

AIR CONDUCTING FAN HANDBOOK

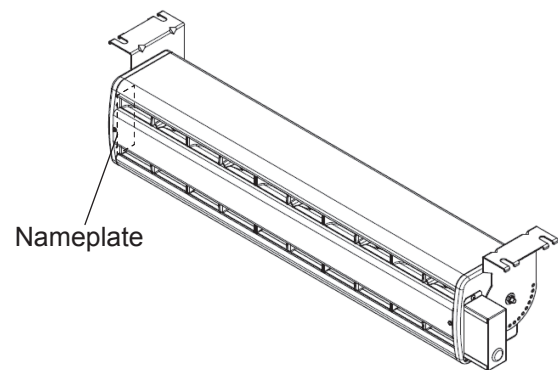
MODELS

AH-1006S1-E

AH-1509S1-E

AH-2009S1-E

AH-3012S1-E



Warning:









Repair work must be performed by the manufacturer, its service agent or a similarly qualified person in order to avoid hazards.




Contents

1. Safety precautions	3
2. Changed points	4
3. Names of components	4
4. Specifications	4
5. Outside dimensions	5
6. Electrical wiring diagrams	6-7
6-1 Internal wiring diagrams	6
6-2 Motor coil diagram	7
7. Troubleshooting	8-10
7-1 Service flowchart	8-9
7-2 Checklist	10
8. Before receiving repair requests	10
9. Service inspection list	10
10. Overhauling procedures	11-15
11. Parts catalog	16-24
AH-1006S1-E	17-18
AH-1509S1-E	19-20
AH-2009S1-E	21-22
AH-3012S1-E	23-24

1. Safety precautions

- Read the following precautions thoroughly before the maintenance, and then inspect and repair the product in a safe manner.
- The types and levels of danger that may arise if the product is handled incorrectly are described with the warning symbols shown below.

 Warning		Improper handling of the product may result in serious injury or death.	
<p>◇ Electric shock</p> <p>If you must inspect the circuitry while the power is on, do not touch the live parts.</p> <p>(Failure to observe this warning may result in electric shock.)</p>	 <p>Caution against electric shock</p>	<p>◇ Turn off the power supply</p> <p>Be sure to shut off the circuit breaker before disassembling the unit for repair.</p> <p>(Failure to observe this warning may result in electric shock.)</p>	 <p>Be sure to follow this instruction.</p>
<p>◇ Modification is prohibited</p> <p>Do not modify the unit.</p> <p>(Failure to observe this warning may result in electric shock, fire and/or injury.)</p>	 <p>Prohibited</p>	<p>◇ Use proper parts and tools</p> <p>For repair, be sure to use the parts listed in the parts catalog of the applicable model and use the proper tools.</p> <p>(Failure to observe this warning may result in electric shock, fire and/or injury.)</p>	 <p>Be sure to follow this instruction.</p>
<p>◇ Proper electric work</p> <p>Use the electric wires designated for electric work, and conduct electric work in accordance with your local electric work regulations and the installation manual.</p> <p>(Improper connection or wiring installation may result in electric shock and/or fire.)</p>	 <p>Be sure to follow this instruction.</p>	<p>◇ Replace damaged and/or degraded parts</p> <p>Be sure to replace the power cord and lead wires if they are damaged and/or degraded.</p> <p>(Failure to observe this warning may result in electric shock and/or fire.)</p>	 <p>Be sure to follow this instruction.</p>
		<p>◇ Check insulation</p> <p>Upon completing repair work, always measure the insulation resistance. Verify that it is at least 10 MΩ (with a 500 V DC insulation resistance tester), and then turn on the power.</p> <p>(Inadequate insulation may result in electric shock.)</p>	 <p>Be sure to follow this instruction.</p>

 Caution		Improper handling of the product may result in injury or damage to properties including buildings and equipment.	
<p>◇ Caution for injury</p> <p>Do not work at a location where you do not have a sure footing.</p> <p>(Failure to observe this caution may result in a fall.)</p>	 <p>Prohibited</p>	<p>◇ Wear gloves</p> <p>Wear a pair of gloves when servicing.</p> <p>(Failure to observe this caution may result in injury.)</p>	 <p>Be sure to follow this instruction.</p>

