Separate Reflex Horn Speakers and Driver Units

Power up your horn speakers with the desired driver units
TOA & Horn Speakers

TOA has been manufacturing horn speakers practically from the company’s very beginning, over eighty years ago in 1934, and today we are recognized even among our longstanding industry contemporaries as a veteran of highest expertise in this field. By 1949 we had succeeded in developing Japan’s first reflex-type horn speaker. We have always dedicated ourselves to being “an international company contributing to human society through sound and communication,” valuing above all the physical craftsmanship that allows the delivery of the clearest possible sound information to listeners. In 1962, an inquiry from abroad led us to conduct transmission testing on an ultra-large PA system. This system, which used a 6.6-meter horn and a 4kW transistor amplifier, marked a transmission distance of 12 kilometers. This achievement would prove instrumental in laying out our destiny of long-running involvement in outdoor public address systems.

TOA-developed horn speakers were often painted blue, and they would become widely familiar as “blue trumpets” unique to TOA. In Indonesia, where we established both factory and sales facilities in 1976, TOA horn speakers became such a part of the public landscape that they were often referred to as “Toas.” They are still a conspicuous part of everyday life there, most notably for public address among the country’s many mosques.

Even today, horn speakers represent one of the fundamental shapes of public address speakers, offering a simple PA system that remains more indispensable than ever in delivering public announcements.

Every horn speaker comprise of a driver unit and a horn, and thus they achieve highest efficiency through impedance matching with the air. Sound pressure drops on both sides of the 1–2kHz range, however, resulting in certain distinctive audio characteristics that cannot be considered favorable in terms of creating good-quality sound.

These high and low range frequency characteristics is one of the key issues to horn speaker sound quality. Particularly, we understand that optimised high range contributes greatly to improving the articulation of outdoor broadcasts. Attenuation in the air is more conspicuous for the high frequency ranges.

General Issues for Horn Speakers

Articulation

Out in the field, there is also an inherent need to have horn speakers deliver higher volume and send the sound farther. More often than not, attempts to meet this need through excessive power input cause malfunction by damaging or even destroying the speaker’s driver unit. Therefore, in addition to frequency characteristics, driver unit durability is also one of the key factors to producing better sound quality.

Additionally, the events taken place in recent years have brought us to understand that in the disaster prevention market, enhanced frequency characteristics not only improves articulation, it also has a positive impact on long-distance sound transmission capability.
Our Development of Driver Units

TOA horn speaker driver units can be divided into several generations based on their diaphragm materials and constructions. From the use of dome-type diaphragms made of phenol-impregnated Conex in our early days of making diaphragm to switching the material to polyimide in 2004, we have models catering to all needs. In our most recent TU-660, ring-type diaphragm construction were used. Each of these various changes have aimed to improve sound quality (frequency characteristics), product quality, durability, and productivity. Now, the range for our types of driver units had widen to meet more needs.

### Diaphragm construction
- **Dome**
- **Dome**
  - TU-720AM (Japan 2004–present)
  - TU-820/850 (overseas 2006–present)
- **Ring**
  - Start of R&D on ring unit using ring-type diaphragms (2012)
- **Ring**
  - TU-780 (Japan 2017–)
  - TU-660 (overseas 2017–)

### Diaphragm materials
- **Conex (fabric), phenol (resin)**
- **Polyimide**
- **(multiple types studied)**
- **Polyimide**

### High Frequency Characteristics
- **Aim:** To improve high range performance by reducing divided vibration with harder structure.

### Low Frequency Characteristics
- Material improves low range performance.

### Quality & Durability
- Phenol’s susceptibility to humidity leads to deformation and greater chance of voice coil friction.
- Stable quality.
- Aim: To prevent voice coil friction by reducing divided vibration with harder structure.

### Productivity
- Requires 1 month curing time.
- No curing time.

### Patent Pending
- Adapts the phase plug design further improve high range performance.
- Adapts to the bottom plate design improve low range performance.
- Improved upper cover heat dissipation, further improving durability.
- No curing time.

