MITSUBISHI ELECTRIC

SPLIT-TYPE, HEAT PUMP AIR CONDITIONERS

January 2018

No.TCH030

HFC utilized R410A

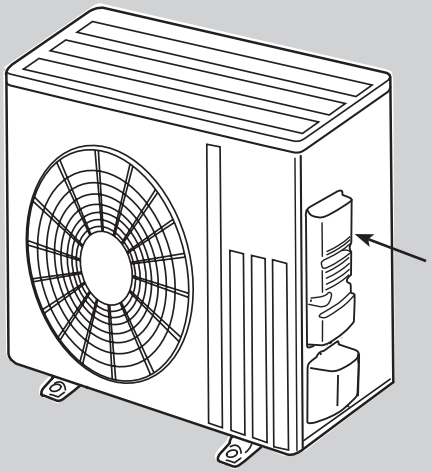
TECHNICAL & SERVICE MANUAL

R410A

Outdoor unit

[Model Name]	[Service Ref.]
SUZ-SA71VA3	SUZ-SA71VA3.TH
SUZ-SA100VA2	SUZ-SA100VA2.TH

Note:
- This service manual describes technical data of the outdoor units only.



CONTENTS

PARTS CATALOG (TCB030)

Mr.SLIM

1 COMBINATION OF INDOOR AND OUTDOOR UNITS

INDOOR UNIT SERVICE MANUAL

Model Name	Service Ref.	Service Manual No.
PLA-SM71/100EA	PLA-SM71/100EA.UK	OCH683 OCB683
PEAD-SM71/100JA(L)	PEAD-SM71/100JA(L) .UK	HWE17010 BWE017160

Note: Please refer to the service manual of indoor unit or the technical data book for the combination data.

2 TECHNICAL CHANGES

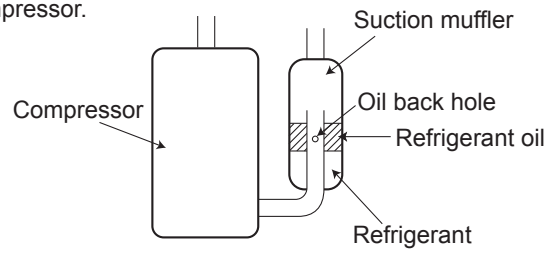
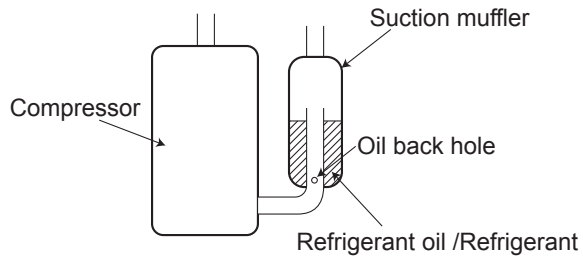
INFORMATION FOR THE AIR CONDITIONER WITH R410A REFRIGERANT

- This room air conditioner adopts an HFC refrigerant (R410A) which never destroys the ozone layer.
- Pay particular attention to the following points, though the basic installation procedure is same as that for R22 conditioners.

① As R410A has working pressure approximate 1.6 times as high as that of R22, some special tools and piping parts/materials are required. Refer to the table below.
② Take sufficient care not to allow water and other contaminations to enter the R410A refrigerant during storage and installation, since it is more susceptible to contaminations than R22.
③ For refrigerant piping, use clean, pressure-proof parts/materials specifically designed for R410A. (Refer to 2. Refrigerant piping.)
④ Composition change may occur in R410A since it is a mixed refrigerant. When charging, charge liquid refrigerant to prevent composition change.

