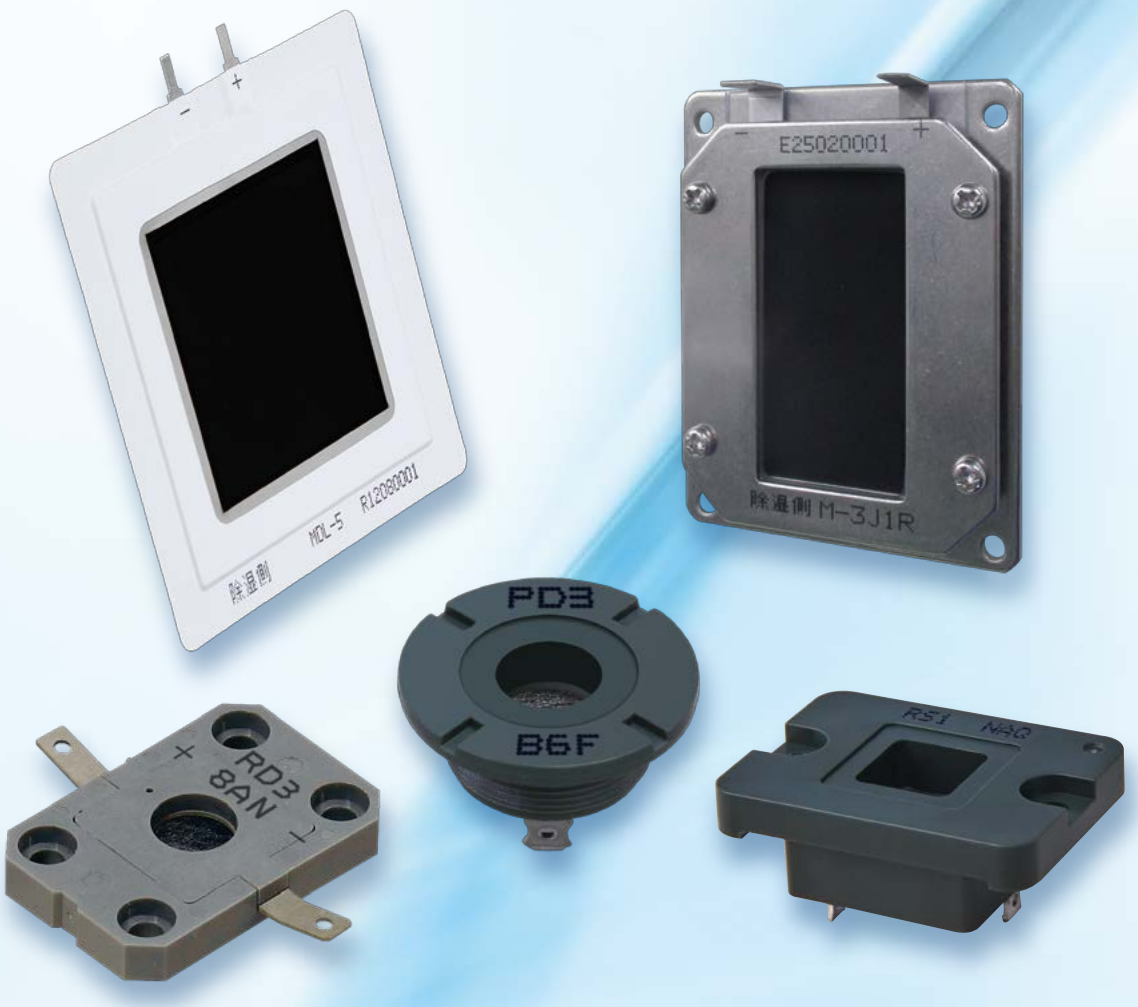
RYOSAI TECHNICA is a group company of MITSUBISHI ELECTRIC

The protective apparatus against dew condensation

Electrolysis type Micro Dehumidifier

ROSAHL



— A new standard for a new era —

Low Energy Footprint

No Liquid Water

Maintenance Free

Long Operating Life

ROSAHL

Completely new approach to dehumidification

Features

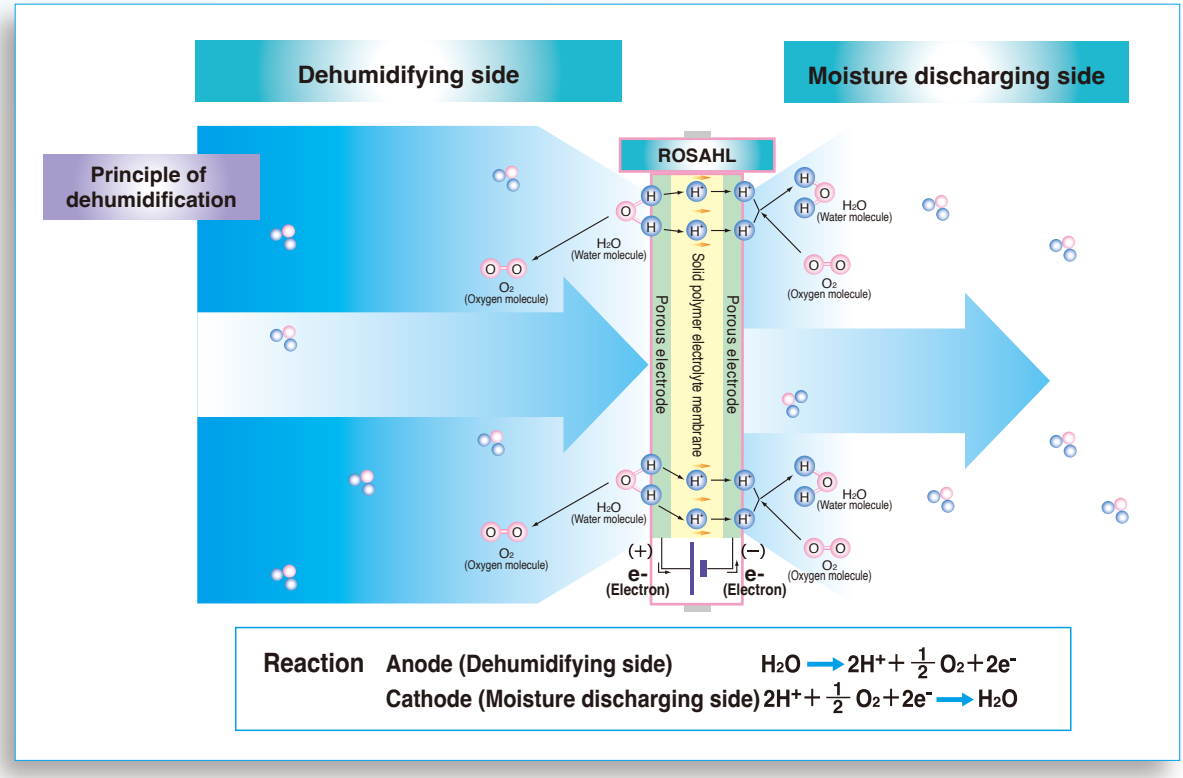
This product uses a solid polymer electrolyte membrane, a completely different principle from conventional dehumidification methods.
It directly electrolyzes and removes moisture from the air, and provides many advantages (see below).
(The name "ROSAHL" comes from a pun on a Japanese phrase meaning "removing dew".)

