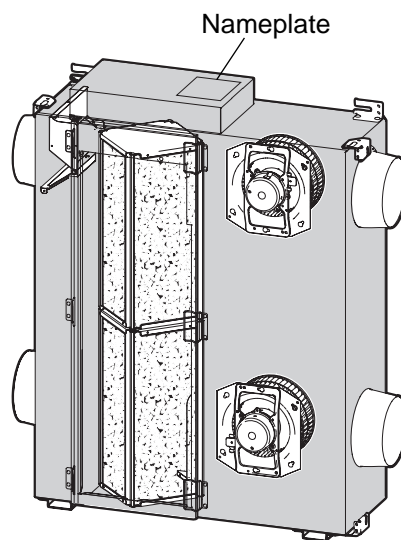


# LOSSNAY

## HAND BOOK

FOR DEALERS

Model: LGH-50RSDC-E











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




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# 1. Safety precautions

- Please be sure to read the following precautions thoroughly before commencing with the maintenance work, and conduct the inspection and repair of the product in a safe manner.
- The types and levels of danger that may arise if the product is handled incorrectly are described by using the warning symbols shown below.

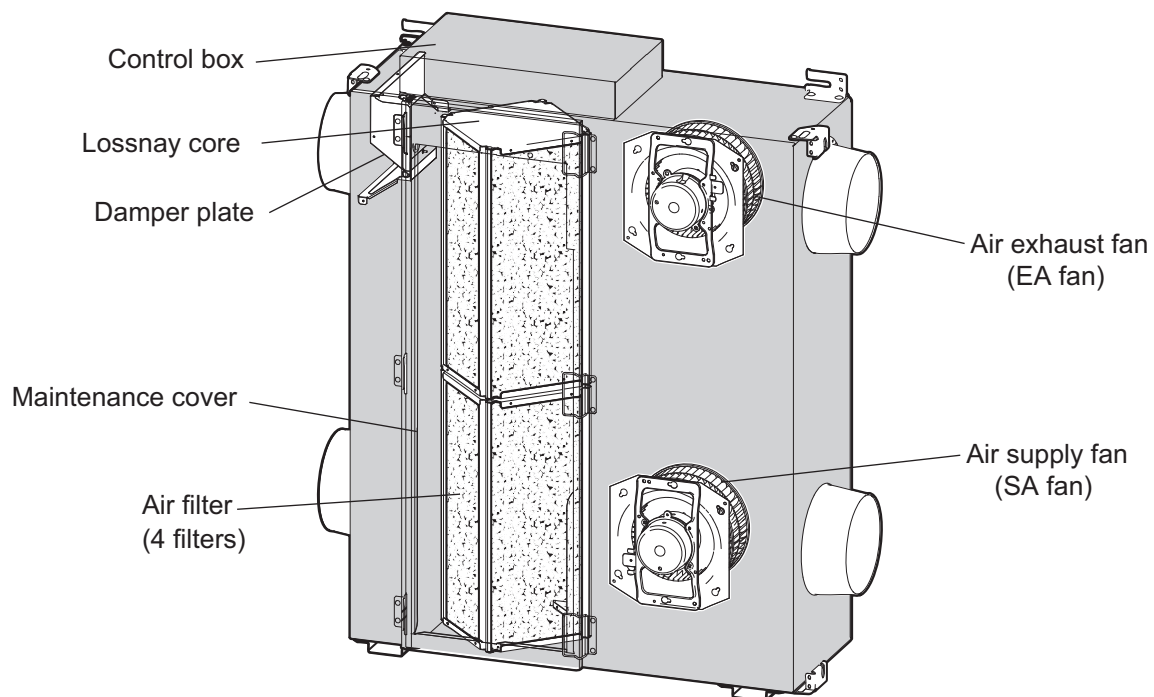
<div> <b>Warning</b></div>		Incorrect handling of the product may result in serious injury or death.	
<div>◇ <b>Electric shock</b></div> <div>If you must inspect the circuitry while the power is on, do not touch the live parts.</div> <div>(Failure to heed this warning may result in electric shock.)</div> <div> Caution for electric shock</div>	<div>◇ <b>Turn off the power supply</b></div> <div>Be sure to shut off the power supply isolator before disassembling the product for repair.</div> <div>(Failure to heed this warning may result in electric shock.)</div> <div> Be sure to follow this instruction.</div>		
<div>◇ <b>Modification is prohibited</b></div> <div>Do not modify the product.</div> <div>(Failure to heed this warning may result in electric shock, fire and/or injury.)</div> <div> Prohibited</div>	<div>◇ <b>Use proper parts and tools</b></div> <div>For repair, be sure to use the parts listed in the service parts list of the applicable model and use the proper tools.</div> <div>(Failure to heed this warning may result in electric shock, fire and/or bodily injury.)</div> <div> Be sure to follow this instruction.</div>		
<div>◇ <b>Proper electric work</b></div> <div>Use the electric wires designated for electric work, and conduct electric work in accordance with the "Electric Installation Engineering Standard", the "Indoor Wiring Regulations" and the installation instructions.</div> <div>(Improper connection or wiring installation may result in electric shock and/or fire.)</div> <div> Be sure to follow this instruction.</div>	<div>◇ <b>Replace damaged and/or degraded parts</b></div> <div>Be sure to replace the power-supply cord and lead wires in the event that they are damaged and/or degraded.</div> <div>(Failure to heed this warning may result in electric shock and/or fire.)</div> <div> Be sure to follow this instruction.</div> <div>◇ <b>Check insulation</b></div> <div>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.</div> <div>(Inadequate insulation may cause electric shock.)</div> <div> Be sure to follow this instruction.</div>		

<div><b>Caution</b></div> <div>Incorrect handling of the product may result in serious injury or damage to properties including buildings and equipment.</div>	
<div>◇ <b>Caution for injury</b></div> <div>Do not conduct any work at a location where you do not have a sure footing.</div> <div>(Failure to heed this caution may result in a fall.)</div> <div><div>Prohibited</div></div>	<div>◇ <b>Wear gloves</b></div> <div>Wear gloves when conducting work.</div> <div>(Failure to heed this caution may result in injury to your hands from sharp metal or other edges.)</div> <div><div>Be sure to follow this instruction.</div></div>

## Request for repair

- Inspect the grounding, and repair it if incomplete. Make sure that a power supply isolator or an overload protection device is being installed, if not, recommend the dealer to install one.
- Make sure that the product operates properly upon completion of repair. Clean the product as well as the surrounding area, and then notify the customer of the completion of repair.

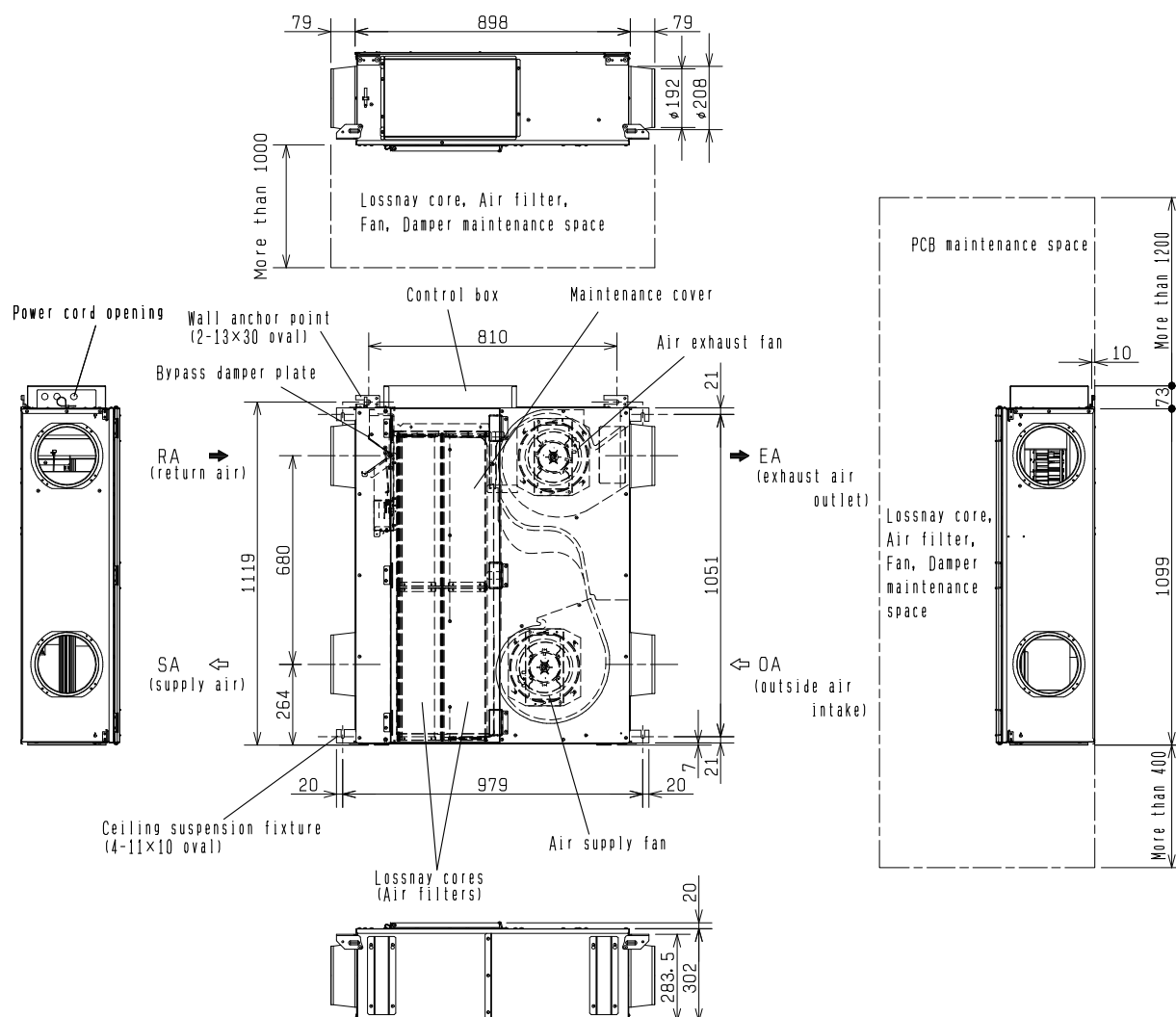
## 2. Names of components



### 3. Specifications

Model		LGH-50RSDC-E										
Heat exchange system		Air-to-air Total heat exchange (sensible heat + latent heat exchange)										
Heat exchange element material		Partition · spacing plate-special treated paper										
Cladding		Galvanized steel sheet										
Heat insulating material		Self-extinguishing urethane foam										
Motor		DC brushless motor. Two units										
Blower		220 mm diameter. Centrifugal fan										
Filter material		Non-woven fabrics filter (Gravitational method 82%, EU-G3)										
Applicable air condition of setting environment		The setting air condition shall be between -10°C to 40°C, 80%RH or less.										
Applicable air condition range of outdoor and indoor		OA temperature shall be -15°C to 40°C, 80%RH or less, with general air conditioning room environment.										
Functions		Lossnay ventilation five speeds / Bypass ventilation (five speeds + power)										
Weight		48 kg										
Frequency / Power source		50 Hz / Single phase 220-240 V										
Ventilation mode		Lossnay (Energy recovery) ventilation					Bypass ventilation					
Fan speed (230 V)		1	2	3	4	5	Power	1	2	3	4	5
Current	[A]	1.17	0.67	0.35	0.20	0.13	1.80	1.20	0.70	0.35	0.20	0.13
Power Consumption	[W]	165	90	41	22	14	265	164	90	40	21	14
Air volume	[m³/h]	395	305	215	144	90	468	395	305	215	144	90
	[l/s]	110	85	60	40	25	130	110	85	60	40	25
External static pressure	[mmH <sub>2</sub> O]	10.2	6.1	3.1	1.5	0.7	13.8	10.2	6.1	3.1	1.5	0.7
	[Pa]	100	60	30	15	7	135	100	60	30	15	7
Temperature exchange efficiency	[%]	77.5	81.5	85.5	88	90	-	-	-	-	-	-
Enthalpy exchange efficiency [%]	Heating	71	75	79	82	84	-	-	-	-	-	-
	Cooling	68	72.5	77	80.5	83	-	-	-	-	-	-
Noise [dB]	Measured at 1.5 m under the center of panel in an anechoic chamber	31	26.5	21	18	18	35	31	26.5	21	18	18
Starting current		2.5 A or less										
Insulation resistance		10 MΩ or more (500 V megger)										
Dielectric strength		AC 1500 V 1 minute										