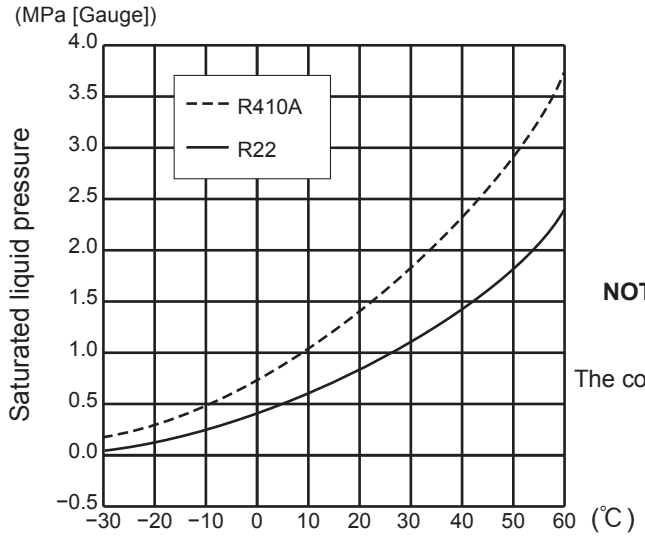
		New refrigerant	Previous refrigerant
Refrigerant	Refrigerant	R410A	R22
	Composition (Ratio)	HFC-32: HFC-125 (50%:50%)	R22 (100%)
	Refrigerant handling	Pseudo-azeotropic refrigerant	Single refrigerant
	Chlorine	Not included	Included
	Safety group (ASHRAE)	A1/A1	A1
	Molecular weight	72.6	86.5
	Boiling point (°C)	−51.4	−40.8
	Steam pressure [25°C](Mpa)	1.557	0.94
	Saturated steam density [25°C](Kg/m³)	64	44.4
	Combustibility	Non combustible	Non combustible
	ODP *1	0	0.055
	GWP *2	1730	1700
	Refrigerant charge method	From liquid phase in cylinder	Gas phase
	Additional charge on leakage	Possible	Possible
Refrigerant oil	Kind	Incompatible oil	Compatible oil
	Color	None	Light yellow
	Smell	None	None

*1: Ozone Depletion Potential : based on CFC-11
*2: Global Warming Potential : based on CO_2

	New Specification	Current Specification
Compressor	The incompatible refrigerant oil easily separates from refrigerant and is in the upper layer inside the suction muffler. Raising position of the oil back hole enables to back the refrigerant oil of the upper layer to flow back to the compressor. 	Since refrigerant and refrigerant oil are compatible with each other, refrigerant oil backs to the compressor through the lower position oil back hole. 

NOTE : The unit of pressure has been changed to MPa on the international system of units (SI unit system).
The conversion factor is: **1 (MPa [Gauge]) =10.2 (kgf/cm² [Gauge])**

Conversion chart of refrigerant temperature and pressure



NOTE: The unit of pressure has been changed to MPa on the international system of units (SI unit system).

The conversion factor is: **1 (MPa [Gauge]) =10.2 (kgf/cm² [Gauge])**

1. Tools dedicated for the air conditioner with R410A refrigerant

The following tools are required for R410A refrigerant. Some R22 tools can be substituted for R410A tools.
The diameter of the service port on the stop valve in outdoor unit has been changed to prevent any other refrigerant being charged into the unit. Cap size has been changed from 7/16 UNF with 20 threads to 1/2 UNF with 20 threads.

R410A tools	Can R22 tools be used?	Description
Gauge manifold	No	R410A has high pressures beyond the measurement range of existing gauges. Port diameters have been changed to prevent any other refrigerant from being charged into the unit.
Charge hose	No	Hose material and cap size have been changed to improve the pressure resistance.
Gas leak detector	No	Dedicated for HFC refrigerant.
Torque wrench	Yes	6.35 mm and 9.52 mm
	No	12.7 mm and 15.88 mm
Flare tool	Yes	Clamp bar hole has been enlarged to reinforce the spring strength in the tool.
Flare gauge	New	Provided for flaring work (to be used with R22 flare tool).
Vacuum pump adapter	New	Provided to prevent the back flow of oil. This adapter enables you to use vacuum pumps.
Electronic scale for refrigerant charging	New	It is difficult to measure R410A with a charging cylinder because the refrigerant bubbles due to high pressure and high-speed vaporization

No: Not substitutable for R410A Yes: Substitutable for R410A

2. Refrigerant piping

① Specifications

Use the refrigerant pipes that meet the following specifications.

