



Instruction Manual - Installation Edition -

ATUC-IR

Hybrid Infrared Conference System

Gooseneck Microphone with LED Ring
ATUC-M43H/58H/M32L

IR Discussion Unit
ATUC-IRDU

Hybrid Control Unit
ATUC-IRCU

Hybrid Control Unit (Dante-Enabled)
ATUC-IRCUDAN

IR Transmitter Unit
ATUC-IRA

IR Distributor
ATUC-IRD

Charger
ATCS-B60

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Device Names

The device names are abbreviated in this manual as follows.

- IRCU: "Hybrid Control Unit" ATUC-IRCU
- IRCUDAN: "Hybrid Control Unit (Dante-Enabled)" ATUC-IRCUDAN
- IRDU: "IR Discussion Unit" ATUC-IRDU
- IRA: "IR Transmitter Unit" ATUC-IRA
- IRD: "IR Distributor" ATUC-IRD
- B60: "Charger" ATCS-B60

Symbols

NOTICE Indicates a risk that may result in malfunction or damage to the device.



Indicates supplementary information as well as tips & advice for operations.

Installation

- After installing an IRA, confirm that it is securely fixed in place.
- Do not install the IRA or the IRDU near anything that generates infrared light, such as direct sunlight, incandescent lights, halogen lights, inverter-type fluorescent lights, or plasma displays. Noise could be generated regardless of the effective range. If noise is being generated, you need to install the IRAs and IRDUs in suitable locations.
- Do not place any obstacles around the IRDUs.
- Do not exceed 100 meters for the total length of cable connections.
- When installing multiple IRAs, use the same length for the total length of each of the cables from the IRAs to the IRCU/IRCUDAN. (We recommend a difference of less than 3 m.)
- Contact our sales representative if you are going to use multiple monitor channels at the same time.

1. Confirming the Size of the Room Intended for Installation

- Checkpoints**
- ① Width, length, ceiling height, existence of windows, etc.
 - ② Does construction of the ceiling allow for installation (ceiling surface, existence of space above ceiling)

1.1 Names of IRA Parts

① Power LED

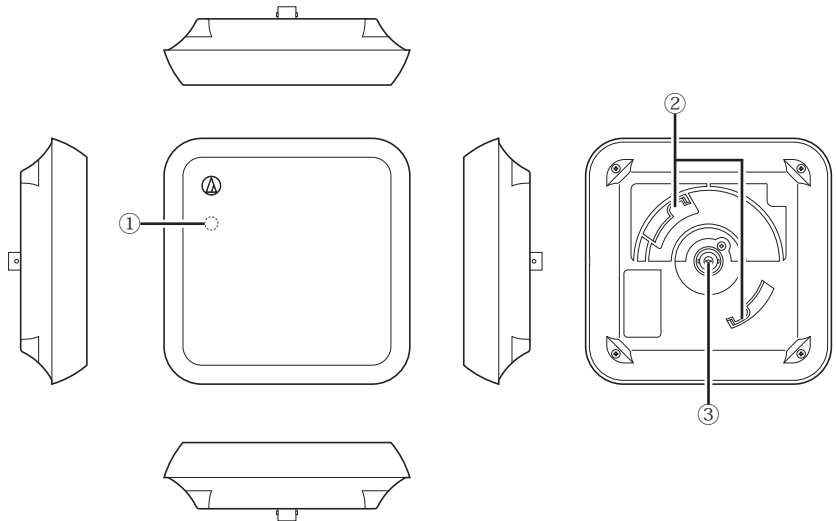
Lights when the power to the IRCU is on, after wiring is complete.

② Hook for mounting

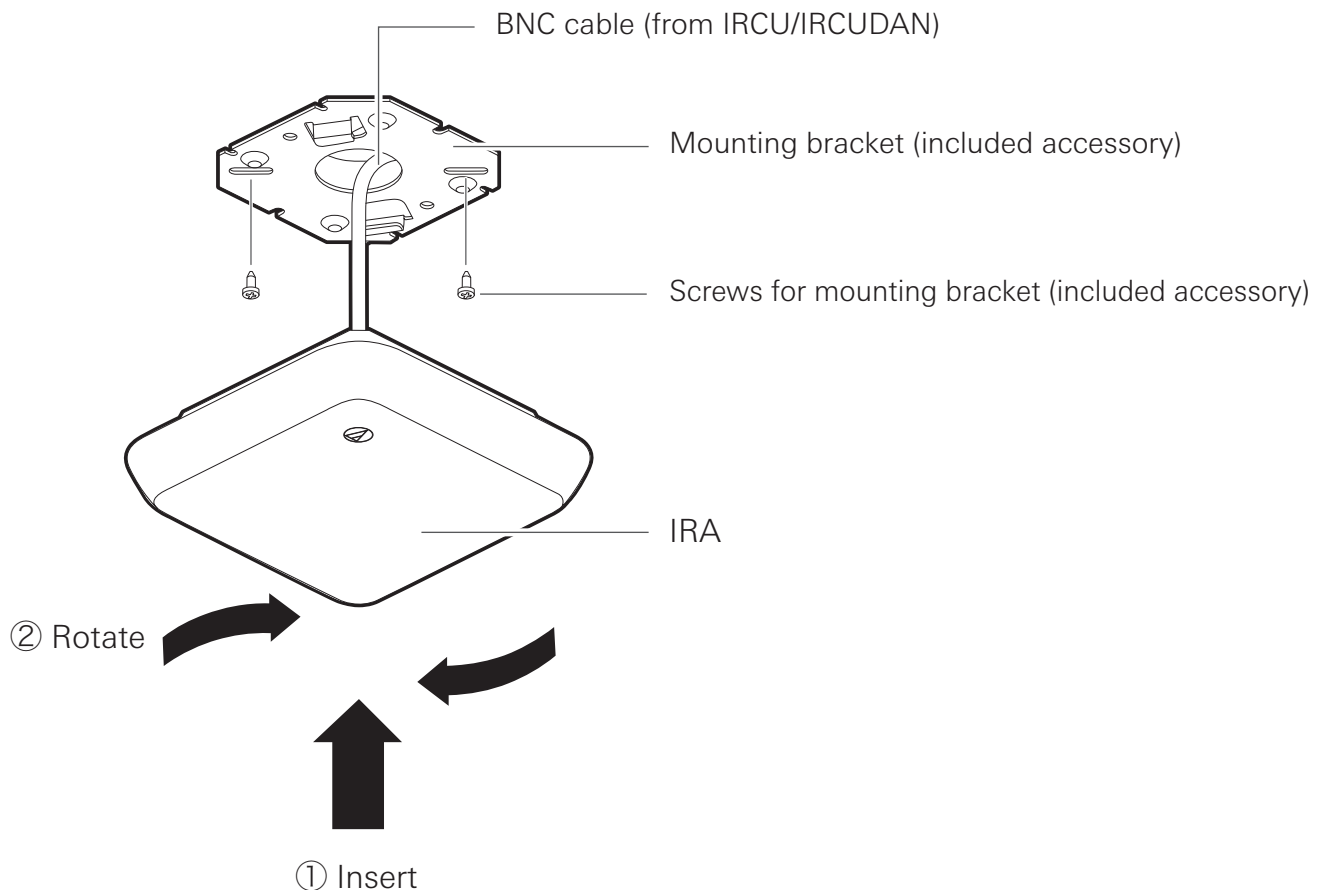
Use to mount on the mounting bracket (included accessory).

③ BNC connector

· BNC cables are not included accessories.