## 4. Outside dimensions



## ■ Attention

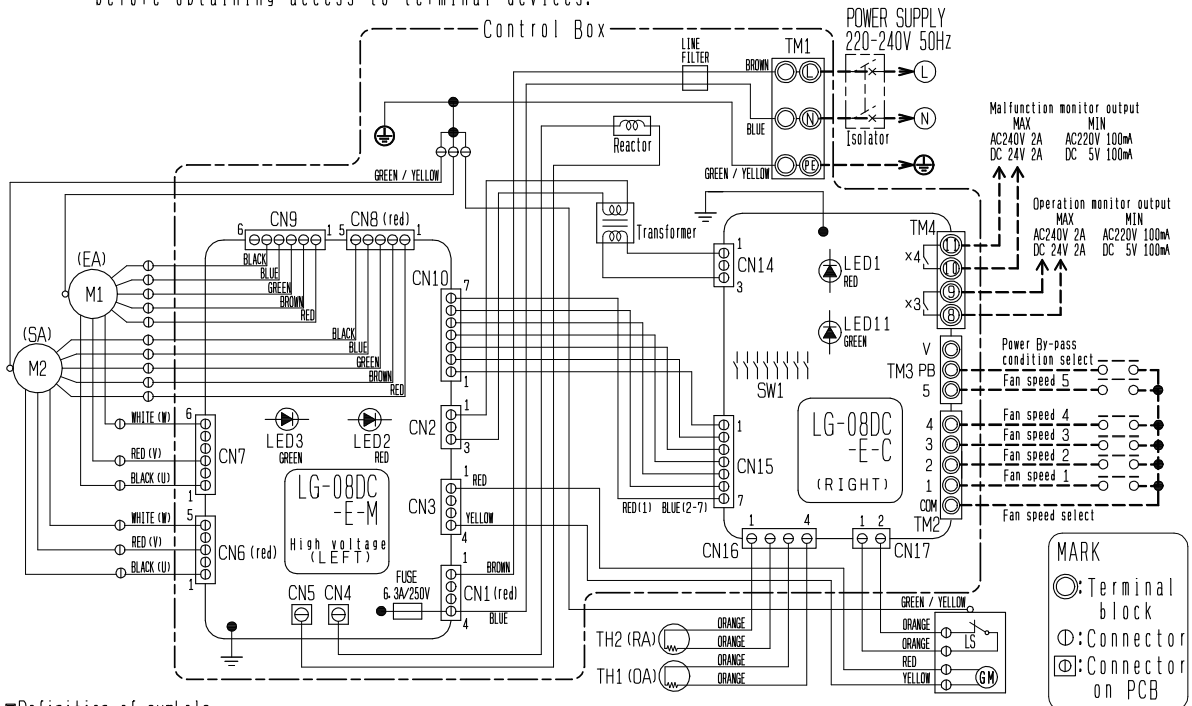
1. When using the product where it is exposed to high temperatures and humidity (40°C or higher, RH 80% or higher), or where fog occurs frequently, moisture is likely to condense in the core, and may result in condensation build up in the unit. The product should not be used under such conditions.
2. Outdoor air may enter the Lossnay owing to the pressure difference between indoor and outdoor or external winds even when the product is not operated. It is recommended to install an Electrically operated damper to block the outdoor air.
3. In a cold weather area, an area with strong external winds or where fog occurs frequently, cold outdoor air, external winds or fog may be introduced into the product when its operation is stopped.  
It is recommended to install an Electrically operated damper.
4. When using the product in an environment where there is a window, or opening near the outdoor louver, where insects are likely to gather around the interior or exterior light, take note that small insects may intrude into the product.
5. In a cold weather area, or others, dewing or freezing could occur on the main unit, where the duct is connected, or other sections, depending on the conditions of outdoor air and indoor temperature and moisture, even if they are within the range of operating conditions. Make sure to confirm the operating conditions and other precautions, and do not use the product if dewing or freezing is anticipated.
6. The outside ducts must be tilted at a gradient (1/30 or more) down toward the outdoor louver from Lossnay, and properly insulated.  
(The entry of rain water may cause power leakage, fire, or damage to household property)
7. All ducts must be covered with heat-insulating material in order to prevent condensation from forming.
8. The space for cleaning filters or maintenance parts should be provided as outside dimensions.

\*Specifications may be subject to change without notice.

Unit (mm)

## 5. Electrical wiring diagram

- NOTE
1. Connect the wires show as dotted lines.
  2. Be sure to connect the ground wire.
  3. A power supply isolator must be installed when wiring power supply to unit.
  4. Always use a single pole isolator for the main switch power connection.
  5. If using earth leakage breaker for isolator, rating of sensed current should be more than 10mA.
  6. All supply circuits must be disconnected, and do not touch the components for more than 5 minutes, before obtaining access to terminal devices.



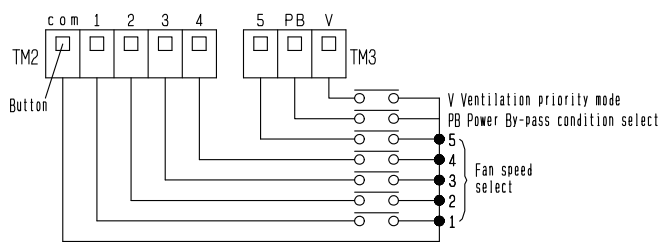
### ■Definition of symbols

M1 :Motor for exhaust fan  
M2 :Motor for supply fan  
GM :Motor for Bypass damper  
LS :Micro switch

TH1:Thermistor for outside air  
TH2:Thermistor for return air  
TM1:Terminal block(Power supply)  
TM2:Terminal block(Fan speed selection)  
TM3:Terminal block(By-pass mode selection)  
TM4:Terminal block(Monitor output)

LED1(red):Power supply indicator lamp  
LED2(red):Inspection indicator lamp  
LED3(green):Inspection indicator lamp  
LED11(green):Inspection indicator and trial operation lamp  
CN1:Connector(Power supply)  
CN2:Connector(Transformer primary)  
CN3:Connector(Motor for By-pass damper)  
CN4:Connector(Reactor)  
CN5:Connector(Reactor)

CN6:Connector(Supply fan motor)  
CN7:Connector(Exhaust fan motor)  
CN8:Connector(Signal for supply fan motor)  
CN9:Connector(Signal for exhaust fan motor)  
CN10:Connector(Signal line)  
CN14:Connector(Transformer secondary)  
CN15:Connector(Signal line)  
CN16:Connector(Thermistor)  
CN17:Connector(Micro switch)



### ■ Caution

- Power By-pass mode is not available even if only PB contact is on.  
When turning on Power By-pass contact with any fan speed contacts on, unit operation becomes Power By-pass mode.
- Be sure to connect Fan speed 5 wiring. Set 5 fanspeed for 24hours ventilation.
- Fan operating may be delayed from the time of contact ON depending on the select timing.
- By-pass damper is automatically operated based on the OA and RA temperature.

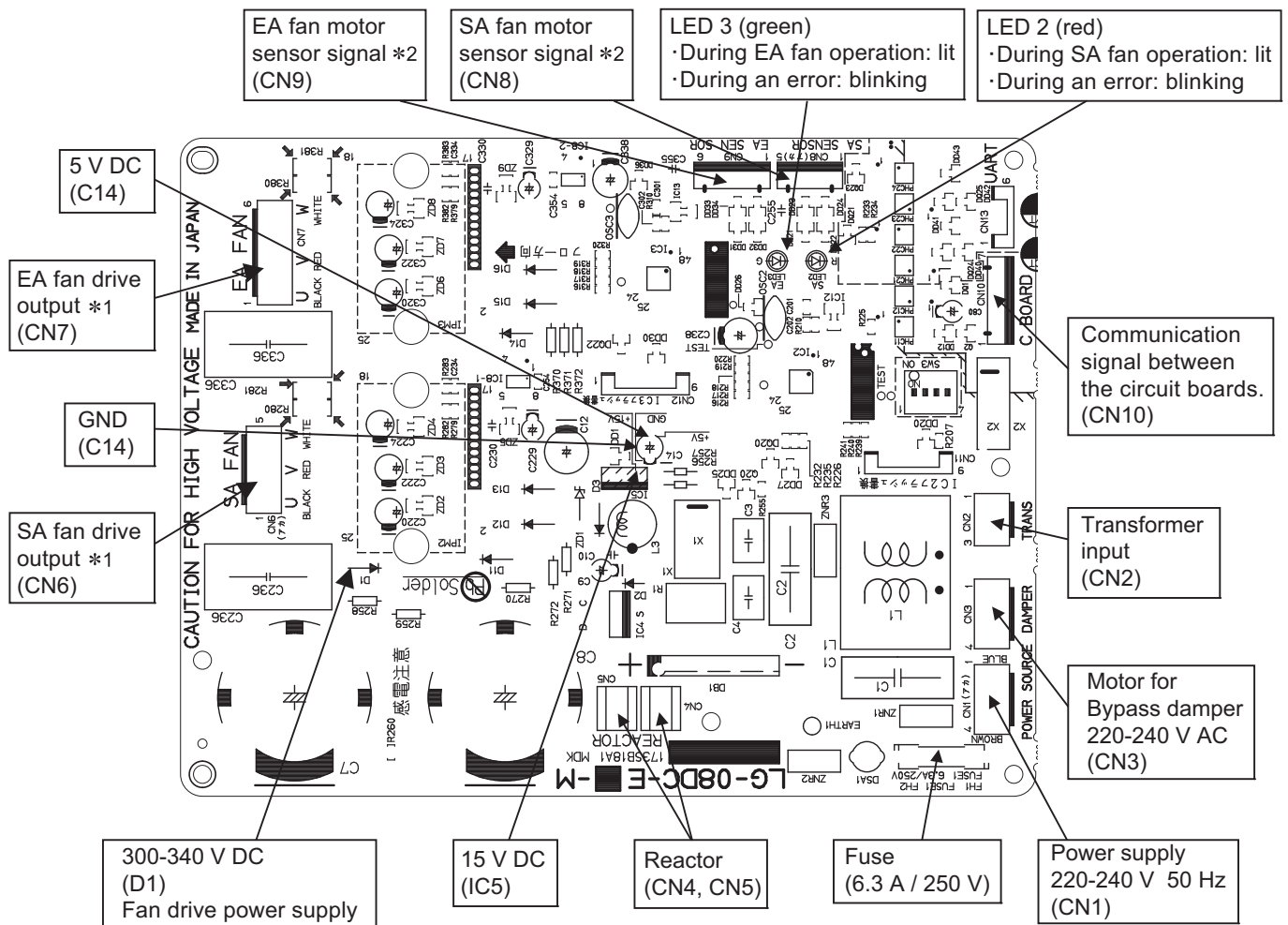
- contact :12VDC 10mA  
cable for operation:0.5mm<sup>2</sup>to 1.0mm<sup>2</sup>  
maximum length :20m from terminal block  
peeling wire length:9~10mm
- Do not connect multiple wires on the one terminal.
  - Always separate the power supply cable and the cable to the control unit by 10 cm or more to prevent malfunctioning of the unit.
  - If the length of the stripped power cables wires is too long, the conductors may touch and cause shorting.
  - Power supply cable size:1.5mm<sup>2</sup> or more

※Specifications may be subject to change without notice.

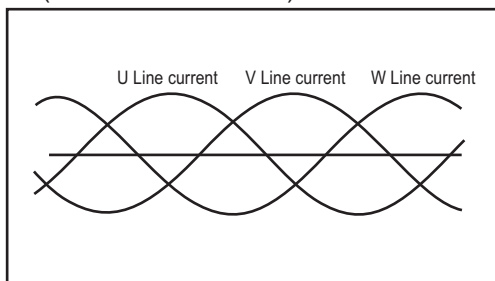
## 6. Basic circuit diagrams

### ● Circuit board diagrams and check points

#### (1) Large PCB (printed circuit board) (Left)

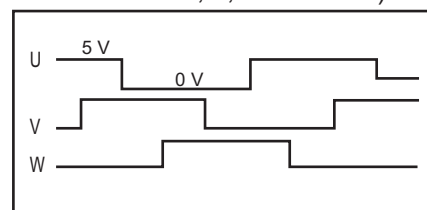


\*1 Current waveform of the fan drive output  
(Current of each line)



Although the current cycle and value varies with the operational status, each current waveform is a sine wave with a phase difference by 120 degrees.  
Note) Noise is included in the actual waveform.