- Low Energy Footprint
- No Liquid Water
- Maintenance Free
- Long Operating Life
- Operates Below Freezing
- Silent & Vibration Free
- Ultra Compact
- Works also as a humidifier

World's first electrolytic method

Principle

- This new type of dehumidifier electrolytically decomposes and removes moisture in a enclosure using a solid polymer electrolyte membrane.
- When a direct current is applied to the porous electrode attached to the special solid polymer electrolyte membrane, moisture at the anode side (dehumidifying side) is separated into hydrogen ions (H^+) and oxygen. The hydrogen ions pass through the solid polymer electrolyte membrane to the cathode side (moisture discharging side).
- The hydrogen ions react with oxygen in the air on the cathode side to form water molecules (gas) and are then discharged.



LINE-UP

Product Lineup

Small type micro dehumidifier

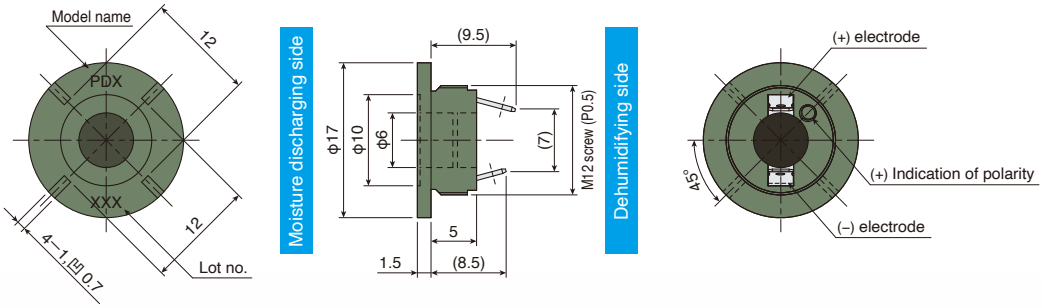
Installation is simple in small size!

PD2 / PD3

Specifications

Figure 1
External dimensions

(Unit : mm)



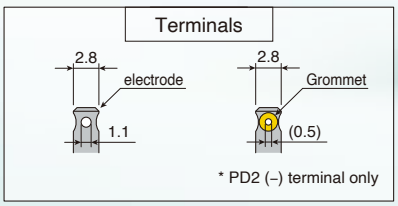
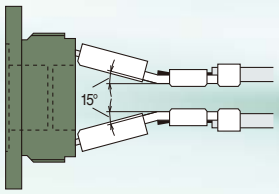


Figure 2
Example installation of insertion type terminal



Model name		PD2 / PD3
Dehumidifying capacity	(mg/day) *1	84
Applicable volume	(cc) *2	Up to 2000
Terminal voltage	(V)	3 VDC
Power consumption	(mW) *3	80
Dimensions	(mm) *4	ϕ17×11
Weight	(g)	0.9
Dimensions of installation hole	(mm) *5	M12 screw (P0.5)
Operating temperature	(°C)	–10 to 50
Connecting terminal type		PD2:Soldered type. PD3:Insertion type *6

Notes *1 The initial value at the temperature of 30°C and humidity of 60%.
(The dehumidifying capacity will degrade during use. How much it degrades depends on the operating environment and conditions. If any signs of abnormality are seen, early replacement is recommended.)

*2 The applicable volume is for a sealed, moisture-impermeable container, and may vary depending on the material of the container, state of sealing and required humidity.

*3 The annual average power consumption in average conditions in Japan.

*4 See Figure 1.

*5 See installation instructions on page 10.

*6 For an insertion type terminal for PD3, use a STO-01T-110N (JST) flat connecting terminal or equivalent.
The insertion type terminals may touch each other, as the element bodies are small. See Figure 2 for installation.

Read the precautions for use on page 14.

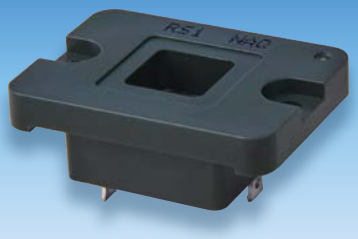
Small type micro dehumidifier

Compact body as small as your thumb!

RD3 / RD4

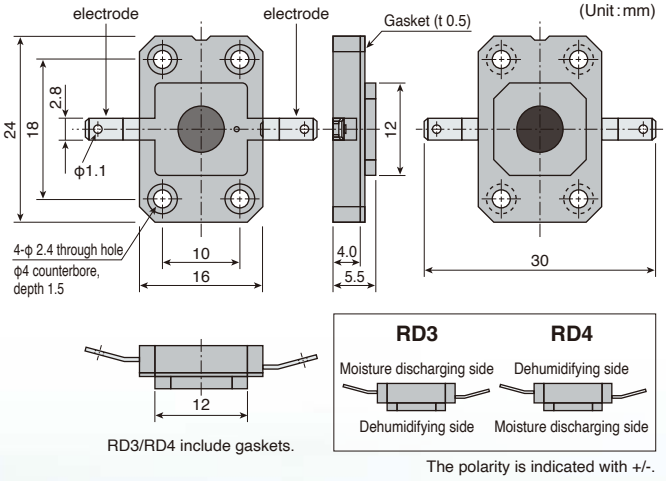
Small type micro dehumidifier

Easy to install with just two screws!



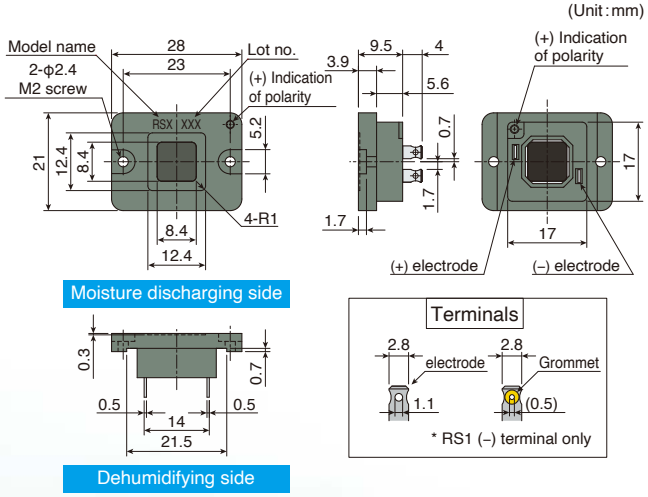
RS1 / RS2

Specifications



RD3/RD4 include gaskets.

The polarity is indicated with +/-.



