TOSHIBA TCB-LD1UPE Leak Detection Sensor Instruction Manual

Contents

TOSHIBA

TOSHIBA TCB-LD1UPE Leak Detection Sensor

Product Information

- **Product Name:** TOSHIBA R32 refrigerant leakage detector (Leak Detector)
- **Model Number:** TCB-LD1UPE
- **Language:** English
- **Manufacturer:** TOSHIBA

Safety Precaution

The safety precaution section contains important warnings and cautions regarding the proper operation and installation of the Leak Detector. Failure to follow these instructions may result in serious personal injury or property damage.

- Before starting to install the air conditioner, read through the Installation Manual carefully, and follow its instructions to install the air conditioner.
- Only a qualified installer or service person is allowed to do installation work. Inappropriate installation may result in water leakage, electric shock or fire.
  Please understand the following details (instructions and symbols) before reading the body text, and follow the instructions.

Indication	Meanings of identification
WARNING	The warnings indicate that if you fail to operate properly and follow the instructions in the warnings, it may cause serious personal injury or death.
CAUTION	The caution Indicates that if you fail to operate properly and, it may cause serious person al injury or property damage. (*1)
*1: Property damage includes loss of buildings, family property, poultry, and pets.	

Warning

- Before carrying out the installation, maintenance, repair or removal work, set the circuit breaker to the OFF position. Otherwise, electric shocks may result.• Place a “Work in progress” sign near the circuit breaker while

the installation, maintenance, repair or removal work is being carried out. There is a danger of electric shocks if the circuit breaker is set to ON by mistake

- Wear protective gloves and safety work clothing during installation, servicing and removal.
- This Leak Detector must be installed in accordance with National Wiring Regulations.
- Connect and fix the specified cables for wiring securely.
- Do not allow the connection to be exposed to external force from the cables.
- Select an installation location which is rigid and strong enough to support or hold this Leak Detector, and select a location for easy maintenance
- Use only the parts specified by Toshiba Carrier Corporation supplied accessories.
- Disassembly and Modification of this Leak Detector is not permitted under any circumstances.
- This Leak Detector must be installed by the sales dealer or installer.
- Repairs must be carried out only by the method specified by Toshiba Carrier Corporation.
- Only replace parts specified by Toshiba Carrier Corporation when replacing parts.
- Torch detectors (or other open flame detectors) should not be used when checking for refrigerant leaks.
- This Leak Detector should be securely installed in accordance with this manual.
- In case of an abnormal condition (such as a burning smell), stop the indoor unit and turn the breaker OFF.
- When devices that use flammable refrigerants are installed in unventilated areas, ensure the refrigerants do not accumulate and present the risk of fire or explosion, even in the unlikely event that refrigerant does happen to leak.
- Do not operate wet hands.
- Do not splash water on the Leak Detector or use it in the bathroom.

CAUTION

- Gases and vapours other than the target refrigerant gas, may cause semi-conductor sensors to react. Sensors exposed to silicon fumes may be permanently damaged. The accumulation of volatile organic compounds resulting from human occupation in a poorly ventilated room may cause inaccurate operation. Adequate room ventilation should be maintained at all times.
- Ground yourself to discharge static electricity before performing any wiring.
- Do not install the Leak Detector in places with direct sunlight or where the ambient temperature is more than 40°C or is less than 0°C. Follow 2.Specification
- The connecting cable must not touch piping directly.
- Install this Leak Detector horizontally.
- The warranty does not cover the product if it falls from an elevated location.
- Do not use the Leak Detector at the following locations. Because may lead to severe decrease in functionality and damage to parts.
    - Location where condensation occurs
    - Location where flammable gases, etc. may leak
    - Location where corrosive gases, etc. may leak
    - Location with lots of water or oil droplets (including machine oil)
    - Steamy locations
    - Location where voltage fluctuation frequently occurs
    - Location where there is a machine producing electromagnetic radiation
    - Location where droplets of organic solvents spread

    - Location where acidic or alkaline solutions or special sprays are frequently used
    - Locations where dust easily accumulates or Extremely dusty
- The semi-conductor sensor may react or malfunction if exposed to gases other than the refrigerant gas or to steam. Accordingly, the following must be avoided when installing.
    - Using in atmospheres where silicone gases (siloxane, etc.) may occur
      The Leak Detector may malfunction or operate incorrectly if items such as adhesives, hair products, rubbers, or putties with silicone in them are used in the vicinity of the Leak Detector.
    - Exposing to organic solvents/chloric gases Alcohols, VOCs, Chloric gases, etc., can be the cause of malfunction or incorrect operation. Large amounts of organic solvents are produced by paints, floor waxes, etc., when building or renovating structures, so ensure the area is properly dried and ventilated before installing the Leak Detector.
    - Polluting with alkaline metals (especially salt mist)

Precaution for operation
WARNING

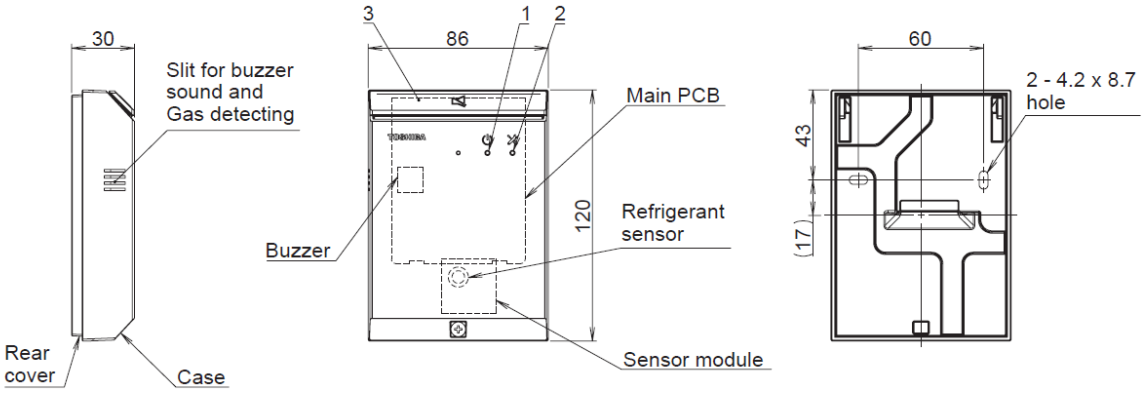
- Do not block the slit for gas detecting. (It will be unable to detect refrigerant leaks and may result in a fire.)
- Do not power off the air conditioner even if it is not used for a long time. The Leak Detector will not operate.
- The buzzer starting to sound indicates that there has been a refrigerant leak. Ignition or fire may result as the concentration of refrigerant increases, so the area should be ventilated and evacuated as quickly as possible.
- If a leak is suspected, all naked flames should be removed and extinguished.
- When someone may touch the air conditioner due to maintenance, etc., do not allow spray to get onto the Leak Detector or use flammable gases near the Leak Detector. Also make sure that the breaker is turned off when performing maintenance on the air conditioner or Leak Detector.
- Do not use sprays or chemicals when cleaning.