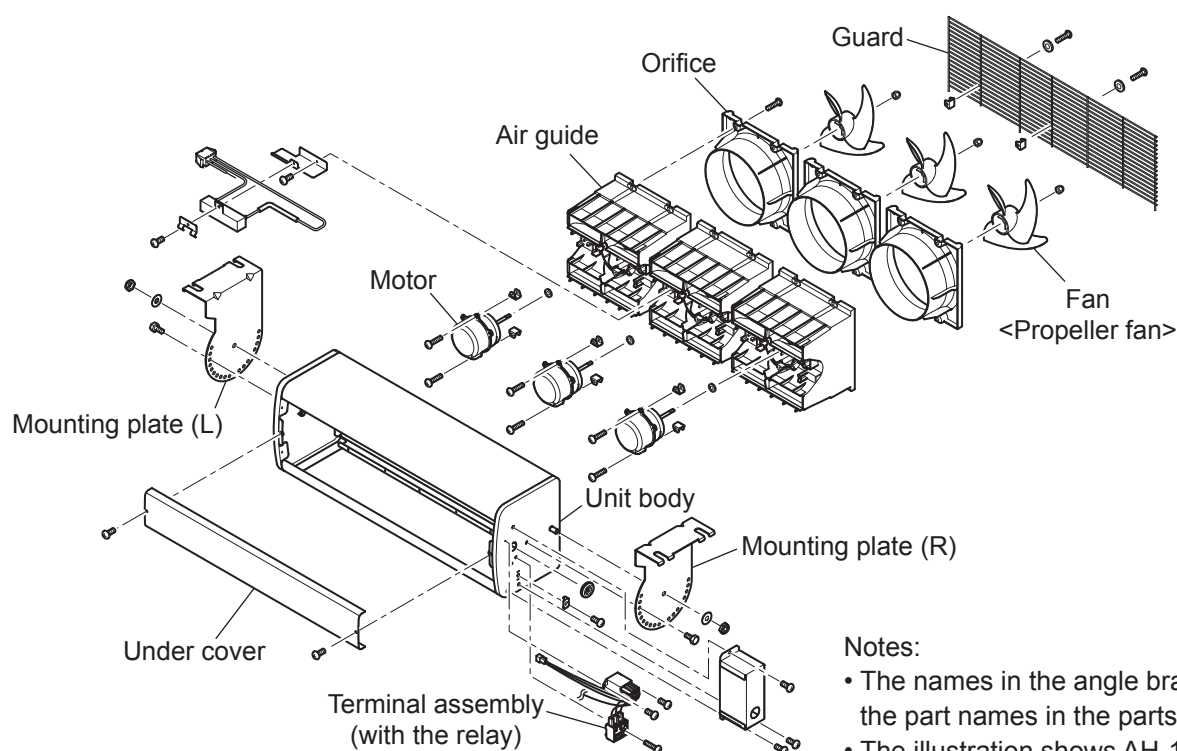
Notes for servicing

- Inspect the grounding, and repair it if it is incomplete. Make sure that an earth leakage breaker is installed, if it is not installed, install one.
- Make sure that the product operates properly upon completion of repair. Clean the product and the surrounding area, and then notify the customer of the completion of repair.

2. Changed points

New model	Former model	Changes from the former model
AH-1006S1-E AH-1509S1-E AH-2009S1-E	AH-1006S-E AH-1509S-E AH-2009S-E	<ul style="list-style-type: none"> • Motor specification was changed. • Fan, air guide, and orifice were changed. • Mounting position of terminal block and relay was changed. • Body color was changed.
AH-3012S1-E	AH-3009S-E	<ul style="list-style-type: none"> • Motor specification was changed. • Fan, air guide, and orifice were changed. • Mounting position of relay was changed. • The method of power supply connection was changed from a power cord to a terminal block. • Body color was changed. • Product dimensions were changed.

3. Names of components



Notes:

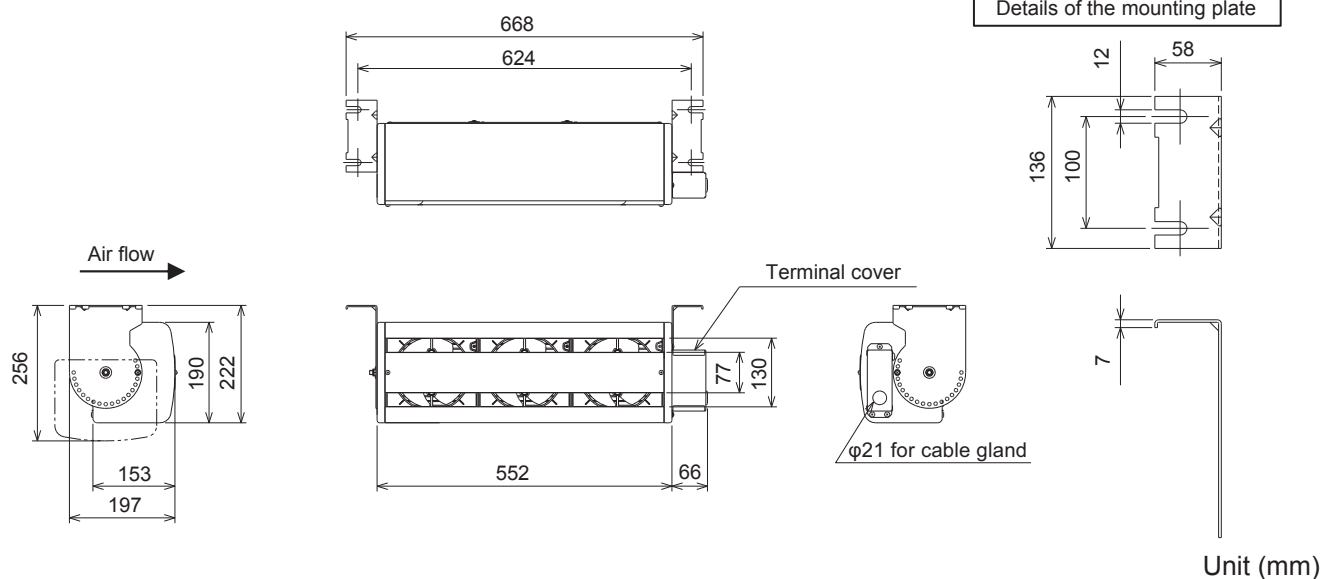
- The names in the angle brackets < > show the part names in the parts catalog.
- The illustration shows AH-1006S1-E.

