

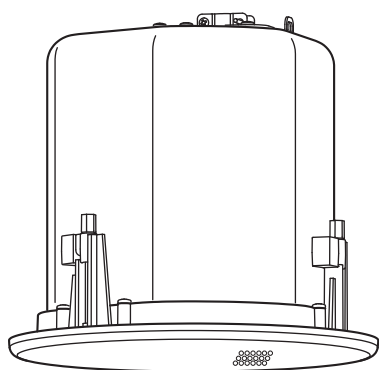


## INSTRUCTION MANUAL

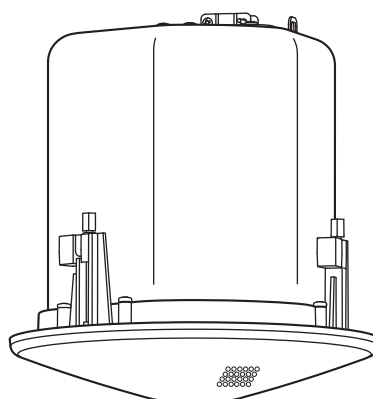
# CEILING SPEAKER SYSTEMS

**F-2322CU2**

**F-2352CU2**



F-2322CU2



F-2352CU2

Thank you for purchasing TOA's Ceiling Speaker Systems.

Please carefully follow the instructions in this manual to ensure long, trouble-free use of your equipment.

## TABLE OF CONTENTS

<b>1. SAFETY PRECAUTIONS .....</b>	<b>3</b>
<b>2. GENERAL DESCRIPTION .....</b>	<b>4</b>
<b>3. FEATURES .....</b>	<b>4</b>
<b>4. NOMENCLATURE AND DIMENSIONS .....</b>	<b>5</b>
<b>5. MOUNTING HARDWARE INSTALLATION .....</b>	<b>6</b>
<b>6. WIRING</b>	
6.1. Wiring through Hard or Flexible Conduit .....	8
6.2. Wiring with Naked Cables .....	9
<b>7. CABLE CONNECTION TO INPUT CONNECTOR .....</b>	<b>10</b>
<b>8. SPEAKER INSTALLATION .....</b>	<b>11</b>
<b>9. REMOVING THE SPEAKER FOR MAINTENANCE</b>	
9.1. Detaching the Front Grille .....	13
9.2. Removing the Speaker .....	13
<b>10. REPAINTING THE SPEAKER FRONT GRILLE .....</b>	<b>14</b>
<b>11. INPUT OVERLOAD PROTECTION FUNCTION .....</b>	<b>14</b>
<b>12. SAFETY AGENCY COMPLIANCE .....</b>	<b>15</b>
<b>13. SPECIFICATIONS .....</b>	<b>16</b>
Accessories .....	16

# 1. SAFETY PRECAUTIONS

- Be sure to read the instructions in this section carefully before use.
- Make sure to observe the instructions in this manual as the conventions of safety symbols and messages regarded as very important precautions are included.
- We also recommend you keep this instruction manual handy for future reference.

## Safety Symbol and Message Conventions

Safety symbols and messages described below are used in this manual to prevent bodily injury and property damage which could result from mishandling. Before operating your product, read this manual first and understand the safety symbols and messages so you are thoroughly aware of the potential safety hazards.



### WARNING

Indicates a potentially hazardous situation which, if mishandled, could result in death or serious personal injury.



### CAUTION

Indicates a potentially hazardous situation which, if mishandled, could result in moderate or minor personal injury, and/or property damage.



### WARNING

- Leave the installation to your TOA dealer because the installation requires expert knowledge. Improper installation may cause the unit to fall, resulting in personal injury and/or property damage.
- Install the unit in a location that can structurally support the weight of the unit and its mounting hardware. Doing otherwise may result in the unit falling down and causing personal injury and/or property damage.
- Do not use other methods than specified to mount the unit. Extreme force is applied to the unit and the unit could fall off, possibly resulting in personal injuries.
- Attach the safety wire to the unit. If not attached, the unit could fall off, resulting in personal injury.
- Tighten each screw securely. Ensure that the unit has no loose joints after installation to prevent accidents that could result in personal injury.
- Never hold the diffuser section as a handle to carry the unit during installation. If the diffuser breaks off, the unit could fall from an elevated position, resulting in possible personal injury. (F-2352CU2 only)

- Use the specified mounting hardware in combination. Doing otherwise may cause the unit or component to fall off, resulting in personal injury.

- Should the following irregularity be found during use, immediately stop operating the unit and contact your nearest TOA dealer. Further attempt to use under this condition may cause fire or electric shock.

- If you detect smoke or a strange smell coming from the unit
- If no tone sounds



### CAUTION

- Avoid installing the unit in humid or dusty locations, in locations exposed to the direct sunlight, near the heaters, or in locations generating sooty smoke or steam as doing otherwise may result in fire or electric shock.
- Do not operate the unit for an extended period of time with the sound distorting. This is an indication of a malfunction, which in turn can cause heat to generate and result in a fire.
- Avoid touching the unit's sharp metal edge to prevent injury.

## 2. GENERAL DESCRIPTION

The F-2322CU2 and F-2352CU2 are flush-mounted Ceiling Speaker Systems that offer wide frequency range of high-quality sound output.

The F-2322CU2 employs a full-range speaker element, while the F-2352CU2 features a 2-way speaker configuration.

Both speaker systems are designed to be mounted to a drop ceiling with use of the supplied tile bridge.