Pipe	Outside diameter	Wall thickness	Insulation material
	mm	mm	
For liquid	6.35	0.8	Heat resisting foam plastic Specific gravity 0.045 Thickness 8 mm
	9.52	0.8	
For gas	9.52	0.8	
	12.7	0.8	
	15.88	1.0	

- Use a copper pipe or a copper-alloy seamless pipe with a thickness of 0.8 mm. Never use any pipe with a thickness less than 0.8 mm, as the pressure resistance is insufficient.

② Flaring work and flare nut

Flaring work for R410A pipe differs from that for R22 pipe.

For details of flaring work, refer to Installation manual “FLARING WORK”.

Pipe diameter (mm)	Dimension of flare nut (mm)	
	R410A	R22
6.35	17	17
9.52	22	22
12.7	26	24
15.88	29	27

3. Refrigerant oil

Apply the special refrigerant oil (accessories: packed with indoor unit) to the flare and the union seat surfaces.

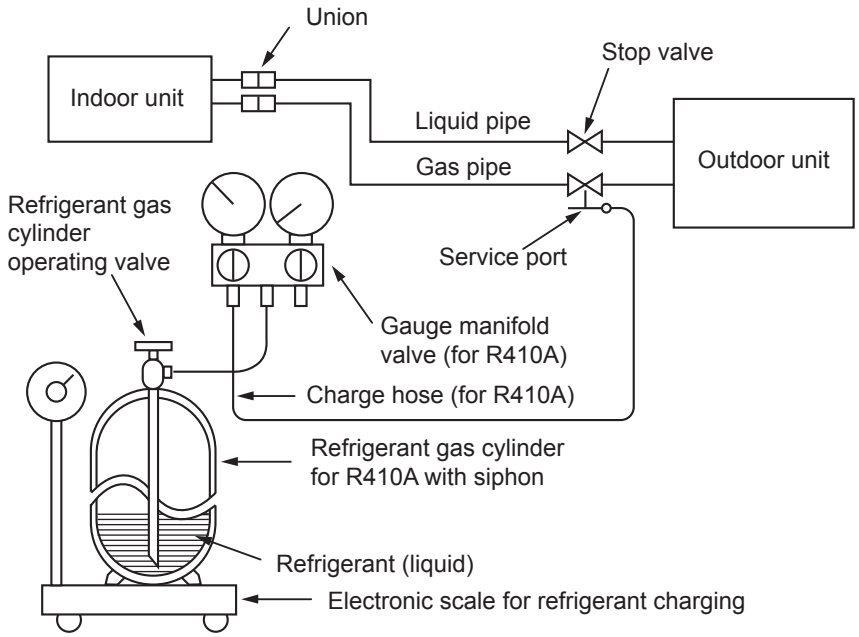
4. Air purge

- Do not discharge the refrigerant into the atmosphere.
  Take care not to discharge refrigerant into the atmosphere during installation, reinstallation, or repairs to the refrigerant circuit.
- Use the vacuum pump for air purging for the purpose of environmental protection.

5. Additional charge

For additional charging, charge the refrigerant from liquid phase of the gas cylinder.

If the refrigerant is charged from the gas phase, composition change may occur in the refrigerant inside the cylinder and the outdoor unit. In this case, ability of the refrigerating cycle decreases or normal operation can be impossible. However, charging the liquid refrigerant all at once may cause the compressor to be locked. Thus, charge the refrigerant slowly.



6. Pumping Down

When relocating or disposing of the air conditioner, pump down the system by following the procedure below so that no refrigerant is released into the atmosphere.

① Turn off the power supply (circuit breaker).
② Connect the gauge manifold valve to the service port of the stop valve on the gas pipe side of the outdoor unit.
③ Fully close the stop valve on the liquid pipe side of the outdoor unit.
④ Supply power (circuit breaker).
⑤ Perform the refrigerant collecting operation (cooling test run).
- For the PAR-31MAA, select “Service” → “Test run” from the main menu to start the test run, and then select the cooling mode.
- For details or for other information about starting the test run when using remote controllers, refer to the installation manual for the indoor unit or the remote controller.