4. Specifications

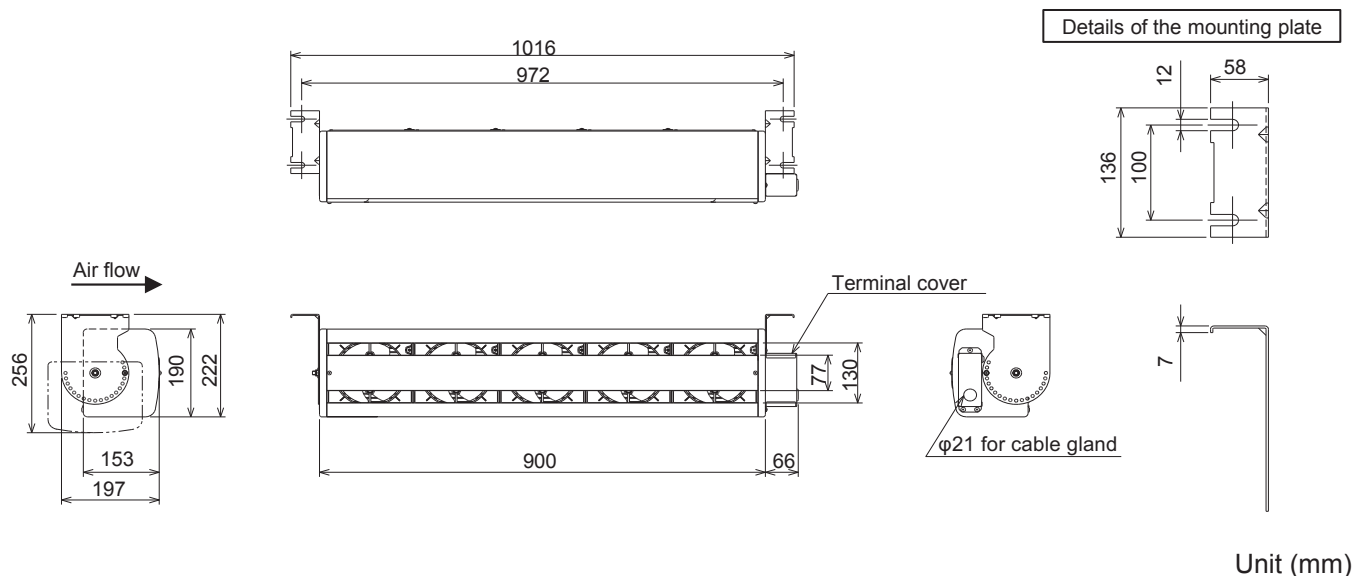
Model	Power supply voltage (V)		Fan speed	Airflow rate (m³/h)		Air velocity (m/s)		Noise (dB)		Starting current (A)		Rating current (A)		Power consumption (W)		Weight (kg)
	50 Hz	60 Hz		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	
AH-1006S1-E	220 240	220	High	740-790	700	7.5-8.0	7.1	42-43	41	0.23	0.23	0.15-0.16	0.18	32-36	38	7
			Low	600-650	520	6.0-6.6	5.2	37-39	33	0.23	0.23	0.13-0.14	0.15	28-33	31	
AH-1509S1-E			High	1260-1340	1220	7.6-8.1	7.4	44.5-46	44	0.36	0.36	0.25-0.26	0.31	54-61	69	10.5
			Low	910-1100	820	5.5-6.6	4.9	38-41	35	0.36	0.36	0.22-0.24	0.24	48-57	53	
AH-2009S1-E			High	1450-1470	1640	8.7-8.9	9.9	47-47.5	50	0.88	0.88	0.41-0.49	0.47	80-96	102	11
			Low	1200-1250	1060	7.2-7.5	6.4	43.5-45.5	40	0.88	0.88	0.34-0.35	0.36	71-80	77	
AH-3012S1-E			High	1740-1760	1950	7.8-7.9	8.8	47.5-48.5	51	0.91	0.91	0.45-0.53	0.6	96-114	125	13
			Low	1460-1600	1220	6.6-7.2	5.5	46-47	42	0.91	0.91	0.38-0.40	0.43	84-96	95	

