AUDIO ENHANCEMENT®

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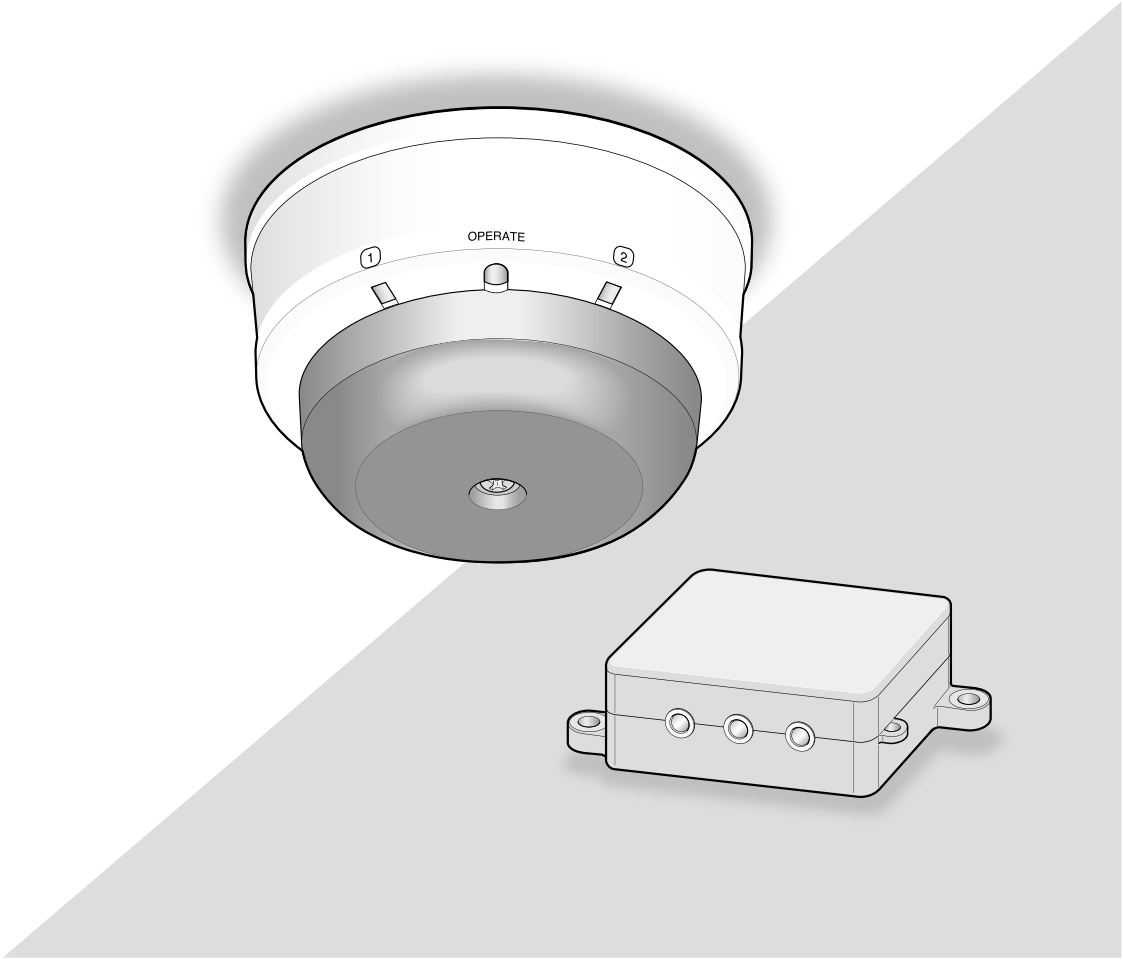
Operating Instructions

IR-Satellite Infrared Sensor/Receiver

Model No. TLD100



Before attempting to connect or operate this product,
please read these instructions carefully and save this manual for future use.

The model number is abbreviated in some descriptions in this manual.

WARNING:

- The main plug or an appliance coupler shall remain readily operable.
- To prevent injury, this apparatus must be securely attached to the floor/wall/ceiling in accordance with the installation instructions.
- The connections should comply with local electrical code.

CAUTION:

- Before attempting to connect or operate this product, please read the label on the back.

For Canada

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numéique de la classe A est conforme la norme NMB-003 du Canada.

For U.S.A

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Caution: To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. For example, use only shielded interface cables when connecting to computer or peripheral devices.

For U.S.A.

The model number and serial number of this product may be found on the surface of the unit.
You should note the model number and serial number of this unit in the space provided and retain this book as a permanent record of your purchase to aid identification in the event of theft.

Model No. _____

Serial No. _____

Important safety instructions

1) Read these instructions.

2) Keep these instructions.

3) Heed all warnings.

4) Follow all instructions.

5) Do not use this apparatus near water.

6) Clean only with dry cloth.

7) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

8) Protect the power cord from being walked on or pinched, particularly at plugs, electrical outlets, and the point where they exit from the apparatus.

9) Only use attachments/accessories specified by the manufacturer.

10) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

11) Unplug this apparatus during lightning/electrical storms or when unused for long periods of time.

12) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

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Disclaimer of warranty

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(1) ANY DAMAGE AND LOSS, INCLUDING WITHOUT LIMITATION, DIRECT OR INDIRECT, SPECIAL, CONSEQUENTIAL OR EXEMPLARY, ARISING OUT OF OR RELATING TO THE PRODUCT;
(2) PERSONAL INJURY OR ANY DAMAGE CAUSED BY INAPPROPRIATE USE OR NEGLIGENT OPERATION OF THE USER;
(3) UNAUTHORIZED DISASSEMBLY, REPAIR OR MODIFICATION OF THE PRODUCT BY THE USER;
(4) ANY PROBLEM, CONSEQUENTIAL INCONVENIENCE, OR LOSS OR DAMAGE, ARISING OUT OF THE SYSTEM COMBINED BY THE DEVICES OF THIRD PARTY.

Preface

The units described in this installation guide are the models that are compatible as of April 2012. Contact your dealer for further information.

Precautions

- Contact your dealer for installation.
  Skill and experience are required for installation to avoid risk of fire, electric shock, injury and damage.
- Do not insert objects.
- If water or metallic items are inserted inside, there is a risk of fire or electric shock.
  Unplug all cables and contact your dealer.
- Do not disassemble and modify.
  There is a risk of fire or electric shock.
- Stop using the product immediately if any abnormality is detected.
  There is a risk of fire if you continue to use the product after smoke or odor is detected.
  Unplug all cables and contact your dealer.
- Avoid placing the product in unstable positions to prevent falling or injury.
- Be sure to hold the plug while pulling the power cable. The cable may be damaged and there is a risk of fire or electric shock.
- Dust off the power plug of power cable periodically.
  If dust accumulates, insulation failure caused by humidity occurs and there is a risk of fire.
  Unplug the power plug and wipe it with a dry cloth.
- Insert the power plug of power cable completely.
  There is a risk of electric shock or overheating if the insertion is incomplete.
  Do not use a damaged or loosened plug and AC outlet.
- Do not use the product beyond the rated value of the AC outlet or wired devices.
  Do not use voltage of more than 100 V AC – 240 V AC.
  Multiple circuit wiring exceeding the rated value may result in overheating and fire.
- Do not use the power cable or the AC adaptor in a way that may cause damage (modifying, placing near heat, bending excessively, twisting, stretching, weighing down or bundling). There is a risk of electric shock, short-circuit or fire when using damaged power cable or AC adaptor. Contact your dealer.
- To avoid electric shock, do not handle the power plug or power cable with wet hands.
- Avoid placing containers of liquid such as water near the product.
  If liquid spills onto the product, it may cause fire or an electric shock.
  Unplug all cables and contact your dealer.
- Do not install or wire during lightning/electrical storms.
  There is a risk of fire or electric shock.
- Fix the mounting screw firmly to prevent falling or or injury.
  Contact your dealer for installation.
- Use the specified Switch-mode power supply (hereinafter, AC adaptor).
  There is a risk of electric shock if any unspecified AC adaptor is used.
  Make sure to use the supplied AC adaptor.
- Be sure to turn off the power of this product before installation.
  There is a risk of electric shock.
- Do not place the product in humid or dusty locations.
  There is a risk of fire or electric shock.
- Power supply: 100 V AC – 240 V AC. (Using supplied AC adaptor)
  Do not use the same AC outlet with high-powered products (such as copy machine or air conditioner).
- Operating temperature (including AC adaptor):
  0 °C to +40 °C {+32 °F to + 104 °F}.
  If the product is used in temperature out of this range, internal parts may be badly affected, and malfunctions may occur.
- Condensation:
  There is a high risk of condensation when humidity is high or when the product is transferred from low to high temperature. When condensation occurs, wait for around 1-2 hours, and after confirming the condensation has disappeared, turn on power.
- Unplug the power plug of AC adaptor when out of use for long periods of time.
- Microphone:
  Match the channel of the microphone and the product in use.
  Keep the distance of each microphone more than 50 cm {19-11/16 inches}.
- Noise:
  The noise produced from electrical devices such as a lighting fixture or plasma display when turned “ON” or "OFF" may cause loud noise from the product.
  Keep the infrared wireless devices and coaxial cables away from the source of noise (high-powered products such as copy machine or air conditioner and their power cables) in order to reduce noise.
- Keep this product away from dripping or splashing water.
- Avoid placing receptacles that contain liquids, such as vases, on the product.
- After discontinuing use of the product, it should be removed to prevent it from dropping.

Product care

- Unplug the power plug of AC adaptor before cleaning the product, otherwise injuries may result.
- Wipe with a dry soft cloth.
- Do not clean with volatile liquids such as benzine and thinner. When using a chemical cloth for cleaning, observe the precautions provided with that product.

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Features

This unit is a receiver which integrates both a sensor receiving infrared light from the infrared wireless microphone (MTD-09, MHH-09) and a receiving component. Integration of a receiving component and a sensor allows an infrared wireless microphone system to be simply constructed by mounting this unit on the ceiling. Use of the supplied conversion box provides extension between the receiver and an amplifier, and accordingly leads to flexibility in installation locations.
This unit also includes the feedback blocker to decrease feedback generated when the microphone and speaker approach each other.

- As the unit uses infrared light, it is not affected by interference from adjacent rooms.
- The microphone is available as a handheld model (MHH-09) and as a pendant “teardrop” model (MTD-09). The 2-channel microphone of this unit and the audio level of the line can be controlled with the pendant type.

Caution about interception of transmission

This product is a wireless system using infrared, and the transmission and reception of audio signals are possible within the range that the infrared light can reach.
If any third party is within the range of the infrared, the audio signals can reach anywhere unless there are obstacles (such as walls). Therefore, if there is no action taken to prevent interception, malicious third parties may listen to content by intercepting the infrared intentionally.

In order to handle this problem, you may set up infrared shielding materials such as shade curtains to close the transmitting and receiving range to reduce the interception.
We would like you to fully understand the risks of using this product without taking precautions for interception, and we recommend you take your own preventative measures.
If interception occurs due to negligence or the specifications of the infrared wireless, we shall not take any responsibility for the damages that are caused thereby.

Caution about external-device control function

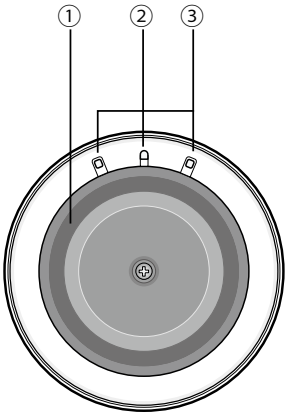
This product is not intended for a security application.
Never use the external-device control function of the product for security use.
We shall not take any responsibility for damages resulting from troubles or malfunction due to cable disconnection.