Specification

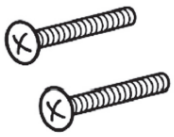
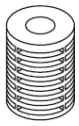
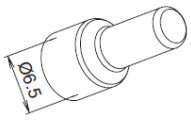
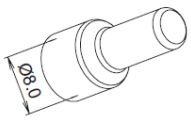
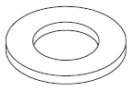
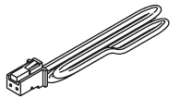
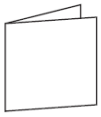
- Dimension: 86W x 120H x 30D mm
- Weight:0.11 kg
- Temperature/humidity range: 0°C to 40°C / 20% to 80% (no condensation) *Indoor use only.
- Power source: DC 13 V to 18 V (Supplied from indoor unit)
- Buzzer sound level: 65dB (A) at 1 m

Parts Name

- **Operation LED**
  If this LED is turning on green light, it indicates that the Leak Detector is power supplied and running.
- **Malfunction LED**
  If this LED is turning on red light, it indicates that any problem is occurs. Details is referred in “8.Operation”.
- **Alarm lamp (Buzzer sound stop button)**
  If the sensor detect refrigerant leakage, this lamp blinks and buzzer sounds a warning sound.
  Push this switch to stop warning sound, but this warning sound can not be killed unless refrigerant density is decrease sufficiency.



Accessory Parts

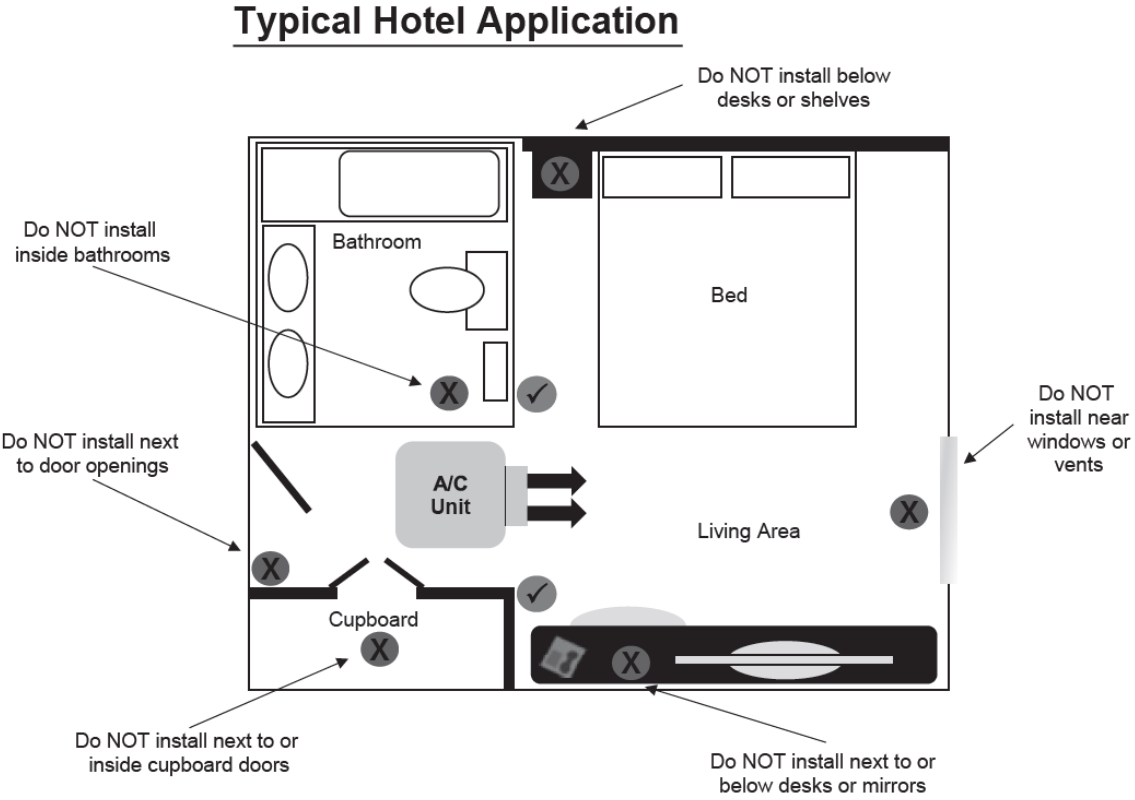
No.	Part name	Image illust	Quantity
1	Screws M4 x 25		2
2	Wood screw M3.8 x 16		2
3	Plastic stud		2
4	Wire terminal 1 (Inner diameter 6.5 mm) for AWG22 ~ AWG16		6
5	Wire terminal 2 (Inner diameter 8.0 mm) for AWG20 ~ AWG14		6
6	M3 washer		2
7	Connecting wire		3
8	CD-ROM media manual *Includes 24 languages of manual		1
9	Installation & Operation Manual (This manual)		1