### TU-660 / TU-660M Specifications

#### DRIVER UNIT 60W
- **TU-660**
  - Applicable Horns: TH-650, TH-652, TH-660
  - Rated Input: 60 W
  - Rated Impedance: 16Ω
  - Sensitivity: 110 dB (1 W, 1 m) (When operated with JIS C 5504 standard horn.)
  - Frequency Response: 150 Hz - 8 kHz (When operated with JIS C 5504 standard horn.)
  - Dust/Water Protection: IP65 (When a driver is operated with a horn.)
  - Horn Coupling: 1-3/8 18 threads (inch screw)
  - Polarity: Hot: Black, Com: White
  - Operating Temperature: -20 °C to +55 °C (-4 °F to +131 °F) (no condensation)
  - Finish: Range: Aluminum, gray, powder coating
  - Rear cover: ABS resin, gray
  - Speaker cable: Polyvinyl chloride insulated cable (6 mm (0.24") in diameter, 600 mm (23.62") in length)
  - Dimensions: ø139 x 108 (D) mm (ø5.47" x 4.25")
  - Weight: 2 kg (4.41 lb)
  - Option: Driver unit cover: UC-200A
  - Matching transformer: TM-30, TM-60T

#### DRIVER UNIT 60W WITH TRANSFORMER
- **TU-660M**
  - Applicable Horns: TH-650, TH-652, TH-660
  - Rated Input: 60 W
  - Line Voltage: 100 V line or 70 V line
  - Rated Impedance:
    - 100 V line: 170 Ω (60 W), 330 Ω (30 W), 670 Ω (15 W)
    - 70 V line: 83 Ω (60 W), 170 Ω (30 W), 330 Ω (15 W), 670 Ω (7.5 W)
  - Sensitivity: 110 dB (1 W, 1 m) (When operated with JIS C 5504 standard horn.)
  - Frequency Response: 150 Hz - 8 kHz (When operated with JIS C 5504 standard horn.)
  - Dust/Water Protection: IP65 (When a driver is operated with a horn.)
  - Horn Coupling: 1-3/8 18 threads (inch screw)
  - Polarity: Hot: Black, Com: White
  - Operating Temperature: -20 °C to +55 °C (-4 °F to +131 °F) (no condensation)
  - Finish: Range: Aluminum, gray, powder coating
  - Rear cover: ABS resin, gray
  - Speaker cable: Polyvinyl chloride insulated cable (6 mm (0.24") in diameter, 600 mm (23.62") in length)
  - Dimensions: ø139 x 151 (D) mm (ø5.47" x 5.94")
  - Weight: 2.7 kg (5.95 lb)
  - Option: Driver unit cover: UC-200A
TU-631 / TU-631M Specifications

**DRIVER UNIT 30W**
TU-631

- **Applicable Horns**: TH-650, TH-652, TH-660
- **Rated Input**: 30 W
- **Rated Impedance**: 16Ω
- **Sensitivity**: 110 dB (1 W, 1 m) (When operated with JIS C 5504 standard horn.)
- **Frequency Response**: 150 Hz - 6 kHz (When operated with JIS C 5504 standard horn.)
- **Dust/Water Protection**: IP65 (When a driver is operated with a horn.)
- **Horn Coupling**: 1 - 3/8 18 threads (inch screw)
- **Polarity**: Hot: Black, Com: White
- **Operating Temperature**: -20 °C to +60 °C (-4 °F to +140 °F) (no condensation)
- **Finish**:
  - Flange: Aluminum, gray, powder coating
  - Rear cover: ABS resin, gray
  - Screws: Stainless steel
  - Speaker cable: Polyvinyl chloride insulated cable (6 mm (0.24") in diameter, 600 mm (23.62") in length)
- **Dimensions**: ø139 x 106 (D) mm (ø5.47" X 4.17")
- **Weight**: 1.4 kg (3.08 lb)
- **Option**: Driver unit cover: UC-200A

**DRIVER UNIT 30W WITH TRANSFORMER**
TU-631M

- **Applicable Horns**: TH-650, TH-652, TH-660
- **Line Voltage**: 100 V line or 70 V line
- **Rated Input**: 30 W
- **Rated Impedance**:
  - 100 V line: 330 Ω (50 W), 670 Ω (15 W), 1k Ω (10W), 2k Ω (5W)
  - 70 V line: 170 Ω (50 W), 330 Ω (15 W), 670 Ω (7.5 W), 1k Ω (5W), 2k Ω (2.5W)
- **Sensitivity**: 110 dB (1 W, 1 m) (When operated with JIS C 5504 standard horn.)
- **Frequency Response**: 150 Hz - 6 kHz (When operated with JIS C 5504 standard horn.)
- **Dust/Water Protection**: IP65 (When a driver is operated with a horn.)
- **Horn Coupling**: 1 - 3/8 18 threads (inch screw)
- **Polarity**: Hot: Black, Com: White
- **Operating Temperature**: -20 °C to +60 °C (-4 °F to +140 °F) (no condensation)
- **Finish**:
  - Flange: Aluminum, gray, powder coating
  - Rear cover: ABS resin, gray
  - Screws: Stainless steel
  - Speaker cable: Polyvinyl chloride insulated cable (6 mm (0.24") in diameter, 600 mm (23.62") in length)
- **Dimensions**: ø139 x 149 (D) mm (ø5.47" x 5.86")
- **Weight**: 1.9 kg (4.1 lb)
- **Option**: Driver unit cover: UC-200A