Caution about feedback blocker

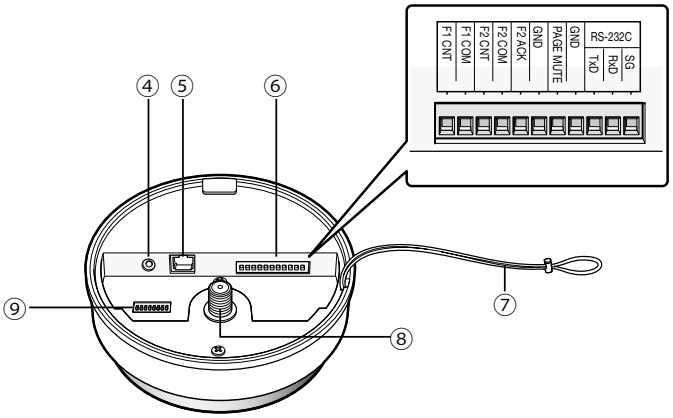
The feedback blocker, with which this product is equipped, is not intended to suppress the feedback howling completely.
A sudden large noise may be produced even when the feedback blocker is activated.
When installing speakers and a sensor, make sure that the feedback howling is not produced.

Major operating controls and their functions (IR-Satellite or Sensor)

Front



Back



① **Infrared sensor cover**
To receive only the infrared by the inner sensor, the visible light is filtered out by this infrared sensor cover.

② **Operation indicator [OPERATE] (Green/Yellow/Red)**
This LED lights green when the power is on and this unit is receivable under normal conditions.
This LED lights as follows to indicate other states:
F2 signal output provided: red light
Page mute signal received: yellow light
See page 16 for further information on operation.

③ **Reception indicator [1/2]**
This LED lights green when this unit is receiving signals from each microphone under normal conditions.
This LED lights as follows to indicate other states:
F1 or F2 signal output provided: red light
Page mute signal received: yellow light
Feedback blocker in operation: yellow light
See page 16 for further information on operation.

④ **LINE IN connector [LINE IN L/R]**
This connector is used to provide an audio input from external sources such as a projector or CD. This is a stereo, line level input, and is internally mixed to a monaural signal.
A stereo mini plug (ø3.5 mm) is used.

⑤ **Conversion box connector [TO CONVERSION BOX]**
This connector is used to connect the cable to the supplied conversion box.
A standard CAT5 or CAT5e cable is used to connect to the conversion box.

CAUTION:
- DO NOT connect this device to any type of Ethernet (LAN) system.

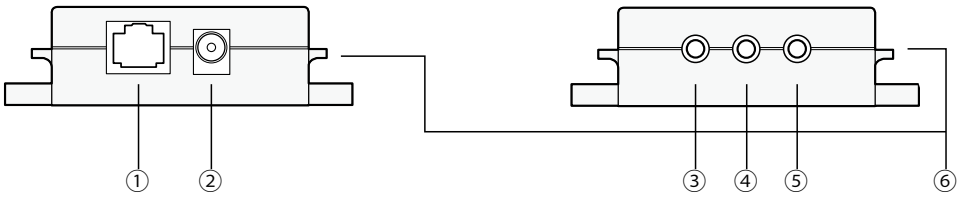
⑥ **Control (Auxillary) terminals**
An 11-pin Euro block is used.
The following terminals are equipped.
F1 CNT: provides F1 signal* output controlled by MTD-09.
F2 CNT: provides F2 signal* output controlled by MTD-09.
* These are available when MTD-09 is used. Settings of F1 and F2 are performed with MTD-09.
F2 ACK: used to activate F2 ACK LED signal.
PAGE MUTE: provides signal inputs externally when the paging function is used.
RS-232C: is used to control this unit via communication from an external device.

⑦ **Safety strap**
This strap is attached to the ceiling mount bracket and prevents the sensor/receiver from dropping.

⑧ **Extension sensor input connector [EXT SENSOR]**
This connector is used for sensor extension. A single additional sensor (EDS-07) can be connected directly to this connector. A total of 4 sensors can be connected to this terminal with the additional coupler (AE-DCF).

⑨ **DIP Switch**
This switch can select the operation mode of each function equipped in this unit (see page 17).
The settings of this switch are updated at the time of turning on the power. Settings changed while powered up are not updated until the power is turned off and then back on (excluding DIP Switches No. 7 and 8).

Major operating controls and their functions (Conversion box)



① **Receiver connector [TO RECEIVER]**
This connector, labeled “TO RECEIVER”, is used to connect a cable to the sensor/receiver.

② **DC power connector [DC IN]**
This connector is used to connect the supplied AC adaptor. No switch is equipped in this unit. This unit operates immediately after connecting the AC adaptor to this connector.

③ **Microphone CH1 output connector [CH1]**
This connector provides the audio output of microphone CH1 received by this unit. This is a TRS balanced output.

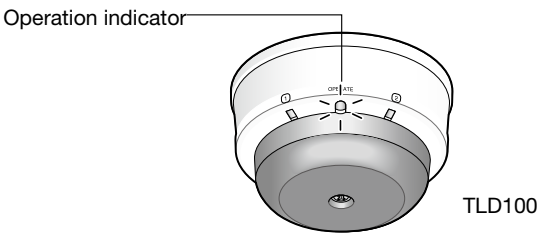
④ **Microphone CH2 output connector [CH2]**
This connector provides the audio output of microphone CH2 received by this unit. This is a TRS balanced output.

⑤ **Mixing output connector [MIX OUT]**
This connector provides the audio output of LINE IN of the main unit. Setting the No. 4 of the DIP switch to ON allows the audio outputs of the microphone CH1 and CH2 received by this unit to be provided after mixing with LINE IN. This is a TRS **balanced** output: Tip (+), Ring (-), Sleeve (ground).

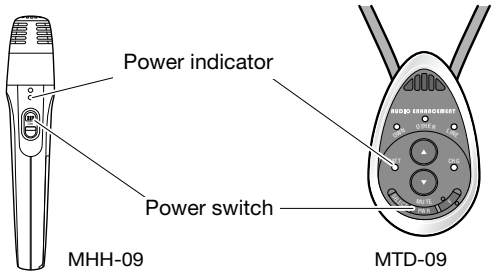
⑥ **Cable binding hook**
This hook is used to hold cables with a cable tying band or the like.

Operating procedures

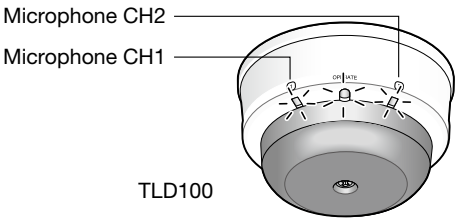
1 Insert the plug of the supplied AC adaptor into the wall outlet.
The operation LED of the sensor/receiver lights green.



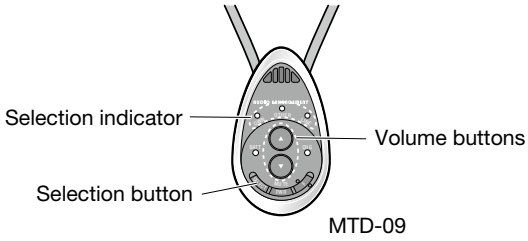
2 Turn on the power switch of the microphone. (MTD-09, MHH-09)
The reception LED indicator of the sensor/receiver lights green depending on a channel to be received.



3 Adjust the volume of external devices such as an amplifier.
The overall volume is adjusted with an amplifier or another external device. Use of the volume button of MTD-09 allows the volume of itself to be adjusted. In addition, selection of the target with the selection button of the MTD-09 allows the volume of the other microphone received by this unit and the volume of LINE IN of this unit to be adjusted.



4 The LED of the sensor/receiver indicates the operating state of this unit during operation.
Refer to page 16 for further information.



	LED of sensor/receiver	
	Operation indicator	**Reception indicator** 1/2
F2 signal output provided*	Red light	Red light (Green light at F2 ACK input provided)
F1 signal output provided*	Green light	Red light (for 300 ms)
Page mute signal input provided	Yellow light	Yellow light
Microphone volume operated*	Green light	No light (for 300 ms)
Feedback blocker operated	Green light	Yellow light (for 5 s)

*Applicable when MTD-09 is used

Note:
- Read the operating instructions of the microphones (MTD-09, MHH-09) as well.
- The volume adjusted with the volume button of the microphone retains its level even if the power is turned off.

Precautions for installation

The installation should be carried out following local standards for electric products.

⚠ **Warning**

- Be sure to contact your dealer for installation.
  Before installing, turn off the power of the connecting product. In addition, be sure to read "Precautions" carefully and follow the instructions. Moreover, be sure to read operating instructions of the connecting product as well.

- **Power**
  Connect the power plug of the AC adaptor by using a circuit breaker in any of the following ways:
  Install this product near the power outlet.
  Connect this product with the breaker of a distribution board which has a contact point of not less than 3.0 mm {3/32 inches}.
  Use a breaker that can block all the poles except for protective earth conductors.
  Connect this product via the outlets of devices that can block power such as a power control unit.

- **Static Electricity**
  Discharge any static electricity charged in your body by touching a metallic area before installing in order to prevent damage caused by static electricity.

- **Install the infrared sensor within a range that the microphone can reach and in a location that can be seen in moving range.**

- **Be sure the connector and coaxial cable are connected in the correct way.**
  If the process and connection are incomplete, receiving sensitivity may be reduced and product will be more easily affected by external noises.

- **Do not install in locations where strong light or sunlight strikes the infrared sensor directly.**
  If the product is installed near a window, the product is subject to the solar light even if the solar light does not strike it directly, which may reduce the receiving sensitivity and shorten the range. Install the product as far from strong light as possible (more than 5 m {16 feet}). If the situation is still not improved, it may be better to install it farther from window side or use a curtain or window shade.

- **Avoid installing near a warm air flow path. In addition, if the product is installed in locations with an abundance of moisture, dust or vibration, there is a risk of damage.**

- **In locations with a large amount of dust, the dust may accumulate on the Infrared Sensor Cover, which may interfere with reception of the infrared signal. As a result, the range may be reduced. Therefore, avoid installing in locations with a lot of dust.**

- **Do not install and use in following locations:**
  ① Locations directly affected by rain or water (including spaces under the eaves).
  ② Locations such as a pool where medical agents are used.
  ③ Locations such as a kitchen or factory workshop where there is a lot of vapor or oil and special environments such as in flammable atmospheres.
  ④ Locations where radiation or X-rays and strong electric fields or magnetism arise.
  ⑤ At sea or along the coast, and locations such as hot springs where corrosive gases arise.
  ⑥ Locations with a lot of vibrations caused by large vehicles or ships (this is not a product for vehicles).
  ⑦ Locations where water drops made by condensation will splash.

- **Plasma television screens generate infrared interference. It is not recommended to use a plasma display in the same room where the TLD100 is installed.**
  However, if a plasma screen must be used, install it in the following way and after confirming operation, use it very carefully.
  ① Install the infrared sensor in a location where side and back of plasma display cannot be seen, and install it as far away as possible (more than 10 m {33 feet}).
  ② The distance between the infrared sensor and microphone should be as short as possible (within 3 m {10 feet}) while in use.
  ③ Do not put any blocks (including the human body) between the infrared sensor and microphone while in use.
  ④ Even after following these recommendations, interference may still occur.