Installation Precautions

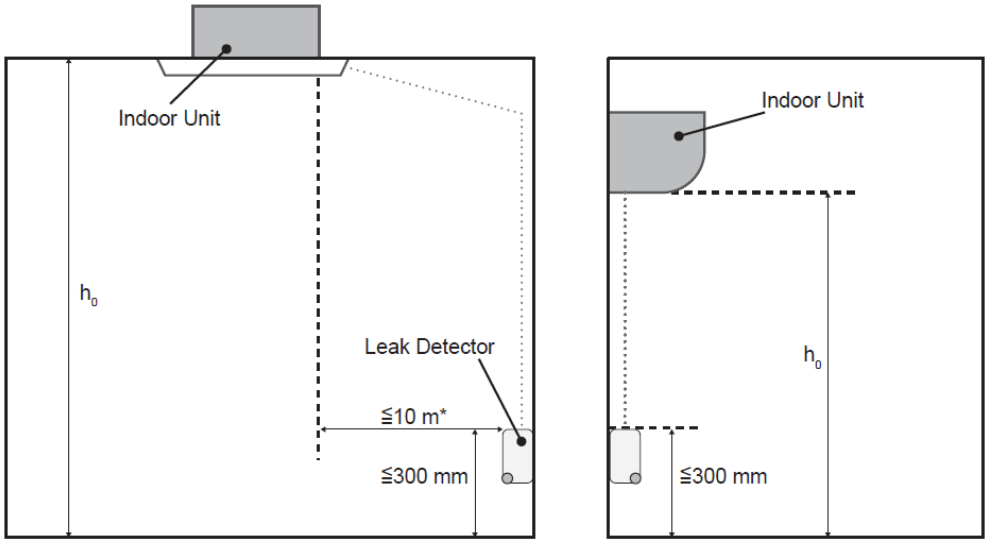
Installation locations

Refrigerants are significantly heavier than air. Therefore in order for the sensor to operate as effective as possible the refrigerant detector must be positioned at a low level inside the room, where the indoor air conditioning unit is

fitted. See diagram showing recommend installation guidelines.



You need to observe the regulations of the local governments, state and country that govern the installation of Leak Detector when installing the Leak Detector. You must ensure that installation complies with all relevant rules and regulations.

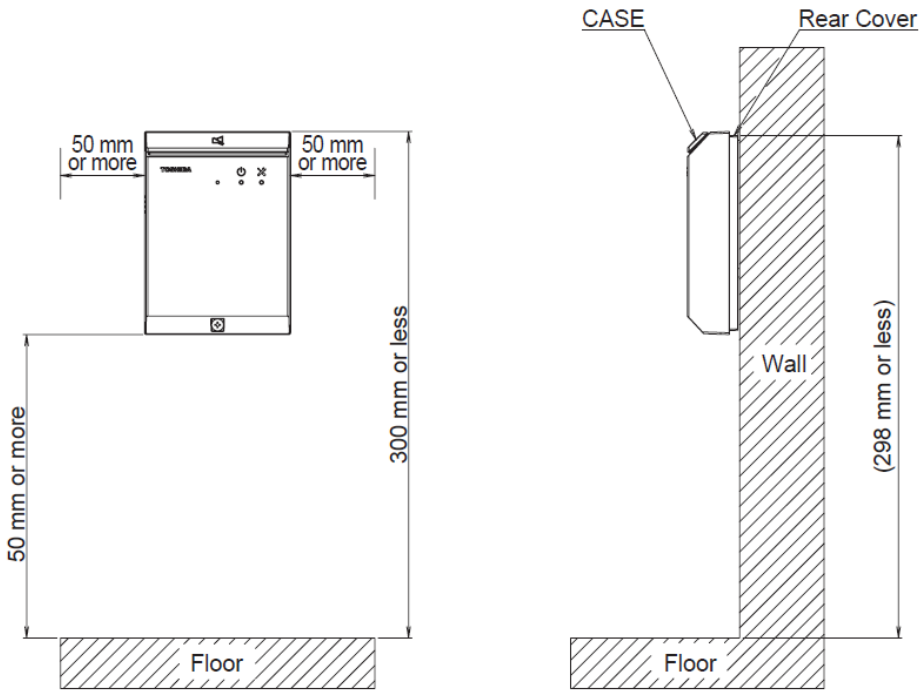


It must be placed within a horizontal distance of 10 meters and on the wall in the room where the indoor unit is installed. However, when it does not enter the field of view on a straight line from the Leak Detector, it is within 7 meters at the shortest horizontal distance without obstacles and installed on the wall in the room where the indoor unit is installed.

- The alarm shall always be 15 dBA louder than the room background noise.

  Leak detector can generate 65 dBA alarm. (Sound pressure level, measured at a distance of 1 m from the alarm.)

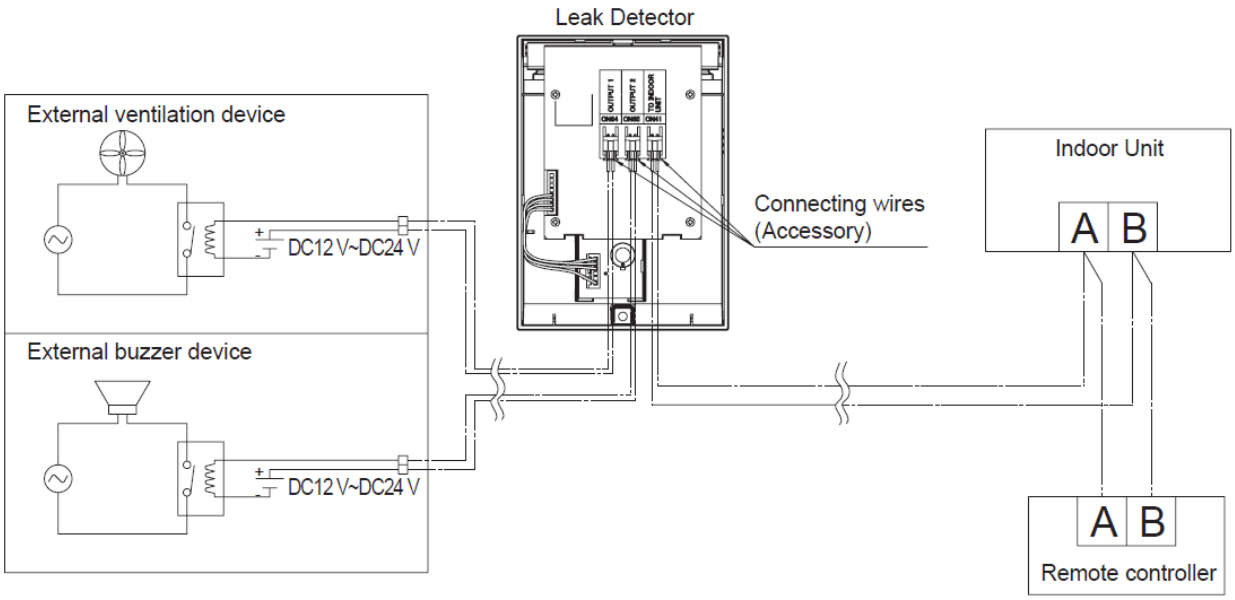
  If the surrounding environment is noisy in a particular room, we recommend that you use an external alarm (by local power supply) in that room.
- This Leak Detector has output terminals to external ventilation and an external alarm. When taking safety measures using external ventilation or an external alarm, install according to “ Basic wiring diagram”.
- Keep a space around the Leak Detector as detailed on the figure shown below.



