounting bracket
- HY-W0801\* / HY-W0801W\* Wall mounting bracket
- ST-34B: Speaker Stand

\*in combination with HY-1200 series brackets

### Specifications

	HS-120B	HS-120W	HS-1200BT	HS-1200WT
<b>Speaker Component</b>	30 cm (12") cone-type, Balanced dome-type x 6			
<b>Power Handling Capacity</b>	100 W (rated) 300 W (continuous program)	100 W (rated) 300 W (continuous program)	60 W (rated, high impedance) 100 W / 300 W (low impedance)	60 W (rated, high impedance) 100 W / 300 W (low impedance)
<b>Rated Impedance (High) (Low)</b>	— 8 Ω	— 8 Ω	70 V / 100 V 8 Ω	70 V / 100 V 8 Ω
<b>Sensitivity</b>	97 dB (1 W, 1 m)	97 dB (1 W, 1 m)	97 dB (1 W, 1 m)	97 dB (1 W, 1 m)
<b>Frequency Response</b>	80 - 20000 Hz	80 - 20000 Hz	70 - 20000 Hz	70 - 20000 Hz
<b>Directivity Angle</b>	Horizontal: 90°, Vertical: 40°			
<b>Dimensions (W x H x D)</b>	361 x 448 x 320 mm			
<b>Weight</b>	8.5 kg	8.5 kg	10 kg	10 kg
<b>Finish (Colour)</b>	Black Polypropylene	White Polypropylene	Black Polypropylene	White Polypropylene

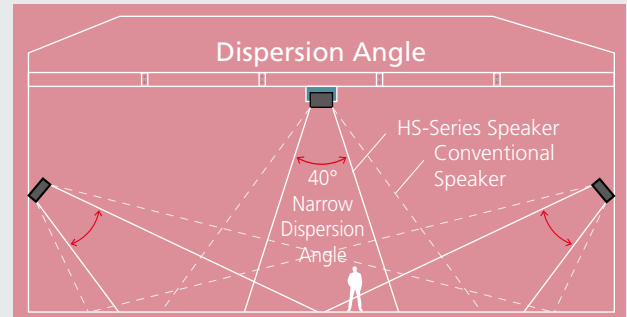


## Coaxial Array Speaker

### Compact Integrated 2-Way Speaker



**HS-1500B/HS-150W/HS-1500BT/HS-1500WT**



Narrow directivity control, e.g. for stage application

### Features

- For mobile or fixed installation e.g. in clubs, banquet rooms or schools, etc.
- Easy to carry and easy to install, with handle for easy transportability
- Rubber feet for straight positioning
- Can be used as a floor monitor
- Twin input terminal connections (Speakon® and screw terminals) for fixed and mobile installation
- Well-controlled sound coverage: 90° horizontal x 40° vertical
- 15" LF speaker
- 2-way unit system equipped with a large-diameter woofer and array tweeter
- Size and weight have been reduced thanks to the use of the array tweeter
- Compact and versatile design enables a broad range of applications
- Multi-purpose speaker designed for both permanent installations and mobile PA
- A model with a built-in matching transformer, for use in high-impedance applications
- Colour black or white

### Options

- HY-1500HB / HY-1500HW: Horizontal orientation, mounting on wall / ceiling
- HY-1500VB / HY-1500VW: Vertical orientation, mounting on wall / ceiling
- HY-C0801\* / HY-C0801W\* Ceiling mounting bracket
- HY-W0801\* / HY-W0801W\* Wall mounting bracket
- ST-34B: Speaker Stand\*

\*in combination with HY-1500 series brackets

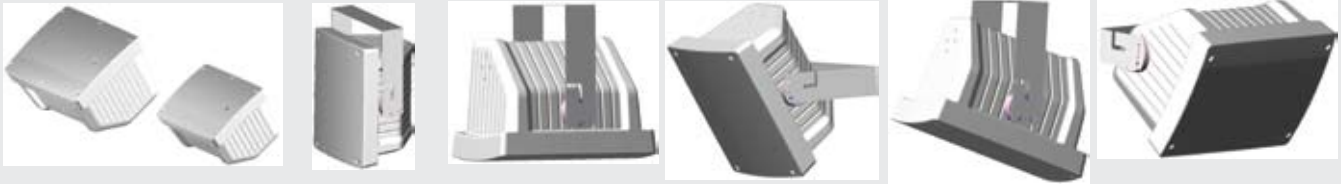
### Specifications

	HS-150B	HS-150W	HS-1500BT	HS-1500WT
<b>Speaker Component</b>	38 cm (15") cone-type, balanced dome-type x 6			
<b>Power Handling Capacity</b>	100 W (rated) 300 W (continuous program)	100 W (rated) 300 W (continuous program)	60 W (rated, high imped.) 100 W / 300 W (low impedance)	60 W (rated, high imped.) 100 W / 300 W (low impedance)
<b>Rated Impedance (High) (Low)</b>	— 8 Ω	— 8 Ω	70 V / 100 V 8 Ω	70 V / 100 V 8 Ω
<b>Sensitivity</b>	98 dB (1 W, 1 m)	98 dB (1 W, 1 m)	98 dB (1 W, 1 m)	98 dB (1 W, 1 m)
<b>Frequency Response</b>	70 - 20000 Hz	70 - 20000 Hz	60 - 20000 Hz	60 - 20000 Hz
<b>Directivity Angle</b>	Horizontal: 90°, Vertical: 40°			
<b>Dimensions (W x H x D)</b>	451 x 560 x 400 mm	451 x 560 x 400 mm	451 x 560 x 400 mm	451 x 560 x 400 mm
<b>Weight</b>	12 kg	12 kg	14 kg	14 kg
<b>Finish (Colour)</b>	Black Polypropylene	White Polypropylene	Black Polypropylene	White Polypropylene



## Coaxial Array Speaker

### Various Installation Options



### Mounting brackets for Wall / Ceiling

**HY-1500HB**



**HY-1500HW**



**HY-1200HB**



**HY-1200HW**



**HY-1500VB**



**HY-1500VW**



**HY-1200VB**



**HY-1200VW**



### Stand Mounting

**ST-34B**

Speaker Stand



### Mounting Brackets for Ceiling

**HY-C0801\* HY-C0801W\***



### Mounting Brackets for Wall

**HY-W0801\***



**HY-W0801W\***



\* in combination with HY-1200 / HY-1500 series brackets

## High Performance Systems



### Wedge-shaped 2-Way System with a Variety of Mounting Options



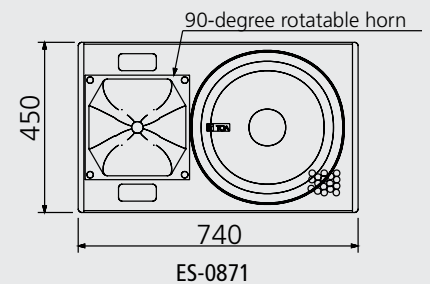
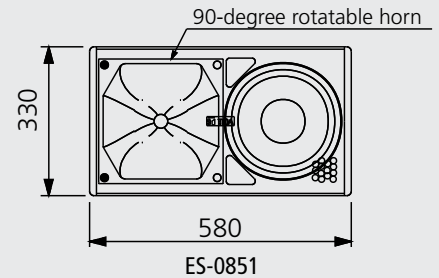
HY-0851CL



HY-B0801



HY-0871WS



### Features

- 2-way bass-reflex box
- 600 W continuous program
- 25 cm woofer (ES-0851) or 38 cm woofer (ES-0871)
- Wedge-shaped rear for installation close to walls, ceilings or edges or usage as floor monitor
- Great number of matching mounting brackets and also on stands and at pipes
- Finish: Black, plywood enclosure
- 90° rotatable CD-horn with high efficiency compression driver for 90° x 60° coverage
- Highly effective built-in crossover network
- 2 x Speakon® + 1 screw terminal inputs

### Application

Live music in halls, sporting facilities, schools, religious facilities, convention halls, discotheques

### Options

For ES-0851:

- HY-0851CL: Wall / ceiling bracket (1 pair), maximum load of 28 kg
- HY-0851ST: Bracket for HY-B0801/C0801/W0801/ ST-32, use for vertical mounting, maximum load of 28 kg,
- HY-0852ST: Bracket for HY-C0801/W0801, use for horizontal mounting, maximum load of 28 kg
- HY-B0801: Ceiling pipe bracket for use with HY-0851ST/0852ST, maximum load of 32 kg
- HY-C0801: Ceiling bracket for use with HY-0851ST /0852ST, maximum load of 32 kg
- HY-W0801: Wall bracket for use with HY-0851ST /0852ST, maximum load of 32 kg
- ST-32: Speaker stand for use with HY-0851ST

For ES-0871:

- HY-0871CL: Wall / ceiling (1 pair), maximum load of 45 kg
- HY-0871WS: Wall (1 set) , maximum load of 45 kg

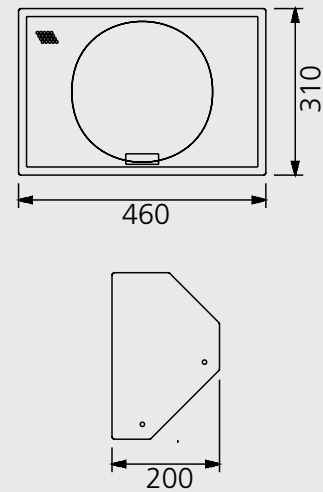
### Specifications

	ES-0851	ES-0871
<b>System</b>	2-Way Bass-Reflex Box	2-Way Bass-Reflex Box
<b>Rated Input</b>	200 W	200 W
<b>Continuous Program</b>	600 W	600 W
<b>Dispersion</b>	90° x 60° / 60° x 90°	90° x 60° / 60° x 90°
<b>Impedance</b>	8 Ohm	8 Ohm
<b>Frequency Response</b>	80 ... 20000 Hz	70 ... 20000 Hz
<b>Crossover Frequency</b>	1.8 kHz	1.8 kHz
<b>SPL (1W, 1m)</b>	97 dB	100 dB
<b>Dimensions (W x H x D)</b>	580 x 330 x 255 mm	740 x 450 x 337 mm
<b>Weight</b>	20 kg	37 kg
<b>Input Terminal</b>	2x Neutrik NL4MP (Speakon) + 1x M5 Screw Terminal	2x Neutrik NL4MP (Speakon) + 1x M5 Screw Terminal



## High Performance Systems

### 2-Way Coaxial Sub-Speaker System



### Features

- 2-Way Coaxial Speaker
- 25 cm low frequency cone speaker and CD horn (60° x 60° coverage)
- Fitted with compression driver with titanium diaphragm
- Compact size despite the power
- Good sound coverage in combination with the T-650 Dual CD-Horn Speaker
- High power due to DIFFRAX (horn structure for coaxial speaker that is aimed at controlling the influence of the diffraction effect at the edge of high frequency horn's opening)

### Applications

Ideal for medium sized halls such as indoor sports facilities and multi-purpose halls with high reverberation

### Options

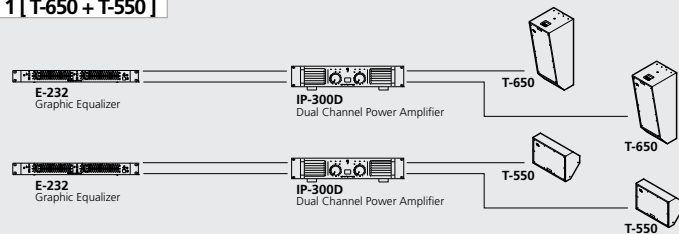
- MT-S0601: Transformer for 100 V / 70 V

### Specifications

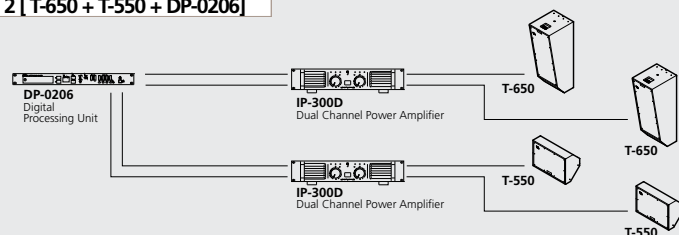
	T-550
Enclosure	Sealed
Speaker Component	2-way coaxial unit with 25 cm cone speaker, CD-horns with driver
Dispersion (hor. x vert.)	60° x 60°
Rated Input	60 W
Continuous Program	180 W
Impedance	8 Ohm
Frequency Response	100 ... 20000 Hz
Crossover Frequency	2.5 kHz
SPL (1 W, 1 m)	96 dB
Dimensions (W x H x D)	460 x 310 x 200 mm
Weight	11 kg
Input Terminal	M5 screw terminal
Accessories	Mounting brackets
Option	Matching transformer MT-S0601 100 V / 70 V