Model name		RD3 / RD4 *6
Dehumidifying capacity	(mg/day) *1	84
Applicable volume	(cc) *2	Up to 2000
Terminal voltage	(V)	3 VDC
Power consumption	(mW) *3	80
Dimensions (height x width x depth)	(mm)	24 x 30 x 5.5
Weight	(g)	1.9
Dimensions of moisture discharging hole	(mm) *4	12.5 x 12.5
Operating temperature	(°C)	–10 to 50
Connecting terminal type	*5	Soldered type or Insertion type

Notes *1 The initial value at the temperature of 30°C and humidity of 60%.
(The dehumidifying capacity will degrade during use. How much it degrades depends on the operating environment and conditions. If any signs of abnormality are seen, early replacement is recommended.)
*2 The applicable volume is for a sealed, moisture-impermeable container, and may vary depending on the material of the container, state of sealing and required humidity.
*3 The annual average power consumption in average conditions in Japan.
*4 See installation instructions on page 10.
*5 For an insertion type terminal, use a STO-01T-110N (JST) flat connecting terminal or equivalent.
*6 When dehumidifying the inside of a container, attach RD3 from the outside or RD4 from the inside.

Read the precautions for use on page 14.

Model name		RS1 / RS2	
Dehumidifying capacity	(mg/day) *1	210	
Applicable volume	(cc) *2	Up to 5000	
Terminal voltage	(V)	3 VDC	
Power consumption	(mW) *3	220	
Dimensions (height x width x depth)	(mm)	21 x 28 x 13.5	
Weight	(g)	3.4	
Dimensions of moisture discharging hole	(mm) *4	17.5 x 17.5	
Operating temperature	(°C)	–10 to 50	
Connecting terminal type		RS1: Soldered type	RS2: Insertion type *5

Notes *1 The initial value at the temperature of 30°C and humidity of 60%.
(The dehumidifying capacity will degrade during use. How much it degrades depends on the operating environment and conditions. If any signs of abnormality are seen, early replacement is recommended.)
*2 The applicable volume is for a sealed, moisture-impermeable container, and may vary depending on the material of the container, state of sealing and required humidity.
*3 The annual average power consumption in average conditions in Japan.
*4 See installation instructions on page 11.
*5 For an insertion type terminal for RS2, use a STO-01T-110N (JST) flat connecting terminal or equivalent.

Read the precautions for use on page 14.

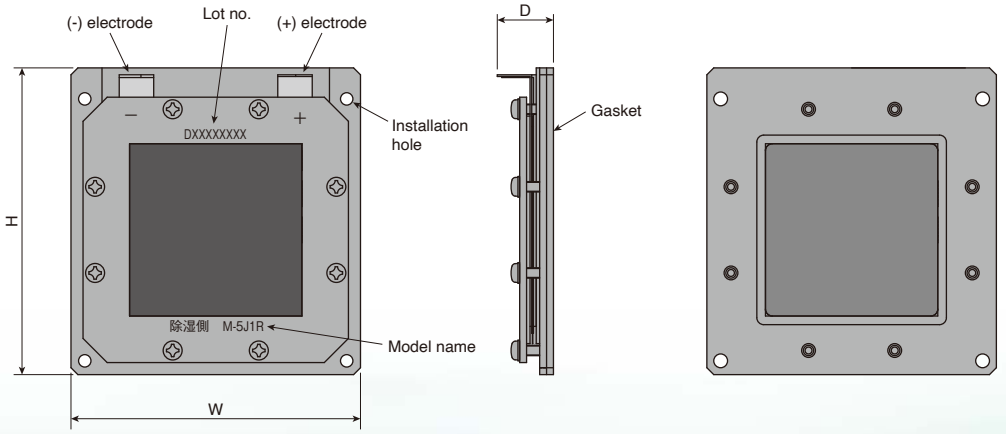
LINE-UP

Product Lineup

General purpose micro dehumidifier

Specifications

*Image : M-5J1R



The polarity is indicated with +/-.

Model name		M-1J1R	M-2J1R	M-3M1R	M-3J1R	M-5J1R	M-7J1R	M-10J1R
Dehumidifying capacity	(g/day) *1	1	2	2.9	4	8	16	29
Applicable volume	(m^3) *2	Up to 0.125	Up to 0.25	Up to 0.35	Up to 0.5	Up to 1	Up to 2	Up to 4
Terminal voltage	(V)	3 VDC						
Power consumption	(W) *3	1	1.5	2	2	3	6	12
Dimensions (height x width x depth)	(mm) *4	52.5 x 50 x 16.5	67.5 x 50 x 16.5	65 x 62 x 16.5	74 x 58 x 16.5	89 x 84 x 16.5	117 x 105 x 17.5	162.5 x 155 x 17.5
Weight	(g)	70	85	90	95	150	340	580
Dimensions of moisture discharging hole	(mm) *5	20 x 25	35 x 25	35 x 35	55 x 30	55 x 55	75 x 75	105 x 105
Operating temperature	(°C)	–10 to 50						
Connecting terminal type		(+)side : TMEDN-480509-FA (NICHIFU) or equivalent						
		(-)side : TMEDN-630809-FA (NICHIFU) or equivalent						

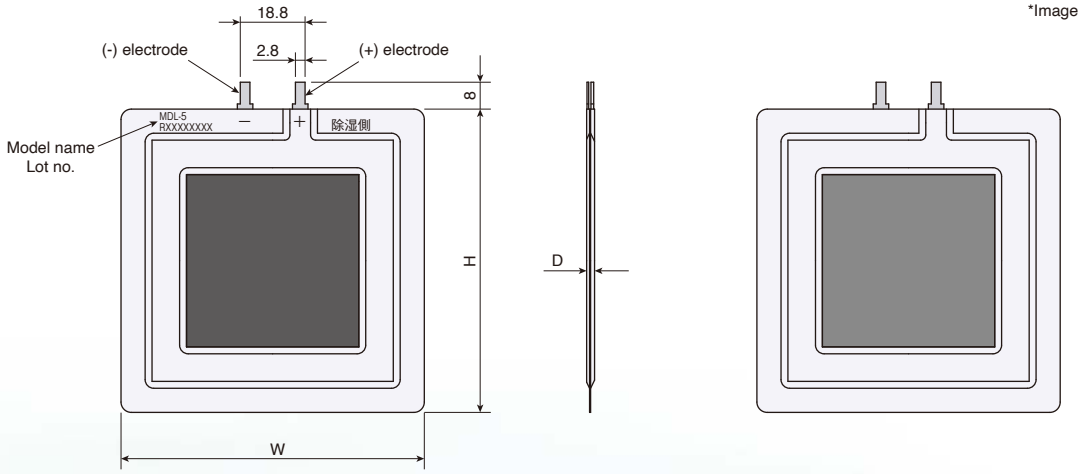
Notes *1 The initial value at the temperature of 30°C and humidity of 60%.
(The dehumidifying capacity will degrade during use. How much it degrades depends on the operating environment and conditions. If any signs of abnormality are seen, early replacement is recommended.)
*2 The applicable volume is for a sealed, moisture-impermeable container, and may vary depending on the material of the container, state of sealing and required humidity.
*3 The annual average power consumption in average conditions in Japan.
*4 The dimensions of H x W x D in the figure.
*5 See installation instructions on page 12.