⑥ Fully close the stop valve on the gas pipe side of the outdoor unit when the pressure gauge shows 0.05 to 0 MPa [Gauge] (approx. 0.5 to 0 kgf/cm²) and quickly stop the air conditioner.
- Push the “ON/OFF” button on the remote controller to stop the air conditioner.

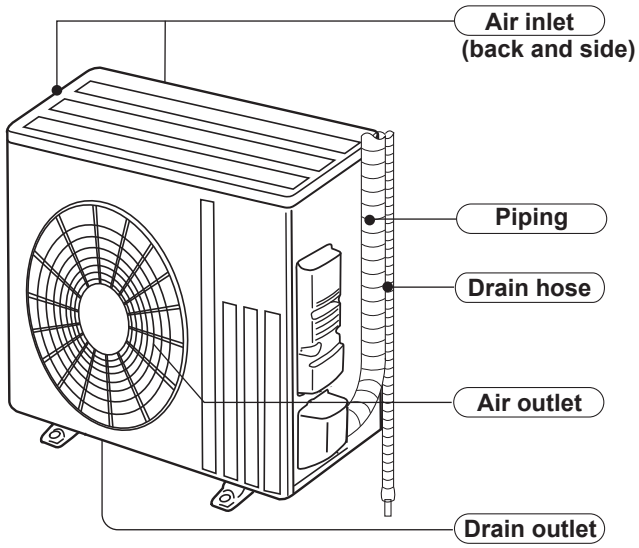
Notes:
1. When the extension piping is very long with a large refrigerant amount, it may not be possible to perform a pump down operation. In this case, use refrigerant recovery equipment to collect all of the refrigerant in the system.
2. If the extension piping length for the SUZ-SA100VA is 20 m or longer, it will not be possible to perform a pump-down operation because there is a large amount of refrigerant. In this case, collect the refrigerant in the system.

⑦ Turn off the power supply (circuit breaker), remove the gauge manifold valve, and then disconnect the refrigerant pipes.

⚠Warning: When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes.
- **If the refrigerant pipes are disconnected while the compressor is operating and the stop valve (ball valve) is open, the pressure in the refrigeration cycle could become extremely high if air is drawn in, causing the pipes to burst, personal injury, etc.**

3 PARTS NAMES AND FUNCTIONS

SUZ-SA71VA3.TH
SUZ-SA100VA2.TH



Model	SUZ-SA·VA2(3)
Drain socket	1

4 SPECIFICATION

Outdoor model					SUZ-SA71VA3.TH	SUZ-SA100VA2.TH
Power supply					Single phase 230V, 50Hz	
Compressor	Model				SNB140FRKMT	SNB220FBGM1T
	Output			W	1,200	1,500
	Current*	Cooling		A	8.30	11.11
		Heating			9.59	12.84
	Refrigeration oil (Model)			L	0.4 (FV50S)	0.46 (FV50S)
Fan motor	Model				RC0J60-BC	RC0J60-BC
	Current*	Cooling		A	0.83	0.85
		Heating			0.82	0.86
Dimensions W × H × D				mm	840 × 880 × 330	840 × 880 × 330
Weight				kg	52	56
Special remarks	Air flow*	Cooling	High	m^3/h	3,492	3,426
			Med.		3,006	3,234
			Low		2,226	2,394
		Heating	High		2,952	3,276
			Med.		2,952	3,276
			Low		2,268	2,472
	Sound level*		Cooling	dB(A)	55	55
			Heating		55	55
	Fan speed	Cooling	High	rpm	950	950
			Med.		840	900
			Low		620	680
		Heating	High		810	910
			Med.		810	910
			Low		630	700
	Fan speed regulator				3	3
	Refrigerant filling capacity (R410A)			kg	1.80	2.20

NOTE: Test conditions are based on ISO 5151
Cooling : Indoor D.B. 27°C W.B. 19°C
Outdoor D.B. 35°C
Heating : Indoor D.B. 20°C
Outdoor D.B. 7°C W.B. 6°C
Refrigerant piping length (one way): 5 m
*Measured under rated operating frequency.