### System Example

#### Example 1 [ T-650 + T-550 ]



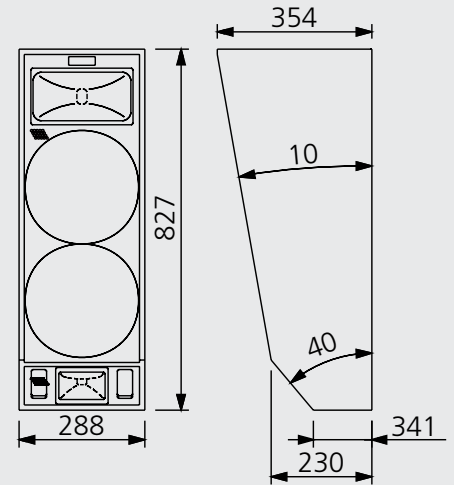
#### Example 2 [ T-650 + T-550 + DP-0206 ]



## High Performance Systems



### Dual CD-Horn Main Speaker System



### Features

- Covers wide rectangular areas by combining a short distance (90° hor. x 40° vert.) and a long distance (60° horizontal x 30° vertical) horn
- Ensures sound clarity by means of the fixed directional horns
- Adjustable angle
- Colour: Black
- Crossover frequency set at 1.2 kHz
- Two woofers control the directivity of the mid and low frequencies
- Built-in overload protection

### Applications

Medium-sized halls such as indoor sports facilities and multi-purpose halls with high reverberation

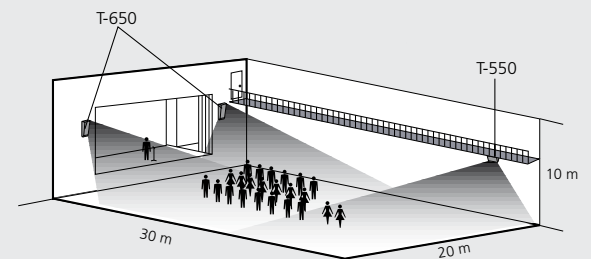
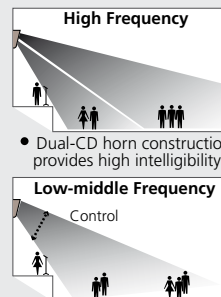
### Options

- MT-S0601: 70 V / 100 V-Transformer / rated 60 W

### Specifications

	T-650
Enclosure	Bass-Reflex Type
Speaker Component	25 cm x 2 cone speaker, 2 CD-horns with drivers
Dispersion (hor. x ver.)	60° x 30° and 90° x 40°
Rated Input	120 W
Continuous program	360 W
Impedance	8 Ohm
Frequency Response	80 ... 20000 Hz
Crossover Frequency	1.2 kHz
SPL (1 W, 1 m)	100 dB
Dimensions (W x H x D)	288 x 827 x 354 mm
Weight	22 kg
Input Terminal	MS screw terminal
Accessories	Mounting brackets

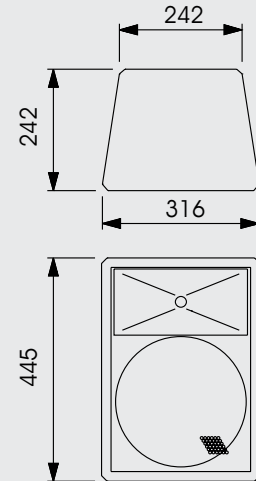
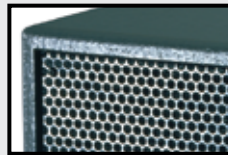
### Area coverage





## Processor Controlled Speaker Systems

### Ultra Compact Full Range Bass-Reflex System



### Features

- Very compact 2-way speaker
- Trapezoidal shape
- For both on-the-road and fixed installation
- Ideal in combination with the processor AC-S05 and the subwoofer SR-L05
- High power handling capacity (450 W)
- High quality sound
- Heavy duty construction and long-term reliability
- Colour: Dark grey, black front grille
- 25 cm (10") woofer
- HF compression driver with titanium diaphragm mounted on a 90° x 40° CD-horn
- Low loss passive crossover network
- Two 4-pole Speakon® jacks (connected parallel) and screw terminal
- Several optional mounting accessories available
- Enclosure: MDF with rugged epoxy paint

### Options

- M-9000M2 Digital Mixer
- SR-L05: Subwoofer

### Specifications

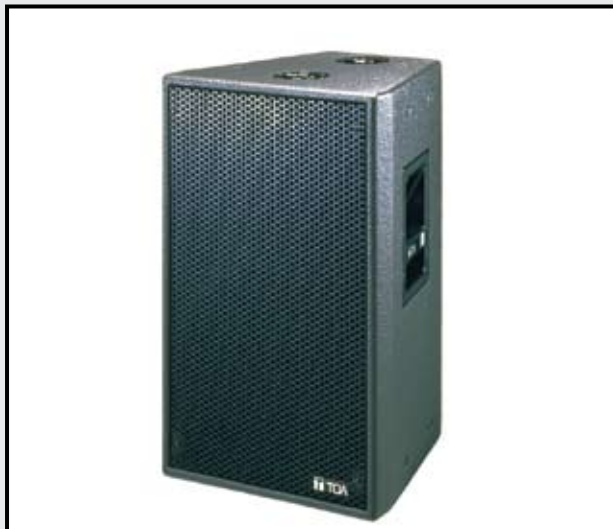
	SR-F05
Speaker	LF 25 cm cone speaker, HF CD-Horn
Recommended Power (at 8 Ohm) in combination with processor, selectable	> 100 / 300 W
Continuous Program	450 W
Rated Input	150 W
SPL (1 W, 1 m)	99 dB
Peak SPL at 1 m	131 dB
Impedance	8 Ohm
Frequency Response	60 ... 18000 Hz
Dispersion	90° x 40°
Dimensions (W x H x D)	316 x 445 x 242 mm
Weight	17 kg
Connectors	2 x 4-pin Speakon



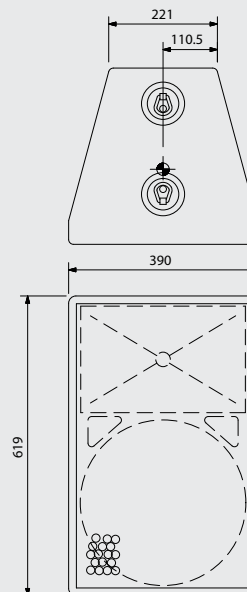
## Processor Controlled Speaker Systems



### Full Range Bass-Reflex System for Mobile Use



**SR-F09 / SR-F09V1**



### Features

- 2-way, trapezoidal speaker
- For mobile application
- Smooth sound characteristics with processor AC-S09
- High power handling capacity: 600 W
- 30 cm (12") woofer
- Highest quality sound
- Enclosure: MDF with rugged epoxy paint
- Colour: Black
- 2 ring / stud pan fittings on the top and on the bottom, each for quick mounting
- Can quickly be clustered and flown with optional ATM FLY-WARE (TM)
- Heavy duty construction and long-term reliability
- HF compression driver with titanium diaphragm mounted on a 90° x 60° CD-horn (SR-F09V1) or 60° x 40° CD-horn (SR-F09)
- Low loss passive crossover network
- Two 4-pole Speakon® jacks (connected parallel) and a screw terminal

### Options

- M-9000M2 Digital Mixer
- SR-L05, SR-L09: Subwoofer

### Specifications

	SR-F09	SR-F09V1
Speaker	LF 25 cm cone speaker, HF CD-Horn	LF 25 cm cone speaker, HF CD-Horn
Recommended Power (at 8 Ohm) in combination with processor, selectable	> 400 W / 200 W	> 400 W / 200 W
Continuous Program	600 W	600 W
Rated Input	200 W	200 W
SPL (1 W, 1 m)	100 dB	100 dB
Peak SPL at 1 m	133 dB	133 dB
Impedance	8 Ohm	8 Ohm
Frequency Response	70 ... 20000 Hz	70 ... 20000 Hz
Dispersion	60° x 40°	90° x 60°
Dimensions (W x H x D)	390 x 619 x 364 mm	390 x 619 x 364 mm
Weight	35 kg	35 kg
Connectors	2x 4-pin Speakon + 1x M5 screw terminal	2x 4-pin Speakon + 1x M5 screw terminal



## Processor Controlled Speaker Systems

### Full Range Bass-Reflex System for Fixed Installation



**SR-F09V2 / SR-F09V3**

#### Features

- For fixed installation
- 3/8" nuts on each side, top and bottom, to fix eye-bolts and fly the systems with steel wires
- 2-way, trapezoidal speaker
- Smooth sound characteristics with processor AC-S09
- High power handling capacity (600 W)
- 30 cm (12") woofer
- Highest quality sound
- Enclosure: MDF with rugged epoxy paint
- Colour: Black
- HF compression driver with titanium diaphragm mounted on a 90° x 60° CD horn (SR-F09V3) or 60° x 40° CD horn (SR-F09V2)
- Low loss passive crossover network
- Two 4-pole Speakon® jacks (connected parallel) and a screw terminal

#### Options

- M-9000M2 Digital Mixer
- SR-L05, SR-L09: Subwoofer

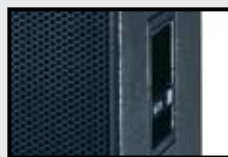
#### Specifications

	SR-F09V2	SR-F09V3
Speaker	LF 25cm cone speaker, HF CD-Horn	LF 25cm cone speaker, HF CD-Horn
Recommended Power (at 8 Ohm) in combination with processor, select.	> 400 W / 200 W	> 400 W / 200 W
Continuous Program	600 W	600 W
Rated Input	200 W	200 W
SPL (1 W, 1 m)	100 dB	100 dB
Peak SPL at 1 m	133 dB	133 dB
Impedance	8 Ohm	8 Ohm
Frequency Response	70 ... 20000 Hz	70 ... 20000 Hz
Dispersion	60° x 40°	90° x 60°
Dimensions (W x H x D)	390 x 619 x 364 mm	390 x 619 x 364 mm
Weight	35 kg	35 kg
Connectors	2x 4-pin Speakon + 1x M5 Screw terminal	2x 4-pin Speakon + 1x M5 Screw terminal

## Processor Controlled Speaker Systems



### Bass-Reflex Subwoofer System



### Features

#### SR-L09

- Subwoofer characteristics adjusted with the SR-F09 series speakers characteristics
- For mobile as well as fixed-installations
- High power handling capacity (900 W)
- Very low frequency response
- Heavy duty construction and long-term reliability
- 2 handles on each side
- Enclosure: MDF with rugged epoxy paint
- Colour: Dark grey and black front grille
- 2 x 38 cm (15") woofers providing an ultra-long stroke of the cone (40 mm) for low distortion in super low frequencies
- 2 x Speakon® jack and a screw terminal

#### SR-L05

- Subwoofer
- For mobile application as well as fixed installations
- High power handling capacity (450 W)
- Very low frequency response
- Heavy duty construction and long-term reliability • 38 cm (15") woofer providing an ultra-long stroke of the cone (40 mm) for low distortion in super low frequencies
- Enclosure: MDF with rugged epoxy paint
- Colour: Dark grey and black front grille
- Equipped with a Speakon® jack and a screw terminal
- 2 handles on each side

### Options

- SR-F05: Full Range Bass Reflex System
- M-9000M2 Digital Mixer

### Specifications

	SR-L05	SR-L09
Subwoofer	1 x 38 cm	2 x 38 cm
Recommended Power (at 8 Ohm) in combination with processor, selectable	> 300 W / 400 W	> 400 W / 200 W
Continuous Program	450 W	900 W
Rated Input	150 W	300 W
SPL (1 W, 1 m)	93 dB	96 dB
Peak SPL at 1 m	125 dB	131 dB
Impedance	8 Ohm	4 Ohm
Frequency Response	35 ... 1000 Hz	35 ... 1000 Hz
Dimensions (W x H x D)	452 x 629 x 502 mm	829 x 629 x 606 mm
Weight	36 kg	67 kg
Connectors	2x 4-pin Speakon + 1x M5 screw terminal	2x 4-pin Speakon + 1x M5 screw terminal

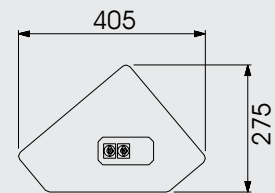
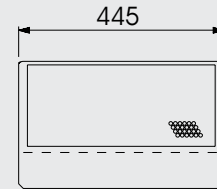


## Processor Controlled Speaker Systems

### Ultra Compact Full Range Stage Monitor



AC-S05



### Features

- Very compact 2-way floor monitor speaker
- For both mobile and fixed installation use
- High power handling capacity (450 W)
- High quality sound
- Heavy duty construction and long-term reliability
- 25 cm (10") woofer
- The horn of the SR-M05L is left, the one of the SR-M05R right
- Enclosure: MDF with rugged epoxy paint
- Colour: Dark grey and black front grille
- HF compression driver with titanium diaphragm mounted on a 40° x 40° CD-horn
- Low loss passive crossover network
- 2 Neutrik NL4MP 4-pole Speakon® jacks (connected parallel) and a screw terminal