Read the precautions for use on page 14.

Thin type micro dehumidifier

Specifications

*Image : MDL-5 (Unit : mm)



The polarity is indicated with +/-.

Model name		MDL-3	MDL-5	MDL-7
Dehumidifying capacity	(g/day) ∗1	4	8	16
Applicable volume	(m^3) ∗2	Up to 0.5	Up to 1	Up to 2
Terminal voltage	(V)	3 VDC		
Power consumption	(W) ∗3	2	3	6
Dimensions (height x width x depth)	(mm) ∗4	88 x 63 x 2.3	88 x 88 x 2.3	108 x 108 x 2.3
Weight	(g)	20	25	50
Dimensions of moisture discharging hole	(mm) ∗5	55 x 30	55 x 55	75 x 75
Operating temperature	(°C)	–10 to 50		
Connecting terminal type		(+)side : STO-41T-110N (JST) or equivalent		
		(-)side : STO-41T-110N-8 (JST) or equivalent		

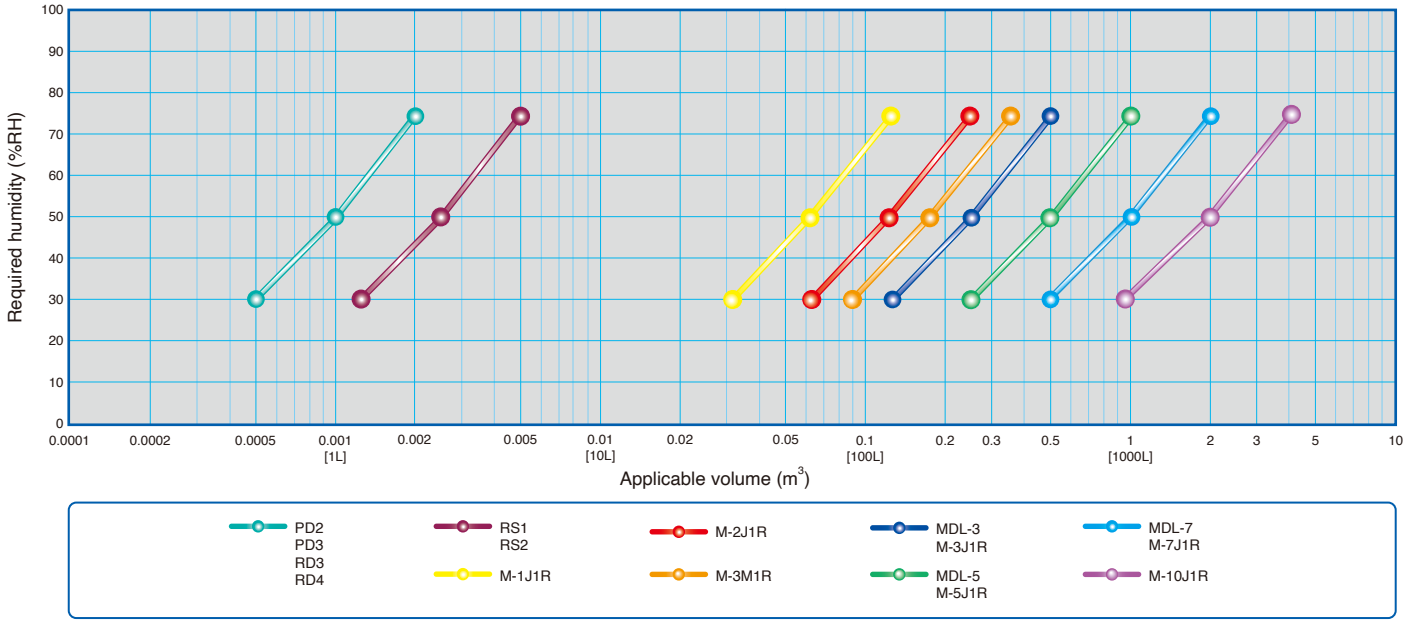
Notes ∗1 The initial value at the temperature of 30°C and humidity of 60%.
(The dehumidifying capacity will degrade during use. How much it degrades depends on the operating environment and conditions. If any signs of abnormality are seen, early replacement is recommended.)
∗2 The applicable volume is for a sealed, moisture-impermeable container, and may vary depending on the material of the container, state of sealing and required humidity.
∗3 The annual average power consumption in average conditions in Japan.
∗4 The dimensions of H x W x D in the figure.
∗5 See installation instructions on page 13.

Read the precautions for use on page 14.

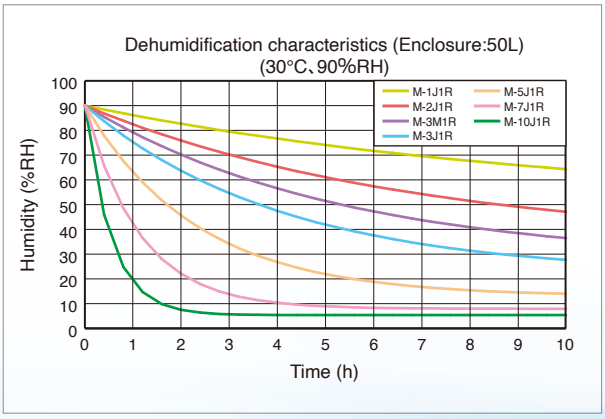
Model Selection Guide

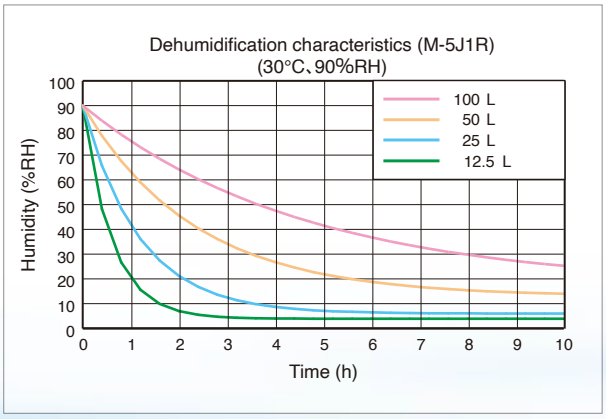
To select a model, use the applicable volume and required humidity graphs below as a guide.

Reference: 1) The graph shows the relationship at an outside air humidity of 90%RH.
2) A sealed moisture-impermeable container is used.