- **The distance between a fluorescent lamp and the infrared sensor should be as far apart as possible (more than 1 m {3.3 feet}) in installing.**

- **If a remote controller such as an audio-visual device or air conditioner is controlled by an infrared sensor, noise or sound breaks may occur.**

- **If there are any other devices making strong noises, product may sometimes be impossible to use. In that case, install the product farther away until it can be used.**

- **Ceiling height is expected to be 2 m {7 feet} to 4 m {13 feet}. If it is out of this range, the arrival range may be shortened.**

- **The base color of wall, floor, and ceiling should be white or light colors. With black or dark color surfaces, the arrival range may be shortened.**

- **A reflection from the wall is used in the arrival range. If the wall is far away from the area of use, the arrival range may be shortened.**

- **Sound breaks may occur near windows or in rooms with a lot of windows. In this case, it may be useful to use light-colored curtains or window shades.**

- **If a microphone is used near and facing a wall, sound breaks may occur.**

- **For tightening bolts and screws, pay attention to the following points:**
  ① Torque control is necessary for tightening the bolts and screws.
  ② Torque wrench and torque driver are necessary for controlling the torque.
  ③ Never use any impact driver or electric drill because torque control is difficult even if they have a clutch. Their use may result in damage to the mounting part.

- **After mounting, confirm visually that the product is firmly and stably fixed. If the product is properly installed, it will not wobble or make noise.**

- **In installing this infrared sensor, be aware of the following:**
  ① Be sure that the installation is carried out by qualified personnel when installing at high locations.
  ② Before installation, confirm that there is nobody around.
  ③ In order to carry out the installation safely and surely, pay close attention to the safety control.

- **The supplied safety strap shall be used.**
  Be sure to firmly secure the safety strap to the ceiling mount bracket at installation.

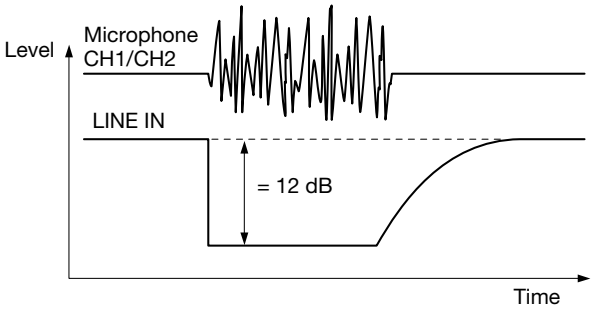
- **Precaution for installation place and securing of the conversion box:**
  The conversion box shall be installed on a stable place such as on a shelf and secured with screws as necessary.

- **Do not apply strong force to this unit. Failure to observe this may damage this unit.**

■ Functions

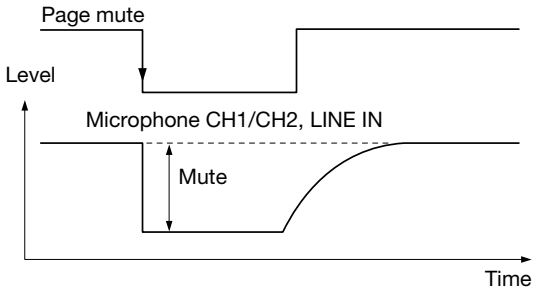
● Microphone override function

This is a function where the audio level of LINE IN is automatically adjusted to lower when the audio input of the microphone CH1 or microphone CH2 is provided. The attenuation of the audio level is –12 dB.
When the audio input of microphone 1 or microphone 2 is no longer provided, the volume of LINE IN automatically returns to the original level.



● Paging mute function

This is a function where the audio outputs of microphone CH1, microphone CH2, and mixing output of this unit are muted by closing the PAGE MUTE terminal.
This function is specified with the DIP switch. This function is set to OFF at default settings.



● Tone function

This is a function where the annunciator tone is provided from the MIX OUT connector when the volume button is operated with the optional microphone, MTD-09. This tone is generated twice at the end of the up or down range.
The level of the operation sound can be selected to HIGH or LOW with the DIP switch. The level is set to LOW at default settings.
This function can be turned on or off with the DIP switch. This function is set to OFF at default settings.

● Microphone/line mixing function

This function is designed to assign microphones CH1 and CH2 to the mixing out, and the three signals (mic 1, mic 2 and line) will be mixed by the mixing out on the DIP switch. No mixing is provided at default settings.

● Remote volume function

The volume of this unit cannot be adjusted with the volume button of the optional microphone, MTD-09.
The volume of external devices can be adjusted with the communication control function of this unit, using the DIP switch.
The volume of the external devices can be controlled with the microphone on this unit's default settings.

● Mixing output attenuator function

Setting the mixing output attenuator to ON reduces the mix output level by 10 dB.
This function is useful when a device with high input sensitivity is connected.
This function is specified with the DIP switch. The output is set to –10 dB at default settings.

■ About the feedback blocker

This is a function when a feedback loop is generated as the microphone is used in close proximity to a speaker.
An integrated filter is automatically selected according to the generated audio frequency, and reduces the uncomfortable feedback loop.
This function is specified with the DIP switch. This function is set to OFF at default settings.

Note:

- This function is simplified and cannot fully remove the feedback loop. When the feedback loop is extremely large, this function will work to mute all the audio outputs of this unit.

■ F1 CNT, F2 CNT function

These functions are available when MTD-09 is used. When F1 or F2 signal is transmitted from the microphone, it will active F1 CNT or F2 CNT terminal on the receiver. Selection between F1 and F2 is made at the microphone side.

Function 1 (F1): Default setting is Open.

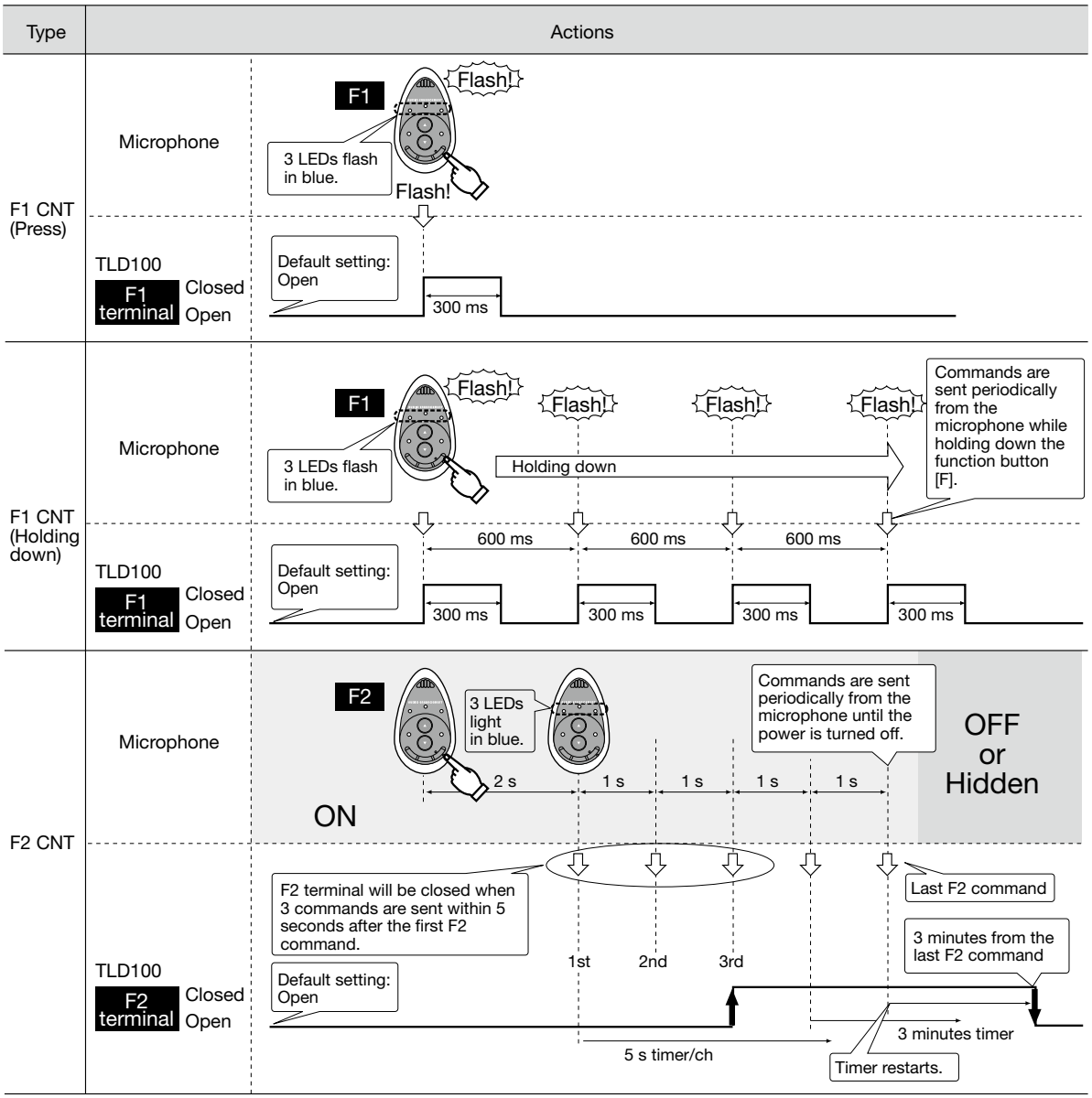
Press the function button [F] of the microphone to select the closed state of 300 ms.

Function 2 (F2): Default setting is Open.

Press the function button [F] of the microphone for 2 seconds or more to select the closed state.

Note:

- To stop the microphone from transmitting the F2 signal, it must be turned off. Then turn off the IR-Satellite Sensor/Receiver (this unit) to reset it.
  If the IR-Satellite Sensor/Receiver (this unit) is not turned off, the F2 terminal will be open (reset) 3 minutes after not receiving a signal from the microphone.

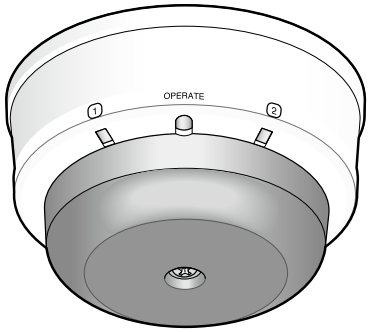


● F2 ACK function

When an F2 ACK signal is received, the reception LED indicator of this unit (CH1 or CH2) turns from red to green.
When, after turning the microphone off and on again, the F2 signal has not been received for three minutes, the operation LED turns from red to green to indicate the normal operating state.

● LED lighting indication (Status-at-a-glance)

The three LEDs of this unit act as operation indicators and will change color based on the operating state (see tables below).
Furthermore, the priority order of indications is dependent on operating states.

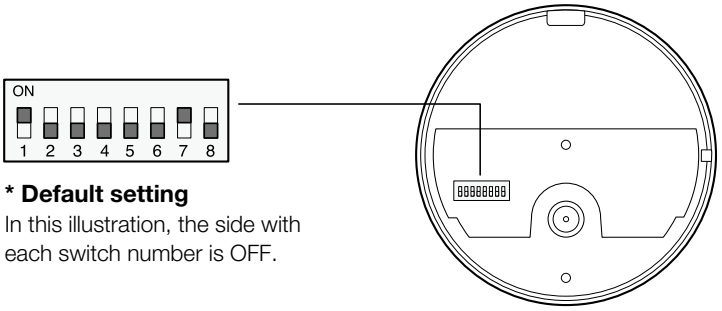


Indication priority	Operating state	LED indication		
		CH1	Operate	CH2
1 (highest)	F2 signal output provided*1	Red	Red*2	Red
		Green light at F2 ACK input provided		Green light at F2 ACK input provided
2	Paging mute signal input	Yellow	Yellow	Yellow
3	F1 signal output provided*1	Red	Green	Red
		Lighting for 300 ms		Lighting for 300 ms
4	Microphone volume button operated*1	No lighting	Green	No lighting
		No lighting for 300 ms at operating volume button		No lighting for 300 ms at operating volume button
5	Feedback blocker operated	Yellow	Green	Yellow
		Lighting for 5 s		Lighting for 5 s
6 (lowest)	Microphone in reception or this unit in operation	Green	Green	Green
		Lighting at receiving with microphone CH1	This unit in operation	Lighting at receiving with microphone CH2

*1 F1 and F2 signal outputs and operating the volume button are available only with the microphone, MTD-09.
*2 The indicator lights green again 3 minutes after the F2 signal is turned off with the microphone, MTD-09 (see page 15).

