

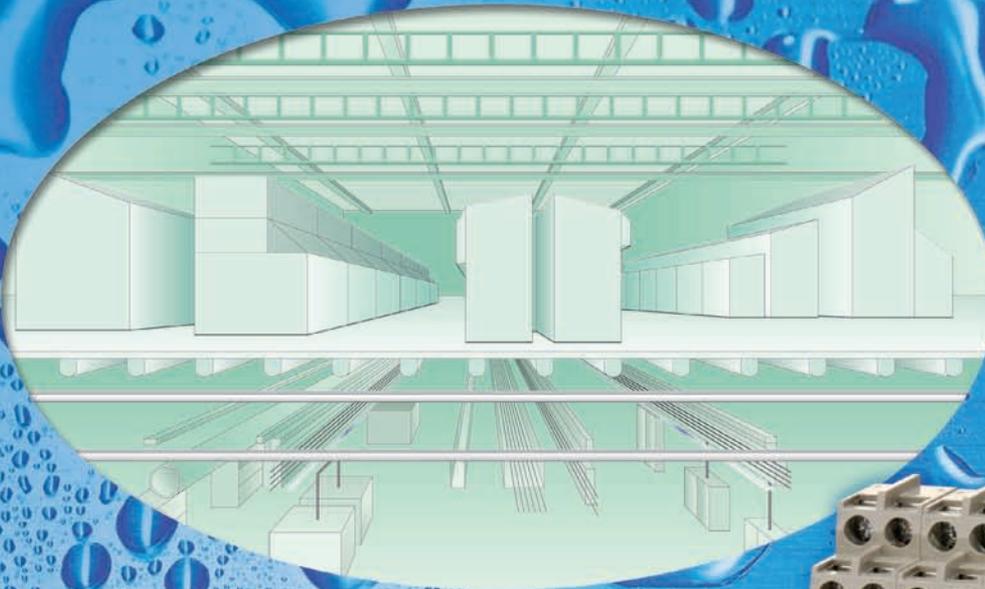
## Liquid Leakage Sensor Amplifiers for Long-distance Wiring

### **K7L-U/K7L-UD**

A new long-distance wiring model joins the K7L Series. The industry's smallest size and longest wiring ability — ideal for detecting liquid leakage on factory floors and ceilings.



Enables long-distance wiring up to 400 m.

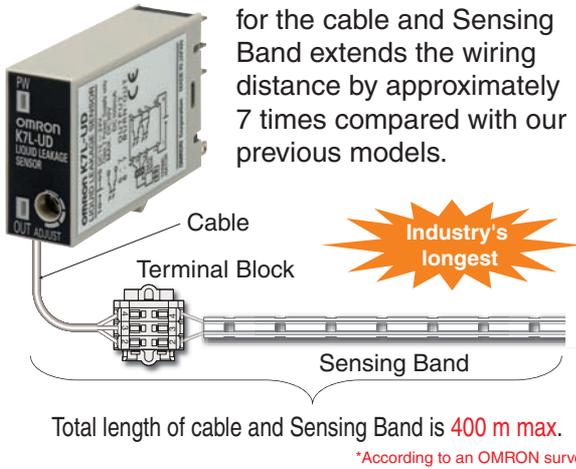


# K7L-U/K7L-UD

# A total distance of 400 m is achieved for cable and Sensing Band to minimize leakage damage.

## Greatly expands the detection area.

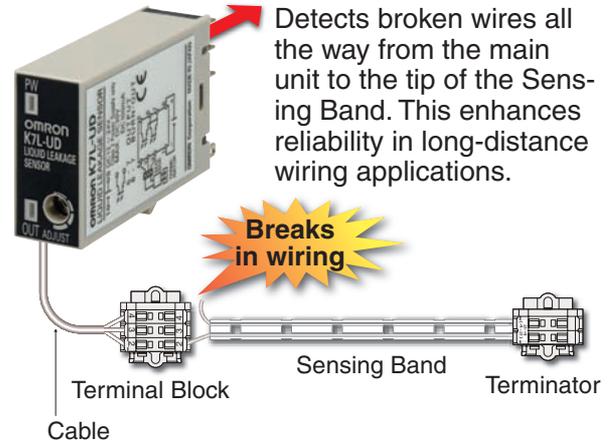
A total distance of 400 m for the cable and Sensing Band extends the wiring distance by approximately 7 times compared with our previous models.



## Detects broken wires.

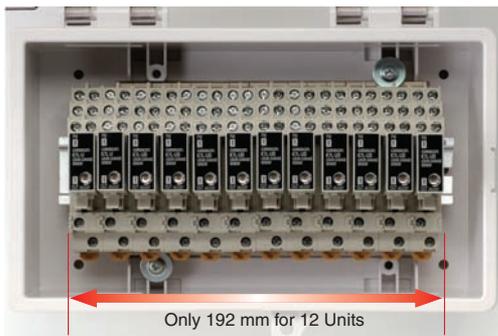
**Broken wire signal**

Detects broken wires all the way from the main unit to the tip of the Sensing Band. This enhances reliability in long-distance wiring applications.



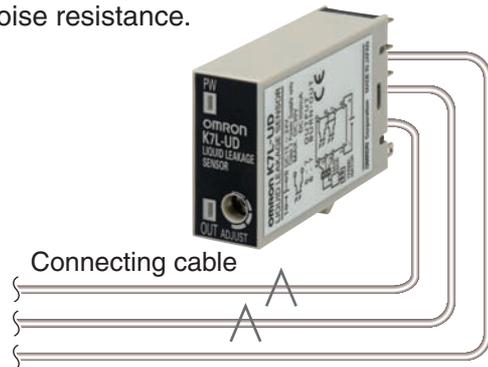
## Helps to downsize gang-mounted panels.

The extremely compact size, with a width of only 16 mm, helps to save panel size when mounting several Units together.



## Features a Noise Canceller (Patented)

A noise canceling circuit employing a three-conductor cable enables stable liquid leakage detection with excellent noise resistance.