### Options

- M-9000M2 Digital Mixer

### Specifications

	SR-M05L / SR-M05R
Speaker	LF 25 cm cone speaker, HF CD-Horn
Recommended Power (at 8 Ohm) in combination with processor, selectable	> 100 / 300 W
Continuous Program	450 W
Rated Input	150 W
SPL (1 W, 1 m)	99dB
Peak SPL at 1 m	131 dB
Impedance	8 Ohm
Frequency Response	60 Hz - 18 kHz
Dispersion	40° x 40°
Dimensions (W x H x D)	445 x 275 x 405 mm
Weight	18.5 kg
Connectors	2x 4-pin. Speakon

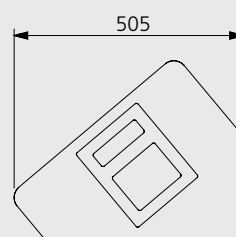
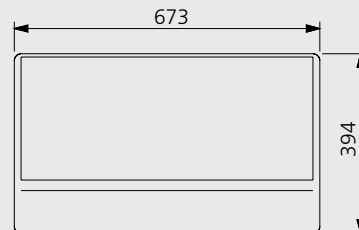
## Processor Controlled Speaker Systems



### High Power 2-Way Monitor System



**SR-M3L / SR-M3R**



### Features

- Floor Monitor System
- High power handling (600 W)
- Extremely rugged construction for reliable, mobile use
- SR-M3L is used for left hand and SR-M3R is used for right hand placing
- Bass reflex enclosure with 15" (38 cm) woofer
- Carrying handles

- High frequency driver features a large, high-power driver, a titanium diaphragm, and a 40 ° (horizontal) x 60 ° (vertical) CD horn
- Single-amplifier driven speaker system with passive internal networks
- Convertable to "biamp" operation by replacing the unit's internal wiring with a standard accessory cable
- 2 Neutrik NL4MP connectors are provided to permit parallel speaker connections

### Applications

Speakers for stage and live entertainment

### Specifications

	SR-M3L / SR-M3R
Enclosure	Bass-reflex type
Power Handling Capacity	600 W continuous program
Rated Impedance	8 Ohm
SPL (1 W, 1 m)	100 dB
Frequency Response	65 ... 20000 Hz
Crossover Frequency	1 kHz
Speaker Component	Low frequency: 38 cm cone speaker, High frequency: CD horn (40 x 60°) fitted with compression driver
Input Connector	Neutrik NL4MP x 2
Finish	Enclosure: Plywood, black, paint, Front grille: Steel plate, black, acrylic paint
Dimensions (W x H x D)	673 x 394 x 505 mm
Weight	34 kg


























## Mounting Accessories

Speakers	FGM Speakers					
Installation Configurations	H-1 	BS-1030B/W 	BS-1110W 	BS-1120W 	F-1000B / BT F-1000W / WT 	F-2000B / BT F-2000W / WT 
Ceiling Mounting Bracket		SP-420 	SP-410 WCB-12/12W 		HY-CM10B HY-CM10W (Photo) 	HY-CM20B (Photo) HY-CM20W 
Wall Mounting Bracket	HY-H1 Adaptor Frame	SP-410 WCB-12/12 	YS-301 			
Other Mounting Bracket		Table Mounting Bracket TMB-1 			HY-BH10 Board Hanger Bracket 	HY-CB20 Cluster Bracket 
Speaker Stand			ST-16 			ST-16A 

Speakers	General Use Speakers		
Installation Configurations	ES-0851 	ES-0871 	ES-0422/ ES-0424/ ES-0426 
Ceiling Mounting Bracket	HY-0851CL 	HY-C0801 *1 	HY-0871CL 
Wall Mounting Bracket	HY-0851CL 	HY-W0801 *1 	HY-0871CL HY-0871WS 
Ceiling Pipe Bracket	HY-B0801 *1 	*1: Use with Speaker Mounting Bracket HY-0851ST or HY-0852ST. *2: Use with HY-B0801, HY-C0801, HY-W0801 or Stand ST-32. *3: Use with HY-B0801, HY-C0801 or HY-W0801.	
Speaker Mounting Bracket	HY-0851ST *2 	HY-0852ST *3 	
Speaker Stand	*Use with HY-0851ST. 		

## Mounting Accessories



Speakers	Compact Array Speakers					
	HX-5B	HX-5W	HX-5B-WP	HX-5W-WP	FB-120B	FB-120W
Installation Configurations						
Rigging Frame	 HY-PF1B	 HY-PF1W	 HY-PF1WP		 HY-PF1B	 HY-PF1W
Ceiling Mount Bracket	 HY-CW1B	 HY-CW1W	 HY-CW1WP			
Mount Bracket	 HY-WM1B	 HY-WM1W	 HY-WM1WP		 HY-WM2WP	
Extension Bracket	 HY-CN1B	 HY-CN1W	 HY-CN1B-WP	 HY-CN1W-WP		
Speaker Stand Adapter	 HY-ST1					



# Speaker Reference

Model	Type	Continuous Power Input	Input Impedance	Freq. Response	Speaker Component	Efficiency (SPL)	Attenuators (Max. cut)	Finish	Grille	Connectors (incl. In / Out)	Other Features
<b>• Monitor Speakers</b>											
ME-120	Bass Reflex	150W	6Ω	60Hz-18kHz	12cm cone-type (magnetically shielded)	88dB		MDF, Black	Cloth, Black	Screw terminals (compatible with a dual-banana plug), gold plated	
ME-160	2-Way Bass Reflex			50Hz-20kHz	16cm resin-impregnated natural fiber cone woofer (magnetically shielded) 2.5cm soft-dome type (magnetically shielded)						

## • SR (Z-Drive) Series Speakers

SR-F09	2-Way Bass Reflex	600W	8Ω	70Hz-20kHz (AC-S09's Use)	30cm, Cone Speaker (90°H x 40°V) CD Horn w/Compression Driver	100dB		Plywood, black, paint	Steel plate, black, acrylic paint	Neutrik NL4MP x 2, M5 screw	
SR-F09-V1											
SR-F09-V2											
SR-F09-V3	Bass Reflex	900W	4Ω	35Hz-1kHz	38cm, Cone Speaker x 2	96dB					
SR-M05L/R	2-Way Bass Reflex	450W	8Ω	60Hz-18kHz	25cm, Compression Drover (90°H x 40°V) CD Horn	99dB		Epoxy Paint Black	Acrylic Paint Black	Neutrik NL4MP x 2	Medium Density Fiberboard Cabinet
SR-M3L/R		600W		65Hz-20kHz	38cm, Cone Speaker (60°H x 40°V) CD Horn w/Compression Driver	100dB	Plywood, black, paint	Steel plate, black, acrylic paint			

## • ES Series

ES-0851	2-Way Bass Reflex	600W	8Ω	80Hz-20kHz	25cm Cone Speaker 90°H and 60°V (60°H x 90°V) CD Horn w/Compression Driver	97dB		Plywood, black, urethane paint	Steel plate, black, acrylic paint	Neutrik NL4MP x 2, M5 screw	
ES-0871				70Hz-20kHz	38cm Cone Speaker 90°H and 60°V (60°H x 90°V) CD Horn w/Compression Driver	100dB					
ES-0422	Sealed	240W	8Ω	120Hz-20kHz	Two 12cm Woofers, CD Horn w/Compression Driver(100°H x 50°V)	91dB		Wood Urethane Paint, White	Steel Plate Acrylic Paint, White	M5 Screw Terminal	Option, MT-S0601 Matching Transformer
ES-0424		360W			Four 12cm Woofers, CD Horn w/Compression Driver(100°H x 50°V)	95dB					
ES-0426					Six 12cm Woofers, CD Horn w/Compression Driver(100°H x 50°V)	96dB					
ES-0422WP	Sealed/Weather-Resistant	240W	8Ω	120Hz-20kHz	Two 12cm Woofers, CD Horn w/Compression Driver(100°H x 50°V)	91dB		Wood FRP Coating Paint, White	Stainless Steel Paint, White	M5 Screw Terminal	Option, MT-S0601 Matching Transformer
ES-0424WP		360W			Four 12cm Woofers, CD Horn w/Compression Driver(100°H x 50°V)	95dB					
ES-0426WP					Six 12cm Woofers, CD Horn w/Compression Driver(100°H x 50°V)	96dB					

## • T Series Speakers

T-650	Bass Reflex	360W	8Ω	80Hz-20kHz	Two 25cm Woofers, Two CD Horns w/Compression Driver	100dB		Coniferous Plywood, Urethane Paint, Black	Steel Plate Acrylic Paint, Black	M5 Screw Terminal	Option: MT-S0601 Matching Transformer
T-550	Sealed	180W		100Hz-20kHz	2-Way Coaxial Unit, 25cm Woofer, CD Horn w/Compression Driver	96dB					

## • H Series Speakers

H-1	2-Way Bass-Reflex/Foreground	12W*	4Ω, 16Ω, 100V: 830Ω, 1.7kΩ, 3.3kΩ 70V: 420Ω, 830Ω, 1.7kΩ, 3.3kΩ	120Hz-20kHz	8 x 5cm Woofer, Balanced Dome Tweeter	85dB		Fire-Resistant ABS Resin, White	Rolled Steel Plate, White	Detachable Screw Terminal, 2 each +/-			
H-2				100Hz-20kHz	10cm Woofer, Balanced Dome Tweeter	88dB							
H-2WP					ABS Resin, White	Stainless Steel Off-White							
H-3		30W*	8Ω, 16Ω, 100V: 330Ω, 670kΩ, 1.3kΩ 70V: 170Ω, 330Ω, 670Ω, 1.3kΩ	100Hz-20kHz	10cm Woofer x 2, 2.5cm Dome Tweeter	89dB						Fire-Resistant ABS Resin, Off-White	Steel Plate, Off-White
H-3WP													
HB-1	Subwoofer	240W	8Ω	45Hz-200Hz	20cm Cone	91dB	Steel plate, Off-White	Punched Net, Off-White					

Notes: \*: Rated Input



## Speaker Reference



Model	Type	Continuous Power Input	Input Impedance	Freq. Response	Speaker Component	Efficiency (SPL)	Attenuators (Max. cut)	Finish	Grille	Connectors (incl. In/Out)	Other Features
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### • F Series Speakers

F-10B/W	Sealed/Foreground	45W	8Ω	100Hz-18kHz	10cm Full-Range Speaker in Triangular Corner Enclosure	88dB		Black/White Triangle	Removable Matching Color Jersey	Hardwire	Optional X-former
F-10BM/ F-10WM		5W*	100V: 3.3kΩ/2kΩ 70V: 1.7kΩ, 1kΩ								Built-in Matching Transformer
F-1000B F-1000W	2-Way Bass Reflex	90W	8Ω	85Hz-20kHz	LF 10cm cone type HF balanced dome tweeter	87dB		HIPS black or white	Punched metal	Push-in terminal	Built-in Matching Transformer
F-1000BT F-1000WT		15W	100V: 670Ω/2kΩ/ 3.3kΩ/10kΩ 70V: 330Ω/670Ω/ 2kΩ/3.3kΩ/10kΩ								Built-in match. transf. IPx4 weatherproof
F-1000BTWP F-1000WTWP											
F-2000B F-2000W	2-Way Bass Reflex	180W	8Ω	65Hz-20kHz	LF 20cm cone type HF 25 mm dome tweeter	92 dB		HIPS black or white	Punched metal	Push-in terminal	Horn Adapter
F-2000BT F-2000WT		60W	100V: 170Ω/330Ω/ 670Ω/3.3kΩ 70V: 83Ω/170Ω/ 330Ω/670Ω/3.3kΩ								Built-in Matching Transformer Horn Adapter
F-2000BTWP F-2000WTWP											Built-in match. transf. IPx4 weatherproof Horn Adapter
F-505WP	2-Way Sealed/Weather-Resistant	60W*	83Ω 170Ω 330Ω 670Ω	80Hz-20kHz	20cm, Compression HF Driver 60°H x 40°V CD Horn	93dB		Polyprop. resin, Ivory	Stainless Steel, Ivory	Pigtail Cable	Overload Protected, Weather-Resistant Cabinet w/Handle
F-505WP-L		240W	8Ω		30cm, Compression HF Driver 60°H x 40°V CD Horn						
F-605WP		120W*	42Ω 83Ω 170Ω 330Ω								
F-605WP-L		360W	8Ω								

Notes: \*: Rated Input

Model	Type	Continuous Program Input	Rated Input	Input Impedance	Freq. Response	Speaker Component	Sensitivity	Finish	Grille	Connection	Dust/Water Protection
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### • F Series Ceiling Speakers

