EXCEL

Infrared Detection Sensor

MS-3100D/MS-3100E

Instructional Manual

Contents

Before You Start Using the System

Thank you for purchasing the Infrared Detection Sensor product (MS-3100D / MS-3100E).
It is very important to read this manual thoroughly before you use the system. Please retain this manual in a safe place for future reference.

This product is designed to assist a caregiver to provide a safe caring environment but in and of itself does not warrant a safe environment.

A wireless transmitter is only installed in the MS3100E main unit. Therefore, there are sections that only relate to the MS3100E in this manual.

Safety Instruction

■Before using MS-3100D/MS-3100E, be sure to read this safety instruction carefully.

*Product specifications described in this material are subject to change without notice for reasons of modification and/or improvement.

■Hazard definition

The following terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important information concerning use of the product.

⚠ **Warning**	Indicates an imminently hazardous situation which, if not avoided, may result in death or serious injury.
⚠ **Caution**	Indicates a potentially hazardous situation which, if not avoided, may result in injury or property damage.

＊ "Caution" indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

■Example of Picture Indication

🚫	This icon indicates "not allowed."	🚫	This icon indicates "do not get it wet."
🚫	This icon indicates disassembly is prohibited.	❗	This icon indicates to "force completion of the following procedure."
🚫	This icon indicates "do not touch with a wet hand."	🔌	This icon indicates to "unplug the AC adaptor."

⚠ Warning

IMPORTANT SAFETY INSTRUCTION

Unplug MS-3100D/MS-3100E from the wall outlet and refer servicing to qualified service personnel under the following conditions.

⚠ 🔌
- When smoke, an unusual noise, or an odor comes from the unit please contact the store that you purchased from for repair.
  Please do not attempt to repair it.
- When water or other foreign objects gets into the unit.
- When the plug-in or the cord becomes hot.
- When you drop or break the unit.

Do not disassemble or alter the product.

Do not attempt to disassemble or alter the product. It may cause fire and electric shock.
Contact your distributor for inspection, adjustment and repair.

Do not wet

Do not wet the product. It may cause a fire and an electric shock.

Do not harm AC adapter's cord

Follow instruction below; fail to do so may damage the cord.

- Do not put heavy item on the cord.
- Do not add or process the cord.
- Do not forcefully bend the cord.
- Do not harm the cord.
- Do not twist or pull the cord.
- Do not put closely to the heating materials

Ask your distributor for an exchange when the AC adapter's cord is damaged. Fail to do so may result in fire or electric shock.

Precautions when using the AC adapter

- If the provided plug does not fit into your outlet,consult an electrician for replacement of the obsolete outlet.
- Do not bundle the AC power cord.
- If an extension cord is used with this product,make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord ampere rating.

Inspect a plug into the outlet regularly

Remove the dust and dirt between the plug and the outlet regularly. Failure to do so may result in short circuit and fire.

Operate this product only with the specified voltage

Failure to do so may cause a fire and an electric shock.

Do not put container filled with water or any kind of liquid on top of the product.

If water/liquid spills or enters inside of the product, it may cause a fire and an electric shock.

⚠ Caution

Hundle the AC adapter with caution

- Do not plug in/out with wet hands. It may cause an electric shock.
- Never pull on the cord when unplugging from the electrical outlet. Always grasp the AC cord plug when unplugging.

Caution with where you set up

- Do not set up this product in humid or dusty places. Failure to do so may be the result of fire and an electric shock.
- Do not set up in a direct sunshine area. Failure to do so may be the result of fire and trouble.

Precaution during the time of non-operation for a long period of time, and maintenance.

For your safety, unplug the AC adapter from the outlet.
Fail to do so, it may cause a fire.

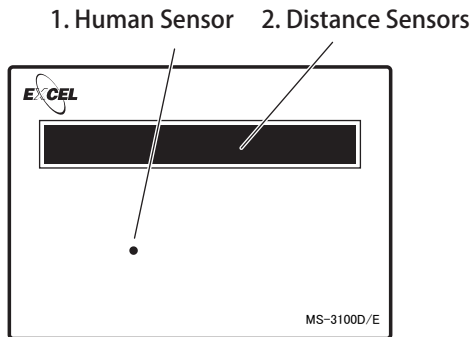### Do not set up at unstable place

Do not set up anywhere that is unstable, shaky or at a shelf. It may drop or fall down and may be the result of an injury.