## Application Examples

Floor or Ceiling of Semiconductor or Flat Panel Display Factory



Floor below Chemical Purification Tank



## Liquid Leakage Sensor Amplifiers for Long-distance Wiring K7L-U/-UD

### Ultra-miniature Liquid Leakage Sensor Amplifier Enables Longest Liquid Leakage Monitoring Distance in Industry

- Stable detection of liquids with impedance as high as 1 MΩ using inter-electrode resistance detection. Detection of chemical liquids and pure water is possible.
- Higher noise immunity with a noise canceller circuit connected to a 3-conductor cable.
- Prevents electrode corrosion with an AC detection method.
- The power supply circuit and detection circuit are isolated, allowing several Amplifiers to be installed in the same place.
- After a disconnection is detected, operating status is held to eliminate instability due to contact of the disconnected part. (See note.)

**Note:** For the K7L-UD.



UL  
UL 508  
CAN/CSA C22.2 No. 14  
CE  
EMC Directives  
EMI: EN 55011  
EMS: EN 61000-6-2

## Ordering Information

	Product name	Model	Characteristics
Amplifier	Liquid Leakage Sensor Amplifier	K7L-U	---
	Liquid Leakage Sensor Amplifier with Disconnection Detection Function	K7L-UD	---
Sensors	Sensing Band	F03-15	Standard model
		F03-16PE	Greater durability and condensation resistance. (See note 1.)
		F03-16PT	Greater temperature and chemical resistance. (See note 1.)
	Point Sensor	F03-16PS	Easier to wipe off than the band type.
		F03-16PS-F	Electrodes have fluororplastic coating to resist chemicals.
Mounting Brackets and Stickers	Sensing Band Stickers	F03-25	Used for F03-15 or F03-16SF(C).
		F03-26PES	Used for F03-16PE (adhesive tape).
		F03-26PEN	Used for F03-16PE (screws).
		F03-26PTN	Used for F03-16PT (screws).
	Point Sensor Mounting Brackets	F03-26PS	Used for F03-16PS.
Track-mounted Socket	Round terminals can be used.	P2RF-08	---
	Round terminals cannot be used.	P2RF-08-E	---
Terminal Blocks		F03-20	---

**Note:** 1. Compared with the standard model, F03-16PE.

2. One F03-20 Terminal Block is included as an accessory with the K7L-U/-UD.

3. The minimum order for the F03-25, F03-26PES, or F03-26PEN Sensing Band Stickers is one set (contains 30 Stickers).

4. The minimum order for F03-20 Terminal Blocks, F03-26PTN Sensing Band Stickers, or F03-26PS Point Sensor Mounting Brackets is one set (contains 10 Terminal Blocks, Stickers, or Mounting Brackets).

## ■ Available Sensing Band Lengths

	1 m	2 m	5 m	10 m	15 m	20 m	25 m	30 m	40 m	50 m	60 m	70 m	75 m	80 m	90 m	100 m
F03-16PE	OK	OK	OK	OK	OK	OK	OK			OK						
F03-15	OK	OK	OK	OK	OK	OK	OK			OK			OK			OK
F03-16PT	OK	OK	OK	OK	OK	OK										
F03-16SF(C)			OK	OK	OK	OK		OK	OK	OK	OK	OK		OK	OK	OK

**Note:** 1. To place an order for 1 m of the F03-16PE for example, specify F03-16PE-1M.

2. If you cannot find the length you need, please order the nearest larger length, then cut it to the required size.

## Specifications

### ■ Ratings

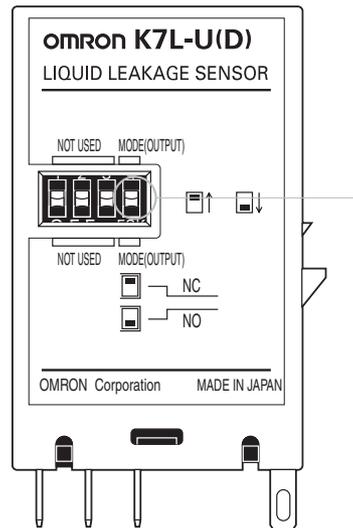
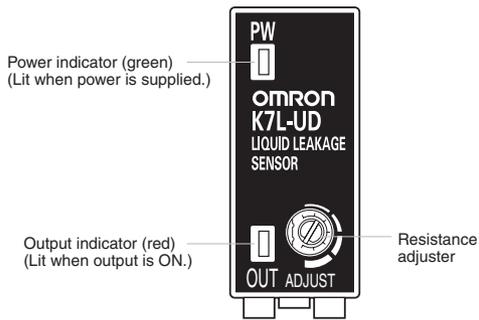
<b>Rated power supply voltage</b>	12 to 24 VDC (Allowable voltage fluctuation range: 10 to 30 VDC)												
<b>Operate resistance</b>	0 to 1 MΩ variable <b>Note:</b> The adjuster (ADJUST) on the top of the Sensor Amplifier sets the resistance for detection within the setting range. It is factory-set to the upper limit. (Normally, the K7L can be used with the adjuster at this setting.)												
<b>Disconnection detection function (See note.)</b>	Detection signal: 10 VDC max., 200 ms Detection time: 10 s max. Recovery: Operation is recovered by resetting the power supply.												
<b>Release resistance</b>	105% min. of operate resistance												
<b>Output configuration</b>	NPN open-collector transistor output with 100 mA at 30 VDC max. for both liquid leakage detection and disconnection detection. <b>Note:</b> If the rightmost pin of the DIP switch on the side of the Sensor Amplifier is set to the down position, the output turns ON when liquid is detected; if it is set to the up position, the output turns OFF when liquid is detected.												
<b>Vibration resistance</b>	10 to 150 Hz, 0.1-mm single amplitude with 50-m/s <sup>2</sup> acceleration for 8 minutes 10 times each in X, Y, and Z directions												
<b>Shock resistance</b>	150 m/s <sup>2</sup> 3 times each in six directions on 3 axes												
<b>Wiring distance</b>	Wiring cable } Total: 400 m max. Sensing Band } <b>Note:</b> These values are possible on the condition that a completely insulated 3-conductor VCT cable with a thickness of 0.75 mm <sup>2</sup> and a dielectric strength of 600 V is used together with the Liquid Sensing Band specified by OMRON. (A 0.2-mm <sup>2</sup> cable can also be used.)												
<b>Accessories</b>	<table border="1"> <thead> <tr> <th></th> <th>Terminal Block</th> <th>Screwdriver for ADJUST</th> <th>Terminator</th> </tr> </thead> <tbody> <tr> <td>K7L-U</td> <td>1</td> <td>1</td> <td>---</td> </tr> <tr> <td>K7L-UD</td> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>		Terminal Block	Screwdriver for ADJUST	Terminator	K7L-U	1	1	---	K7L-UD	1	1	1
	Terminal Block	Screwdriver for ADJUST	Terminator										
K7L-U	1	1	---										
K7L-UD	1	1	1										