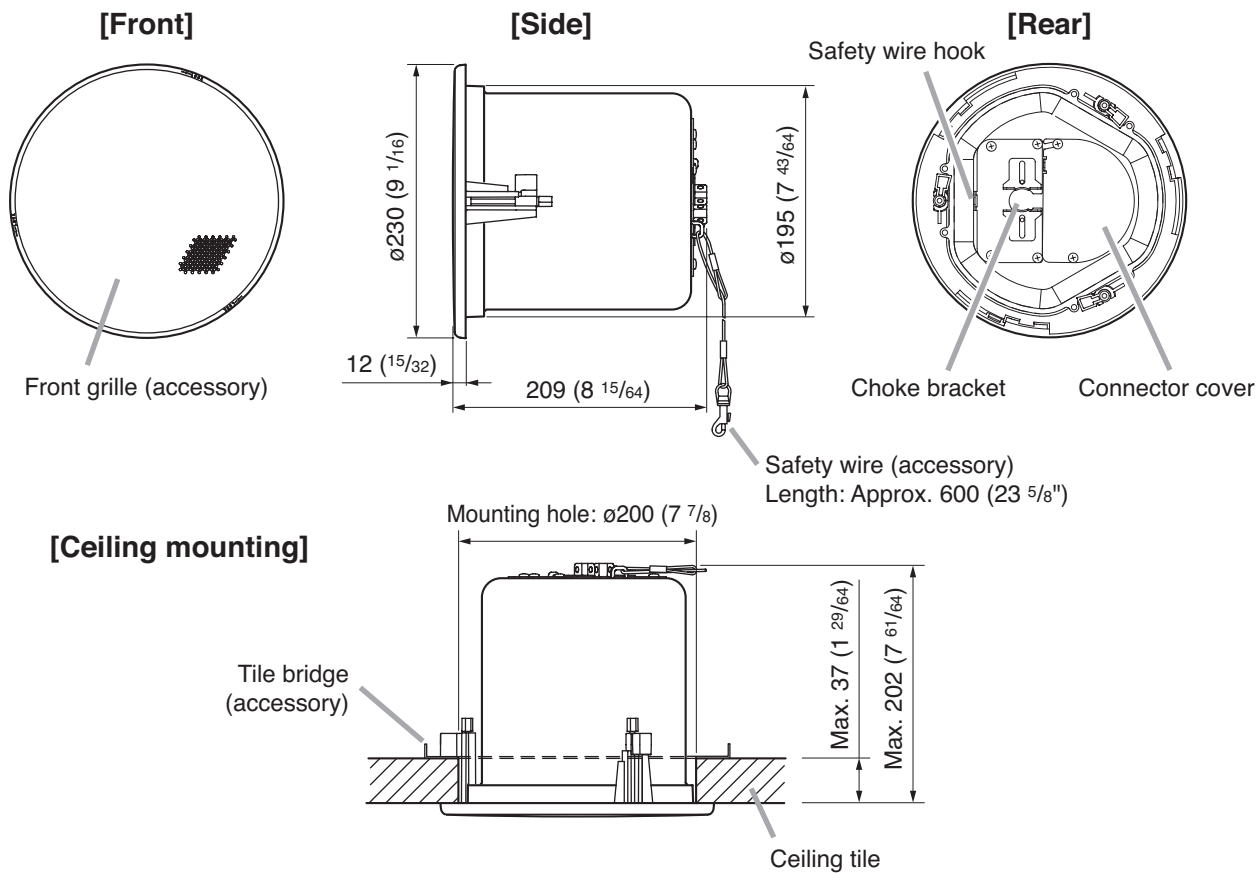
## 3. FEATURES

- Bass-reflex speaker system designed to provide a wide frequency range and high power handling capability.
- Wide-dispersion flush-mount ceiling speaker design employs unique acoustic construction to realize a wide area of coverage. Uniform sound output levels are achievable not only directly under the speaker, but also over a wide radius.
- Because the speaker is provided with both low- and high-impedance operating capability, it can be used in many different applications. Front panel-mounted input selector switch permits easy verification and change of current impedance settings.
- Easy installation. Can be quickly and accurately mounted to ceilings.
- Rotating front grille can be installed quickly and conveniently.
- Attractive exterior design specially created by an interior designer blends naturally with any architectural space, enhancing the immediate area's sense of harmony.

