GENERAL CATALOGUE 2004/2005

Industrial Components




- Electromechanical Relays
- Timers
- Counters
- Programmable Relays
- Level Controllers
- Limit Switches
- Pushbutton Switches
- Low Voltage Switch Gear
- Temperature Controllers
- Solid State Relays
- Panel Indicators
- Power Supplies

Advanced Industrial Automation

Cat. No. Y202-EN2-02 ICD

OMRON

Others

Interface Converter
K3SC

A compact converter that allows communications between RS-232C/USB and RS-422/485 devices. Ideal for industrial applications.

- Allows communications between RS-232C/USB (Universal Serial Bus) and RS-422/485 devices.
- Phototransistor couplers ensure 1,500-VAC isolation between the RS-232C/USB and RS-422/485 sides and a transformer ensures 1,500-VAC isolation for the power supply.
- Compact 30-mm-wide body supports both screw-mounting and DIN track mounting.
- LED indicator for RD, SD, and power.
- Operation either with or without echoback available.
- Recognized to conform to U.S. and Canadian requirements under the Component Recognition Program of UL.
- CE marking (except for USB).
- Functionality to convert between USB and RS-232C communications added.
- USB driver providing virtual communications port for USB communications is available.

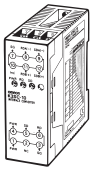
Note: To use USB communications, the USB driver for the K3SC must be downloaded from the OMRON web site.

Application Examples

- Data can be transferred between computers (using the USB port if there is no RS-232C port) and field devices.
- Using two K3SC Units enables long-distance communications between devices connected via RS-232C.

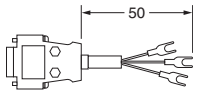
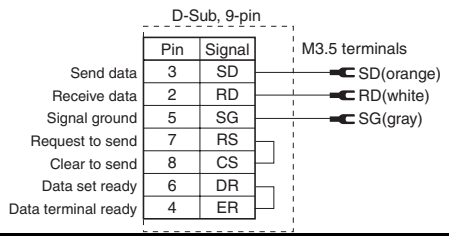
Ordering Information

■ List of Models

Appearance	Size (mm)	Power supply voltage	Model
	30 × 80 × 78 (W × H × D)	100 to 240 VAC	K3SC-10 100 to 240 VAC
		24 VAC/VDC	K3SC-10 24 VAC/VDC

■ Accessories (Order Separately)

Adapter for RS-232C Serial Cable and K3SC (D-Sub, 9-pin, male)

Appearance	Wiring diagram	Model
		K32-23209

Specifications

■ Ratings

Item		K3SC-10 100 to 240 VAC	K3SC-10 24 VAC/VDC
Supply voltage		100 to 240 VAC 50/60 Hz	24 VAC 50/60 Hz, 24 VDC
Operating voltage range		85% to 110% of power supply voltage	
Power consumption		5 VA max.	3 VA max./3 W max.
Master/slave device communications format (Select one of the formats listed on the right using the DIP switch.)		Master Device / Slave Device RS-232C or USB / RS-485, half duplex RS-232C or USB / RS-422, full duplex USB / RS-232C, full duplex	
Communications method		Start-stop synchronization	
Ambient operating temperature	**RS-232C**	–10 to 55 °C (with no icing)	
	USB	0 to 55 °C (with no icing)	
Ambient operating humidity		25% to 85% (with no condensation)	
Ambient storage temperature		–20 to 65 °C	

■ Characteristics

Item				Specification
Master device	RS-232C interface (See note 1.)	Maximum transmission distance		15 m
		Maximum number of connectable Units		1 Unit
	USB interface (See note 2.)	Maximum transmission distance		5 m; hub delay time + cable delay time ≤ 70 ns
		Maximum number of connectable Units		1 Unit
		USB standard		V1.1
Slave device	RS-422/485 interface	Maximum transmission distance		500 m
		Maximum number of connectable Units		31 Units (for multi-drop connection)
Baud rate				1,200/2,400/4,800/9,600/19,200/38,400 (bps) Default setting: 9,600
Data length				7/8 bits Default setting: 7
Stop bit length				1/2 bits Default setting: 2
Communications parity				None/even/odd Default setting: Even
Echoback selection				Echoback: With/without Default setting: Without
Selection switch response delay				Approx. 30 ms
Insulation resistance				20 MΩ min. measured at 500 VDC between the following: External terminals ↔ casing RS-232C terminals and USB port ↔ RS-422/485 terminals ↔ power supply terminals
		Isolation method	Communications	Phototransistor coupler
			Power supply	Isolating transformer
Dielectric strength				1,500 VAC for 1 minute measured between the following: External terminals ↔ casing RS-232C terminals, USB port, RS-422 terminals, and RS-485 terminals ↔ power supply terminals
				500 VAC for 1 minute measured between the following: RS-232C terminals and USB port ↔ RS-422 terminals and RS-485 terminals
Noise immunity				AC power supply terminals, normal/common mode: ±1,500 V AC/DC power supply terminals, normal mode: ±480 V; common mode: ±1,500 V Square wave with 1-ns rising edge ±1 μs, ±100 ns
Vibration resistance		Malfunction		10 to 55 Hz, 0.5-mm single amplitude for 10 minutes each in X, Y, and Z directions
		Destruction		10 to 55 Hz, 0.5-mm single amplitude for 2 hours each in X, Y, and Z directions
Shock resistance		Malfunction		98 m/s² 3 times each in X, Y, and Z directions
		Destruction		294 m/s² 3 times each in X, Y, and Z directions
Weight				Approx. 150 g
Degree of protection (See note 3.)		Front panel operation parts		Conforms to IEC standards, equivalent to IP20 (when terminal cover mounted)
		Terminals		Equivalent to VDE 0106/100 (when terminal cover mounted)
EMC				(EMI) EN61326+A1 Industry Emission Enclosure: CISPR 11 Group 1 class A: CISRP16-1/-2 Emission AC Mains: CISPR 11 Group 1 class A: CISRP16-1/-2 (EMS) EN61326+A1 Industry Immunity ESD: EN61000-4-2: 4 kV contact discharge (level 2), 8 kV air discharge (level 3) Immunity RF-interference: EN61000-4-3: 10 V/m (amplitude-modulated, 80 MHz to 1 GHz) (level 3) Immunity Fast Transient Noise: EN61000-4-4: 2 kV (power line) (level 3) Immunity Burst Noise: 1 kV line to line (I/O signal line) Immunity Surge: EN61000-4-5: 1 kV line to line, 2 kV line to ground (power line) Immunity Conducted Disturbance EN61000-4-6: 3 V (0.15 to 80 MHz) (level 2) Immunity Voltage Dip/Interrupting EN61000-4-11: 0.5 cycles, 0, 180°, 100% (rated voltage)
Approved standards				UL508, Conforms to EN61326+A1, EN61010-1 (IEC61010-1)
Memory protection				No protective functions (Communications data is not protected for power interruptions during communications.)

Note: 1. With RS-232C communications, free-run mode is supported for SD and RD but not for any other signal lines.

2. To use USB communications, the USB driver for the K3SC must be downloaded from the OMRON web site.
http://www.fa.omron.co.jp/sensing/download/dpm/k3sc/english/index.html

3. The enclosure ratings do not apply when USB is used.

4. The CE marking does not apply when the K3SC is used for USB.

Connections

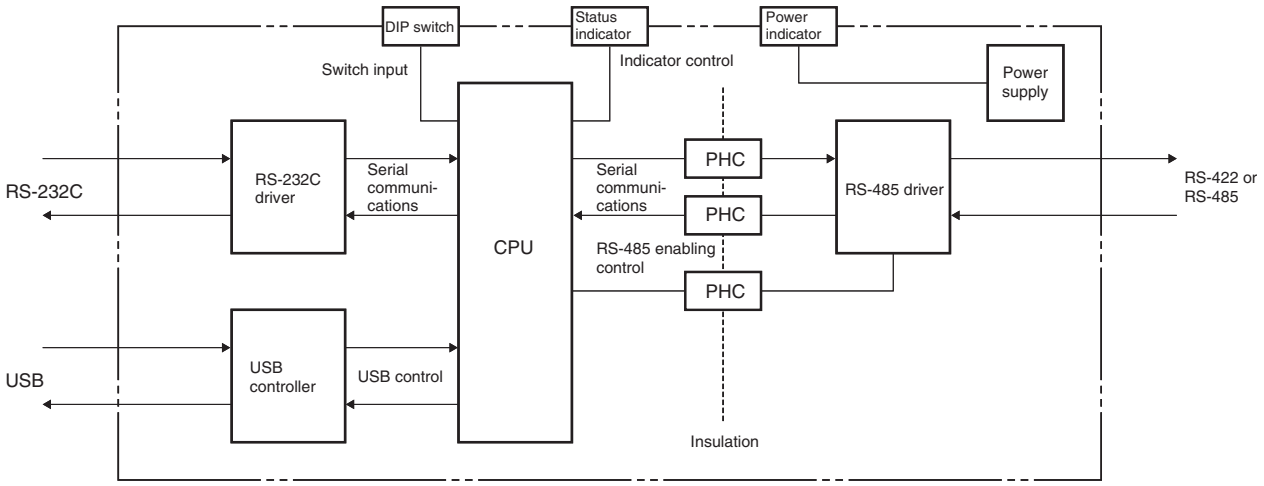
■ Terminal Specifications

Be sure to check the input and output specifications for the signal pins of connected devices before connecting the terminals.

Function	Terminal number	Name	Signal direction	Explanation
For connecting the operating power supply	1 and 4	PWR	---	The input power supply specifications vary with the model. A 100 to 240-VAC model and a 24-VAC/VDC (no-polarity) model are available.
Connection terminals for RS-232C communications with master device (DIP switch pin 8: OFF)	3	SG	---	Connect to signal ground.
	5	SD	Input	Receives data from SD of the master device.
	6	RD	Output	Sends data to RD of the master device.
Used for RS-485 communications with slave device (DIP switch pin 9: OFF)	8	RDA(–)	Input/output	SD and RD for RS-485 (cold side) Terminals 8 and 9 are connected internally when pin 9 of the DIP switch is set to OFF.
	9	SDA(–)		
	11	RDB(+)	Input/output	SD and RD for RS-485 (hot side) Terminals 11 and 12 are connected internally when pin 9 of the DIP switch is set to OFF.
	12	SDB(+)		
Used for RS-422 communications with slave device (DIP switch pin 9: ON)	7	SG	---	Connect to signal ground.
	8	RDA(–)	Input	Receives RS-422 data and outputs it to the master side.
	9	SDA(–)	Output	Converts data received via RS-232C from the master device to RS-422 data and outputs the data.
	11	RDB(+)	Input	Receives RS-422 data and outputs it to the master side.
	12	SDB(+)	Output	Converts data received via RS-232C from the master device to RS-422 data and outputs the data.

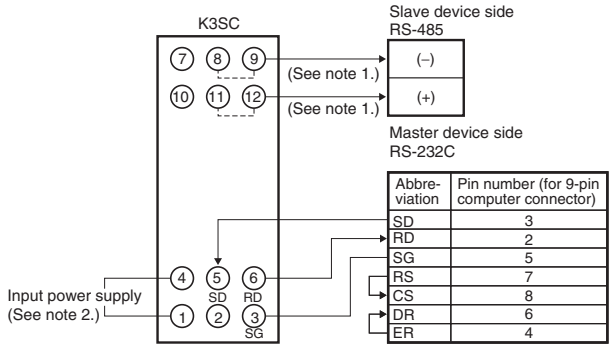
Note: Terminals 2 and 10 are not used.

■ Internal Configuration (Block Diagram)



■ External Connections

RS-485 Connection

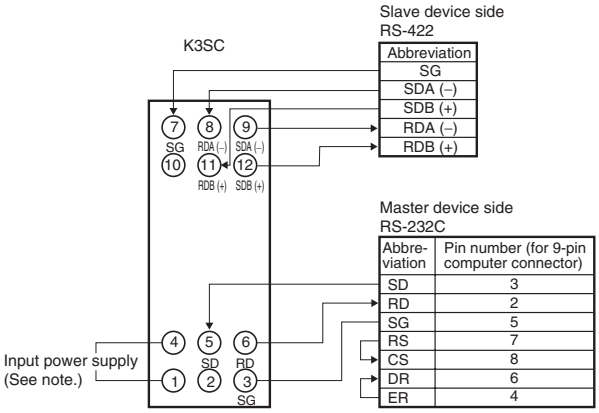


Abbreviation	Pin number (for 9-pin computer connector)
SD	3
RD	2
SG	5
RS	7
CS	8
DR	6
ER	4

Note: 1. If RS-485 is selected as the communications method (i.e., pin 9 of the DIP switch is set to OFF), terminals 8 and 9, and terminals 11 and 12 are connected internally.

2. Either a 100 to 240-VAC or 24-VAC/VDC (no polarity) input power supply is used. Recommended DC power supply; OMRON S8VS.

RS-422 Connection

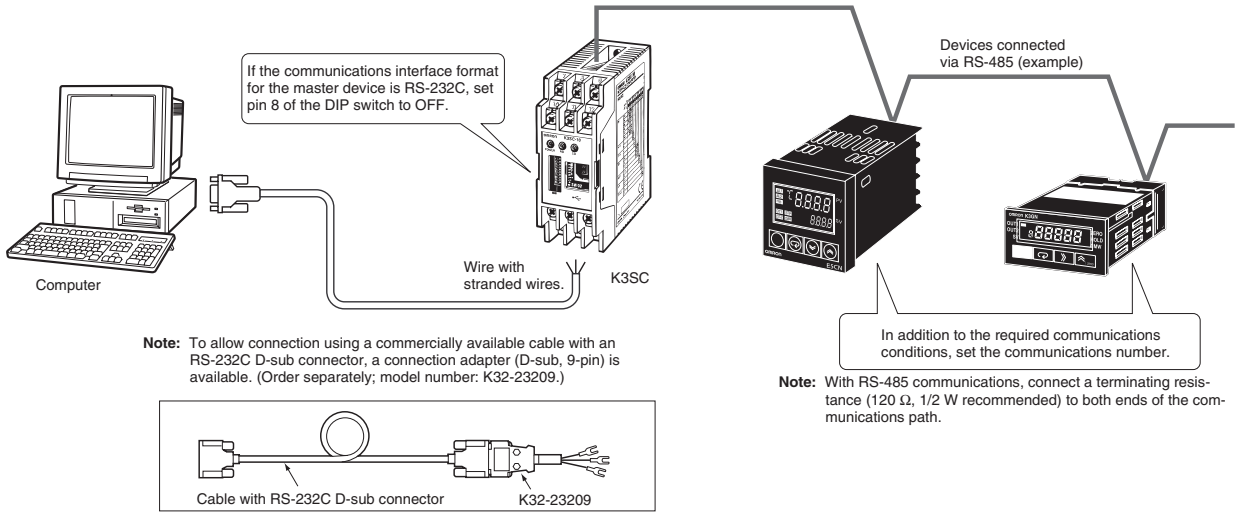


Abbreviation	Pin number (for 9-pin computer connector)
SD	3
RD	2
SG	5
RS	7
CS	8
DR	6
ER	4

Note: Either a 100 to 240-VAC or 24-VAC/VDC (no polarity) input power supply is used. Recommended DC power supply; OMRON S8VS.

Connecting an RS-232C or USB Master Device to an RS-422/485 Slave Device

First set the same communications conditions (baud rate, stop bits, data length, and parity) for the master device, the Interface Converter, and slave devices.



Note: To allow connection using a commercially available cable with an RS-232C D-sub connector, a connection adapter (D-sub, 9-pin) is available. (Order separately; model number: K32-23209.)

Note: With RS-485 communications, connect a terminating resistance (120 Ω, 1/2 W recommended) to both ends of the communications path.

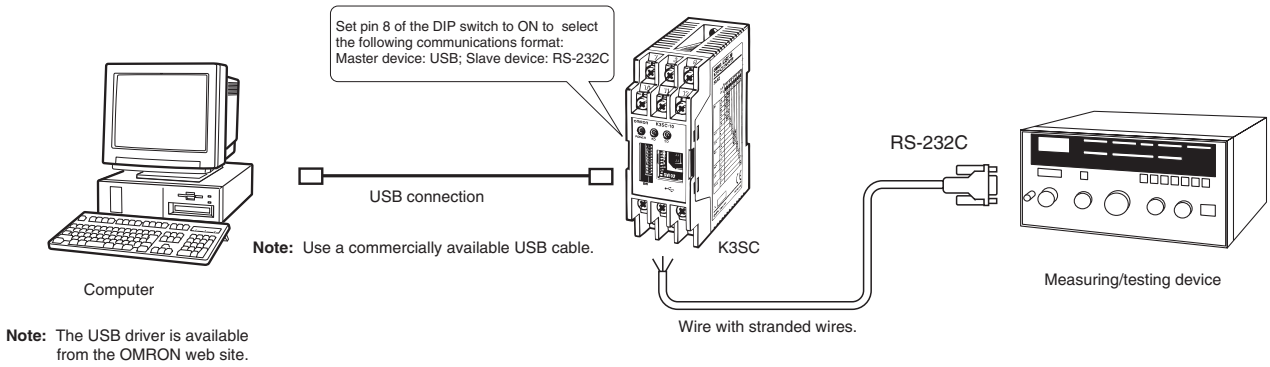
Note: 1. 1-to-N connection via OMRON NT Link communications is not supported.

2. If the communications interface format for the master device is USB, obtain a commercially available USB cable and download the USB driver for the K3SC from the OMRON web site.