**Note:** For the K7L-UD.

### ■ Characteristics

<b>Ambient temperature</b>	Operating: -10 to 55°C
<b>Ambient humidity</b>	Operating: 45% to 85%
<b>Insulation resistance</b>	10 MΩ at 100 VDC between case and current-carrying parts
<b>Dielectric strength</b>	1,000 VAC at 50/60 Hz for 1 min between case and current-carrying parts
<b>Power consumption</b>	1 W max.
<b>Response time</b>	Operate: 800 ms max. Release: 800 ms max. Startup time after power ON: 2 s max.
<b>Weight</b>	Approx. 14 g

# Nomenclature and DIP Switch Settings



## Sensing Range Settings

DIP switch	Output
	Output is OFF when liquid leakage or disconnection is detected. (See note.)
	Output is ON when liquid leakage or disconnection is detected. (See note.)

**Note:** Disconnection detection is supported only by the K7L-UD.

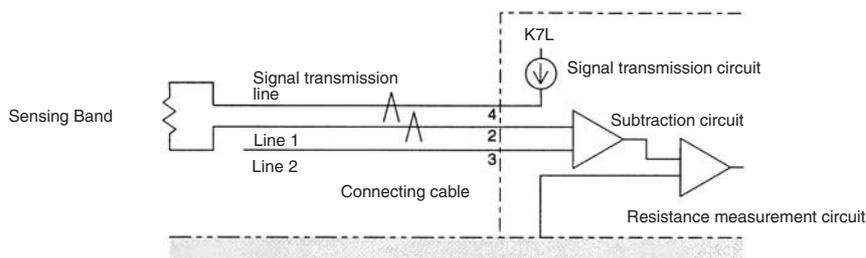
# Noise Countermeasures (Common)

## Noise Canceller Function for Highly Sensitive Impedance Detection

The K7L-U Liquid Leakage Sensor Amplifier detects liquids with impedance as high as 1 MΩ and connects to the Sensing Band through a cable that can be extended up to 400 meters. Countermeasures against external noise are especially important for the Sensing Band and connecting cable because they pick up external noise like an antenna. The K7L incorporates the noise canceller function described below.

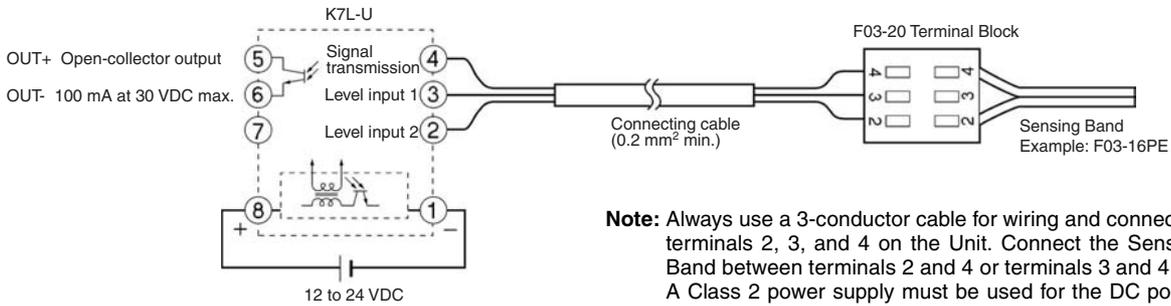
## Connected with 3-conductor Cable that Offsets Inductive Noise (Patent Pending)

A VCT cable with three conductors (lines) is used as shown in the diagram. Line 1 is connected to the Sensing Band and line 2 is left open. Lines 1 and 2 are almost in the same position and thus will experience the same noise level. The K7L detects the difference between these signals (including noise). This means that the noise signals in lines 1 and 2 are offset against each other and a reading for the signal, without inductive noise, can be made.



# Connections

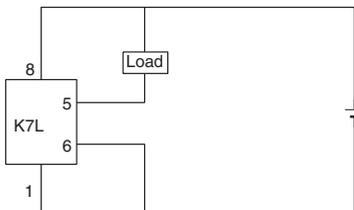
## K7L-U



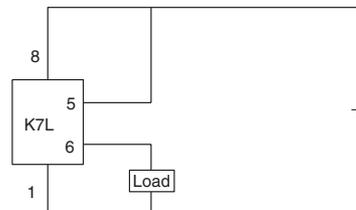
**Note:** Always use a 3-conductor cable for wiring and connect to terminals 2, 3, and 4 on the Unit. Connect the Sensing Band between terminals 2 and 4 or terminals 3 and 4. A Class 2 power supply must be used for the DC power supply to comply with UL standards.

## Connection Examples

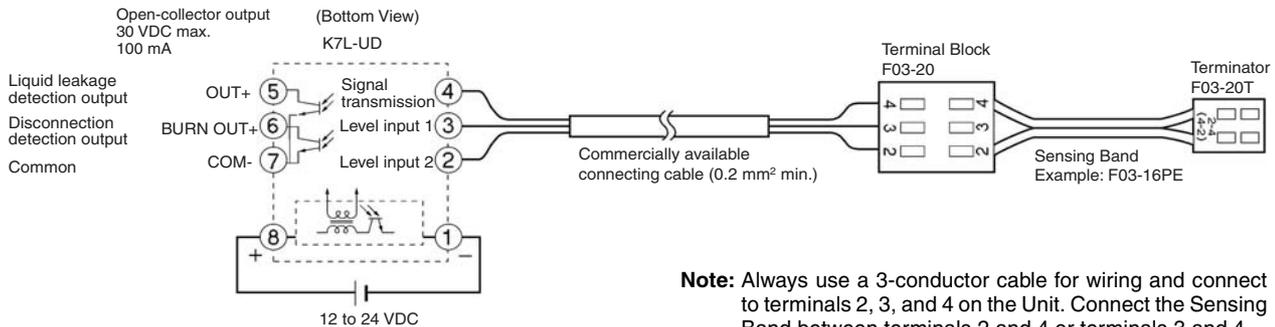
### NPN Output



### PNP Output



## K7L-UD

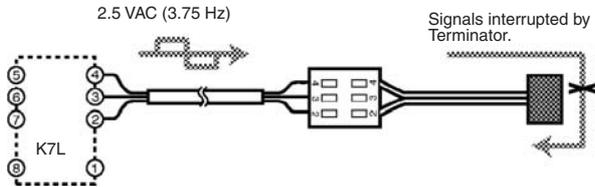


**Note:** Always use a 3-conductor cable for wiring and connect to terminals 2, 3, and 4 on the Unit. Connect the Sensing Band between terminals 2 and 4 or terminals 3 and 4. A Class 2 power supply must be used for the DC power supply to comply with UL standards.