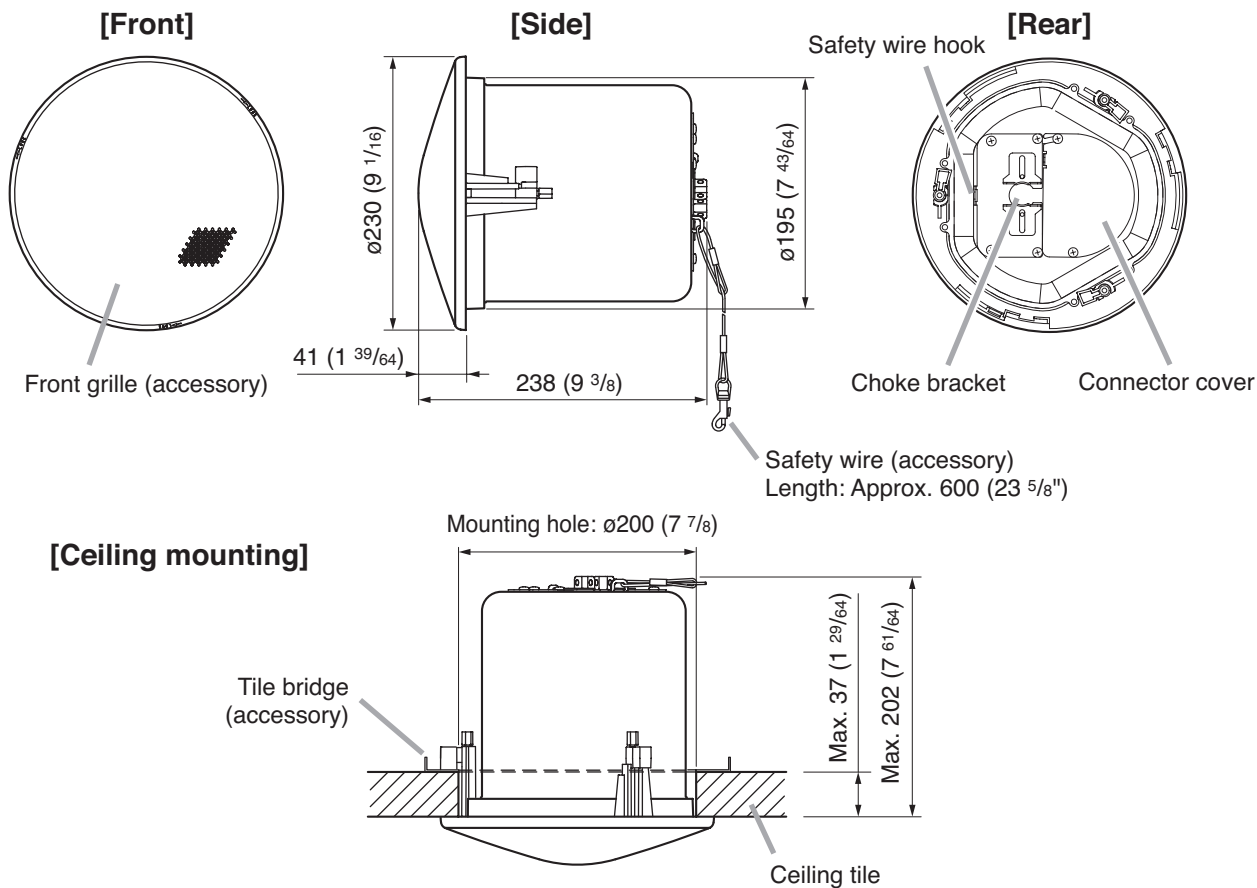
## 4. NOMENCLATURE AND DIMENSIONS

### • F-2322CU2

Unit: mm (inches)



### • F-2352CU2



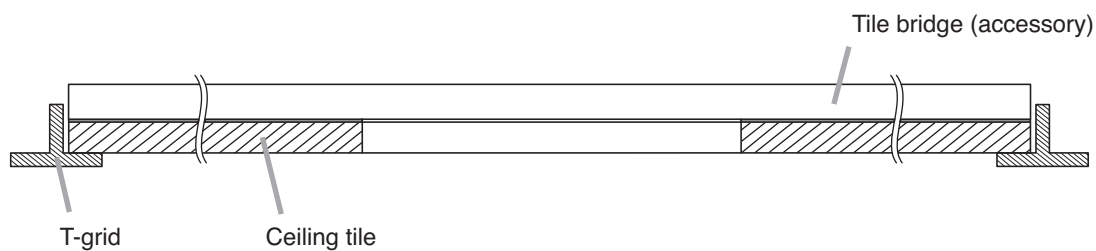
## 5. MOUNTING HARDWARE INSTALLATION

Before mounting the speaker, check the ceiling structure is of drop ceiling with 2-foot standard ceiling tiles.

### [Installation view on Drop Ceilings]

#### Caution

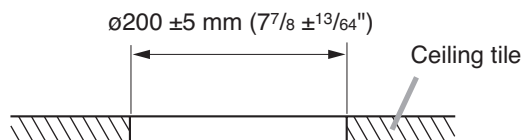
Set the tile bridge so that both ends fit securely into the T-grids, even if the ceiling tile accidentally falls off.



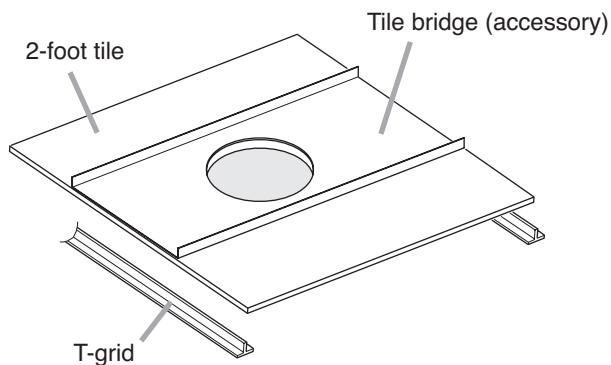
### [Installation procedures]

**Step 1.** Cut a  $\varnothing 200$  mm ( $7\frac{7}{8}$ ") hole in the ceiling.

Use the supplied paper pattern to position and trace the hole.