Connecting a USB Master Device to an RS-232C Slave Device

First set the same communications conditions (baud rate, stop bits, data length, and parity) for the master device, the Interface Converter, and slave devices.

Note: There is no isolation between the USB and RS-232C sides.



Note: The USB driver is available from the OMRON web site.

Operation

■ Communications Settings Switch

Use this switch to set the communications conditions for the K3SC to those used by connected devices.

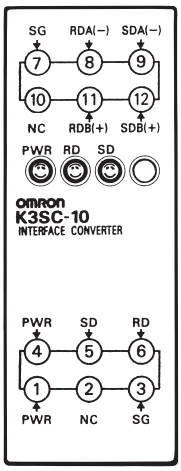
Setting	Baud rate						Data length		Stop bits		Parity			Configuration			Echoback	
ON↔OFF	1,200 bps	2,400 bps	4,800 bps	9,600 bps	19,200 bps	38,400 bps	7	8	2	1	Even	Odd	None	Master : USB	Master: RS-232C or USB (See note.)		OFF (without)	ON (with)
														Slave: RS-232C	Slave: RS-485	Slave: RS-422		
1	ON	OFF	ON	OFF	ON	OFF												
2	OFF	ON	ON	OFF	OFF	ON												
3	OFF	OFF	OFF	OFF	ON	ON												
4							OFF	ON										
5									OFF	ON								
6											OFF	ON	OFF					
7											OFF	OFF	ON					
8														ON	OFF			
9															OFF	ON		
0																	OFF	ON

Note: 1. All pins are factory-set to OFF.

2. When using the communications configuration with RS-232C or USB set for the master device and RS-422 or RS-485 set for the slave device, use either RS-232C or USB (but not both) on the master device side.

Nomenclature

Terminal Cover



Note: Cover the terminals to prevent electric shock.

Caution: Be sure to use the K3SC-10 with the terminal cover mounted when using in machinery that must conform to EN/IEC standards.

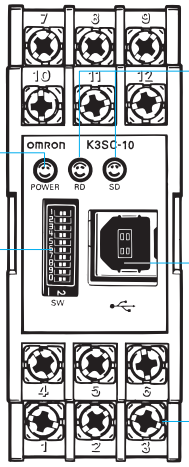
Power Indicator
Lights (green) when power is supplied.

Communications Setting Switch
Used to set the communications conditions for connected devices.

Communications Setting Switch

Switch	Setting
1	Baud rate
2	
3	
4	Data length
5	
6	Parity
7	
8	Master device
9	Slave device
10	Echoback

K3SC without Terminal Cover



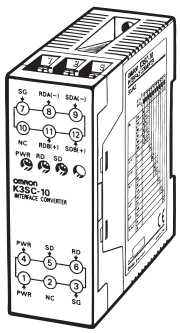
Communications Status Indicators
Light (yellow) during communications.
- RS-232C/USB ↔ RS-422/485:
  RD: Lights when receiving RS-422/485 communications.
  SD: Lights when sending RS-422/485 communications.
- USB ↔ RS-232C:
  RD: Lights when receiving RS-232C communications.
  SD: Lights when sending RS-232C communications.

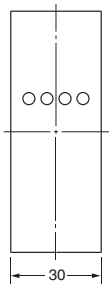
USB Port
Port for USB connections. Use this port if the master device is a USB device.

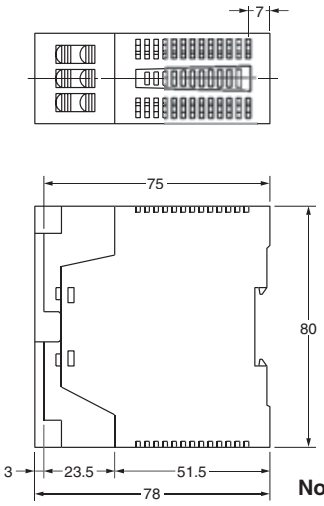
M3.5 Terminal Screw

Dimensions

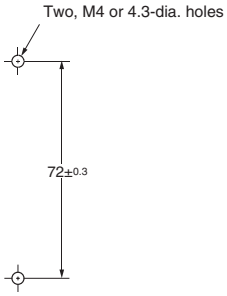
K3SC-10







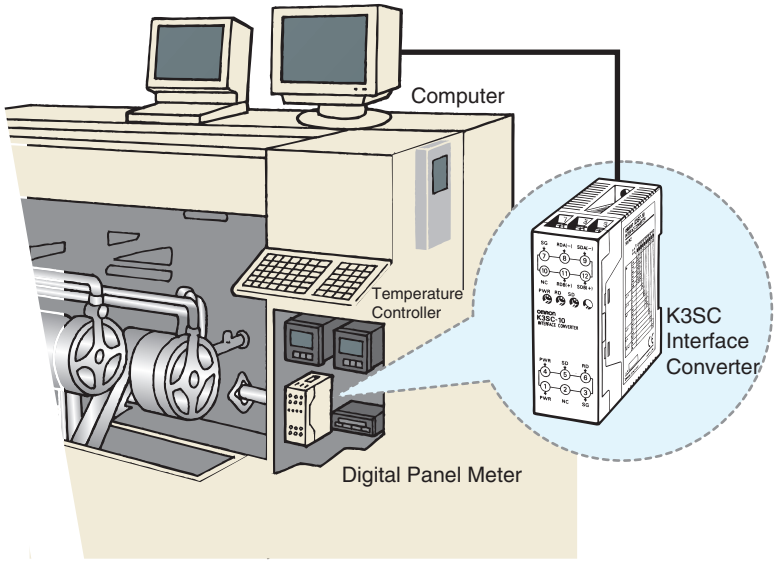
Mounting Hole Dimensions (For Direct Mounting)



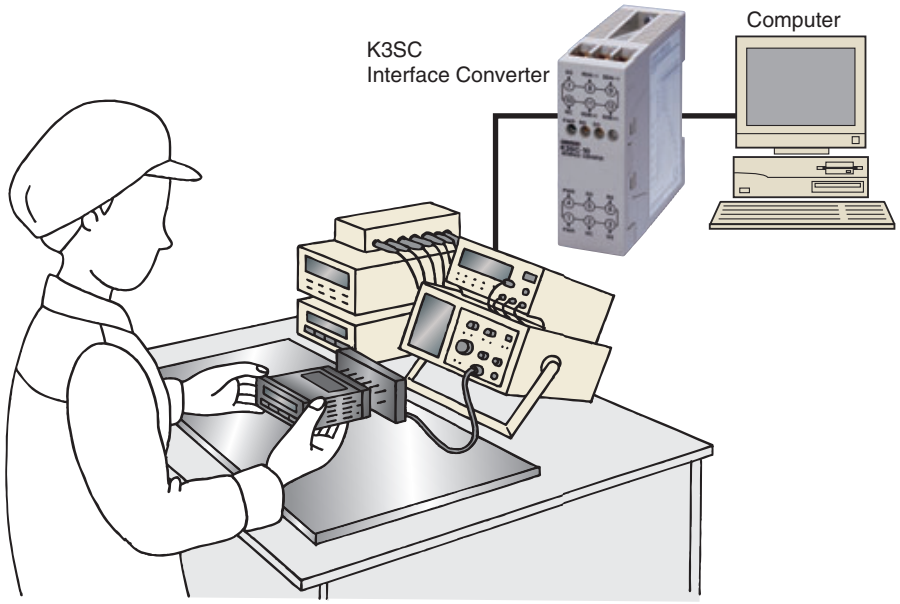
Note: DIN track mounting is also possible.

Application Examples

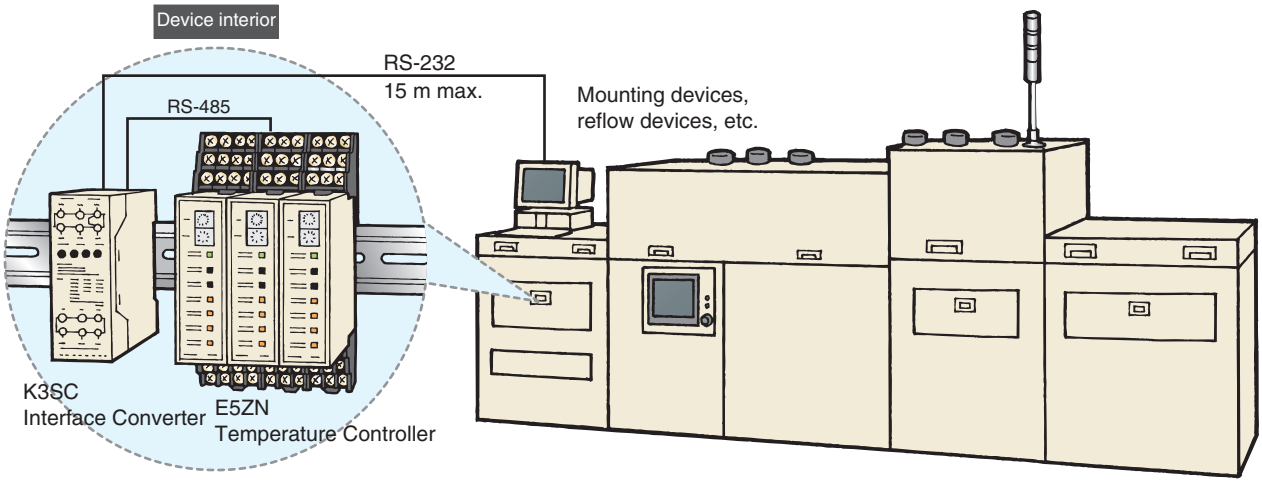
Monitoring and Maintenance of Installations and Equipment



Inspections and Debugging for Communications Equipment



Installation Temperature Control with a Computer



Precautions

⚠ Caution

Do not touch any of the terminals while power is being supplied. Doing so may result in electric shock.

⚠ Caution

Do not allow metal objects or wire cuttings to enter the product. Doing so may result in electric shock, fire, or malfunction.

⚠ Caution

Do not attempt to disassemble, repair, or modify the product. Any attempt to do so may result in malfunction, fire, or electric shock.

⚠ Caution

Be sure to tighten the terminal screws to the specified torque. Loose screws may result in burning or malfunction. The recommended tightening torque is 0.78 N·m.

General Precautions

Do not mount the product in the following places:

- Locations subject to shock or vibration
- Outdoor locations or locations subject to direct sunlight, wind, or rain.
- Locations subject to temperatures or humidity outside the specified ranges
- Locations subject to condensation or icing
- Locations subject to large amounts of dust
- Locations subject to flammable gases or objects
- Locations subject to corrosive gases (in particular sulfide or ammonia gases)

Be sure to check power supply specifications, terminal numbers, and polarities before performing wiring.

Turn OFF the power supply before performing installation or wiring.

Turn OFF the power supply before removing the terminal cover.

Do not connect anything to unused terminals.

Correct Use

Perform wiring with crimp terminals that are suitable for M3.5 screws.

Install the product as far away as possible from devices that generate strong high-frequency noise (e.g., high-frequency welders) or surges.

Do not pull on the USB cable. Doing so may cause the cable to come loose.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. N104-E1-03

AC Axial-flow Fans
R87F/R87T

Optimum Cooling with a Comprehensive Lineup of Axial-flow Fans

- Low noise level, long service life, and resistance to the environment.
- Shaft supported by ball bearings for highly-reliable operation.
- Plastic-bladed models (48 type) and metal-bladed models (24 type) included in series.
- R87F-A□A16H-WR Water-resistant AC Axial-flow Fans (IP65 degree of protection) added to series.
- A wide range of models with CSA, VDE, and EN/IEC approval also available.

Model Number Structure

■ Model Number Legend

R87□ - □□ □□□□□□ - □

1 2 3 4 5 6 7 8

1. Basic series

R87F: Plastic blade
R87T: Metal blade

2. Rated voltage

A1: 100 VAC
A3: 115 VAC
A4: 200 VAC
A6: 230 VAC

3. Frame material

A: Die-cast aluminum

4. Frame size

0: 150 dia.
1: 120×120
9: 92×92
8: 80×80

5. Frame thickness

3: 25
5: 38
6: 40
7: 55

6. Rotational speed

H: High
M: Medium
L: Low

7. Terminal type

No marking: Lead wires
P: Terminals (See note 1.)

8. Type

No marking: Standard
WR: Water-resistant

Note: 1. A Plug Cord (R87F-PC) is available as an option for models with terminals.

2. These tables show only how to read product markings. They do not indicate which products are available. Refer to product ratings when ordering.

Ordering Information

■ Available Models

AC Axial-flow Fans

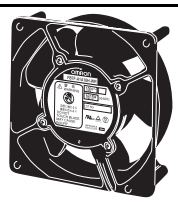
Series	Size (mm)	Model	Page number
R87F (plastic blades)	120×120×t40	R87F-A□A16H-WR	Refer to page 19.
	120×120×t38	R87F-A□A15	Refer to page 21.
	120×120×t25	R87F-A□A13	Refer to page 23.
	92×92×t25	R87F-A□A93	Refer to page 25.
	80×80×t38	R87F-A□A85	Refer to page 27.
	80×80×t25	R87F-A□A83	Refer to page 29.
R87T (metal blades)	150-dia.×t55	R87T-A□A07	Refer to page 31.
	150-dia.×t38	R87T-A□A05	Refer to page 33.
	120×120×t38	R87T-A□A15	Refer to page 35.
	80×80×t38	R87T-A□A85	Refer to page 37.
	80×80×t25	R87T-A□A83	Refer to page 39.

Note: Mounting screws are not provided.

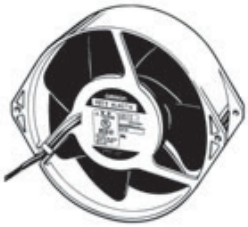
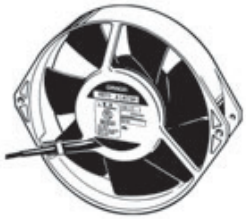
Options

Product name	Model	Page number
Plug Cord	R87F-PC	Refer to page 41.
Finger Guard	R87F-FG□	Refer to page 41.
Filter	R87F-FL□(S)	Refer to page 42.

■ AC Axial-flow Fan Series

Series	Size (mm)	Model	Rated voltage	Speed	Safety standards				Electrical connection	Page number
					UL	CSA	EN/IEC			
							VDE	TÜV		
R87F (plastic blades)	 120 × 120 × 40	R87F-A1A16H-WR	100 VAC	High	Yes	Yes	---	Yes	Lead wires	Refer to page 19.
		R87F-A3A16H-WR	115 VAC		Yes	Yes	---	Yes		
		R87F-A4A16H-WR	200 VAC		Yes	Yes	---	Yes		
		R87F-A6A16H-WR	230 VAC		Yes	Yes	---	Yes		
	 120 × 120 × 38	R87F-A1A15HP	100 VAC	High	Yes	Yes	---	Yes	Tab terminals	Refer to page 21.
		R87F-A3A15HP	115 VAC		Yes	Yes	Yes	Yes		
		R87F-A4A15HP	200 VAC		Yes	Yes	---	Yes		
		R87F-A6A15HP	230 VAC		Yes	Yes	Yes	Yes		
		R87F-A1A15MP	100 VAC	Medium	Yes	Yes	---	---		
		R87F-A3A15MP	115 VAC		Yes	Yes	Yes	---		
		R87F-A4A15MP	200 VAC		Yes	Yes	---	---		
		R87F-A6A15MP	230 VAC		Yes	Yes	Yes	---		
		R87F-A1A15LP	100 VAC	Low	Yes	Yes	---	---		
		R87F-A3A15LP	115 VAC		Yes	Yes	Yes	---		
		R87F-A4A15LP	200 VAC		Yes	Yes	---	---		
		R87F-A6A15LP	230 VAC		Yes	Yes	Yes	---		
	 120 × 120 × 25	R87F-A1A13HP	100 VAC	High	Yes	Yes	---	Yes		Refer to page 23.
		R87F-A3A13HP	115 VAC		Yes	Yes	Yes	Yes		
		R87F-A4A13HP	200 VAC		Yes	Yes	---	Yes		
		R87F-A6A13HP	230 VAC		Yes	Yes	Yes	Yes		
		R87F-A1A13LP	100 VAC	Low	Yes	Yes	---	---		
		R87F-A3A13LP	115 VAC		Yes	Yes	Yes	---		
		R87F-A4A13LP	200 VAC		Yes	Yes	---	---		
		R87F-A6A13LP	230 VAC		Yes	Yes	Yes	---		
	 92 × 92 × 25	R87F-A1A93HP	100 VAC	High	Yes	Yes	---	---		Refer to page 25.
		R87F-A3A93HP	115 VAC		Yes	Yes	Yes	---		
		R87F-A4A93HP	200 VAC		Yes	Yes	---	---		
		R87F-A6A93HP	230 VAC		Yes	Yes	Yes	---		
		R87F-A1A93LP	100 VAC	Low	Yes	Yes	---	---		
		R87F-A3A93LP	115 VAC		Yes	Yes	Yes	---		
		R87F-A4A93LP	200 VAC		Yes	Yes	---	---		
		R87F-A6A93LP	230 VAC		Yes	Yes	Yes	---		
	 80 × 80 × 38	R87F-A1A85HP	100 VAC	High	Yes	Yes	---	---		Refer to page 27.
		R87F-A3A85HP	115 VAC		Yes	Yes	Yes	---		
		R87F-A4A85HP	200 VAC		Yes	Yes	---	---		
		R87F-A6A85HP	230 VAC		Yes	Yes	Yes	---		
		R87F-A1A85LP	100 VAC	Low	Yes	Yes	---	---		
		R87F-A3A85LP	115 VAC		Yes	Yes	Yes	---		
		R87F-A4A85LP	200 VAC		Yes	Yes	---	---		
		R87F-A6A85LP	230 VAC		Yes	Yes	Yes	---		
	 80 × 80 × 25	R87F-A1A83H	100 VAC	High	Yes	Yes	---	---	Lead wires	Refer to page 29.
		R87F-A3A83H	115 VAC		Yes	Yes	Yes	---		
		R87F-A4A83H	200 VAC		Yes	Yes	---	---		
		R87F-A6A83H	230 VAC		Yes	Yes	Yes	---		
		R87F-A1A83L	100 VAC	Low	Yes	Yes	---	---		
		R87F-A3A83L	115 VAC		Yes	Yes	Yes	---		
		R87F-A4A83L	200 VAC		Yes	Yes	---	---		
		R87F-A6A83L	230 VAC		Yes	Yes	Yes	---		