Do not put heavy item on the product

This may be the result of trouble of this product.

Name and Function

Front view

1. Human Sensor   2. Distance Sensors

EXCEL

MS-3100D/E

1. Human Sensor

This sensor detects the infrared radiation originating from an individual. In essence, it detects the temperature differences between an individual and the surrounding spaces. When an individual moves, the minimum detection movement distance to identify the temperature differences is approximately 30 cm.

2. Distance Sensors

There are three infrared distance detection sensors (LS = left sensor, CS = center sensor, RS = right sensor) installed in the distance detection sensor window. When an infrared beam with a 4 cm diameter strikes an object and the infrared beam bounces back to the system it calculates the distance between the object and the main unit. The detection range is approximately 20-130 cm.

3. Indicator LED Lights

Display the status of the MS-3100D/MS-3100E.

PW (Power) : When the power is on the LED lamp lights up

HS (Human Sensor) : When the infrared sensor detects an infrared radiation discrepancy the HS LED on top of the main unit lights up

RS ("Right" Sensor) : When the right distance detection sensor detects an object in its range the RS LED light on top of the main unit lights up

CS (Center Sensor) : When the center distance detection sensor detects an object in its range the CS LED light on top of the main unit lights up

LS ("Left" Sensor) : When the left distance detection sensor detects an object in its range the LS LED light on top of the main unit lights up

AL (Alarm) : When a pre-determined requirement for activating a nurse "call" is met the designated LED lights up. A nurse "call" is activated simultaneously.
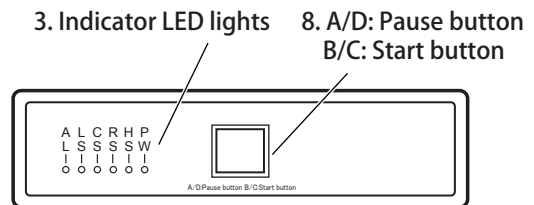
4. Nurse Call Connector

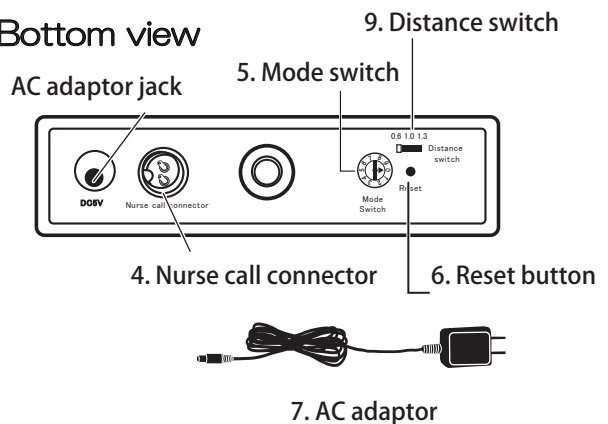An existing nurse call system can be connected via the connector.

5. Mode Switch

A detection mode can be selected from the pre-programed 10 different detection types and the detection duration range options.

Top view

3. Indicator LED lights   8. A/D: Pause button B/C: Start button

A L C R H P
L S S S S W
| | | | | |
○ ○ ○ ○ ○ ○

A/D:Pause button B/C:Start button

Bottom view

9. Distance switch

5. Mode switch

AC adaptor jack

0.6 1.0 1.3   Distance switch

DC6V   Nurse call connector   Mode Switch   Reset

4. Nurse call connector   6. Reset button

7. AC adaptor

6. Reset Button

It is the "Reset" switch for the system. When a new mode is selected the "Reset" button must be pressed.

7. AC adaptor

There is no "Power" switch on the main unit. When the AC adaptor is connected to the main unit and plugged into the power outlet the system starts automatically (if no issues are found).