5. Outside dimensions

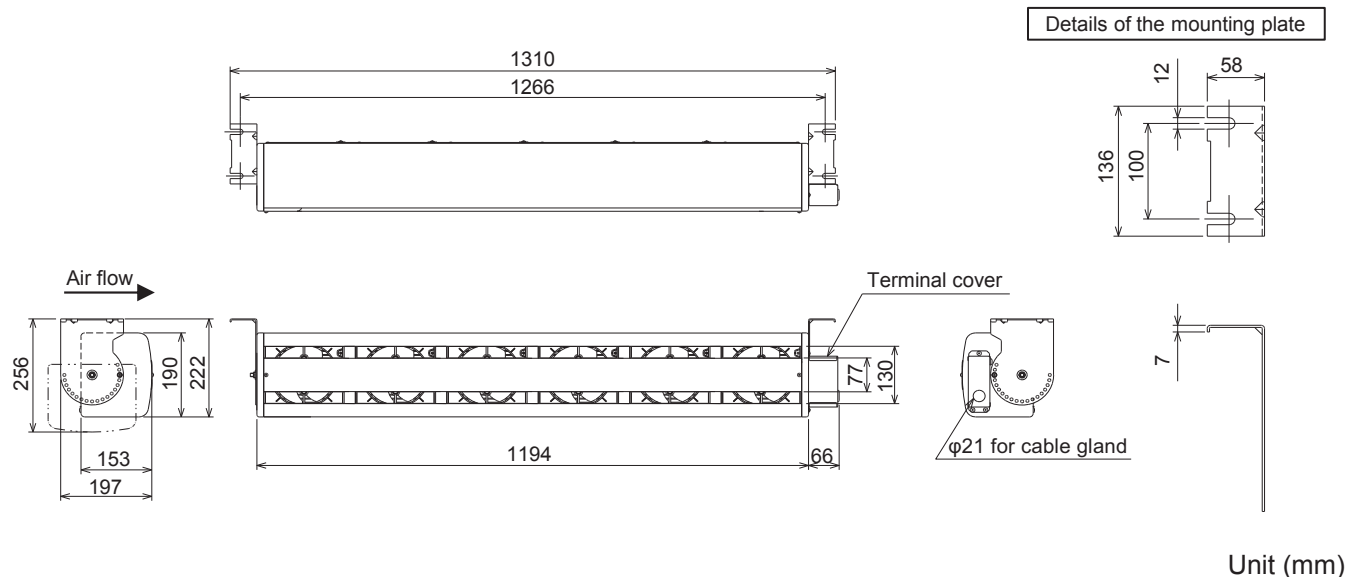
AH-1006S1-E



AH-1509S1-E, AH-2009S1-E

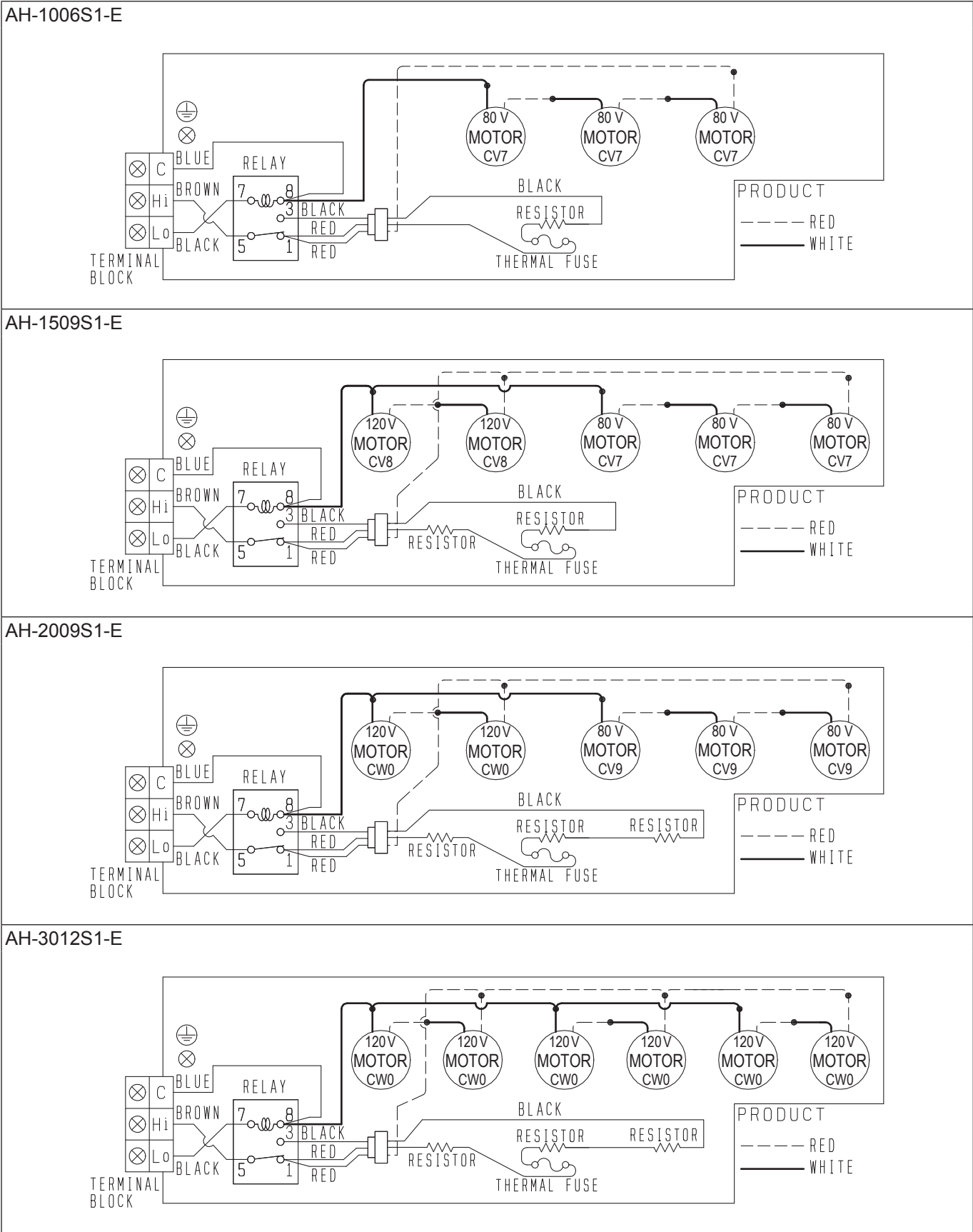


AH-3012S1-E



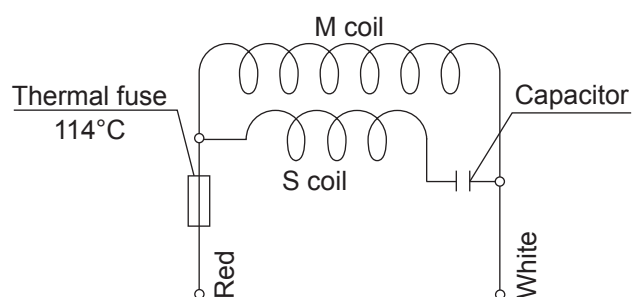
6. Electrical wiring diagrams

6-1 Internal wiring diagrams



6-2 Motor coil diagram

- ※ The motor contains a built-in capacitor. (S coil resistance cannot be measured.)
- ※ Coil resistance at a temperature of 30°C



Model	Motor code	Motor rated voltage (V)	Capacitor capacitance (μF)	Resistance (Ω)	
				M coil	S coil
AH-1006S1-E	CV7	80	2.5	117	152
AH-1509S1-E	CV7	80	2.5	117	152
	CV8	120	1.5	203	261
AH-2009S1-E	CV9	80	3.0	43	110
	CW0	120	2.5	91	115
AH-3012S1-E	CW0	120	2.5	91	115