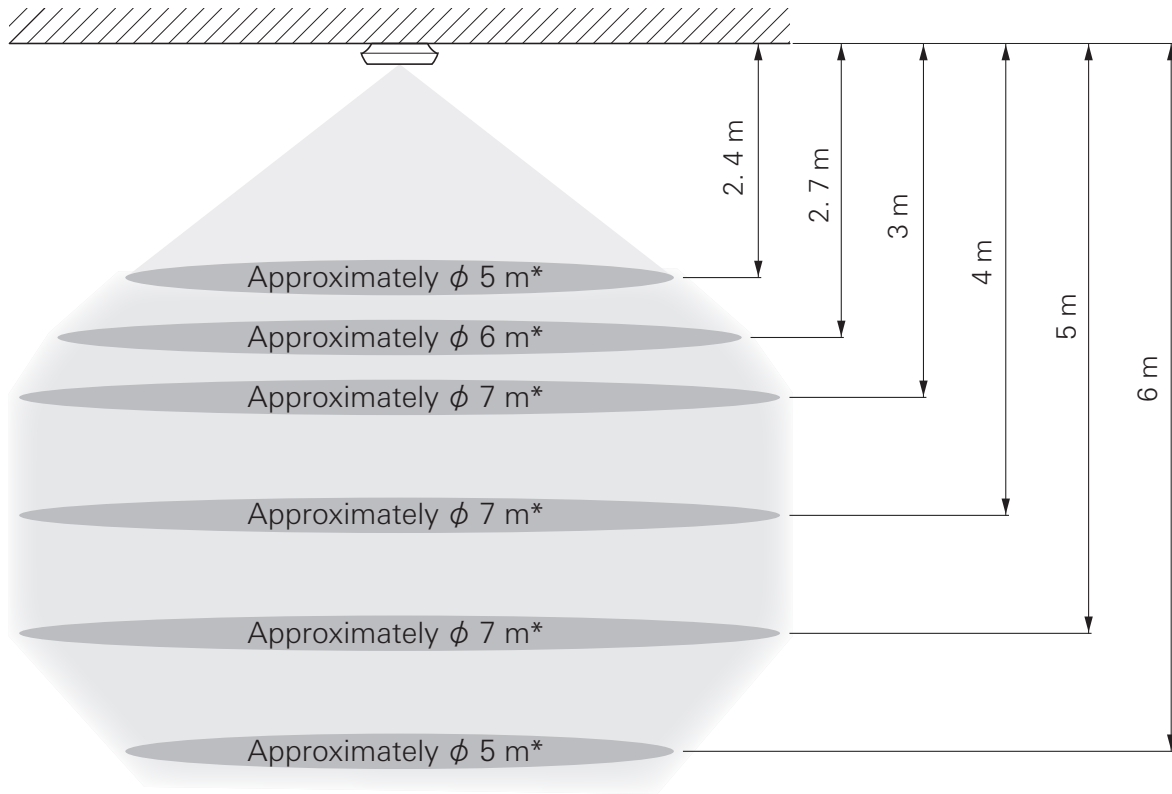
1.2 Image of IRA Installation



2. Confirming the Operating Space

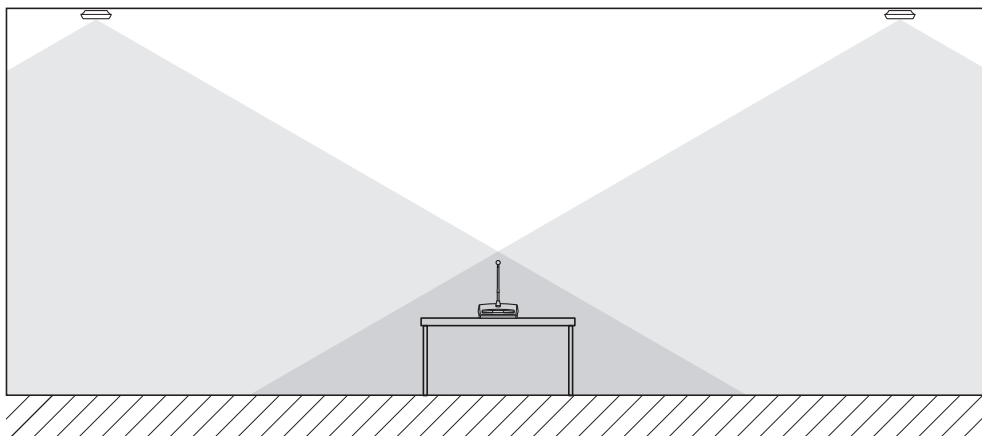
Checkpoints ① Coverage area, number of units, and distance between units when mounting IRA on a ceiling

2.1 Relationship Between Ceiling Height and Transmission Area for Ceiling Installation of IRA

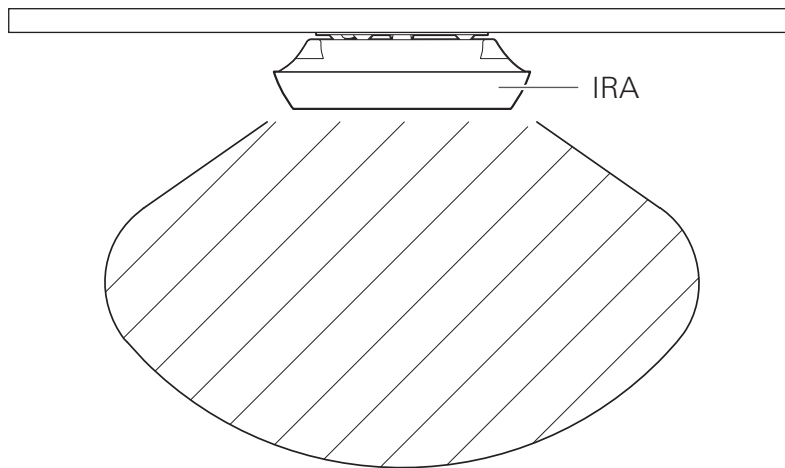


* Transmission Area

Elevation Diagram



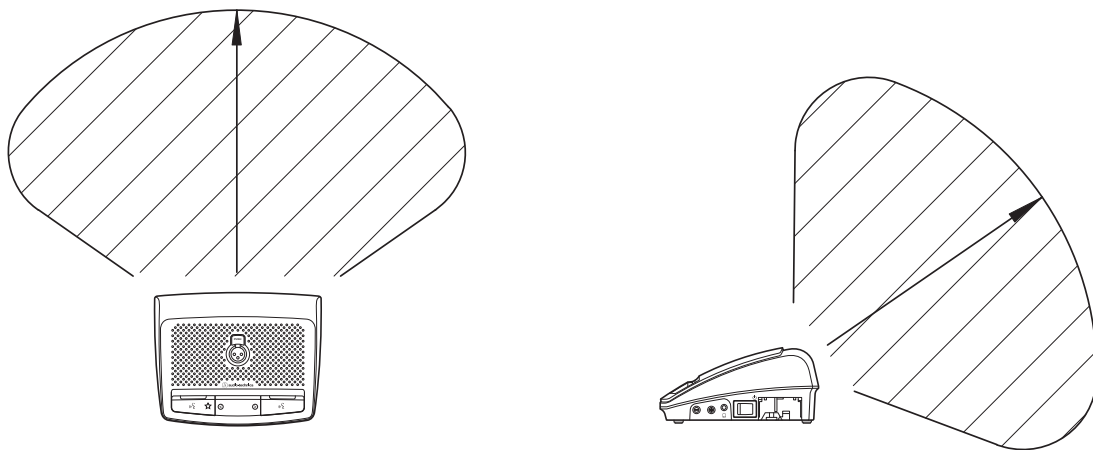
2.2 Image of Effective Infrared Range of IRA



NOTICE

- Infrared transmissions cannot reach the IRA if they are hidden or blocked by users.
- Install multiple IRAs so they can be seen from the IRDUs
- Do not cover the infrared transmitter with your hand or anything else.

2.3 Image of Effective Infrared Range of IRDU



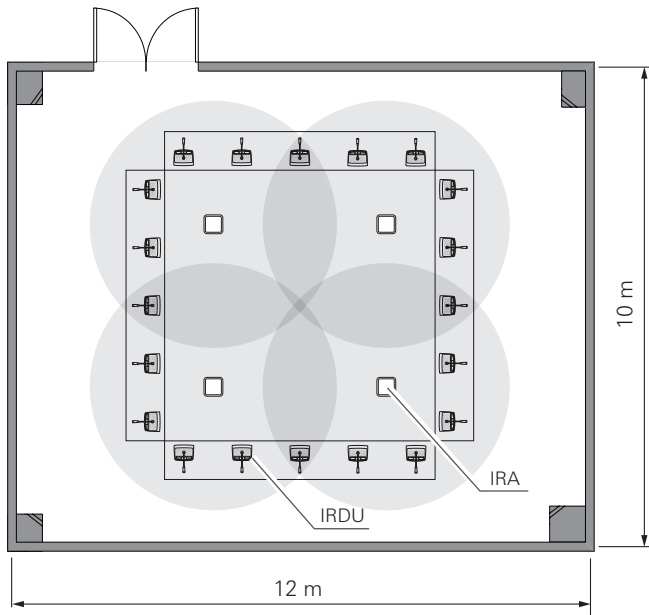
3. Confirming the Operating Arrangements

- Checkpoints**
- ① Confirm operating format: U shape, square shape, school format, etc.
 - ② Distance between and orientation of IRDUs and IRAs

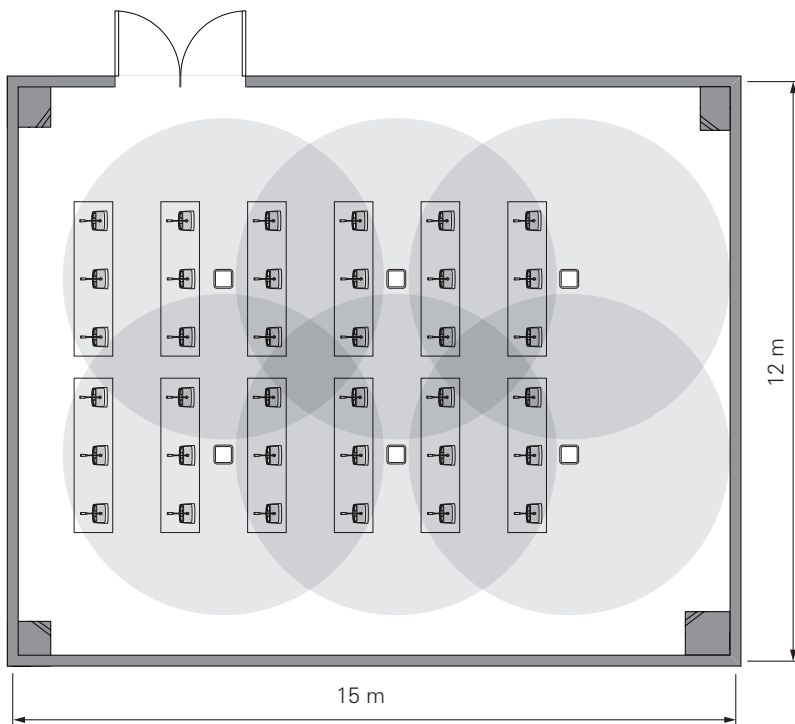
- Be sure to install an IRA in front of the IRDUs so the IRDUs can transmit.
- For specific installation positions, contact our sales representative.

3.1 Images of Installations in U Shapes and Square Shapes

- The following diagram shows a square shape.