TU-651 / TU-651M Specifications

**DRIVER UNIT 50W**
TU-651

- **Applicable Horns**: TH-650, TH-652, TH-660
- **Rated Input**: 50 W
- **Rated Impedance**: 16Ω
- **Sensitivity**: 110 dB (1 W, 1 m) (When operated with JIS C 5504 standard horn.)
- **Frequency Response**: 150 Hz - 6 kHz (When operated with JIS C 5504 standard horn.)
- **Dust/Water Protection**: IP65 (When a driver is operated with a horn.)
- **Horn Coupling**: 1 - 3/8 18 threads (inch screw)
- **Polarity**: Hot: Black, Com: White
- **Operating Temperature**: -20 °C to +55 °C (-4 °F to +131 °F) (no condensation)
- **Finish**:
  - Flange: Aluminum, gray, powder coating
  - Rear cover: ABS resin, gray
  - Screws: Stainless steel
  - Speaker cable: Polyvinyl chloride insulated cable (6 mm (0.24") in diameter, 600 mm (23.62") in length)
- **Dimensions**: ø139 x 106 (D) mm (ø5.47" X 4.17")
- **Weight**: 2.0 kg (4.41 lb)
- **Option**: Driver unit cover: UC-200A

**DRIVER UNIT 50W WITH TRANSFORMER**
TU-651M

- **Applicable Horns**: TH-650, TH-652, TH-660
- **Line Voltage**: 100 V line or 70 V line
- **Rated Input**: 50 W
- **Rated Impedance**:
  - 100 V line: 200 Ω (50 W), 330 Ω (30 W), 670 Ω (15 W)
  - 70 V line: 100 Ω (50 W), 200 Ω (25W), 330 Ω (15 W), 670 Ω (7.5 W)
- **Sensitivity**: 110 dB (1 W, 1 m) (When operated with JIS C 5504 standard horn.)
- **Frequency Response**: 150 Hz - 6 kHz (When operated with JIS C 5504 standard horn.)
- **Dust/Water Protection**: IP65 (When a driver is operated with a horn.)
- **Horn Coupling**: 1 - 3/8 18 threads (inch screw)
- **Polarity**: Hot: Black, Com: White
- **Operating Temperature**: -20 °C to +55 °C (-4 °F to +131 °F) (no condensation)
- **Finish**:
  - Flange: Aluminum, gray, powder coating
  - Rear cover: ABS resin, gray
  - Screws: Stainless steel
  - Speaker cable: Polyvinyl chloride insulated cable (6 mm (0.24") in diameter, 600 mm (23.62") in length)
- **Dimensions**: ø139 x 149 (D) mm (ø5.47" x 5.86")
- **Weight**: 2.7 kg (5.95 lb)
- **Option**: Driver unit cover: UC-200A
<table>
<thead>
<tr>
<th>TU-632 / TU-632M Specifications</th>
<th></th>
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<tbody>
<tr>
<td><strong>DRIVER UNIT 30W</strong></td>
<td><strong>DRIVER UNIT 30W WITH TRANSFORMER</strong></td>
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<tr>
<td><strong>TU-632</strong></td>
<td><strong>TU-632M</strong></td>
</tr>
<tr>
<td>Applicable Horns</td>
<td>TH-650, TH-652, TH-660</td>
</tr>
<tr>
<td>Rated Input</td>
<td>30 W</td>
</tr>
<tr>
<td>Rated Impedance</td>
<td>16 Ω</td>
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<tr>
<td>Sensitivity</td>
<td>110 dB (1 W, 1 m) (When operated with JIS C 5504 standard horn.)</td>
</tr>
<tr>
<td>Frequency Response</td>
<td>150 Hz - 6 kHz (When operated with JIS C 5504 standard horn.)</td>
</tr>
<tr>
<td>Dust/Water Protection</td>
<td>IP65 (When a driver is operated with a horn.)</td>
</tr>
<tr>
<td>Horn Coupling</td>
<td>1 - 3/8 18 threads (inch screw)</td>
</tr>
<tr>
<td>Polarity</td>
<td>Hot: Black, Com: White</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-20 °C to +55 °C (-4 °F to +131 °F) (no condensation)</td>
</tr>
<tr>
<td>Finish</td>
<td>Flange: Aluminum, white, powder coating, Rear cover: HPS, white, Screws: Stainless steel</td>
</tr>
<tr>
<td>Dimensions</td>
<td>ø139 x 106 (D) mm (ø5.47” X 4.17”)</td>
</tr>
<tr>
<td>Weight</td>
<td>1.5 kg (3.31 lb)</td>
</tr>
<tr>
<td>Option</td>
<td>Driver unit cover: UC-200A, Matching transformer: TM-30T, TM-60T</td>
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<tr>
<th>TU-652 / TU-652M Specifications</th>
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<tr>
<td><strong>DRIVER UNIT 50W</strong></td>
<td><strong>DRIVER UNIT 50W WITH TRANSFORMER</strong></td>
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<tr>
<td><strong>TU-652</strong></td>
<td><strong>TU-652M</strong></td>
</tr>
<tr>
<td>Applicable Horns</td>
<td>TH-650, TH-652, TH-660</td>
</tr>
<tr>
<td>Rated Input</td>
<td>50 W</td>
</tr>
<tr>
<td>Rated Impedance</td>
<td>16 Ω</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>110 dB (1 W, 1 m) (When operated with JIS C 5504 standard horn.)</td>
</tr>
<tr>
<td>Frequency Response</td>
<td>150 Hz - 6 kHz (When operated with JIS C 5504 standard horn.)</td>
</tr>
<tr>
<td>Dust/Water Protection</td>
<td>IP65 (When a driver is operated with a horn.)</td>
</tr>
<tr>
<td>Horn Coupling</td>
<td>1 - 3/8 18 threads (inch screw)</td>
</tr>
<tr>
<td>Polarity</td>
<td>Hot: Black, Com: White</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-20 °C to +55 °C (-4 °F to +131 °F) (no condensation)</td>
</tr>
<tr>
<td>Finish</td>
<td>Flange: Aluminum, white, powder coating, Rear cover: HPS, white, Screws: Stainless steel</td>
</tr>
<tr>
<td>Dimensions</td>
<td>ø139 x 106 (D) mm (ø5.47” X 4.17”)</td>
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<tr>
<td>Weight</td>
<td>2 kg (4.41 lb)</td>
</tr>
<tr>
<td>Option</td>
<td>Driver unit cover: UC-200A, Matching transformer: TM-30T, TM-60T</td>
</tr>
</tbody>
</table>
# TH-650 / TH-652 / TH-660 Specifications