- Install so the Leak Detector is within 300 mm of the floor. This is stipulated in regulations.
- Install this Leak Detector horizontally.
- Do not block the slit for gas detecting or place objects immediately in front of the gas detector as this will mean leaks will not be detected.
- This Leak Detector should be mounted in a position where it can be easily accessed for maintenance and repairs.
- Avoid the following locations for installation.
    - By a window, etc. exposed to direct sunlight or external airflow
    - In the shadow or backside of objects deviated from the room airflow
    - Location where condensation occurs (The Leak Detector is not moisture proof or drip proof)
    - Location near heat source
    - Uneven surface
    - Location where there is a danger of mechanical damage being inflicted on the Leak Detector
    - Location where there is a danger of the generation of contaminants such as silicone gases (siloxane, etc.), organic solvents/chloric gases, etc.
- Do not install the Leak Detector in a place where smoke, chemical agent, or organic solvent is present.
- Do not use gas equipment using combustion gas (LPG etc.) such as propane, butane, or methane, an insecticide, or sprays or paints containing siloxane, near the Leak Detector. The refrigerant leak detection sensor operates mistakenly, causing the air conditioner not to operate.

Basic wiring diagram

- Interconnecting cable wire are produced locally.
- Using the specified wires, ensure to connect the wires and fix wires securely, so that the external tension to the wires does not affect the connecting part of the terminals. Incomplete connection or fixation may cause.



Output connector can be connected the external device (Ventilation, external buzzer device and etc.) When the Leak Detector detects leakage, outputs the signal to these device. When the buzzer is stopped, Output 1(CN64) will keep to output, Output 2(CN65) will stop to output.
So the external buzzer is recommended to connect to Output 2 (CN65)

Output signal table

Status of the Leak Detector	**Leak Detector operation**						**Remote controller status**	**Indoor unit operation**	**Outdoor unit operation**
	Operation LED	**Malfunction LED**	**Alarm lamp**	**Alarm sound**	**External output**				
					Output 1 (CN64)	**Output 2 (CN65)**			
Monitoring (Normal)	ON	OFF	OFF	OFF	OFF	OFF	Normal	Normal	Normal
Preparing (Startup)	Blinking*1	OFF	OFF	OFF	OFF	OFF	Normal	Normal	Normal
Advance notice of the life of refrigerant leak detection sensor	ON	Blinking*1	OFF	OFF	OFF	OFF	Notice code	Normal	Normal
Refrigerant leak detection sensor exceeding its life of the product	ON	ON	OFF	OFF	OFF	OFF	J31	Normal	Normal
Abnormal	ON/Blinking*1	ON	OFF	OFF	OFF	OFF	J29	Normal	Normal
Refrigerant leak detection	ON	OFF	Blinking*1	Ringing	ON	ON	J30	Stop / Circulate operation	Normal / Stop (system lock)
After cancelled alarm sound	ON	OFF	Blinking*1	OFF	ON	OFF	J30	Stop / Circulate operation	Normal / Stop (system lock)
*1 : It is 0.5 seconds interval.									