Note: The products approved by standard organizations satisfied the following tests.
UL approval number: UL507 (UL519, UL547)
CSA approval number: C22.2 (No. 0, No. 113)
VDE approval number: DIN/EN60950 (VDE0805), EN60950, IEC950
TÜV approval number: VDE0700 Teil 1, VDE0700 Teil 234, EN60355-1, IEC335-1

Series	Size (mm)	Model	Rated voltage	Speed	Safety standards				Electrical connection	Page number
					UL	CSA	EN/IEC			
							VDE	TÜV		
R87T (metal blades)	 150 dia. × t55	R87T-A1A07H	100 VAC	High	Yes	---	---	Yes	Lead wires	Refer to page 31.
		R87T-A3A07H	115 VAC		Yes	---	---	Yes		
		R87T-A4A07H	200 VAC		Yes	---	---	Yes		
		R87T-A6A07H	230 VAC		Yes	---	---	Yes		
	 150 dia. × t38	R87T-A1A05H	100 VAC		Yes	---	---	Yes		Refer to page 33.
		R87T-A3A05H	115 VAC		Yes	---	---	Yes		
		R87T-A4A05H	200 VAC		Yes	---	---	Yes		
		R87T-A6A05H	230 VAC		Yes	---	---	Yes		
	 120 × 120 × 38	R87T-A1A15HP	100 VAC	High	Yes	---	---	Yes	Tab terminals	Refer to page 35.
		R87T-A3A15HP	115 VAC		Yes	---	---	Yes		
		R87T-A4A15HP	200 VAC		Yes	---	---	Yes		
		R87T-A6A15HP	230 VAC		Yes	---	---	Yes		
		R87T-A1A15MP	100 VAC	Medium	Yes	---	---	---		
		R87T-A3A15MP	115 VAC		Yes	---	---	---		
		R87T-A4A15MP	200 VAC		Yes	---	---	---		
		R87T-A6A15MP	230 VAC		Yes	---	---	---		
	 80 × 80 × 38	R87T-A1A85H	100 VAC	High	Yes	---	---	---	Lead wires	Refer to page 37.
		R87T-A3A85H	115 VAC		Yes	---	---	Yes		
		R87T-A4A85H	200 VAC		Yes	---	---	---		
		R87T-A6A85H	230 VAC		Yes	---	---	Yes		
	 80 × 80 × 25	R87T-A1A83H	100 VAC		Yes	---	---	---		Refer to page 39.
		R87T-A3A83H	115 VAC		Yes	---	---	---		
		R87T-A4A83H	200 VAC		Yes	---	---	---		
		R87T-A6A83H	230 VAC		Yes	---	---	---		
Plug Cord		R87F-PC	---	---	Yes	Conforms	---	---	---	Refer to page 41.
Finger Guard		R87F-FG□	---	---	---	---	---	---	---	Refer to page 41.
Filter		R87F-FL□	---	---	---	---	---	---	---	Refer to page 42.
		R87F-FL□S			---	---	---	---	---	

Note: The products approved by standard organizations satisfied the following tests.
UL approval number: UL507 (UL519, UL547)
CSA approval number: C22.2 (No. 0, No. 113)
VDE approval number: DIN/EN60950 (VDE0805), EN60950, IEC950
TÜV approval number: VDE0700 Teil 1, VDE0700 Teil 234, EN60355-1, IEC335-1

Water-resistant AC Axial-flow Fans

R87F-A□A16H-WR

Axial-flow Fans Designed for Environments Subject to High Humidity

NEW

- Size: 120 × 120 × t40 mm, with lead wires.
- Degree of protection: IP65 (sealed construction)
- Airtight construction in a slim design (40-mm depth).
- Highly environment-resistive, flame-resistant PBT used for blade material.
- Low noise level, long service life, and resistance to environment.
- Highly reliable ball bearings used for bearings.
- Range of models that comply with the Electrical Appliance and Material Safety Law and IEC60335. UL and CSA approval also available.

International Protection (IP)

These fans comply with IP65 degree of protection (for internal parts), demonstrating outstanding strength under high humidity.

- Labyrinthine construction provides protection against dust and water entering between the blades and motor casing.
- Silicon rubber used to seal the section where lead wires exit the motor protects against dust and water entering the motor.
- Fan motor is hermetically sealed by an O-ring, preventing dust and water from entering the motor.

Ideal for Harsh Environments

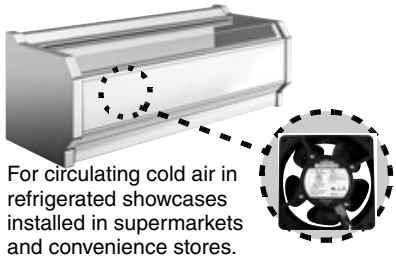
IP Degree of Protection (International Protection)

Degree of protection against international of foreign objects in fan motor: IP65

First digit of IP Code: Protection against International of Solids		Second digit of IP Code: Protection against International of Liquids	
Class	Degree of protection	Class	Degree of protection
6	Totally protected from dust.	5	Protected from low pressure jets of water from all directions.

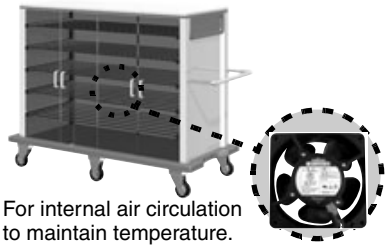
Applications (Ideal for High-temperature Environments and Outdoor Installation)

Refrigerated Showcases



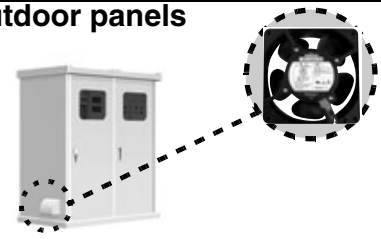
For circulating cold air in refrigerated showcases installed in supermarkets and convenience stores.

Meal-serving Trolleys



For internal air circulation to maintain temperature.

Outdoor panels



As an inlet or exhaust fan in various control panels installed outdoors.

Note: Other applications include discharging air in outdoor devices (small-size outdoor devices), and cooling internal components of machine tools and switchboards in industrial devices.

Specifications

■ Ratings

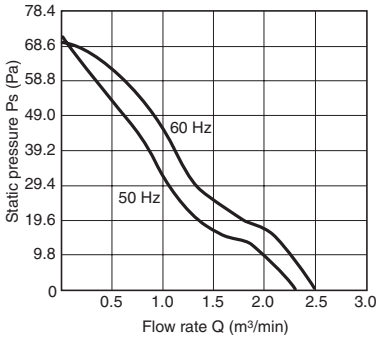
Note: *indicates a nominal value.

Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A16H-WR	100	85 to 110% rated voltage	50/60	0.217	0.197	16	15	2690	3040	2.3	2.5	70.9	69.6	43	46
R87F-A3A16H-WR	115			0.194	0.175										
R87F-A4A16H-WR	200			0.109	0.098										
R87F-A6A16H-WR	230			0.098	0.088										

■ Characteristics

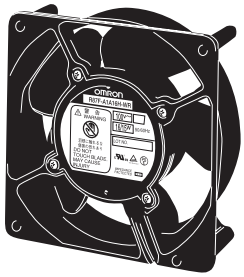
Motor type	Single-phase, shading coil induction motor (2-pole, sealed type)	**Ambient operating temperature**		−30 to 70°C (no icing)
		Ambient storage temperature		−40 to 85°C (no icing)
Size	120 × 120 × t40 mm	**Ambient humidity**		98% RH max.
Lead terminal	Lead-wire type	**Protection**		Impedance protection
Insulation class	IEC class E (120°C) UL class A (105°C) CSA class A (105°C)	**Materials**	**Frame**	Die-cast aluminum Melamine resin, mat black baked coating
			Blades	PBT/glass, black (UL94V-0)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.	**Bearings**		Ball bearings
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.	**Weight**		650 g max.
Degree of protection	IP65 (conforming to EN/IEC60529)	**Standards**		Conforms to Electrical Appliance and Material Safety Law, UL/CSA, and IEC60335

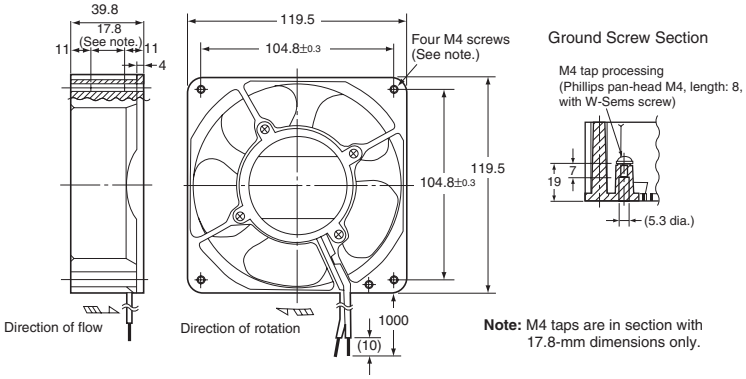
■ Flow Rate and Static Pressure Characteristics (Reference Values)



Note: For details on measurement conditions, refer to "Flow Rate and Static Pressure" on page 45.

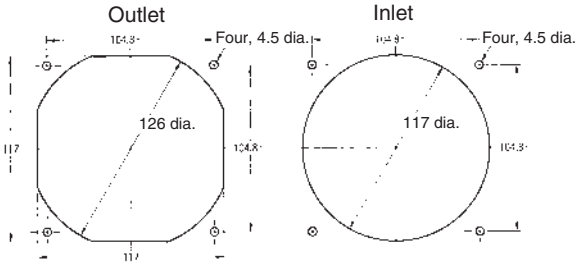
Dimensions





Note: M4 taps are in section with 17.8-mm dimensions only.

Panel Cut-outs



Options

Name	Model	Page number
Finger Guard	R87F-FG120	Refer to page 41.
Filter	R87F-FL120(S)	Refer to page 42.

AC Axial-flow Fans with Terminals (120 x 120 x t38 mm)
R87F-A□A15

Specifications

■ Ratings

Note: *indicates a nominal value.

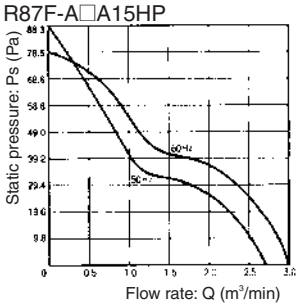
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A15HP R87F-A3A15HP R87F-A4A15HP R87F-A6A15HP	100 115 200 230	85 to 110% rated voltage	50/60	0.232 0.195 0.105 0.095	0.210 0.180 0.098 0.090	16	15	2700	3000	2.7	3.0	88.3	78.5	47	50
R87F-A1A15MP R87F-A3A15MP R87F-A4A15MP R87F-A6A15MP	100 115 200 230	85 to 110% rated voltage	50/60	0.220 0.185 0.100 0.090	0.195 0.165 0.090 0.082	15	14	2350	2550	2.3	2.6	61.8	63.7	42	44
R87F-A1A15LP R87F-A3A15LP R87F-A4A15LP R87F-A6A15LP	100 115 200 230	85 to 110% rated voltage	50/60	0.175 0.155 0.085 0.076	0.155 0.138 0.075 0.068	13	12	2000	2100	1.9	2.0	39.2	39.2	38	41

■ Characteristics

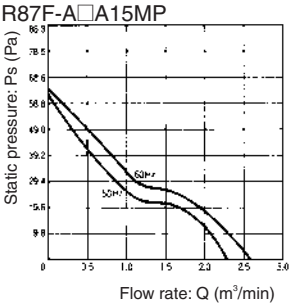
Ambient operating temperature	−30 to 70°C (no icing)
Ambient storage temperature	−40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	VDE class E (120°C) UL class A (105°C) CSA class B (130°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Glass polycarbonate
Bearings	Ball bearings
Weight	550 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

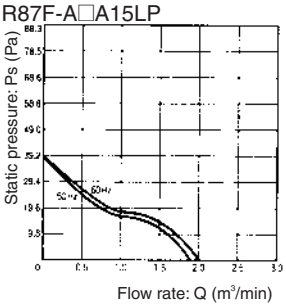
R87F-A□A15HP



R87F-A□A15MP

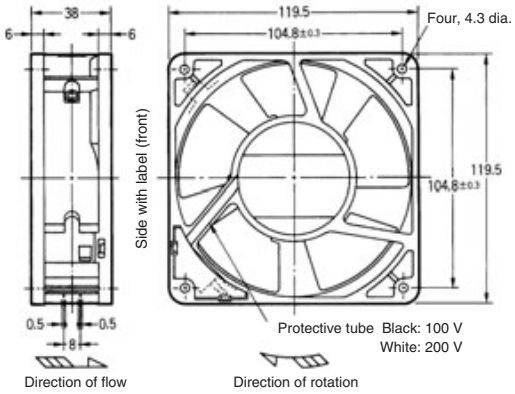


R87F-A□A15LP



Note: For details on measurement conditions, refer to “Flow Rate and Static Pressure” on page 45.

Dimensions



Screw hole for grounding

M4 screw: 0.7 pitch

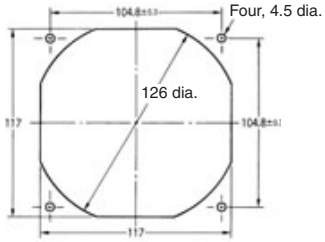
Terminal shape

Faston #110 terminals (or equivalent)

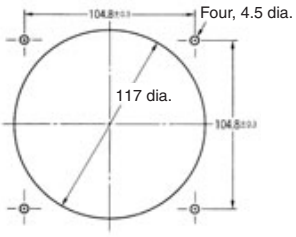
Panel Cut-outs

For reference purposes.

Outlet



Inlet



Options

Name	Model	Page number
Plug Cord	R87F-PC	Refer to page 41.
Finger Guard	R87F-FG120	Refer to page 41.
Filter	R87F-FL120(S)	Refer to page 42.

AC Axial-flow Fans with Terminals (120 x 120 x t25 mm)
R87F-A□A13

Specifications

■ Ratings

Note: * indicates a nominal value.

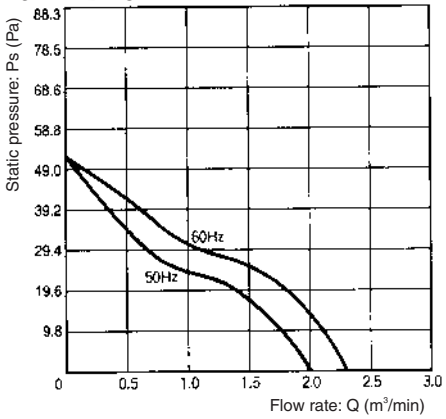
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A13HP R87F-A3A13HP R87F-A4A13HP R87F-A6A13HP	100 115 200 230	85 to 110% rated voltage	50/60	0.170 0.148 0.085 0.074	0.145 0.125 0.072 0.063	14	12	2500	2850	2.0	2.3	52.0	52.0	40	44
R87F-A1A13LP R87F-A3A13LP R87F-A4A13LP R87F-A6A13LP	100 115 200 230	85 to 110% rated voltage	50/60	0.110 0.096 0.058 0.051	0.096 0.084 0.050 0.043	9	8	1800	2000	1.5	1.7	25.5	25.5	30	33

■ Characteristics

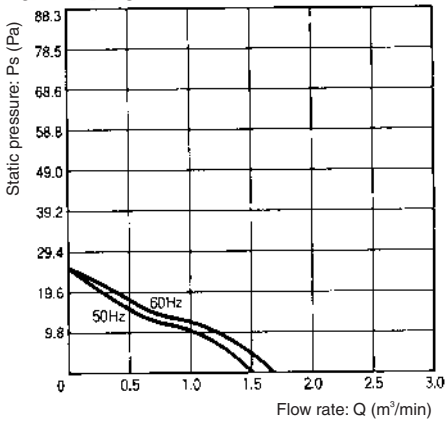
Ambient operating temperature	–30 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	VDE class E (120°C) UL class A (105°C) CSA class B (130°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Glass polycarbonate
Bearings	Ball bearings
Weight	330 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

R87F-A□A13HP

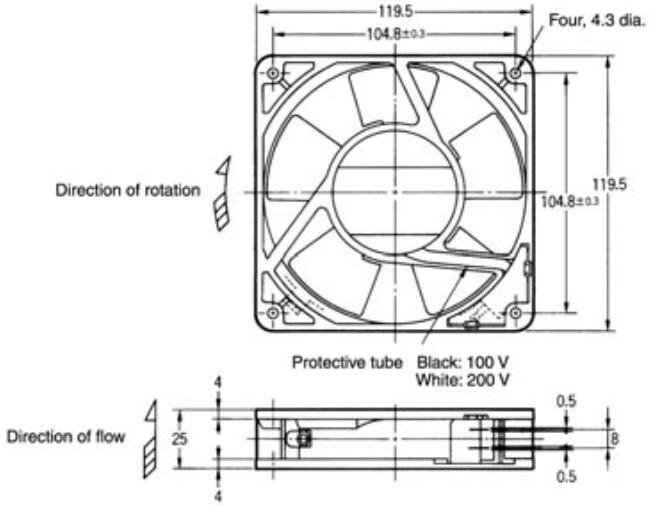


R87F-A□A13LP

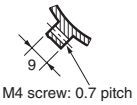


Note: For details on measurement conditions, refer to “Flow Rate and Static Pressure” on page 45.