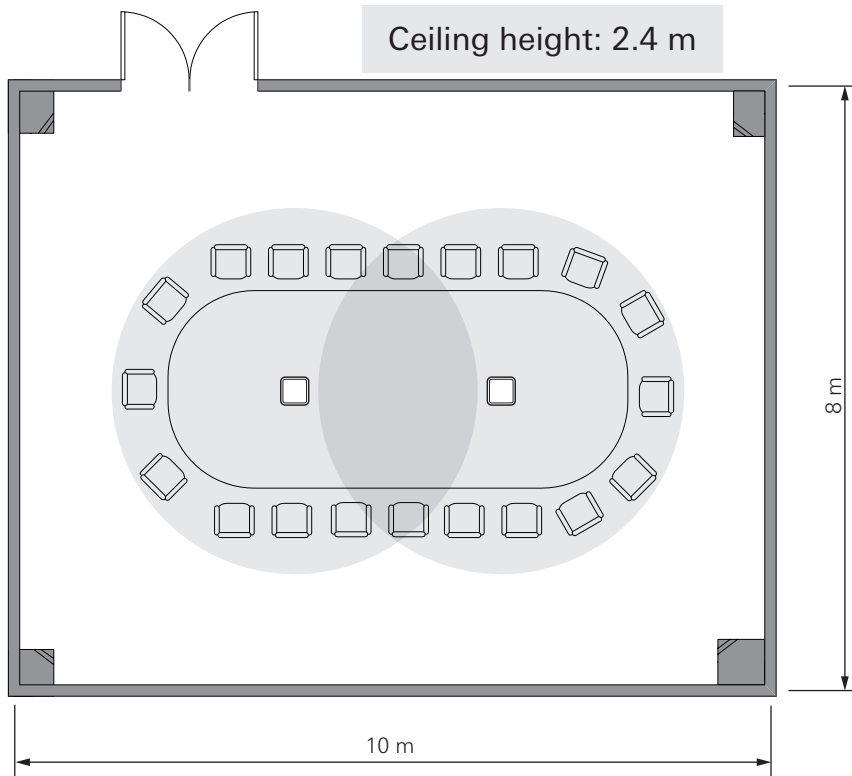


3.2 Images of Installations in School Formats

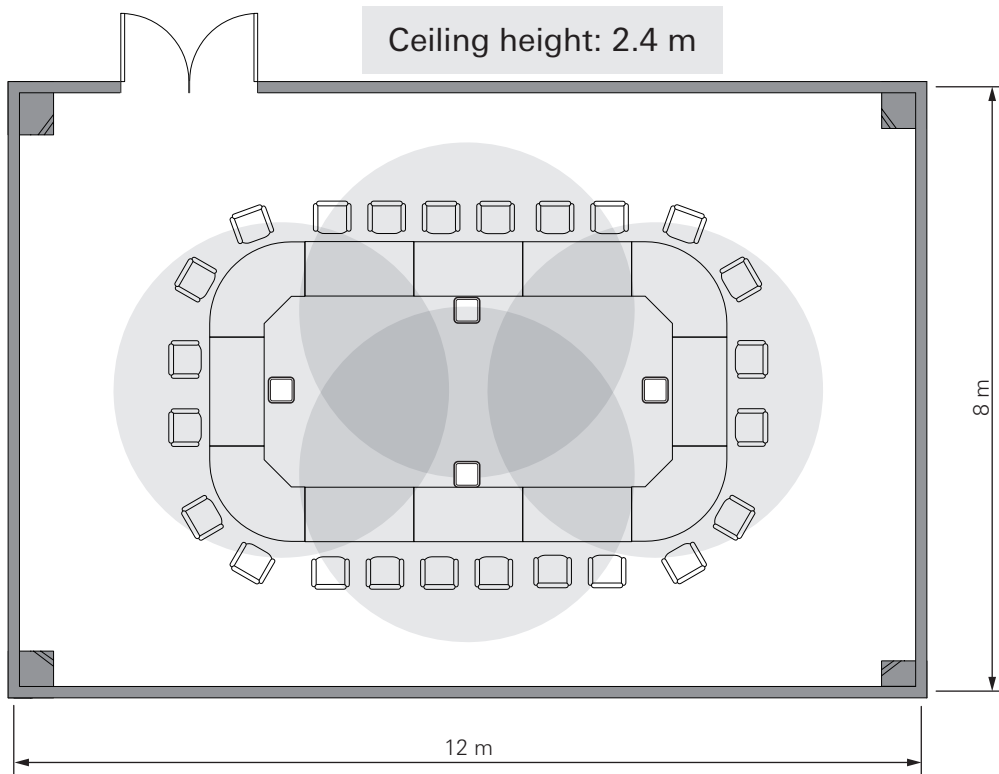


3.3 Installation Examples

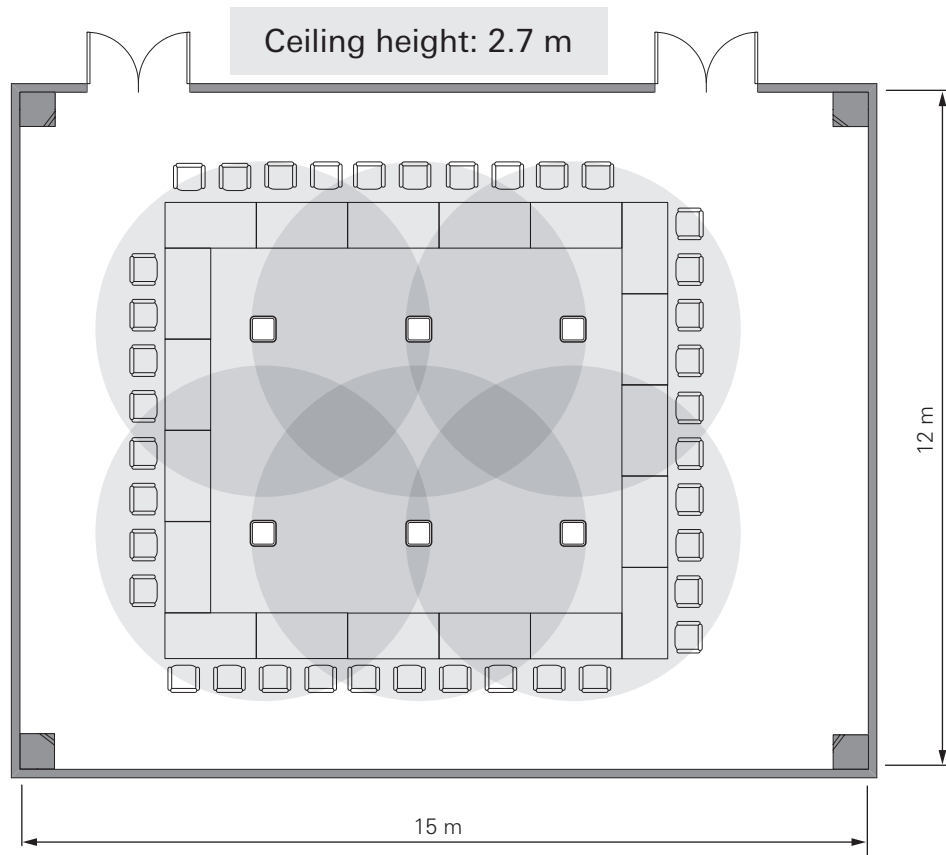
Round table [W: 10 m, D: 8 m, H: 2.4 m], transmission area: approximately $\phi 5$ m



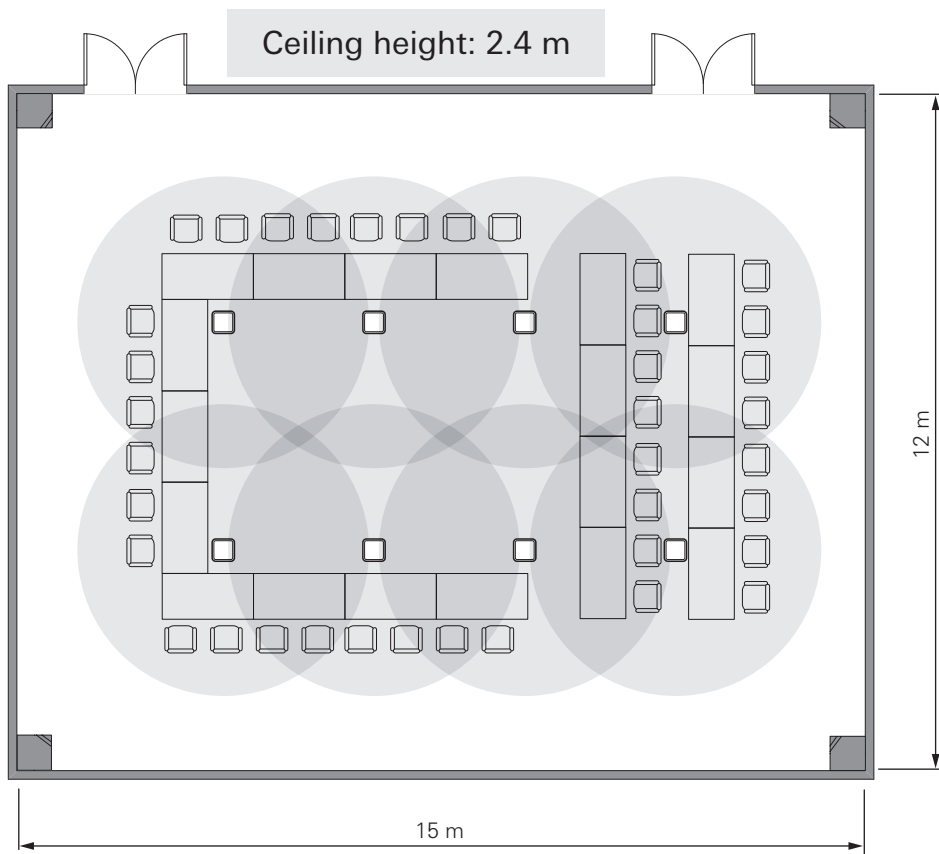
Square shape (small) [W: 12 m, D: 8 m, H: 2.4 m], transmission area: approximately $\phi 5$ m