# Disconnection Detection Function (K7L-UD)

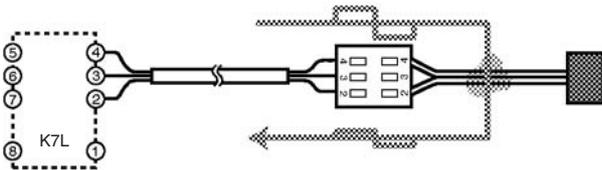
## Operation While Monitoring for Liquid Leakage

- Short-wave signals (2.5 VAC, 3.75 Hz) for liquid leakage detection are output from terminal 4 of the K7L.
- When there is no liquid leakage, the liquid leakage detection signals that are output are interrupted by the Terminator and the core of the Sensing Band will form an open loop.



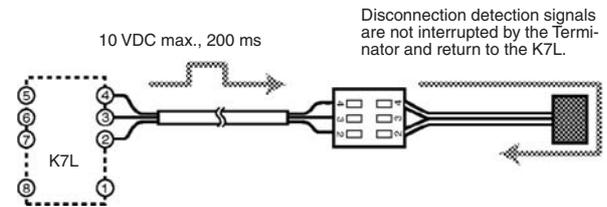
## Operation at Liquid Leakage Detection

- When liquid leakage occurs within the sensing range, the liquid leakage detection signals output from terminal 4 are input to terminal 2 through the leaked liquid.
- The voltage of the input signals will vary with the resistance of the leaked liquid. This voltage is compared with the detection level set at the K7L.
- As a result of the comparison, if the K7L determines that liquid leakage has occurred, the K7L's output LED will light, and the liquid detection output will either turn ON or OFF.



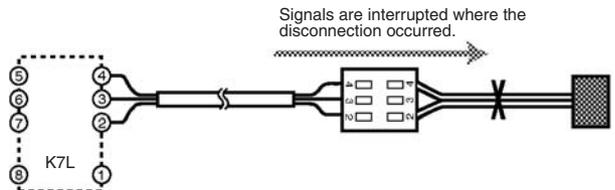
## Operation While Monitoring for Disconnection

- Output of disconnection detection signals starts within 2 s after power is supplied to the K7L and is repeated at approximately 7-s intervals.
- Disconnection signals are DC signals of 10 V max. that are output for approximately 200 ms. During this time, the K7L is in disconnection monitoring mode, i.e. it monitors for disconnections only and the liquid leakage detection signals are stopped.
- If there is no disconnection, the disconnection detection signals (10 VDC) that are output pass through the Terminator and return to the K7L. The K7L takes this as normal, i.e., there is no disconnection.



## Operation at Disconnection Detection

- If there is a disconnection, the signals will be interrupted at the place where the disconnection occurred, and will not return to the K7L.
- If the signals do not return, it will determine that a disconnection has occurred. The output indicator will flash, and the disconnection output will turn ON/OFF.

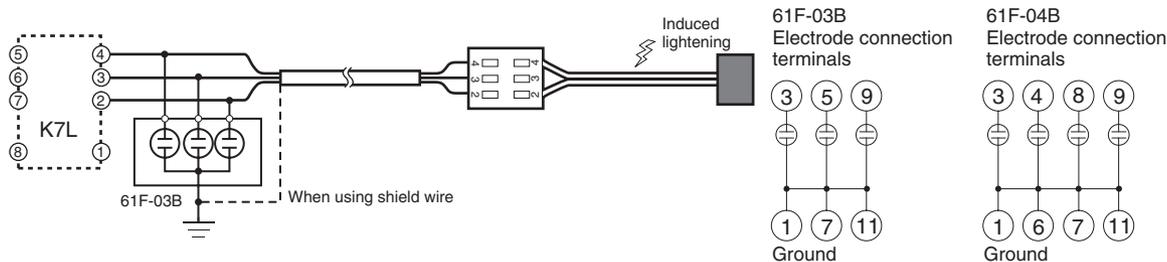


- Note:**
1. Disconnection detection is only performed between terminals 2 and 4. Therefore, be sure to connect the Sensing Band between terminals 2 and 4.
  2. The K7L will switch from liquid leakage detection to disconnection detection if either of the following conditions occur while liquid leakage is detected.
    - Disconnection occurs between the K7L and the place where liquid is leaked.
    - While liquid leakage is detected, disconnection occurs between the place where liquid is leaked and the Terminator (F03-20T) and, subsequently, the leaked liquid is removed (e.g., wiped up or dried).
  3. During disconnection detection, liquid leakage will not be detected. Once disconnection has been detected, reset the power supply to stop disconnection detection.

## Surges

Use in conjunction with a 61F-03B/04B Surge Suppressor Unit in environments exposed to surges.

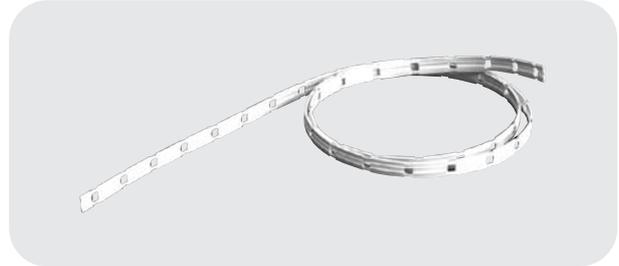
Install the Surge Suppressor Unit near the K7L. The surge suppression may not be sufficient if the Surge Suppressor Unit is installed near the Sensing Band.



**Note:** For details on Surge Suppressor Units, refer to Cat. No. F030-E1-09, OMRON Corporation, page 46.

## Sensing Band F03-16PE

- SUS316 used for core and polyethylene used for sheath to ensure high resistance to both acidic and alkaline liquids.
- Sensing Band Stickers that use the same material as the Sensing Band's insulating resin are available in 2 types: adhesive-tape type and screw type.