Dimensions



Screw hole for grounding



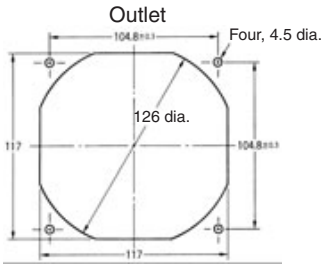
Terminal shape

Faston #110 terminal (or equivalent)

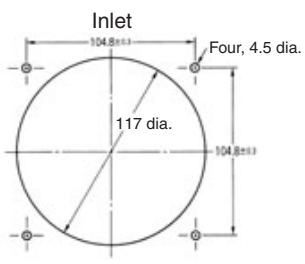
Panel Cut-outs

For reference purposes.

Outlet



Inlet



Options

Name	Model	Page number
Plug Cord	R87F-PC	Refer to page 41.
Finger Guard	R87F-FG120	Refer to page 41.
Filter	R87F-FL120(S)	Refer to page 42.

AC Axial-flow Fans with Terminals (92 x 92 x t25 mm)
R87F-A□A93

Specifications

■ Ratings

Note: * indicates a nominal value.

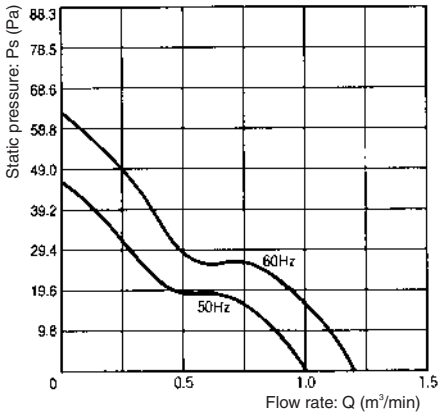
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A93HP R87F-A3A93HP R87F-A4A93HP R87F-A6A93HP	100 115 200 230	85 to 110% rated voltage	50/60	0.130 0.116 0.061 0.056	0.110 0.098 0.052 0.048	10	9	2600	3050	1.0	1.2	46.1	62.8	34	38
R87F-A1A93LP R87F-A3A93LP R87F-A4A93LP R87F-A6A93LP	100 115 200 230	85 to 110% rated voltage	50/60	0.084 0.075 0.043 0.035	0.073 0.065 0.038 0.032	7	6	2000	2300	0.70	0.85	24.5	31.4	28	31

■ Characteristics

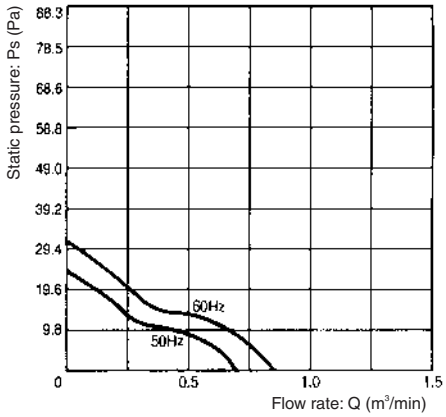
Ambient operating temperature	–30 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	VDE class E (120°C) UL class A (105°C) CSA class B (130°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Glass polycarbonate
Bearings	Ball bearings
Weight	330 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

R87F-A□A93HP

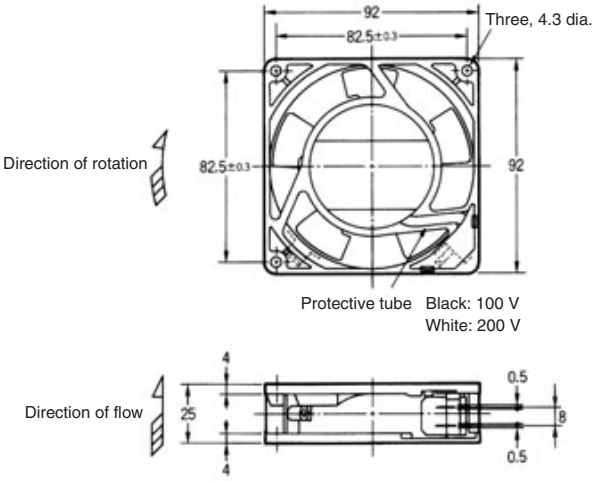


R87F-A□A93LP



Note: For details on measurement conditions, refer to “Flow Rate and Static Pressure” on page 45.

Dimensions



Screw hole for grounding

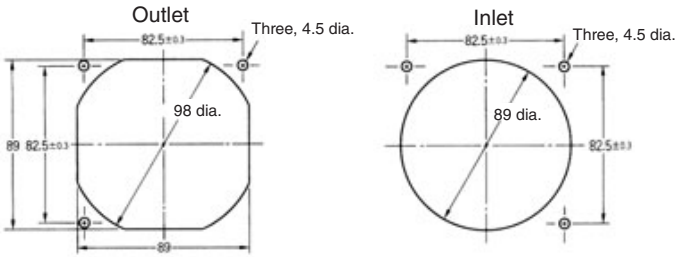
M4 screw: 0.7 pitch

Terminal shape

Faston #110 terminal (or equivalent)

Panel Cut-outs

For reference purposes. Panel cutting reference dimensions (note 3 mounting holes)



Options

Name	Model	Page number
Plug Cord	R87F-PC	Refer to page 41.
Finger Guard	R87F-FG90	Refer to page 41.
Filter	R87F-FL90	Refer to page 42.

AC Axial-flow Fans with Terminals (80 x 80 x t38 mm)
R87F-A□A85

Specifications

■ Ratings

Note: * indicates a nominal value.

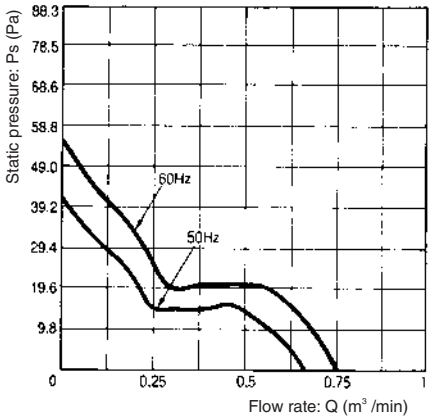
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A85HP R87F-A3A85HP R87F-A4A85HP R87F-A6A85HP	100 115 200 230	85 to 110% rated voltage	50/60	0.121 0.106 0.061 0.052	0.111 0.097 0.055 0.049	9	8	2800	3250	0.66	0.76	41.2	54.9	38	43
R87F-A1A85LP R87F-A3A85LP R87F-A4A85LP R87F-A6A85LP	100 115 200 230	85 to 110% rated voltage	50/60	0.064 0.055 0.032 0.028	0.057 0.050 0.029 0.025	5.5	5	2050	2050	0.46	0.46	24.5	25.5	28	30

■ Characteristics

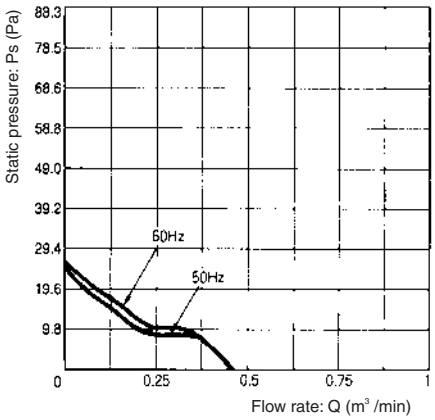
Ambient operating temperature	−30 to 70°C (no icing)
Ambient storage temperature	−40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	VDE class E (120°C) UL class A (105°C) CSA class B (130°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Glass polycarbonate
Bearings	Ball bearings
Weight	460 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

R87F-A□A85HP

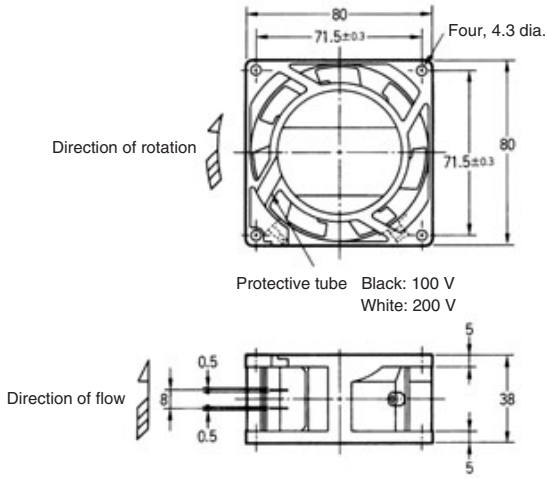


R87F-A□A85LP



Note: For details on measurement conditions, refer to “Flow Rate and Static Pressure” on page 45.

Dimensions



Screw hole for grounding

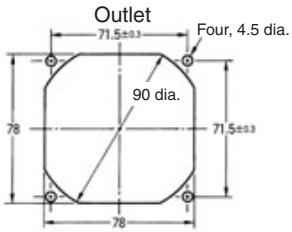
M4 screw: 0.7 pitch

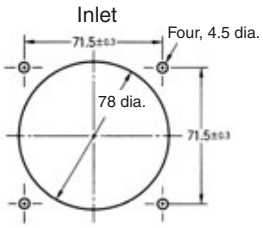
Terminal shape

Faston #110 terminal (or equivalent)

Panel Cut-outs

For reference purposes.





Options

Name	Model	Page number
Plug Cord	R87F-PC	Refer to page 41.
Finger Guard	R87F-FG80	Refer to page 41.
Filter	R87F-FL80	Refer to page 42.

AC Axial-flow Fans with Lead Wires (80 x 80 x t25 mm)
R87F-A□A83

Specifications

■ Ratings

Note: * indicates a nominal value.

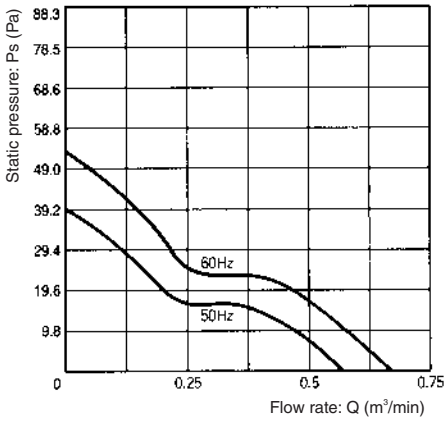
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A83H R87F-A3A83H R87F-A4A83H R87F-A6A83H	100 115 200 230	85 to 110% rated voltage	50/60	0.091 0.082 0.040 0.038	0.080 0.071 0.036 0.034	7	6	2600	3000	0.57	0.67	39.2	53.0	34	38
R87F-A1A83L R87F-A3A83L R87F-A4A83L R87F-A6A83L	100 115 200 230	85 to 110% rated voltage	50/60	0.070 0.059 0.032 0.029	0.061 0.052 0.029 0.025	5	4.5	1800	2050	0.39	0.43	19.6	23.5	26	28

■ Characteristics

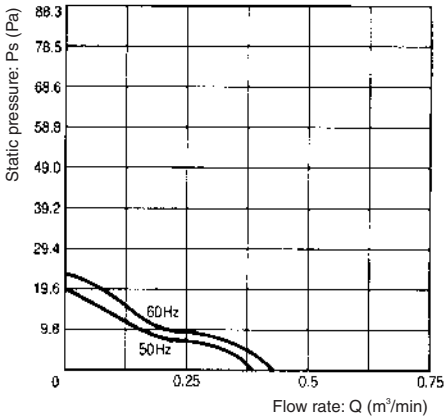
Ambient operating temperature	−30 to 70°C (no icing)
Ambient storage temperature	−40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL A (105°C) CSA B (130°C) VDE E (120°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Glass polycarbonate
Bearings	Ball bearings
Weight	240 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

R87F-A□A83H

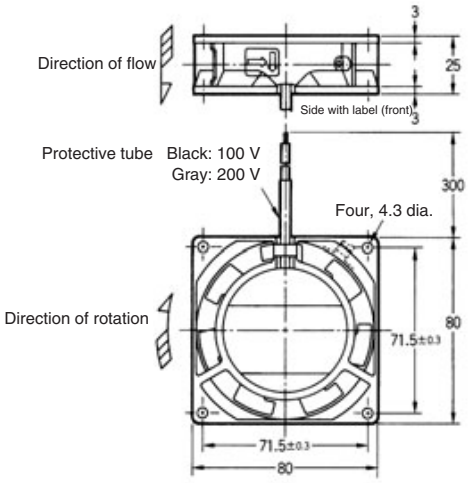


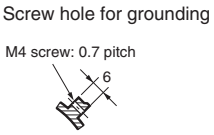
R87F-A□A83L



Note: For details on measurement conditions, refer to “Flow Rate and Static Pressure” on page 45.

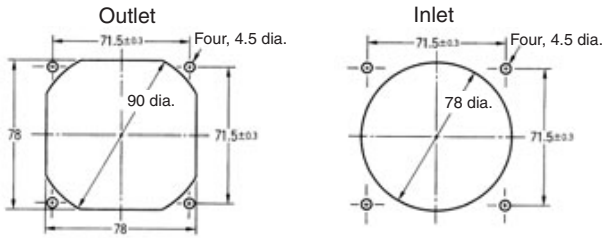
Dimensions





Panel Cut-outs

For reference purposes.



Options

Names	Model	Page number
Finger Guard	R87F-FG80	Refer to page 41.
Filter	R87F-FL80	Refer to page 42.

AC Axial-flow Fans with Lead Wires (150-dia. x t55 mm)
R87T-A□A07

Specifications

■ Ratings

Note: * indicates a nominal value.

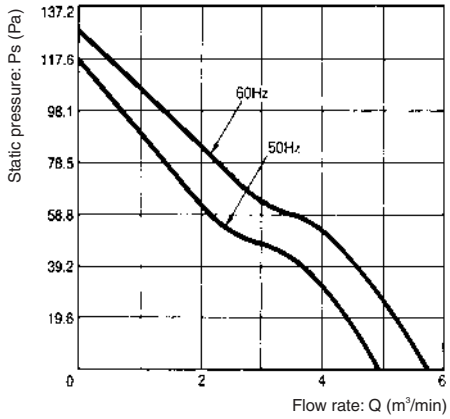
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87T-A1A07H	100	85 to 110% rated voltage	50/60	0.660	0.560	37	34	2750	3050	5.0	5.8	111.7	127.5	55	59
R87T-A3A07H	115			0.450	0.400										
R87T-A4A07H	200			0.330	0.280										
R87T-A6A07H	230			0.210	0.190										

■ Characteristics

Ambient operating temperature	–20 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL A (105°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Thermal protection
Materials	Frame: Die-cast aluminum Blades: Steel plate (mat black baked coating)
Bearings	Ball bearings
Weight	1200 g

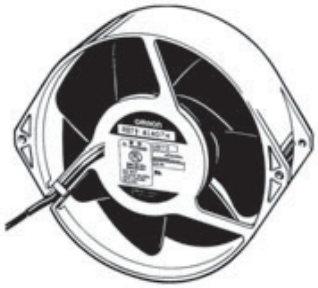
■ Flow Rate and Static Pressure Characteristics (Reference Value)

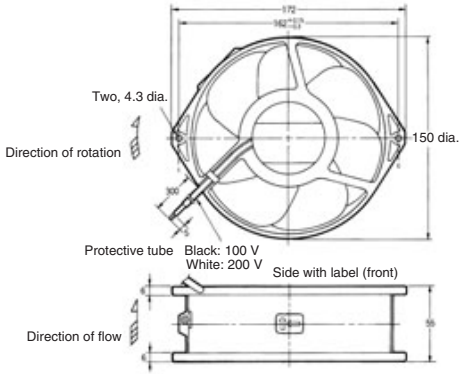
R87T-A□A07H



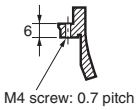
Note: For details on measurement conditions, refer to “Flow Rate and Static Pressure” on page 45.

Dimensions



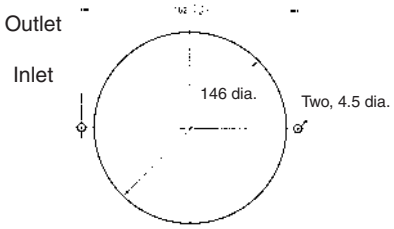


Screw hole for grounding



Panel Cut-outs

For reference purposes.



Options

Name	Model	Page number
Finger Guard	R87F-FG150	Refer to page 41.

AC Axial-flow Fans with Lead Wires (150-dia. x t38 mm)
R87T-A□A05

Specifications

■ Ratings

Note: * indicates a nominal value.