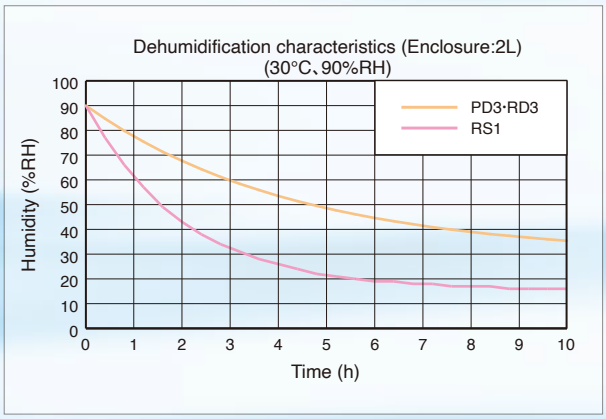


◆General purpose dehumidifier (M-1J1R/M-2J1R/M-3M1R/M-3J1R/M-5J1R/M-7J1R/M-10J1R)

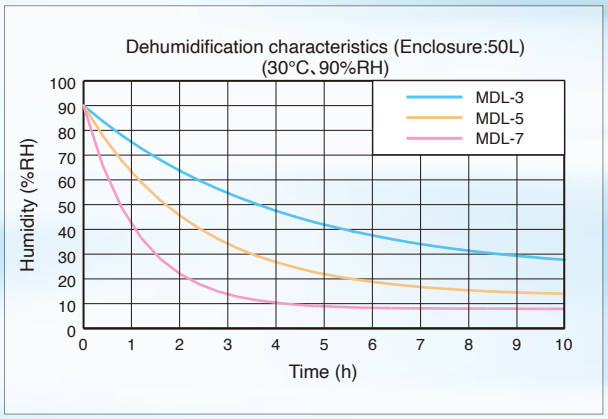




◆Small type dehumidifier (PD3･RD3/RS1)



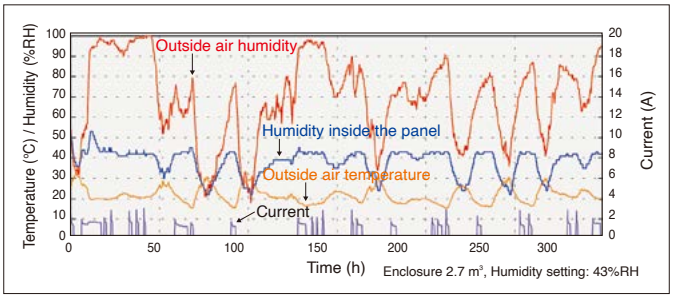
◆Thin type dehumidifier (MDL-3/MDL-5/MDL-7)



- Characteristics of the graphs may vary depending on the material of the container and the degree of airtightness.
- If the container contains moist material such as resin, dehumidifying the inside of the container induces release of moisture from the material, which will result in slow dehumidification of the inside of the container.
- The dehumidifying capacity of the element varies according to the absolute water amount inside the container.

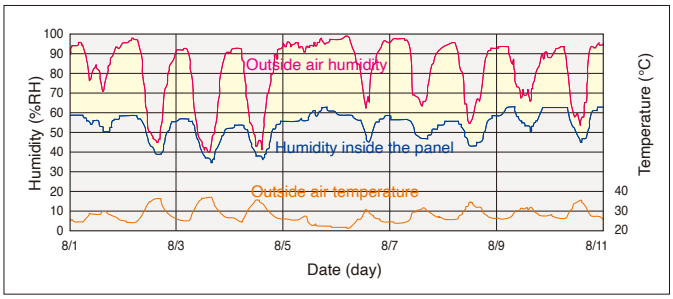
Test data

■Test data of humidity controller embedded type (M-10J1R)

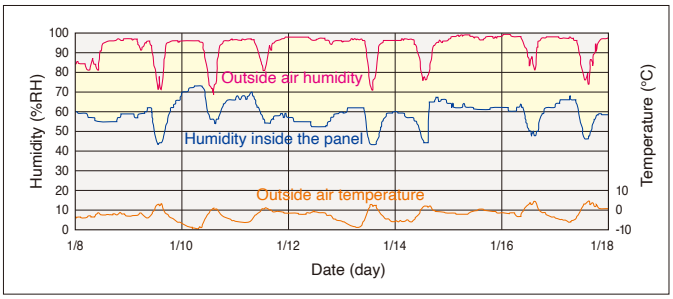


■Field test data

◆Dehumidification results at high temperature and high humidity in summer



◆Dehumidification results at low temperature and high humidity in winter



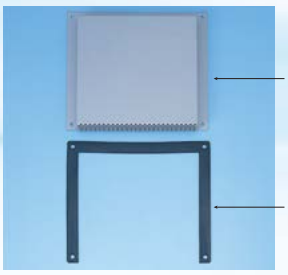
Optional Parts

Rain cover : This product prevents rain drops and insects from entering the moisture discharging hole when the dehumidifier is used in an outdoor panel.

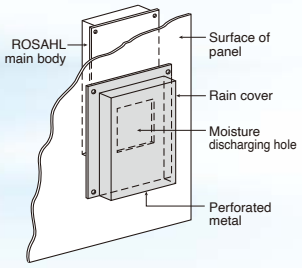
Options

Product name	Model name	Compatible model
Rain cover	For M-3J1R	M-3J1R, M-3M1R, M-2J1R, M-1J1R
	For M-5J1R	M-5J1R, MDL-5, MDL-3
	For M-7J1R	M-7J1R, MDL-7
	For M-10J1R	M-10J1R

Rain cover parts



Installed rain cover



How to install Micro dehumidifier

Follow these instructions to ensure airtightness when installing a micro dehumidifier.

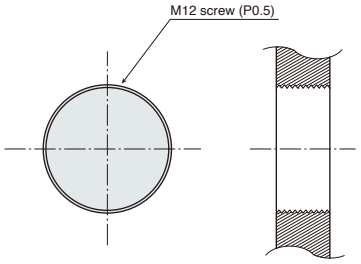
How to install small type micro dehumidifier

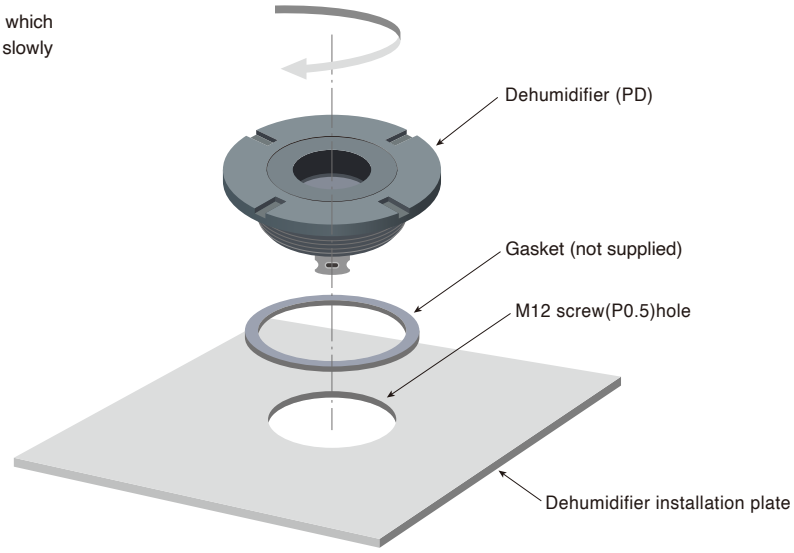
「PD2、PD3」

Make a screw hole for an M12 (P0.5) mm screw on the enclosure on which you will install the micro dehumidifier. Insert a gasket into the hole and slowly screw in the screw.
*Specified torque : 0.25 to 0.39N・m (2.5 to 4.0kgf・cm)
The gasket is not included.