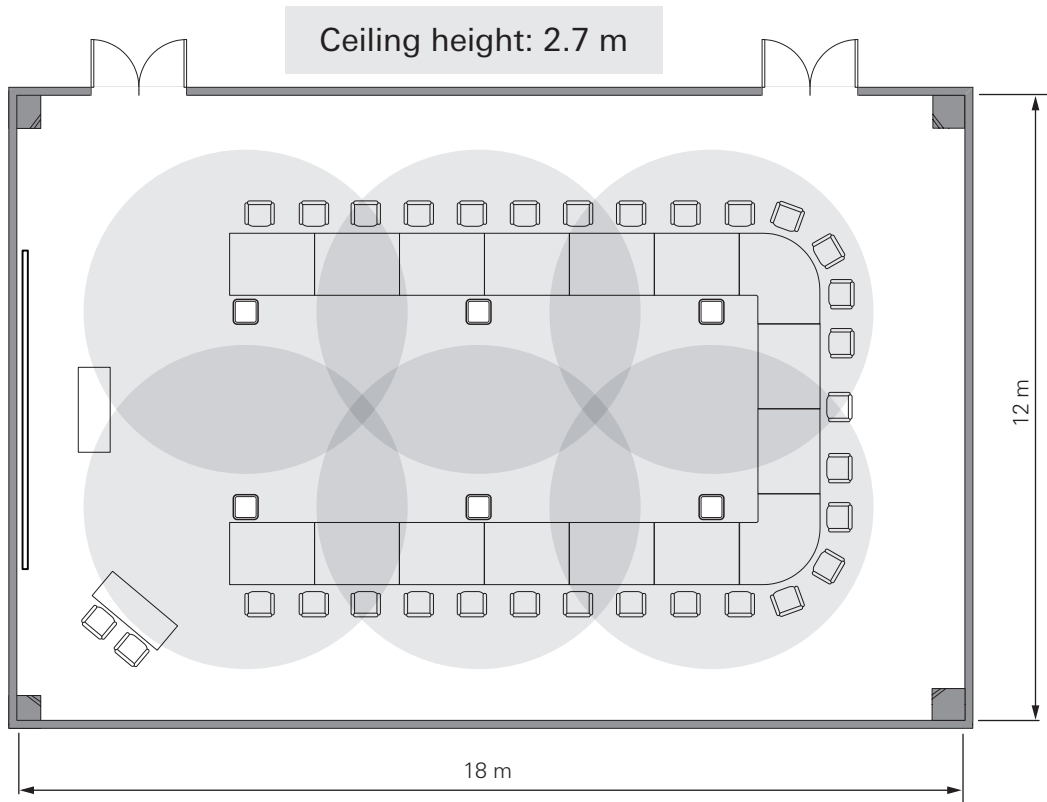
Square shape (large) [W: 15 m, D: 12 m, H: 2.7 m], transmission area: approximately $\phi 6$ m



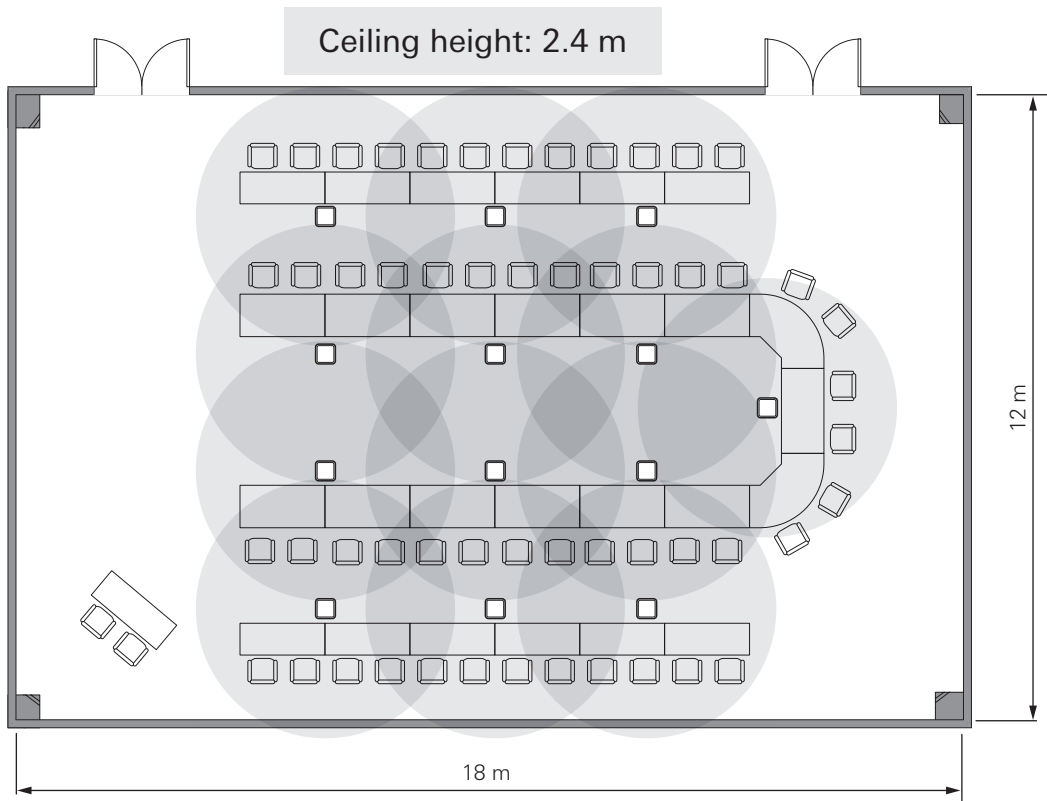
U shape + back area seats [W: 15 m, D: 12 m, H: 2.4 m], transmission area: approximately $\phi 5$ m



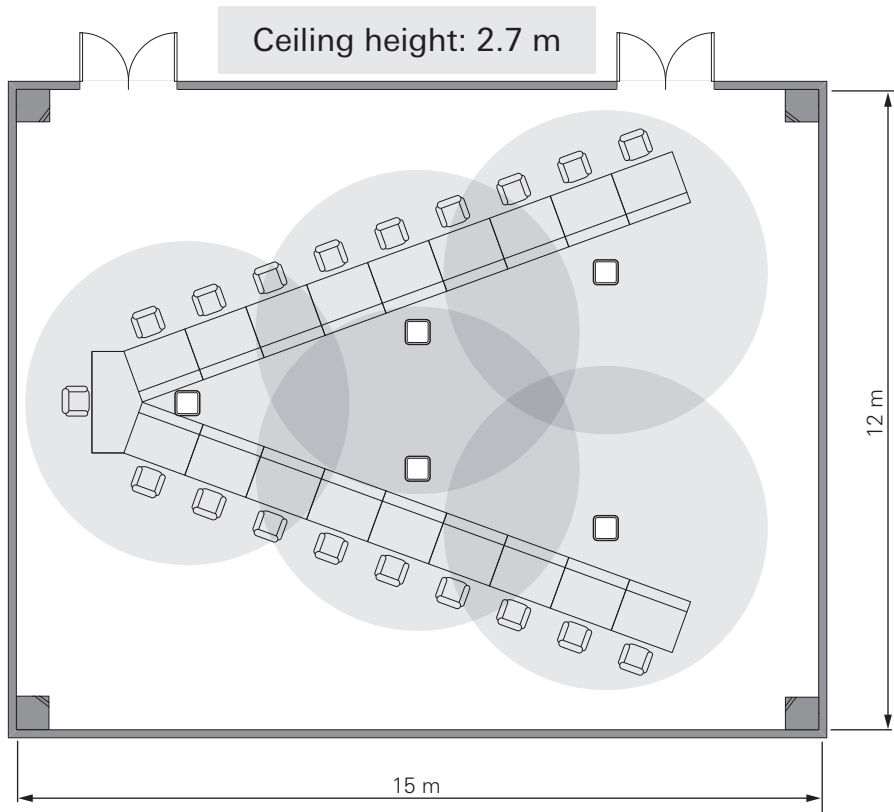
Long U shape desks [W: 18 m, D: 12 m, H: 2.7 m], transmission area: approximately $\phi 6$ m