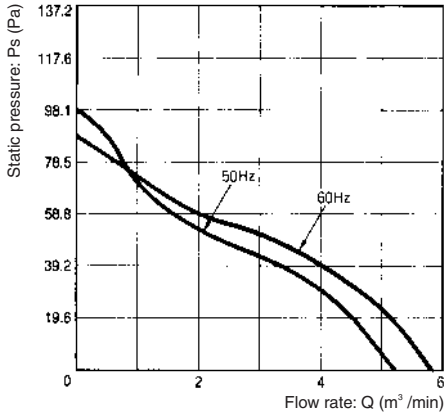
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87T-A1A05H	100	85 to 110% rated voltage	50/60	0.540	0.470	35	33	2600	2950	5.2	5.8	98.1	88.3	54	56
R87T-A3A05H	115			0.430	0.380										
R87T-A4A05H	200			0.240	0.210										
R87T-A6A05H	230			0.220	0.200										

■ Characteristics

Ambient operating temperature	–20 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL class A (105°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Thermal protection
Materials	Frame: Die-cast aluminum Blades: Steel plate (mat black baked coating)
Bearings	Ball bearings
Weight	830 g

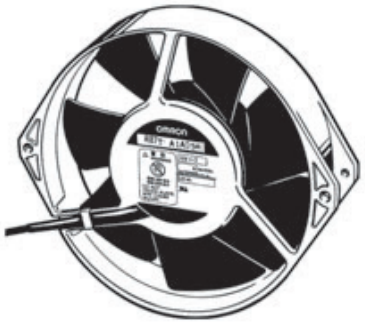
■ Flow Rate and Static Pressure Characteristics (Reference Value)

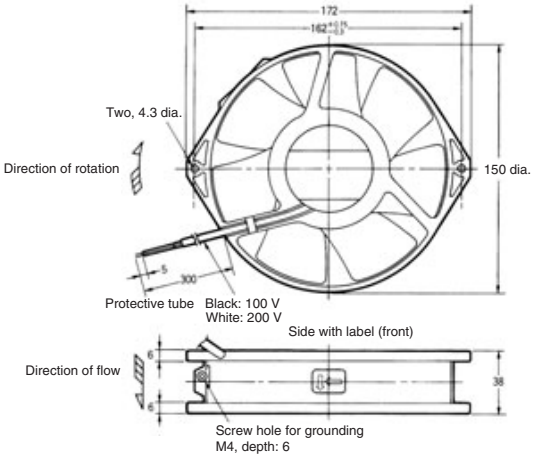
R87T-A□A05H

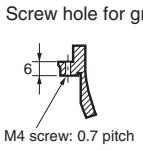


Note: For details on measurement conditions, refer to “Flow Rate and Static Pressure” on page 45.

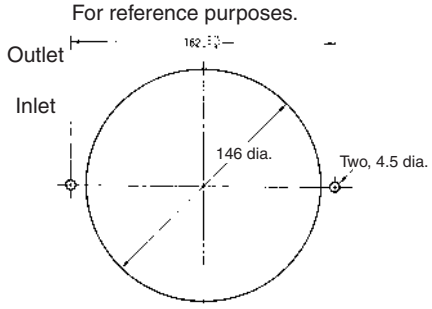
Dimensions







Panel Cut-outs



Options

Name	Model	Page number
Finger Guard	R87F-FG150	Refer to page 41.

AC Axial-flow Fans with Terminals (120 x 120 x t38 mm)
R87T-A□A15

Specifications

■ Ratings

Note: * indicates a nominal value.

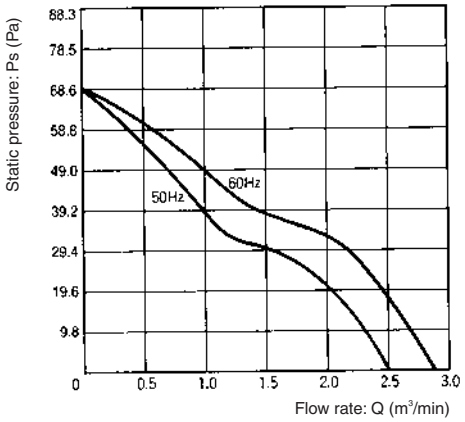
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87T-A1A15HP R87T-A3A15HP R87T-A4A15HP R87T-A6A15HP	100 115 200 230	85 to 110% rated voltage	50/60	0.230 0.190 0.110 0.100	0.210 0.170 0.100 0.091	16	15	2700	3050	2.5	2.9	68.6	68.6	43	47
R87T-A1A15MP R87T-A3A15MP R87T-A4A15MP R87T-A6A15MP	100 115 200 230	85 to 110% rated voltage	50/60	0.220 0.180 0.102 0.096	0.200 0.162 0.092 0.086	15	14	2250	2500	2.0	2.2	40.2	38.2	38	42

■ Characteristics

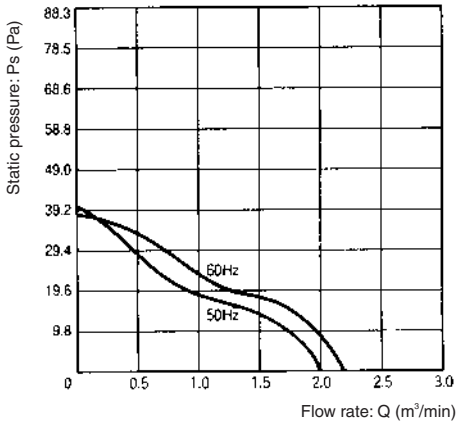
Ambient operating temperature	−20 to 70°C (no icing)
Ambient storage temperature	−40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL class A (105°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Steel plate (mat black baked coating)
Bearings	Ball bearings
Weight	580 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

R87T-A□A15HP

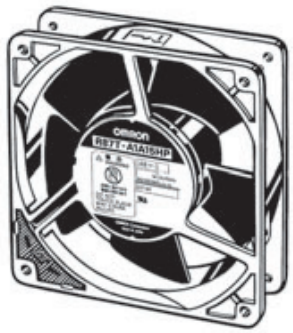


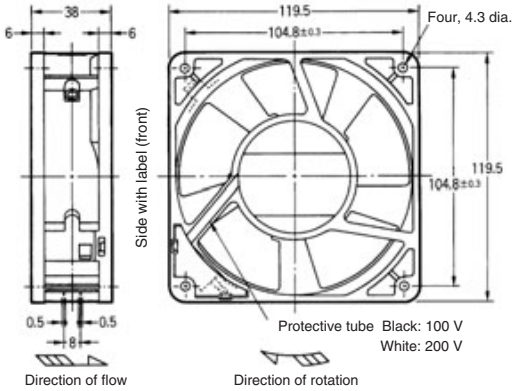
R87T-A□A15MP



Note: For details on measurement conditions, refer to “Flow Rate and Static Pressure” on page 45.

Dimensions





Screw hole for grounding

M4 screw: 0.7 pitch

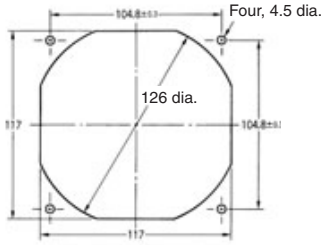
Terminal shape

Faston #110 terminal (or equivalent)

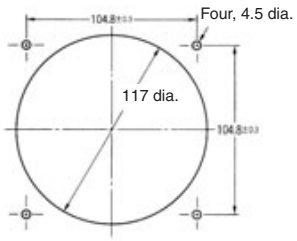
Panel Cut-outs

For reference purposes.

Outlet



Inlet



Options

Name	Model	Page number
Plug Cord	R87F-PC	Refer to page 41.
Finger Guard	R87F-FG120	Refer to page 41.
Filter	R87F-FL120(S)	Refer to page 42.

AC Axial-flow Fans with Lead Wires (80 x 80 x t38 mm)
R87T-A□A85

Specifications

■ Ratings

Note: * indicates a nominal value.

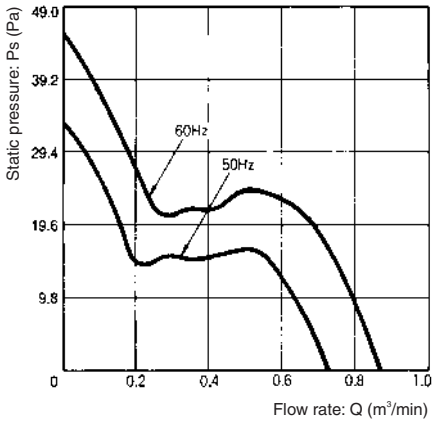
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87T-A1A85H	100	85 to 110% rated voltage	50/60	0.170	0.150	11	10	2700	3150	0.73	0.87	33.3	46.1	35	40
R87T-A3A85H	115			0.140	0.120										
R87T-A4A85H	200			0.081	0.069										
R87T-A6A85H	230			0.069	0.060										

■ Characteristics

Ambient operating temperature	–20 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL class A (105°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Steel plate (mat black baked coating)
Bearings	Ball bearings
Weight	440 g

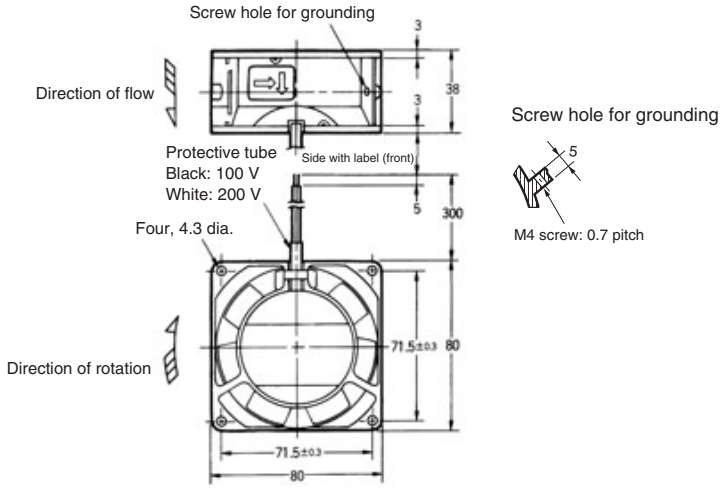
■ Flow Rate and Static Pressure Characteristics (Reference Value)

R87T-A□A85H



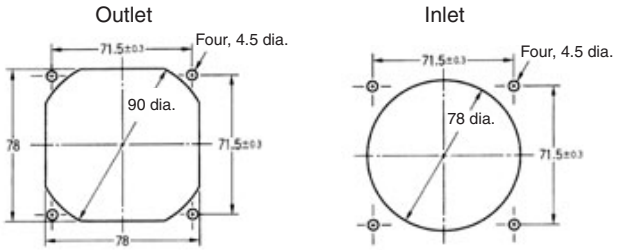
Note: For details on measurement conditions, refer to “Flow Rate and Static Pressure” on page 45.

Dimensions



Panel Cut-outs

For reference purposes.



Options

Name	Model	Page number
Finger Guard	R87F-FG80	Refer to page 41.
Filter	R87F-FL80	Refer to page 42.

AC Axial-flow Fans with Lead Wires (80 x 80 x t25 mm)
R87T-A□A83

Specifications

■ Ratings

Note: * indicates a nominal value.

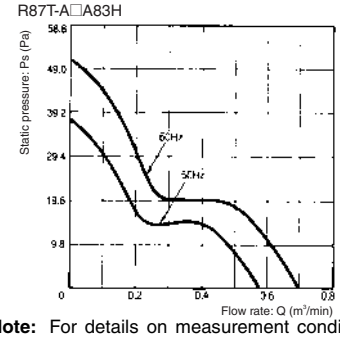
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87T-A1A83H R87T-A3A83H R87T-A4A83H R87T-A6A83H	100 115 200 230	85 to 110% rated voltage	50/60	0.150 0.140 0.079 0.065	0.130 0.120 0.067 0.056	11	10	2550	3100	0.58	0.70	37.3	51.0	37	40

■ Characteristics

Ambient operating temperature	–20 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL class A (105°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Steel plate (mat black baked coating)
Bearings	Ball bearings
Weight	320 g

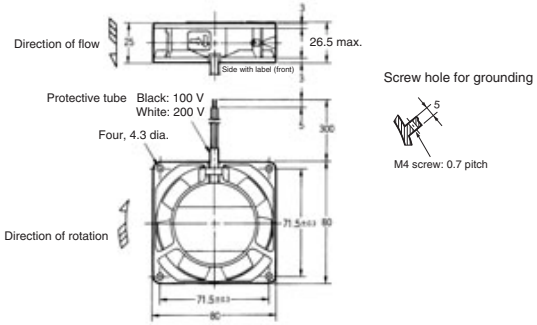
■ Flow Rate and Static Pressure Characteristics (Reference Value)

R87T-A□A83H



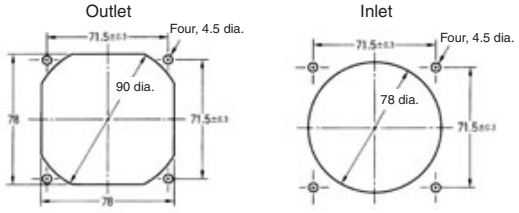
Note: For details on measurement conditions, refer to "Flow Rate and Static Pressure" on page 45.

Dimensions



Panel Cut-outs

For reference purposes.



Options

Name	Model	Page number
Finger Guard	R87F-FG80	Refer to page 41.
Filter	R87F-FL80	Refer to page 42.

AC Axial-flow Fans

Common Information

Accessories (Order Separately)

■ Plug Cord

R87F-PC Rating: 250 VAC, 3 A
UL approved/conforms to CSA

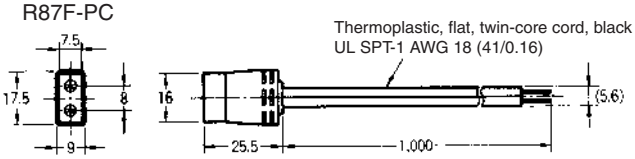
Note: UL File No. E175022

Available Models

Cord length	Model number
1 m	R87F-PC
2 m	R87F-PC-20

Dimensions

R87F-PC



Connectable to Faston #110 terminals (or equivalent).
Note: This Plug Cord is used for Axial-flow Fans with terminals.

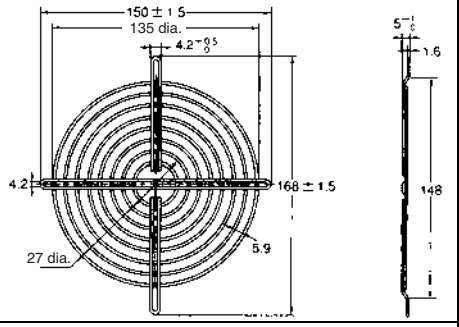
■ Finger Guards

R87F-FG

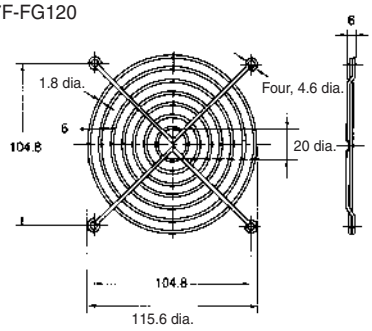
Dimensions

Material: steel, Joints: spot welded, Surface: nickel-chrome plated

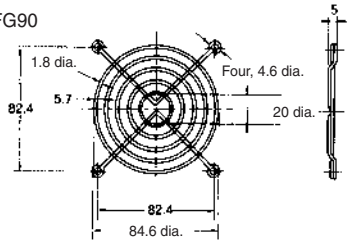
R87F-FG150



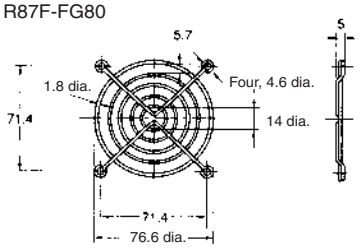
R87F-FG120



R87F-FG90



R87F-FG80



Applicable Axial-flow Fans

AC Axial-flow Fan		Finger Guard
Size	Model	
150 dia.	R87T-A□A0 Series	R87F-FG150
120×120	R87F-A□A1 Series R87T-A□A1 Series	R87F-FG120
92×92	R87F-A□A9 Series	R87F-FG90
80×80	R87F-A□A8 Series R87T-A□A8 Series	R87F-FG80

Note: Finger Guards reduce the flow rate by approximately 2% to 5%.

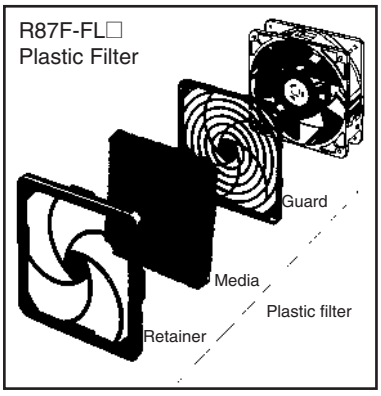
Available Models

Size	Rated voltage
150 dia.	R87F-FG150
120×120	R87F-FG120
92×92	R87F-FG90
80×80	R87F-FG80

■ Filters

R87F-FL

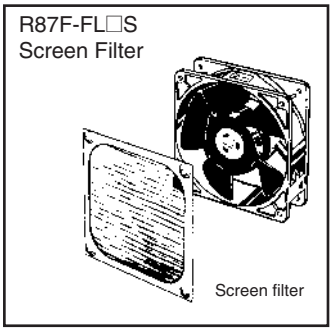
R87F-FL□
Plastic Filter



Mounting Method

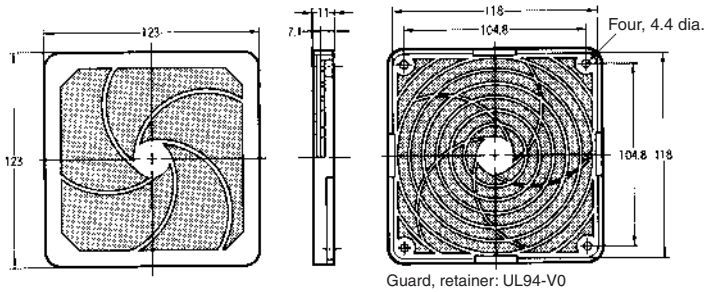
1. Attach the guard to the Fan using the mounting bolts. (There are no mounting bolts provided with the Plastic Filter.)
2. With the media held between the retainer and the guard, hook the retainer to the guard. (The media and retainer can be one-touch mounted/dismounted.)
3. Use the following model number to order media only.
   R87F-FL□-M□ (□: 120, 90, or 80)
   (One package contains five media.)