- **Basic wiring limitation**

Remote controller wiring

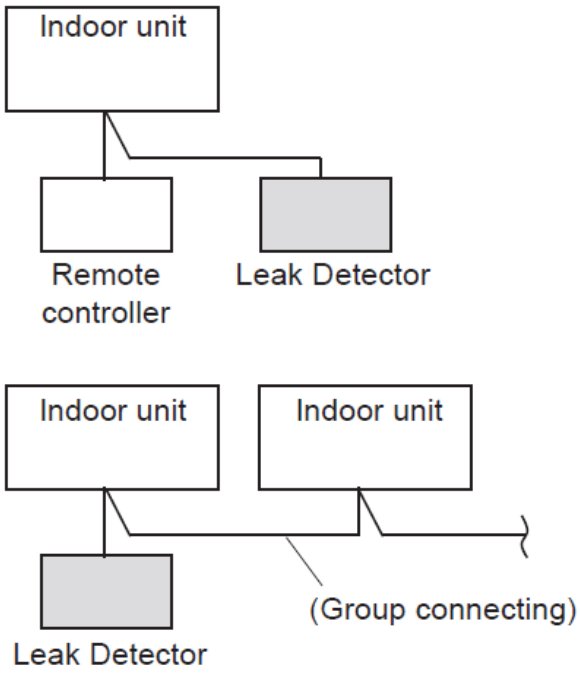
- Type of wiring

Ext output wiring

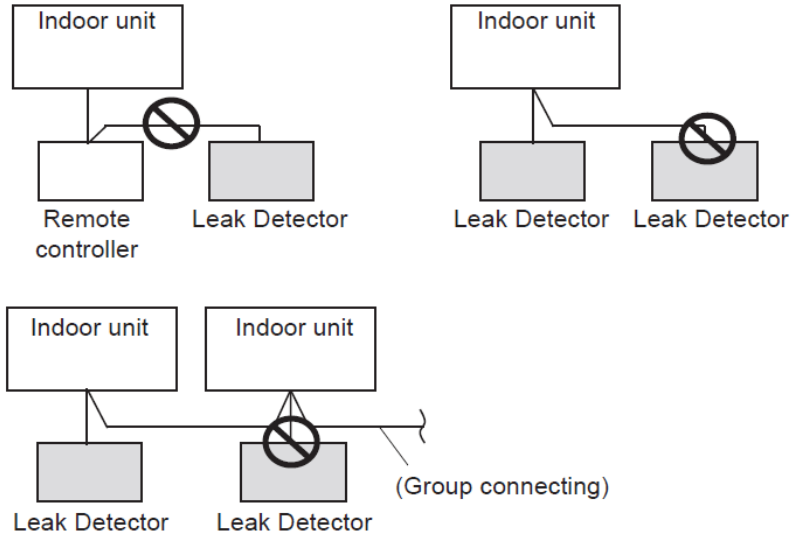
- Type of wiring
- Use cables of 0.5 to 2.0 mm2 (Min. 0.5 mm2) • Use cables of 0.75 to 2.0 mm2 (Min. 0.75 mm2)
- Total wire length : 300 m or less
- Total wire length : 100 m or less
- Maximum length between Leak Detector and header indoor unit (DN14=1) : 100 m

	Leak Detector side		External equipment side		
	Rating	Terminal name	Terminal	Circuit example	Condition
Status	Output1 (CN64) Maximum Voltage: DC 25 V Maximum Current: 0.2 A Output2 (CN65) Maximum Voltage: DC 25 V Maximum Current: 0.2 A	Output 1 or 2 non porarity 100 m or less / 0.75 mm²		DC12 V ~ DC24 V Relay	Rated coil Voltage DC12 V ~ 24 V

Correct wiring diagrams



Wirings as shown below are prohibited



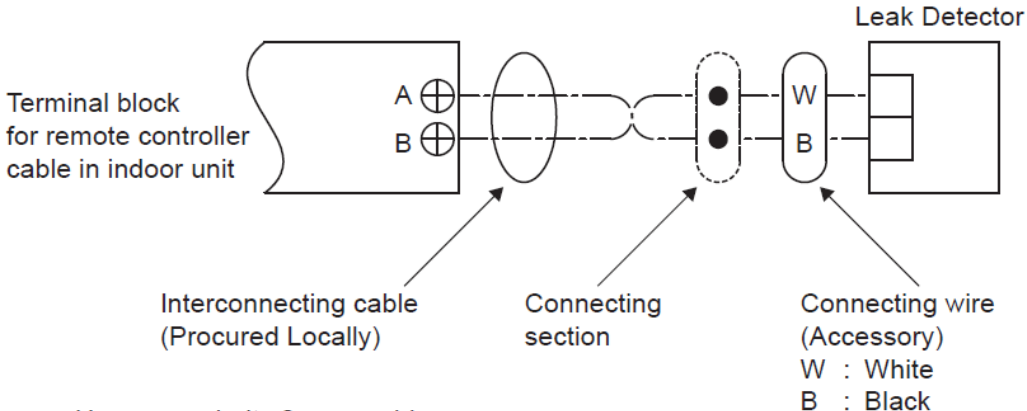
- Only one Leak Detector can connect to one Indoor unit.
- Only one Leak Detector can connect in one group connecting.

CAUTION

- After refrigerant piping has been connected, do not turn on the power until gas leakage check is finished. If refrigerant gas leaks, then Leak Detector in the system will operate, causing air conditioner not to operate.

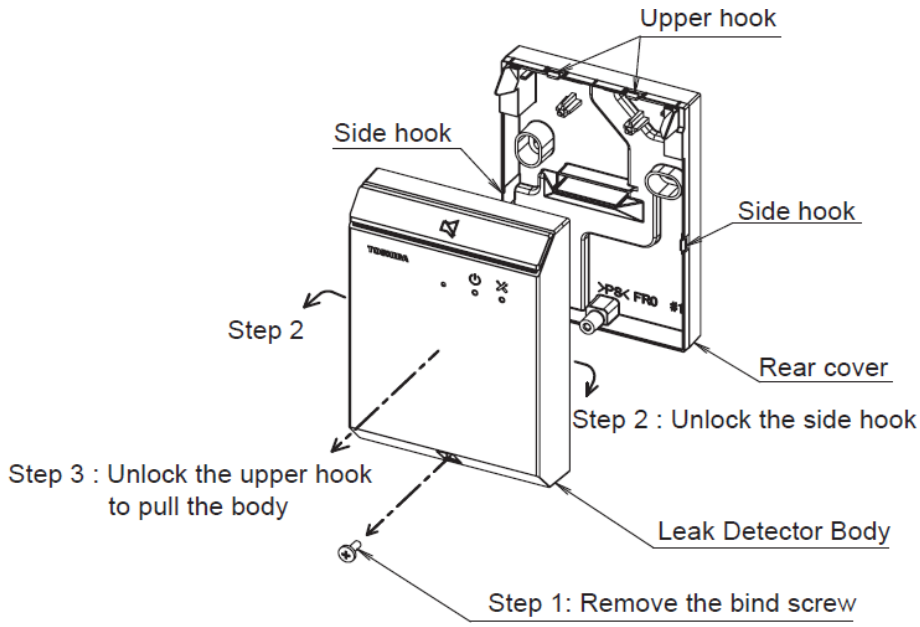
Mounting

1. Please use a connecting wire (accessory) and an interconnecting cable (procured locally) to connect to indoor unit terminal board cable. If crimping tools are not available, please use other reliable methods for connection. Do not only use the insulating tape to connect; otherwise it can be dangerous. Since the Leak Detector cable has no polarity that is OK if the indoor unit's terminal A and terminal B are inversely connected.