\*2 Voltage waveform of the fan motor sensor signal  
(Voltage between the lead wires of the connectors 2, 3, 4 and GND)

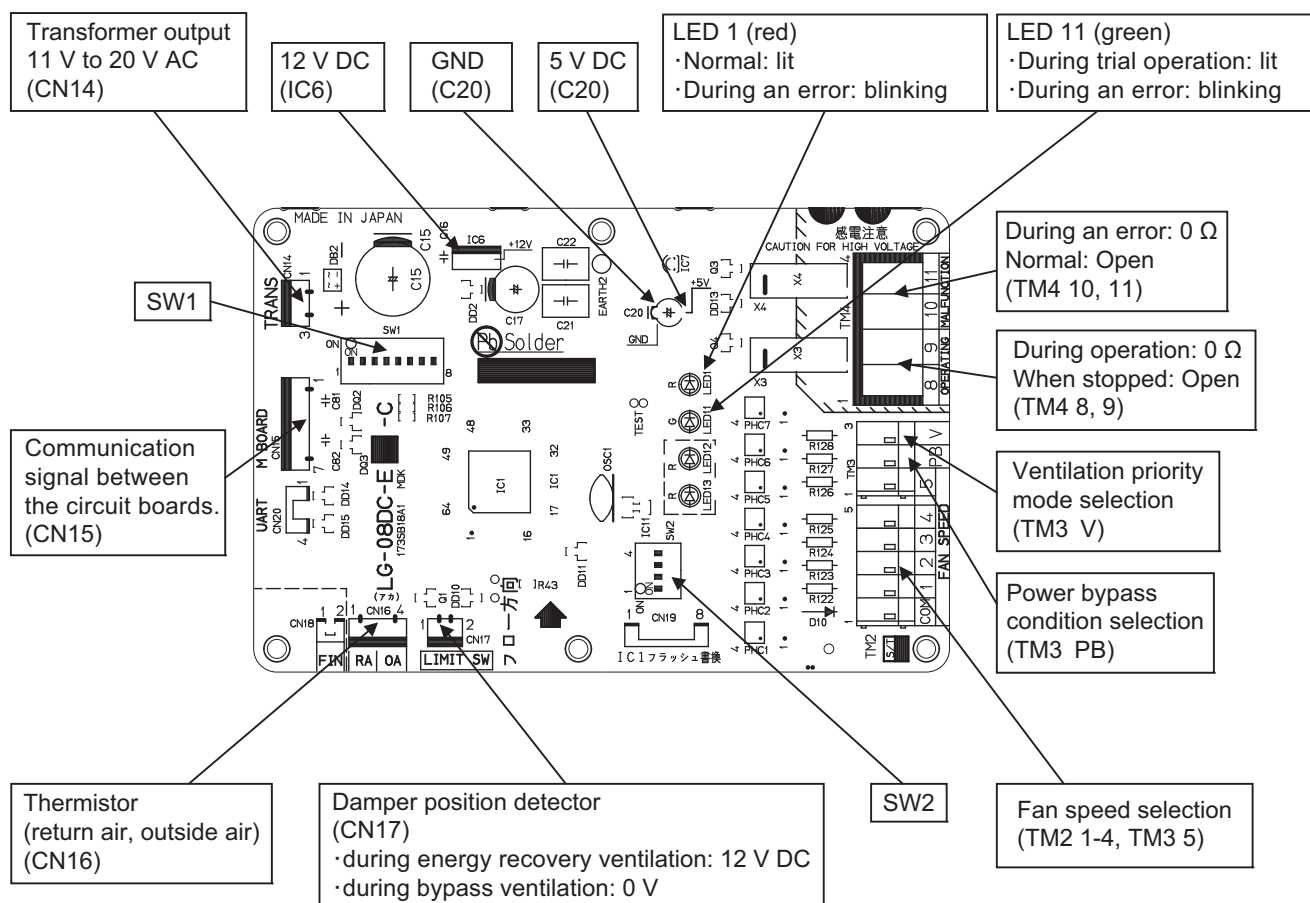


The voltage cycle varies with the operational status (rotational frequency).  
Each signal has 50% duty cycle of H (5 V) and L (0 V), and there is a phase difference by 120 degrees.  
Note) Noise is included in the actual waveform.

### ● CAUTION

Live parts of the large PCB is not insulated from the power supply.  
Even after turning off the power, the capacitors on the circuit boards are still charged.  
Wait more than 5 minutes before servicing.

## (2) Small PCB (right)



## 7. Fundamentals of operation

### ● Description of the PCB

#### (1) Air volume control

Fan speed selection (TM2, TM3)	Operation	Air volume (Reference value under rated static pressure)	
		(m³/h)	(l/s)
All contacts : OFF	Stop	0	0
Speed 1 (Contact between 1 and COM) : ON	Running	395	110
Speed 2 (Contact between 2 and COM) : ON		305	85
Speed 3 (Contact between 3 and COM) : ON		215	60
Speed 4 (Contact between 4 and COM) : ON		144	40
Speed 5 (Contact between 5 and COM) : ON		90	25
Power bypass (Contact between PB and COM) : ON		468	130

\*1 Power bypass will be enabled when any of fan speed contacts (1 to 5) are ON. (The fan will not operate when only the power bypass contact is turned ON.)

\*2 It needs 5 seconds to change air volume (including OFF) after the fan speed is selected.

\*3 When multiple fan speeds are selected simultaneously, the higher fan speed will be performed.

#### ① Fan speed fine-tuning

Fan speed can be fine-tuned by the dip switch SW 2 on the circuit board.

	ON	OFF	Operation
SW 2	2		All supply air fan speeds are default settings.
	1		
	2		Each of the supply air fan speed settings except power bypass mode is increased.
	1		
	2		Each of the supply air fan speed settings is decreased.
	1		
	4		All exhaust fan speeds are default settings.
	3		
	4		Each of the exhaust fan speed settings except power bypass mode is increased.
	3		
	4		Each of the exhaust fan speed settings is decreased.
	3		

#### ② Automatic air volume increasing during bypass setting

Fan speed will automatically increase 1 step higher than its present speed if both conditions are met:

- The dip switch SW 1-7 on the circuit board is ON.
- Operation mode is switched to bypass ventilation from energy recovery ventilation (with a summer criteria) in automatic ventilation mode.

Example 1 : Speed 3 operation → Speed 2 operation

Example 2 : Speed 1 operation → Power bypass operation

(If the operation mode is switched to energy recovery ventilation from bypass ventilation, fan speed will return to its original speed.)

### ③ Cold region operation mode

When using the unit in cold region, set the air supply (SA) fan in the SA intermittent operation mode to prevent the energy recovery core from freezing. The fan operation is based on the measured outside air (OA) temperature as below.

Operation mode	OA temperature	SA fan	EA fan
Normal	$-10^{\circ}\text{C} < \text{OA temperature}$	Continuous running *1 *2	Continuous running
SA intermittent	$-15^{\circ}\text{C} < \text{OA temperature} \leq -10^{\circ}\text{C}$	Repeat 10 min. stop / 60 min. running *1 *2	Continuous running
SA stopped	$\text{OA temperature} \leq -15^{\circ}\text{C}$	Repeat 55 min. stop / 5 min. running *1 *2	Continuous running *3

\*1 The operation mode will be decided 5 minutes after the normal operation during startup.

\*2 The running condition does not change while the SA fan stops or 1 minute after startup. (OA temperature is voided.)

\*3 When the switch SW 1-3 is on, the EA fan operates at fan speed 5 during 55-minute stop of the SA fan.

## (2) Damper motor control

### ① Automatic ventilation mode

Automatic ventilation algorithm patterns are switched by the OA • RA (return air) thermistor and function setting switch SW 1-6.

Function setting switch SW1-6	OA temperature criteria in the summer season	Automatic ventilation algorithm
OFF (factory setting)	$17^{\circ}\text{C}$ or higher	Automatic ventilation pattern 1 (chart 1)
ON	$28^{\circ}\text{C}$ or higher	Automatic ventilation pattern 2 (chart 2)

### ② Power bypass mode

When turning on the TM3 PB contact with any fan speed contacts (1 to 5) on, operation mode will be switched to bypass ventilation. Then, fan speed will be also increased to Power bypass speed.

### ③ Ventilation priority mode

When turning on the TM3 V contact with any fan speed contacts (1 to 5) on, operation mode (energy recovery or bypass) can be fixed by the function setting switch SW 1-4. (Fan speed will not be changed in the bypass ventilation mode.)

Function setting switch SW1-4	Ventilation priority mode
OFF (factory setting)	Bypass ventilation fixed
ON	Energy recovery ventilation fixed

### ④ Prohibition of the bypass ventilation

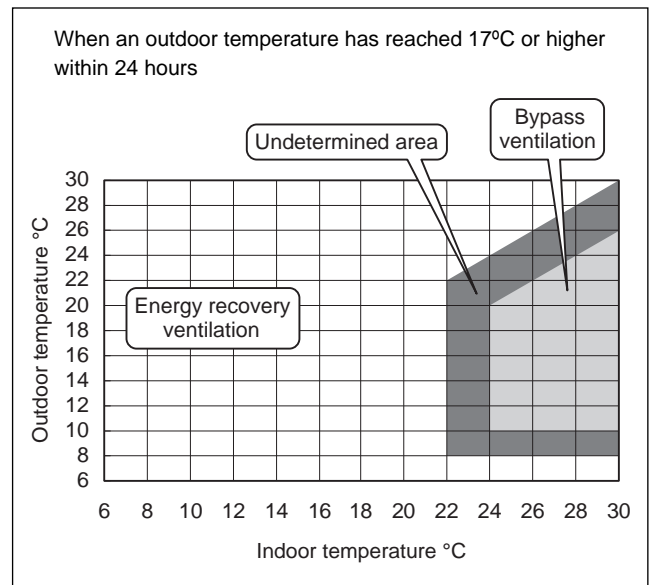
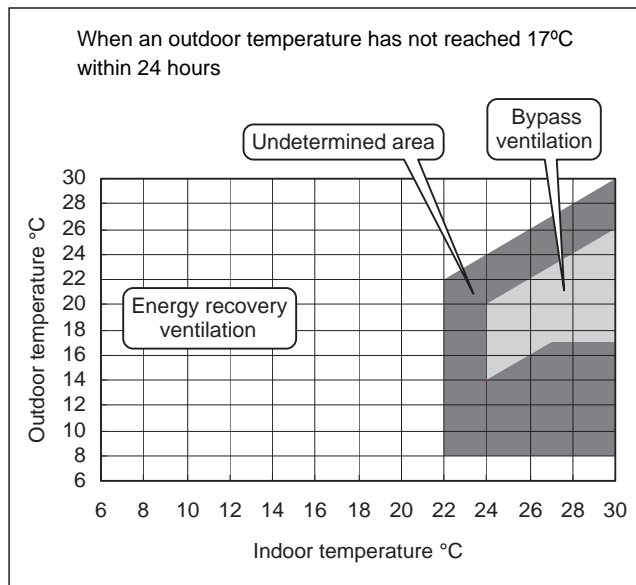
In case of the situations below, bypass ventilation will be disabled, and energy recovery ventilation setting will be activated.

- OA temperature  $\leq 8^{\circ}\text{C}$  (for dew condensation prevention)
- OA • RA thermistor failure.

## ⑤ Automatic ventilation algorithm temperature chart

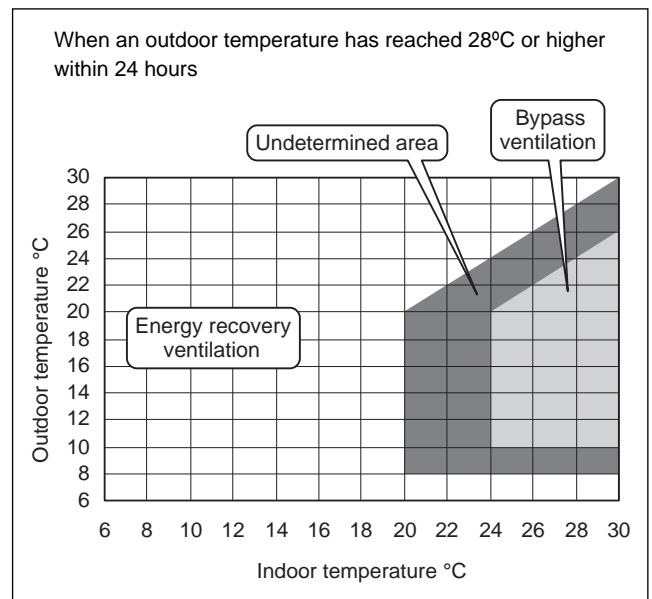
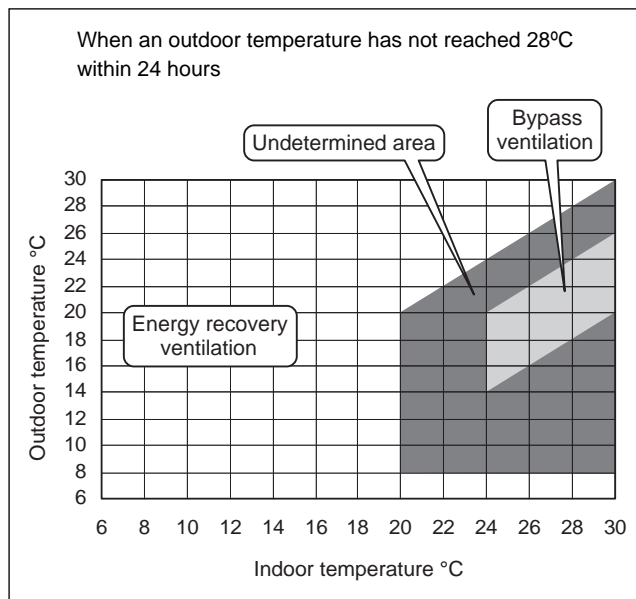
<Pattern 1>

**Chart 1. Automatic ventilation algorithm temperature chart during the switch SW 1-6 OFF setting.**



<Pattern 2>

**Chart 2. Automatic ventilation algorithm temperature chart during the switch SW 1-6 ON setting.**



\* Undetermined area

When operation starts under this condition, energy recovery ventilation will be activated.