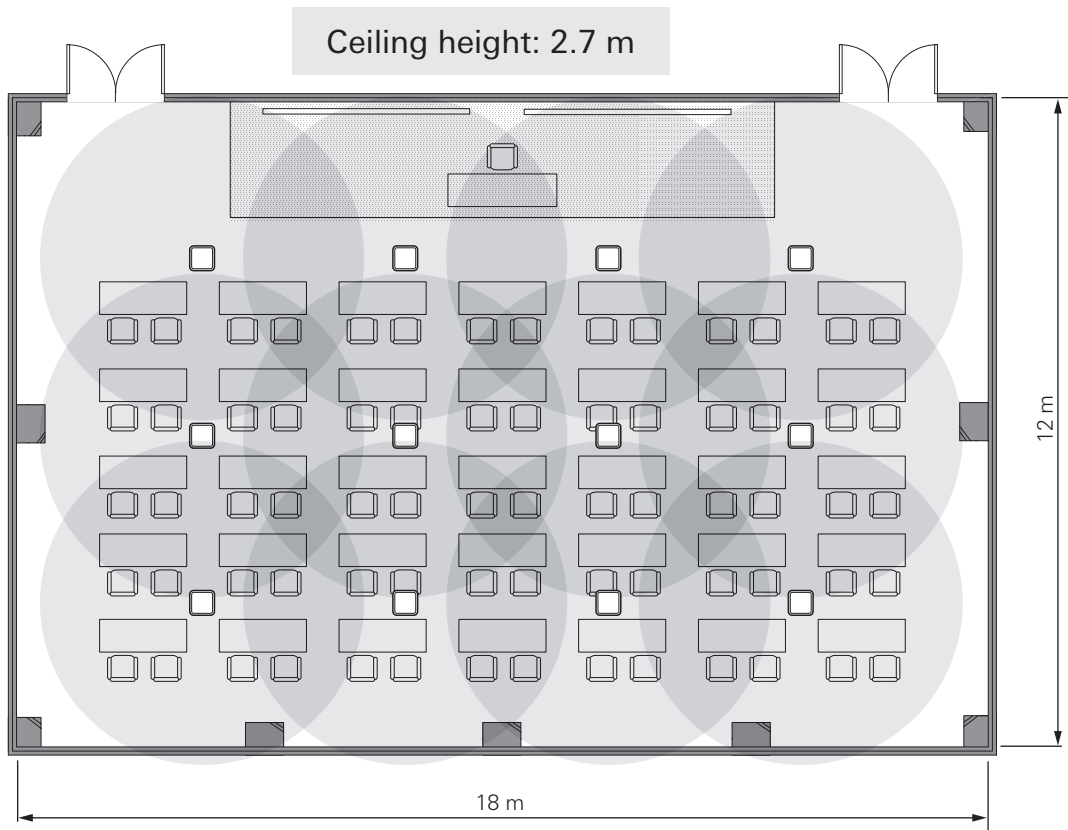
Long U shape + desks on both sides [W: 18 m, D: 12 m, H: 2.4 m], transmission area: approximately $\phi 5$ m



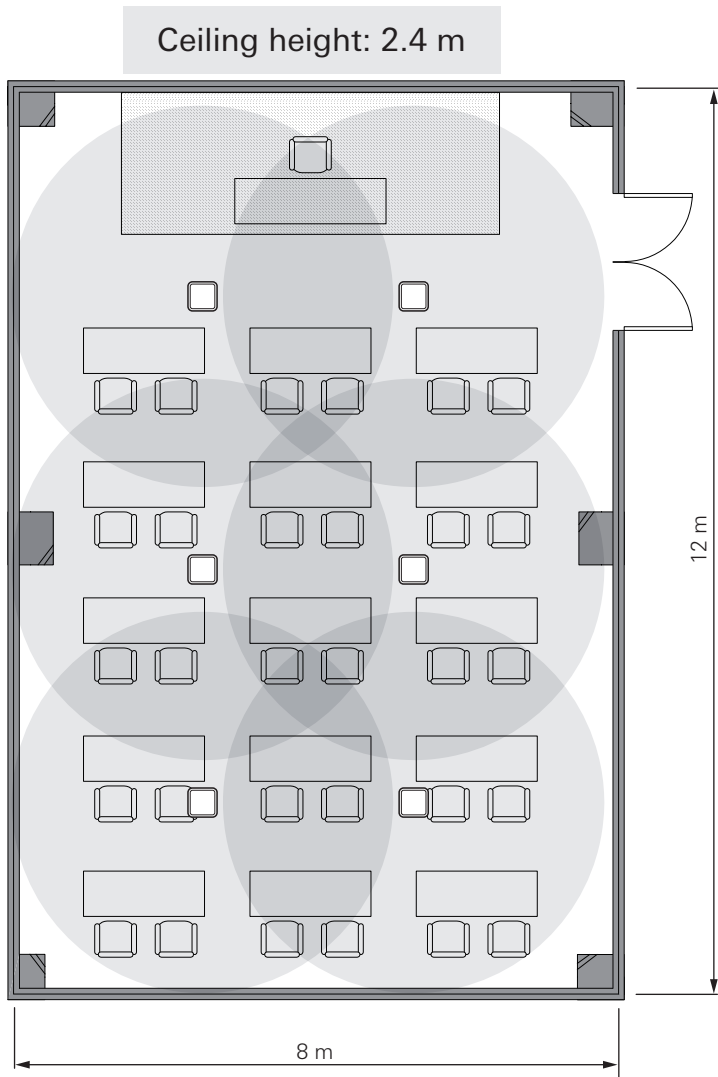
V shape [W: 15 m, D: 12 m, H: 2.7 m], transmission area: approximately $\phi 6$ m



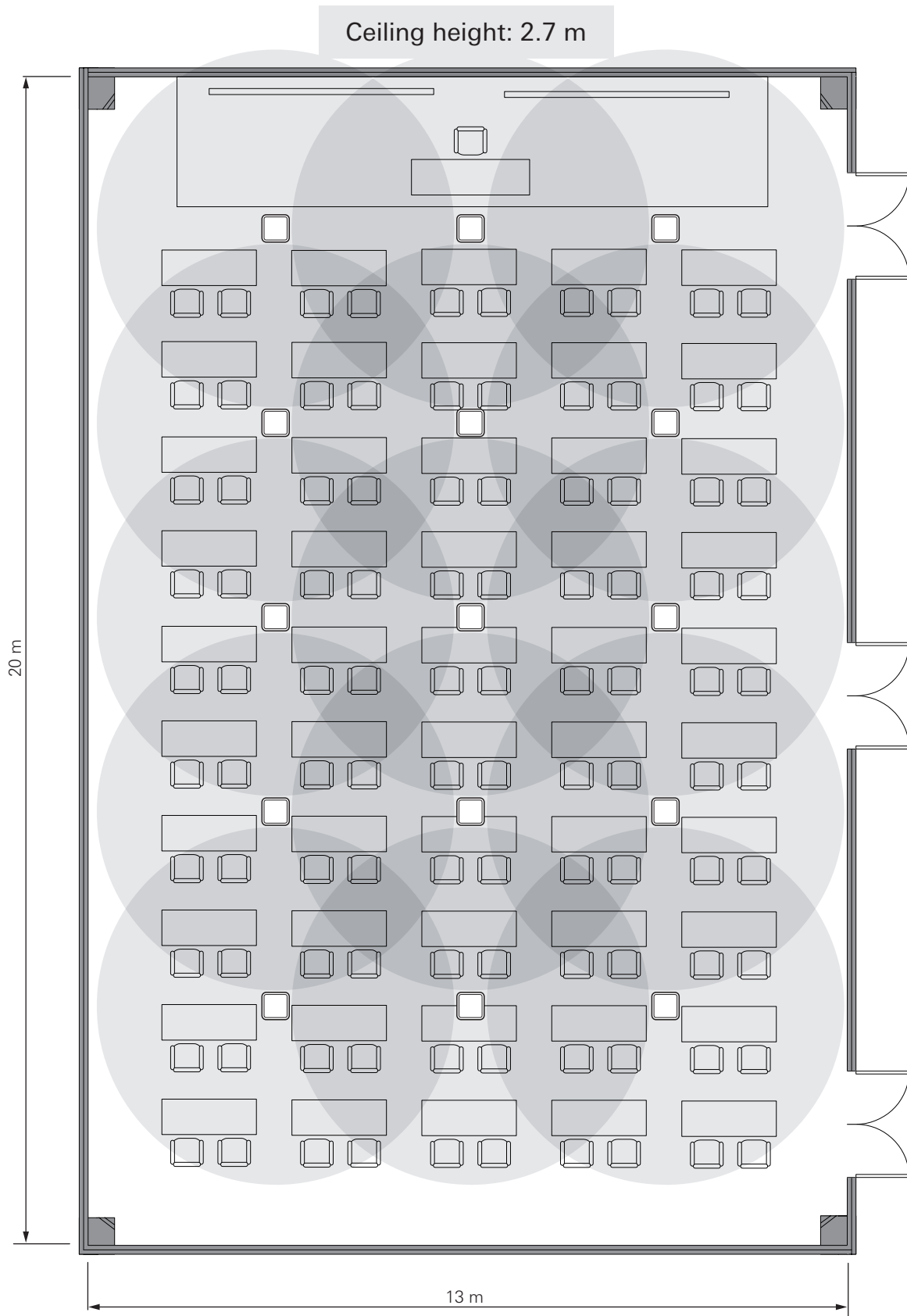
School format (horizontal) [W: 18 m, D: 12 m, H: 2.7 m], transmission area: approximately $\phi 6$ m



School format (vertical) [W: 8 m, D: 12 m, H: 2.4 m],
transmission area: approximately $\phi 5$ m