R87F-FL□S
Screen Filter

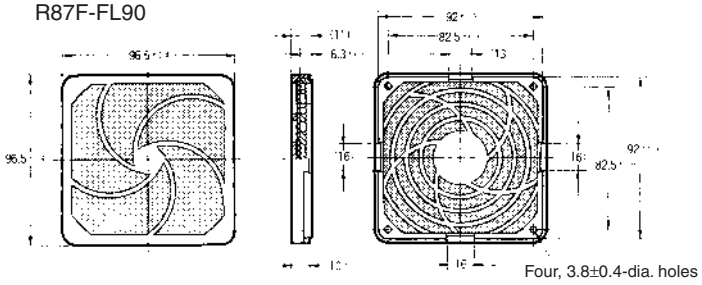


Dimensions

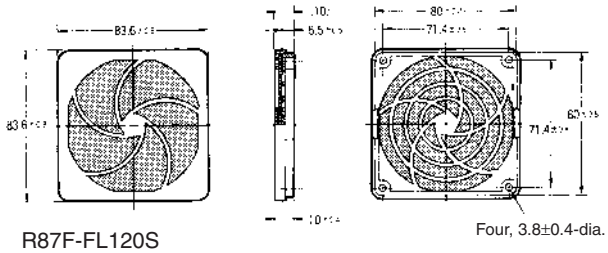
R87F-FL120



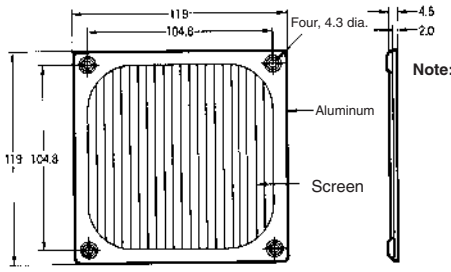
R87F-FL90



R87F-FL80



R87F-FL120S



Note: **1.** The Screen Filter is made using aluminium and has an EMI/RFI shielding effect.
2. When mounting the Screen Filter, make sure that it does not come in contact with the fan blades.
3. The screen is a 30×30 aluminum mesh.

Applicable Axial-flow Fans

AC Axial-flow Fan		Filter	
Size	Model	Plastic Filter	Screen Filter
150 dia.	R87T-A□A0 Series	---	---
120×120	R87F-A□A1 Series R87T-A□A1 Series	R87F-FL120	R87F-FL120S
92×92	R87F-A□A9 Series	R87F-FL90	---
80×80	R87F-A□A8 Series R87T-A□A8 Series	R87F-FL80	---

Note: Filters reduce the flow rate by approximately 20% to 40%. Ensure that there is no clogging.

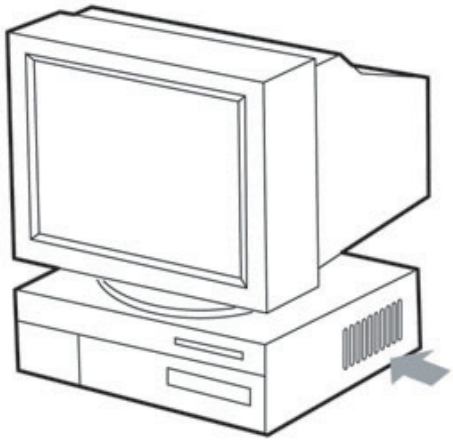
Available Models

Size	Model number
120×120	R87F-FL120
92×92	R87F-FL90
80×80	R87F-FL80
120×120	R87F-FL120

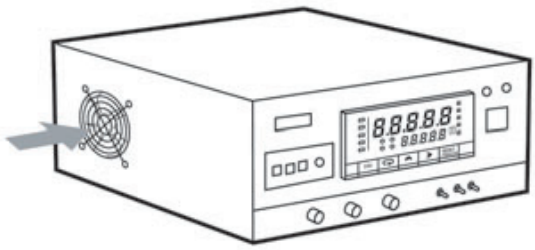
Application Examples

1. Control Panels

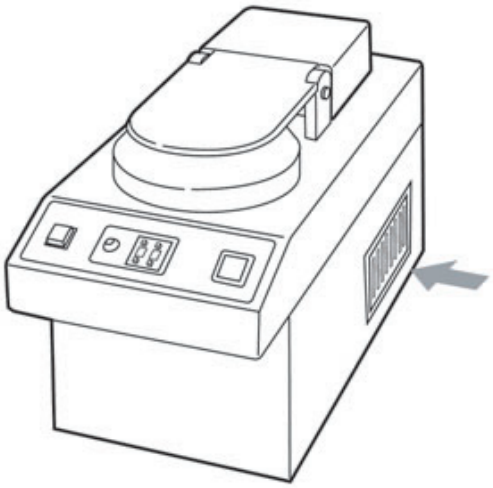
2. Computer



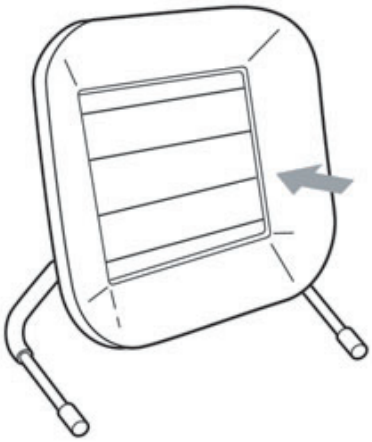
3. Measurement Devices



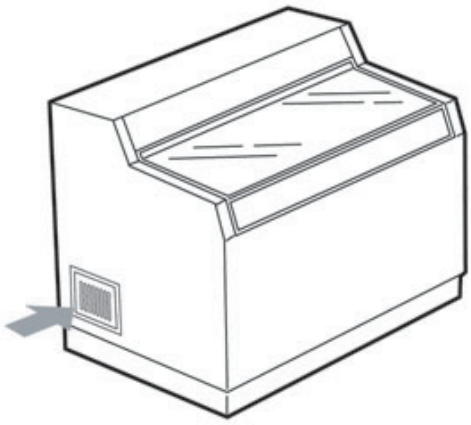
4. Medical Equipment



5. Soldering Fume Extractor



6. Automatic Vending Machines and Display Cases



Precautions

⚠ WARNING

Assembly

Be sure to attach a Finger Guard if there is a danger of the user touching the Fan.

Attach a guard, protective net, or a Finger Guard (available as an option) to the Axial Fan's mounting section.

A variety of Finger Guards are available as options (R87F-FG). Select a Finger Guard of a size appropriate for the Fan used. For details of the available Finger Guards, refer to page 41.

Be sure to turn OFF the power supply and confirm that the blades have stopped before performing inspections or replacing Filters. Not doing so may result in injury due to contact with the blades.

⚠ WARNING

Application

Do not touch the blades. Doing so may result in injury.

Ensure that no part of your body and no objects come in contact with the blades while they are moving, otherwise injury may result due to contact with the blades or due to scattering of object fragments.

Handling

Do not use the Fan in locations subject to explosive, flammable, or corrosive gases, or in locations subject to drops of water. Doing so may result in fire, electric shock, or injury.

Do not use the Fan outside the rated temperature range or above the rated voltage. Doing so will cause the temperature of the coil (at the center of the Fan) to increase, and may result in deformation or scorching of the blades.

Operate the Fan using a sine-wave power supply.

Do not hold the Fan by its power lines, or pull the power lines with excessive force. Doing so may cause damage to the wire insulation or break the wire, resulting in injury due to electric shock or the Fan falling.

Mounting

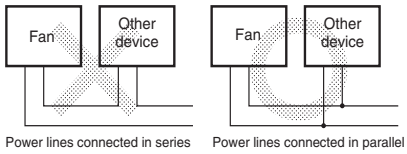
Be sure to secure the Fan with the mounting bolts. Not doing so may result in injury due to the Fan falling.

A precision-type ball bearing is used to hold the shaft of the Fan. The structure of the ball bearing is prone to damage if the Fan is subjected to shock (e.g., dropped). Ensure that the Fan is not subjected to shock, otherwise the service life and performance characteristics of the Fan will be adversely affected.

Wiring

Prevent short-circuiting of the Fan from adversely affecting other devices by installing circuit-breakers in the Fan's power lines.

Do not wire the power lines of the Fan in series with those of other Fans or devices. Doing so may cause a voltage above the Fan's rated voltage to be applied, and this may result in malfunction or burning. Be sure to wire devices in parallel.



Cleaning

Ensure that drops of water do no come in contact with the Fan.

Ensure that no organic solvents or alkaline chemicals are in contact with plastic parts of the Fan, otherwise cracks, swelling, or dissolution may result.

When performing any action that requires touching the blades, such as inspections, ensure that power is turned OFF. Unexpected operation of the Fan after, for example, the Fan has stopped due to contact failure or due to the operation of the overheating protection function (thermal protection), may result in injury.

Do not apply grease to the Fan or attempt to remodel it. Doing so may result in malfunction or injury.

Correct Use

(1) Leakage Flux

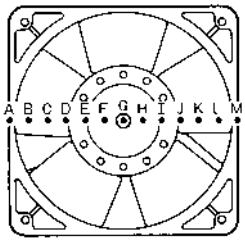
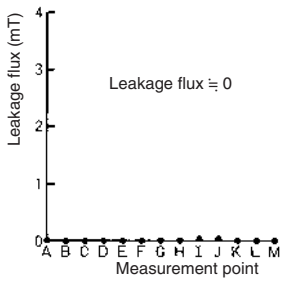
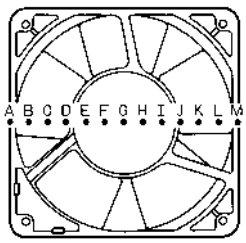
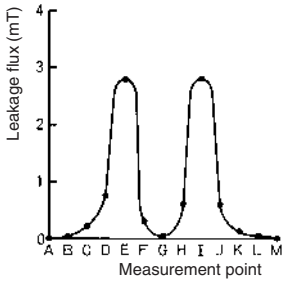
Leakage flux from a Axial-flow Fan may distort the image on nearby CRT screens. Measures to prevent this problem include:

1. Keeping CRT's at least 30 cm away from the Axial-flow Fan
2. Shielding the Axial-flow Fan side with metal mesh.

The leakage flux from a Fan with metal blades is less than with plastic blades. Note, however, that the leakage flux differs between the inlet and outlet sides.

Leakage Flux Distribution Curves

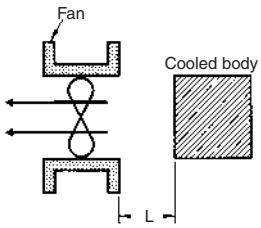
The leakage flux distribution curves for inlet and outlet sides of the R87T Axial-flow Fans are shown below as examples.

Inlet		Outlet	
Dimensions	**Leakage flux distribution**	**Dimensions**	**Leakage flux distribution**
			

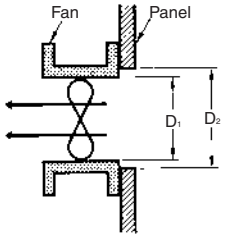
(2) Noise Countermeasures

The cooling effect and noise levels of Axial-flow Fans are greatly affected by the mounting conditions. Take the points listed below into account when installing the Fans.

Maintain as much clearance as possible (L) between the Fan inlet and the cooled object.
(If the cooled object occupies about the same surface area as the Fan on a flat surface, a distance of approximately 10 cm is appropriate.)



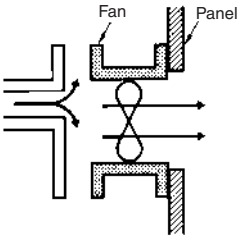
The diameter of the Fan installation hole (D_2) should be larger than the diameter of the Fan (D_1).



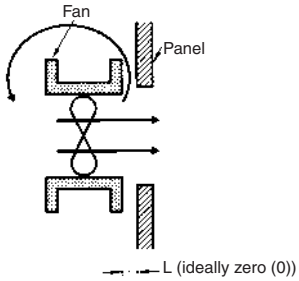
D_1: Fan installation hole diameter
D_2: Fan diameter
$D_1 > D_2$

(3) Cooling Effect

Avoid rapid changes in air flow direction or air-flow cross-section which reduce the cooling effect.



When installing the Fan, keep the clearance at the outlet side as small as possible. (If there is a large clearance at the outlet side, it may not be possible to obtain a sufficient cooling effect.)



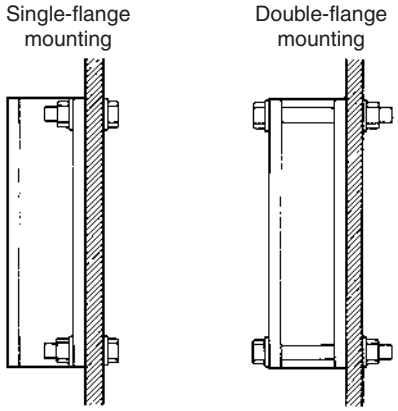
Measurement Conditions

Number of Fans tested	Ambient conditions	Measurement device
5	Temperature: 23±2°C Humidity: 65±5%	Measurement was performed using the multi-nozzle double chamber method based on AMCA (Air Moving Condition Association, U.S.A.) standards 270 to 274.

(4) Installation

The Fan can be mounted with bolts through only one flange (single-flange mounting) or with through-bolts through both flanges (double-flange mounting). Take care not to distort the frame when using double-flange mounting.

Tighten the bolts to a torque of approximately 0.44 N·m when installing the Fan.



Flow Rate and Static Pressure

The characteristic graphs provided for each of the models represent the average of actual measurement data obtained under the measurement conditions given below. They are provided as reference for determining the Fan most suitable for the type of cooling required; the actual characteristics may differ from the values represented in the graphs.

A simple explanation of the flow rate/static pressure characteristics and the methods of measuring them is given below.

Maximum Static Pressure, Ps max (flow rate = 0):
Fully close the damper. Take the pressure difference between chamber B and ambient pressure (Ps). The maximum value of the pressure difference (Ps) is the maximum static pressure (Ps max).

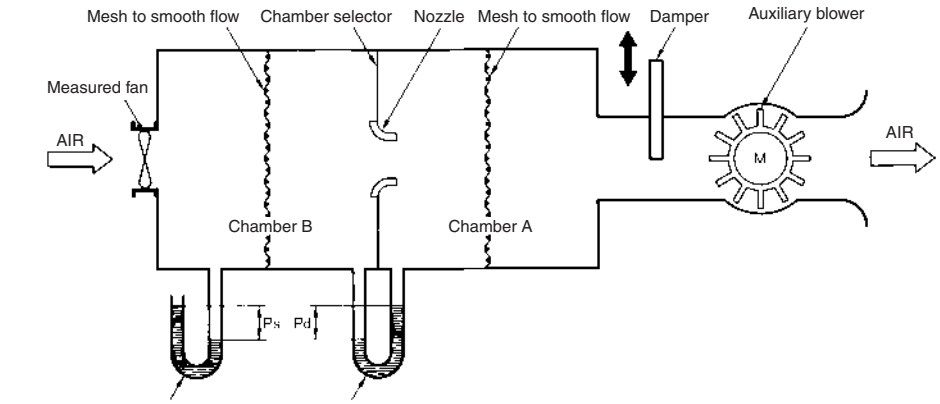
Intermediate Region, (Q, Ps):
Adjust the auxiliary blower to change the static pressure (Ps). Measure the pressure difference between chamber A and chamber B (Pd). Calculate the flow rate (Q).

Maximum Flow Rate, Q max (static pressure = 0):
Fully open the damper and adjust the auxiliary blower to set the static pressure to zero (0). Measure the pressure difference between chamber A and chamber B (Pd). Take the flow rate (Q) calculated at this point as the maximum flow rate (Q max).

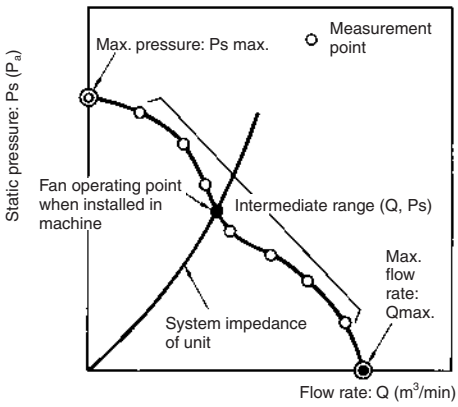
Fan Operating Point:
A Fan installed in equipment operates near the point where the Fan characteristic curve crosses the system impedance curve.

Note: The maximum flow rate and maximum static pressure do not indicate the Fan operating point when it is installed in equipment. However, these characteristics are important for comparing Fan performances and for selecting Fans.

Flow Rate Measurement Device



Sample Flow Rate/Static Pressure Characteristic



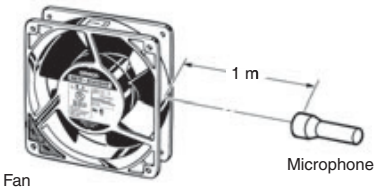
Noise Measurements

The following two methods are available for measuring Fan noise. These are used interchangeably by Fan manufacturers so that the measurement method is not standardized.