When this condition is reached after operation starts, the current ventilation mode is maintained.

### (3) Operation monitor output

When the function setting switch SW 1-2 (for operation monitor output with delay function) is set to OFF, and the switch SW 1-5 (for operation monitor output) is set to ON, the operation monitor signal can be output from the monitor terminal block ⑧ and ⑨ (TM4) on the circuit board.

SW 1-2	OFF	
SW 1-5	ON	
Signal type	Uncharged a-contact	
Contact specifications	Maximum load	220-240 V AC 2 A 24 V DC 2 A
	Minimum load	5 V DC 100 mA
Operation	Stopping	Monitor output : Off (contact : open)
	Running	Monitor output : On (contact : close)

### (4) Operation monitor output with delay function

When the function setting switch SW 1-2 (for operation monitor output with delay function) is set to ON, the operation monitor signal from the monitor terminal block ⑧ and ⑨ (TM4) on the circuit board is shown as below.

SW 1-2	ON	
Signal type	Uncharged a-contact	
Contact specifications	Maximum load	220-240 V AC 2 A 24 V DC 2 A
	Minimum load	5 V DC 100 mA
Operation	OA temperature $\leq -5^{\circ}\text{C}$	Monitor output : On (contact : close) 10 seconds after air supply fan operates
	OA temperature $\geq 15^{\circ}\text{C}$	Monitor output : Off (contact : open)
	The fan continues to operate for 3 minutes, after operation monitor output has been OFF by the Lossnay stopping control.	

### (5) Malfunction monitor output

The malfunction monitor signal can be output from the monitor terminal block ⑩ and ⑪ (TM4) on the circuit board.

Signal type	Uncharged a-contact	
Contact specifications	Maximum load	220-240 V AC 2 A 24 V DC 2 A
	Minimum load	5 V DC 100 mA
Operation	Normal	Monitor output : Off (contact : open)
	During an error	Monitor output : On (contact : close)

## (6) Trial operation function

This is a function for operating the Lossnay without external signals (contact signals). With this function, connecting condition of the AC power supply line and the wirings can be confirmed. Also, the Lossnay can be forced to operate in case of system down.

How to set	Turn on the trial operation switch SW 1-1.
SA fan operation	Speed 1
EA fan operation	Speed 1
Operation mode	Energy recovery ventilation, after 1 minute bypass ventilation
LED 11	Lit
Operation monitor output (TM4 ⑧ and ⑨)	When SW 1-2 (Operation monitor output with delay function) is ON, or SW 1-5 (Operation monitor output) is ON, Monitor output : On (contact : close)

## (7) LED display

Small PCB (right)			Large PCB (left)		
LED	Display	Condition	LED	Display	Condition
LED 1 (red)	Unlit *1	No power supplied	LED 2 (red)	Unlit	SA fan stopping
	Lit	Power supplied		Lit	SA fan running
	Blinking	Error		Blinking	Error
LED 11 (green)	Unlit *1	Normal	LED 3 (green)	Unlit	EA fan stopping
	Lit	In trial operation		Lit	EA fan running
	Blinking	Error		Blinking	Error

\*1 When one of LED 1 and LED 11 is blinking, the other one will be unlit.

\*2 In case multiple errors have occurred at the same time, each LED will blink simultaneously.

## (8) Function setting switches

### SW1

1		Trial operation
2		Operation monitor output with delay function
3		Setting for exhaust fan in cold region operation mode
4		Ventilation priority mode during ventilation setting input on
5		Operation monitor output
6		Bypass auto ventilation priority setting
7		Automatic air volume increasing during bypass setting
8		Not to used

### SW2

4		Decreasing exhaust fan power
3		Increasing exhaust fan power
2		Decreasing supply fan power
1		Increasing supply fan power

- All switches are OFF at factory setting.

#### 1 Trial operation (Refer to (6) (page 14).)

	OFF	ON	Operation
SW1	1		Normal operation
	1		Trial operation

#### 2 Operation monitor output with delay function (TM4 ⑧ ⑨)

	OFF	ON	Operation
SW1	2		Not available
	2		Available (Refer to (4) (page 13).)

#### 3 Exhaust fan speed setting in cold region operation mode (Refer to (1) ③ (page 11).)

	OFF	ON	Operation
SW1	3		Not fixed
	3		Exhaust fan : speed 5 fixed

#### 4 Ventilation priority mode during ventilation setting input on (Refer to (2) ③ (page 11).)

	OFF	ON	Operation
SW1	4		Bypass ventilation mode fixed
	4		Lossnay (Energy recovery) ventilation mode fixed

\* Below 8°C, even SW1-4 is fixed any setting, ventilation mode should be Lossnay (Energy recovery) ventilation.

#### 5 Operation monitor output (TM4 ⑧ ⑨)

	OFF	ON	Operation
SW1	5		Not available
	5		Available (Refer to (3) (page 13).)

\* During SW1-2 on, operation monitor output is prior to "2 operation monitor output with delay function".

#### 6 Bypass automatic ventilation priority setting (Refer to (2) ⑤ (page 12).)

	OFF	ON	Operation
SW1	6		When outdoor temperature is 17°C or higher within 24 hours, then bypass ventilation starts by comparison OA and RA.
	6		When outdoor temperature is 28°C or higher within 24 hours, then bypass ventilation starts by comparison OA and RA.

#### 7 Automatic air volume increasing during bypass setting

	OFF	ON	Operation
SW1	7		Not increasing.
	7		When unit is in bypass operation except power bypass mode, the unit fan speed is automatically increased 1 step.

#### 8 Fan speed fine-tuning

	ON	OFF	Operation
SW2	2	1	All supply air fan speeds are default settings.
	2	1	
	2	1	Each of the supply air fan speed settings except power bypass mode is increased.
	2	1	Each of the supply air fan speed settings is decreased.
	4	3	All exhaust fan speeds are default settings.
	4	3	
	4	3	Each of the exhaust fan speed settings except power bypass mode is increased.
	4	3	Each of the exhaust fan speed settings is decreased.

## 8. Troubleshooting

### ■ Work precautions

- When removing or touching a transformer, printed circuit board or other parts, make sure to turn off the power supply isolator. Even after disconnecting the power supply isolator, the voltage is still high in the capacitors on the printed circuit boards. Wait more than 5 minutes, and make sure a voltage is low by using a tester, before servicing.
- When removing the circuit board, always hold it at both ends and remove carefully so as not to apply force to the surface mounted parts.
- When removing the circuit board, be careful of the metal edges on the board.
- When removing or inserting the connectors for the circuit board, hold the entire housing section. Never pull on the lead wires.
- When servicing, be sure to recreate the malfunction two or three times before starting repairs.
- When reconnecting the power supply, wait more than 5 minutes after power-off, and then turn it on again.
- If it is thought that there is a printed circuit board malfunction, check for disconnected wires in the print pattern, burnt parts or discoloration.
- If the printed circuit board is replaced, make sure that the switch settings on the new board are the same as the old board.

\* Part names used in the following text correspond to those listed in the parts catalog.

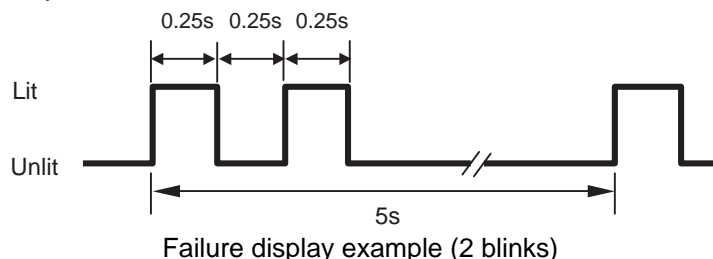
### (1) Checkpoints for installation condition

No.	Checkpoints
1	Do the wiring diameters and capacity of the motor breaker and the ground-fault interrupter meet specifications?
2	Is the specified power (220-240 V AC 50 Hz) supplied to the power terminal (TM1)?
3	Do the wirings for the fan speed and bypass condition selections meet specifications? <ul style="list-style-type: none"><li>• Contact: 12 V DC 10 mA</li><li>• Diameter of cables : 0.5 mm<sup>2</sup> to 1.0 mm<sup>2</sup></li><li>• Maximum length : 20 m from terminal block</li><li>• Wire peeling length : 9-10 mm</li></ul>
4	Are the wirings for fan speed and bypass condition selections correct?
5	Are the wires for fan speed and bypass condition selections more than 10 cm away from the power supply cable?
6	Are the connected terminal blocks of the wires for fan speed and bypass condition selections correct? (TM2 1-4 and TM3 5 are for fan speed selection. TM3 PB and V are for bypass condition selection.)
7	Is each wire securely connected to the terminal blocks?
8	Are external signals correctly input to TM2 and TM3 on the circuit board?
9	Is the output capacity of the operation and malfunction monitors within rated range? Operation monitor output : Maximum 220-240 V AC/ 24 V DC 2 A, minimum 5 V DC 100 mA Malfunction monitor output : Maximum 220-240 V AC/ 24 V DC 2 A, minimum 5 V DC 100 mA

## (2) Troubleshooting and repair method

### ① When any LEDs on the circuit boards are blinking

The type of failure is shown by the number of blinking times of LED 1 (red), LED 11 (green), LED 2 (red) and LED 3 (green) on the circuit boards. The LED blink interval is 0.25 seconds for both lit and unlit. The display duration is approximately 5 seconds.



Checklist of LED failure displays

LED 1 (red)	LED 11 (green)	LED 2 (red)	LED 3 (green)	Symptom	Cause	Corrective action
2 blinks	-	1 blink	-	SA fan over-current failure	Overcurrent occurred at the SA fan motor.	Turn off the power supply, wait more than 5 minutes, and then turn it on again.
					SA fan motor malfunction	Check the coil resistance of the fan motor. If it has a defect, replace the fan motor.
					Large circuit board malfunction	Replace the circuit board if none of above related actions works.
-	2 blinks	-	1 blink	EA fan over-current failure	Overcurrent occurred at the EA fan motor.	Turn off the power supply, wait more than 5 minutes, and then turn it on again.
					EA fan motor malfunction	Check the coil resistance of the fan motor. If it has a defect, replace the fan motor.
					Large circuit board malfunction	Replace the circuit board if none of above related actions works.
2 blinks	-	3 blinks	-	Fan drive voltage failure (Undervoltage)	The power supply voltage is low (150 V AC or lower).	Check the power supply voltage. (220-240 V AC 50 Hz)
					Large circuit board malfunction	Replace the circuit board if none of above related actions works.
2 blinks	-	4 blinks	-	Fan drive voltage error (Overvoltage)	The power supply voltage is high (320 V AC or higher).	Check the power supply voltage. (220-240 V AC 50 Hz)
					Large circuit board malfunction	Replace the circuit board if none of above related actions works.
2 blinks	-	5 blinks	-	SA fan operation failure	The SA fan does not rotate properly.	Check whether the fan turns by hand.
					SA fan motor wire connection error	Check the wiring of the connector (CN6) on the circuit board and the fan motor.
					SA fan motor malfunction	Check the coil resistance of the fan motor. If it has a defect, replace the fan motor.
					SA fan motor sensor malfunction	Check the signal voltage of the fan motor sensor. If it has a defect, replace the fan motor.
					Large circuit board malfunction	Replace the circuit board if none of above related actions works.

\* In case multiple errors have occurred at the same time, each LED will blink simultaneously.

\* When reconnecting the power supply, wait more than 5 minutes after power-off, and then turn it on again.