Specifications and rating conditions of main electric parts

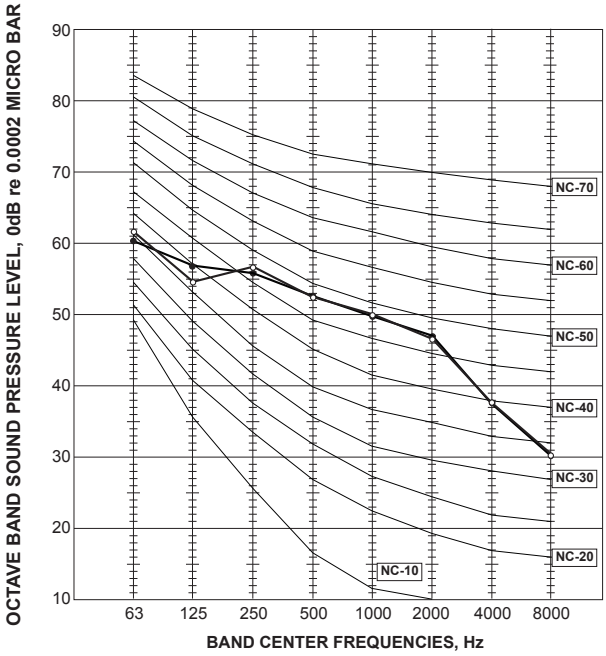
SUZ-SA71VA3.TH SUZ-SA100VA2.TH

Item \ Model		SUZ-SA71VA3.TH	SUZ-SA100VA2.TH
Smoothing capacitor	(C61)	—	
	(C62, C63)	—	
	(CB1, 2, 3)	560 µF 450 V	
Diode module	(DB61)	—	
Fuse	(F61)	—	
	(F62)	T20AL 250 V	
	(F701, F801, F901)	—	
Intelligent power module	(IPM)	—	
	(IC932)	5 A 600 V	
IGBT module	(IC700)	20 A 600V	
Power factor controller	(PFC)	20 A 600 V	
	(IC820)	20 A 600 V	
Expansion valve coil	(LEV)	12 V DC	
Reactor	(L61)	—	
	(L)	340 µH 20 A	
Current-Limiting PTC thermistor	(PTC64, PTC65)	33 Ω	
Terminal block	(TB1, TB2)	3P	
	(TB)	—	
Relay	(X63)	—	
	(X64)	20 A 250 V	
	(X601)	3 A 250 V	
	(X602)	3 A 250 V	
R.V. coil	(21S4)	220–240 V AC	

5 NOISE CRITERIA CURVES

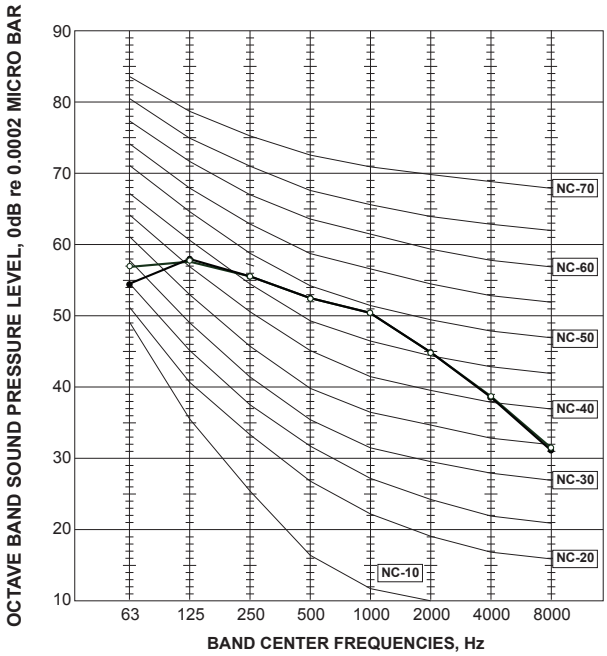
SUZ-SA71VA3.TH

FAN SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	55	●——●
	HEATING	55	○——○

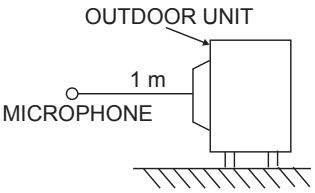


SUZ-SA100VA2.TH

FAN SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	55	●——●
	HEATING	55	○——○