## Ordering Information

Name	Model number	Remarks
Liquid Leakage Sensing Band	F03-16PE	---
Sensing Band Stickers	F03-26PES	30 Stickers per set
	F03-26PEN	30 Stickers per set

## Specifications

Sheath	Polyethylene
Core	SUS316 stainless steel
Ambient operating temperature	-15 to 55°C
Weight	Approx. 16 g (1 m)

## Dimensions (Unit: mm)

### ■ Sensing Band

Appearance	
Structure	<p>Materials: Electrodes: SUS316 stainless steel, Sheath: Polyethylene</p>

### ■ Sensing Band Stickers

	F03-26PEN (screws)	F03-26PES (adhesive tape)
Appearance		
Structure	<p>Material: Polyethylene</p>	<p>Adhesive tape (See note.) Material: Polyethylene</p>

**Note:** The shape of the adhesive tape shown above is for securing the F03-16PE.

# Fluoroplastic Sensing Band F03-16PT

- Compared to the F03-16PE (polyethylene), the F03-16PT has higher resistance to both high temperatures and chemicals.
- Detection precision remains constant even with a loopback, thanks to a two-sided detection design.



## Ordering Information

Name	Model number	Remarks
Fluoroplastic Sensing Band	F03-16PT	---
Fluoroplastic Sensing Band Stickers	F03-26PTN	10 Stickers per set

## Specifications

Sheath	PTFE fluoroplastic
Core	SUS316 stainless steel
Ambient operating temperature	-50 to 200°C
Weight	Approx. 16 g (1 m)

## Dimensions (Unit: mm)

### ■ Fluoroplastic Sensing Band

Appearance	
Structure	<p>Materials: Electrodes: SUS316 stainless steel, Sheath: Fluoroplastic</p>

### ■ Fluoroplastic Sensing Band Stickers

F03-26PTN (screws)	
Appearance	
Structure	<p>Material: Fluoroplastic PTA</p>

## Sensing Band F03-15

- Ideal for harsh electrical room environments that are dusty and humid.
- For installation in locations requiring insulated materials.



## Ordering Information

Name	Model number	Remarks
Liquid Leakage Sensing Band	F03-15	---
Sensing Band Stickers	F03-25	30 Stickers per bag

## Specifications

Sheath	Flexible, transparent vinyl chloride
Core	SUS304 stainless steel
Ambient operating temperature	-15 to 50°C
Weight	Approx. 48 g (1 m)

## Dimensions (Unit: mm)

### ■ Sensing Band

#### F03-15

Appearance	
Structure	<p>Electrode pairs (Stainless steel wire 0.3 mm x 12-wire braided cable)</p> <p>25</p> <p>Flexible, transparent vinyl chloride</p> <p>333 (3 pairs/m)</p>

### ■ Sensing Band Stickers

#### F03-25

F03-25	
Appearance	
Structure	<p>25±2</p> <p>15±1</p> <p>(3)</p> <p>(5)</p> <p>(0.5)</p> <p>(1)</p> <p>Adhesive tape</p> <p>Material: SUS304</p>

# Sensing Band

## F03-16SF

- Greater flexibility and superior workability compared with the F03-16PE.
- The sheath becomes transparent to reveal the red inner sheath if liquid leakage occurs, thereby enabling visual confirmation. After drying, the Sensing Band color will return to white (F03-16SFC only).



## Ordering Information

Name	Model number	Remarks
Sensing Band	F03-16SF	Without color indication
	F03-16SFC	With color indication
Stickers	F03-25	30 Stickers per bag

## Specifications

Sheath	Special plastic fiber braided cable with water-absorbent and water-repellent characteristics
Core	Tin-plated, copper stranded wire
Ambient operating temperature	-15 to 60°C
Fire retardancy	Not fire retardant
Weight	Approx. 20 g (1 m)

## Dimensions (Unit: mm)

	F03-16SF	F03-16SFC
Appearance		
Structure		

	F03-25
Appearance	
Structure	

## Liquid Leakage Point Sensor F03-16PS

**A New Liquid Leakage Point Sensor Has Been Added to the K7L Series. Fluoroplastic Coating on the Bottom Electrode Ensures Chemical Resistance.**

- Can be used in conjunction with Sensing Bands.
- Stud screw mounting requires no tools for installation.
- No tools means the Sensor can be wiped clean quickly and easily.
- The optional Mounting Bracket enables faster installation than three-screw mounting.
- Connect multiple Sensors to one K7L Amplifier for significant cost savings.



## Ordering Information

### Sensors

Product name	Main material	Cable material	Electrode material	Model
Liquid Leakage Point Sensor	Polyethylene	Outer sheath: PVC	SUS304	<b>F03-16PS</b>
		Inner sheath: Fluoroplastic	SUS304 and fluoroplastic coating	<b>F03-16PS-F</b>
Mounting Brackets (See note 1.)		---	---	<b>F03-26PS</b>
Terminal Block (See note 2.)	Nylon 6.6	---	---	<b>F03-20</b>

**Note:** 1. Use a commercially available bonding agent for PVC. One bag contains 10 Brackets.  
2. One bag contains 10 Blocks.

### Amplifier

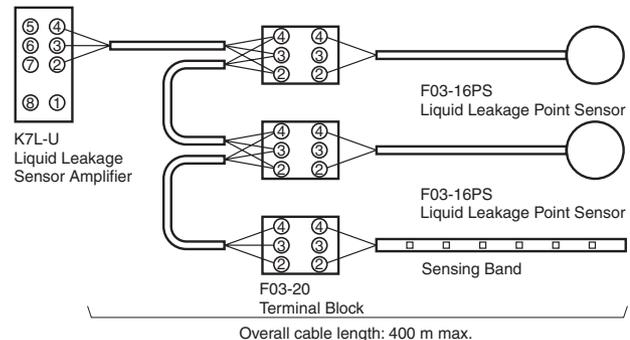
Product name	Model
Liquid Leakage Sensor Amplifier	K7L-U

## Specifications

<b>Material</b>	<b>Sensor Amplifier</b>	Polyethylene
	<b>Conductor</b>	Outer sheath: PVC, Inner sheath: Fluorine resin
	<b>Core</b>	F03-16PS: SUS304 stainless steel F03-16PS-F: SUS304 and fluorine coating
<b>Ambient operating temperature range</b>	-10 to 60°C	
<b>Weight</b>	Approx. 30 g	
<b>Maximum number of Point Sensors connected per Amplifier</b>	Any number up to an overall cable length of 400 m.	
<b>Applicable Amplifier</b>	K7L-U (excluding Liquid Leakage Sensor Amplifier with disconnection detection function)	

## Wiring Diagram

Any number of Sensors can be connected in parallel up to an overall cable length of 400 m. Leakage areas cannot be specified with the K7L.