Installation dimensions

(Unit : mm)





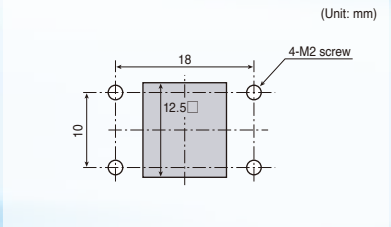
How to install small type micro dehumidifier

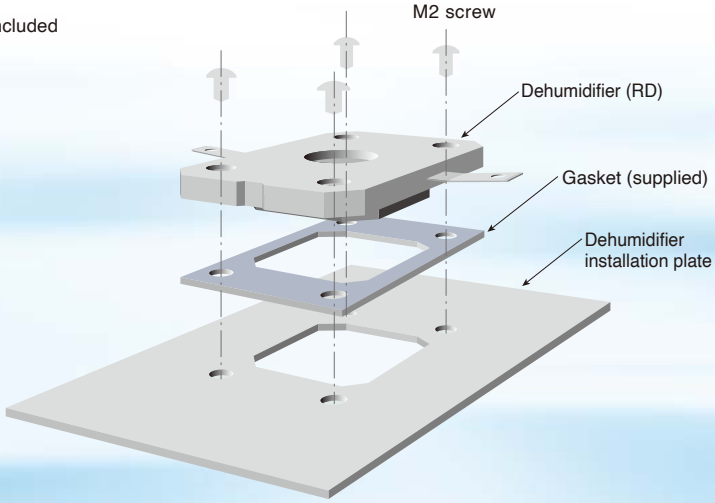
「RD3、RD4」

Make a square hole 12.5 mm x 12.5 mm on the enclosure insert the included gasket and attach the micro dehumidifier with four M2 screws.
*Specified torque : Max 0.18N・m (1.8kgf・cm)

Installation dimensions

(Unit: mm)

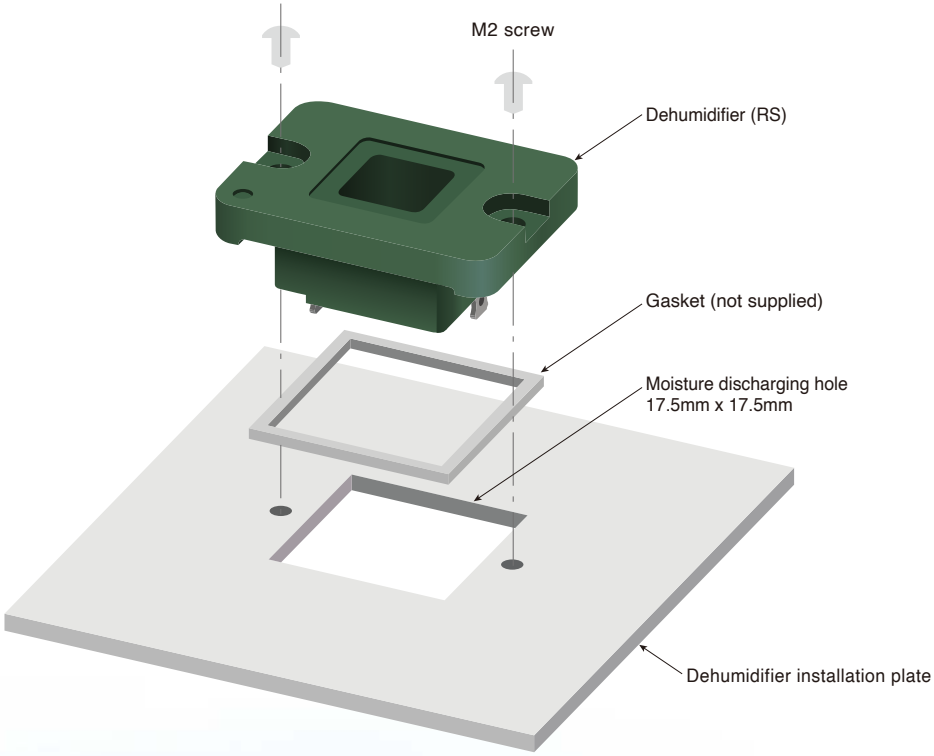




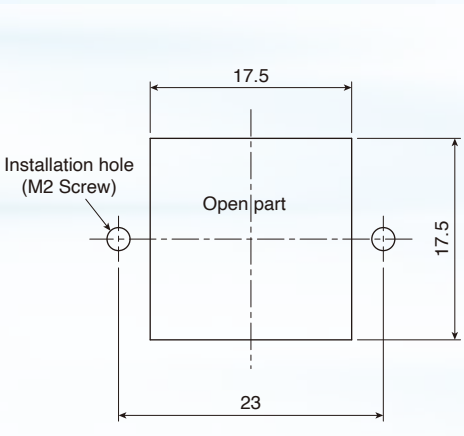
How to install small type micro dehumidifier

「RS1、RS2」

Make a square hole 17.5mm x 17.5mm on the enclosure insert the gasket and attach the micro dehumidifier with two M2 screws and washers.
*Specified torque : Max 0.088N･m (0.9kgf･cm)

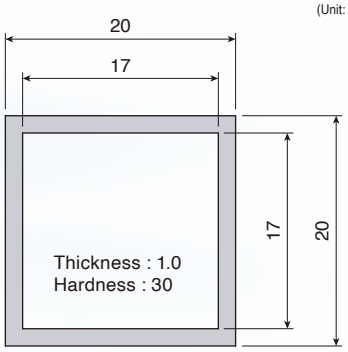


Installation dimensions



Gasket dimensions

(Unit: mm)



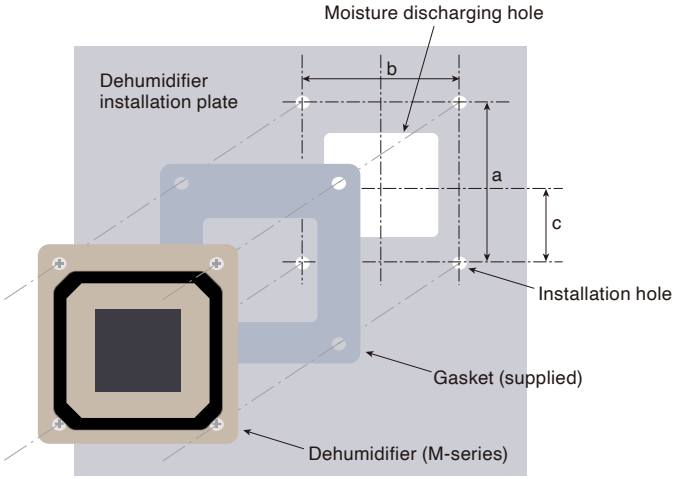
How to install Micro dehumidifier

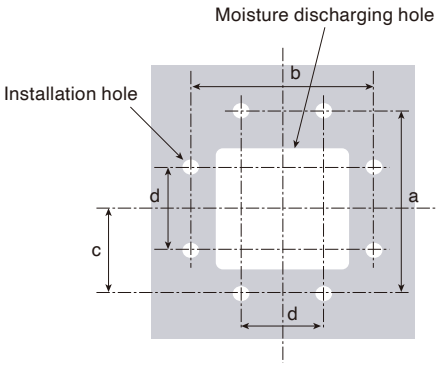
Follow these instructions to ensure airtightness when installing a micro dehumidifier.