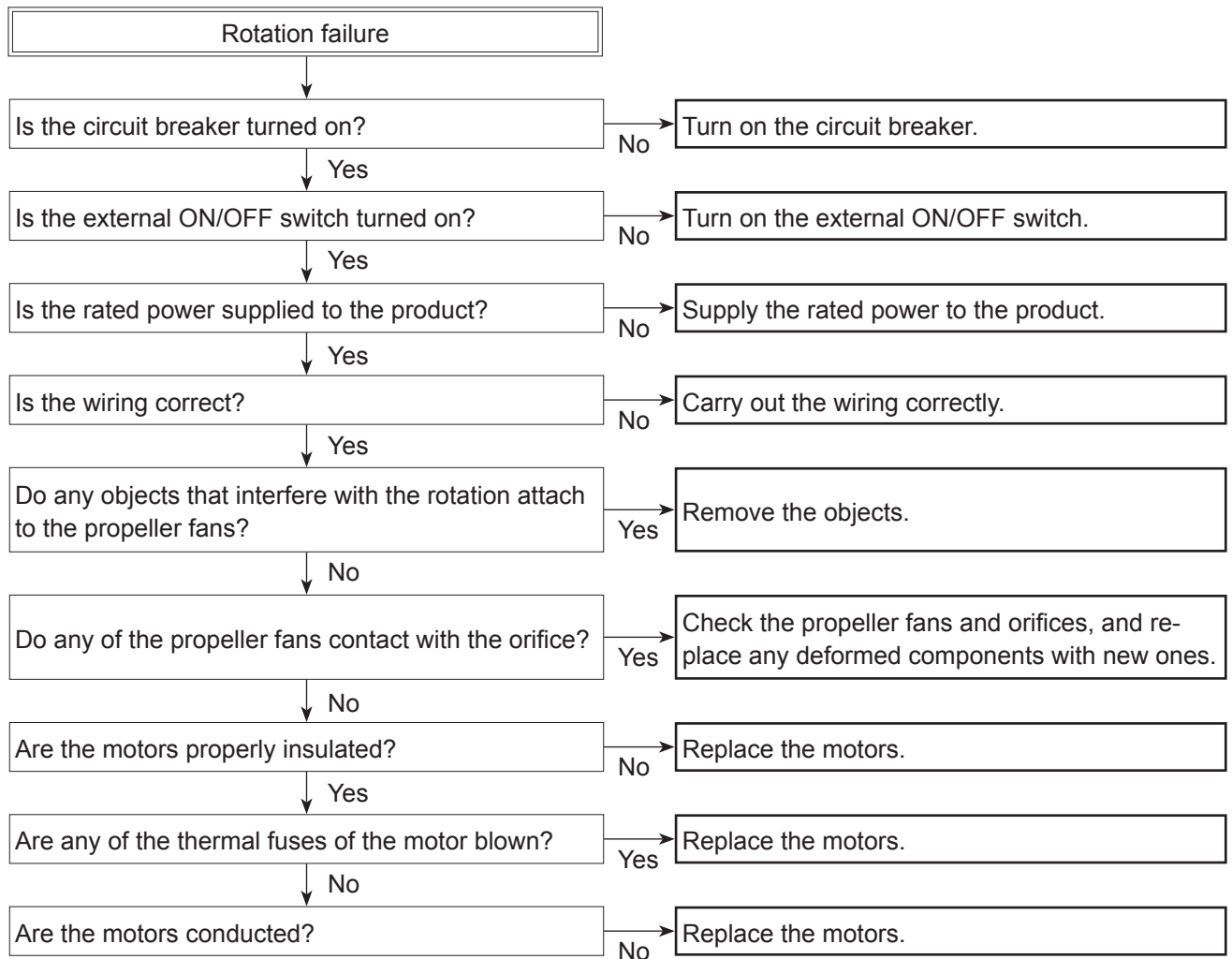
7. Troubleshooting

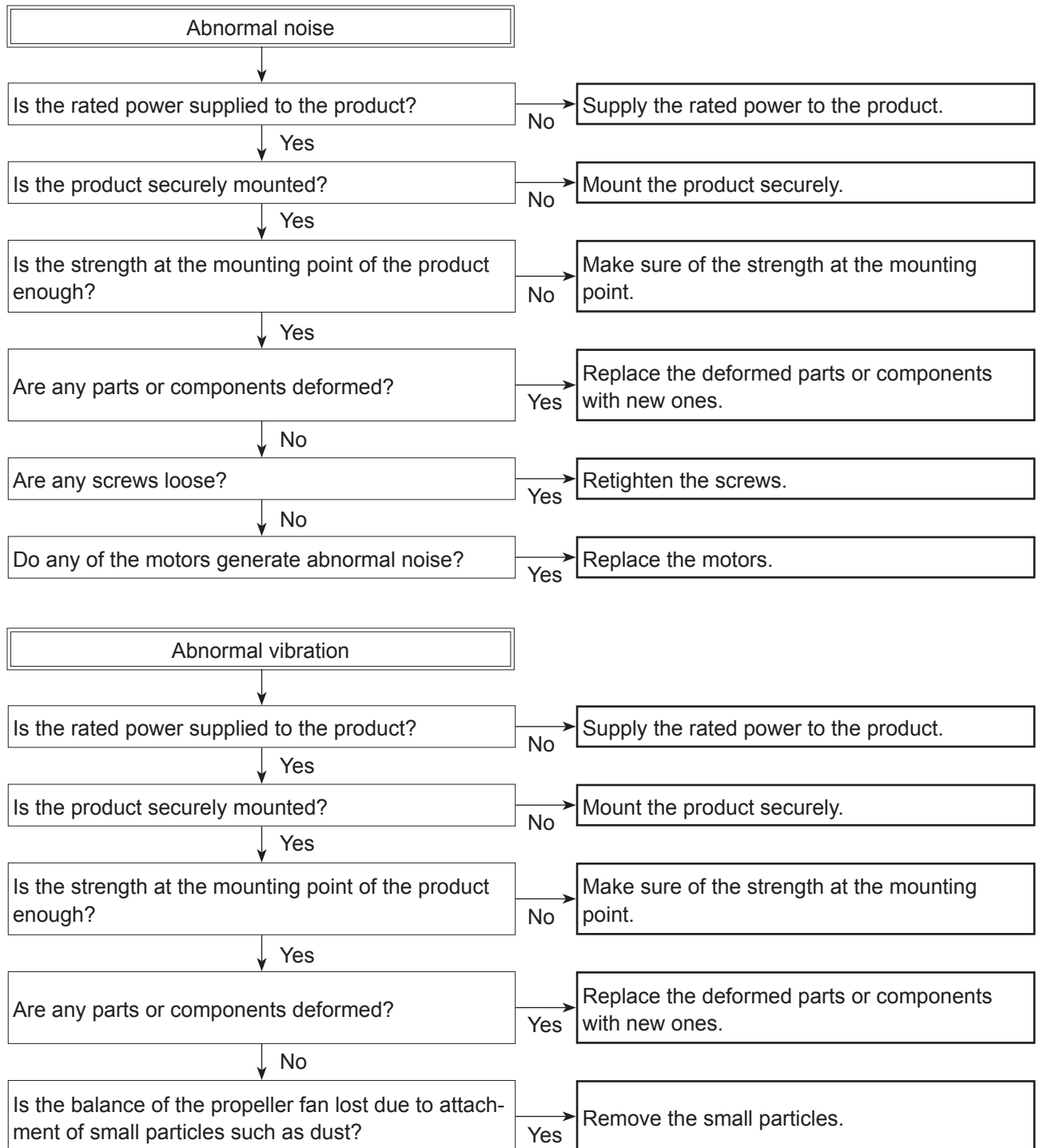
■ Work precautions

- When servicing, recreate the malfunction two or three times before starting repairs.
- When servicing, always keep proper footing.
- When servicing, always unplug the power cord from the outlet, or turn off the circuit breaker. Pay sufficient attention to avoid electric shock or injury.
- Make sure to connect the power supply wires correctly.
- Avoid application of abnormal voltage.

* The part names in the text are standardized with the part names in the parts catalog. (There are some exceptions.)

7-1 Service flowchart





7-2 Checklist

No.	Error	Cause	Action
1	The product does not operate.	Is the circuit breaker turned on?	Turn on the breaker.
		Is the external ON/OFF switch turned on?	Turn on the external ON/OFF switch.
		Is the wiring correct?	Check the wiring.
		Is there any connection failure of the wiring?	Check that the wiring connections are securely performed.
		Is the rated power supplied to the product?	Check that the rated power is supplied to the product.
		Are the motors conducted?	Replace the faulty motors.
2	The product does not operate properly.	Do any objects get caught in the gaps between the propeller fan and orifice?	Remove the objects.
		Do any of the propeller fans contact with the orifice?	Check the propeller fans and orifices, and replace any deformed components with new ones.
	The fan does not rotate.	Are the propeller fans deformed?	Replace the deformed propeller fans.
	The fan speed cannot be changed.	Is the external HIGH/LOW switch correctly operated?	Operate the HIGH/LOW switch correctly in accordance with the Operating and Installation instructions.
3	The product generates abnormal sounds or vibrations.	Do any objects get caught in the gaps between the propeller fan and orifice?	Remove the objects.
		Do any of the propeller fans contact with the orifice?	Check the propeller fans and orifices, and replace any deformed components with new ones.
		Are the propeller fans deformed?	Replace the deformed propeller fans.
		Is the product securely mounted?	Check the installation conditions of the product.

8. Before receiving repair requests

Frequently asked question	Response