F-122C	Bass Reflex	120W	30W	100V: 330Ω, 1kΩ, 3.3kΩ, 10kΩ 70V: 170Ω, 330Ω, 1kΩ, 3.3kΩ, 10kΩ 25V: 170Ω, 330Ω, 1kΩ, 3.3kΩ, 10kΩ 16Ω, 8Ω	70 – 20kHz	12cm Cone Speaker	90dB			Removable locking connector	
F-2352C	2-Way Bass Reflex					Balanced dome tweeter, 12cm Cone Speaker					
F-2322C	Bass reflex/ Distributed FGM					12cm Cone Speaker					
F-2852C	2-Way Bass Reflex	180W	60W	100V: 170Ω, 330Ω, 670Ω, 3.3kΩ 70V: 83Ω, 170Ω, 330Ω, 670Ω, 3.3kΩ 25V: 83Ω, 170Ω, 330Ω, 670Ω, 3.3kΩ 16Ω, 8Ω	60 – 20kHz	Dome Tweeter, 16cm Cone Speaker	91dB	White	Punched Steel, White		
F-1522SC	Distributed FGM	18W	6W	100V: 1.7kΩ, 3.3kΩ, 10kΩ, 20kΩ 70V: 830Ω, 1.7kΩ, 3.3kΩ 25V: 830Ω, 1.7kΩ, 3.3kΩ, 8Ω, 16Ω	65 – 18kHz	10cm Cone Speaker	88dB			Push-in Terminal	
F-2352SC					100V: 1.7kΩ, 3.3kΩ, 10kΩ, 20kΩ 70V: 830Ω, 1.7kΩ, 3.3kΩ, 10kΩ, 20kΩ 25V: 830Ω, 1.7kΩ, 3.3kΩ, 10kΩ, 20kΩ 8Ω, 16Ω	80 – 20kHz	12cm Cone Speaker, Balanced dome tweeter	89dB			



# Speaker Reference

Model	Type	Continuous Program Input	Rated Input	Input Impedance	Freq. Response	Speaker Component	Sensitivity	Finish	Grille	Connection	Dust/Water Protection
SR-A12L	2-Way Bass Reflex	Low frequency: 450W High frequency: 180W		8Ω 16Ω	50Hz-20kHz*	Low frequency: 30 cm cone-type High frequency: Wave front control horn 90° (horizontal) × 5° (vertical) + compression driver × 2	Low frequency: 98dB High frequency: 110dB	Plywood, black, paint	Punched steel plate, black, acrylic paint	M5 screw terminal and Neutrik NL4MP × 2	IPX4
SR-A12LWP								Multi-layer wood, black, urethane coating	Punched stainless steel (SUS304), black, paint	Direct cable withdrawal	
SR-A12S								Multi-layer wood, black, paint	Punched steel plate, black, acrylic paint	M5 screw terminal and Neutrik NL4MP × 2	
SR-A12SWP								Multi-layer wood, black, urethane coating	Punched stainless steel (SUS304), black, paint	Direct cable withdrawal	
SR-A18B	Bass Reflex	720W		8Ω	40-400Hz*	48 cm cone-type	95dB	Plywood, black, paint	Punched steel plate, black, acrylic paint	M5 screw terminal and Neutrik NL4MP × 2	
SR-C8L	2-Way Bass Reflex	Low frequency: 360W High frequency: 120W		16Ω 16Ω	65Hz-20kHz*	Low frequency: 20 cm cone-type High frequency: Wave front control horn 110° (horizontal) × 5° (vertical) + compression driver × 2	Low frequency: 95dB High frequency: 110dB	Plywood, black, urethane paint	Punched steel plate, black, acrylic paint	M5 screw terminal and Neutrik NL4MP × 2	IPX4
SR-C8LWP								Plywood, black, urethane coating	Punched stainless steel plate, black, paint	Direct cable withdrawal	
SR-C8S								Plywood, black, urethane paint	Punched steel plate, black, acrylic paint	M5 screw terminal and Neutrik NL4MP × 2	
SR-C8SWP								Plywood, black, urethane coating	Punched stainless steel plate, black, paint	Direct cable withdrawal	
SR-C15B	Bass Reflex	450W		8Ω	40-400Hz*	38 cm cone-type	93dB	Plywood, black, urethane paint	Punched steel plate, black, acrylic paint	M5 screw terminal and Neutrik NL4MP × 2	IPX4
SR-C15BWP								Plywood, black, urethane coating	Punched stainless steel plate, black, paint	Direct cable withdrawal	
SR-H2L	Bass Reflex	180W		8Ω	80Hz-18kHz*	7cm cone-type × 8	92dB* <sup>2</sup>	MDF, white, urethane paint	Punched steel plate, white, acrylic paint	Removable input connector	
SR-H2S					90Hz-17kHz*		90dB* <sup>2</sup>				
SR-H3L		360W			110Hz-18kHz*		95dB* <sup>3</sup>				
SR-H3S					90Hz-17kHz*		92dB* <sup>3</sup>				
SR-S4L	2-Way Bass Reflex	600W		8Ω	70Hz-20kHz*	Low frequency: 10cm cone-type × 8 High frequency: 2.5cm balanced-dome tweeter × 24	94dB	MDF, white, paint	Punched steel plate, white, acrylic paint	M5 screw terminal and Neutrik NL4MP × 2	IPX4
SR-S4LWP	2-Way Sealed							Plywood, white, urethane coating	Punched stainless steel (SUS304), white, paint	Direct cable withdrawal	
SR-S4S	2-Way Bass Reflex							MDF, white, paint	Punched steel plate, white, acrylic paint	M5 screw terminal and Neutrik NL4MP × 2	
SR-S4SWP	2-Way Sealed							Plywood, white, urethane coating	Punched stainless steel (SUS304), white, paint	Direct cable withdrawal	
SR-T5	2-Way Bass Reflex	750W		8Ω	80Hz-20kHz	Low frequency: 13cm cone-type × 8 High frequency: Balanced-dome tweeter × 24	93dB	Plywood, black, urethane paint	Punched steel plate, black, acrylic paint	M5 screw terminal	

\* When equalized at recommended parameters.

\*<sup>2</sup> 1W, 1m equivalent, measured at 4m.

\*<sup>3</sup> 1W, 1m equivalent measured at 8m.

## Speaker Reference



Model	Type	Continuous Program Input	Rated Input	Input Impedance	Freq. Response	Speaker Component	Sensitivity	Finish	Grille	Connection	Dust/Water Protection
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### • Compact Array Speakers

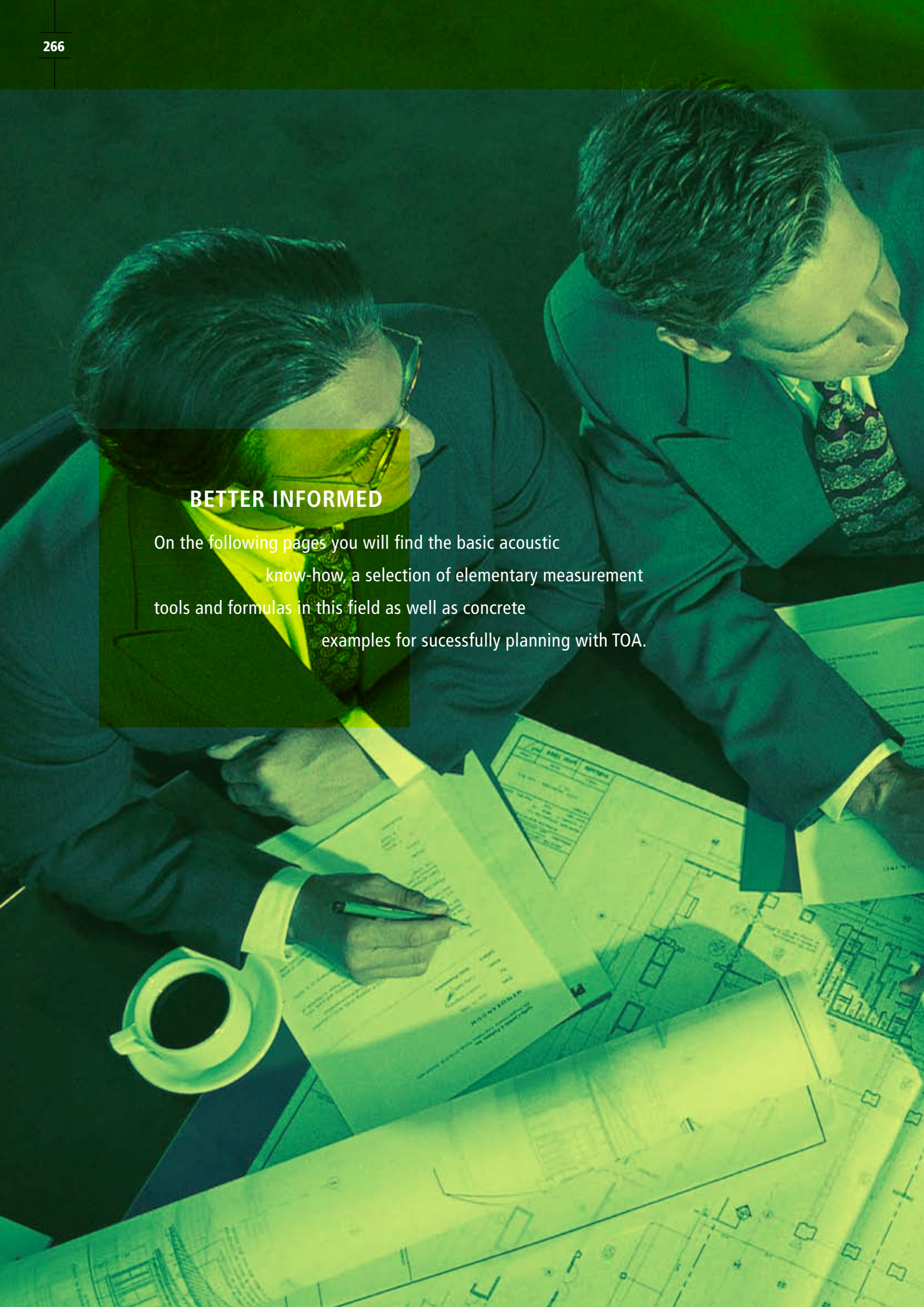
HX-5B	2-Way Bass Reflex	600W		8Ω	70Hz-20kHz (60° mode), 75Hz-20kHz (45° mode), 80Hz-20kHz (30° mode), 85Hz-20kHz (15° mode).	Low frequency: 12cm cone-type × 4 High frequency: Balanced-dome tweeter × 12	95dB (60° mode), 97dB (45° mode), 98dB (30° mode), 99dB (15° mode)	Enclosure: Polypropylene, black	Punched steel plate, black, paint	Neutrik NL4MP × 2 and M4 screw terminal	IPX4
HX-5W					Enclosure: Polypropylene, white			Punched steel plate, white, paint			
HX-5B-WP	2-Way Sealed				Enclosure: Polypropylene, black			Punched steel plate, black, paint	2-core cabtyre cable		
HX-5W-WP					Enclosure: Polypropylene, white			Punched steel plate, white, paint			
FB-120B	Bass Reflex	600W		8Ω	40Hz-1.2kHz	30cm cone-type	90dB	Poywood	Punched steel plate, black, paint	Neutrik NL4MP × 2 and M4 screw terminal	
FB-120W									Punched steel plate, white, paint		

### • HS Series Speakers

HS-120B	2-Way Sealed	300W	60W	8Ω	80Hz-20kHz	Low frequency: 30cm cone-type High frequency: Balanced-dome tweeter × 6	97dB	Polypropylene, black	Surface-treated Steel Plate, black	Neutrik NL4MP Speakon and M4 screw terminal		
HS-120W					Polypropylene, white			Surface-treated Steel Plate, white				
HS-1200BT					8Ω 100V: 170Ω, 330Ω, 670Ω 70V: 83Ω, 170Ω, 330Ω, 670kΩ,			70Hz-20kHz	Polypropylene, black		Surface-treated Steel Plate, black	
HS-1200WT					Polypropylene, white			Surface-treated Steel Plate, white				
HS-150B			60W	8Ω	70Hz-20kHz	Low frequency: 38cm cone-type High frequency: Balanced-dome tweeter × 6	98dB	Polypropylene, black	Surface-treated Steel Plate, black			
HS-150W								Polypropylene, white	Surface-treated Steel Plate, white			
HS-1500BT								8Ω 100V: 170Ω, 330Ω, 670Ω 70V: 83Ω, 170Ω, 330Ω, 670kΩ,	60Hz-20kHz		Polypropylene, black	Surface-treated Steel Plate, black
HS-1500WT								Polypropylene, white	Surface-treated Steel Plate, white			

## BETTER INFORMED

On the following pages you will find the basic acoustic know-how, a selection of elementary measurement tools and formulas in this field as well as concrete examples for successfully planning with TOA.







## Sound Knowledge

This chapter shall give you a basic knowledge about electro-acoustics. It provides you with an idea about planning a simple sound system. Furthermore some information can help you to understand certain measures in existing sound systems and in sound system planning.