How to install general purpose micro dehumidifier

「M-1J1R、M-2J1R、M-3M1R、M-3J1R、M-5J1R、M-7J1R、M-10J1R」

Make a square hole and installation holes on the enclosure insert the included gasket and attach the micro dehumidifier with screws.





Installation dimensions for M-10J1R

●Install dimensions

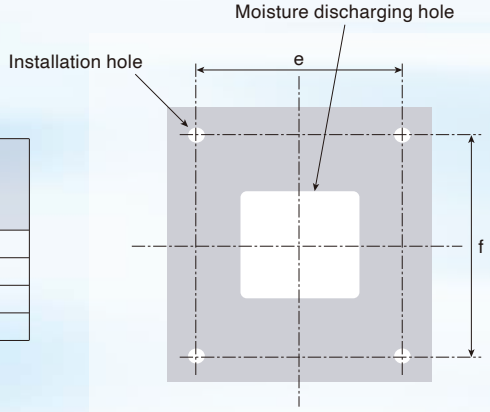
(Unit : mm)

Process details	M-1J1R	M-2J1R	M-3M1R	M-3J1R	M-5J1R	M-7J1R	M-10J1R *1
Moisture discharging hole	20 × 25	35 × 25	35 × 35	55 × 30	55 × 55	75 × 75	105 × 105
Dimension a	37	52	48	65	76	108	152.5
Dimension b	42	42	50	50	76	95	145
Dimension c	18.5	26	24	32.5	38	50.5	72.5
Dimension d	–	–	–	–	–	–	80
Installation screw	4-M3	4-M3	4-M3	4-M3	4-M3	4-M4	8-M4

Note *1 Installation hole position for M-10J1R is different from other products, it fixes with 8 screws.

●Install dimensions of rain cover

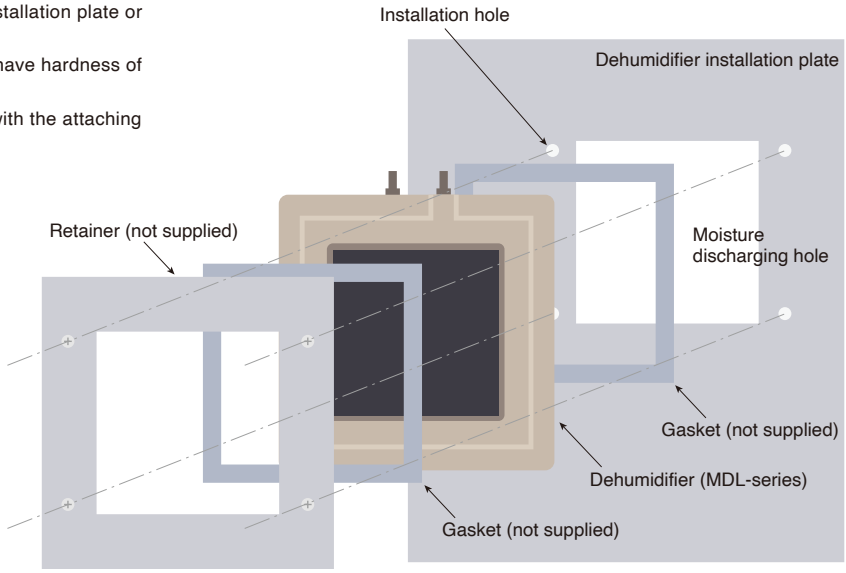
Process details	M-1J1R M-2J1R M-3M1R M-3J1R	M-5J1R	M-7J1R	M-10J1R
Dimension e	85	135	175	225
Dimension f	115	125	150	180
Rain cover model name	For M-3J1R	For M-5J1R	For M-7J1R	For M-10J1R
Installation screw	4-M4	4-M4	4-M4	4-M4

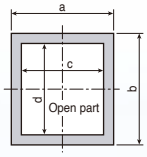


How to install thin type micro dehumidifier

「MDL-3、MDL-5、MDL-7」

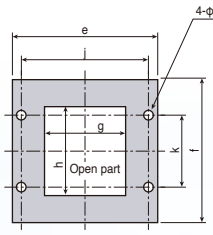
・As shown in the right figure, fit gasket to both sides of the micro dehumidifier, attach the retainer plate on the top and fasten at around four points around the edge with M4 screws. If the necessary distance is not secured between the connecting terminal of micro dehumidifier and the panel surface, attach the micro dehumidifier to dehumidifier installation plate or such other plate and then install to the panel surface.
・The gaskets used should be made from EPT series and have hardness of 8±5.
・When installing in an outdoor panel, avoid interference with the attaching screws of the rain cover.





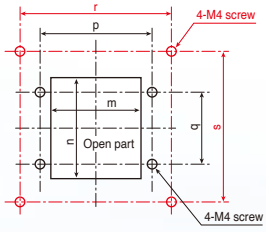
Material: EPT series
Hardness: 8±5
Thickness: 2 mm

Figure 1: Gasket



Material: SUS
Thickness: 3 mm

Figure 2: Retainer plate



Black: Dimensions of dehumidifier installation hole
Red: Dimensions of rain cover installation hole

Figure 3: Dimensions of installation holes

●Installation dimensions of thin type micro dehumidifier (recommended)

(Unit: mm)

Model name	Gasket (Figure 1)				Retainer plate (Figure 2)						Main body insutallation dimensions (Figure 3)				Rain cover installation dimensions (Figure 3)		
	a	b	c	d	e	f	g	h	j	k	m	n	p	q	r	s	Rain cover model name
MDL-3	45	70	30	55	80	75	30	55	70	40	30	55	70	40	135	125	For M-5J1R
MDL-5	70	70	55	55	105	75	55	55	95	40	55	55	95	40	135	125	
MDL-7	90	90	75	75	125	95	75	75	115	60	75	75	115	60	175	150	For M-7J1R

For the rain cover, see page 9.

Precautions for use of Micro dehumidifier

1. Please install a protective cover when necessary to prevent hands or objects from touching the membranes of both the dehumidifying and humidifying surfaces.

2. Ensure that the installation direction is correct. If installed incorrectly, it will reverse the dehumidifying and humidifying functions, which may affect the items inside the enclosure.