The product does not operate even though the external ON/OFF switch is turned on.	[1] If the circuit breaker is off, turn it on. [2] Check if power failure has occurred.
The product generates abnormal sounds or vibrations.	[1] If any objects are caught on the propeller fans, remove them. [2] If the guard is almost detached (or tilted), fix it firmly. [3] If any of the mounting screws are loose, tighten them properly.

9. Service inspection list

Location	Inspection Item	Check Result
Electric wiring	Is the power source securely connected?	
	Is the wiring correct?	
Appliance	Is the main unit securely mounted?	
	Is grounding established properly?	
	Does the product operate as described in the Operating and Installation instructions when the external ON/OFF switch is operated?	
	Are the propeller fans rotating?	
	Does the product operate without abnormal vibrations or sounds?	

10. Overhauling procedures

■ Work precautions

- Before replacing parts or components, follow the instructions described in the troubleshooting.
- When servicing, always keep proper footing.
- When servicing, always unplug the power cord from the outlet, or turn off the circuit breaker. Pay sufficient attention to avoid electric shock or injury.
- Make sure to connect the power supply wires correctly.
- Avoid application of abnormal voltage.
- Pay attention not to drop the parts or components.
- After completing repairs, check that the product operates properly.
- Servicing at a high place must be performed by two workers.
- For the parts provided with tightening torques, tighten them with the specified tightening torques.

* **Always wear a pair of gloves when servicing.**

* The part names in the text are standardized with the part names in the parts catalog. (There are some exceptions.)

Note: The pictures and illustrations show AH-1509S1-E.

Precaution

Before replacing the parts or components, dismount the main unit of the product.

Working at the high place causes a danger if the parts or components are replaced without dismounting the unit.

(1) Turn off the power supply.

- [1] Turn off the external ON/OFF switch.
- [2] Turn off the circuit breaker.
- [3] Disconnect the power wires from the terminal block.

Precaution

The circuit breaker must be turned off before disconnecting the power wires.

(2) Remove the motor.