LED 1 (red)	LED 11 (green)	LED 2 (red)	LED 3 (green)	Symptom	Cause	Corrective action
-	2 blinks	-	5 blinks	EA fan operation failure	The EA fan does not rotate properly.	Check whether the fan turns by hand.
					EA fan motor wire connection error	Check the wiring of the connector (CN7) on the circuit board and the fan motor.
					EA fan motor malfunction	Check the coil resistance of the fan motor. If it has a defect, replace the fan motor.
					EA fan motor sensor malfunction	Check the signal voltage of the fan motor sensor. If it has a defect, replace the fan motor.
					Large circuit board malfunction	Replace the circuit board if none of above related actions works.
2 blinks	-	6 or 7 blinks	-	SA fan motor sensor failure	Wire connection error of SA fan motor sensor	Check the wiring of the connector (CN8) on the circuit board and the fan motor sensor.
					SA fan motor sensor malfunction	Check the signal voltage of the fan motor sensor. If it has a defect, replace the fan motor.
					Large circuit board malfunction	Replace the circuit board if none of above related actions works.
-	2 blinks	-	6 or 7 blinks	EA fan motor sensor failure	Wire connection error of EA fan motor sensor	Check the wiring of the connector (CN9) on the circuit board and the fan motor sensor.
					EA fan motor sensor malfunction	Check the signal voltage of the fan motor sensor. If it has a defect, replace the fan motor.
					Large circuit board malfunction	Replace the circuit board if none of above related actions works.
9 blinks	9 blinks	9 blinks	9 blinks	Communication failure between the circuit boards *1	Connection error between the circuit boards	Check the connections of the connectors (CN10, CN15) on the circuit boards.
					The external signal wires and power supply cable are too close.	Keep the wires for fan speed and bypass condition selections more than 10 cm away from the power supply cable.
					Connection error of transformer	Check the connection of the connectors (CN2, CN14) on the circuit boards.
					Transformer malfunction	Check the output of the transformer. If it has a defect, replace the transformer.
					Connection error of reactor	Check the connection of the connectors (CN4, CN5) on the circuit board.
					Reactor malfunction	Check the resistance of the reactor. If it is open, replace the reactor.
					Circuit boards malfunction	Replace both circuit boards if none of above related actions works.

\*1 Each LED does not blink simultaneously in some cases.

\* In case multiple errors have occurred at the same time, each LED will blink simultaneously.

\* When reconnecting the power supply, wait more than 5 minutes after power-off, and then turn it on again.

LED 1 (red)	LED 11 (green)	LED 2 (red)	LED 3 (green)	Symptom	Cause	Corrective action
3 blinks	-	-	-	Damper failure	Damper plate operation error	Remove the rod, and then check whether the damper plate moves by hand. For removing the rod, open the maintenance cover and remove the guards from the unit.
					Wire connection error of the damper unit	Check the wiring of the connectors (CN3, CN17) on the circuit boards and the damper unit.
					Connection error between the circuit boards	Check the connection of the connectors (CN10, CN15) on the circuit boards.
4 blinks	-	-	-	OA thermistor failure	Connector connection error of thermistor	Check the wiring of the connector (CN16) on the circuit board and the thermistor.
					Thermistor malfunction	Check the resistance of the thermistor. If it has a defect, replace the thermistor.
5 blinks	-	-	-	RA thermistor failure	Connector connection error of thermistor	Check the wiring of the connector (CN16) on the circuit board and the thermistor.
					Thermistor malfunction	Check the resistance of the thermistor. If it has a defect, replace the thermistor.
8 blinks	-	-	-	External device error (when the switch SW 1-2 is ON)	The following conditions developed. • OA temperature is still -10°C or lower, 60 minutes after the TM4 8,9 output started. • OA temperature is 15 °C or higher within 15 minutes after the TM4 8,9 output started.	When external devices are connected, check the external devices. When external devices are not connected, check the switch SW 1-2.

\* In case multiple errors have occurred at the same time, each LED will blink simultaneously.

\* When reconnecting the power supply, wait more than 5 minutes after power-off, and then turn it on again.

#### LED displays (Normal)

LED 1 (red)	LED 11 (green)	LED 2 (red)	LED 3 (green)	Contents	Descriptions
Lit * 2	-	-	-	Power supplying to the circuit board	Lit when the power is supplying to the circuit board.
-	Lit * 2	-	-	Trial operation	Lit during trial operation (SW 1-1 ON).
-	-	Lit	-	SA fan operation	Lit during the SA fan operation.
-	-	-	Lit	EA fan operation	Lit during the EA fan operation.

\* 2 When one of LED 1 and LED 11 is blinking (during an error), the other one will be unlit.

\* All LEDs are temporarily lit just after power-on.

② When the unit does not operate or operates irregularly

No.	Symptom	Cause	Corrective action
1	The fans do not operate.	Power is not supplied to the unit.	Check the power supply. (200-240 V AC 50 Hz)
		Power supply voltage is out of rated range.	Check the power supply. (220-240 V AC 50 Hz)
		<ul style="list-style-type: none"> <li>Improper connection or wiring of the external signals.</li> <li>The type of external signals does not match the connected terminal block.</li> </ul>	Check the connections of the external signal wires and the terminal blocks (TM2, TM3). (TM2 1-4 and TM3 5 are for fan speed selection.) (TM3 PB is for bypass condition selection.) (TM3 V is for ventilation priority mode.)
		The type of external signals is incorrect. (Uncharged a-contact)	Check the type of external signals.
		The external device signals are not input.	Check the external devices.
		The signal cables from the external devices are longer than specified.	Check the wiring length of the signal cables. (Make sure the wiring length from the external devices is within 20 m.)
		The external signal wires and the power supply cable are too close.	Keep the wires for fan speed and bypass condition selections more than 10 cm away from the power supply cable.
		Malfunction of the circuit board, or the fan motor	See the "Checklist of LED failure displays" (page 17).
2	<ul style="list-style-type: none"> <li>The fans do not stop.</li> <li>The fan speed does not change.</li> </ul>	The trial operation switch SW 1-1 is ON.	Check the trial operation switch SW 1-1.
		The external device signals are input.	Check the external devices.
		The external signal wires and the power supply cable are too close.	Keep the wires for fan speed and bypass condition selections more than 10 cm away from the power supply cable.
		The signal cables from the external devices are longer than specified.	Check the wiring length of the signal cables. (Make sure the wiring length from the external devices is within 20 m.)
3	Air volume changes by itself.	The function setting switch SW 1-7 (Automatic air volume increasing during bypass setting) is ON.	<p>If energy recovery ventilation mode is automatically switched to bypass ventilation with the switch SW 1-7 is ON, fan speed will increase 1 step higher than its present speed (with a summer criteria).</p> <p>If the operation mode is switched to energy recovery ventilation, fan speed will return to its original speed.</p> <p>Refer to 7. (1) ② (page 10). (This is not a failure.)</p>
4	The SA fan periodically stops operating.	<ul style="list-style-type: none"> <li>When <math>-15^{\circ}\text{C} &lt; \text{OA temperature} \leq -10^{\circ}\text{C}</math>, the SA fan regularly stops for 10 minutes to prevent the Lossnay core from freezing.</li> <li>When OA temperature is <math>-15^{\circ}\text{C}</math> or lower, The SA fan stops to prevent the Lossnay core from freezing.</li> </ul>	Refer to 7. (1) ③ (page 11). (This is not a failure.)

No.	Symptom	Cause	Corrective action
5	The SA fan periodically stops operating, and the EA fan air volume decreases.	When OA temperature is -15°C or lower, the SA fan stops operating to prevent the Lossnay core from freezing. Then, the EA fan runs at speed 5 if the switch SW 1-3 is ON.	Refer to 7. (1) ③ (page 11). (This is not a failure.)
6	After operation has been stopped, the fan continues to run for a while.	The function setting switch SW 1-2 (Operation monitor output with delay function) is ON.	When the switch SW 1-2 is ON, the fan continues to operate for 3 minutes after Lossnay operation has been stopped. Refer to 7. (4) (page 13). (This is not a failure.)
7	The damper plate does not operate.	When OA temperature is 8°C or lower, energy recovery ventilation mode is turned on.	Check the OA temperature.
		Trial operation switch SW 1-1 is ON.	Turn off the trial operation switch SW 1-1.
		Malfunction of the circuit board, or the damper motor	See the "Checklist of LED failure displays" (page 17).
	When the bypass condition selection signal (TM3 PB, V) is being used.	The type of external signals does not match the connected terminal block.	Check the connections of the external signal wires and the terminal blocks (TM2, TM3). (TM3 PB or V is for bypass condition selection)
		The type of external signals is incorrect. (Uncharged a-contact)	Check the type of external signals.
		The external device signals are not input.	Check the external devices.
		The signal cables from the external devices are longer than specified.	Check the wiring length of the signal cables. (Make sure the wiring length from the external devices is within 20 m.)
		The external signal wires and the power supply cable are too close.	Keep the wires for fan speed and bypass condition selections more than 10 cm away from the power supply cable.
		The function setting switch SW 1-4 (Ventilation priority mode during ventilation setting input on) is ON.	When the switch SW 1-4 and TM3 V input is ON, operation mode is fixed in energy recovery ventilation. Refer to 7. (2) ③ (page 11).
8	Operation monitor or malfunction monitor is not correctly output.	<ul style="list-style-type: none"> <li>The connected terminal block is incorrect.</li> <li>Connection error</li> <li>The function setting switch SW 1-2 or SW 1-5 is not set to ON.</li> </ul>	<ul style="list-style-type: none"> <li>Check the connections of the terminal blocks (TM4).</li> <li>Check the switch SW 1-2 (Operation monitor output with delay function) or SW 1-5 (Operation monitor output).</li> </ul>
9	LED 1 on the circuit board is not lit in spite of power supplying.	Connection error of the power supply lead wires	Check the wiring of the connector (CN1) and the power supply terminal block (TM1) on the circuit board.
		Connection error of the transformer	Check the connection of the connectors (CN2 and CN14) on the circuit board.
		Transformer malfunction	Check the transformer output. If it has a defect, replace the transformer.
		Disconnection of the fuse	Replace the circuit board.
		Malfunction of the small circuit board	Replace the circuit board if none of above related actions works.

③ Temperature and thermistor resistance table

Temperature (°C)	Resistance value (kΩ) (TYP)	Temperature (°C)	Resistance value (kΩ) (TYP)
-30	53.9 - ∞	16	7.0
⋮	⋮	17	6.7
-20	32.8	18	6.5
-19	31.3	19	6.2
-18	29.8	20	6.0
-17	28.4	21	5.8
-16	27.1	22	5.6
-15	25.9	23	5.4
-14	24.7	24	5.2
-13	23.5	25	5.0
-12	22.5	26	4.8
-11	21.5	27	4.7
-10	20.6	28	4.5
-9	19.6	29	4.3
-8	18.8	30	4.2
-7	18.0	31	4.0
-6	17.2	32	3.9
-5	16.4	33	3.8
-4	15.7	34	3.6
-3	15.1	35	3.5
-2	14.4	36	3.4
-1	13.9	37	3.3
0	13.3	38	3.2
1	12.8	39	3.1
2	12.2	40	3.0
3	11.7	41	2.9
4	11.2	42	2.8
5	10.8	43	2.7
6	10.4	44	2.6
7	9.9	45	2.5
8	9.5	46	2.4
9	9.2	47	2.4
10	8.8	48	2.3
11	8.5	49	2.2
12	8.1	50	2.1
13	7.8	⋮	⋮
14	7.5	90	0-0.7
15	7.3		

## 9. Overhaul procedure

### ■ Work precautions

- When touching the electric components such as circuit boards and fan motors, do not touch the components for more than 5 minutes after power-off, and then start servicing.
- Before replacing parts, repair troubled sections according to the instructions described in the troubleshooting.
- When servicing, always keep proper footing.
- When servicing, make sure that the cord is pulled out of the outlet, or the power supply isolator is off if no mains connector is built in the product, so as no electrical shock or injury to occur. Pay sufficient attention when working on the product.
- Always connect the power wire properly.
- After completing repairs, confirm that the main unit operates normally.
- Always wear gloves when servicing.

\* Part names used in the following text correspond to those listed in the parts catalog.

### (1) Turning power off

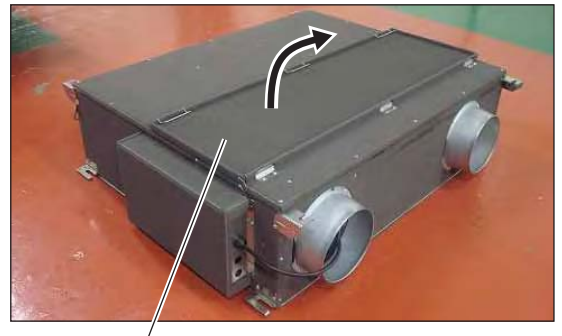
- ① Shutdown the unit.
- ② Turn off the power supply isolator on the distribution board.

#### Precaution

All supply circuit must be disconnected, and do not touch the components for more than 5 minutes, before obtaining access to the terminal devices.

### (2) Fan parts

- ① Open the maintenance cover.