3. Please strictly follow the power supply instructions for ROSAHL
   (1) Do not reverse the polarity. Reversing the polarity will reverse the dehumidification and humidification functions, which could damage the items in storage. Additionally, the porous electrode on the moisture release side will be damaged by a chemical reaction, leading to system failure.
   (2) When powered on, ROSAHL may draw a high inrush current. Therefore, we recommend using the power supply listed in Table 1.
   (3) Use a separate power supply for each ROSAHL unit. Connecting multiple ROSAHL units to a single power supply, whether in series or parallel, could cause all units to malfunction or fail.
   (4) ROSAHL transmits moisture vapor. When powered off, external moisture will enter the enclosure, causing the humidity inside to return to the same level as the outside. Over time, the humidity inside the enclosure will balance with the external humidity.

   Table 1. Recommended Power Supply Specifications

Model	PD2/PD3 RD3/RD4 RS1/RS2	M-1J1R	M-2J1R	M-3M1R M-3J1R MDL-3	M-5J1R MDL-5	M-7J1R MDL-7	M-10J1R
Rated output voltage	3V DC						
Rated output current	500mA	1A	1.5A	2A	3A	5A	10A
Overcurrent protection *	Required						
Overvoltage protection	Required						
Output voltage variation	0.1V or less						
Ripple noise	0.2V or less						
Others	In accordance with the specifications of commercially available power supply						

*Note : Use a constant or fold-back current power supply. Do not use a power supply with Hiccup mode, as ROSAHL requires a minimum of 2V DC even when overcurrent protection is operating. If using a Hiccup mode power supply, ROSAHL may fail to operate properly.

4. The container must be properly sealed. If the enclosure is permeable to moisture, the expected performance may not be achieved.

5. Install ROSAHL with an airtight seal using the gasket. Position it at the center of the inner side.
   Do not install it on the ceiling or floor, as dust or metal particles may accumulate and cause malfunctions.

6. Crystallization may occasionally occur when using sealed rubber gaskets containing antioxidants. Conduct a thorough evaluation of the gasket to ensure compatibility.

7. When using sealing materials to ensure the airtightness of the enclosure, avoid silicone-based sealants. Silicone sealants emit oxime and siloxane gases, which can cause a significant decrease in performance over time. If using materials other than silicone, ensure that the sealing material is completely cured before installing ROSAHL in the enclosure.
   Volatile substances released during curing may negatively affect ROSAHL's performance.
   [Recommended Product]: Modified Silicon Caulk (Konishi)

8. Avoid contact with water on the moisture discharge side. If the membrane surface becomes wet, the dehumidification effect will not recover until it is completely dry. When using ROSAHL outdoors, a rain cover or another protective enclosure is required to shield it from water exposure.

9. If using ROSAHL in an environment with dust, oil mist, or similar contaminants, install a moisture-permeable sheet for protection.

10. Ensure proper ventilation at the moisture discharge side.

11. Do not use ROSAHL in locations with volatile rust inhibitors, insect repellents, or high concentrations of organic gases.

12. Do not disassemble, repair, or modify the device, as this may result in malfunction or failure.

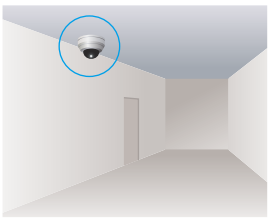
13. When using silicone gaskets to install ROSAHL, ensure they have undergone vulcanization treatment (e.g., 200°C for 6 hours).
    The presence of low-molecular-weight siloxane in some gaskets can degrade ROSAHL's performance.

[Precautions for use of the storage cabinet]

1. When using ROSAHL in a storage cabinet, do not store items that release volatile rust inhibitors or organic gases. These gases may chemically react with the anode side (dehumidification side) of the membrane, leading to the formation of harmful substances. This can not only reduce ROSAHL's performance but also affect other stored items. If valuable stored items are damaged due to newly formed gases, we cannot provide any guarantee. Please conduct thorough verification before using ROSAHL in a storage cabinet.

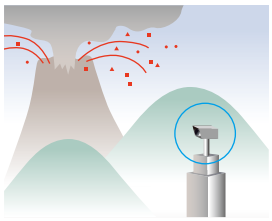
2. If manufacturing or selling storage cabinets equipped with ROSAHL, provide detailed usage instructions to the end users.

Monitoring cameras



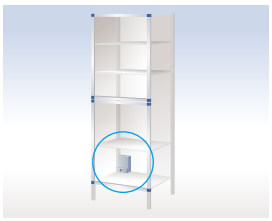
Dome type monitoring cameras

Inner-city monitoring cameras



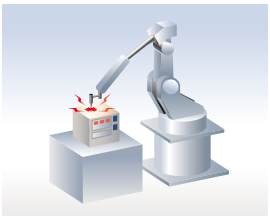
Disaster prevention monitoring cameras

Laboratory cabinets



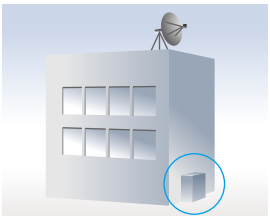
Cabinets for storing medicine and optical parts

Optical application equipment



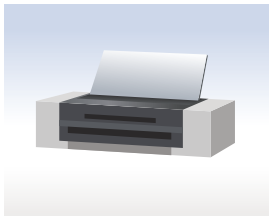
Laser processing machines

Telecommunications



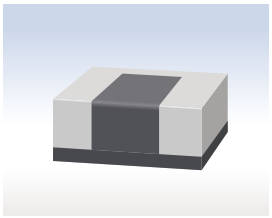
Mobile phone shelters

OA equipment



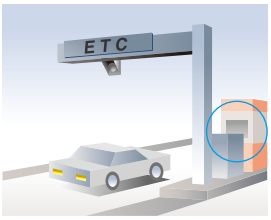
High quality image printers

Analyzers

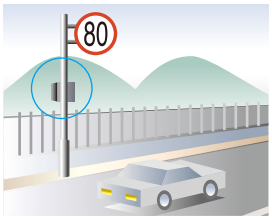


Infrared spectrographs (FT-IR)

Road facilities

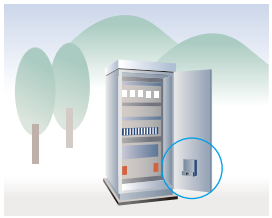


ETCS control panels



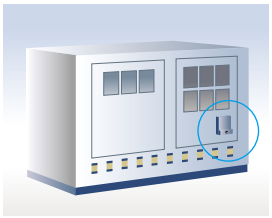
Automatic speed indicators

Electric facilities



Monitoring control panels

Production facilities



NC control panels

Intellectual property right

The basic patent of dehumidifier using this system is reserved by Mitsubishi Electric Corp.
Our company acquires its patent license, and is also applying for the relevant patents in cooperation with Mitsubishi Electric Corp.

CAUTION

- Prior to use, carefully read the instruction manual published on the website.
- The specifications described in this brochure, such as the rating, dimensions and appearance, may be subject to changes without prior notice; it is, therefore, necessary to purchase our product after it has been checked satisfactorily at your end.

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This leaflet shows the product specifications and dimensions as of Mar., 2025. It is subject to change without prior notice.

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