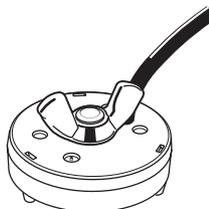
## Mounting Methods

### Stud Screw Mounting

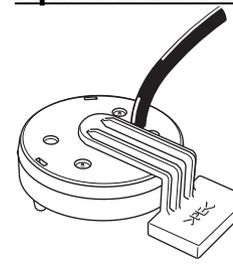
Securing the Sensor with a Nut



Securing the Sensor with a Wing Nut



### Special Bracket Mounting



**Note:** Use a commercially available bonding agent for PVC.

# Chemical Resistivity for F03-16PE/-16PT

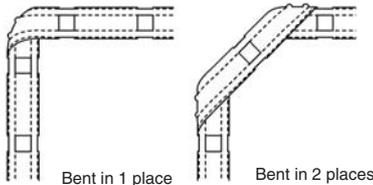
Material	Sheath		Core	Material	Sheath		Core
	Polyethylene	Fluoroplastic	SUS316		Polyethylene	Fluoroplastic	SUS316
Water	A	A	A	Toluene	C	B	B
Acetone	C	A	A	Phenol	B	B	A
Ammonia	A	A	A	Butanol	B	A	---
Ethanol	B	A	A	Fluorine	A	A	C
Hydrochloric acid	A	A	C	Hexane	C	A	---
Hydrogen peroxide solution	A	A	A	Benzene	C	A	A
Xylene	B	A	A	Methanol	B	A	A
Cyclohexane	C	A	---	Sulfuric acid	C	A	B
Trichloroethylene	C	A	A	Phosphoric acid	A	B	B

- Note:** 1. A: Not affected at all or only very slightly affected.  
 B: Slightly affected but, depending on the conditions, sufficient for use.  
 C: Affected but may still be used. (Replace the Sensing Band immediately after detection.)
2. The F03-16PE Sensing Band is made from the following materials.  
 Core: SUS316  
 Insulated sheath: Polyethylene
3. In order to prevent secondary fire damage, consider the effect of the atmosphere of the environment and the solution to be detected on the Sensing Band.
4. If the Sensing Band changes shape or color when a liquid is detected, replace the Sensing Band.

## Connecting the Sensing Band

### Bending the Sensing Band

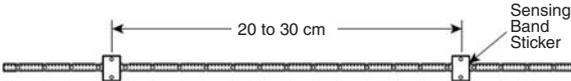
To change the direction of the Sensing Band, bend the Sensing Band in one or two places where the core is not exposed.



**Note:** Bend the Sensing Band approximately 4 cm (i.e., twice the distance between places where the core is exposed) away from places where a Sticker is attached. If the Sensing Band is bent at places further away than this, the Sensing Band may come away from the surface.

### Interval Between Stickers

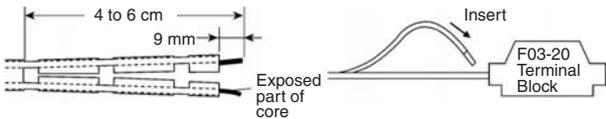
When securing the Sensing Band with Stickers, attach the Stickers at intervals of 20 to 30 cm in places where the core is not exposed.



- Note:** 1. When using the F03-26PES (adhesive-tape model), be sure to wipe all moisture, oil, and dust from the surface to which the Sticker is to be attached. Failure to do so may result in insufficient adhesion, and the Sticker may peel away from the surface.
2. When using the F03-26PEN (screw model), before installing the Sensing Band, it is necessary to perform stud welding. For details on the pitch of the studs, refer to the information on the dimensions of Sensing Band Stickers.
3. Commercially available screwdrivers can be used. It is recommended, however, that either a 210-350/01 screwdriver or a 209-132 operating tool to connect jumpers, both manufactured by Wago Japan, is used. Contact <http://www.wago.com>.

### Stripping and Connecting Terminals

1. Cut into the Sensing Band approximately 4 to 6 cm in from the end as shown in the diagram below.
2. Strip away approximately the last 9 mm of the sheath to expose the core (SUS line).
3. To connect to the Terminal Block, insert the screwdriver (see note 3) from the top of the Terminal Block and insert the stripped end of the core from the side. (Refer to *Dimensions* on page 8.)



**Note:** Check that the wiring is secure before using the K7L in applications.

# Liquid Leakage Sensing Band Precautions

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Refer to the following installation methods and install the Sensing Band securely using the proper method for the location and environment.

1. **Post or Beam Mounting**  
Use fasteners, such as concrete anchors, to secure the Sensing Band every 500 to 1,000 mm to ensure that it does not come loose. If the surface of the post or beam is very uneven, apply two-sided tape to the mounting surface first and then secure the Sensing Band to the tape with the fastener.
2. **Conduit Installation**  
For vertical conduits, wrap the Sensing Band around the conduit at a pitch 2 to 3 times the diameter of the conduit. For horizontal conduits, secure the Sensing Band at appropriate intervals along the bottom of the conduit using an insulated adhesive strap, such as Insulock, to ensure that the Sensing Band does not come loose.
3. **Dike and Catch Basin installation**  
Use the specified stickers (sold separately) to secure the Sensing Band at appropriate intervals to keep it flat in the dike or catch basin.
4. **Floor Installation**  
Estimate the leakage detection area and use stickers to secure the Sensing Band at appropriate intervals on the floor and around equipment. Cover the Sensing Band with plastic or metal molding to protect it from contact with other objects and from being stepped on by workers. Leave a 50- to 100-mm gap in the molding at approximately 500-mm intervals where it touches the floor to allow liquids to pass through.
5. Do not install the Sensing Band in locations where condensation is likely to occur.
6. Mount the Sensing Band as close as possible to the mounting surface. Make sure that any gaps are no more than 2 mm in horizontal installations, such as the floor, and no more than 1 mm with vertical installations, such as posts and beams.
7. Attach an insulated protector, such as plastic molding, securely to the Sensing Band to protect it from contact with power cables carrying over 300 V.
8. Normally leaking materials detected by the Sensing Band will evaporate and the Sensing Band will return to its original state. The Sensing Band may not return to its original state and will have to be replaced, however, if the leaking material contained conductive impurities. Follow the appropriate replacement procedures.
9. The Sensing Band is not designed to be used as electrical wiring and must not be used for any purpose other than leak detection.
10. Do not apply petroleum-based products, such as wax, to the Sensing Band. Otherwise, liquids may be repelled and detection may fail.