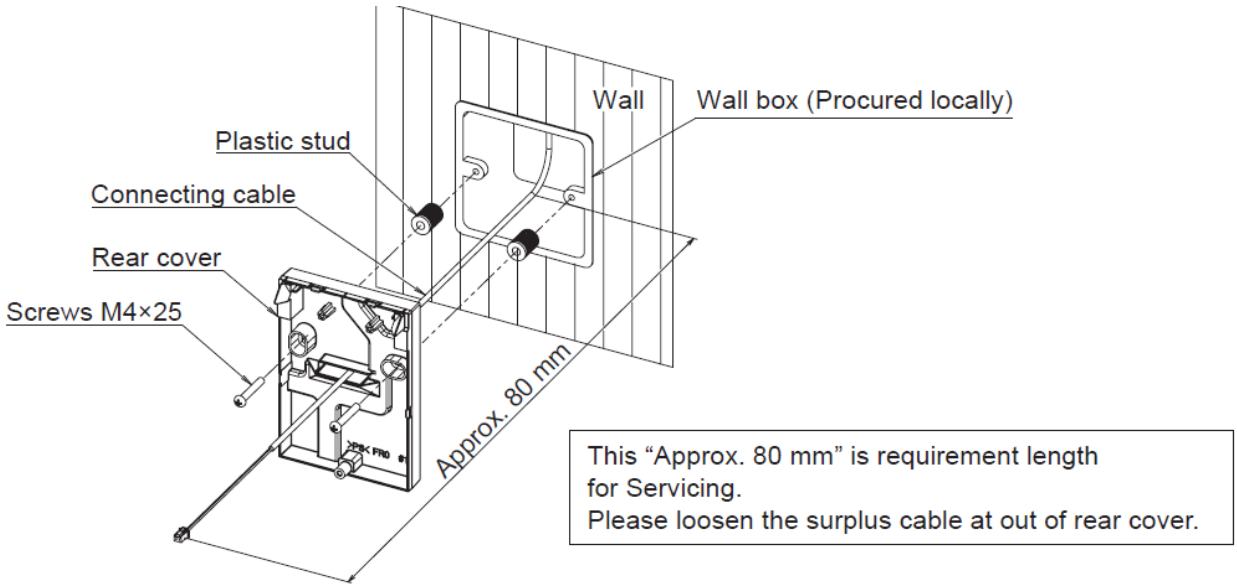
- Use non-polarity 2-core cable.
- Use 0.5 mm^2 - 2.0 mm^2 cable.

2. Remove rear cover from body to refer to the step 1 to 3 shown as below figure. Keep screw and body until process 5.



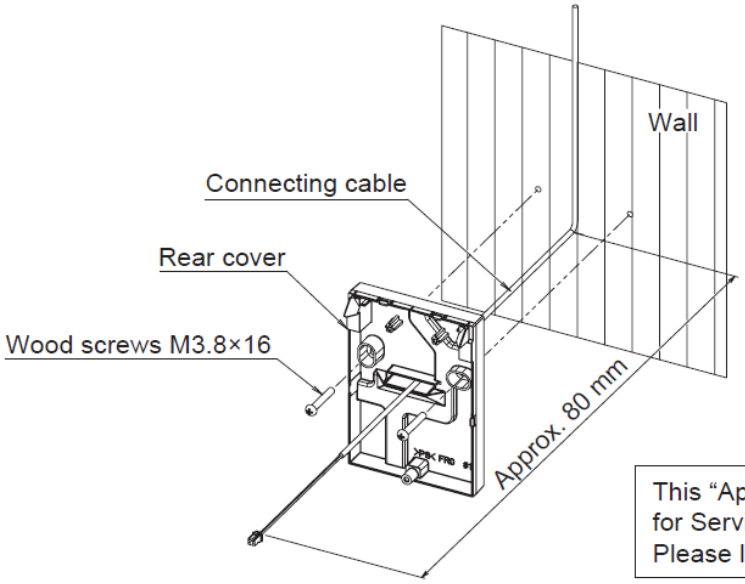
3. In case of mounting to wall box

   In case of mounting to wall box, cut the plastic stud in the accessory to a suitable length for filling the gap between the rear cover and the wall box. Then use the M4 screws in the accessory to fix the rear cover to the wall box through the plastic stud

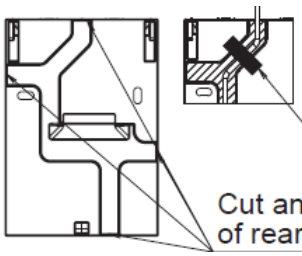


   In case of mounting to wall directly

   In case of mounting to wall directly, cut and remove the side wall of rear cover which pass the cable wire. Connecting cable wire is passed through this groove on rear cover. Then use M3.8 wood screw in the accessory to fix the rear cover to the wall so as to take care not to pinch among wall and rear cover.



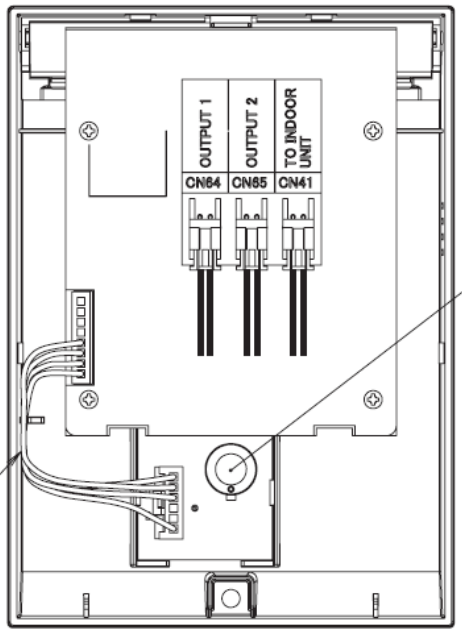
This “Approx. 80 mm” is requirement length
for Servicing.
Please loosen the surplus cable at out of rear cover.



Connecting cable wire is passed
through this groove on rear cover
so as not to pinch among wall and rear cover.
It is recommended that fix cable wire with tape etc..

Cut and remove the side wall
of rear cover which pass the wire

4. Insert communication cable of indoor unit to the connector CN41 on PCB of the Leak Detector, Confirm the terminal number of indoor unit and connect the Leak Detector cable correctly. (The Leak Detector may be damaged if connecting the power supply of indoor unit.) If connect the Leak Detector to external device, communication cable of those is inserted to the connector CN64 or CN65.