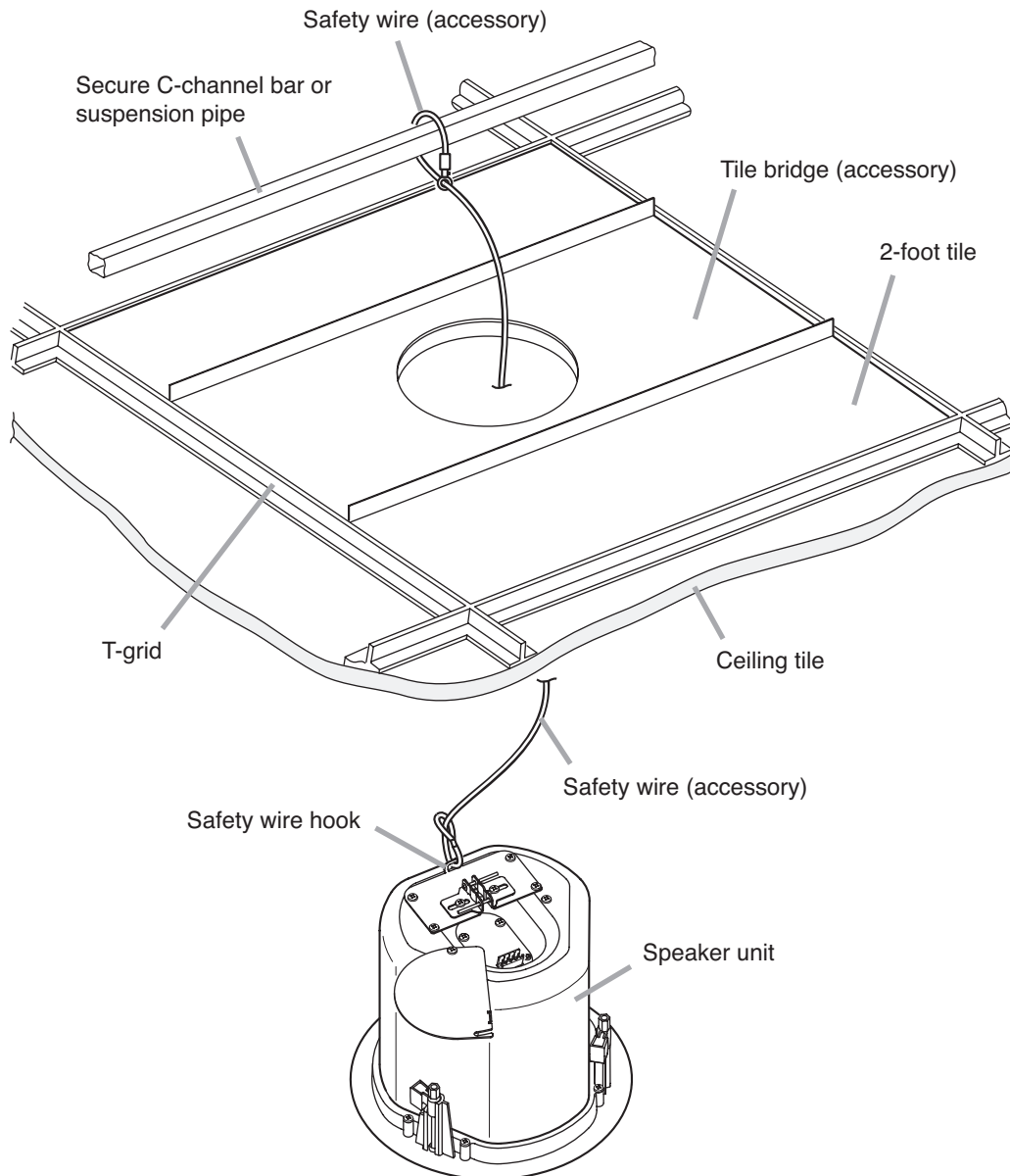


**Step 2.** Place the supplied tile bridge on the 2-foot tile as shown below.



**Step 3.** Attach a safety wire to prevent the speaker from accidentally falling.

To attach, tie one end of the supplied safety wire around the speaker's safety wire hook, and tie its snap ring around a secure C-channel bar or suspension pipe.



## 6. WIRING

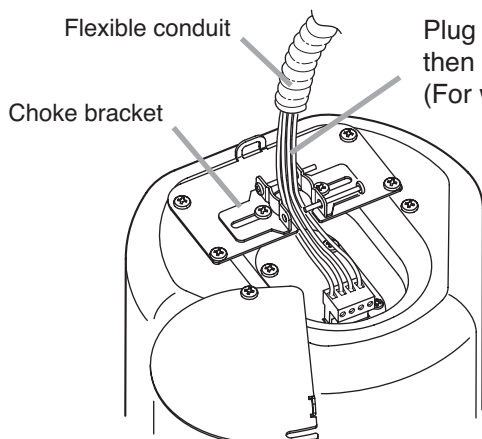
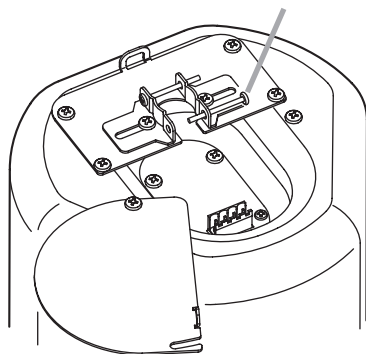
### 6.1. Wiring through Hard or Flexible Conduit

#### Note

The choke bracket equipped with the speaker has not been evaluated by UL, for conduit connection and UL514B Standard.

Flexible conduit of 3/8 or 1/2 inch trade size and the UL514B conduit fitting of the same trade size can also be used. When using the UL514 listed conduit fitting, detach the equipped choke bracket and mount the conduit fitting instead.

Loosen the screw to allow the speaker cable to pass through.