### The Decibel Notation System

"Decibel" is often used in communication systems. The Decibel notation system was established to match audio signal levels with the human ear's logarithmic perception and to reduce the wide range of physical values (the human's ear has a dynamic range of 1 : 3 million). The Decibel value is the logarithm of a ratio between two (physical) values. Its abbreviation is "dB".

(A Decibel is a tenth Bel, named in honour to Mr. Alexander Graham Bell.) When calculating with sound pressure levels, voltages and currents, then the calculation is:

$$\text{dB} := 20 \times \log_{10} (\text{value 1} / \text{value 2}) \quad (1)$$

In the further text, " $\log_{10}$ " is substituted by just "log".

Example: A voltage ratio is calculated as:  $\text{dB} := 20 \times \log (U_1 / U_2)$ . When calculating with power, then the formula is:

$$\text{dB} = 10 \times \log (P_1 / P_2) \quad (2)$$

In the further text several formulas do not contain the value 2. In this case the value 2 is equal 1 and the unit the same as of value 1.

The value 2 can be a fixed reference. Then a certain letter is added to the "dB", indicating the reference value:

Reference	1 $\mu\text{V}$	1 mV	0.775 volt	1 volt	20 $\mu\text{Pa}$ *
Decibel	dB $\mu\text{V}$	dBmV	dBu (dBm)	dBV	dB SPL

\* : 20  $\mu\text{Pa}$  (micro-Pascal = 0.00002 Pa) is the lowest sound pressure level which can be heard by the human's ear at 1 kHz. This level is called threshold of hearing.

Table 1: Decibel reference values

### Calculations with Decibel

The table below shows some relations in calculation and meaning between physical values and the Decibel:

Physical	Multi- plication	Division	< 1	1	> 1	nega- tive
	↓	↓	↓	↓	↓	↓
Decibel	Addition	Subtraction	nega- tive	0	posi- tive	impos- sible

Table 2: Decibel calculation rules

Example 1: An amplifier reinforces an input signal of 1 mV (millivolt) to an output signal of 1000 mV. Then the amplification is 1000 times (1000 : 1), or:  $20 \times \log (1000) = +60 \text{ dB}$ .

Example 2: An attenuator reduces a voltage to a tenth. The ratio between output and input is:  $\text{Output/input} = 0.1 : 1 = 0.1$ . In Decibel it is:  $20 \times \log (0.1/1) = -20 \text{ dB}$ .

Example 3: The attenuator (ex. 2) is connected after the amplifier (ex. 1). Then the total amplification is:  $1000 \times 0.1 = 100$ , or in Decibels it is:  $60 \text{ dB} + (-20 \text{ dB}) = 60 \text{ dB} - 20 \text{ dB} = 40 \text{ dB}$ .

## A Little Bit of Acoustics

### Sound and Frequency

Sound is a sparse and dense wave (vibration) transmitted in the medium of air. The rarefaction and compression wave of air stimulates our acoustic sense and is felt as a sound.

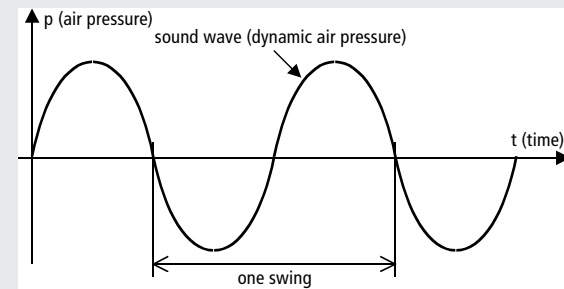


Figure 1: Sound wave swing

The frequency is the number of swings per second. Its unit is Hertz, abbreviated as „Hz“. 1000 Hz is also expressed as 1 kHz (kilo Hertz). The electro-acoustics treats the audible frequency range between 16 Hz and 20000 Hz.

### Sound Pressure Level (SPL)

The sound pressure level is the strength or volume of the sound waves. The physical unit is Pascal [Pa]. In the electro-acoustics it is expressed in dB SPL, referring to the threshold of hearing.

More details about SPL can be found in the chapter on loudspeakers.

### Sound Transducers

Sound transducers are devices which convert sound waves into electrical signals and opposite.

### Microphones

There are different types and transducer principles. The most popular types are the dynamic and electret (condenser) microphones. Dynamic microphones are tough and can process high sound pressure levels. Electret microphones have a better performance at high frequencies, are cheaper than dynamic microphones and require a power supply, either by a built-in battery or by phantom power.

The microphones come with different receiving characteristics. The main ones are omni-directional (receiving sound from all directions), and uni-directional (receiving sound mainly from the front).

### Microphones for PA Systems

#### Paging Microphone

A paging microphone is a microphone combined with a talk button. This button usually works in the so called Press-To-Talk (PTT) mode. When depressing it, then an announcement can be made. After releasing the button, the broadcast will be stopped. Often the paging microphone is on a gooseneck or other mechanical extension fixed on a (desk) stand.

#### Remote Microphone

A remote microphone has a similar construction as a paging microphone. Additionally it is equipped with several buttons to control some functions of the PA system remotely. In most cases these buttons are used for zone selection.



## Loudspeakers

Loudspeakers transfer electrical audio signals into sound waves. They are designed for different application and therefore they have different performances. Some specific features are explained in the further chapter.

### Loudspeaker Types

#### Full-range Speaker

A full-range speaker can reproduce a wide frequency range, at least the main band of the whole audible range. A speaker with a frequency response from 250 to 8000 Hz or better can be called a full-range speaker.

#### Multi-Way Speaker

For a high quality sound, two or more speaker chassis, each designed for a specific frequency range, are combined to cover a wide frequency range. Depending on the number of combined frequency ranges, such a speaker is called a 2-way, 3-way etc. speaker.

#### Enclosure Types

A sealed box speaker is unproblematic in use. The speaker chassis' membrane is protected from extremely high movements by the counter-pressure of the air inside the enclosure.

A bass reflex speaker can reproduce low frequencies better than a sealed box speaker. But it is recommended to use a high pass (or low-cut) filter,

set at the lower frequency of the loudspeaker's frequency response. This prevents the speaker's membrane from high movements at very low frequencies which may cause a damage of the woofer.

Some loudspeakers as ceiling speakers have no enclosure. Their speaker chassis are designed to limit the membrane's movement to prevent the speaker from damage.

#### Horn Speakers

A horn speaker consists of a driver which converts the audio signal into acoustic waves and a horn which reinforces and bundles the sound waves. Horn speakers have a high efficiency and can reach a very high SPL.

#### Line Array Systems

Line array systems operate as a so-called line source. The decrease of SPL with the distance is less than that of a conventional speaker, therefore line array speakers are ideal to cover a wide audience area. They provide a wide horizontal coverage and a very small vertical coverage. They can be aimed exactly to the audience, so that only a minimum sound waves will be sent to reflecting walls and ceiling. This makes the line array speaker ideal for reverberant environments. Another advantage of line array speakers is that these do not cause any interference when stacked in a speaker cluster, i.e. the sound does not deteriorate.

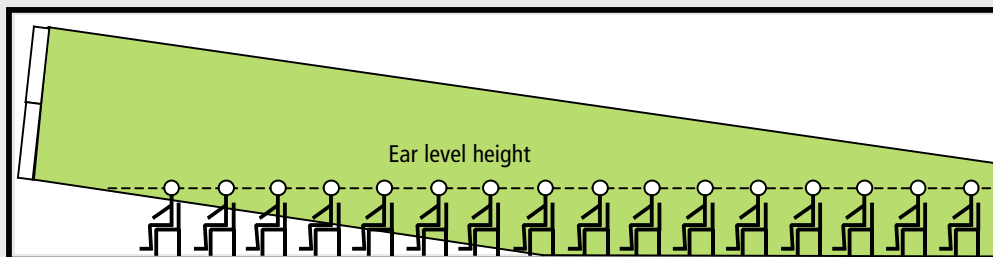


Figure 2: Vertical coverage of a line array speaker cluster

### Loudspeaker Types and Application

There exist many different speaker designs which were constructed to fit with several requirements. Some examples are listed in the table below:

Loudspeaker Type	Application
PA Wall Speaker	General, background music, speech
PA Ceiling Speaker	General, background music, speech
PA Sound Projector	Aimed sound propagation, foreground and background music, speech
PA Pendant Speaker	General, design, background music, speech
PA Lamp Speaker	Unobtrusive sound, background music, speech
Design Speaker	Optically nice speakers, foreground music, speech
(Reflex) Horn Speaker	Large areas, noisy areas, outdoor, speech
Column Speaker	Wide horizontal and narrow vertical sound propagation, reverberant environment, speech
Professional Sound Speaker	High quality sound reinforcement, foreground music, speech
High Power Professional Sound Speaker	High quality sound reinforcement for large areas, foreground music, speech
Line Array Speakers	High quality sound reinforcement in reverberant environment and big halls, speaker clusters without interference, foreground music, speech
Subwoofer	Support of very low frequencies (disco, theatre, cinema, pop concert)

Table 3: Loudspeaker types and applications



## Technical Specifications? We don't let you fall behind!

### Specifications of Loudspeakers

#### Impedance

The impedance is the AC resistance. There are two types of speaker impedance systems: low impedance speakers and high impedance speakers. The low impedance speakers have impedances of 4, 8 or 16 ohms. The high impedance speaker's impedance depends on its input power and can be in the range between a few 10 ohms and several 1000 ohms.

#### Frequency Response

The frequency response is the range of frequencies which can be reproduced by the loudspeaker. It can be stated in a written format (e.g. 50 Hz - 20000 Hz) or in a graph:

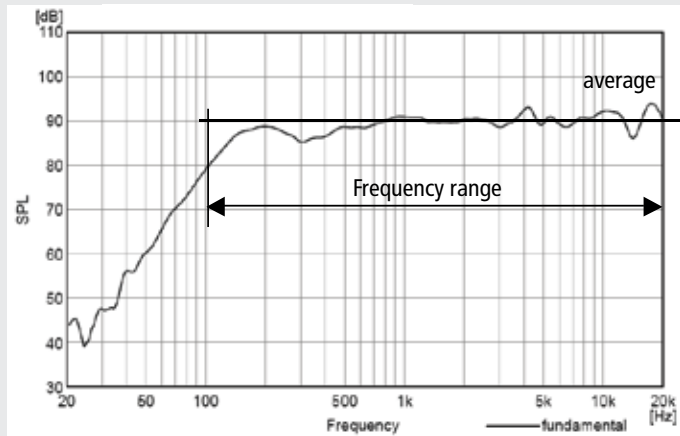


Figure 3: Frequency response of a loudspeaker

In the graph it is obvious that the SPL differs at different frequencies, therefore the written frequency response states the range where the SPL value differs not more than 10 dB from the average value. The written frequency response of the example above is: 100 Hz - 20000 Hz.

#### Sound Directivity and Coverage Angle

Loudspeakers with a low directivity distribute the sound over a wide area and loudspeakers with a high directivity bound the sound to a small area. The directivity indicates how much the speaker bundles the sound.

The coverage angle, also called the beamwidth, is defined as the angle between the points where the SPL is 6 dB below the SPL on the speaker axis. Several speakers provide different coverage angles in the horizontal and vertical plane, therefore a horizontal and vertical coverage angle is indicated. Most ceiling speakers and a few other speakers provide a symmetrical coverage angle. Then only one coverage angle is indicated.

The coverage angle depends on the frequency, therefore a detailed information is shown by a graph. When indicating only a coverage angle, also the frequency of it should be informed (e.g. „100°, 4 kHz“).

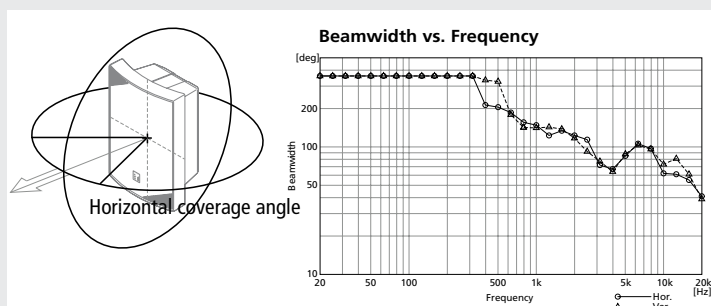


Figure 4: (L): Horizontal and vertical plane; (r): Coverage angle vs. frequency

Loudspeakers with a small coverage angle have an advantage in a reverberant environment: When the coverage angle covers only the audience and not any reflecting walls or ceilings, then the reflections are low and therefore also the reverberation, causing a better intelligibility. A typical speaker type for a reverberant environment is the column speaker. It has a wide horizontal coverage and a small vertical coverage.