Note:
- The LED indication indicates the state of the operation with the highest priority among operations of this unit. After the indication of the operating state with the higher priority ends, the operating state with the next higher priority is indicated, and this pattern is repeated in this manner.

● DIP switch setting



*** Default setting**
In this illustration, the side with each switch number is OFF.

No	Name	Function	On	Off
1	Microphone Override	Selection of microphone override function	Activated*	Deactivated
2	Tone ON/OFF	Selection of tone signal from this unit at operating volume button of MTD-09	Tone ON	Tone OFF*
3	Tone Level High/Low	Selection of tone signal (2 levels) at operating volume button	High level	Low level*
4	Microphone/Line Mixing	Selection of whether to mix the microphones CH1 and CH2 to the mixing output (Line Out)	Mixing activated	Mixing deactivated*
5	Feedback Blocker setting	Selection of feedback blocker function	Feedback blocker activated	Feedback blocker deactivated*
6	Remote Volume setting	Selection of remote volume function, normal mic buttons or reassigned. When this switch is set to ON, the volume control of this unit using the volume button of MTD-09 will be deactivated. This setting is intended for the control of an external device using the volume button of MTD-09 through the serial communication command. (Page 29)	Mic buttons reassigned	Mic buttons normal* (as labeled)
7	Mix Out Attenuator setting	Attenuation of audio output of the mixing output (–10 dB)	ATT effective* -10dB	ATT deactivated
8	Ext Sensor	Set to ON when adding the sensor (EDS-07) as an extension device by utilizing the optional Infrared Sensor Coupler (AE-DCF).	When utilizing the AE-DCF	When not utilizing the AE-DCF*

* Default setting

Note:

- Settings of the DIP switch No. 1 - 6 are recognized when the power of this unit is turned on. Therefore, change of settings after turning on the power does not update the settings of this unit. When settings of the DIP switch are changed, the power needs to be turned off and on again.
  The functions settable with the DIP switch can also be changed through RS-232C (page 29).
  In this case, the communication control can change settings even after the power is turned on.
- The internal circuit is physically changed by the DIP switches No. 7 and 8. It is impossible to change the circuit through RS-232C. Be sure to set these switches manually to ON or OFF.
- Improper setting for the DIP switch No. 8 may shorten the transmission range.

● Channel setting

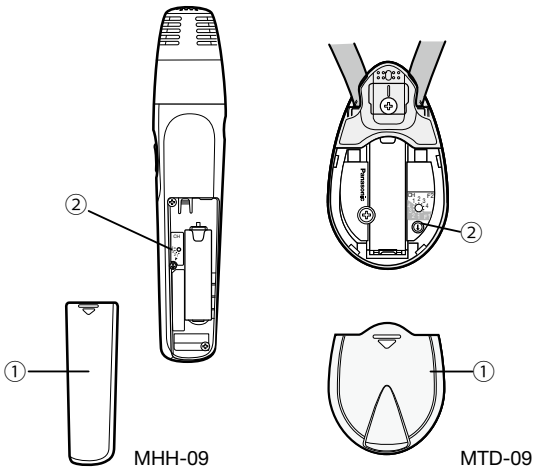
Refer to the combination table and set each channel appropriately.
This unit can receive only through CH1 and CH2. Therefore, this unit cannot receive by selecting CH3 or CH4 with the microphone or sensor (EDS-07).

Infrared wireless microphone Channel switch [1, 2, 3, 4]	Coverage frequency	TLD100	EDS-07 (System expansion)
1	2.30 MHz	Available	Channel settings [1/2]
2	2.80 MHz	Available	
3	3.20 MHz	Not available	Channel settings [3/4] (Cannot be set)
4	3.80 MHz	Not available	

Transmission channel setting for the infrared wireless microphones

Remove the battery cover of the microphone (①) and set the transmission channel (②).
Refer to the above combination table and set the channel correctly.

- Do not assign the same channel to two or more microphones in a space.
- The power indicator blinks if channel is set to any unspecified position except 1 to 4.
- Please note that the TLD/00 will only receive Channels 1 and 2.

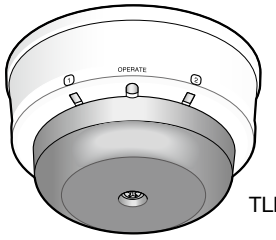


① Battery cover
② Channel select switch (inside the battery cover)

● Sensor setting

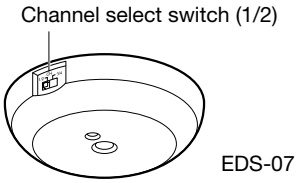
For TLD100:

No setting is necessary. CH1 and CH2 are fixed for reception channels.



For EDS-07:

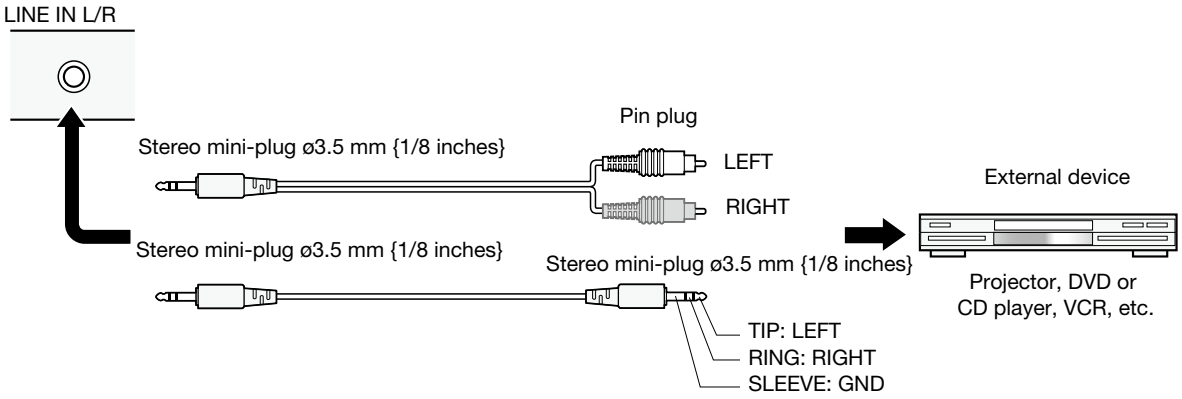
Switch the channel select switch to select [1/2].
Refer to the above combination table and set channel correctly.



■ Connection of sensor/receiver

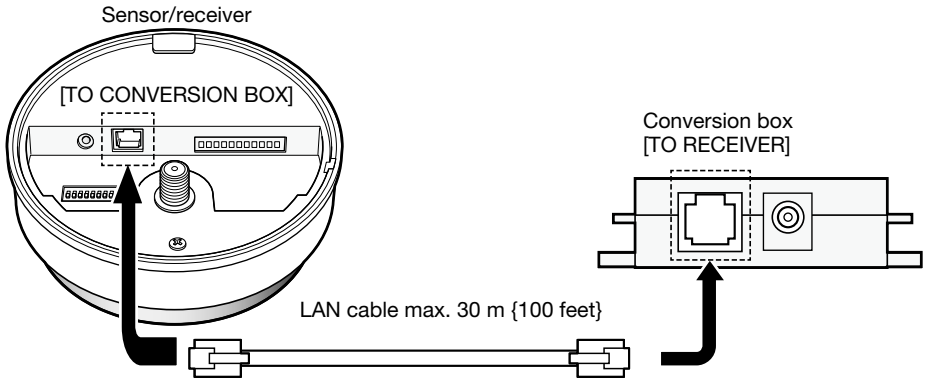
● LINE IN connection

Connect the audio output of a projector, CD player, DVD/VCR or similar line level output to the LINE IN L/R connector of the dome sensor/receiver. The line input of this terminal is a stereo input. Audio signals are mixed to monaural signals internally. Cables should be selected depending on the connector types of devices to be connected and follow the description below to connect external devices.



● Connection with the conversion box

The TO CONVERSION BOX connector of this unit shall be connected to the TO RECEIVER connector (RJ-45) of the conversion box. Use a commercially available LAN cable (CAT5 or similar) as a connection cable.
30 m {100 feet} is the maximum connectable distance.



Note:

- An RJ-45 type connector of this unit is based on our original system and electrical specifications. Never connect this terminal to a LAN connector that is compatible with Ethernet and PoE (Power over Ethernet).
  Never connect this connector to a LAN connector that is compatible with Ethernet and PoE (Power over Ethernet).
  Be sure to make a connection when the power of this unit is set to OFF. (No AC adaptor is allowed to be connected to the conversion box.)
- If making an unbalanced connection for an audio output of this unit, use a STP (Shield Twisted Pair) LAN cable to prevent extraneous noise.

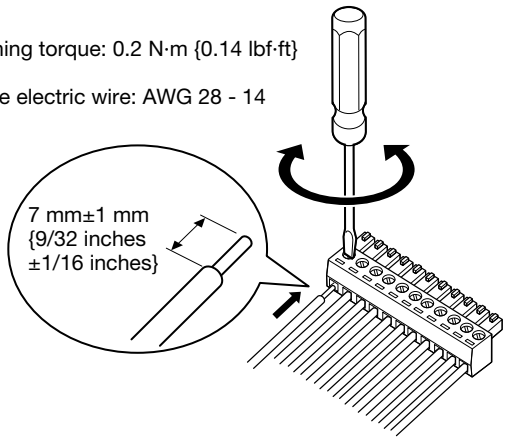
■ Connection to control terminal

● Cable processing

Before connection, prepare the cable as shown in the drawing at right.

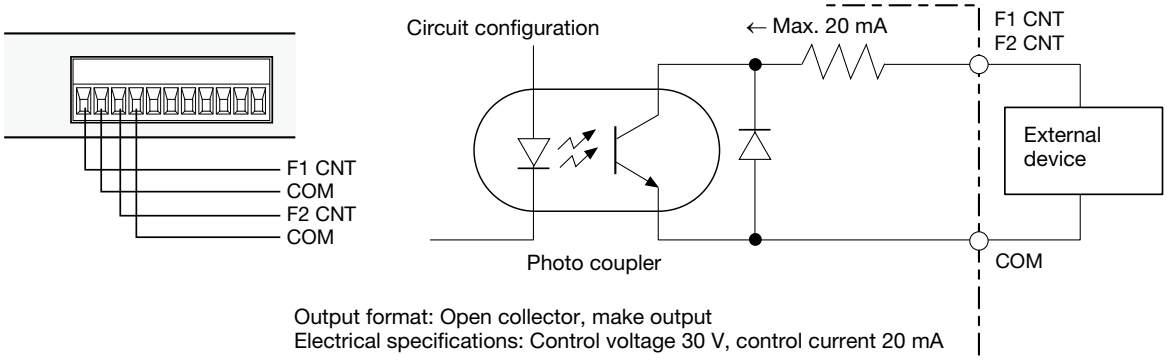
Note:

- Stranded wire is highly recommended.
- Wire insulation must be removed.
- Do not use solder to tin the wire.
- The recommended maximum cable length is 15 m {49 feet}.