8. A / D mode : Pause button   B / C mode: Start button

Detection mode A/D: When the A or D detection mode is selected this button functions as a "Pause" button. When the button is pressed the system pauses for 2 minutes and 30 seconds. Before you enter the detection areas please press this button. The yellow LED lights on the top of the main unit turn on when the button is pressed. Every 30 seconds, the LED light will be tuned off one by one. For the last 30 seconds, all 4 LED lights will flash. When the 2 minutes and 30 seconds expire the MS 3100 will start trying to detect the human body. If the button is pushed during the 2 minutes and 30 second period the timer is reset and a new 2 minute and 30 second pause period will begin.

Detection mode B/C: When the B or C detection mode is selected this button functions as a "Start" button. Press the start button to complete the settings. The system automatically starts detecting the individual.
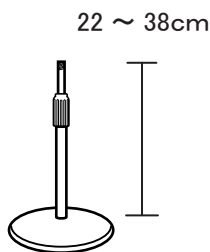
9. Distance Switch

There are 3 detection distances that may be selected.
0.6: approximately 60 cm
1.0: approximately 100 cm
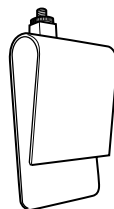1.3: approximately 130 cm
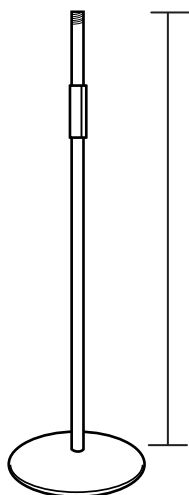
50 ～ 100cm

22 ～ 38cm

**Extension pole
(Long) with a base**

**Extension pole
(Short) with a base**
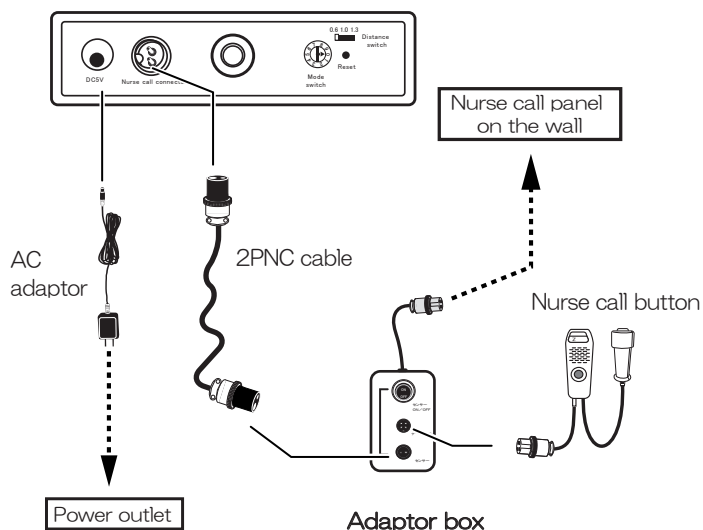
Bed holder (BH-2)

This will be attached
to a headboard.

Angle-adjustable
adapter (PT-1)

The main unit can be
attached to the adapter
for a better detection
angle, and the adapter
can be attached to the
bed hanger or the
extension poles.

How to Connect with an Existing Nurse Call System

Bottom view

0.6 1.0 1.3

Distance
switch

DC5V   Nurse call connect   Mode   Reset
                                   switch

Nurse call panel
on the wall

AC
adaptor

2PNC cable

Nurse call button

Power outlet

Adaptor box

1. Connect the AC adaptor to the
main unit and insert the other end
into the power outlet. Please
confirm PW LED light turns green.

2. Connect the 2PNC cable to the
main unit, and then to the adaptor
box.

3. Connect the nurse call button to
the adaptor box. Connect the
adaptor box and the nurse call
panel on the wall.

# How to Connect with Wireless Nurse Call System (NC-5000)

Please note that only the MS-3100E system option can be connected with the Wireless Nurse Call System (NC-5000).

It is required to register all NC-5000 receivers if you want the MS-3100E to be used as a transmitter. The registration process differs for each receiver. Please read appropriate sections of the receivers' manuals.

A detection signal generated, based on each of the detection mode's required criteria, is wirelessly transmitted to the receiver(s).
Once the signal is transmitted to the receiver, an alarm is generated.