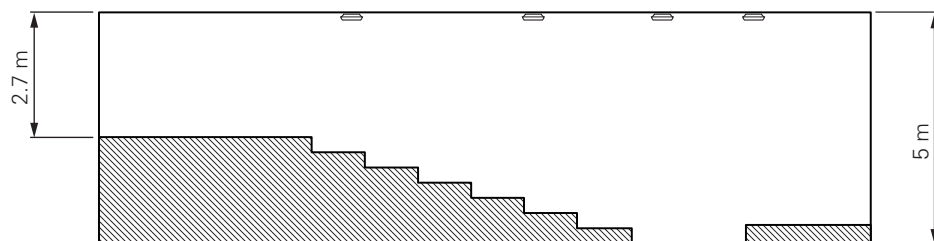
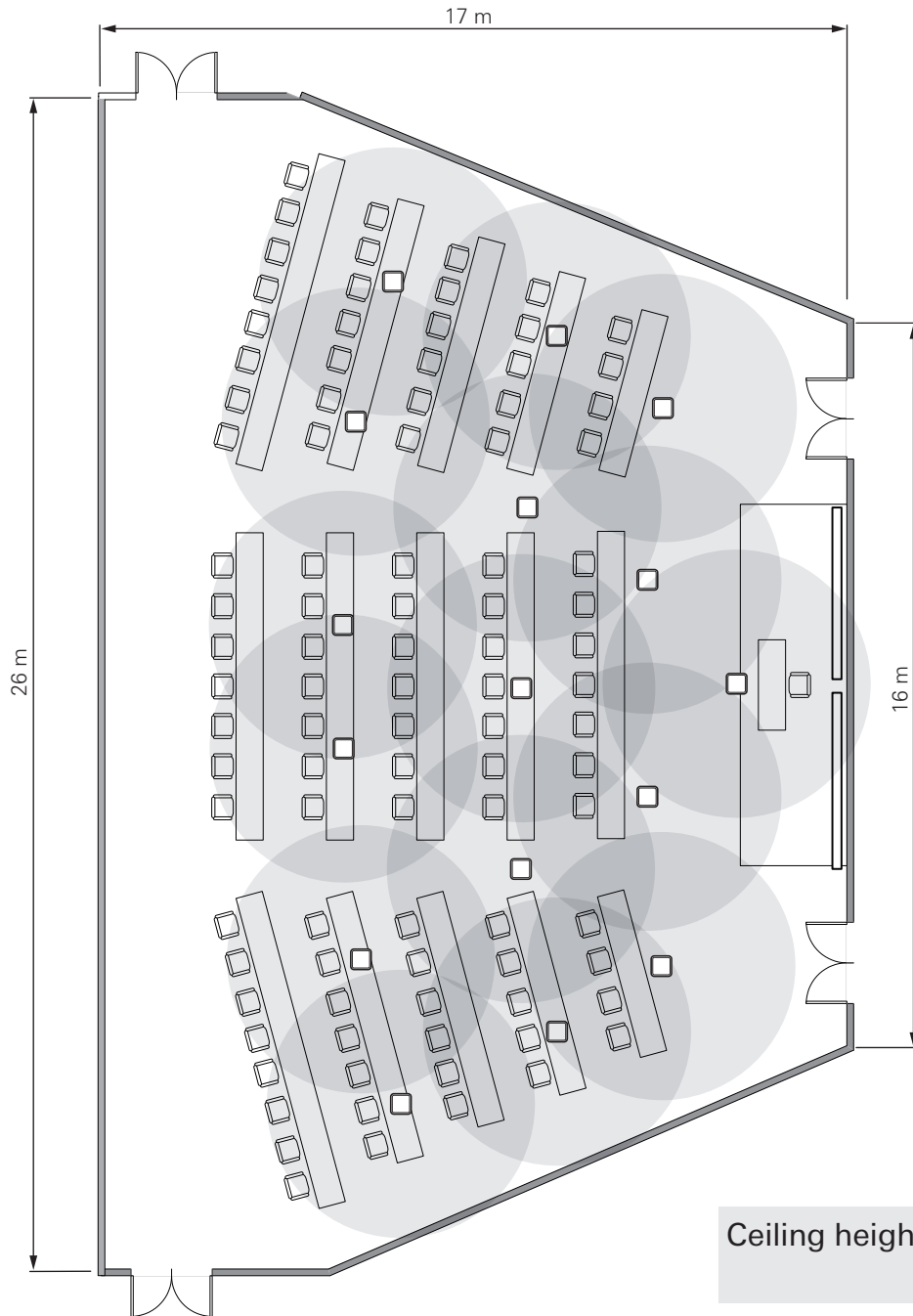


School format (vertical) [W: 13 m, D: 20 m, H: 2.7 m],
transmission area: approximately $\phi 6$ m

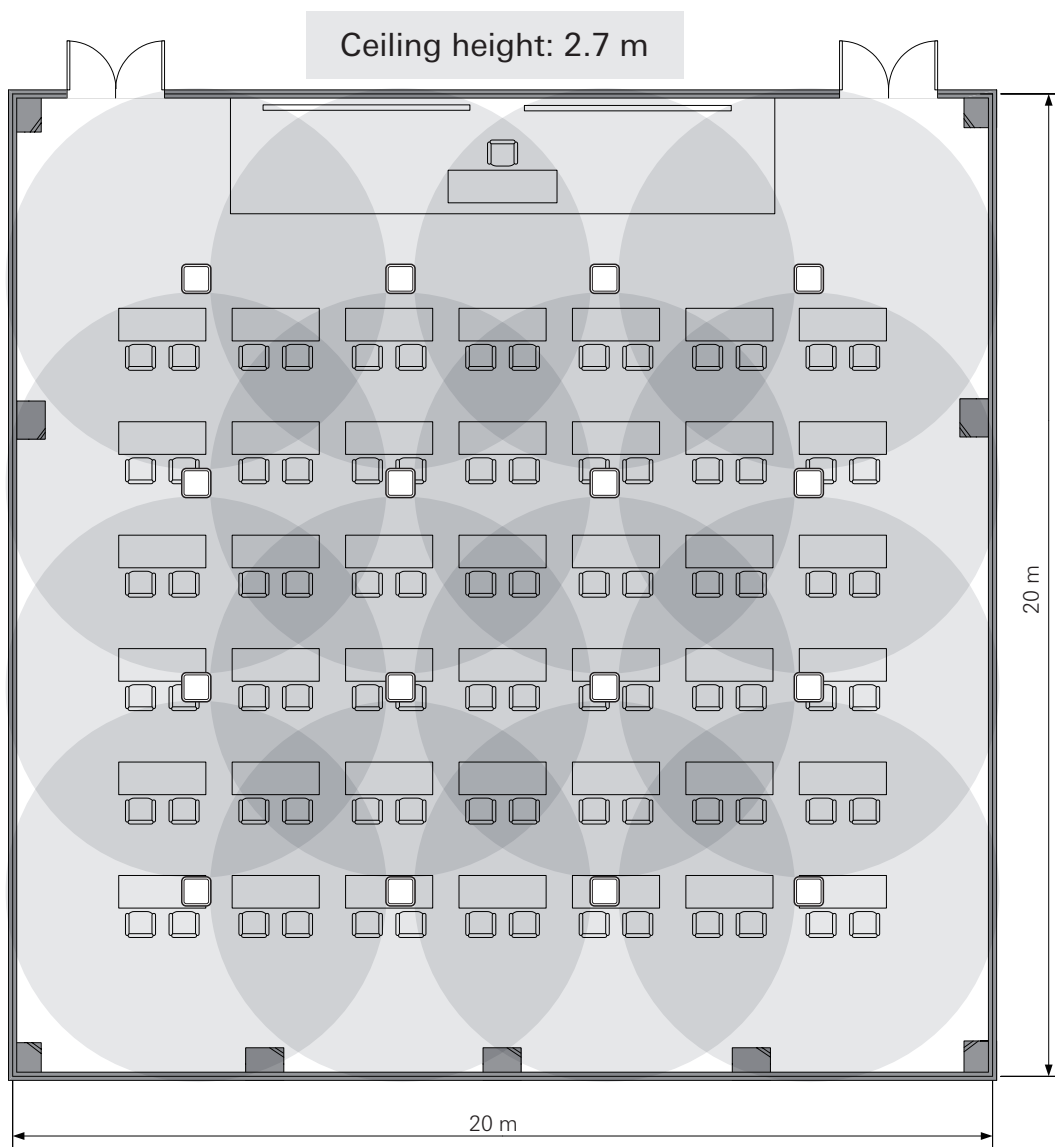


School format (vertical)

[W: 17 m, D: 16 (26) m, H: 2.7 (5) m], transmission area: approximately $\phi 6$ m



School format (maximum 16 units) [W: 20 m, D: 20 m, H: 2.7 m],
transmission area: approximately $\phi 6$ m

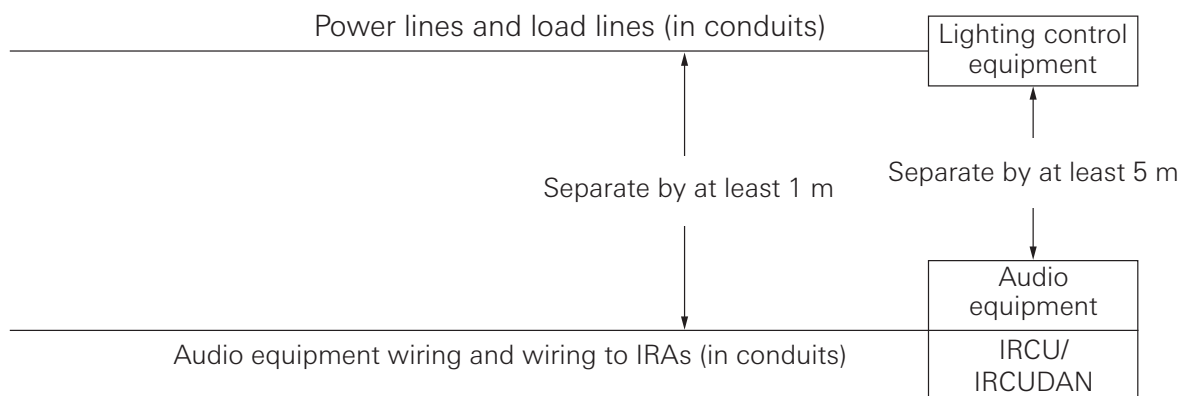
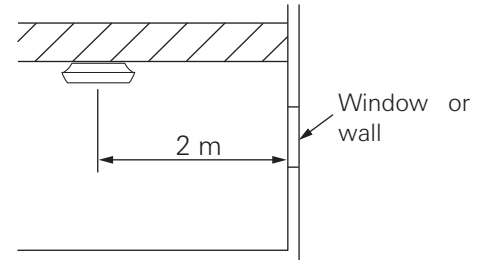