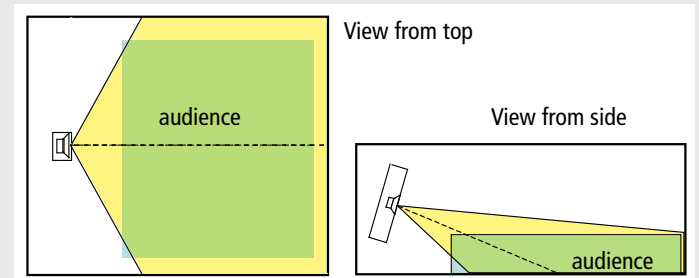


Figure 5: Coverage of a column speaker

#### Sensitivity of a Loudspeaker

At a certain distance and power, different loudspeakers provide different sound pressure levels. This is a specific value of a certain loudspeaker and is called sensitivity (pn), stated as  $\hat{A}_g$ SPL (1W, 1m)Åh. It is measured on the speaker axis (in front of the speaker) in a distance of 1 metre at 1 watt power. TOA declares the SPL average and not the maximum SPL (achieved at only one single frequency), if not stated otherwise. The unit can be written as:

$$\text{dB SPL (1W, 1m)} \quad \text{or} \quad \text{dB/Wm}$$

### Calculations with Loudspeakers

#### SPL at a certain power

The SPL (at a distance of 1m) of a loudspeaker at a certain wattage is calculated as:

$$p = p_n + 10 \times \log(P) \text{ [dB]} \quad (3)$$

p: sound pressure level [dB]     $p_n$ : sensitivity of the speaker [dB]  
 P: power (supplied to the speaker) [W]

Table 4 below shows some „dB“ values at different power to be added to the speaker's sensitivity. If a certain power is not in the table, then it can be combined by a multiplication/division of the power (refer to the example).

Wattage [W]	1	2	5	6	10	15	20	30	50	100
Increase of SPL [dB]	0	3	7	8	10	12	13	15	17	20

Table 4: Increase of sound pressure level at different supplied power

Example: 60 W are supplied to a speaker with a sensitivity of 90 dB/Wm;

$$\begin{aligned} \rightarrow \text{SPL} &= 90 \text{ dB} + 8 \text{ dB (6 watt}^*) + 10 \text{ dB (10 watt}^*) \\ &= 108 \text{ dB.} \end{aligned}$$

\* from table 4



## Sound System Design



### SPL at a certain Distance

The sound pressure level of conventional speakers decreases with increasing distance as:

$$p = p_0 - 20 \times \log(d) \text{ [dB SPL]} \quad (4)$$

p: sound pressure level at distance  $p_0$ : SPL at 1 m d: distance [m]

In other words: When doubling the distance (x2), then the sound pressure level reduces to a quarter (1/4), or by 6 dB.

The relation between some distances and decreases of sound pressure level is as following:

Distance [m]	1	2	3	4	5	10	20	50	100
Decrease of sound pressure level [dB]	0	6	9.5	12	14	20	26	34	40

Table 5: Decrease of SPL with the distance; reference distance: 1 m

**Example:** A speaker produces a SPL of 105 dB at 1 m. What is the SPL at a distance of 5 metres?  $\pm$  SPL = 105 dB - 14 dB (from table 3) = 91 dB.

### SPL at certain power and distance

In a project the SPL must be calculated at a given power and distance to the speaker(s). So the formulas for SPL at a certain power and SPL at a certain distance will be combined. The SPL at a given power and distance can be calculated as:

$$p = p_n + 10 \times \log(P) - 20 \times \log(d) \text{ [dB SPL]} \quad (5)$$

p: sound pressure level [dB]  $p_n$ : sensitivity of the speaker [dB]  
d: distance from speaker P: power (supplied to the speaker) [W]

**Example:** A loudspeaker shall be installed in a room. The longest distance to the audience is 8 metre. The loudspeakers has a sensitivity of 90 dB/Wm and 30 watts input power. What SPL can be reached most far away from the loudspeaker?

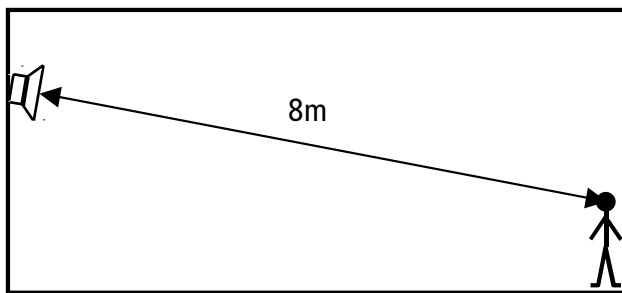


Figure 6: Distances of the speakers in the example

Calculation:

$$\begin{aligned} \text{SPL} &= 90 \text{ dB SPL} + 10 \times \log(30) - 20 \times \log(8) \\ &= 90 \text{ dB} + 15 \text{ dB} - 18 \text{ dB} = 87 \text{ dB SPL} \end{aligned}$$

Applying the tables 2 and 3:

$$\begin{aligned} \text{SPL} &= 90 \text{ dB SPL} + 15 \text{ dB (table 2)} - 12 \text{ dB (table 3)} - 6 \text{ dB (table 3)} \\ &= 87 \text{ dB SPL} \end{aligned}$$

### Centralised Sound System

In a centralised sound system the speakers are installed at the same place. When a sound is combined with an optical event, then the sound should come from the direction of the event. A sound coming from another direction as the event would irritate the spectator.

Often the event is at the front of a room and sometimes there is a stage. In many cases the speakers will be placed at the left and right side of the event's place. The speaker should be mounted high to obtain a not too loud SPL near the speakers.

In case of a deep room supporting speakers can be installed at the walls or ceiling in the direction of the sound propagation. A smart solution is to send a delayed audio signal to the speakers in the rear, then the event will still be heard from the event's place.

Calculation of the delay time:

$$T = d/340 + 0.01 \text{ s [s]} \quad (6)$$

T: delay time [s] d: distance from front speaker to delay speaker [m]

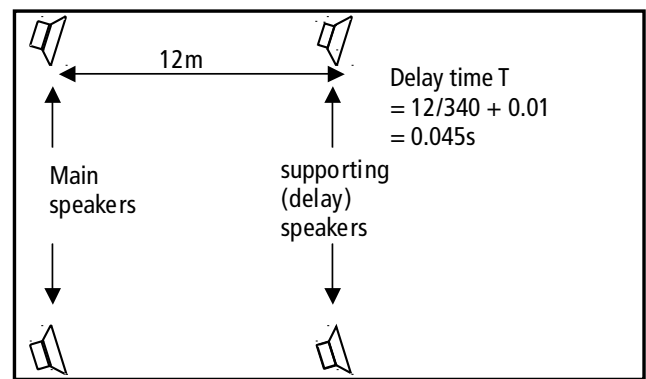


Figure 7: Frontal sound system with supporting (delay) speakers

### Decentralised Sound Systems

If no optical event is combined with the sound or in large areas with a low ceiling height (e.g. a supermarket) a frontal sound system is neither necessary nor useful. A better solution is a decentralised (distributed) sound system in which the speakers are placed where needed.

#### Ceiling Sound Distribution Systems

The ceiling speakers should be arranged evenly over the area, i.e. with the same distance between each other. Important for the design of such a system is the required intelligibility. It depends on:

- ceiling height
- speaker's coverage angle
- purpose of usage (quality of sound)

The higher the speaker, the wider the covered listening area (ear level height) which is approx. 1.5 metres above the floor.

For a good intelligibility the audibility of 6 kHz should be good at each place. A reasonable intelligibility is reached at 4 kHz, but BGM can be worse.



## TOA applies Technology and Know-How

Coverage angle	Good intelligibility	Fair intelligibility	BGM
Standard ceiling speaker	60°	90°	120°
TOA standard ceiling speakers (PC-600/PC-1800 series)	75°	100°	140°
TOA wide dispersion ceiling speakers (F-series)	150°	180°	180°

Table 6: coverage angle

Distance and minimum SPL between TOA standard ceiling speakers at different intelligibilities and 6 watt power:

Ceiling height	h	[m]	3	3.5	4	4.5	5	5.5	6
Good Intelligibility	a	[m]	2.30	3.10	3.80	4.60	5.40	6.10	6.90
	min. SPL	[dB]	92	90	88	86	85	84	83
Fair Intelligibility	a	[m]	3.60	4.80	6.00	7.20	8.30	9.50	10.70
	min. SPL	[dB]	90	88	86	84	83	82	81
BGM	a	[m]	8.20	11.00	13.70	16.50	19.20	22.00	24.70
	min. SPL	[dB]	85	82	81	79	78	76	75

Table 7: Speaker distance of TOA standard ceiling speakers for different intelligibilities in a ceiling speaker system

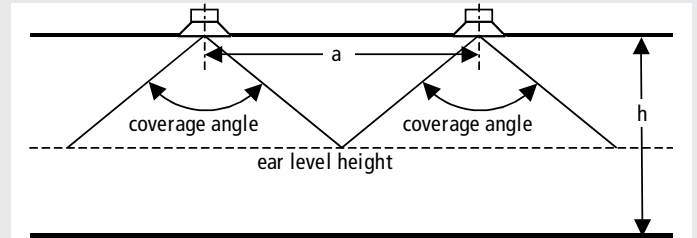


Figure 8: Graphical explanation of speaker installation with certain coverage angles

## Public Address Systems

PA systems always operate in mono. They are used to distribute one or more audio signals into different zones (broadcast areas). The audio signals can be background music (BGM), manual or automatic announcements (paging), or signal tones (chime, alarm tones). Usually the audio signals will not be mixed, only one is sent to a certain zone or several zones. A priority control system is provided to avoid conflicts if two or more audio signals shall be broadcasted into the same zones. Most PA systems operate with high impedance speaker lines.

### Priority System

Some broadcast signals are more important than others. With the priority control different priority levels can be assigned to certain audio sources. Example:

Emergency > paging > BGM

Another kind of priority comes into force, if several audio sources have the same priority level:

- First-in-first-out (served priority): The source which was activated first will get priority.

- Last-in-first-out (served priority): The source which was activated last will get priority.

The priority system is important for a proper operation of a PA system. It operates automatically and avoids conflicts by overlapping announcements.

### High Impedance Speaker Line System (100-Volt Systems)

High impedance systems provide a speaker line level of 100 volt (at full power of the audio signal), sometimes 70 or 50 volts. This has several advantages over low impedance systems and makes the high impedance systems ideal for the typical PA Application.

Features and Advantages:

- long cables can be used because of low current
- > low loss on the speaker line

- all loudspeakers can be connected parallel

-> easy installation

-> single speakers can be switched off or on and volume controls can be used without affecting other speakers on the line

-> different types of loudspeakers with different wattages can be connected to the same speaker line

-> Easy calculation of the required power of the power amplifier: Just by adding the speakers' power; the total (rated) power of the speakers must not exceed the total (rated) output power of a power amplifier

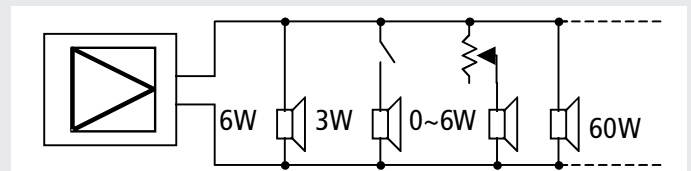


Figure 9: Different loads, switches and volume controls on one 100-volt speaker line

The figure above illustrates the described advantages. The required power is the sum of all wattages of the speakers: 6W + 3W + 6W + 60W = 75W

### Calculation of Power and Impedance

After planning and installation of the speaker line(s), they should be checked to avoid an overload of the amplifier and to find breaks or short circuits. This can be done by measuring the line's impedance with an impedance meter (e.g. TOA ZM-104). The formula below shows the relation between speaker line voltage, wattage and impedance.

$$Z = U^2 / P = 10,000 / P \quad (7)$$

Z: impedance [ohm] U: voltage [volt] P: power [watt]

Example: Speakers with a total power of 75 watt are connected to a speaker line. What impedance is on the speaker line?

$$Z = 10000 / 75 = 133 \text{ Ohm}$$

## System Planning



### Calculation of Cable Effective Area

In PA systems the speaker line is designed to have no more loss than 10%. The required effective cross-section area of a speaker line cable can be found in the table below:

Min. effective cross section area in mm<sup>2</sup> at a loss of 10%

power	cable length						
	50 m	100 m	200 m	300 m	500 m	750 m	1000 m
30 W	0.05	0.09	0.19	0.28	0.47	0.71	0.95
60 W	0.09	0.19	0.38	0.57	0.95	1.42	1.89
120 W	0.19	0.38	0.76	1.13	1.89	2.84	3.78
240 W	0.38	0.76	1.51	2.27	3.78	5.67	7.56
360 W	0.57	1.13	2.27	3.40	5.67	8.51	11.34
420 W	0.66	1.32	2.65	3.97	6.62	9.92	13.23

Table 8: Effective cross section area in regard to cable length and power

For speaker lines usually solid cables (not stranded) are used. The isolation shall withstand 500 ... 600 VDC.

### Planning a PA System

The way of planning a PA system will be explained by the following example.