Selecting Appropriate Mode Settings

Bottom view

Mode switch
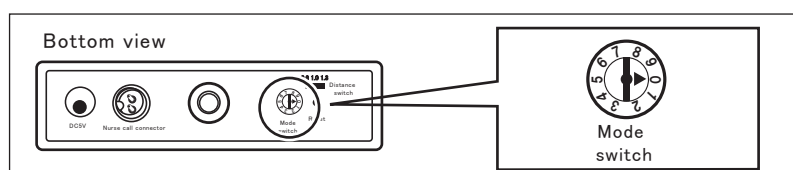
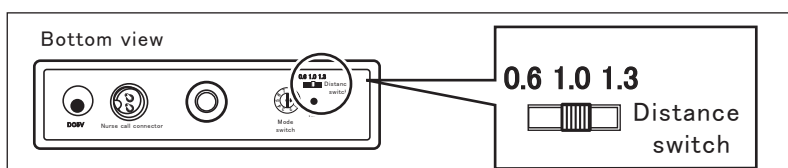| Mode number	Detection Mode Type	Detection duration
0	Type A: Getting out of bed	1.22 sec
1	Type A: Getting out of bed	1.66 sec
2	Type D: Trespass detection	0.77 sec
3	Type D: Trespass detection	1.22 sec
4	Type B: Potential fall detection	2 sec
5	Type B: Potential fall detection	6 sec
6	Type B: Potential fall detection	10 sec
7	Type C: Not back in bed detection	6 min
8	Type C: Not back in bed detection	10 min
9	Type C: Not back in bed detection	30 min

Select a desired detection setting to meet a caregiver's needs.

There are 4 detection mode types and different detection durations to choose from.

After selecting a desired mode number, be sure to press the "Reset" button or unplug the AC adaptor. This establishes the selected detection mode type.

More detailed information about the detection mode types and appropriate installation of the system can be found later in this manual.

Selecting an Appropriate Detection Distance

Bottom view

0.6 1.0 1.3
Distance switch

The sensors' detection distance can be selected from the distance switch on the bottom of the main unit. There are a total of 3 distance detection options (i.e., 0.6 m, 1.0 m, and 1.3 m). Based on a physical caring environment and the detection mode type desired, please select an appropriate distance option.

Type A Setting: Detecting the Movement of an Individual on the Bed

Distance sensors
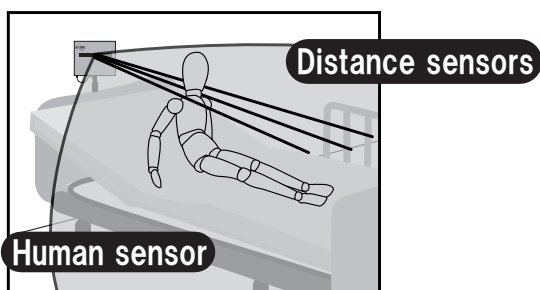
Human sensor

Type A setting is used for detecting the movement of an individual on the bed. The two sensors, the human sensor and the distance sensors, work together to minimize a potential detection false alarm. When an individual gets up the system detects the movement of the individual and it activates a nurse call system.

1. Installation of MS3100

Attach the MS3100 unit to an accessory tool such as the extension pole or the bed holder and install the main unit behind the bed.

Height adjustment:

It is recommended that the detection sensor beams should strike an individual on the bed's shoulders when he or she sits up on the bed.

* In order to minimize a potential detection false alarm, it is recommended to install the main unit at least 10 cm above the headboard.

Detection length adjustment:

The detection length range is between 20 cm and 130 cm from the front panel of the main unit. Select the appropriate setting option (i.e., 0.6, 1.0, or 1.3 m). It is recommended to locate the main unit within 130 cm when an individual sits up on the bed.
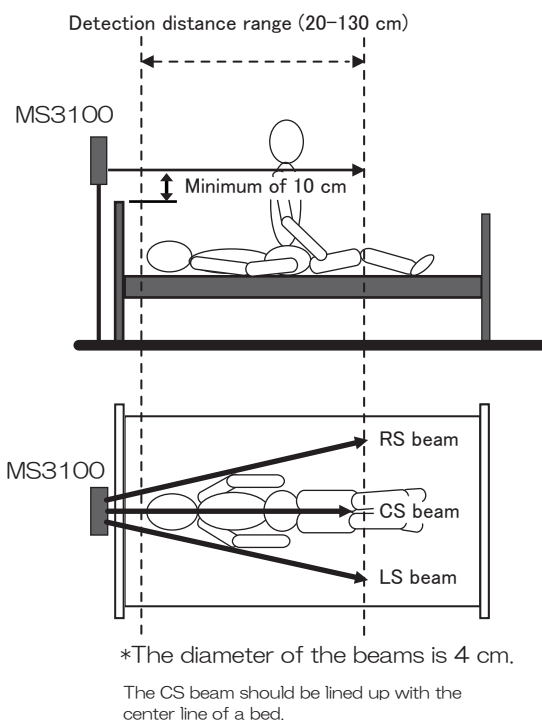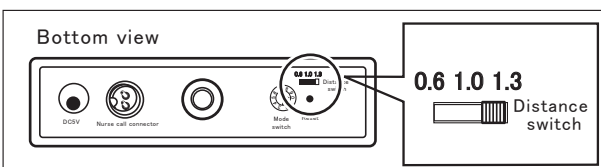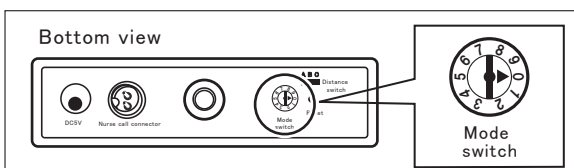
2. Select a mode option

Select the mode either zero "O" or one "1" from the mode switch. For the zero "O" setting, a nurse call system will be activated 1.22 seconds after the individual's movement is detected. This setting would be appropriate for a patient who has full physical motor capability. For the one "1" setting, the nurse call system will be activated 1.66 seconds after the individual's movement is detected. This setting would be appropriate for a patient who has the capability to get up from bed by him/herself.

3. Select a detection distance

A typical setting is 1.3 (1.3 m). Some situations where a shorter distance is desirable 1.0 (1.0 m) or 0.6 (0.6 m) can be selected.

Detection distance range (20-130 cm)

MS3100

Minimum of 10 cm

MS3100

RS beam

CS beam

LS beam

*The diameter of the beams is 4 cm.

The CS beam should be lined up with the center line of a bed.

Bottom view

DCSV Nurse call connector Mode switch

Mode switch

Bottom view

DCSV Nurse call connector Mode switch Preset

0.6 1.0 1.3

Distance switch

Type B Setting: Detecting an Individual's Potential Fall from a Bed/ Type C Setting: Detecting an Individual's Potential Wandering and Emergency Situations

Type B Setting is used for detecting an Individual's potential fall from a bed and Type C setting is used for detecting an Individual's potential wandering and emergency situations, when none of the distance infrared beams can detect the presence of the individual's body on the bed a timer starts. When the timer expires the distance beams try to detect the presence of an individual. If the system cannot detect the individual the system activates a nurse call system. A desired duration between the first and the second detection can be selected based on a care recipient's needs.

The difference between the Type B and C is the duration difference between the first and second detection attempts.

First detection   **Second detection**

The 3 distance beams detect an individual on the bed.

When absence of the body is detected a timer will start.

If the system detects the absence of the body for the second time a nurse call will be activated.
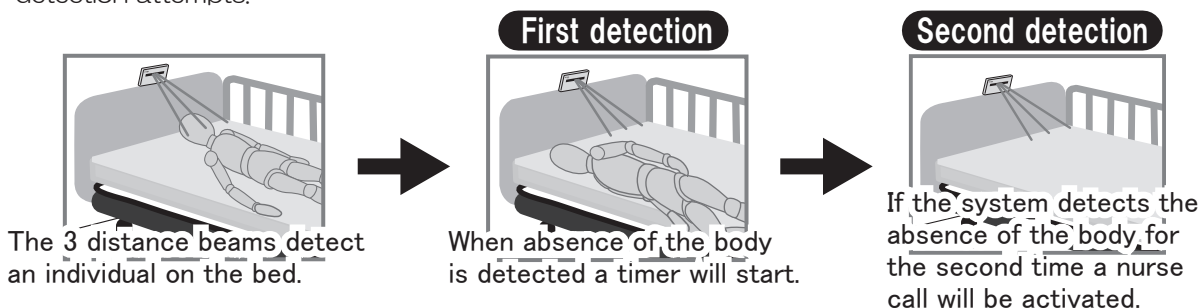
1. Select a mode option