- [1] Unscrew the screws (two PP screws 4x6, indicated by O), and remove the under cover.

Tightening torque:
1.39 to 1.89 N·m



Under cover

- [2] Identify the faulty motors.

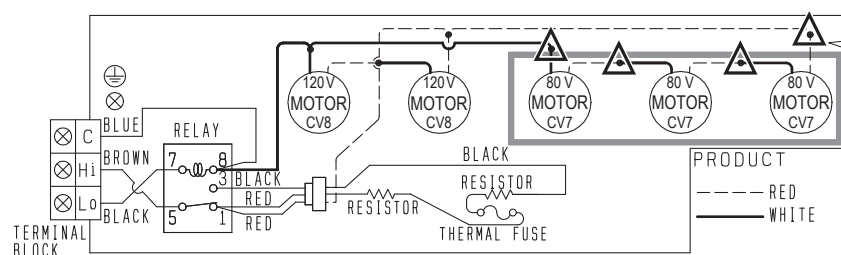
- If one of the motors is not working, replace the motor.
- If multiple motors are not working, identify the faulty motors by the following procedures.

- For example, if the motors surrounded by \square are not working

Cut the crimp caps (indicated by \triangle) at the position indicated by \equiv , and measure the coil resistance between the lead wires of each motor.

Precaution

When cutting the crimp caps, keep the length of the lead wires as long as possible. If the lead wires are too short, they cannot be reconnected after the replacement.



When the coil resistance at ordinary temperatures is equivalent to the values below, the motor is normal.

Model	Motor code	Motor rated voltage (V)	Capacitor capacitance (μ F)	Resistance (Ω)
				M coil
AH-1006S1-E	CV7	80	2.5	117
AH-1509S1-E	CV7	80	2.5	117
	CV8	120	1.5	203
AH-2009S1-E	CV9	80	3.0	43
	CW0	120	2.5	91
AH-3012S1-E	CW0	120	2.5	91

Measure the resistance of all the motors that are not working to identify the faulty motors.

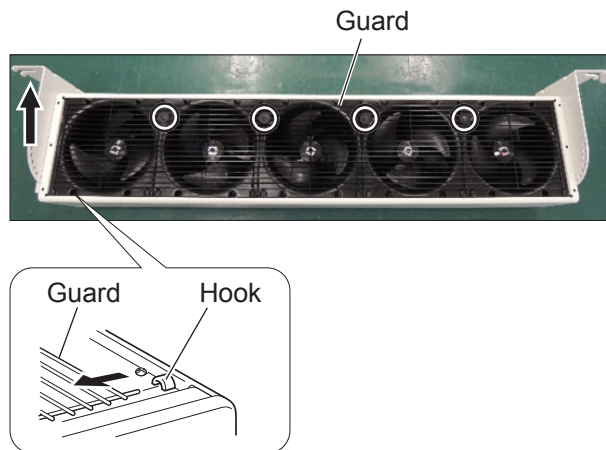
[3] Remove the guard.

- a. Turn the main unit upside down.
- b. Remove the screws (PTT screws 4x20) and special washers (4.2) (indicated by O).

Model	Screws (pieces)
AH-1006S1-E	2
AH-1509S1-E	4
AH-2009S1-E	4
AH-3012S1-E	5

Tightening torque:
1.39 to 1.89 N·m

- c. Slide the guard in the direction of the arrow, and remove it from the hook.



[4] Loosen the cap nut (M5) (indicated by O) clockwise, and remove the propeller fan.

Reassembly precaution
When installing the propeller fan, fasten the cap nut (M5) with the tightening torque shown below.

Tightening torque:
1.08 to 1.27 N·m



Propeller fan

[5] Remove the faulty motor.

- a. Turn the main unit upside down.
- b. Unscrew the screws (two PTT screws 4x20, indicated by O), and remove the motor.

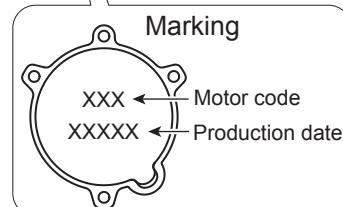
Tightening torque:
1.39 to 1.89 N·m

- c. Replace the motor, and then reconnect the lead wires with the supplied crimp caps.

Reassembly precaution
AH-1509S1-E and AH-2009S1-E contain two types of the motor: rated voltage 80 V and 120 V. Check the motor code marked on the motor, and refer to Internal wiring diagram and Parts catalog. Make sure to replace the motors with the same type motors.



Motor



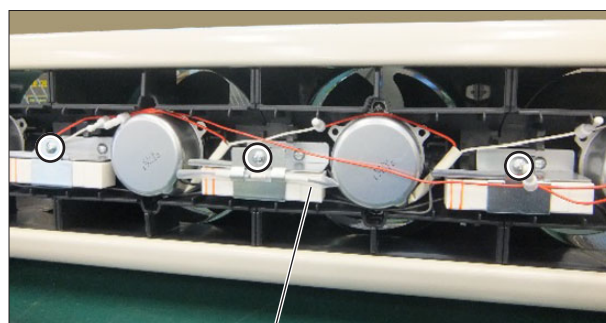
(3) Remove the resistor assembly.

[1] Remove the under cover. → See (2) [1].

[2] Unscrew the screws (PTT screws 4x6, indicated by ○), and remove the resistor assembly.