#### Example: Supermarket

The supermarket has the following specifications:

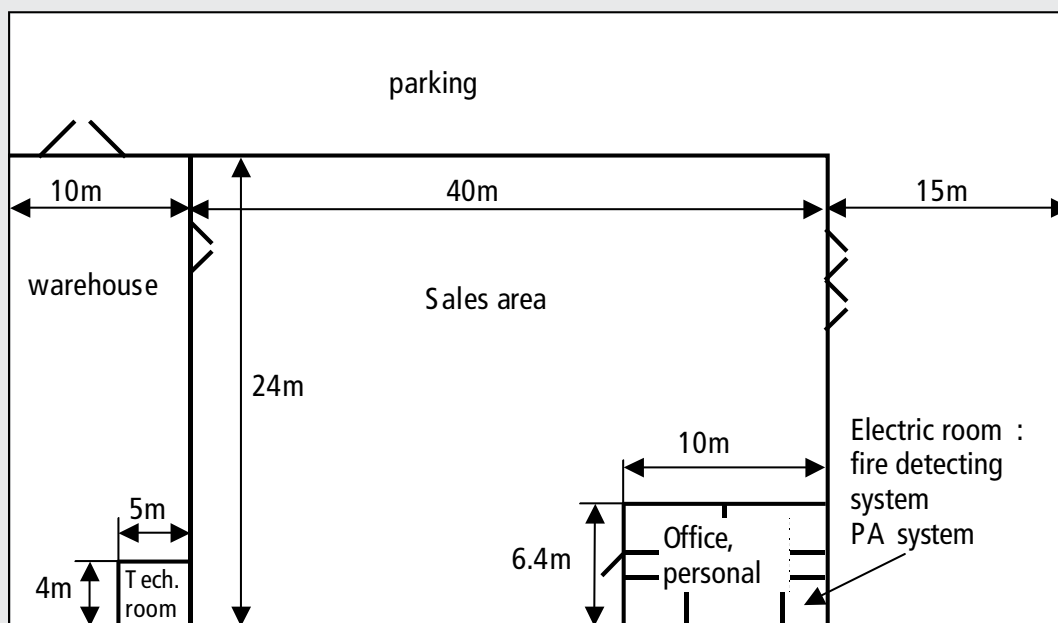
Area	Size	Ceiling		Ambient noise	Panic noise
		Type	Height		
Sales	1120 m <sup>2</sup>	false	4 m	55 dB SPL	80 dB SPL
Ware-house	260 m <sup>2</sup>	solid	5 m	65 dB SPL	75 dB SPL
staff, office	80 m <sup>2</sup>	false	4 m	50 dB SPL	75 dB SPL
Technical room	20 m <sup>2</sup>	solid	5 m	85 dB SPL	85 dB SPL
Parking	800 m <sup>2</sup>	-	-	60 dB SPL	80 dB SPL

Table 9: Supermarket specifications

Required functions of the PA system:

- BGM in selectable zones – each of the areas shall be a zone -> 5 zones
- 1 remote microphone for director's office
- 3 paging microphones for cashiers
- Emergency function:
  - Automatic and manual voice alarm
  - Emergency microphone in utility room

Dimensions of the supermarket:





## Systems are nothing without Sound

### Selection of speakers

In case of an emergency, the sound system must provide a sound pressure level of min. 6 dB above the panic level. The minimum intelligibility should be fair.

### Calculation per Zone

Zone / Speaker selection	dB SPL required / achieved	Calculation	Speaker power required
Sales area TOA standard ceiling speakers	80 + 6 = 86 / 86	Using table 4, at fair intelligibility, ceiling height 4m and minimum SPL = 86 dB -> distance between speakers: 6 m (grey in table)  Arranging the speakers evenly, then $1120 \text{ m}^2 / 36 \text{ m}^2 = 31.1$ -> 32 ceiling speakers are required	32x 6 watt = 192 watt
Warehouse 2 horn speakers SC-610M	75 + 6 = 81  /  86	Installation: At 5m height on the centre of the long outer wall, each facing into the opposite corner -> maximum distance: $\text{sqrt}(12^2+10^2+3.5^2) = 16 \text{ m}$ .  Formula (5) with 16m and 10 watt: $110 \text{ dB} + 10 \times \log(10) - 20 \times \log(16) = (110 + 10 - 24) \text{ dB} = 96 \text{ dB}$ .  96 dB is much more than 81 dB -> setting speakers to 1 watt, -> table 2: (96 - 10) dB SPL = 86 dB SPL	2x 1 watt = 2 watt
Office TOA standard ceiling speakers	75 + 6 = 81  /  83  83  81	One ceiling speaker per room.  Big rooms: Longest room dimension is approx. 6m, similar as speaker spacing in sales area, same height. Required SPL: 5 dB less than sales area, i.e. power for the speakers can be reduced. Next speaker tapping: 3 watt (1/2 power := -3 dB, see table 2) -> (86 - 3) dB = 83 dB  Small rooms: Half length of big rooms, table 3 -> 6 dB more SPL, can be compensated by -6 dB power, table 2: Quarter power of big rooms -> 3 watt / 4 = 0.75 watt -> speaker tapping: 0.8 watt  Floor: Less than double length of big rooms, table 3 -> less than 6 dB less SPL (... 4-5 dB), can be compensated by 3 dB power (SPL is already 2 dB higher as required), table 2: double power of big rooms -> 2x 3 watt = 6 watt	3x 3 watt = 9 watt  1x 0.8 watt  1x 6 watt
Technical room 1 horn speaker SC-610M	85 + 6 = 91  /  94 dB	Installation near the room's ceiling -> maximum distance to the ear level height is approx. 6m (estimated). Calculation similar as in the warehouse, formula (5) with 20m and 10 watt: $110 \text{ dB} + 10 \times \log(10) - 20 \times \log(6) = (110 + 10 - 16) \text{ dB} = 104 \text{ dB}$ is much more than 91 dB -> setting speakers to 1 watt -> table 2: (104 - 10) dB SPL = 94 dB SPL	1x 1 watt
Parking area 3 horn speakers SC-610M	80 + 6 = 86  /  89 dB	2 speakers installed at the long wall and 1 at the small wall in a height of 5m. Longest distance at right side: $d = \text{sqrt}(15^2 + 12^2 + 5^2)$ approx. 20m. Formula 5 with 20m and 10 watt: $110 \text{ dB} + 10 \times \log(10) - 20 \times \log(20) = 110 \text{ dB} + 10 \text{ dB} - 26 \text{ dB} = 94 \text{ dB}$ . This is 8 Db more than required -> lower tapping: 3 watt, reduction of SPL by 5 dB (formula 3: $10 \times \log(10/3)$ ).	3x 3 watt = 9 watt
<b>Total speaker power required:</b>			<b>219.8 watt</b>

### Selection of the Amplification System

The required functions can be achieved with the VM-2000 system. The system manager VM-2240 (240 watt) provides enough power for the speakers (219.8 watt).



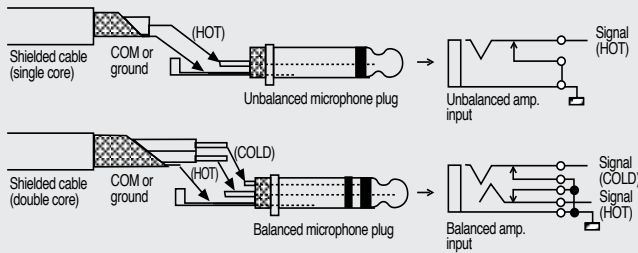
## Microphones and amplifiers

### Microphones

#### Wiring of microphones

Output from a microphone is rather weak. Therefore, it is important to use shielded cable for microphones to prevent line noise. The low impedance shielded cable intended for microphones are commercially available. The shielded cable is generally used to transmit the audio signals from microphones (-70 dB/0.3mV) or source equipment (0dB/1V).

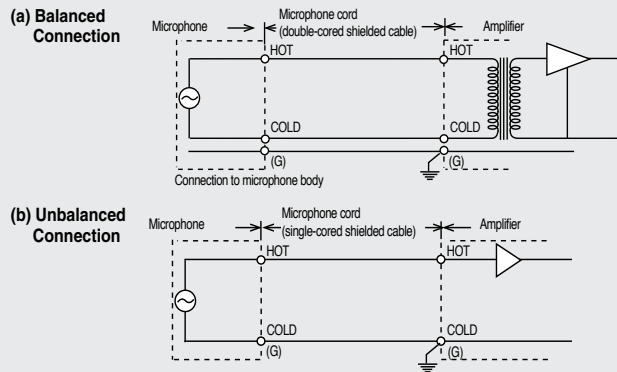
#### Balanced and unbalanced type



#### Balanced and unbalanced output

There are two kinds of output from a microphone: Balanced and unbalanced. With balanced output the audio signal appears between the hot (on-going audio signal) and cold (return audio signal), which are both independent of the ground. With unbalanced output the audio signal appears between the hot and ground (connected to the cold). The connection between balanced output and balanced input (on the amplifier side) is virtually unaffected by external line noise and it is used for wiring between long distances. Double-cored shielded cable is used for connecting

balanced output, and single-cored shielded cable is used for connecting unbalanced output.



#### Distance of extension for microphone cords

The following table shows the maximum extension distance for microphone cords. When distance extends beyond the following figures, excessive noise will make the microphone impractical and therefore it will be necessary to use a microphone pre-amplifier to boost the signal level to minimize the influence of noise.

Microphone output	Amplifier input	Microphone cord extension distance
Unbalanced	Unbalanced	20m
Balanced	Unbalanced	20m
Balanced	Balanced	100m

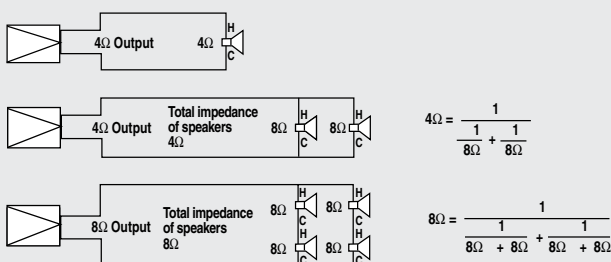
### Amplifiers

#### High-Impedance Connection and Low-Impedance Connection

The PA amplifiers generally come with low-impedance speaker outputs (indicated as 4 Ω, 8 Ω, 16 Ω, etc) and high-impedance outputs (indicated as 70V, 100V, etc). Low-impedance output is used when a small number of speakers (1 to 4) is used and there is a short distance (10-some meters) between amplifiers and speakers. High-impedance output is used with a large number of speakers and a longer distance of wiring. Speakers with transformers are used for high-impedance output. For a PA system: high impedance connection should be used if possible, in consideration of wrong speaker connections and transmission efficiency.

#### Example of low-impedance connection:

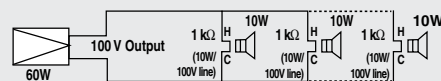
It is necessary to design the total speaker input impedance to be larger than the amplifier output impedance. When the total speaker impedance is lower than the amplifier output impedance, unstable operation or amplifier malfunction may result. The wiring distance between amplifier and speaker should be less than 10-some meters. If the wiring distance is greater than this, the output power from the amplifier will be consumed as heat in the cables, and not be able to supply the speaker with sufficient power.



#### Example of High-Impedance Connection:

In a PA system to cover a large area, the wiring distance will be greater, so high impedance connection is used predominantly. In high-impedance connection, all speakers (each with a transformer) will be connected in parallel. Avoid using these speakers together with those without transformers.

In high-impedance connection, as long as you have parallel connection. It will be sufficient to design the total speaker input to be lower than the amplifier output, and this will help eliminate complex impedance calculation.



#### Speaker input impedance (10W/100V line)

$$Z = \frac{100 (V)^2}{10 (W)} = 1 \text{ k}\Omega$$

#### Amplifier output impedance

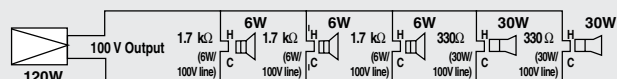
$$Z = \frac{100 (V)^2}{60 (W)} = 167 (\Omega)$$

#### Total impedance of speakers

$$Z = \frac{1}{\frac{1}{1 \text{ k}(\Omega)} + \frac{1}{1 \text{ k}(\Omega)} + \frac{1}{1 \text{ k}(\Omega)} + \frac{1}{1 \text{ k}(\Omega)} + \frac{1}{1 \text{ k}(\Omega)} + \frac{1}{1 \text{ k}(\Omega)}} = 167 (\Omega)$$

Amplifier output 60W = total speaker input (60W)

Even when connecting speakers with different inputs, there will be no problem as long as the total wattage of the speakers does not exceed the amplifier output.