● Connection of F1 CNT and F2 CNT terminals

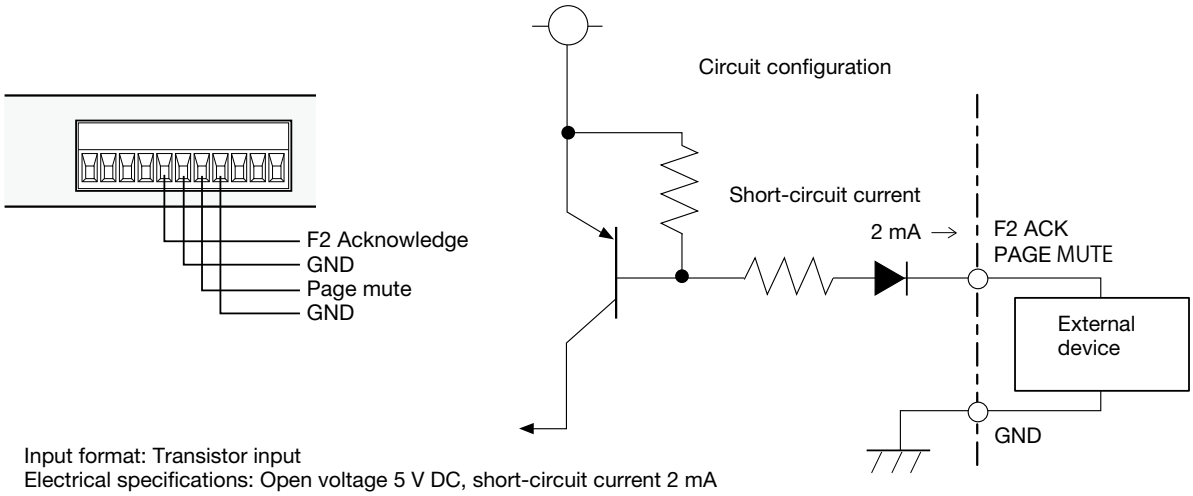
An external device is connected between CNT and COM. These terminals are isolated from the internal circuit by a photo coupler.



Output format: Open collector, make output
Electrical specifications: Control voltage 30 V, control current 20 mA

● Connection of F2 ACK and PAGE MUTE terminals

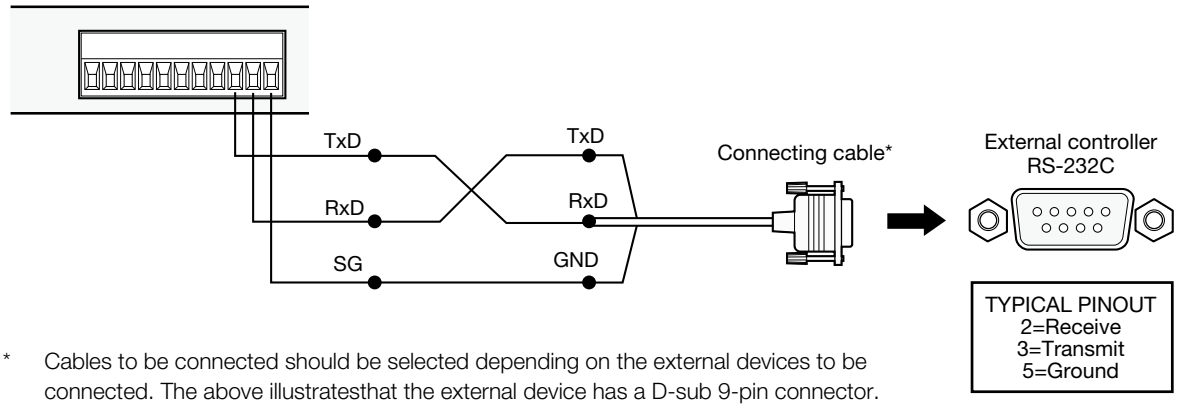
An external device is connected between each terminal and GND. These terminals operate by closing their circuits. The GND terminal is connected to GND in this unit. A set of “dry relay” contacts are recommended to activate these features.



Input format: Transistor input
Electrical specifications: Open voltage 5 V DC, short-circuit current 2 mA

■ Connection of RS-232C

The TLD100 can send and receive commands and status information via RS-232C to external devices. The external device is connected with a 3 wire cable. The cable should be cross-connected. In other words, the transmitting signal (TxD) of this unit is connected to the receiving signal (RxD) of the external device, and the receiving signal (RxD) of this unit is connected to the transmitting signal (TxD) of the external device. The ground signal of each device should be connected to one another.



* Cables to be connected should be selected depending on the external devices to be connected. The above illustratesthat the external device has a D-sub 9-pin connector.

Communication conditions

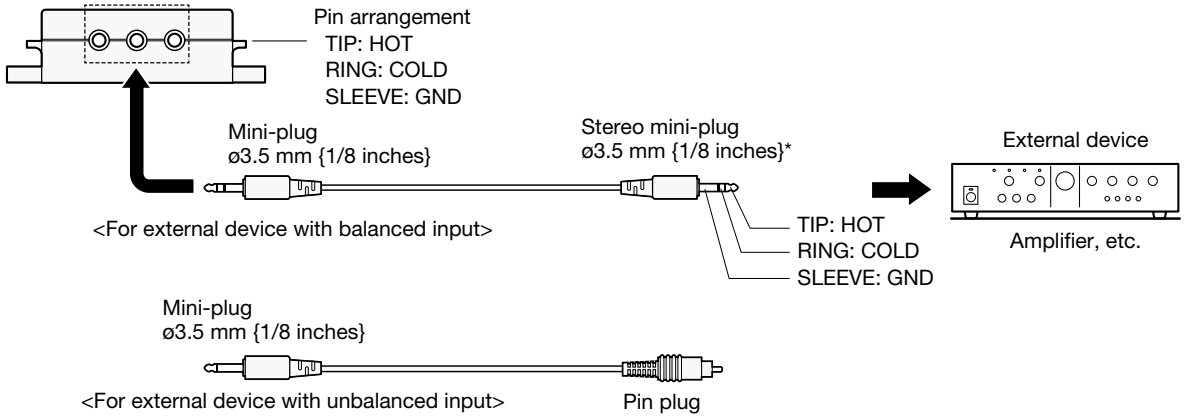
The communication configuration of external devices to be connected should fulfill the conditions in the table below.

Interface	RS-232C
Communication system	Asynchronous
Baud rate	9600 bps
Data length	8 bits
Parity	None
Stop bit	1 bit
Flow control	None
Communication code	ASCII character code

■ Connection of conversion box

● Connection of microphones CH1 and CH2 and MIX OUT connector

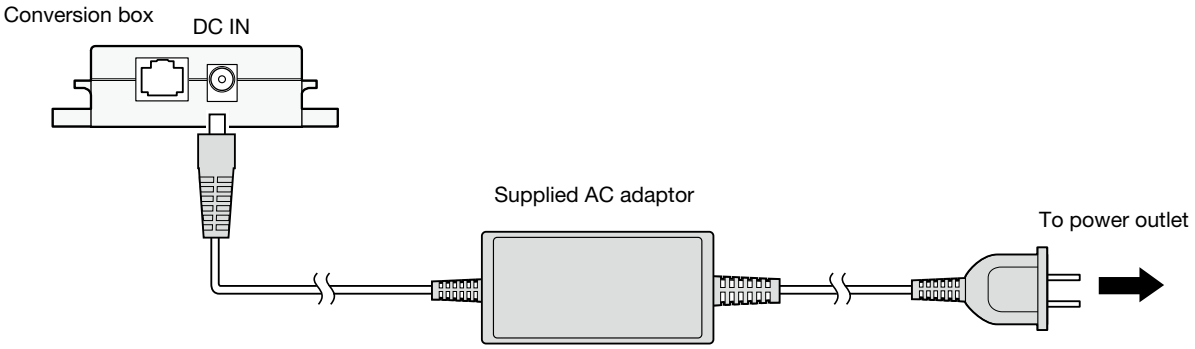
This unit employs **BALANCED** output terminals. These terminals should be connected to an external device equipped with balanced input connector. If these terminals are connected to an external device with unbalanced input connector, select a cable as described below.



* Cable with optimal plug type should be selected depending on the device to be connected.

■ Connection of power supply

The supplied AC adaptor is connected to the conversion box and the adaptor plug is inserted into the wall outlet after ensuring that all the connections are correct.



* Make sure to use the supplied AC adaptor.

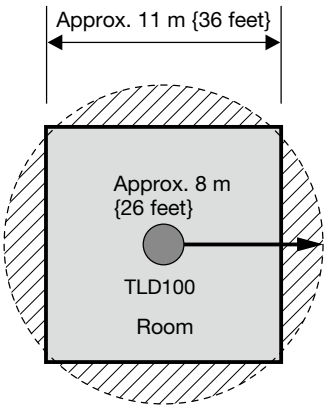
Note:

- Connection of the AC adaptor shall be done after all the connections are completed. This unit is not equipped with a power supply On/Off switch. Connecting the AC cable of the AC adaptor allows the power to be supplied to and operate this unit. (The operation LED of this unit lights green.)
- Never use an AC adaptor other than the supplied AC adaptor.
- The AC adaptor shall be kept away from a moist place or a heat generating source.

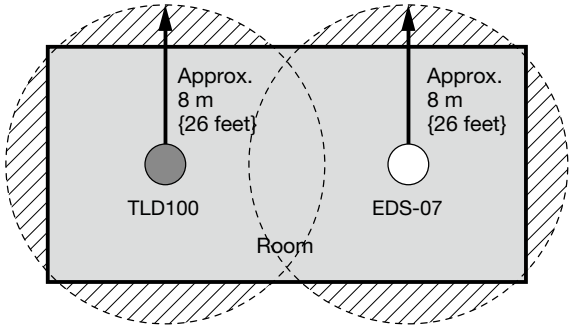
■ Reception range and expansion

The reception range of one infrared sensor in normal use is approx. 8 m {26 feet} in radius.
To expand the reception range, additional sensors can be used. A second sensor can be connected directly to the EXT SENSOR connector. If 2 or more additional sensors are to be used, an Infrared Sensor Coupler (AE-DCF) will be required. **Please note that a common, off-the-shelf, antenna splitter will not function in this capacity.**

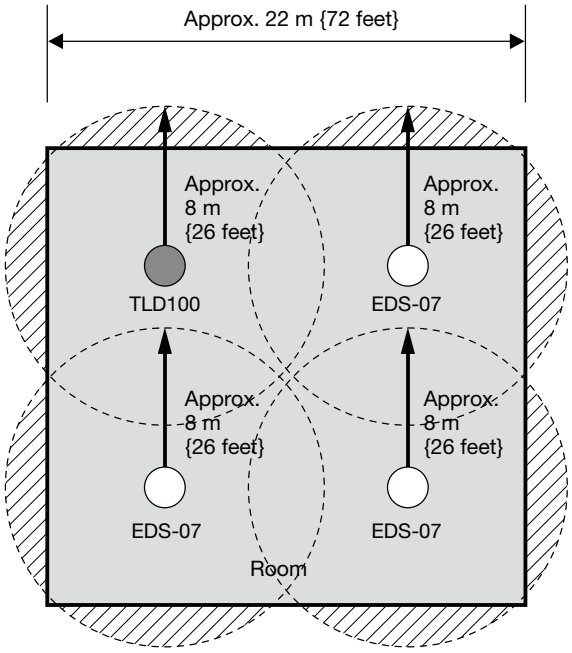
Receiving from CH1 and CH2



For one infrared sensors



For two infrared sensors



For four infrared sensors

■ When connecting multiple Infrared Sensors

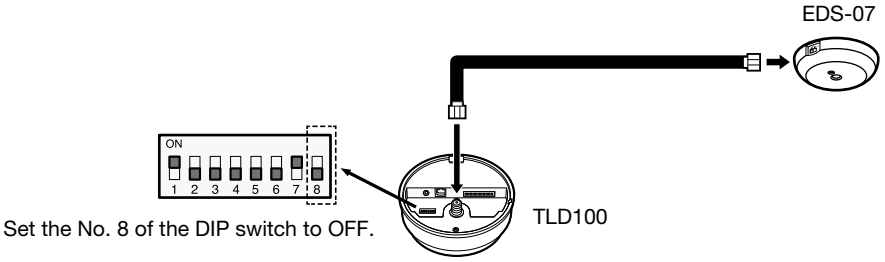
⚠ Warning

- **Before installing, be sure to turn off the power of the infrared sensor/receiver.**

There is a risk of electric shock.