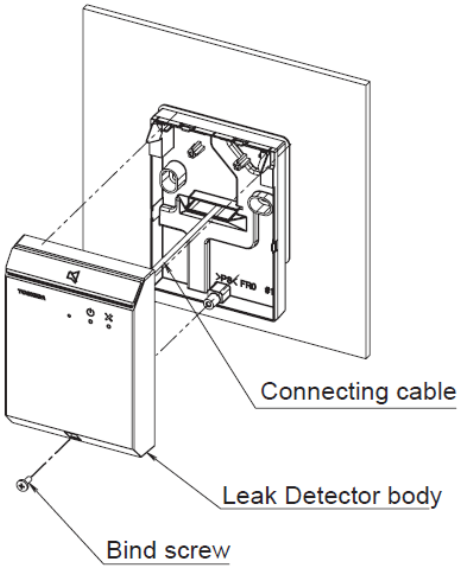


Refrigerant sensor

Gather the cable wire and
store to this space.

- Do not touch, damage, or dirty the top of sensor. It may cause that detecting performance is decreased.

5. Mount the Leak Detector body to rear cover. And be careful not to pinch the cable among the body and rear cover. Finally, tighten the bind screw to body.



- When mount Leak Detector body to rear cover, take care not to pinch connecting cable among body and rear cover.

Self-diagnostics table

Self-diagnostics table

The LEDs light as follows according to the status of the Leak Detector. Please contact the service man and inform the status of the Leak Detector. Then take appropriate measures for solution.

- please keep the status of the Leak Detector and do not cancel it until service man take measures.

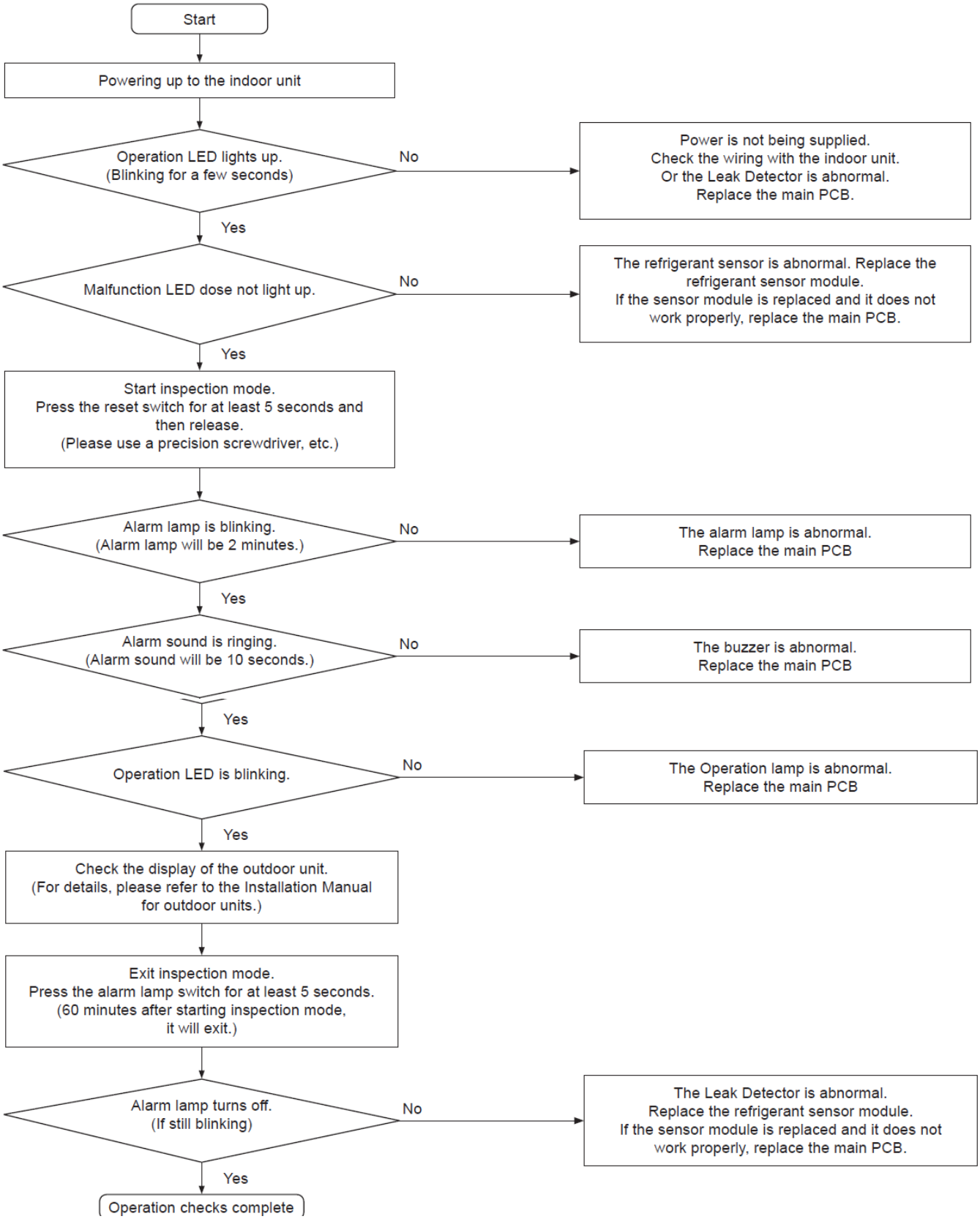
● : ON ○ : OFF ◉ : Blinking

Operation LED (Green)	Malfunction LED (Red)	Alarm lamp (Red)	Status	Solution
◉	○	▭	Preparing	The Leak Detector is preparing to operate. Preparation continues for 30 seconds after powering up.
●	○	▭	Monitoring	The normal status.
●	○	◉	Leaking	Refrigerant is leaking. Start ventilating immediately. You should contact our sales/ service team or an authorized dealer.
● or ◉	●	▭	Abnormal	There is an abnormality with the Leak Detector. It may be unable to detect refrigerant leakage so you should contact our sales/service team or an authorized dealer.
●	◉	▭	End of service life is approaching	The refrigerant sensor is about to reach the end of its service life. Contact our sales/service team or an authorized dealer to arrange for replacement of the Leak Detector.
●	●	▭	End of service life	The refrigerant sensor reached the end of its service live. Contact our sales/service team or an authorized dealer to arrange for replacement of the Leak Detector.

Set up

Test run (Inspection mode)

After installation is complete, use following procedure to confirm that the Leak Detector is operating properly.