4. Checking for Interference to Infrared Transmissions

Checkpoints ① Interference from sunlight, lighting (incandescent lights, downlights, halogen, etc.), plasma displays, and the position to install the IRAs

About Installation

- The effective range of the infrared transmissions varies depending on the color and material used for ceilings, walls, and other things.
- Noise could be generated regardless of the effective range. If this happens, you need to install the IRAs and IRDUs in suitable locations.
- Do not place any obstacles around the IRDUs.
- Block sunlight with curtains or blinds so it does not shine directly on the equipment.
- If you install IRAs on the ceiling, install them so they are at least 2 meters away from windows and walls. (Refer to diagram on right.)
If you want to install them within 2 meters, contact our sales representative.
- Install IRAs at least 50 cm away from fluorescent lights.
- Implement the following measures in cases where there is a risk of static interference from audio equipment or TVs.
 - The high-frequency currents that flow through power lines and load lines generate magnetic fields that may affect nearby audio signal lines.
 - Measure A: Separate wires to the IRAs and wires to audio and TV antenna equipment (microphone cords, etc.) by at least 1 meter from lighting control wires (load lines and power lines). (Refer to diagram below.)
 - Measure B: Use separate conduits for the lighting control wires and audio equipment wires. (Refer to diagram below.)
 - Measure C: Be sure to use D-type (type 3) ground connections for IRCU/IRCUDAN, lighting controls, and audio controls.
- Implement sufficient precautions because simultaneous interpretation systems and medical equipment may be affected by nearby lighting controls or lighting fixtures that are being controlled.



- If you install IRAs or IRDUs near the following sources that produce infrared light, they may cause the generation of noise or malfunctions in the system.
 - Lighting equipment
 - Projectors (LCD, DLP, etc.), OHP, incandescent light bulbs, etc.
 - Mercury vapor lights, halogen lights, and inverter-type fluorescent lights
 - Plasma displays
 - Lighting controls
- Infrared equipment, such as remote controls, infrared microphones, and infrared LAN
- Digital equipment and wiring, such as digital power amplifiers (speaker wires from digital power amplifiers, etc.)
- Wi-Fi routers

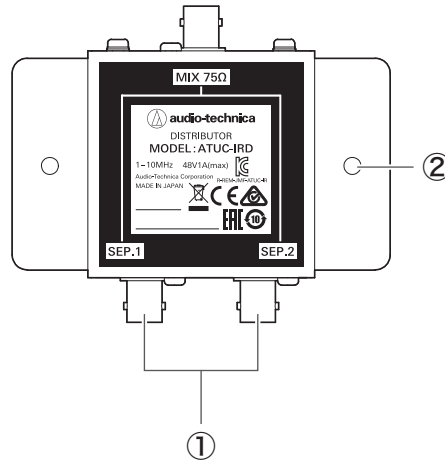
5. Confirming Wiring and Cable Lengths

Checkpoints ① Do not exceed 100 meters for the total length of cable connections.

When installing multiple IRAs, use the same total cable lengths from the IRAs to the IRCU/IRCUDAN. (We recommend a difference of less than 3 m.)

5.1 When Using IRDs

Names of IRD parts



① **BNC connectors**

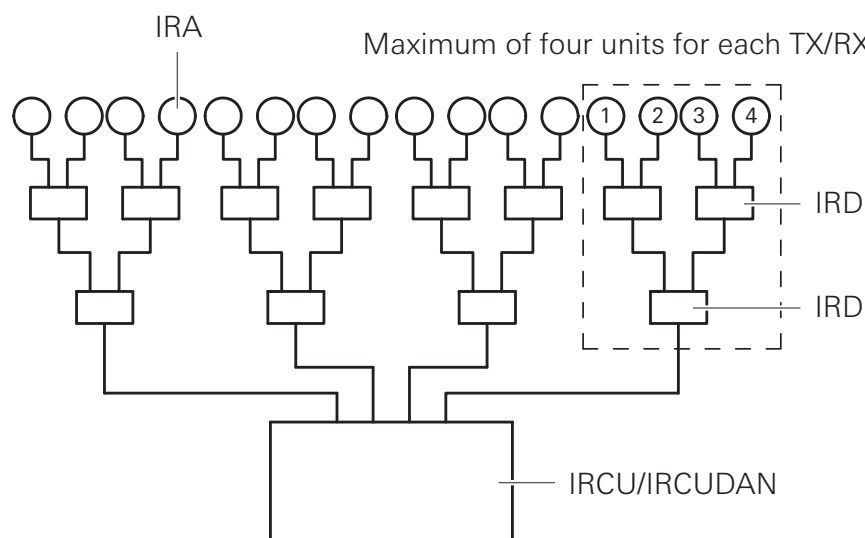
· BNC cables are not included accessories.

② **Mounting holes**

Holes to mount IRD

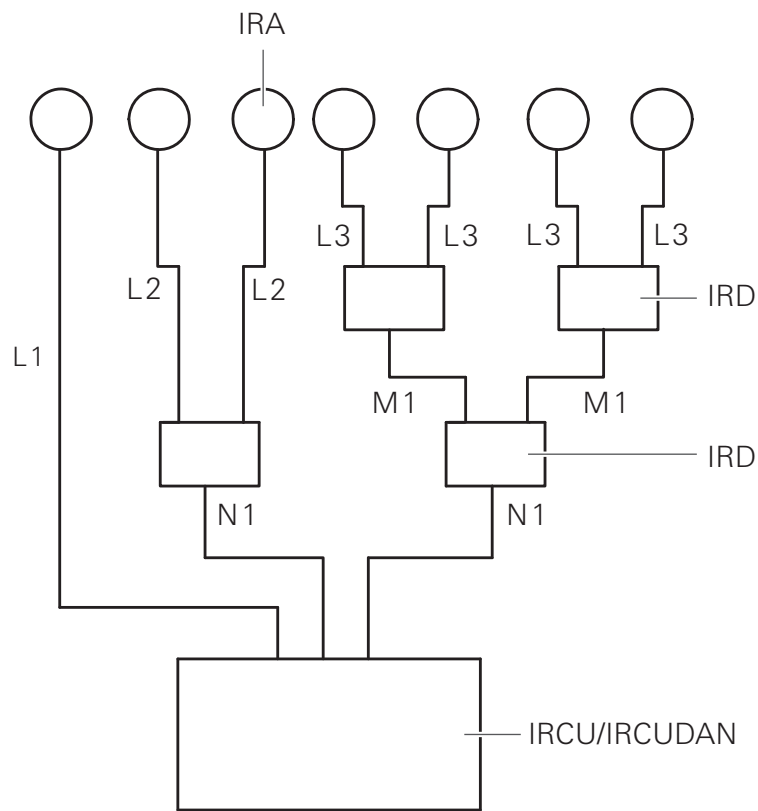
Wiring for IRAs and IRCU/IRCUDAN

You can install up to four IRAs from each TX/RX terminal on the IRCU/IRCUDAN. A maximum of 16 IRAs can be installed by using IRDs.



Length of wiring cables

If the phase of the input signals to each IRA is not the same phase, the reception levels may drop. To synchronize the phases of the signals, use the same total cable lengths from the IRAs to the IRCU/IRCUDAN.



- Length of cables from IRA to IRCU/IRCUDAN: $L1 = L2 + N1 = L3 + M1 + N1$
- Keep the differences in the $L1$, $L2 + N1$, and $L3 + M1 + N1$ cables to within ± 3 m.

5.2 Confirming Wiring Plans

The wiring between the IRAs and the IRCU/IRCUDAN must meet the following two criteria.

- ① Maximum allowable loss in wiring circuit (total loss of cables and distributors): 15 dB or less
- ② Maximum allowable drop in DC voltage: 3 V or less

Use the above values to do the wiring.

Values needed to calculate losses

- ① IRD loss: 4 dB
- ② Attenuation per 100 m of coaxial cable

3C-2V	4.2 dB	RG-59U	3.0 dB
5C-2V	2.7 dB	RG-6U	2.3 dB
7C-2V	2.2 dB	RG-11U	1.3 dB

Values needed to calculate drop in voltage

- ① Operating current for each IRA: 0.09 A
- ② Resistance of IRD: 0.5 Ω
- ③ Loop resistance per 100 m of coaxial cable (at 20°C)

3C-2V	9.14 Ω	RG-59U	4.5 Ω
5C-2V	3.59 Ω	RG-6U	3.0 Ω
7C-2V	2.07 Ω	RG-11U	1.3 Ω

- The attenuation and loop resistance values for coaxial cable are reference values. Check the values of the cables you are using for your actual installation.