## REFLEX HORN SPEAKER

### TH-650

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensitivity</strong></td>
<td>110 dB (1 W, 1 m) (When operated with a driver.)</td>
</tr>
<tr>
<td><strong>Frequency Response</strong></td>
<td>200 Hz - 6 kHz (When operated with a driver.)</td>
</tr>
<tr>
<td><strong>Dust/Water Protection</strong></td>
<td>IP65 (When a driver is operated with a driver.)</td>
</tr>
<tr>
<td><strong>Driver Coupling</strong></td>
<td>1 - 3/8 18 threads (inch screw)</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>-20 °C to +55 °C (-4 °F to +131 °F) (no condensation)</td>
</tr>
<tr>
<td><strong>Finish</strong></td>
<td>Horn flare and flange: Aluminum, off-white, powder coating</td>
</tr>
<tr>
<td></td>
<td>Reflector horn: ABS resin, off-white</td>
</tr>
<tr>
<td></td>
<td>Bracket holder: Aluminum, gray, powder coating</td>
</tr>
<tr>
<td></td>
<td>Bracket: Steel, gray, powder coating</td>
</tr>
<tr>
<td></td>
<td>Screws and bolts: Stainless steel</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>ø500 x 394 (D) mm (ø19.68&quot; X 15.51&quot;)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>2.9 kg (6.39 lb)</td>
</tr>
</tbody>
</table>

### TH-652

<table>
<thead>
<tr>
<th>Feature</th>
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<tbody>
<tr>
<td><strong>Sensitivity</strong></td>
<td>110 dB (1 W, 1 m) (When operated with a driver.)</td>
</tr>
<tr>
<td><strong>Frequency Response</strong></td>
<td>200 Hz - 6 kHz (When operated with a driver.)</td>
</tr>
<tr>
<td><strong>Dust/Water Protection</strong></td>
<td>IP65 (When a driver is operated with a driver.)</td>
</tr>
<tr>
<td><strong>Driver Coupling</strong></td>
<td>1 - 3/8 18 threads (inch screw)</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>-20 °C to +55 °C (-4 °F to +131 °F) (no condensation)</td>
</tr>
<tr>
<td><strong>Finish</strong></td>
<td>Horn flare and flange: Aluminum, white, powder coating</td>
</tr>
<tr>
<td></td>
<td>Reflector horn: HIPS, white</td>
</tr>
<tr>
<td></td>
<td>Bracket: Steel, white, powder coating</td>
</tr>
<tr>
<td></td>
<td>Screws and bolts: Stainless steel</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>ø500 x 357 (D) mm (ø19.69&quot; X 14.06&quot;)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>2.7 kg (5.95 lb)</td>
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### TH-660