Model	Screws and cement resistors (pieces)	Resistance (Ω)
AH-1006S1-E	1	260
AH-1509S1-E	2	85
AH-2009S1-E	3	60
AH-3012S1-E	3	50

Tightening torque:
1.39 to 1.89 N·m



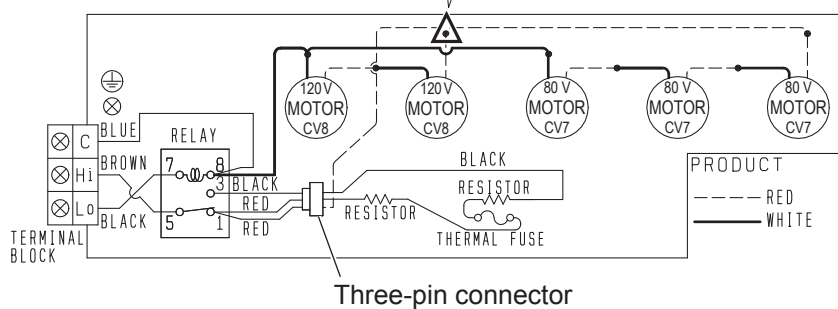
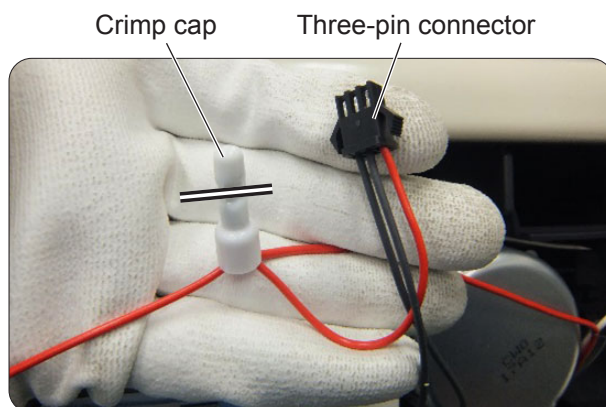
Resistor assembly

[3] Disconnect the three-pin connector.

[4] Cut the crimp cap (indicated by △) that is connected to the three-pin connector at the position indicated by == to replace the resistor assembly.

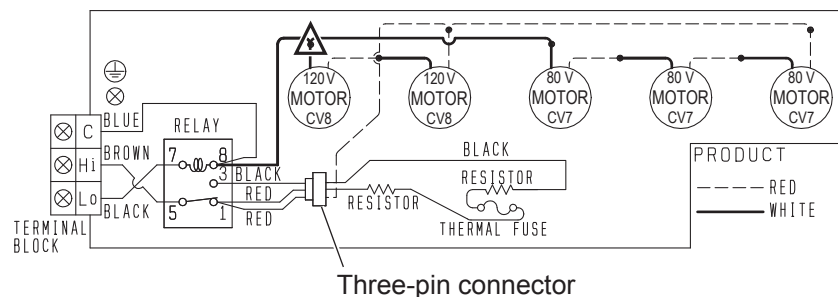
Precaution

When cutting the crimp cap, keep the length of the lead wires as long as possible.
If the lead wires are too short, they cannot be reconnected after the replacement.

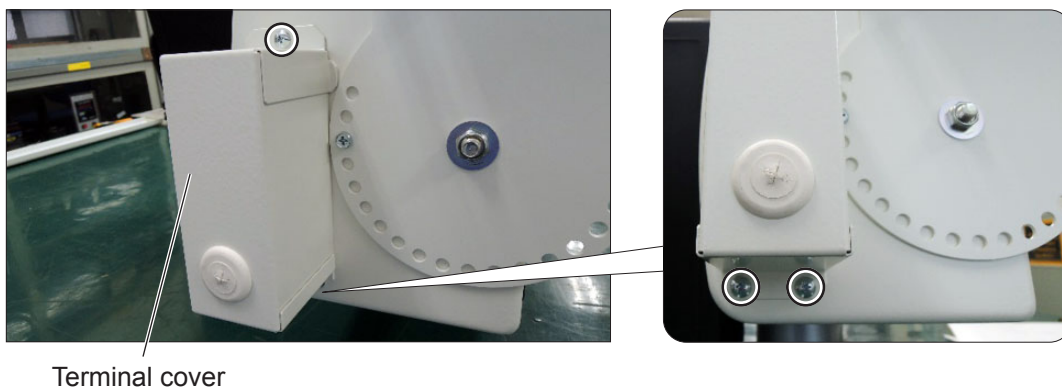


(4) Remove the terminal assembly (with the relay).

- [1] Disconnect the power wires. → See (1) [3].
- [2] Remove the under cover. → See (2) [1].
- [3] Disconnect the three-pin connector. → See (3) [3].
- [4] Cut the crimp cap (indicated by Δ) to disconnect the motor connection.
→ See (3) [4] for cutting of the crimp cap.



- [5] Unscrew the screws (three PT screws 4x8, indicated by O), and remove the terminal cover.



Terminal cover

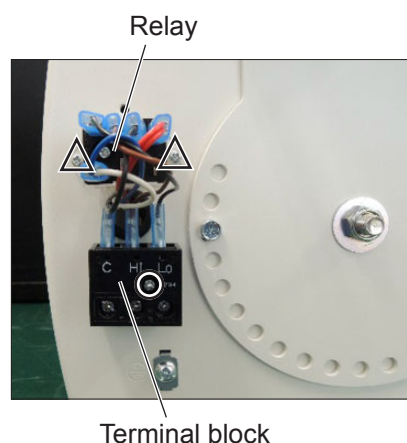
Tightening torque:
1.39 to 1.89 N·m

- [6] Unscrew the screw (one PP screw 3x20, indicated by O), and remove the terminal block.

Tightening torque:
0.61 to 0.82 N·m

- [7] Unscrew the screws (two PPT screws 3x8, indicated by Δ), and remove the relay.

Tightening torque:
0.6 to 0.8 N·m



* When reassembling

- Reassemble the unit in the reverse order of disassembly.
- Fix all the components securely.
- After reassembly, always make a test run to make sure that the unit operates properly.