JIS B 8330: Testing and Inspection Methods for Fans

JIS C 9603: Extractor Fans

OMRON conducts testing according to JIS (Japan Industrial Standard) C 9603 because of the small size and low noise levels of the Fans and because of their similarity in shape to extractor fans. This standard prescribes that the noise be measured at a distance of 1 m from the side of the Fan.



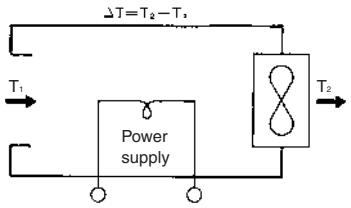
Selecting a Fan

Follow the steps below to select Fans.

1. Procedure

(1) Estimate the amount of heat generated inside the Unit.

(2) Set the maximum permitted temperature rise limit inside the Unit.



T_1: Temperature of the inlet air (°C).

T_2: Temperature of the outlet air (°C).

(3) Calculate the required flow rate.

$Q = 50W/\Delta T$ (m^3/min)

Q = flow rate (m^3/min.)

ΔT = permitted temperature rise limit (°C)
(Normally between 8 to 10°C.)

W = amount of heat generated (kW)

(4) Estimate the system impedance from the air flow through the Unit or from previous data.

$\Delta P = KQ^n$

ΔP: Pressure drop (Pa)

K: Unit constant

n: Coefficient determined by air flow
n=1: laminar flow
n=2: turbulent flow
(n=2 is the normal value.)

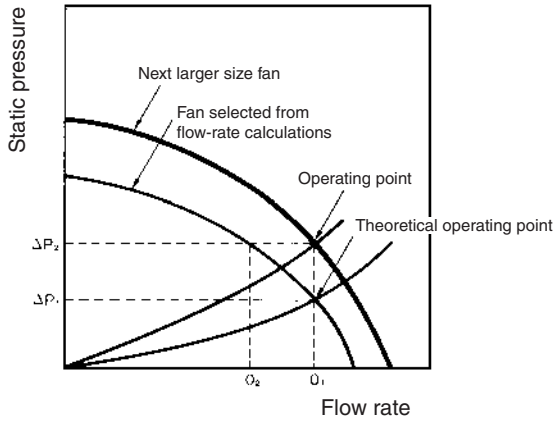
(5) Select the Fan according to the P - Q characteristics.

(6) Measure the temperature rise in an installed Unit.

(7) Reappraise the Fan if the measured cooling effect is insufficient.

2. Recheck the Selected Fan

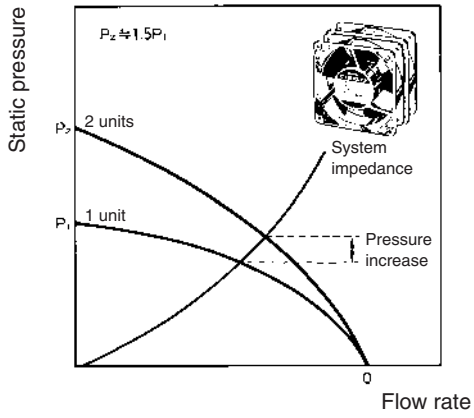
In the following diagram, the value for the system impedance ΔP_1 is unknown. It is assumed that a flow rate of Q_1 is required but measurements of the cooling effect show a reduced flow rate of Q2, for example. This result indicates that the system impedance was ΔP_1, so the Fan one size larger is necessary to produce the flow rate Q_1 to obtain the prescribed cooling effect.



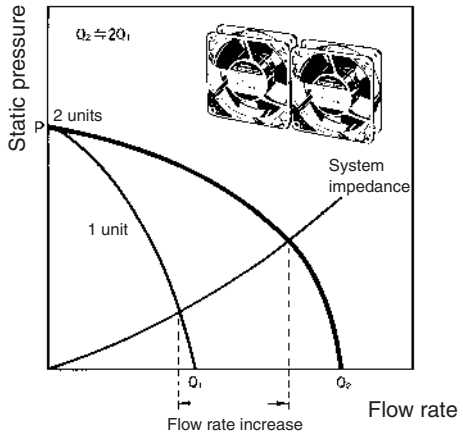
3. Serial and Parallel Fan Operation

The characteristics of two identical Fans operated in series or parallel are determined as shown in the following diagrams.

Serial Operation:



Parallel Operation:



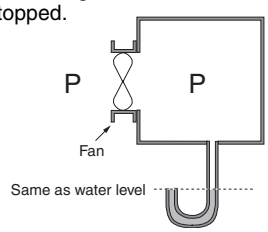
Terminology

Nominal Value:
The average value of data based on actual measurements.
Nominal values cannot be treated as rated values. Enquire separately for details on rated values.

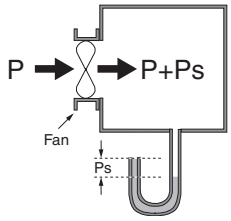
Flow Rate: Q (m^3/min.)
The volume of air discharged by the Fan in a unit of time.

Static Pressure: Ps (Pa)
The pressure difference across the front to the back of the Fan generated by the discharged air, which is unaffected by air flow speed.

1. The air pressure across the front to the back of the fan does not change when the fan is stopped.

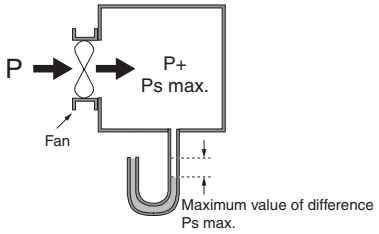


2. Static pressure (Ps) is generated at the front of the fan when it rotates.



Maximum Flow Rate: Q max (m^3/min.)
The volume of air discharged by the Fan when the static pressure is adjusted to zero (Pa) at the flow measurement unit.

Maximum Static Pressure: Ps max (Pa)
The pressure difference inside and outside the Unit when the flow rate is adjusted to zero (0 m^3/min.) at the flow measurement unit.



System Impedance:
The flow resistance inside a mounted Axial-flow Fan caused by the density of parts and shape of the flow path.

Impedance Protection:
A method of preventing burning damage when the motor is restricted from rotating by setting the motor winding impedance (AC resistance) to a value giving a temperature rise in the windings below the temperature at which burning occurs.

Thermal Protection:
A method of preventing burning damage when the motor is restricted from rotating by setting a thermal element to interrupt (the restricting) operation before the motor reaches a temperature at which burning occurs.

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.

Cat. No. X068-E1-03

In the interest of product improvement, specifications are subject to change without notice.

Screwless Clamp Terminal Socket
PYF□□S

- Screwless clamping greatly contributes to reducing wiring time.
- No over or under tightening of cable connection so better contact reliability is achieved.
- Double wiring possible on all the terminals, and easy bridge and branch connections.
- Use either solid or stranded wires from 0.2 to 1.5 mm^2 (AWG24 to AWG16).
- Safe terminal arrangement: Coil terminals separated from contact terminals.
- Unique ejector enables easy relay replacement.
- Two types of nameplate are available: New MY and Legrand.
- Finger-protection construction.

Ordering Information

■ List of Models

	4-pole	2-pole
Socket	PYF14S	PYF08S
Clip & Release Lever	PYCM-14S	PYCM-08S
Nameplate	R99-11 nameplate for MY	
Socket Bridge	PYDM-14SR, PYDM-14SB	PYDM-08SR, PYDM-08SB

Specifications

■ Ratings/Characteristics

Item	PYF14S	PYF08S	Remarks
Relay	MY2 Series MY4 Series	MY2 Series	---
Dimensions	31 × 85 × 36.5 mm max. (W × H × D)	23.2 × 85 × 36.5 mm max. (W × H × D)	---
Rated voltage	250 V AC		---
Rated carry current	10 A at 55°C with MY2 (S) (see note) 5 A at 70°C with MY4 (S)	10 A at 55°C with MY2 (S) 7 A at 70°C with MY2 (S)	VDE0627
Applicable wires	0.2 to 1.5 mm^2 (AWG24 to AWG16) Solid wire Stranded wires		---
Number of wire connections	2 wires per terminal (1 wire per hole)		---
Clamping force	10 N min. (0.2 mm^2) 40 N min. (1.5 mm^2)		EN60999

Note: MY2 (S) can be used at 70°C but at 7 A.

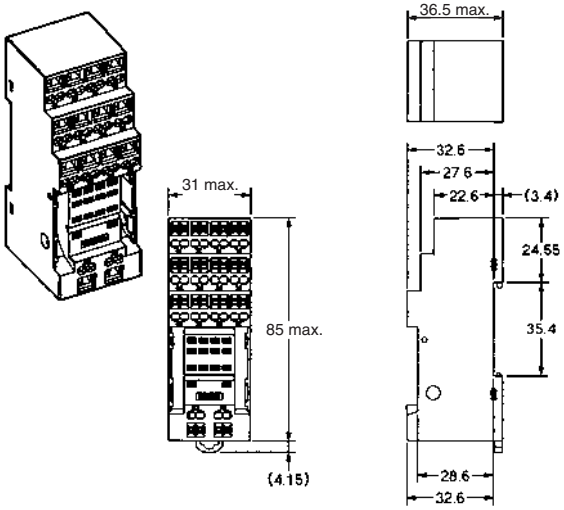
■ Approved Standards

Standard	File No.
VDE0627 (IEC664, EN60999)	112467UG
UL508 (UL1059)	E87929 Vol. 3
CSA C22.2 No. 14 (CSA C22.2 No. 158)	LR31928

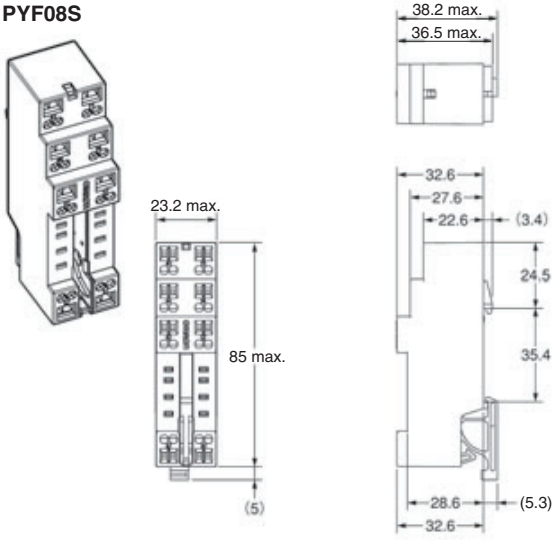
Dimensions

Note: All units are in millimeters unless otherwise indicated.

PYF14S

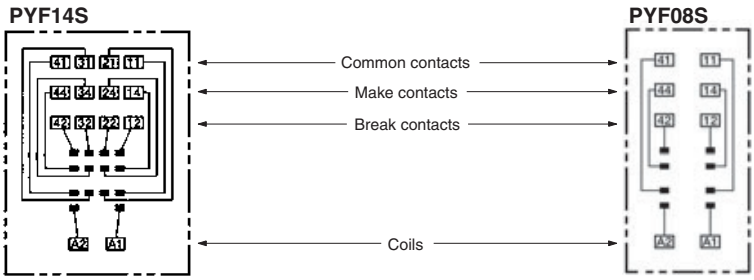


PYF08S



Terminal Arrangement

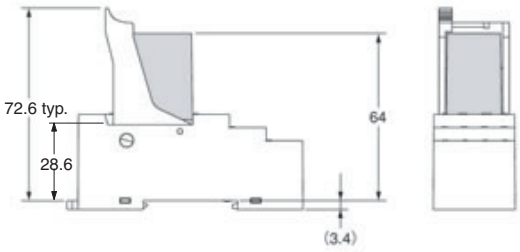
PYF14S **PYF08S**



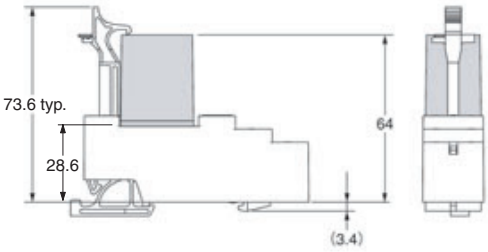
Note: Pole-2 and pole-3 cannot be used with the MY2 type. Use pole-1 (terminal numbers: 11, 14, 12) and pole-4 (terminal numbers: 41, 44, 42).

Mounting Height (With Lever)

PYF14S

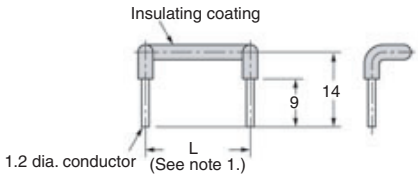


PYF08S



■ Accessories (Option)

Socket Bridge



Note: 1. The relationship between the model number, the length L, and the color of the insulating coating is shown in the following table.

Model number	Length L (mm)	Color of insulating coating
PYDM-14SR	27.5	Red
PYDM-14SB		Blue
PYDM-08SR	19.7	Red
PYDM-08SB		Blue

2. The insulating coating must be able to withstand a voltage of 1,500 V for 1 minute. Use either PE or PA as the material of the insulating coating.

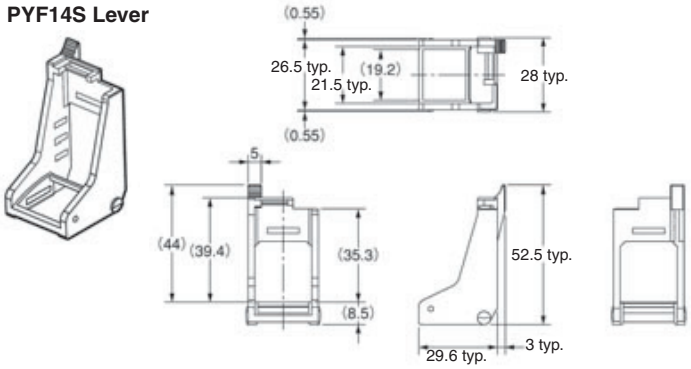
3. The positions of the ends of the insulating coating must not vary more than 0.5 mm.

4. The characteristics of the socket bridge are shown in the following table.

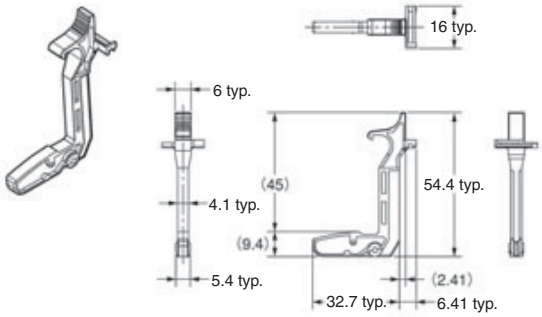
Item	Characteristic
Rated ON current	10 A
Rated insulation voltage	250 VAC
Temperature rise	35°C max.
Dielectric strength	1,500 VAC for 1 minute
Ambient operating temperature	–55 to 70°C

Levers

PYF14S Lever



PYF08S Lever



Installation

■ Tools

A flat-blade screwdriver should be used to mount the cables.

Applicable Screwdriver

● Flat-blade, Parallel-tip, 2.5 mm diameter (3.0 mm max.)

● Flat-blade, Parallel-tip

● Flat-blade, Flared-tip

Cannot be used.

Examples: FACOM AEF.2.5 × 75E (AEF. 3 × 75E)
VESSEL No. 9900-(-)2.5 × 75 (No. 9900-(-)3 × 100)
WAGO 210-119
WIHA 260/2.5 × 40 (260/3 × 50)

*Chamfering the tip of the driver improves insertion when used as an exclusive tool.

■ Applicable Wires

Applicable Wire Sizes

0.2 to 1.5 mm^2, AWG24 to AWG16

Applicable Wire Type

Solid wires, stranded wires, flexible wires, or wires with ferules can be used.

(See note 1.) < 2.2 ≤ Diameter D (mm) ≤ 3.2 (3.5: see note 2.)

Conductor diameter d (mm) or length of sides a and b (mm) ≤ 1.9

Wires with Ferules

Note: 1. If the overall diameter of the wire is less than 2.2 mm, do not insert the wire past the conductor. Refer to the following diagrams.

2. If the overall diameter of the wire is over 3.2 mm, it will be difficult to use double wiring.

Examples of Applicable Wires (Confirmed Using Catalog Information)

Type of wire	Conductor type	See note 1, above.	Recommended wire sizes	See note 2, above.
Equipment wire 2491X	Flexible		0.5, 0.75, 1.0 mm^2	1.5 mm^2
BS6004	Solid	0.5 mm^2		
Switchgear BS6231	Solid		1.0 mm^2	1.5 mm^2
Switchgear BS6231	Flexible		0.5, 0.75 mm^2	1.0 mm^2
Tri-rated control and switchgear	Flexible		0.5, 0.75, 1.0, 1.5 mm^2	
Conduit	Stranded		1.5 mm^2	
UL1007	Flexible	18AWG	16AWG	
UL1015	Flexible		18AWG, 16AWG	
UL1061	Flexible	18AWG		
UL1430	Flexible	18AWG	16AWG	

■ Wiring

Use wires of the applicable sizes specified above. The length of the exposed conductor should be 8 to 9 mm.

Fig. 1 Exposed Conductor Length

Use the following wiring procedure.

1. Insert the specified screwdriver into the release hole located beside the wire connection hole where the wire is to be inserted.