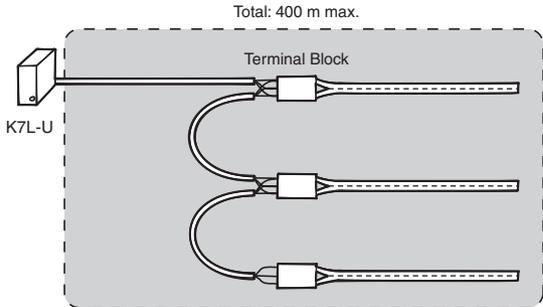
# FAQs

Some questions that are frequently asked about the K7L are given below. Use this information when selecting a model.

## Can one K7L Amplifier be used for detection in more than one place?

**Yes.**

By using Terminal Blocks to connect Sensing Bands in parallel, detection can be performed in more than one place with only one K7L Amplifier.

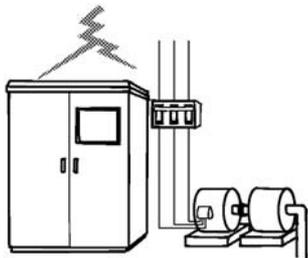


- Note:**
1. When wiring, be sure not to exceed the maximum possible wiring distances for both the connecting cable and the Sensing Band. Exceeding these distances may lead to faulty operation. Connect one Sensing Band to each Terminal Block.
  2. Not applicable to the K7L-UD.

## Can the K7L Amplifier be used as a replacement for the 61F-GPN-V50 Water Leakage Detector?

**Yes.**

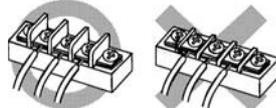
Because the surge withstand capability is different, however, do not use in locations where it will be exposed to impulses and surges, such as outdoor roofs or in pump panels. Also, items such as the power supply voltage and the connection sockets are different. Check these items before application.



## Can a different terminal block (e.g. a commercially available terminal block or a terminal block constructed by the user) be used instead of the one provided?

**Yes.**

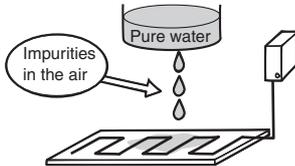
When using another terminal block, however, be sure to check that all the terminals are mutually isolated, and that there is no danger of ground faults in connecting cables or Sensing Bands.



## Can the K7L Amplifier detect pure water?

**Yes.**

Even pure water, which has a resistance exceeding 10 MΩ·cm, can nearly always be detected if the K7L is used at its maximum sensitivity. This is because impurities are mixed with the water when it is leaked and the resistance drops.



## Can the K7L Amplifier detect oil?

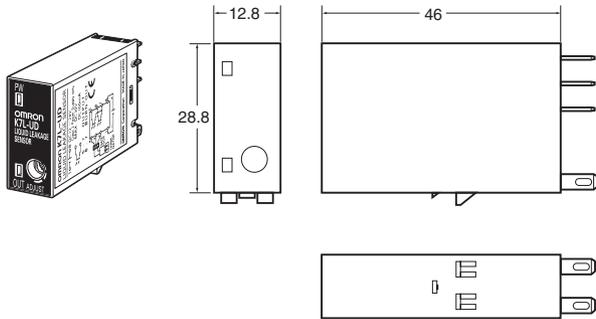
**No.**



# Dimensions (Unit: mm)

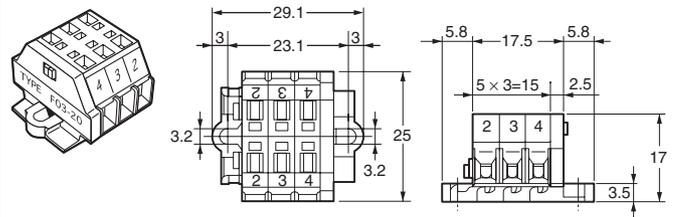
## Liquid Leakage Sensor Amplifier

K7L-U/-UD



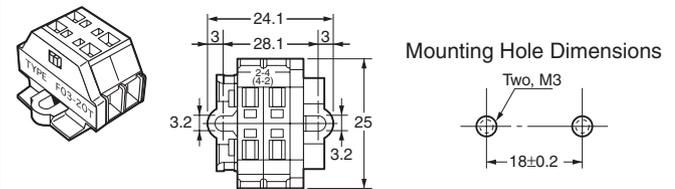
## Terminal Block (See note 1.)

F03-20



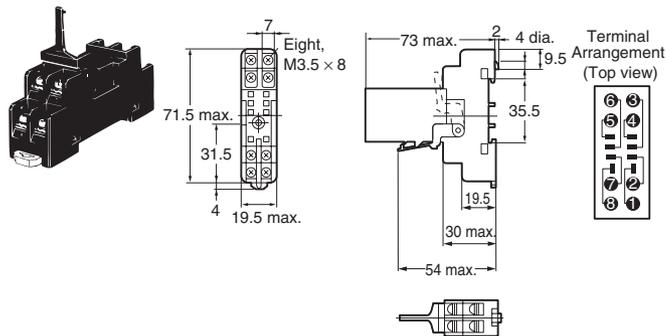
## Terminator (See note 1.)

F03-20T



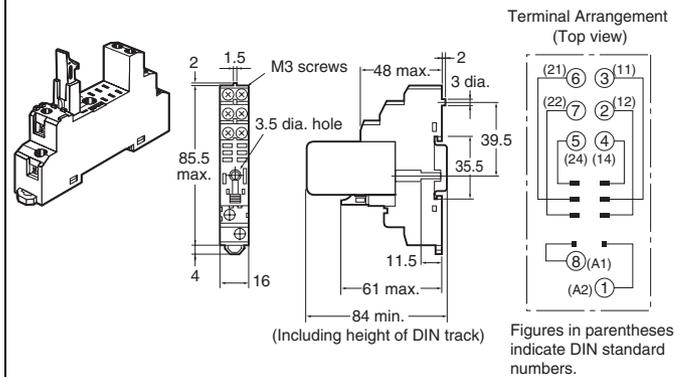
## Track-mounted Sockets (See note 2.)