#### Amplifier output impedance

$$Z = \frac{100 (V)^2}{120 (W)} = 83 (\Omega)$$

#### Total impedance of speakers

$$Z = \frac{1}{\frac{1}{1.7 \text{ k}(\Omega)} + \frac{1}{1.7 \text{ k}(\Omega)} + \frac{1}{1.7 \text{ k}(\Omega)} + \frac{1}{330 (\Omega)} + \frac{1}{330 (\Omega)}} = 128 (\Omega)$$

Amplifier output 120W > total speaker input (78W)



## IP Grades

### IP Grade Panel

What is IP standard?

This standard provides a system for classifying the degrees of protection provided by the enclosures of electrical equipment under the International Electrotechnical Commission (IEC) publication 529.

The type of protection covered by this system of classification is as follows.

- Protection of persons against contact with or approach to live parts and against contact with moving parts inside the enclosure and protection of the equipment against ingress of solid foreign bodies.
- Protection of the equipment inside the enclosure against harmful ingress of water.

1st Numeral: Protection against solid foreign objects		2nd Numeral: Protection against ingress of water			
0		Non-protected	0		Non-protected
1		Protected against solid foreign objects of 50mm $\phi$ and greater.	1		Protected against vertically falling water drops.
2		Protected against solid foreign objects of 12.5mm $\phi$ and greater.	2		Protected against vertically falling water drops when enclosure tilted up to 15°.
3		Protected against solid foreign objects of 2.5mm $\phi$ and greater.	3		Protected against splashing water.
4		Protected against solid foreign objects of 1.0mm $\phi$ and greater.	4		Protected against splashing water.
5		Dust-protected	5		Protected against water jets.
6		Dust-tight	6		Protected against powerful water jets.
X		Not tested	7		Protected against the effects of temporary immersion in water.
			8		Protected against the effects of continuous immersion in water.
			X		Not tested



## List of CE-Certified Models

### A

A-1706  
A-1712  
A-1724  
A-1803  
A-1806  
A-1812  
A-2030  
A-2060  
A-2120  
A-2240  
A-912MK2  
AD-0910  
AD-246  
AD-1210P  
AN-001T  
AN-9001

### B

BC-900  
BP-900  
BS-1015BSB / BSW  
BS-1030B  
BS-1030W  
BS-1034 / EN  
BS-1034S  
BS-10WL  
BS-5W  
BS-633A  
BS-633AT  
BS-634  
BS-634T  
BS-678  
BS-678B  
BS-678BSB / BSW  
BS-678BT  
BS-678T  
BS-680F  
BS-680FC

### C

C-001T  
CA-115  
CA-130  
CA-160  
CM-760  
CM-960  
CP-73  
CP-77  
CP-93  
CP-97  
CS-154 / BS  
CS-304  
CS-64 / BS

### D

D-001T  
D-901  
D-911  
D-921E

D-921F  
D-922E  
D-922F  
D-923AE  
D-936R  
D-937SP  
D-961SP  
D-971E  
D-971M  
D-971R  
D-972AE  
D-981  
D-983  
D-984VC  
D-2000AD1  
D-2000CB  
D-2000DA1  
D-2012C  
D-2080SP  
DA-250D  
DA-250DH  
DA-250F  
DA-250FH  
DA-500F  
DA-550FH  
DP-0206  
DP-K1  
DP-L2  
DQ-A01  
DQ-A02  
DQ-C01  
DS-1000B

### E

E-1231  
E-232  
EM-410  
EM-600  
RM-700  
EM-800  
ER-1203  
ER-1206  
ER-1206S  
ER-1206W  
ER-1215  
ER-1215S  
ER-2215  
ER-2215W  
ER-2230W  
ER-2930W  
ER-3215  
ER-520  
ER-520S  
ER-520W  
ER-604W  
ES-0422  
ES-0422W  
ES-0424  
ES-0424W  
ES-0426

ES-0426WP  
ES-0851  
ES-0871  
ES-C0651  
EV-200M  
EV-20R  
EV-350P  
EV-350R  
EV-CF128M

### F

F-1000B  
F-1000BT  
F-1000BTWP  
F-1000W  
F-1000WT  
F-1000WTWP  
F-122C  
F-1300B  
F-1300BT  
F-1300BTWP  
F-1300W  
F-1300WT  
F-1300WTWP  
F-2000B  
F-2000BT  
F-2000BTWP  
F-2000W  
F-2000WT  
F-2000WTWP  
F-2322C  
F-2352C  
F-2352SC  
F-2852C  
FB-100  
FB-120B  
FB-120W

### G

GS-302

### H

H-1  
H-2  
H-2WP  
H-3  
H-3WP  
HB-1  
HS-120B  
HS-120W  
HS-150B  
HS-150W  
HS-1200BT  
HS-1200WT  
HS-1500BT  
HS-1500WT  
HX-5B  
HX-5B-WP  
HX-5W  
HX-5W-WP

### I

IR-200BC  
IR-200M  
IR-300M  
IR-500R  
IR-510R  
IR-520R  
IR-700D  
IR-702T

### J

JP-028B

### M

M-243  
M-66  
M-9000M2  
MB-TS900  
MP-032B  
MP-1216  
M-633D  
MT-200

### N

N-8000AF  
N-8000AL  
N-8000CO  
N-8000DI  
N-8000EX  
N-8000MI  
N-8000MS  
N-8000RS  
N-8010EX  
N-8010MS  
N-8010RS  
N-8011MS  
N-8020MS  
N-8031MS  
N-8050DS  
N-8500MS  
N-8510MS  
N-8540DS  
NX-100  
NX-100S

### P

P-1812  
P-2240  
PC-1867F  
PC-1867FC  
PC-1869 / EN  
PC-2369 / EN  
PC-2668  
PC-2852  
PC-2869  
PC-391  
PC-391T  
PC-3CL  
PC-3WR  
PC-648R



## List of CE-Certified Models

PC-658R  
PE-154BS /EN  
PE-304  
PE-64  
PJ-154BS  
PJ-304  
PJ-64  
PM-20EV  
PP-025B

### R

RC-001T  
RM-200M  
RM-200RJ  
RM-200SA  
RM-200SF  
RM-200X  
RM-200XF  
RM-210  
RM-300MF  
RM-320F  
RS-140  
RS-141  
RS-150  
RS-160  
RS-170  
RS-180  
RS-191  
RS-450  
RS-460  
RS-470  
RS-480  
RS-481

### S

S-20S  
SC-610  
SC-610M  
SC-615  
SC-615BS  
SC-615M  
SC-630  
SC-630M  
SC-651  
SR-A12L  
SR-A12LWP  
SR-A12S  
SR-A12SWP  
SR-A18B  
SR-C8L  
SR-C8LWP  
SR-C8S  
SR-C8SWP  
SR-C15B  
SR-C15BWP  
SR-F09  
SR-F09-V1  
SR-F09-V2  
SR-F09-V3  
SR-L09  
SR-F05  
SR-H2L  
SR-H2S

SR-H3L  
SR-H3S  
SR-M05L  
SR-M05R  
SR-M3L  
SR-M3R  
SR-T5  
SS-9001  
SV-200MA  
SX-200RM  
SX-2000  
SX-2000AO  
SX-2000CI  
SX-2000CO  
SX-2000SM  
SX-2100AI  
SX-2100AO

### T

T-001T  
TC-615  
TC-615M  
TC-631  
TC-631M  
TH-650  
TH-660  
TS-770  
TS-771  
TS-772  
TS-773  
TS-774  
TS-775  
TS-800  
TS-801  
TS-802  
TS-900  
TS-901  
TS-902  
TS-903  
TS-904  
TS-905  
TS-907  
TT-104B  
TU-631  
TU-631M  
TU-651  
TU-651M  
TZ-105  
TZ-205

### U

U-01R

### V

VM-2120  
VM-2240  
VM-3240E  
VM-3360E  
VM-3240VA  
VM-3360VA  
VP-200VX  
VP-1061  
VP-1121

VP-1241  
VP-1361  
VP-2064  
VP-2122  
VP-2241  
VP-2421  
VR-1001B  
VR-1005  
VR-1010  
VR-1020  
VX-2000  
VX-2000DS  
VX-2000PF  
VX-2000SF  
VX-200PS  
VX-200SE  
VX-200SI  
VX-200SO  
VX-200SP  
VX-200SP-2  
VX-200SZ  
VX-200SZ-2  
VX-200XI  
VX-200XR

### W

WD-4800  
WM-4200  
WM-4210  
WM-4220  
WM-4300  
WM-5220  
WM-5270  
WM-5320  
WM-5320A  
WM-5320H  
WS-200  
WS-300  
WT-4820  
WT-5800  
WT-5805  
WT-5810  
WTU-4800

### Y

YW-1022  
YW-1024  
YW-3500  
YW-4500

### Z

ZM-104A  
ZM-9001  
ZM-9002  
ZM-9003  
ZM-9011  
ZM-9012  
ZM-9013  
ZM-9014  
ZP-001T



## List of EN 54 Certified Models



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BS-678BSB	100, 176	RM-320F	140	VX-200SO	157
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PC-2369EN	83, 173	VM-3240VA	137		
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PE-154EN	108, 178	VM-3360VA	137		
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RM-200M	141, 145, 170	VP-2122	152, 162, 165, 166		
RM-200S	164, 170, 171	VP-2241	152, 162, 165, 166		
RM-200X	154	VP-2421	152, 162, 165, 166		
RM-200XF	153	VX-200PF	151		
RM-210	145, 153, 164, 170	VX-200PS	151, 162, 165, 166		
		VX-200SE	157		



## List of UL-Certified Models

<b>A</b>	<b>M</b>	<b>T</b>
A-2060	M-243	TS-770
A-2120	M-633D	
A-2240	M-9000M2	
	MP-1216	
<b>D</b>	<b>N</b>	<b>W</b>
D-2000AD1	N-8000AF	WD-4800
D-2000CB	N-8000AL	
D-2000DA1	N-8000CO	
D-2008SP	N-8000DI	
D-901	N-8000EX	
D-911	N-8000MI	
D-921E	N-8000MS	
D-921F	N-8000RS	
D-922E	N-8010EX	
D-922F	N-8010MS	
D-923AE	N-8010RS	
D-936R	N-8011MS	
D-937SP	N-8020MS	
D-961SP	N-8031MS	
D-971E	N-8050DS	
D-971M	N-8400RS	
D-971R		
D-972AE		
D-981	<b>R</b>	
D-983	RS-140	
D-984VC	RS-141	
DA-250D	RS-150	
DA-250DH	RS-160	
DA-250F	RS-170	
DA-250FH	RS-180	
DA-500F-HL	RS-190	
DA-550F	RS-191	
DP-0206	RS-450	
DP-K1	RS-460	
DP-L2	RS-470	
	RS-480	
<b>E</b>	RS-481	
E-1231		
E-232		



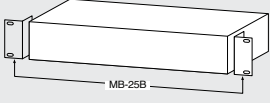




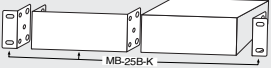
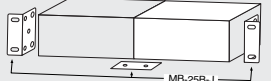
## Matching Brackets



Mountable Equipment			Rack Mounting Brackets		
	Name	Model	Appearance	Appearance, Size and Color	Setting
Voice Evacuation System	VM-2000 Series	VM-2120		<b>MB-36 (3-size)</b> Color: Gray 	
		VM-2240			
Wireless Microphone System	Power Antenna Distributor	WD-4800		<b>MB-15B (1-size)</b> Color: Black 	
	UHF Wireless Tuner	WT-5800		<b>MB-WT3 (1-size)</b> Color: Black 	
		WT-5805			
		WT-4820			
	Infrared Wireless Tuner	IR-702T		<b>MB-WT4 (1-size)</b> Color: Black 	
Infrared Wireless Distributor	IR-700D				
Program Timer & Other Equipment	Sound Repeater	EV-20R		<b>MB-15B (1-size)</b> Color: Black 	
	Program Timer	TT-104B			
Network-Related System	Network Audio Adapter	NX-100		<b>MB-15B-BK (1-size)</b> (Color: Black) 	
		NX-100S			



## Matching Brackets

Mountable Equipment			Rack Mounting Brackets			
Name	Model	Appearance	Appearance, Size and Color	Setting		
Amplifiers	<b>Mixer Amplifier</b>	<b>A-2030</b> <b>A-2060</b> <b>A-2120</b> <b>A-2240</b>		<b>MB-25B (2-size)</b> Color: Black 	 MB-25B	
		<b>A-1803</b> <b>A-1806</b> <b>A-1812</b>				
		<b>A-1706</b> <b>A-1712</b> <b>A-1724</b>				
	<b>Power Amplifier</b>	<b>P-2240</b> <b>P-1812</b>				
		<b>VP-1061</b>				<b>MB-25B-BK (2-size)</b> Color: Black  MB-25B-K
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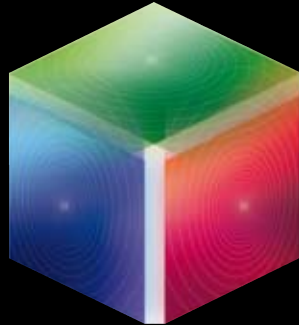
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