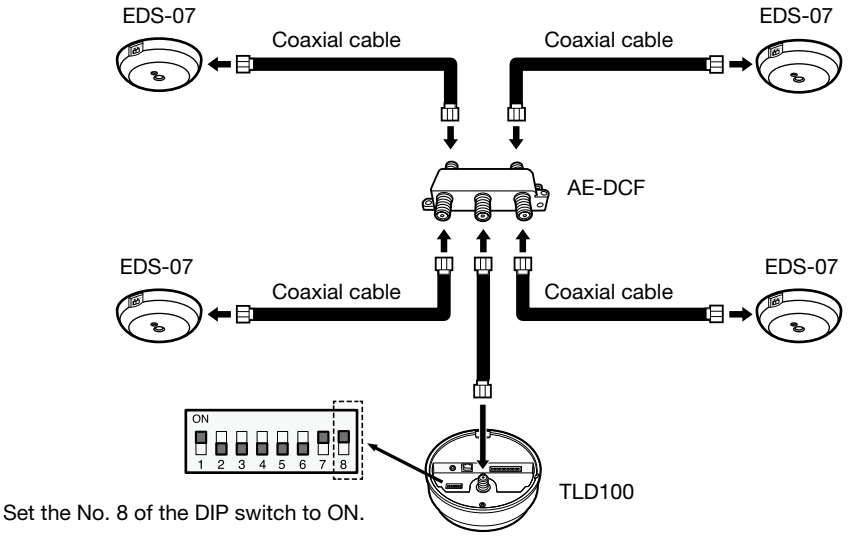
● When connecting a single Infrared Sensor (EDS-07)

Connect the Infrared Sensor (EDS-07) to the EXT SENSOR connector of this unit. Set the No. 8 of the DIP switch to OFF.



● When connecting two or more Infrared Sensors (EDS-07) by utilizing the Infrared Sensor Coupler (AE-DCF)

Using the Infrared Sensor Coupler (AE-DCF), it is possible to expand additional infrared sensors and to receive over a much larger area.
When the infrared sensor coupler (AE-DCF) is utilized, make connections as shown in the illustration below.
Set the No. 8 of the DIP switch to ON.



Note:

- Improper setting of the DIP switch No. 8 may shorten the transmission range.

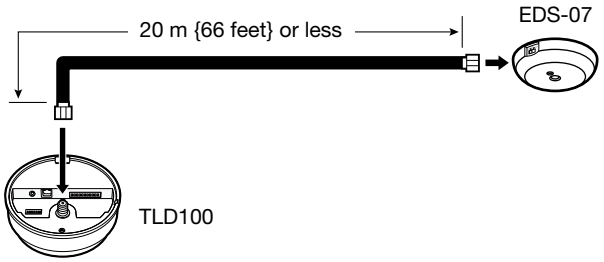
■ About the coaxial cables

Use the following length and type of coaxial cable to connect the infrared receivers and the infrared sensors.

- Length of coaxial cable: Less than 20 m {66 feet}
- Type of coaxial cable: RG-6U

● When connecting a single Infrared Sensor (EDS-07)

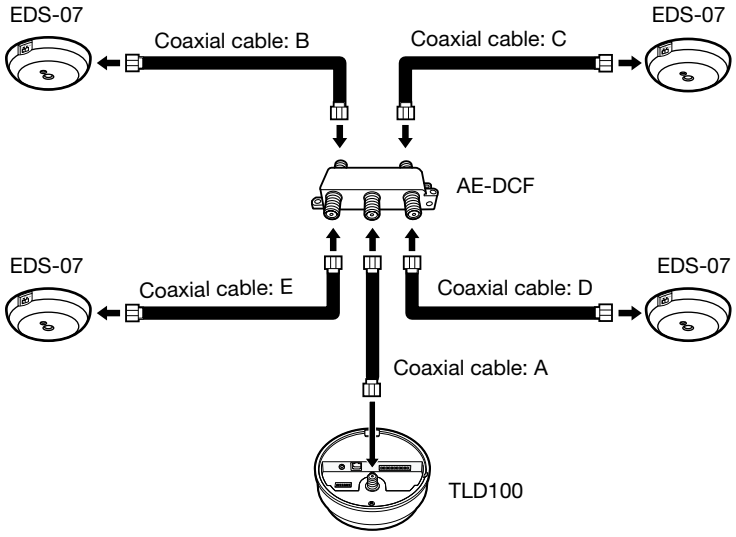
Make a connection so that the length between the Infrared Sensor (EDS-07) and this unit is kept within a range of 20 m {66 feet}.



● When connecting two or more Infrared Sensors (EDS-07) by utilizing the Infrared Sensor Coupler (AE-DCF)

"Coaxial cable: A" : the coaxial cable length from the Infrared Receiver to the Infrared Sensor Coupler.
"Coaxial cable: B to E" : the coaxial cable length from the Infrared Sensor Coupler to each Infrared Sensor.

- The total length of the longest cable length among "Coaxial cable B-E" plus "Coaxial cable A" should be kept under 20 m {66 feet}.



[Good example]

Coaxial cable length: A = 5 m {16.4 feet}, B = 8 m {26 feet}, C = 4 m {13 feet}, D = 6 m {20 feet}, E = 10 m {33 feet}
Total cable length: A: 5 m {16.4 feet} + E: 10 m {33 feet} = 15 m {49.2 feet}
This is less than the limit 20 m {66 feet}, therefore, there is no problem.

[Bad example]

Coaxial cable length: A = 15 m {49.2 feet}, B = 8 m {26 feet}, C = 4 m {13 feet}, D = 6 m {20 feet}, E = 10 m {33 feet}
Total cable length: A: 15 m {49.2 feet} + E: 10 m {33 feet} = 25 m {82 feet}
This is over the limit 20 m {66 feet}, therefore, there is a problem with a length.

Note:

- Check the specifications of both the F-connector and the coaxial cable to ensure that they match before assembling. Follow the instructions of the F-connector to assemble securely.
- In order to make the connections secure, use screw-type F-connectors.

Installation

⚠ Warning

- **Before installing, be sure to turn off the power of the infrared sensor/receiver.**
  There is a risk of electric shock.

■ Installation of the IR-Satellite Sensor/Receiver

● When using a ceiling panel

When installing the sensor and cables in a removable ceiling, follow the instructions shown below.

1 Make a hole in the ceiling panel.
Remove the ceiling panel, drill a hole of approx. ø110 mm {ø4-5/16 inches} through the panel, and run the cables to be connected through the hole.

2 Connect the necessary cables to the sensor.
Connect the cables running through the hole of the ceiling panel by following the description on page 19.

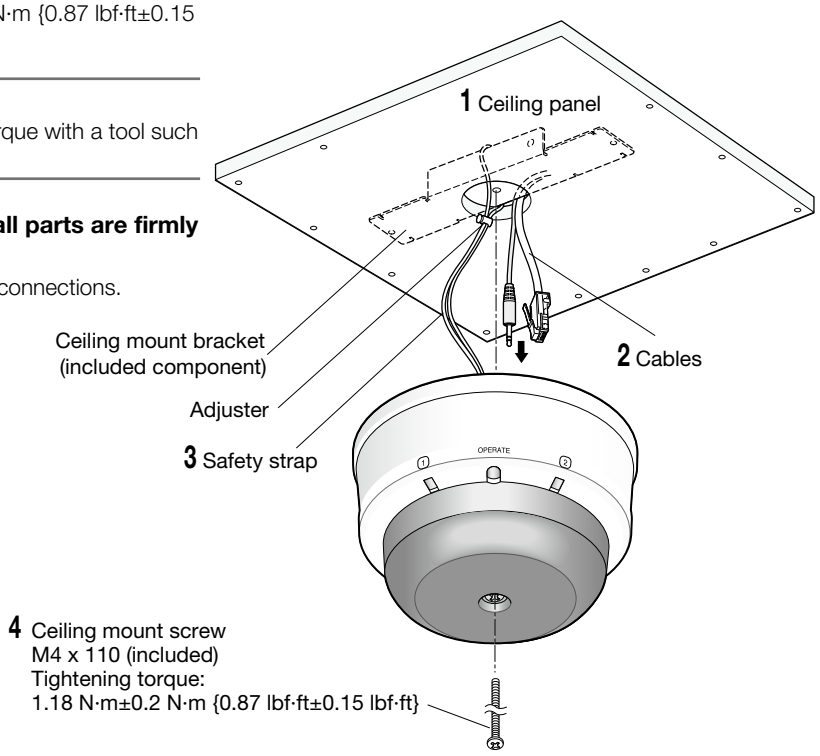
3 Install the safety strap to the ceiling mount bracket.
Run the safety strap through the ceiling mount bracket and tighten the strap with the adjuster.
(Arrange the strap and the adjuster so that they do not hang on the screw hole on the center of the bracket.)

Important:
- To prevent the installation from falling down, make sure to run the safety strap through the ceiling mount bracket and tighten the strap with the adjuster. If the strap is not tightened, it may slip off the ceiling mount bracket, which could result in this unit falling down. (The strap and the adjuster should not hang on the screw hold on the center of the bracket.)

4 Install the IR-Satellite Sensor/Receiver.
Push the connected cable into the hole.
Tuck the excess portion of the safety strap into the hollow space on the rear of this unit.
Tighten the ceiling mount screw (M4 x 110, accessory) after mounting this unit to the mount bracket (accessory).
Tightening torque: 1.18 N·m±0.2 N·m {0.87 lbf·ft±0.15 lbf·ft}

Note:
- Fix this unit firmly with specified torque with a tool such as a torque driver.

5 After installation, check that all parts are firmly installed.
Check visually for loose parts and connections.

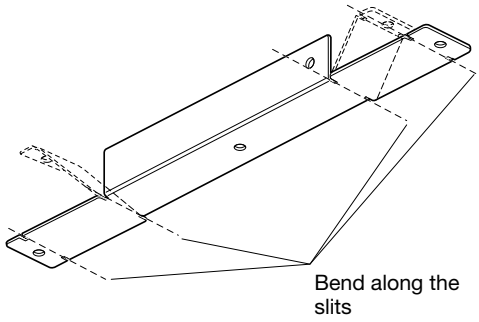


⚠ Warning

- **Before installing, be sure to turn off the power of the infrared sensor/receiver.**
  There is a risk of electric shock.

■ When not using a ceiling panel

If the coaxial cables cannot be routed through the ceiling, install this product as shown below.



1 Prepare the ceiling mount bracket.
Use a tool (pliers etc.) and bend the ceiling mount bracket (included component) as shown in the figure on the right.

Note:
- When reinstalling, do not bend the bracket again. Repeated bending may damage the bracket.