Select between number 4 and 6 on the mode switch for the Type B settings. Select between 7 and 9 for the Type C settings. Each mode has 3 different duration options. Please refer to page 6 for more detailed information for a care recipient.

Bottom view

Mode switch
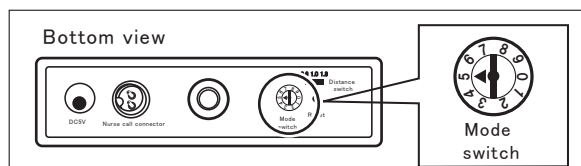
2. Select a detection distance

A typical setting is 0.6 (0.6 m).
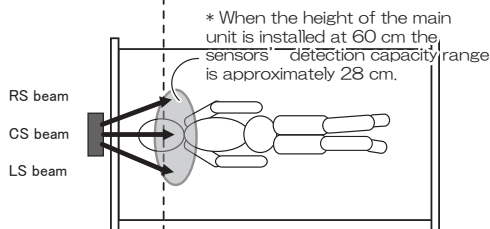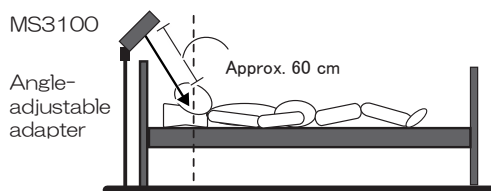
Bottom view

0.6 1.0 1.3
Distance switch
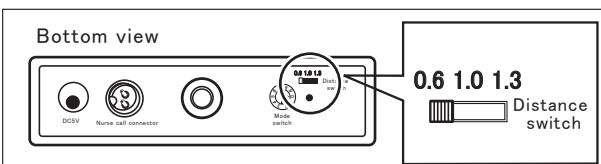
3. Installation of MS3100

Have an individual rest on a bed with his or her head on a pillow. Please confirm that one of the distance detection sensors (LS, CS, or RS)'s indicator LED lights turns on (yellow). This means the individual is in the detection range.

Next, please confirm that when the individual's head leaves the pillow the LED lights (yellow) turn off and the AL LED light turns on (red).

Note: if the yellow LED lights do not turn off and the AL light turns on red please adjust the location of the pole and the main unit.

Press the start button to complete the settings. The system automatically starts detecting the individual.

MS3100

Angle-adjustable adapter

Approx. 60 cm

* When the height of the main unit is installed at 60 cm the sensors' detection capacity range is approximately 28 cm.

RS beam
CS beam
LS beam

* The diameter of each beam is 4 cm.
The CS beam should be lined up with the center line of a bed.

Note: After the start button is pushed, all distance sensor LED lights should turned on for 5 seconds if the individual is in the detection range. If any of the LED lights do not turn on please adjust the location (i.e., distance and angle) of the main unit. This process allows you to fine tune the appropriate location of the main unit. After you confirm that the LED lights are turned on, and you are satisfied with the location of the main unit the LED lights including the HS light should flash 10 times and the system will then start automatically.

Type D Setting: Detecting an Individual in a Restricted Area
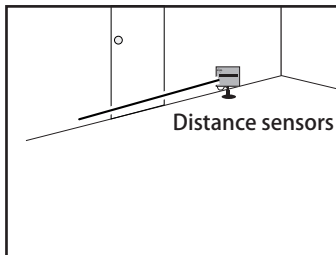
Distance sensors

Type D setting is used to detect an individual who is trespassing or in a restricted area. We will notify you by detecting a nurse call by blocking the beam using distance sensor. The following situations are the best use for this setting.
a. A care recipient enters a wrong room.
b. Care recipients who have a wandering habit.
c. Any individuals who are in a restricted area or trespassing.