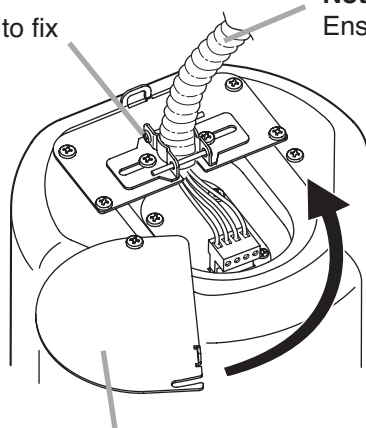
Plug the wired input connector into the speaker's socket, then pull the speaker cable from the choke bracket. (For wiring the input connector, refer to p. 10.)

#### Accommodating larger diameter conduit

The choke bracket accommodates up to 3/8-inch (9.5 mm) flexible conduit. When larger diameter conduit should be fit, use a suitable fitting commercially available by replacing the existing choke bracket with it. Detaching the choke bracket by unscrewing it exposes a 7/8-inch (22 mm) hole. Install the alternate fitting there.



Retighten the screw to fix the flexible conduit.



#### Note

Ensure that the flexible conduit is securely fixed.

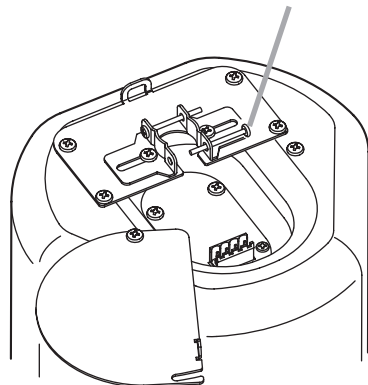
Connector cover

After completing the speaker cable connection, turn the connector cover in the direction indicated by the arrow, and fix the cover with 2 screws.



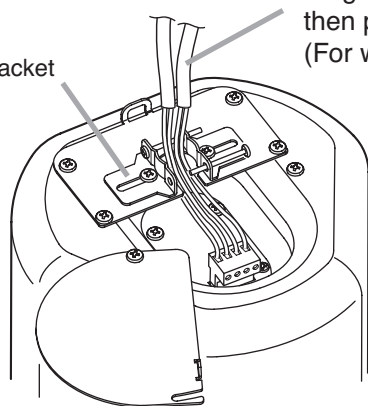
## 6.2. Wiring with Naked Cables

Loosen the screw to allow the speaker cable to pass through.



Plug the wired input connector into the speaker's socket, then pull the speaker cable from the choke bracket. (For wiring the input connector, refer to p. 10.)

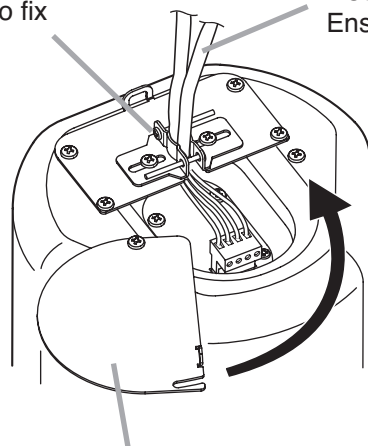
Choke bracket



Retighten the screw to fix the speaker cable.

### **Note**

Ensure that the speaker cable is securely fixed.



Connector cover

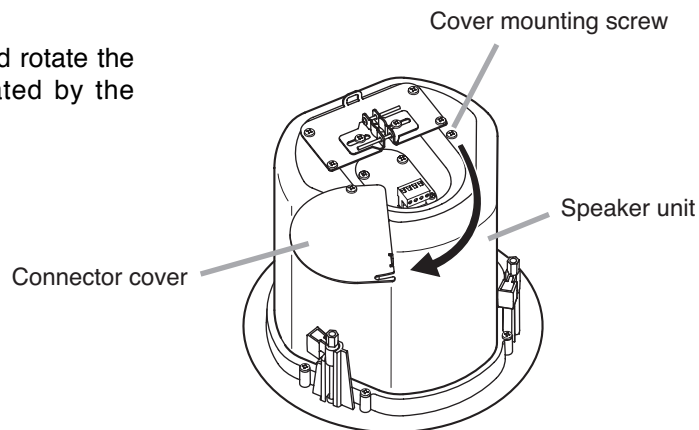
After completing the speaker cable connection, turn the connector cover in the direction indicated by the arrow, and fix the cover with 2 screws.

## 7. CABLE CONNECTION TO INPUT CONNECTOR

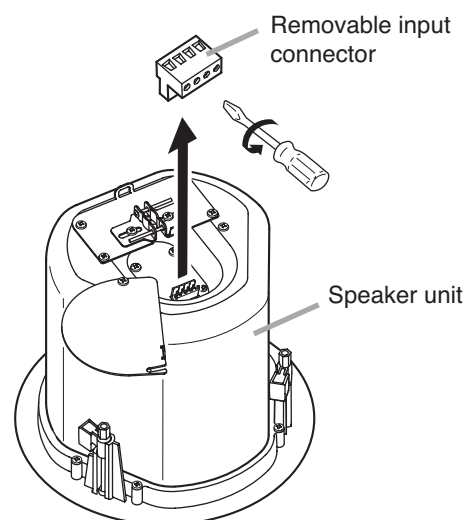
### Recommended cable types

- Solid copper wire:  $\varnothing 1.0 - \varnothing 1.6$  mm  
(equivalent to AWG 18 – 14)
- Stranded copper wire:  $0.75 - 2.5$  mm<sup>2</sup>  
(equivalent to AWG 18 – 14)

**Step 1.** Loosen the 2 cover mounting screws, and rotate the connector cover in the direction indicated by the arrow in the figure at right.