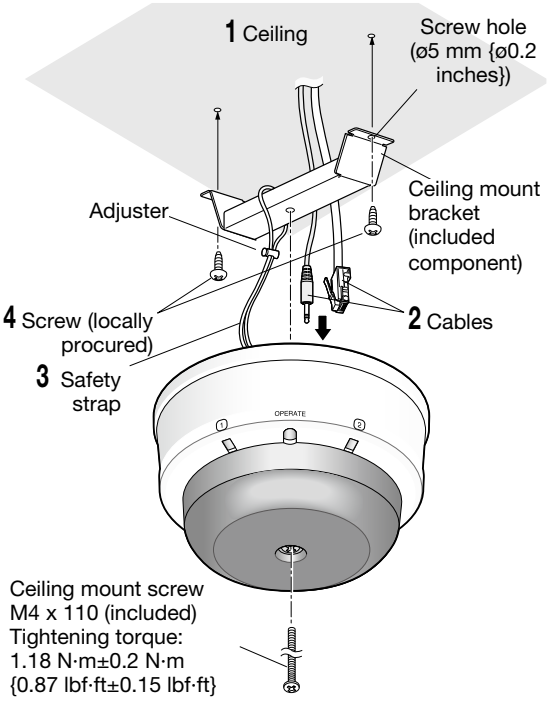
2 Connect the necessary cables to the sensor/receiver.
Connect the cables by following the description on page 19.
When connecting multiple infrared sensors, connect the F-type connectors of extended sensors to the external sensor terminals of this unit.

3 Install the safety strap to the ceiling mount bracket.
Run the safety strap through the ceiling mount bracket and tighten the strap with the adjuster.
(Arrange the strap and the adjuster so that they do not hang on the screw hole on the center of the bracket.)

Important:
- To prevent the installation from falling down, make sure to run the safety strap through the ceiling mount bracket and tighten the strap with the adjuster. If the strap is not tightened, it may slip off the ceiling mount bracket, which could result in this unit falling down. (The strap and the adjuster should not hang on the screw hole on the center of the bracket.)

4 Install the ceiling mount bracket on the ceiling.
Attach the processed ceiling mount bracket on the ceiling with screws (locally procured).

Note:
- The screws for attaching the ceiling mount bracket to the ceiling are not provided. Procure these screws separately according to the material and construction of the ceiling and total weight of this unit and other accessories.
- The installation direction of this unit may be restricted depending on the position where the ceiling mount bracket is installed. Confirm the proper direction of the bracket and the unit before attaching the bracket to the ceiling.



5 Install the sensor/receiver.
Tuck the excess portion of the safety strap into the hollow space on the rear of this unit.
Tighten the ceiling mount screw (M4 x 110, accessory) after mounting this unit to the ceiling mount bracket (accessory).
Tightening torque: 1.18 N·m±0.2 N·m {0.87 lbf·ft ±0.15 lbf·ft}

Note:
- Fix this unit firmly with specified torque with a tool such as a torque driver.

6 After installation, check that all parts are firmly installed.
Check visually for loose parts and connections.

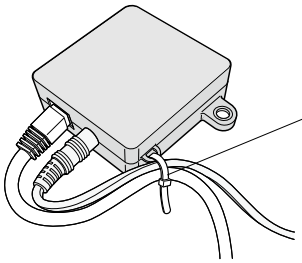
■ Installation of the conversion box

⚠ Warning

- **Be sure to turn off the power of this unit before installation.**
  Otherwise electric shock may result.

1 Connect the necessary cables to the conversion box.
Connect the LAN cable, AC adaptor, and audio cables by following the description on page 19.

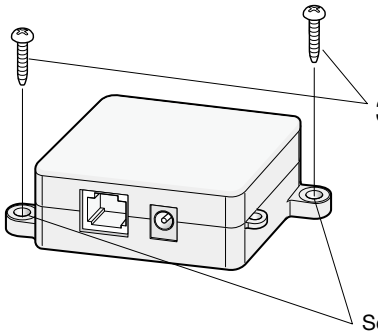
2 Attach a tying band to the conversion box.
As necessary, tighten the connected cables to the hook with a tying band.



2 Tying band

Fix cables using the supplied tying band as shown in the drawing at left.

3 Use screws (locally procured) to secure them as necessary.



3 Screw (locally procured)

Screw hole
ø5 mm {ø0.2 inches}

Note:
- The screws for attaching the conversion box are not provided. Procure these screws separately according to the material and construction of the mounting fixtures.

Serial communication command

■ Preface

The volume of this unit and functions set by the DIP switch can be remotely controlled by an external device using the serial communication command.

Note:

- The settings of the functions that can be set with the DIP switch can be overwritten by sending a serial command. The serial command has the higher priority and will override the DIP switch settings. The unit will default back to the DIP switch settings when the power is cycled. (Excluding DIP switches No. 7 and 8)

■ Basic format

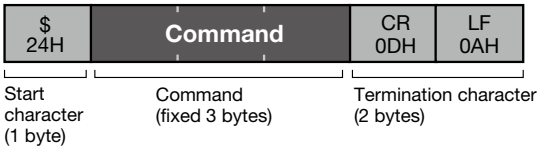
The serial command employs a common format to the commands of both from a control device to this unit and from this unit to a control device, and the format is categorized into 3 patterns as follows:

When no parameter: "$" as a starting character, command, the control code,"CR" and "LF", as the termination character.

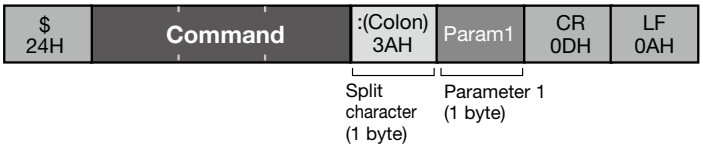
When a single parameter: "$" as a starting character, command, colon, 1st parameter, the control code,"CR" and "LF", as the termination character.

When two parameters: "$" as a starting character, command, colon, 1st parameter, colon, parameter, the control code,"CR" and "LF", as the termination character.

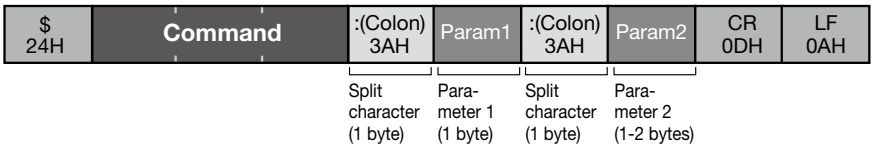
When no parameter



When a single parameter



When two parameters



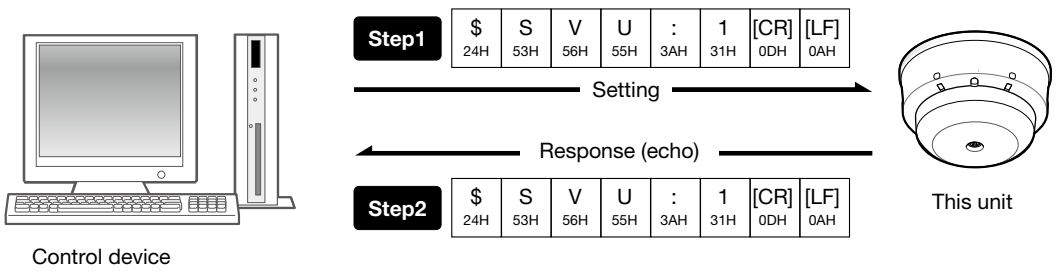
- All of $, CR, LF, : (colon) are fixed single byte, and the command part is fixed 3 bytes.
- The length of the parameter part is basically single byte. As an exception, only the 2nd parameter is 2 bytes for the volume setting command.
- If a command containing a failure in the command part or format is transmitted to this unit, $ER1[CR][LF] is returned from this unit.
- If a command containing a failure in the parameter part is transmitted to this unit, $ER2[CR][LF] is returned from this unit.
- When a timeout error occurs on the receiving timer (30 seconds) between each byte, $ER3[CR][LF] is returned.

Note:

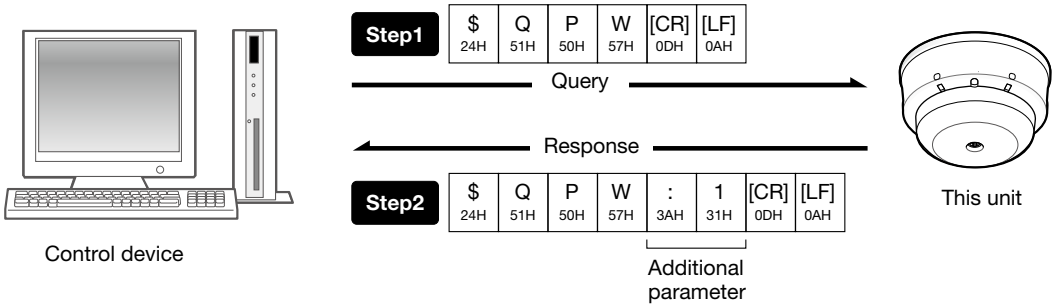
- When commands are successively transmitted, keep 300 ms or more between successive commands that are transmitted to this unit.

■ Examples of sequence

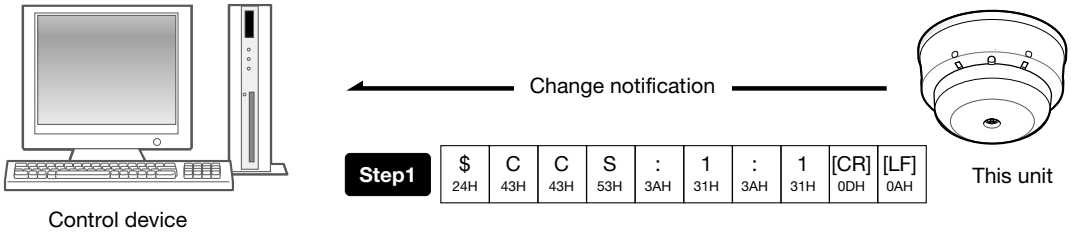
- Examples are shown below. Refer to the next page or later for further information on command.
- For a setting command (a command starting with S): an echo is returned.



- For a query command (a command starting with Q): the command with a parameter added is returned.



- For a change notification command (a command starting with C): If a change targeting this unit is detected, a command is issued.