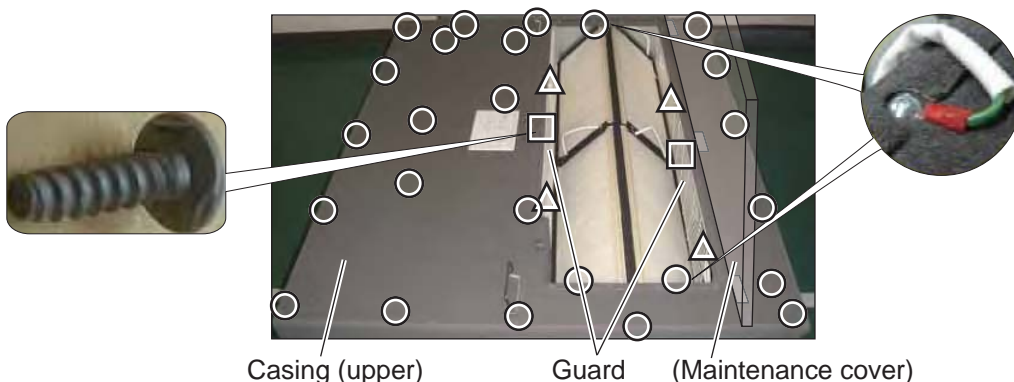


Maintenance cover

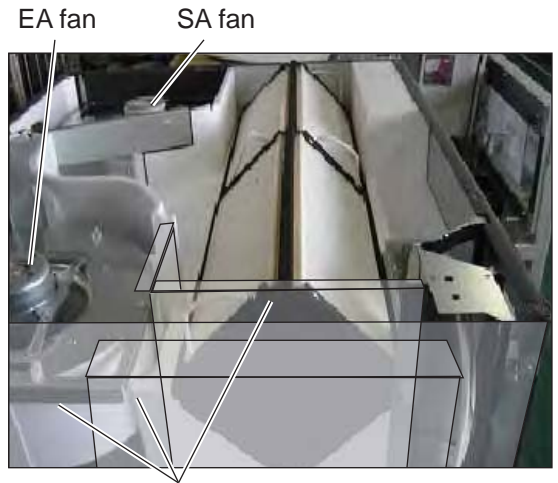
- ② Unscrew the fixing screws (25 PTT screws 4 x 8, indicated by ○) for the casing (upper).
- ③ Unscrew the fixing screws (four screws indicated by △, and two special screws indicated by □) for the guards.

#### Precaution

DO NOT REMOVE the maintenance cover, although the picture shows the unit without the cover for easy understanding. When you remove the casing (upper), close the maintenance cover after unscrewing all the screws.



- ④ Remove the casing (upper).



These parts are drawn translucently to show inner parts.

#### Air Exhaust (EA) fan

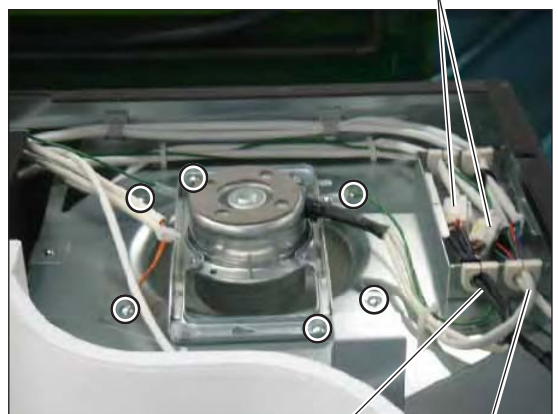
- ⑤ Unscrew the screws (two PTT screws 4 x 8, indicated by ○) for the connector cover next to the EA fan.



EA fan

- ⑥ Disconnect all the connectors for the fans.  
⑦ Unscrew the screws (six PTT screws 5 x 10, indicated by ○).

Connectors for the EA fan and SA fan



### Air Supply (SA) fan

- ⑧ Unscrew the screws (six PTT screws 5 x 10, indicated by ○).

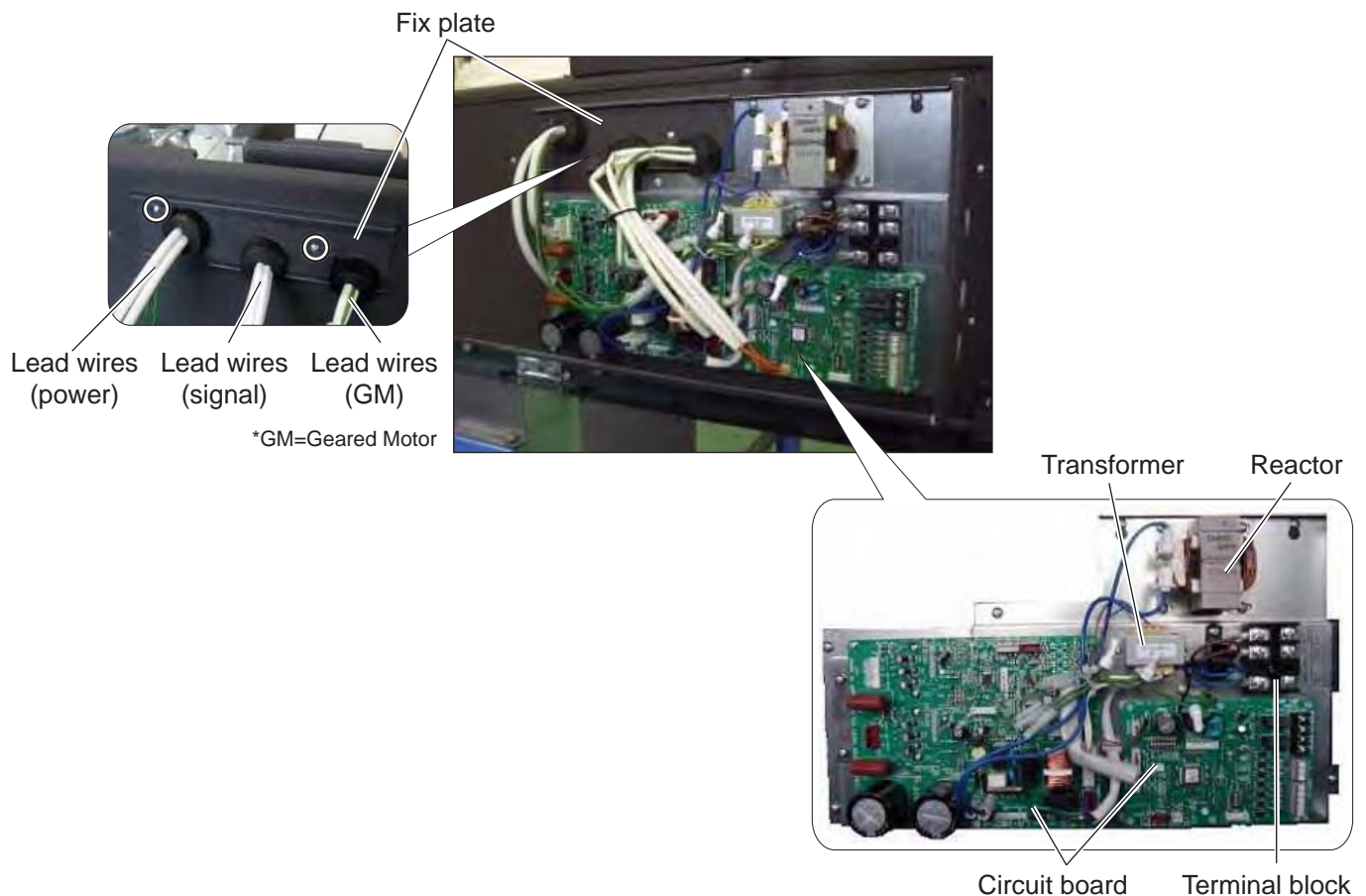


### (3) Circuit board parts

- ① Unscrew the screws (four screws, indicated by ○) for the control cover.

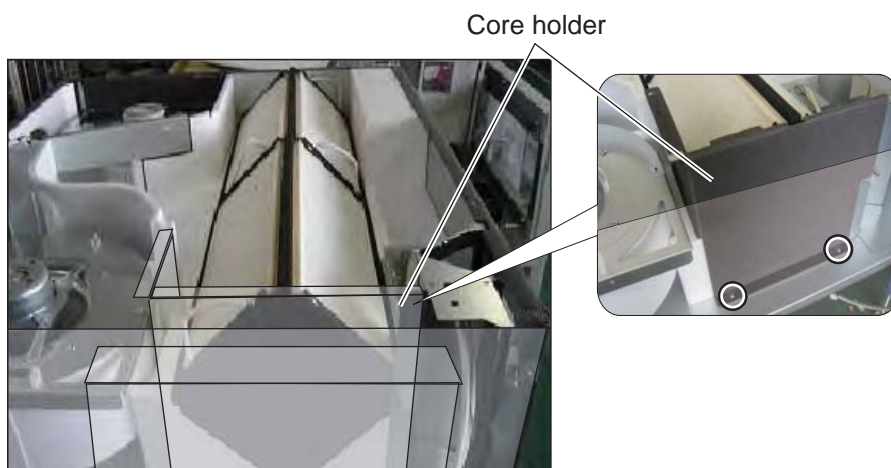


- ② When replacing the lead wires or damper parts, unscrew the fixing screws (two PTT screws 4 x 8, indicated by ○) for the fix plate.

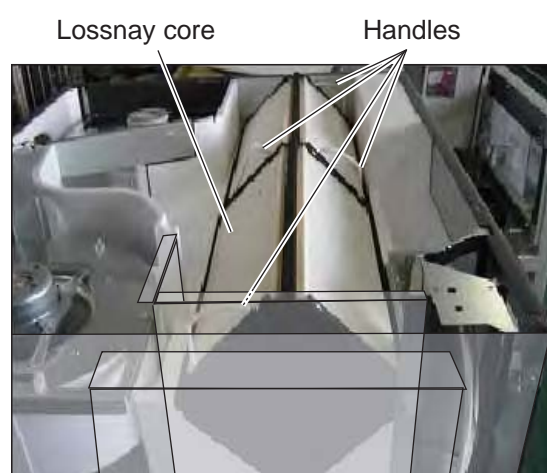


## (4) Lossnay core

- ① Unscrew the screws (two screws, indicated by ○) for the core holder.

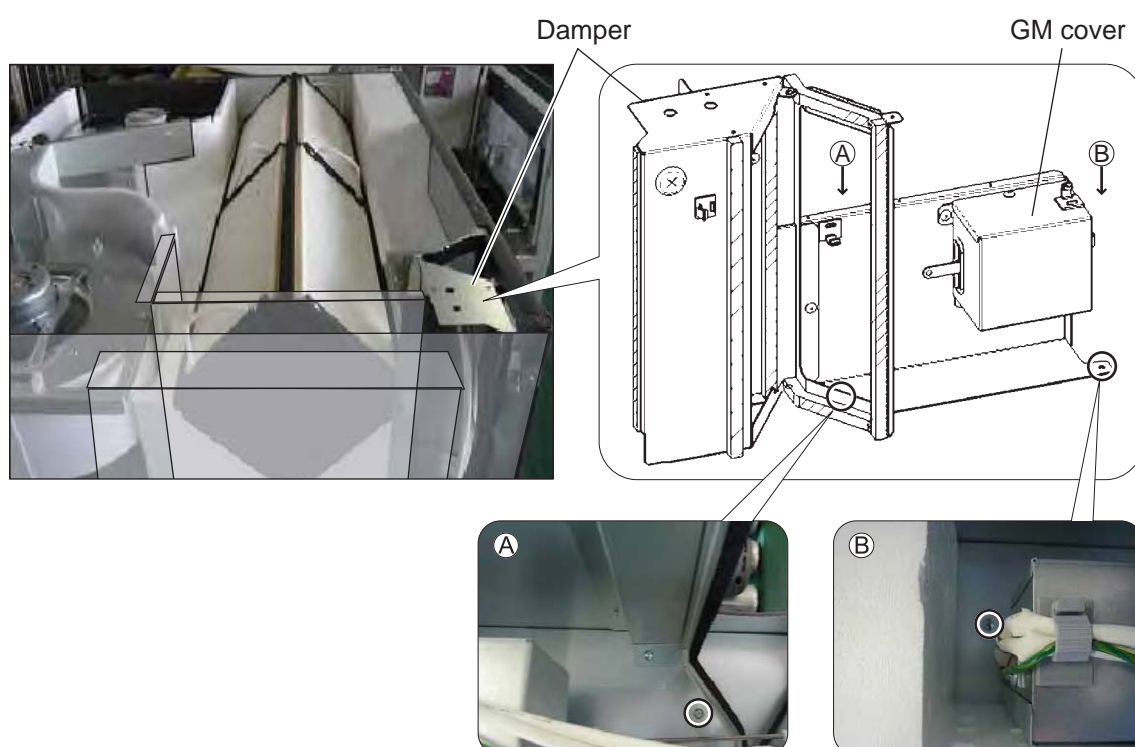


- ② Draw the Lossnay core from the unit by holding the handles.