5.3 Calculations

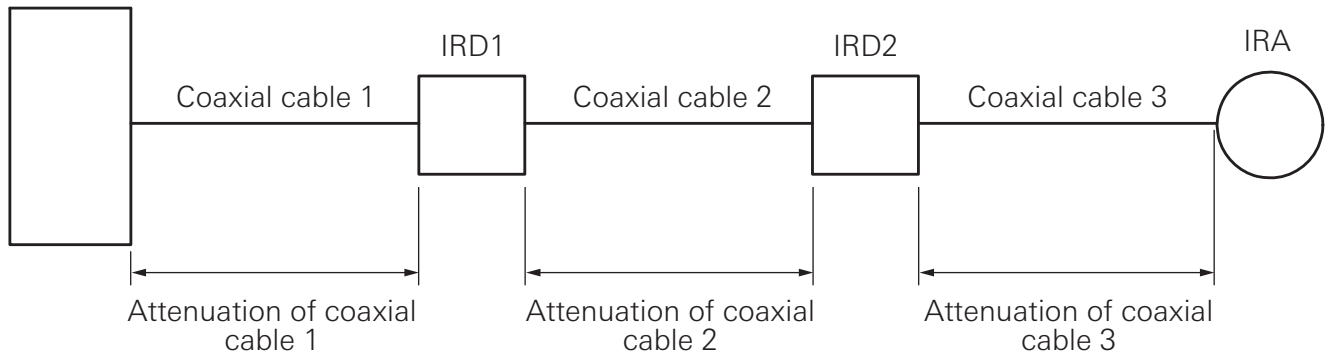
Calculating losses in wiring circuits

Conditions: Total attenuation ≤ 15 dB

Attenuation of cable = (length/100) \times attenuation per 100 m

Total attenuation = Attenuation of coaxial cable 1 + attenuation of coaxial cable 2 + attenuation of coaxial cable 3 + attenuation of IRD1 + attenuation of IRD2)

IRCU/IRCUDAN



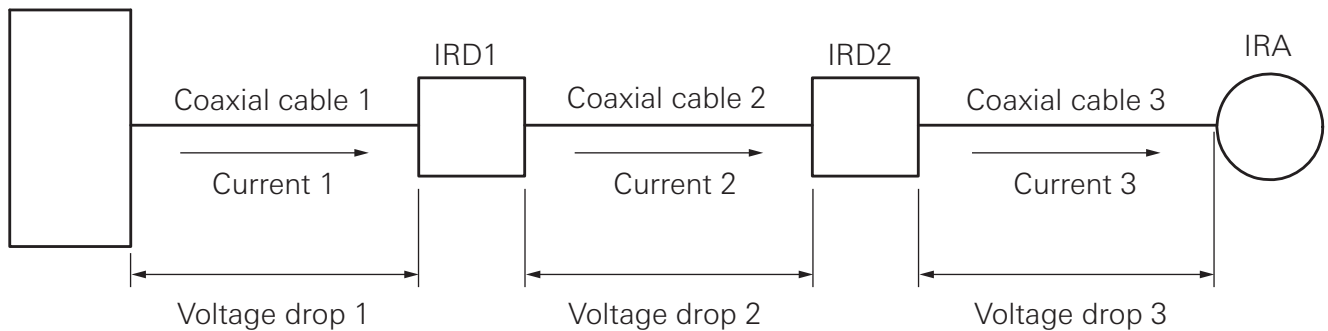
Conditions: Total voltage drop ≤ 3 V

Voltage drop of cable = (length/100) \times loop resistance per 100 m of cable \times current

Current flowing in cable = Number of IRAs connected to one TX/RX terminal $\times 0.09$ A

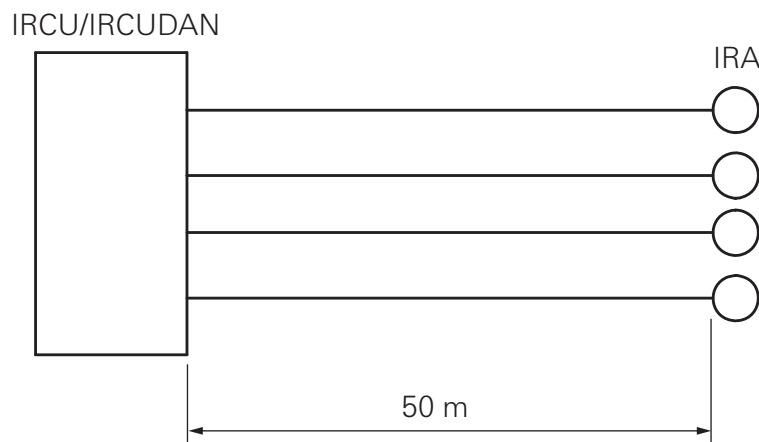
Total voltage drop = Voltage drop 1 + voltage drop 2 + voltage drop 3

IRCU/IRCUDAN



Example 1: When 4 IRAs are installed

Conditions: Assuming the distance from IRCU/IRCUDAN to IRAs is 50 m. When 5C-2V coaxial cable is used.



1) Calculating maximum allowable loss of cables

Attenuation from IRCU/IRCUDAN to IRAs

$$= 2.7 \text{ dB} \times (50 \text{ m}/100 \text{ m}) = 1.35 \text{ dB}$$

Result is less than maximum allowable loss (15 dB).

2) Calculating maximum allowable voltage drop of cables

Voltage drop from IRCU/IRCUDAN to IRAs

$$= 3.59 \Omega \times (50 \text{ m}/100 \text{ m}) \times 0.09 \text{ A}$$

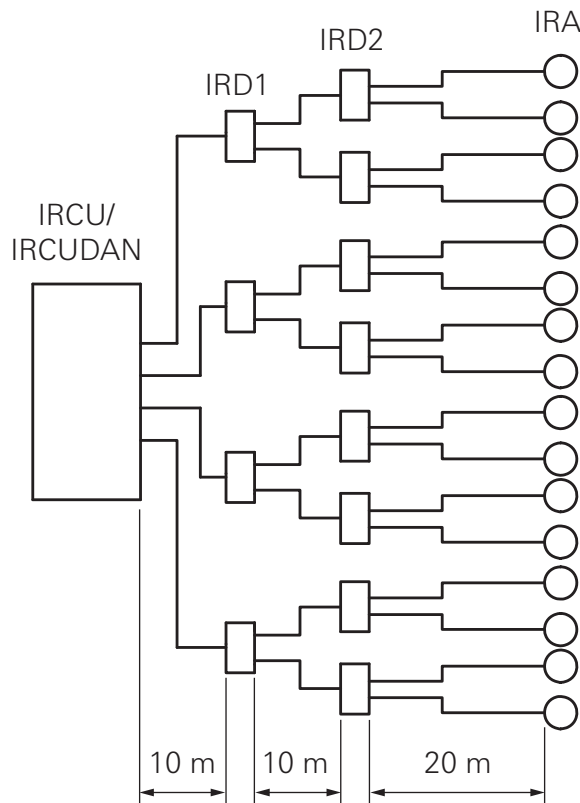
$$= 0.16 \text{ V}$$

Result is less than maximum allowable drop in voltage (3 V).

Use cable lengths that stay within the maximum allowable losses and maximum allowable voltage drops.

Example 2: When 16 IRAs are installed

Conditions: Assuming the distance from IRCU/IRCUDAN to IRD1 is 10 m, the distance from IRD1 to IRD2 is 10 m, and the distance from IRD2 to IRA is 20 m. When 5C-2V coaxial cable is used.



1) Calculating maximum allowable loss

- ① Attenuation from IRCU/IRCUDAN to IRD1 = $2.7 \text{ dB} \times (10 \text{ m}/100 \text{ m}) = 0.27 \text{ dB}$
- ② Attenuation from IRD1 and 2 = $2.7 \text{ dB} \times (10 \text{ m}/100 \text{ m}) = 0.27 \text{ dB}$
- ③ Attenuation from IRD2 to IRA = $2.7 \text{ dB} \times (20 \text{ m}/100 \text{ m}) = 0.54 \text{ dB}$
- ④ Loss from IRD1 and 2 = $4 \text{ dB} + 4 \text{ dB} = 8 \text{ dB}$

The total attenuation from the cables and loss from the IRDs is 9.08 dB ($0.27 \text{ dB} + 0.27 \text{ dB} + 0.54 \text{ dB} + 8 \text{ dB}$), which is less than the maximum allowable loss (15 dB).

2) Calculating maximum allowable drop in voltage

- ① Voltage drop from IRCU/IRCUDAN to IRD1
= $3.59 \Omega \times (10 \text{ m}/100 \text{ m}) \times 0.09 \text{ A} \times 4 = 0.129 \text{ V}$
- ② Voltage drop of IRD1 = $0.5 \Omega \times 0.09 \text{ A} \times 4 = 0.18 \text{ V}$
- ③ Voltage drop between IRD1 and 2 = $3.59 \Omega \times (10 \text{ m}/100 \text{ m}) \times 0.09 \text{ A} \times 2 = 0.064 \text{ V}$
- ④ Voltage drop of IRD2 = $0.5 \Omega \times 0.18 \text{ A} = 0.09 \text{ V}$
- ⑤ Voltage drop between IRD2 and IRA = $3.59 \Omega \times (20 \text{ m}/100 \text{ m}) \times 0.09 \text{ A} = 0.064 \text{ V}$

The total voltage drop is 0.527 V ($0.129 \text{ V} + 0.18 \text{ V} + 0.064 \text{ V} + 0.09 \text{ V} + 0.064 \text{ V}$), which is less than the maximum allowable voltage drop (3 V).

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