**Step 2.** Detach the removable input connector from the speaker's socket, and loosen the screw of the terminal to be used.



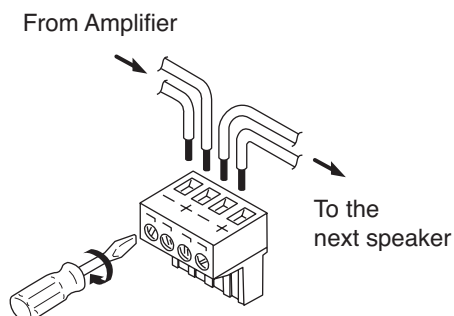
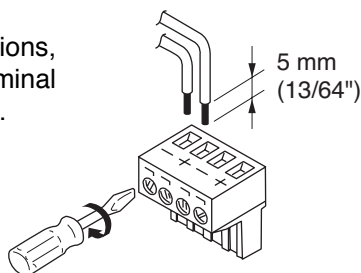
**Step 3.** Insert the stripped cable end into the terminal and tighten the terminal screw with a screwdriver.

[If not bridging]

[If bridging]

### Note

If not making bridge connections, be sure to tighten unused terminal screws to avoid their vibration.

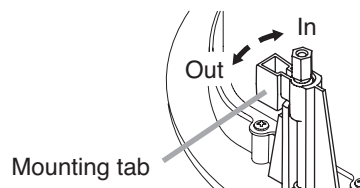


## 8. SPEAKER INSTALLATION

### Caution

Before mounting, check to be sure that the speaker's 3 mounting tabs are turned inside the unit as shown in the figure.

If turned outward, the speaker cannot be inserted through the mounting hole.

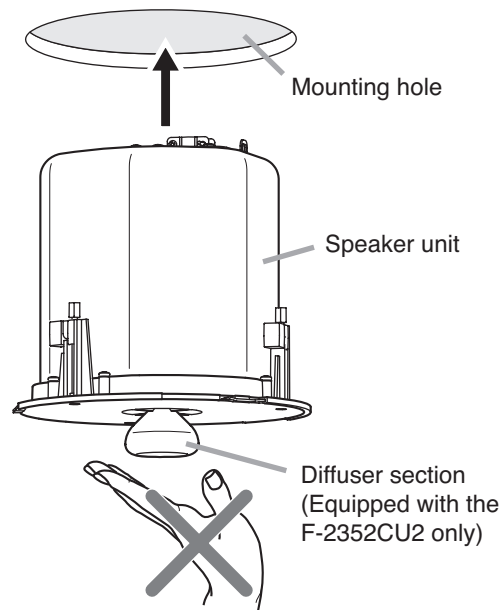
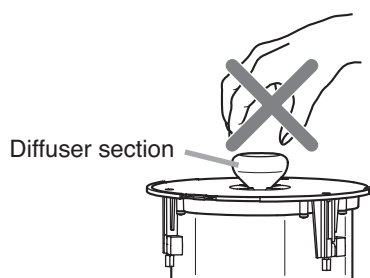


**Step 1.** Insert the speaker through the mounting hole till it contacts the ceiling panel.

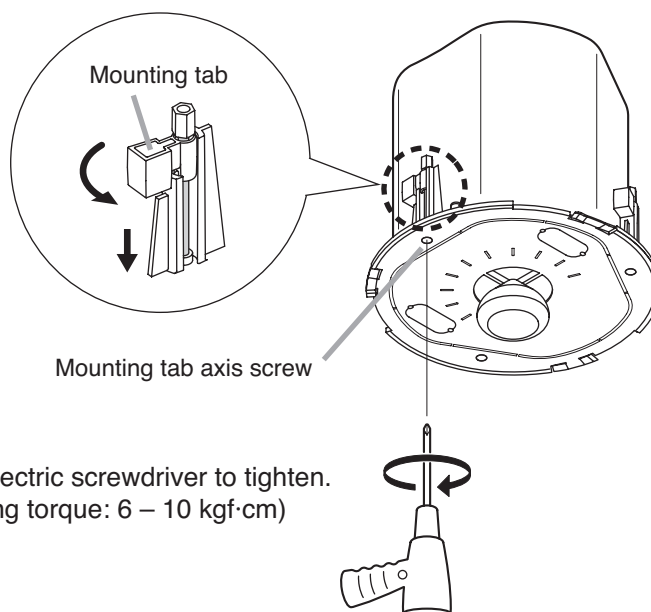
While doing so, avoid directly touching the speaker's diffuser section. (F-2352CU2 only)

### ⚠ WARNING

Never hold the F-2352CU2's diffuser section as a handle to carry the speaker during installation. If the diffuser breaks off, the unit could fall from an elevated position, resulting in possible personal injury.



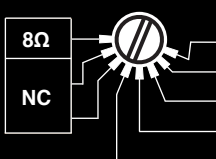
**Step 2.** Rotate and tighten the mounting tab axis screws (3 places) on the unit clockwise to their full stop in order to grip the ceiling panel with the mounting tabs.



**Step 3.** Set the input power.

Turn the input selector switch (on the unit's front) to set it to the desired input impedance.

(Factory-preset to 170  $\Omega$ .)