## (5) Damper parts and Damper motor

- ① Remove the fix plate for the lead wires and disconnect the wires from the circuit board. (Refer to (3) (page 25)).
- ② Unscrew the screws (two screws, indicated by ○) for the damper, and draw the damper from the unit.



- ③ Unscrew the screws (three screws, indicated by ○) for the GM cover.
- ④ Remove the GM cover.



- ⑤ Unscrew the screws (two screws, indicated by ○) for the damper motor.



Damper motor (GM)

### \* When assembling

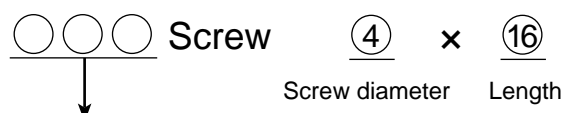
- Assemble the unit in the reverse order of disassembly.
- Always make sure that the unit works properly when reassembled.

## 10. Parts catalog

### Please note the following when using the parts catalog.

1. When ordering parts, always indicate the part number, part name, and the number of parts required.
2. Parts are not always available, and it may take time for you to receive them.
3. There may be specification improvements.
4. Specifications are correct as of August 2009.
5. Parts marked  $\Delta$  are critical for safety. To maintain safety and performance, always replace these parts with the parts prescribed.
6. The numbers that are circled in the exploded view are the same as the reference number for the part being indicated.

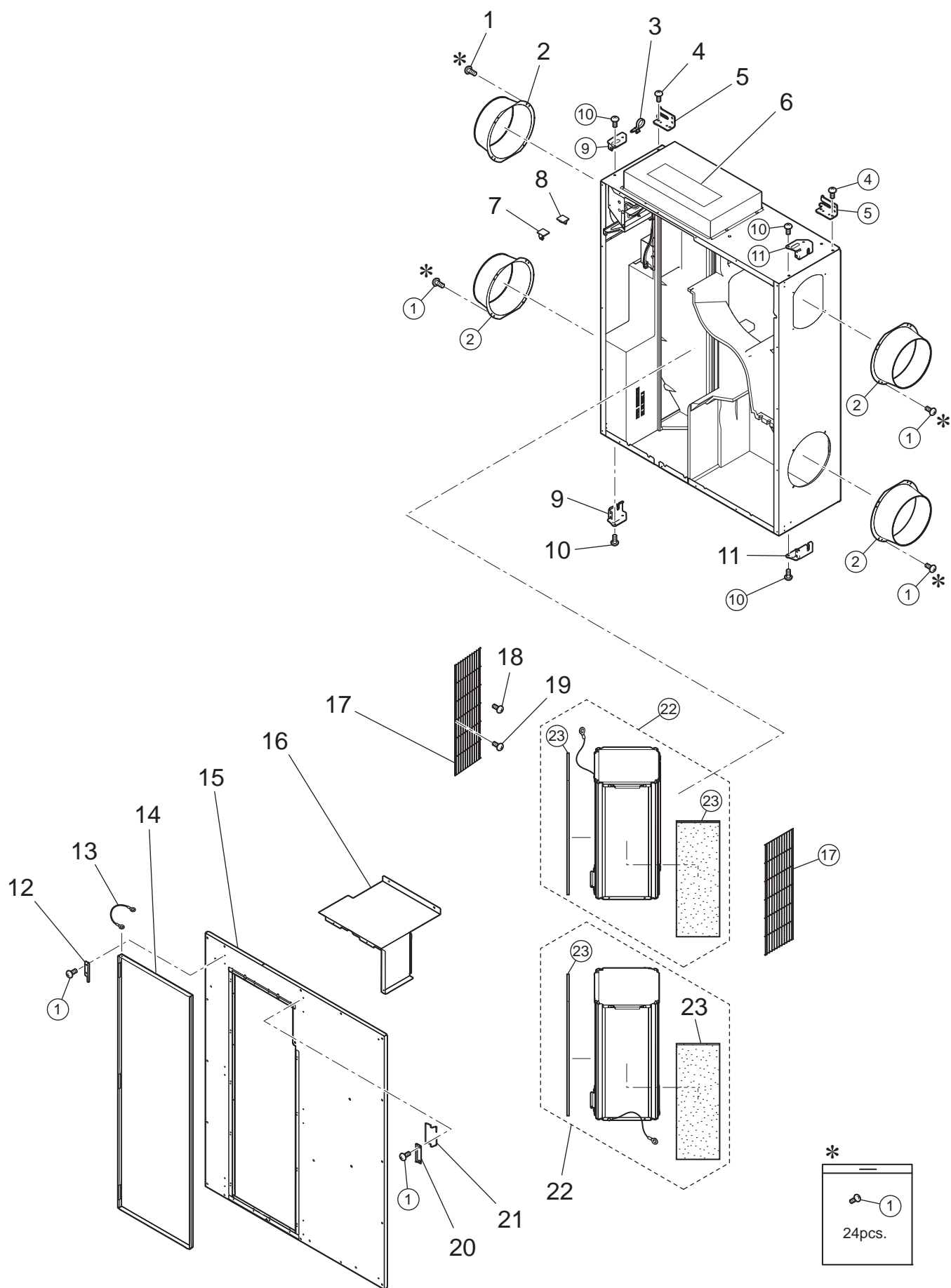
### Description of screw abbreviations



Abbreviation	Description
PC screw	Cross recess flat head machine screw
PRC screw	Cross recess oval head machine screw
PP screw	Cross recess pan head machine screw
SW · PP screw	Cross recess pan head screw with spring washer
PPT screw	Cross recess tapping screw
PCT screw	Cross recess flat head tapping screw
PTT screw	Cross recess truss head tapping screw
PT screw	Cross recess truss head machine screw
SET screw	Slotted head stop screw
SQ · SET screw	Square head stop screw
P · SET screw	Pan head stop screw
PMT screw	Primer truss head screw
HS · SET screw	Hexagon head stop screw
P · R · W screw	Cross recess round wood screw
P · C · W screw	Cross recess flat head wood screw
P · R · C · W screw	Cross recess round and flat wood screw
R · W screw	Slotted round wood screw
PW · PP screw	Cross recess pan head screw with small washer
SW-PW · PP screw	Cross recess pan head machine screw with spring washer and flat washer

Model LGH-50RSDC-E

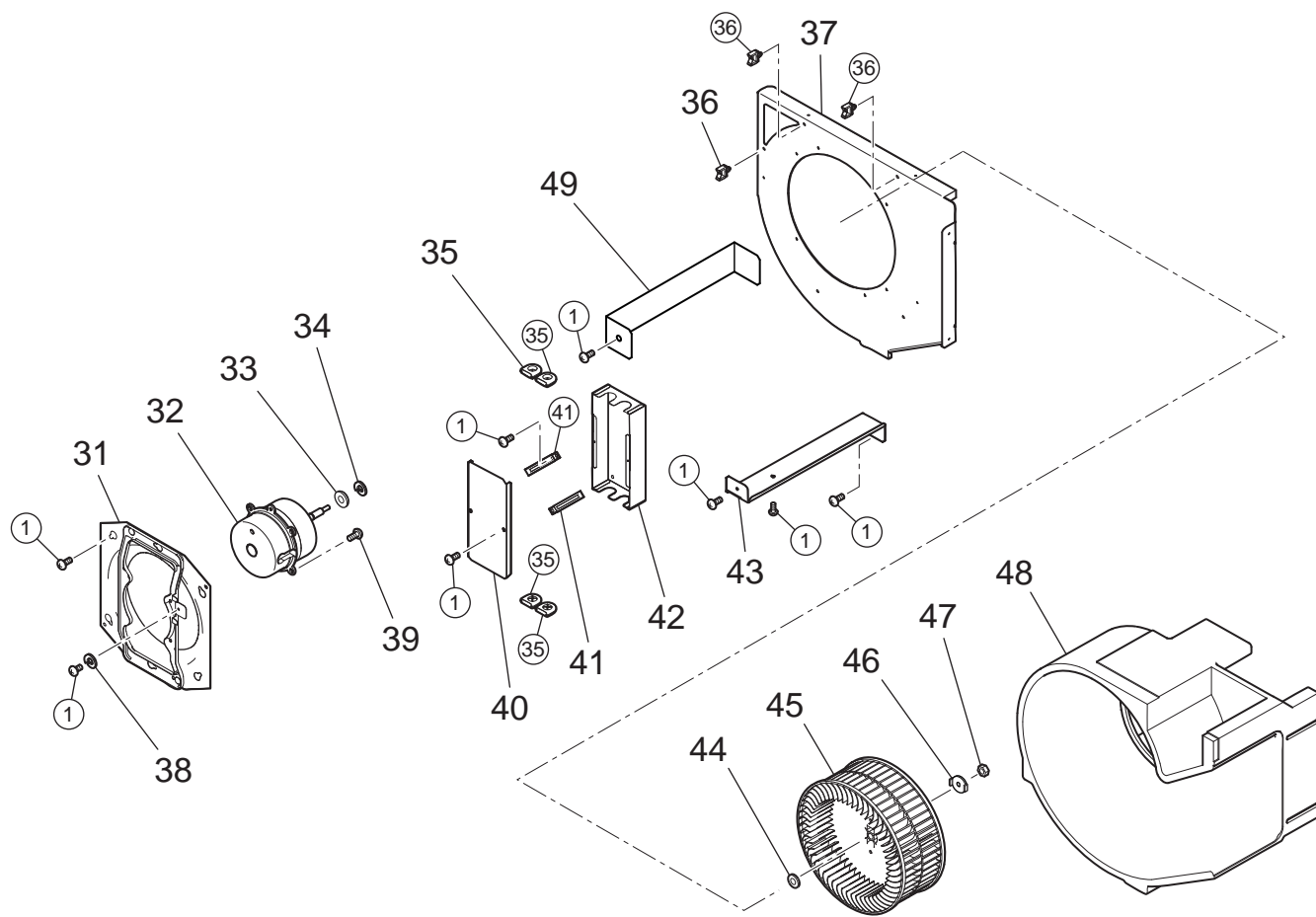
No.	Parts No.	Name of part	Q'ty pcs/unit	Critical for safety	Remarks	Price
1.	H00 000 487	PTT screw 4×8	99			
2.	R50 028 610	Flange	4			
3.	Y55 001 223	Cord clip	1			
4.	H00 000 244	PT screw 6×12	4			
5.	R50 095 380	Hanger	2			
6.	Y50 123 369	Wiring diagram	1			
7.	R50 399 223	Cord clip	2			
8.	R50 399 224	Cord clip	8			
9.	K81 540 384	Fix plate	2			
10.	H00 000 390	PT screw 5×10	4			
11.	K81 540 385	Fix plate	2			
12.	Y50 123 722	Fix piece	3			
13.	Y50 057 344	Wire	1			
14.	Y50 123 721	Maintenance cover	1			
15.	Y50 123 830	Casing(upper)	1			
16.	Y50 123 717	Core holder	1			
17.	Y50 123 723	Guard	2			
18.	H00 000 332	PTT screw 4×10	4			
19.	A33 391 045	Special screw 4×12	2		Black	
20.	Y50 123 345	Fix piece	3			
21.	Y50 123 344	Hinge	3			
22.	Y50 123 724	Lossnay core	2	▲		
23.	Y50 123 730	Filter	4	▲		