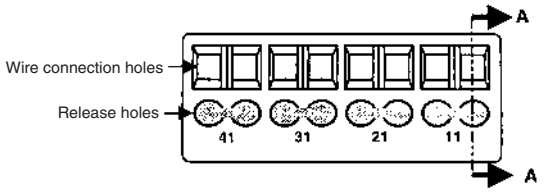


Fig. 2 Wire Connection Holes and Release Holes

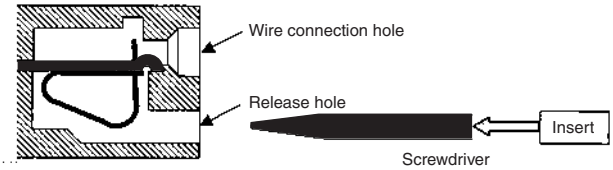
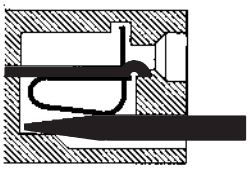


Fig. 3 Section A-A of Fig. 2



2. Insert the exposed conductor into the wire connection hole.

3. Pull out the screwdriver.

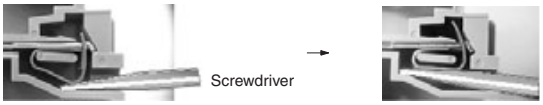
Precautions

Precautions for Connection

- Do not move the screwdriver up, down, or from side to side while it is inserted in the hole. Doing so may cause damage to internal components (e.g., deformation of the coil spring or cracks in the housing) or cause deterioration of insulation.
- Do not insert the screwdriver at an angle. Doing so may break the side of socket and result in a short-circuit.

- Do not insert two or more wires in the hole. Wires may come in contact with the spring causing a temperature rise or be subject to sparks. (There are two wiring holes for each terminal.)

- Insert the screwdriver along the hole wall as shown below.



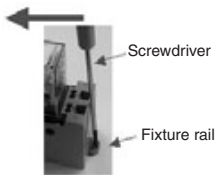
- If lubricating liquid, such as oil, is present on the tip of screwdriver, the screwdriver may fall out resulting in injury to the operator.
- Insert the screwdriver into the bottom of the hole. It may not be possible to connect cables properly if the screwdriver is inserted incorrectly.

General Precautions

- Use the clip to prevent relays floating or falling out of the socket.
- Do not use the product if it has been dropped on the ground. Dropping the product may adversely affect performance.
- Confirm that the socket is securely attached to the mounting track before wiring. If the socket is mounted insecurely it may fall and injure the operator.
- Ensure that the socket is not charged during wiring and maintenance. Not doing so may result in electric shock.
- Do not pour water or cleansing agents on the product. Doing so may result in electric shock.
- Do not use the socket in locations subject to solvents or alkaline chemicals.
- Do not use the socket in locations subject to ultraviolet light (e.g., direct sunlight). Doing so may result in markings fading, rust, corrosion, or resin deterioration.
- Do not dispose of the product in fire.

Removing from Mounting Rail

To remove the socket from the mounting rail, insert the tip of screwdriver in the fixture rail, and move it in the direction shown below.



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. J122-E1-04

Screwless Clamp Terminal Socket
P2RF□□S

- Screwless clamping greatly contributes to reducing wiring time.
- No over or under tightening of cable connection so better contact reliability is achieved.
- Double wiring possible on all the terminals, and easy bridge and branch connections.
- Use either solid or standard wires from 0.2 to 1.5 mm^2 (AWG24 to AWG16).
- Safe terminal arrangement: Coil terminals separated from contact terminals.
- Unique ejector enables easy relay replacement.
- Two types of nameplate are available: New MY and Legrand.
- Finger-protection construction.
- VDE, UL, CSA approval pending.

Ordering Information

■ List of Models

	1-pole	2-pole
Socket	P2RF-05-S	P2RF-08-S
Clip & Release Lever	P2CM-S	
Nameplate	R99-11 nameplate for MY	
Socket Bridge	P2RM-SR, P2RM-SB	

Specifications

■ Ratings/Characteristics

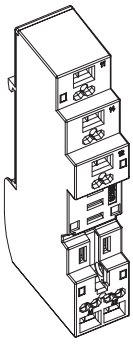
Item	P2RF05S	P2RF08S	Remarks
Relay	G2R-1-S Series	G2R-2-S Series	---
Dimensions (W×H×D)	18×92×38.2 max.		---
Rated voltage	250 VAC		---
Rated carry current	10 A at 70°C	5 A at 70°C	VDE0627
Applicable wires	0.2 to 1.5 mm^2 (AWG24 to AWG16) Solid wire, Standard wire		---
Number of wire connections	2 wires per terminal (1 wire per hole)		---
Clamping force	10 N min. (0.2 mm^2), 40 N min. (1.5 mm^2)		EN60999

■ Approved Standards

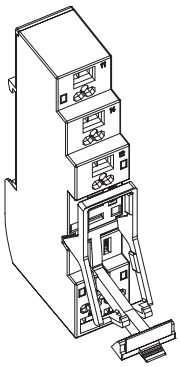
Standard	File No. (status)
VDE0627 (IEC664, EN60999)	40002313UG
UL508 (UL1059)	E87929
CSA C22.2 No. 14 (CSA C22.2 No. 158)	LR31928 (1281408)

Dimensions

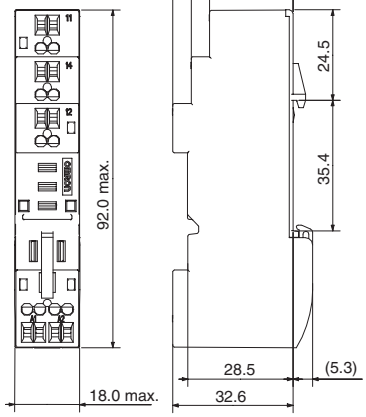
P2RF-05-S

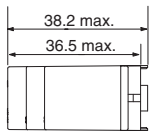


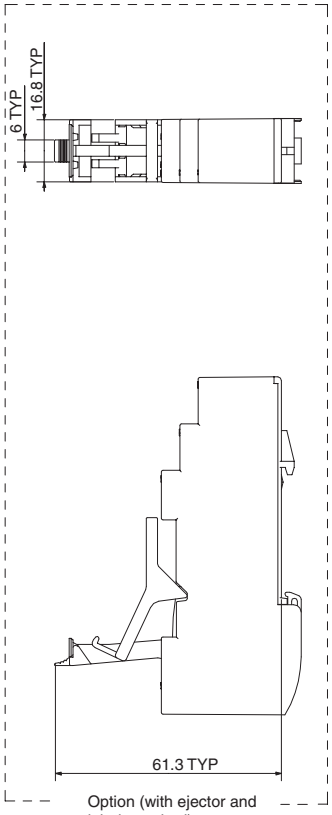
Standard model



Option (with ejector and label attached)

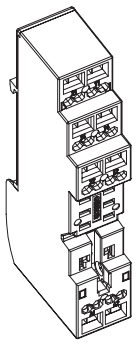




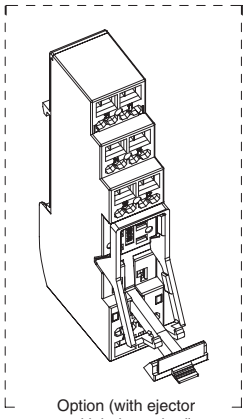


Option (with ejector and label attached)

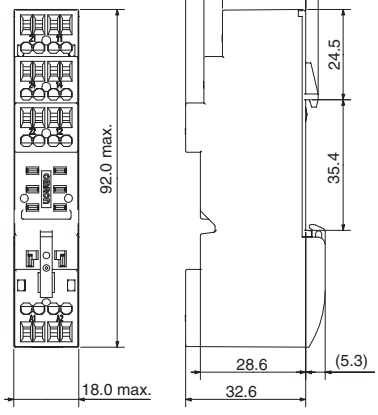
P2RF-08-S

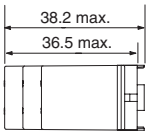


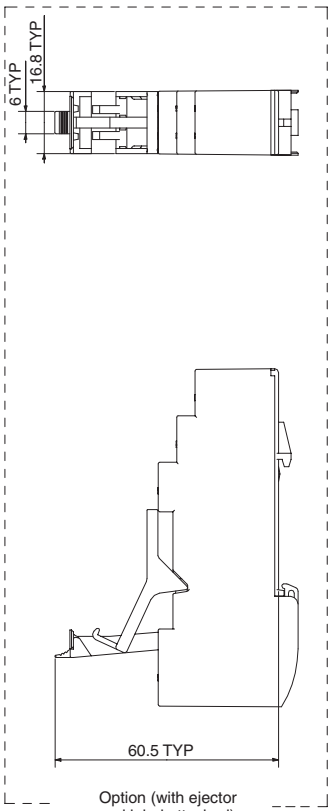
Standard model



Option (with ejector and label attached)

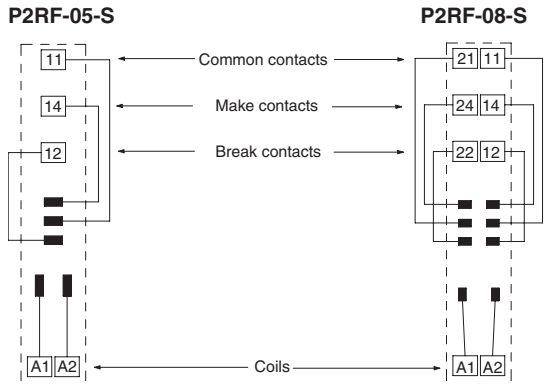






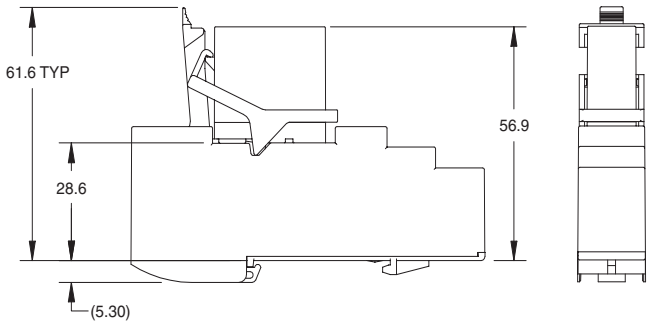
Option (with ejector and label attached)

Terminal Arrangement

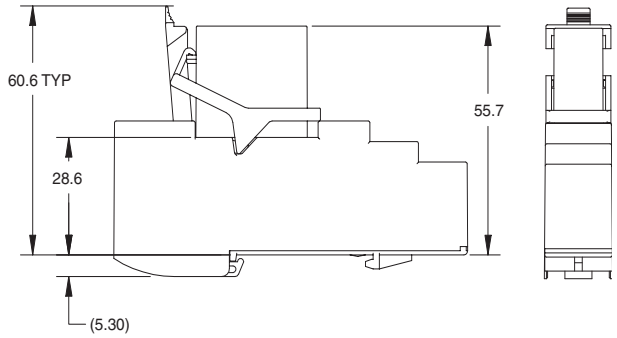


Mounting Height (With Lever)

P2RF-05-S

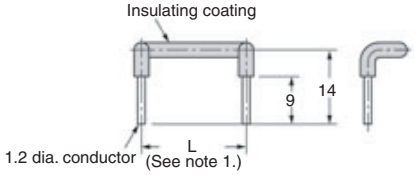


P2RF-08-S



■ Accessories (Option)

Socket Bridge



1. The relationship between the model number, the length L, and the color of the insulating coating is shown in the following table.

Model number	Length L (mm)	Color of insulating coating
P2RM-SR	14.3	Red
P2RM-SB		Blue

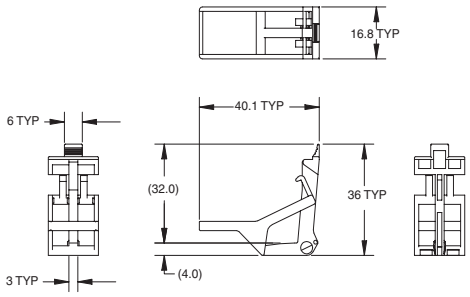
2. The insulating coating must be able to withstand a voltage of 3,000 V for 1 minute. Use either PE or PA as the material of the insulating coating.

3. The positions of the ends of the insulating coating must not vary more than 0.5 mm.

4. The characteristics of the socket bridge are shown in the following table.

Item	Characteristic
Rated ON current	10 A
Rated insulation voltage	250 VAC
Temperature rise	35°C max.
Dielectric strength	3,000 VAC for 1 minute
Ambient operating temperature	–55 to 70°C

Clip and Release Lever



Installation

■ Tools

A flat-blade screwdriver should be used to mount the cables.

Applicable Screwdriver

● Flat-blade, Parallel-tip, 2.5 mm diameter (3.0 mm max.)

● Flat-blade, Parallel-tip

● Flat-blade, Flared-tip

Cannot be used.

Examples:

	FACOM AEF.2.5×75E	(AEF. 3×75E)
	VESSEL No. 9900-(-)2.5×75	(No. 9900-(-)3×100)
	WAGO 210-119	
	WIHA 260/2.5×40	(260/3×50)

*Chamfering the tip of the driver improves insertion when used as an exclusive tool.

■ Applicable Wires

Applicable Wire Sizes

0.2 to 1.5 mm^2, AWG24 to AWG16

Applicable Wire Type

Solid wires, standard wires, flexible wires, or wires with ferules can be used.

(See note 1.) < 2.2 ≤ Diameter D (mm) ≤ 3.2 (3.5: see note 2.)

Conductor diameter d (mm) or length of sides a and b (mm) ≤ 1.9

Wires with Ferules

Note: 1. If the overall diameter of the wire is less than 2.2 mm, do not insert the wire past the conductor. Refer to the following diagrams.

2. If the overall diameter of the wire is over 3.2 mm, it will be difficult to use double wiring.

Examples of Applicable Wires (Confirmed Using Catalog Information)

Type of wire	Conductor type	See note 1, above.	Recommended wire sizes	See note 2, above.
Equipment wire 2491X	Flexible		0.5, 0.75, 1.0 mm^2	1.5 mm^2
BS6004	Solid	0.5 mm^2		
Switchgear BS6231	Solid		1.0 mm^2	1.5 mm^2
Switchgear BS6231	Flexible		0.5, 0.75 mm^2	1.0 mm^2
Tri-rated control and switchgear	Flexible		0.5, 0.75, 1.0, 1.5 mm^2	
Conduit	Standard		1.5 mm^2	
UL1007	Flexible	18AWG	16AWG	
UL1015	Flexible		18AWG, 16AWG	
UL1061	Flexible	18AWG		
UL1430	Flexible	18AWG	16AWG	

■ Wiring

Use wires of the applicable sizes specified above. The length of the exposed conductor should be 8 to 9 mm.

Fig. 1 Exposed Conductor Length

Use the following wiring procedure.

1. Insert the specified screwdriver into the release hole located beside the wire connection hole where the wire is to be inserted.

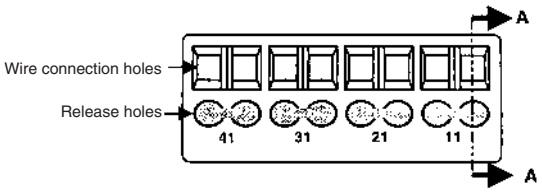


Fig. 2 Wire Connection Holes and Release Holes

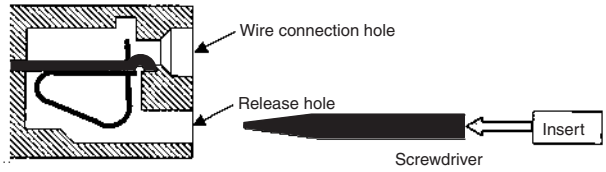
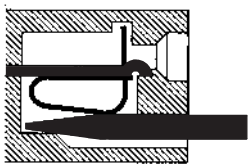


Fig. 3 Section A-A of Fig. 2



2. Insert the exposed conductor into the wire connection hole.

3. Pull out the screwdriver.

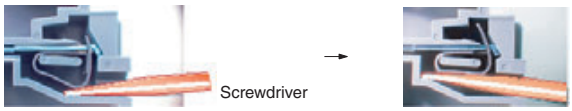
Precautions

Precautions for Connection

- Do not move the screwdriver up, down, or from side to side while it is inserted in the hole. Doing so may cause damage to internal components (e.g., deformation of the clamp spring or cracks in the housing) or cause deterioration of insulation.
- Do not insert the screwdriver at an angle. Doing so may break the side of socket and result in a sort-circuit.

- Do not insert two or more wires in the hole. Wires may come in contact with the spring causing a temperature rise or be subject to sparks. (There are two wiring holes for each terminal.)

- Insert the screwdriver along the hole wall as shown below.



- If lubricating liquid, such as oil, is present on the tip of screwdriver, the screwdriver may fall out resulting in injury to the operator.
- Insert the screwdriver into the bottom of the hole. It may not be possible to connect cables properly if the screwdriver is inserted incorrectly.

General Precautions

- Use the clip to prevent relays floating or falling out of the socket.
- Do not use the product if it has been dropped on the ground. Dropping the product may adversely affect performance.
- Confirm that the socket is securely attached to the mounting track before wiring. If the socket is mounted insecurely it may fall and injure the operator.
- Ensure that the socket is not charged during wiring and maintenance. Not doing so may result in electric shock.
- Do not pour water or cleansing agents on the product. Doing so may result in electric shock.
- Do not use the socket in locations subject to solvents or alkaline chemicals.
- Do not use the socket in locations subject to ultraviolet light (e.g., direct sunlight). Doing so may result in markings fading, rust, corrosion, or resin deterioration.
- Do not dispose of the product in fire.

Removing from Mounting Rail

To remove the socket from the mounting rail, insert the tip of screwdriver in the fixture rail, and move it in the direction shown below.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. J132-E1-02

In the interest of product improvement, specifications are subject to change without notice.