P2RF-08 (Round terminals can be used.)



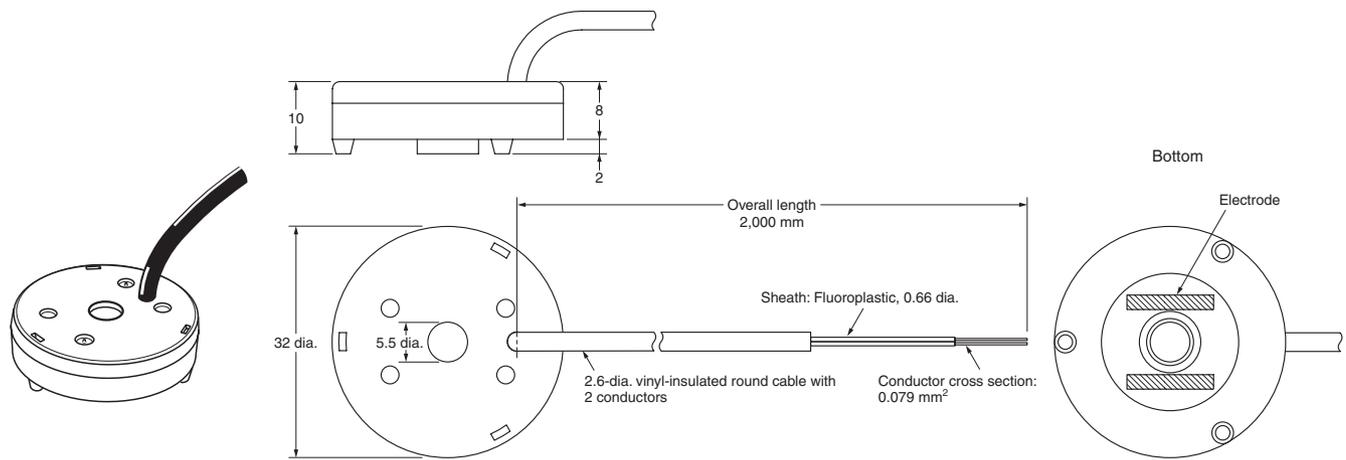
## Track-mounted Sockets (See note 2.)

P2RF-08-E



## Liquid Leakage Point Sensor

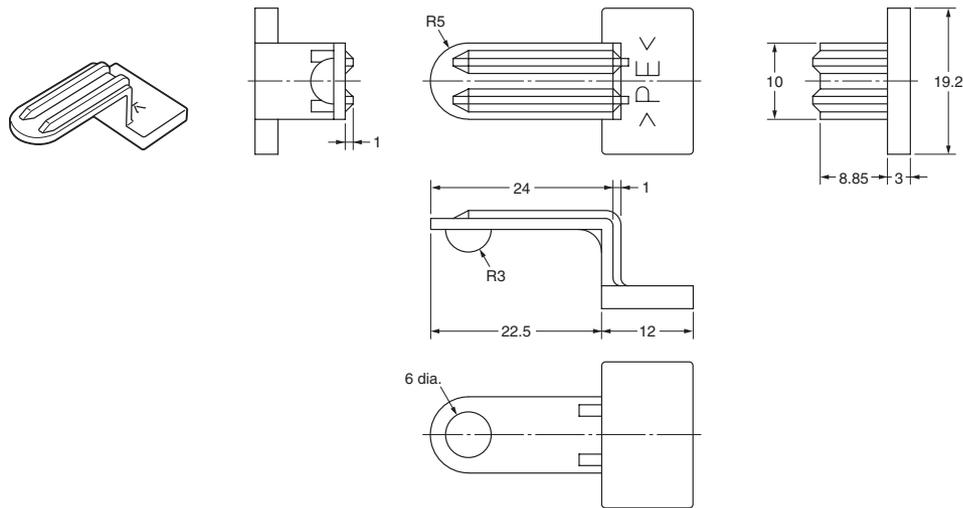
F03-16PS  
F03-16PS-F



- Note:**
1. The Terminal Block is made of nylon 66. Mount the Terminal Block in locations not subject to liquid chemicals using M3 screws.
  2. Secure the Sockets with M3 screws at a torque of 0.78 to 1.18 N·m.

## Point Sensor Mounting Bracket

F03-26PS



## Safety Precautions

### ⚠ WARNING

This product cannot be used as a detection device for protecting human life.



### ■ Precautions for Safe Use

Observe the following points to ensure safe operation.

- Be sure to use a power supply voltage within the specified range. Not doing so may result in burning or malfunction.
- Do not use the product in locations subject to flammable gases or combustible objects. Doing so may result in fire.
- Insert the connection points into Sockets until the connection is locked securely. Not doing so may result in burning or malfunction.
- Do not short-circuit loads connected to output terminals. Doing so may result in burning.
- Be sure to connect the power supply with the correct polarity. Not doing so may result in malfunction.

### ■ Precautions for Correct Use

#### Installation

Attach to a panel of thickness 1 to 5 mm.

Do not install in the following locations.

- Locations subject to shock or vibration
- Locations where the temperature or humidity lies outside the specified range, or where condensation is likely to occur (To detect liquids with high impedances, do not use in locations with high humidity.)
- Locations subject to dust
- Locations subject to corrosive gases (particularly sulfide and ammonia gases)
- Outdoors or locations subject to direct sunlight
- Near devices that generate strong high-frequency noise (e.g., high-frequency welding devices etc.)

### ■ Application Precautions

You must allow sufficient leeway in ratings and performance, and provide proper fail-safe or other safety measures when using these products in any of the following applications. Be sure also to consult with your OMRON representative before actually attempting any of these applications.

- Applications under conditions or environments not specified in user documentation
- Applications for nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, or safety equipment
- Applications that may have a serious influence on lives and property and thus require particularly attention to safety

# Warranty and Application Considerations

## Read and Understand this Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

## Warranty and Limitations of Liability

### WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

### LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS, OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

## Application Considerations

### SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

## Disclaimers

### PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON *Warranty and Limitations of Liability*.

### CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

### DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

### ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