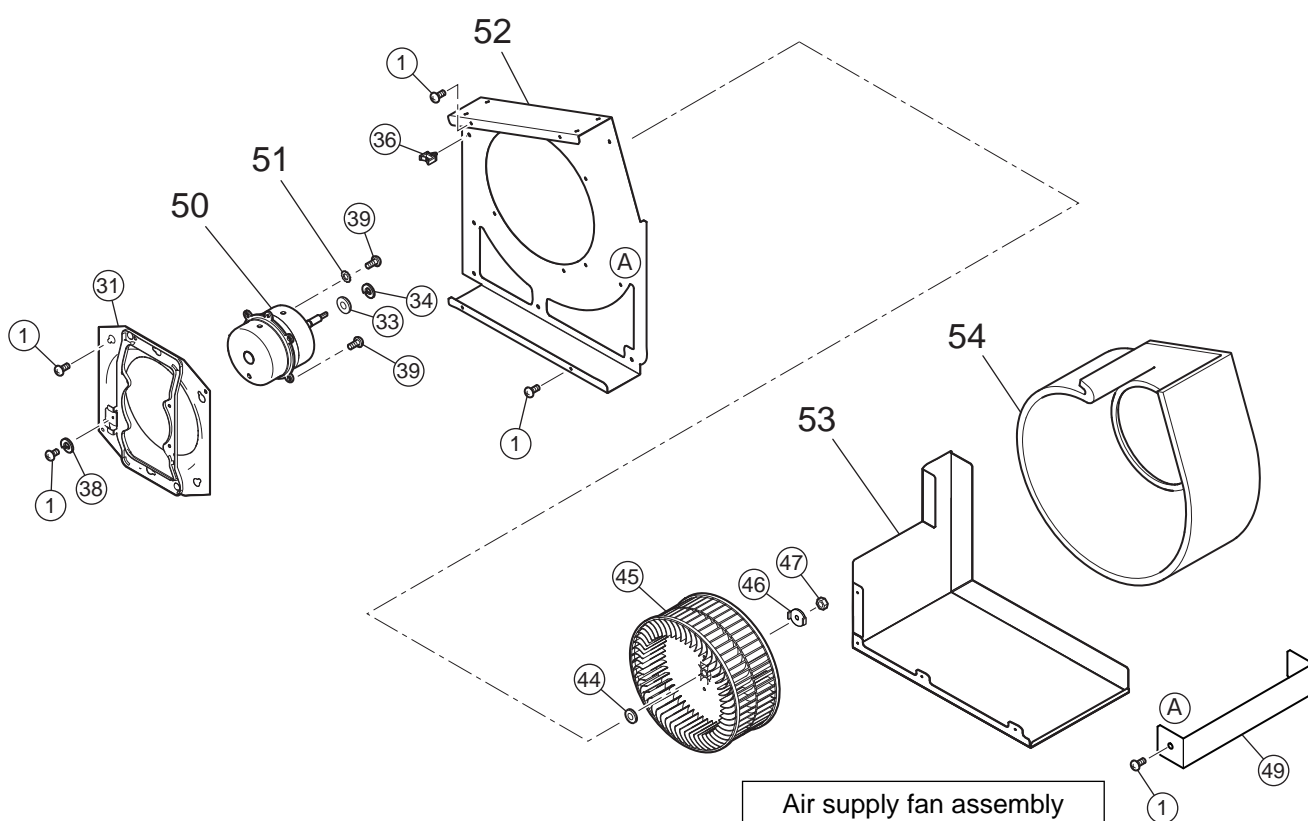
\* shows accessory parts.

Model LGH-50RSDC-E

No.	Parts No.	Name of part	Q' ty pcs/unit	Critical for safety	Remarks	Price
31.	R50 488 713	Motor fix plate	2			
32.	Y50 123 453	Motor	1	▲		
33.	Y50 031 608	Flinger	2			
34.	K81 417 102	U ring	2			
35.	M45 649 226	Bush	5			
36.	M35 164 224	Cord clip	10			
37.	Y50 123 708	Fan base	1			
38.	H00 056 075	Spring washer(4)	2			
39.	H00 189 007	PTT screw 5×10	20			
40.	Y50 123 720	Connector cover	1			
41.	D41 123 223	Lead wire clip	2			
42.	Y50 123 710	Connector case	1			
43.	Y50 123 711	Fix plate(earth)	1			
44.	M34 706 465	Special washer	2		φ 10	
45.	R50 542 480	Centrifugal fan	2	▲	φ 220	
46.	M34 398 077	Tab washer	2			
47.	R50 331 067	Special nut(8)	2		Left-handed	
48.	Y50 123 718	Fan casing	1			
49.	Y50 123 709	Fix pieces	2			
50.	Y50 123 454	Motor	1	▲		
51.	H00 172 076	Lock washer	1			
52.	Y50 123 712	Motor fix plate	1			
53.	Y50 123 713	Separator	1			
54.	Y50 123 719	Fan casing	1			



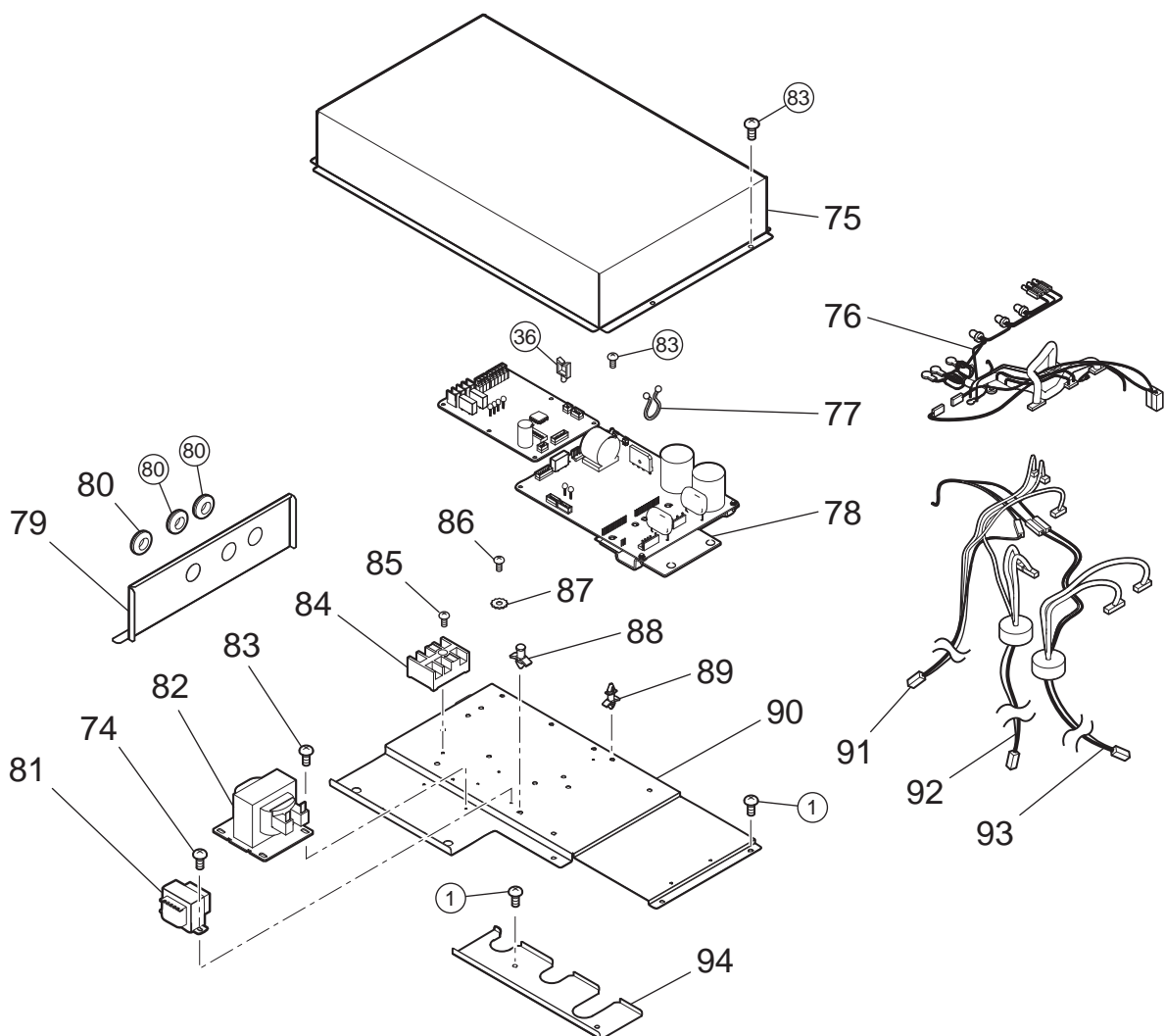
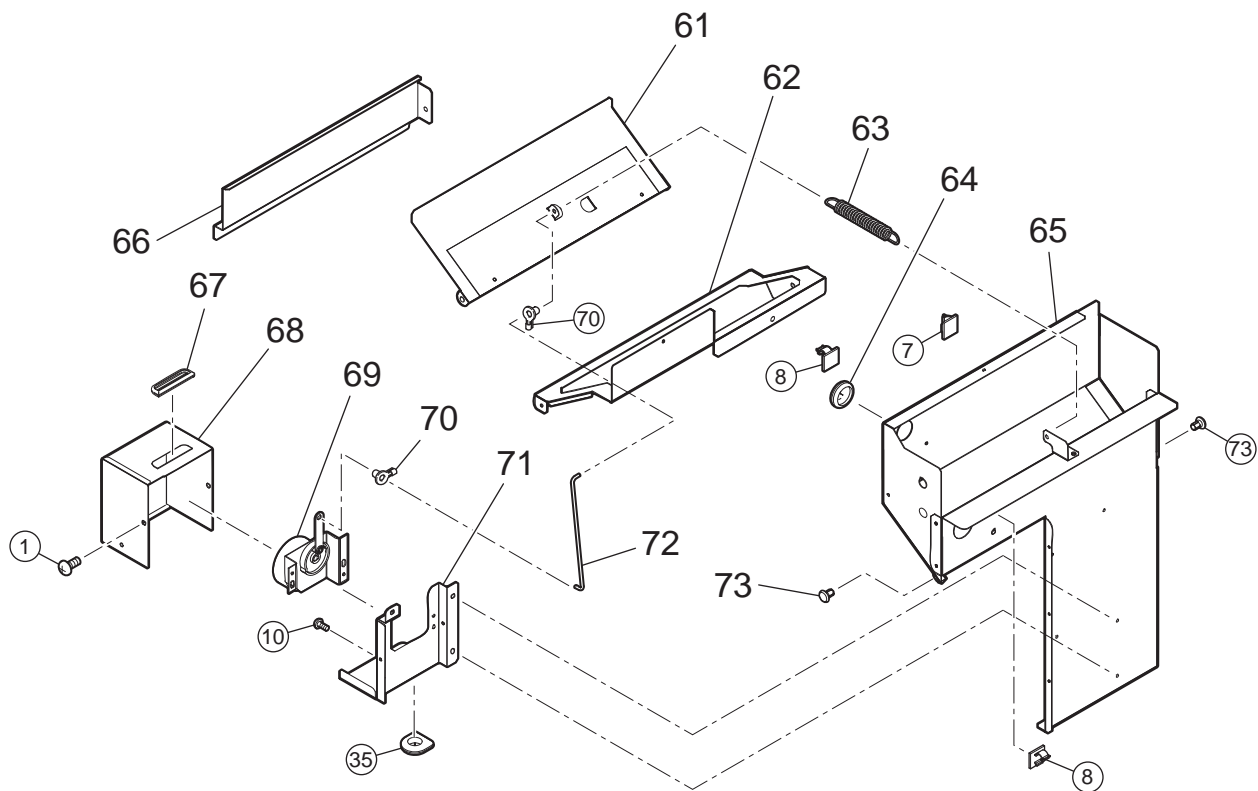
Air exhaust fan assembly



Air supply fan assembly

Model LGH-50RSDC-E

No.	Parts No.	Name of part	Q'ty pcs/unit	Critical for safety	Remarks	Price
61.	Y50 123 732	Damper fix plate	1			
62.	Y50 123 727	Fix plate	1			
63.	Y50 123 156	Pull spring	1			
64.	D40 072 225	Bush	1			
65.	Y50 123 729	Damper	1			
66.	Y50 123 716	Damper support	1			
67.	Y50 115 225	Bush	1			
68.	Y50 123 726	GM cover	1			
69.	Y50 061 260	Damper motor (GM)	1	▲	AC220•240V	
70.	R50 054 225	Special bush	2			
71.	Y50 123 725	GM fix plate	1			
72.	Y50 123 728	Rod	1			
73.	M31 234 089	Special bush	2			
74.	H00 000 003	PP screw 4×8	2			
75.	Y50 123 715	Control cover	1			
76.	Y50 123 221	Lead wire	1	▲		
77.	D41 006 363	Cord band	1			
78.	Y50 123 172	Circuit board	1	▲	LG-08DC-E	
79.	Y50 123 714	Fix plate	1			
80.	K83 223 225	Bush	3			
81.	Y50 138 216	Transformer	1	▲	AC230V	
82.	Y50 123 179	Reactor	1	▲		
83.	H00 000 349	PT screw 4×8	9			
84.	M13 100 242	Terminal block	1	▲	3P	
85.	H00 154 005	PPT screw 4×12	1			
86.	H00 011 008	PT screw 4×8(BS)	1			
87.	H00 013 076	Lock washer(4)	2			
88.	D42 019 095	Spacer	3			
89.	X40 139 095	Spacer	10			
90.	Y50 123 733	Circuit fix plate	1			
91.	Y50 123 216	Lead wire(GM)	1	▲		
92.	Y50 123 214	Lead wire(sigunal)	1	▲		
93.	Y50 123 213	Lead wire(poewr)	1	▲		
94.	Y50 123 731	Fix plate	1			





## Revision record

U162-1