1. Installation of MS3100

Attach the MS3100 main unit to the short extension pole and install it by the entrance of a care recipient's room.

2. Select a mode option

Select mode either 2 or 3 from the mode switch. If you want the system to activate a nurse call system right away select 2. On other hand, if you want the system to activate the nurse call system after a few seconds then select 3.
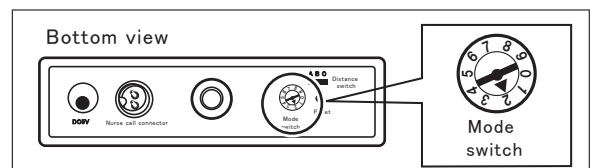
Bottom view
Mode switch

3. Select a detection distance

A typical setting is 1.3 (1.3 m). Some situations where a shorter distance is desirable 1.0 (1.0 m) or 0.6 (0.6 m) can be selected.

Bottom view
0.6 1.0 1.3
Distance switch

Distance sensors
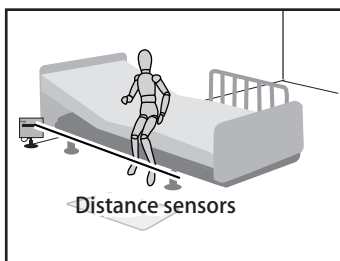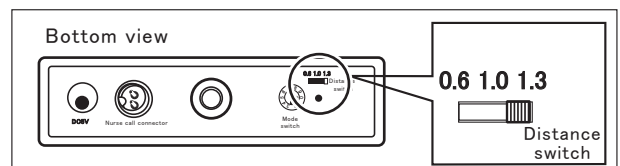
You can use it as a foot sensor next to bed.

Troubleshooting

Type A setting:

◆ **"There is no one on the bed, but a nurse "call" is activated."**

• Please check the location of the main unit.
• Are there any objects blocking the infrared sensors?

◆ **"When I stand by the bed a nurse "call" is activated."**

• Please check the location of the main unit.
• Is the mode switch selected accurately?

◆ **"An individual sits up on the bed but a nurse "call" is not being activated."**

• Please check the location of the main unit.

• The sensor setting option has not been selected correctly? Please check the sensor setting option.

◆ **"I have changed the mode but the mode is not changed."**

• When you only change the mode number option the mode will not change. After an appropriate mode is selected you must push the "reset" button or unplug the AC adaptor for 10 seconds. One of these procedure will activate the selected mode.

Type B or C setting:

◆ **"The HS LED light keeps flashing."**

• Push the "start" button. The HS light starts flashing when the AC adaptor is plugged in or a care recipient is detected by the system. When this happens the system will be in a standby mode until the "start" button is pushed.

Note: When the HS LED light is turned on it means the system is in the first or second standby mode.

◆ **"None of the LED lights are turned on (yellow)."**

• Between the first and second detection attempts (based on the selected duration option), no infrared beams are activated therefore, no LED lights are turned on.

◆ **"When a care recipient's head leaves the pillow but a nurse call system is not activated."**

• Please ensure that the LS, CS, and RS LED lights are turned on when a care recipient's head leaves the pillow. This means that the care recipient is outside of the detection range. If one of the LED lights is still turned on it means the care recipient's head is in the detection range. This causes the system to not activate the nurse call system. If this happens please adjust the locations of the main unit and/or the pillow.

Specification

Item		Specifications	Remarks
Detection range	1st Sensor	Distance: approx.. 5 m Angle: 30°	Infrared pyroelectric sensor (HS)
	2nd Sensor	Distance: approx.. 1.3 m Spotbeam method	Reflective infrared sensor (distance sensors)
Mini. detection cycle		Approx. 2 sec	Adjustable
Power		AC100-240V 50/60Hz DC5V 300mA	AC adaptor is used
Environmental condition		Temp.: 0 – 40° C	Non-condensing
		Humidity: 25 – 85 %	
Dimensions		158(W) x 110(H) x 40(D) mm	Excluding protrusions
Weight		Approx. 290g	Excluding cables and others
Frequency		2.4 GHz	MS-3100E only