Operation

Overview

- Read this manual carefully for safe use.
- Read this manual as well as operating manual supplied with indoor units and outdoor units.
- Be sure to read the “Safety Precaution” before use.
- Keep this manual with operating manual supplied with indoor units and outdoor units in a safe place.

Before operating the unit, read these Operating Instructions thoroughly and keep them for future reference. In

case of malfunction of this appliance, do not repair by yourself. Contact the sales or service dealer for repair and disposal.

Prohibited matters in Operation

- WARNING
- Disassembly and modification of this Leak Detector is not permitted under any circumstances.
- Do not operate with wet hands.
- Do no splash water on the Leak Detector or use it in the bathroom.
- Do not block the slit for the gas detecting. (It will be unable to detect refrigerant leaks and may result in a fire.)
- Do not power off the air conditioner even if it is not used for a long time. The Leak Detector will not operate.
- When someone may touch the air conditioner due to maintenance, etc., do not allow spray to get onto the Leak Detector or use flammable gases near the Leak Detector. Also make sure that the breaker is turned off when performing maintenance on the air conditioner or Leak Detector.
- Do not use sprays or chemical when cleaning.

Matters to be observed in Operation

- WARNING
- The buzzer starting to sound indicates that there has been a refrigerant leak.
  Ignition or fire may result as the concentration of refrigerant increases, so the area should be ventilated and evacuated as quickly as possible. Also contact the manager of the facility and the person responsible for servicing.
- If a leak is suspected, all naked flames should be removed and extinguished.

CAUTION

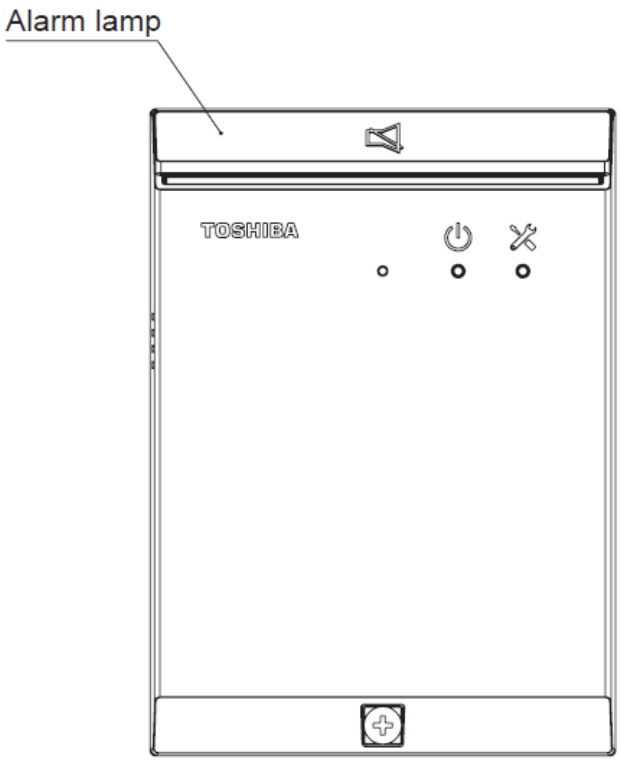
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance.
- Cleaning and user maintenance shall not be made by children without supervision.
- This equipment is not suitable for use in locations where children are likely to be present.

Leak Detector status and operation

Status of the Leak Detector	Leak detector operation						Remote controller status	Indoor unit operation	Outdoor unit operation
	Operation LED	Malfunction LED	Alarm lamp	Alarm sound	External output				
					Output 1 (CN64)	Output 2 (CN65)			
Monitoring (Normal)	ON	OFF	OFF	OFF	OFF	OFF	Normal	Normal	Normal
Preparing (Startup)	Blinking*1	OFF	OFF	OFF	OFF	OFF	Normal	Normal	Normal
Advance notice of the life of refrigerant leak detection sensor	ON	Blinking*1	OFF	OFF	OFF	OFF	Notice code	Normal	Normal
Refrigerant leak detection sensor exceeding its life of the product	ON	ON	OFF	OFF	OFF	OFF	J31	Normal	Normal
Abnormal	ON / Blinking*1	ON	OFF	OFF	OFF	OFF	J29	Normal	Normal
Refrigerant leak detection	ON	OFF	Blinking*1	Ringing	ON	ON	J30	Stopn/ Circulate operation	Normaln/ Stop (system lock)
After cancelled alarm sound	ON	OFF	Blinking*1	OFF	ON	OFF	J30	Stopn/ Circulate operation	Norma ln/ Stop (system lock)
*1 : It is 0.5 seconds interval.									

- Once the refrigerant is detected, the alarm lamp will not be released even if the concentration returns to normal. The above operation is also continued for external output 1, remote control, indoor unit, and outdoor unit.
- Once the refrigerant is detected, be sure to replace the refrigerant sensor module. It cannot be detected correctly.
- The estimated service life of the Leak Detector is 10 years. If use so as not to observe this manual, service life may be shorter than that of estimated.
- If the Leak Detector exceeds the estimated service life and the operation indicates it, contact the managers of both building and system and exchange the sensor module to new one
  (refer to Service Manual).

Procedure stopping buzzer
The buzzer can be stopped by pressing the alarm lamp switch for at least 2 seconds.



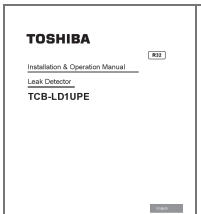
- Warning in Operations

WARNING

- When a gas alarm occurs, immediately ventilate the area and evacuate from the room. Also contact the manager of the facility and the person responsible for servicing.
- If there is abnormal behaviour, contact the manager of the facility and the person responsible for servicing. This Leak Detector may be in a state where it is unable to detect refrigerant.

144 / 9 Moo 5, Bangkadi Industrial Park, Tivanon Road, Tambol Bangkadi, Amphur Muang, Pathumthani 12000, Thailand

Documents / Resources

	TOSHIBA TCB-LD1UPE Leak Detection Sensor [pdf] Instruction Manual TCB-LD1UPE Leak Detection Sensor, TCB-LD1UPE, Leak Detection Sensor, Detection Sensor, Sensor