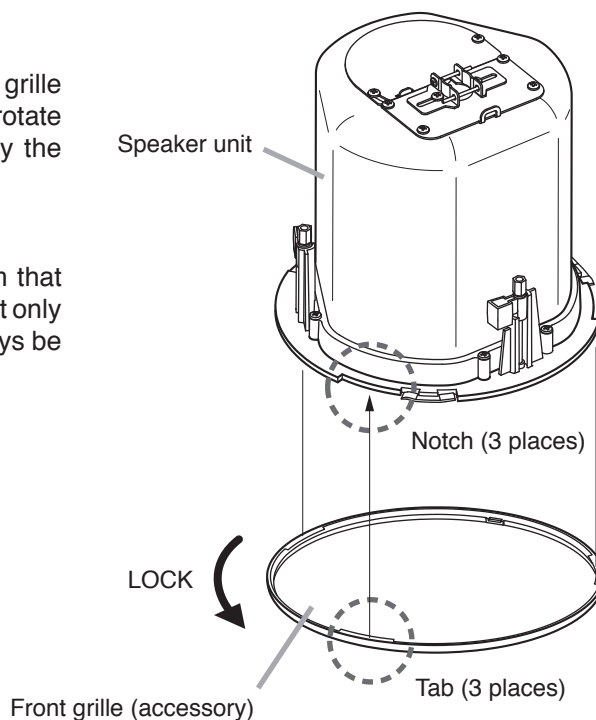
F-2322CU2 F-2352CU2				
	8 $\Omega$	IMP.	70VLINE	25VLINE
	NC	10k $\Omega$	0.5W	0.06W
		3.3k $\Omega$	1.5W	0.2W
		1k $\Omega$	5W	0.6W
		330 $\Omega$	15W	1.9W
		170 $\Omega$	30W	3.7W

**Step 4.** Attach the front grille.

Align the tabs (3 places) on the back side of the grille with the corresponding notches in the unit, then rotate the grille to full stop in the direction indicated by the "LOCK" arrow.

**Tip**

The front grille employs a double-locking system that clicks into place once partway through rotation, but only locks into position at its point of full rotation. Always be sure to rotate the grille to its full stop.



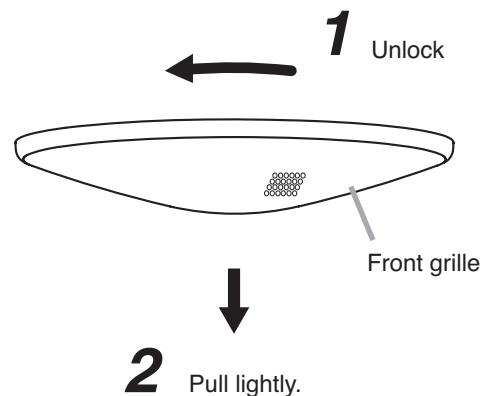
## 9. REMOVING THE SPEAKER FOR MAINTENANCE

### 9.1. Detaching the Front Grille

Turn the front grille counterclockwise to full stop, then lightly pull it downward.

#### Tip

The front grille employs a double-locking system. If the grille cannot be detached when lightly pulled downward, it likely has not yet been fully rotated back to the detachment position. In such cases, take care to rotate the grill fully counterclockwise in order to release the lock.

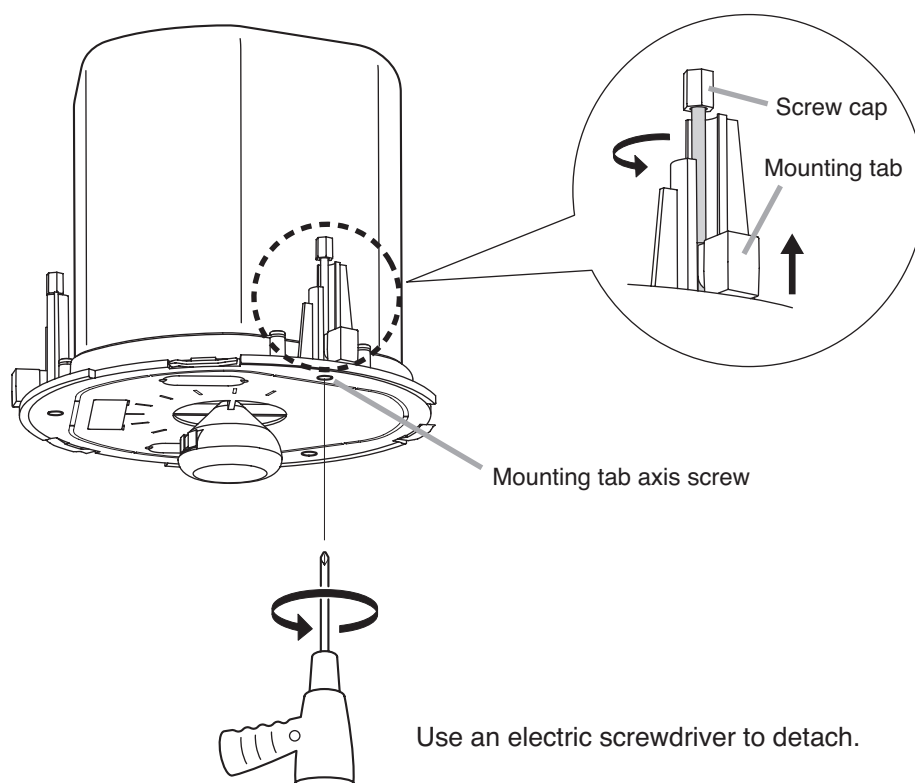


### 9.2. Removing the Speaker

Rotate the 3 mounting tab axis screws counterclockwise. The mounting tabs rise as they turn, allowing the speaker to be removed.

#### Caution

When loosening the mounting tab axis screws, support the speaker by hand to prevent it from falling.