■ Command list

Command	Content	Type	1st parameter	2nd parameter	Command example
QPW	Query about this unit power state	Query	None	None	$QPW[CR][LF]
		Response	1: POWER ON	None	$QPW:1[CR][LF]
CCS	Notification of microphone power state	Change notification	1: MIC1 input 2: MIC2 input	0: MIC OFF 1: MIC ON	$CCS:1:1[CR][LF]
QCS	Query about microphone power state	Query	1: MIC1 input 2: MIC2 input	None	$QCS:1[CR][LF]
		Response	Same as above	0: MIC OFF 1: MIC ON	$QCS:1:0[CR][LF]
SVL	Volume setting	Setting	1: MIC1 input 2: MIC2 input L: LINE input	* Refer to “Volume list” (page 32).	$SVL:L:00[CR][LF]
		Response	Same as above	Same as above	$SVL:L:00[CR][LF]
SVU	Volume 1-step up	Setting	1: MIC1 input 2: MIC2 input L: LINE input	None	$SVU:1[CR][LF]
		Response	Same as above	None	$SVU:1[CR][LF]
SVD	Volume 1-step down	Setting	1: MIC1 input 2: MIC2 input L: LINE input	None	$SVD:2[CR][LF]
		Response	Same as above	None	$SVD:2[CR][LF]
QVL	Volume query	Query	1: MIC1 input 2: MIC2 input L: LINE input	None	$QVL:1[CR][LF]
		Response	Same as above	* Refer to “Volume list” (page 32).	$QVL:1:01[CR][LF]
SMT	Mute individual setting	Setting	1: MIC1 output 2: MIC2 output M: MIX output	0: MUTE OFF 1: MUTE ON	$SMT:1:0[CR][LF]
		Response	Same as above	Same as above	$SMT:1:0[CR][LF]
QMT	Mute state query	Query	1: MIC1 output 2: MIC2 output M: MIX output	None	$QMT:M[CR][LF]
		Response	Same as above	0: MUTE OFF 1: MUTE ON	$QMT:M:0[CR][LF]
SAM	Mute collective setting	Setting	0: MUTE OFF 1: MUTE ON	None	$SAM:1[CR][LF]
		Response	Same as above	None	$SAM:1[CR][LF]
CPM	Notification of page mute state	Change notification	0:PAGE MUTE OFF 1:PAGE MUTE ON	None	$CPM:1[CR][LF]
QPM	Query about page mute state	Query	None	None	$QPM[CR][LF]
		Response	0: PAGE MUTE OFF 1: PAGE MUTE ON		$QPM:0[CR][LF]
CF1	Notification of F1 state	Change notification	None	None	$CF1[CR][LF]
CF2	Notification of F2 state * 3-time transmission at 1 sec. interval	Change notification	0: Non F2 status 1: F2 status & F2 ACK signal not received 2: F2 status & F2 ACK signal received	None	$CF2:1[CR][LF]
QF2	Query about F2 state	Query	None	None	$QF2[CR][LF]
		Response	0: Non F2 status 1: F2 status & F2 ACK signal not received 2: F2 status & F2 ACK signal received	None	$QF2:2[CR][LF]
SDS	Microphone Override setting	Setting	1: Microphone Override	0: Disable 1: Enable	$SDS:1:0[CR][LF]
		Response	Same as above	Same as above	$SDS:1:0[CR][LF]

Command	Content	Type	1st parameter	2nd parameter	Command example
SDS	Tone setting	Setting	2: Tone	0: Disable 1: Enable	$SDS:2:1[CR][LF]
		Response	Same as above	Same as above	$SDS:2:1[CR][LF]
	Tone Level setting	Setting	3: Tone Level	0: Low, 1: High	$SDS:3:0[CR][LF]
		Response	Same as above	Same as above	$SDS:3:0[CR][LF]
	Microphone/Line Mixing setting	Setting	4: Microphone/Line Mixing	0: Disable 1: Enable	$SDS:4:1[CR][LF]
		Response	Same as above	Same as above	$SDS:4:1[CR][LF]
	Feedback Blocker setting	Setting	5: Feedback Blocker	0: Disable 1: Enable	$SDS:5:0[CR][LF]
		Response	Same as above	Same as above	$SDS:5:0[CR][LF]
	Remote Volume setting	Setting	6: Remote Volume	0: Disable 1: Enable	$SDS:6:1[CR][LF]
		Response	Same as above	Same as above	$SDS:6:1[CR][LF]
QDS*	State query of Microphone Override setting	Query	1: Microphone Override	None	$QDS:1[CR][LF]
		Response	Same as above	0: Disable 1: Enable	$QDS:1:0[CR][LF]
	State query of Tone setting	Query	2: Tone	None	$QDS:2[CR][LF]
		Response	Same as above	0: Disable 1: Enable	$QDS:2:1[CR][LF]
	State query of Tone Level setting	Query	3: Tone Level	None	$QDS:3[CR][LF]
		Response	Same as above	0: Low, 1: High	$QDS:3:0[CR][LF]
	State query of Microphone/Line Mixing setting	Query	4: Microphone/Line Mixing	None	$QDS:4[CR][LF]
		Response	Same as above	0: Disable 1: Enable	$QDS:4:1[CR][LF]
	State query of Feedback Blocker setting	Query	5: Feedback Blocker	None	$QDS:5[CR][LF]
		Response	Same as above	0: Disable 1: Enable	$QDS:5:0[CR][LF]
	State query of Remote Volume setting	Query	6: Remote Volume	None	$QDS:6[CR][LF]
		Response	Same as above	0: Disable 1: Enable	$QDS:6:1[CR][LF]
CVU	Notification of volume up operation from microphone	Change notification	1: MIC1 input volume up 2: MIC2 input volume up L:LINE input volume up	None	$CVU:1[CR][LF]
CVD	Notification of volume down operation from microphone	Change notification	1: MIC1 input volume down 2: MIC2 input volume down L: LINE input volume down	None	$CVD:L[CR][LF]
SRS	Reset volume and F1/F2 states	Setting	None	None	$SRS[CR][LF]
		Response	None	None	$SRS[CR][LF]

* Each QDS response command returns not the physical ON/OFF status of the DIP switch but the current setting status of the corresponding function.

● Volume list

Parameter	Volume	Parameter	Volume	Parameter	Volume
00	0 dB	08	–16 dB	16	–32 dB
01	–2 dB	09	–18 dB	17	–36 dB
02	–4 dB	10	–20 dB	18	–40 dB
03	–6 dB	11	–22 dB	19	–44 dB
04	–8 dB	12	–24 dB	20	–48 dB
05	–10 dB	13	–26 dB	21	–60 dB
06	–12 dB	14	–28 dB	22	–72 dB
07	–14 dB	15	–30 dB		

Troubleshooting

Symptom	Cause/solution	Ref. pages
No reception	Does the operation LED light? → Check the AC adaptor connection. Check the connection between the sensor/receiver and conversion box.	–
	Is the power of the microphone turned on (is a battery installed)? → Turn on the power of the microphone (install a battery) to put it into the transmissible state.	Operating Instructions of MHH-09, MTD-09
	Is the microphone and this unit set to the same channel? → Set the channel of the microphone to CH1 or CH2.	–
No sound generated	Does the reception LED indicator CH1 or CH2 light? → If the microphone is not normally receivable, the reception LED indicator does not light.	–
	The audio output of LINE IN is not provided. → Is audio output of the device connected to LINE IN ready to be provided?	–
	No audio output of the microphone or LINE IN is provided. → Is the page mute signal input provided to this unit? If the page mute signal input is provided, the audio output from this unit is muted. The 3 LEDs of this unit light yellow while the page mute function is activated.	–
	Is the volume setting equipped in this unit set to the lowest level? → The volume of the microphones CH1 and CH2 and LINE IN equipped in this unit can be adjusted by MTD-09 and through external communication control.	Operating Instructions of MHH-09, MTD-09
	The volume of the mixing output fluctuates. → When the microphone override function is active, an audio input to the microphone (CH1 or CH2) attenuates the audio level provided to LINE IN.	–
Audio interrupted	Is the feedback blocker activated? Adjust the speaker output to the lower level so as to avoid feedback.	–
Interference	Are the multiple microphones set to THE same channel? → Change all the channels (frequency) to be different which is not used by any other microphone in the same room.	–
	Are the multiple microphones in use in close range? → Widen the distance of the microphones from each other, more than 50 cm {19-11/16 inches}.	–
	Is the microphone in use too close to the sensor? → Increase the distance while using.	Operating Instructions of MHH-09, MTD-09
	If there is a device that uses high frequency or there is a source of noise nearby, interference may occur. → Keep a distance from the source of noise or use the microphone closer to this unit.	–

Specifications

General

Power (DC IN)	24 V DC (use the specified AC adaptor (included))
Input current	160 mA (At 4 pieces of extended sensors (EDS-07) connected)
Operating temperature range	0 °C - 40 °C {32 °F - 104 °F}
Dimensions	Sensor/receiver: ø152 mm x 76 mm (H) {ø6 inches x 3 inches (H)} * Excluding F-type connector Conversion box: 25.5 mm (H) x 67 mm (W) x 67 mm (D) {1 inch (H) x 2-5/8 inches (W) x 2-5/8 inches (D)} * Excluding screw hole
Mass	Sensor/receiver: Approx. 500 g {1.1 lbs} Conversion box: Approx. 80 g {0.18 lbs}
Finish	Sensor/receiver: Infrared passing-type acrylic resin (black color) ABS resin white color Conversion box: ABS resin black color

IR receiver

Reception channel (subcarrier frequency)	CH1: 2.3 MHz, CH2: 2.8 MHz
Reception system	T.R.F. (Tuned Radio Frequency)
Receiving sensitivity	S/N 60 dB or more (40 dBµV input, ±12.5 kHz FM @1 kHz)
Signal-to-noise ratio	70 dB or more (60 dBµV input, ±12.5 kHz FM @1 kHz)

Audio

General Signal-to-noise ratio	70 dB or more (Line in to Mixing output)
Frequency response	50 Hz – 15 kHz (Line in to Mixing output) 100 Hz – 10 kHz (Microphone to Mixing output)
Total harmonic distortion	0.5 % or less @1 kHz (Line in to Mixing output) 1.0 % or less (Microphone to Mixing output, 60 dBµV input, ± 12.5 kHz FM @1 kHz)
LINE IN L/R	–10 dBV input impedance 10 kΩ or more Unbalanced, stereo (monaural mixing), ø3.5 mm (ø1/8 inches) stereo mini jack (Tip: Left, Ring: Right, Sleeve: GND)
CH1/CH2 (Microphone output)	–5 dBV Balanced, Adaptive impedance 10 kΩ or more, ø3.5 mm (ø1/8 inches) stereo mini jack (Tip: Hot, Ring: Cold, Sleeve: GND)
MIX OUT	0 dBV Balanced, Adaptive impedance 10 kΩ or more, ø3.5 mm (ø1/8 inches) stereo mini jack (Tip: Hot, Ring: Cold, Sleeve: GND)

Control terminal

F1 CNT, Com		Output format: open collector, make output Electrical specifications: control voltage; 30 V, control current; 20 mA
F2 CNT, Com		
F2 ACK, GND		Input format: transistor input Electrical specifications: open voltage; 5 V DC, short-circuit current; 2 mA
PAGE MUTE, GND		
RS-232C	TxD	Compliant with RS-232C, asynchronous, 9600 bps
	RxD	
	SG	

Interface

TO CONVERSION BOX	RJ-45 (LAN type connector), * original format Note: Never make a connection to a LAN connector that is compatible with Ethernet and PoE.
TO RECEIVER	
EXT SENSOR	75 Ω F-type connector (adjusted interface sensor: EDS-07, AE-DCF)

Other functions

Volume control	Configurable when the microphone, MTD-09, is used or by control through RS-232C Controlled object: Microphone CH1, CH2, Line in Setting range: 0 dB - –32 dB/2 dB step , –36 dB - –48 dB/4 dB step, –60 dB, –72 dB

AC Adaptor (Included)

Power	100 V AC - 240 V AC, 1.5 A, 50 Hz/60 Hz
Rated output	24 V DC, 2.5 A
Operating temperature range	0 °C - 40 °C {32 °F - 104 °F}
Dimensions	31 mm (H) x 116 mm (W) x 50 mm (D) {1-7/32 inches (H) x 4-9/16 inches (W) x 1-31/32 inches (D)}
Mass	Approx. 260 g {0.57 lbs}
Finish	ABS resin black color

Dimensions and weights indicated are approximate.
Specifications are subject to change without notice.

Included Components

Operating Instructions (this manual) ..... 1 pc.

The following are for installation.
Conversion box ..... 1 pc.
Ceiling mount bracket ..... 1 pc.
Ceiling mount screw (M4x110) ..... 1 pc.
AC adaptor ..... 1 pc.
Power cable ..... 1 pc.
Cable tie ..... 4 pcs.

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