<table>
<thead>
<tr>
<th>Feature</th>
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<tbody>
<tr>
<td><strong>Sensitivity</strong></td>
<td>110 dB (1 W, 1 m) (When operated with a driver.)</td>
</tr>
<tr>
<td><strong>Frequency Response</strong></td>
<td>200 Hz - 6 kHz (When operated with a driver.)</td>
</tr>
<tr>
<td><strong>Dust/Water Protection</strong></td>
<td>IP65 (When a driver is operated with a driver.)</td>
</tr>
<tr>
<td><strong>Driver Coupling</strong></td>
<td>1 - 3/8 18 threads (inch screw)</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>-20 °C to +55 °C (-4 °F to +131 °F) (no condensation)</td>
</tr>
<tr>
<td><strong>Finish</strong></td>
<td>Horn flare and flange: Aluminum, off-white, powder coating</td>
</tr>
<tr>
<td></td>
<td>Reflector horn: ABS resin, off-white</td>
</tr>
<tr>
<td></td>
<td>Bracket holder: Aluminum, gray, powder coating</td>
</tr>
<tr>
<td></td>
<td>Bracket: Steel, gray, powder coating</td>
</tr>
<tr>
<td></td>
<td>Screws and bolts: Stainless steel</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>ø600 x 425 (D) mm (ø23.62&quot; X 16.73&quot;)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>3.6 kg (7.93 lb)</td>
</tr>
</tbody>
</table>


**DH-110 / DH-120 Specifications**

**STARIGHT HORN SPEAKER**

**DH-110**

- **Sensitivity**: 110 dB (1 W, 1 m) (When operated with a driver.)
- **Frequency Response**: 180 Hz - 6 kHz (When operated with a driver.)
- **Driver Coupling**: 1 - 3/8 18 threads (inch screw)
- **Variable Installation Angle**: Vertical: +10°, -20° (when locally procured mounting bracket is used)
- **Finish**: Horn A: Aluminum, ivory, powder coating
  L-shaped Adapter and Horn C: Aluminum, ivory, powder coating
  Bracket: Steel plate, ivory, powder coating
- **Dimensions**: ø518 x 968 (D) mm (ø20.40” X 38.11”)
- **Weight**: 5.3 kg (11.69 lb)
- **Accessory**: Stainless steel bolt for assembly x 1 set, Gasket x 1 set, Anti-bird net x 1 set

**DH-120**

- **Sensitivity**: 110 dB (1 W, 1 m) (When operated with a driver.)
- **Frequency Response**: 180 Hz - 6 kHz (When operated with a driver.)
- **Driver Coupling**: 1 - 3/8 18 threads (inch screw)
- **Variable Installation Angle**: Vertical: +10°, -20° (when locally procured mounting bracket is used)
- **Finish**: Horn A: Aluminum, ivory, powder coating
  L-shaped Adapter and Adapter: Aluminum, ivory, powder coating
  Bracket: Steel plate, ivory, powder coating
- **Dimensions**: ø518 x 884 (D) mm (ø20.40” X 34.80”)
- **Weight**: 5.3 kg (11.69 lb)
- **Accessory**: Stainless steel bolt for assembly x 1 set, Gasket x 1 set, Anti-bird net x 1 set

**Diaphragms & Driver Unit Cover**

**Dome Diaphragm DG-30DB**

- **Rated Input**: 50W
- **Rated Impedance**: 1Ω
- **Sensitivity**: 110 dB (1W, 1m)
- **Frequency Response**: 150 Hz - 6 kHz

**Ring Diaphragm**

- **Rated Input**: 60W
- **Rated Impedance**: 1Ω
- **Sensitivity**: 110 dB (1W, 1m)
- **Frequency Response**: 150 Hz - 8 kHz
- **Applicable Driver Unit**: TU-660 / 660M

**UC-200A**

- **Finish**: Unit Cover: Glass fiber mixed unsaturated polyester resin, ivory
  Cover Fixing Screw: Stainless Steel
- **Weight**: 590g
- **Accessory**: Washer x 2, Throat gasket x 1

**Applicable Driver Unit**


**Applicable Horn**

- TH-650, TH-660, TH-652, DH-110, DH-120