#### Caution

Be sure to set the screwdriver's torque for under 4 kgf·cm. Failure to do so may cause the Screw cap and the Mounting tab to fall off on the rear of ceiling panel.

## 10. REPAINTING THE SPEAKER FRONT GRILLE

**Note:** Be sure to detach the front grille from the speaker before repainting.

**Step 1.** Clean the front grille before painting.  
Wipe with a soft cloth dampened in a detergent.

**Caution**

Do not use thinner or other volatile liquids to clean the grille.

**Step 2.** Spray on a uniform, thin coat of paint.

**Cautions**

- Avoid painting with a roller or brush, as the grille mesh holes could become clogged with paint.
- Use appropriate spray paints for the front grille (grille and frame) materials.  
Grille: Rolled steel plate  
Frame: Fire-resistant ABS resin (acrylic paint)
- Be sure to follow the directions indicated on the paint when painting.

**Step 3.** After the paint has dried, apply another light coat.

**Caution**

Repeating Step 2, apply two or more light coats of paint.

Application of one thick coat of paint all at once may cause drips or unevenness to show up in the painted finish, or clog the mesh holes.

## 11. INPUT OVERLOAD PROTECTION FUNCTION

Both the F-2322CU2 and the F-2352CU2 feature internal input overload protection circuitry. If an extremely high input level is fed to the unit, the protection circuitry automatically cuts off the signal to the speaker element.

A drastic reduction in sound volume indicates that the protection circuitry has been enabled.

In such cases, simply reduce the amplifier volume. The protection circuitry will automatically reset in approximately 10 seconds. After reset, try to maintain the volume at a level slightly lower than before.

**Caution**

This protection circuitry does not completely protect the unit against extremely high input power levels. Depending on the type or duration of excessive power input, the protection circuitry might not be enabled, resulting in damage to the speaker element. Also, if the excessive power input continues for a long period of time, the circuitry may not be capable of resetting to its original condition.

Use the system with care so that the speakers are not exposed to excessive power input.

## 12. SAFETY AGENCY COMPLIANCE

Both the F-2322CU2 and F-2352CU2 are designed for indoor use only.



- **General signaling speaker, UL1480 Category UEAY and CAN/CSA C22.5 No. 205 Category UEAY7**

Products Listed under these categories are suitable for use in general (non-fire alarm) signaling service in conjunction with compatible Listed audio equipment, the combination of which is intended to be installed in accordance with the applicable requirements of the National Electrical Code (NEC) and the local authority having jurisdiction.

- **Suitable for use in air-handling spaces (UL2043)**

Fire Test for Heat and Visible Smoke Release for Discrete Products and their Accessories Installed in Air-Handling Spaces (1998) - NFPA 70 National Electrical Code (NEC) 2002, Article 300-22 (c) and NFPA 90A Installation of air-conditioning and ventilation systems, section 2-3.10.1 (a) exception 3.

### **[Output power vs. switch settings for 25 V and 70 V line operation]**

The rotary switches on the F-2322CU2's and F-2352CU2's front panels permit selection of speaker handling power on 25 V or 70 V line operation as shown in the table below.

	70 V Line					25 V Line				
Setting Position	0.5 W	1.5 W	5 W	15 W	30 W	0.06 W	0.2 W	0.6 W	1.9 W	3.7 W

### 13. SPECIFICATIONS

Model No.	F-2322CU2	F-2352CU2
Enclosure	Bass reflex type	
Rated Input	30 W (High Impedance)	
Power Handling Capacity	Continuous pink noise: 60 W (8 Ω)	
Impedance	70 V line: 170 Ω (30 W), 330 Ω (15 W), 1 kΩ (5 W), 3.3 kΩ (1.5 W), 10 kΩ (0.5 W) 25 V line: 170 Ω (3.7 W), 330 Ω (1.9 W), 1 kΩ (0.6 W), 3.3 kΩ (0.2 W), 10 kΩ (0.06 W) 8 Ω	
Sound Pressure Level	90 dB (1 W, 1 m)	
Frequency Response	70 – 20,000 Hz	
Speaker Component	12 cm (5") cone-type	High frequency: Balanced dome-type Low frequency: 12 cm (5") cone-type
UL Code	UL1480 (UEAY), UL2043, CAN/CSA C22.2 No.205 (UEAY7)	
Mounting Hole	ø200 mm (7 7/8") Maximum ceiling thickness: 37 mm (1 29/64")	
Input Terminal	Removable locking connector with screw-down terminals (2 input terminals and 2 bridge terminals)	
Usable Cable	Solid copper wire: ø1.0 – ø1.6 mm (equivalent to AWG 18 – 14) Stranded copper wire: 0.75 – 2.5 mm <sup>2</sup> (equivalent to AWG 18 – 14)	
Finish	Enclosure: Steel plate, plating Baffle: Fire-resistant ABS resin (resin material grade: UL-94 V-0 or its equivalent), black Rim: Fire-resistant ABS resin (resin material grade: UL-94 V-0 or its equivalent), white, paint Punched net: Steel plate, white, paint	
Dimensions	ø230 mm (9 1/16") x Depth 209 mm (8 15/64")	ø230 mm (9 1/16") x Depth 238 mm (9 3/8")
Weight	4.3 kg (including mounting accessories)	

**Note:** The design and specifications are subject to change without notice for improvement.

#### • Accessories

Front grille .....	1
Tile bridge .....	1
Safety wire (approx. 60 cm or 23 5/8") .....	1
Paper pattern .....	1