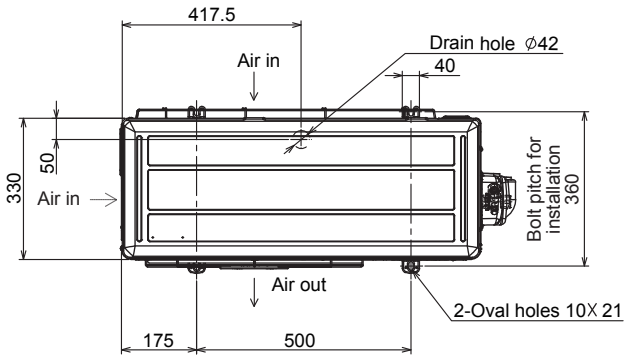
Test conditions
Cooling: Dry-bulb temperature 35°C
Heating: Dry-bulb temperature 7°C
Wet-bulb temperature 6°C

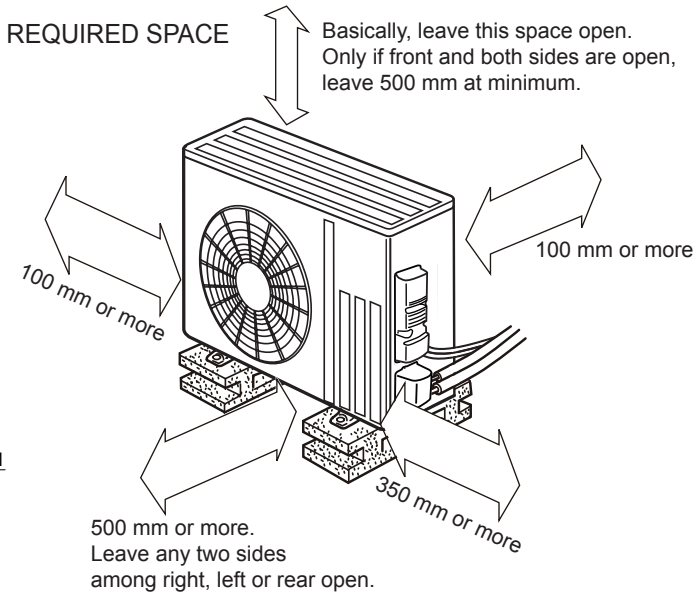


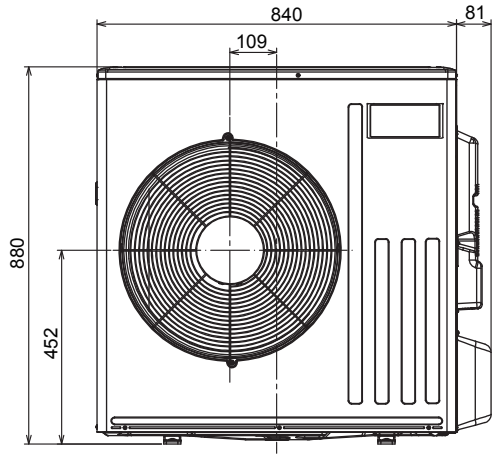
6 OUTLINES AND DIMENSIONS

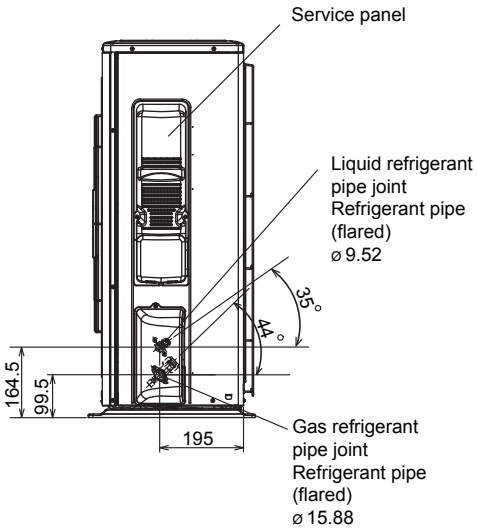
SUZ-SA71VA3.TH SUZ-SA100VA2.TH

Unit: mm



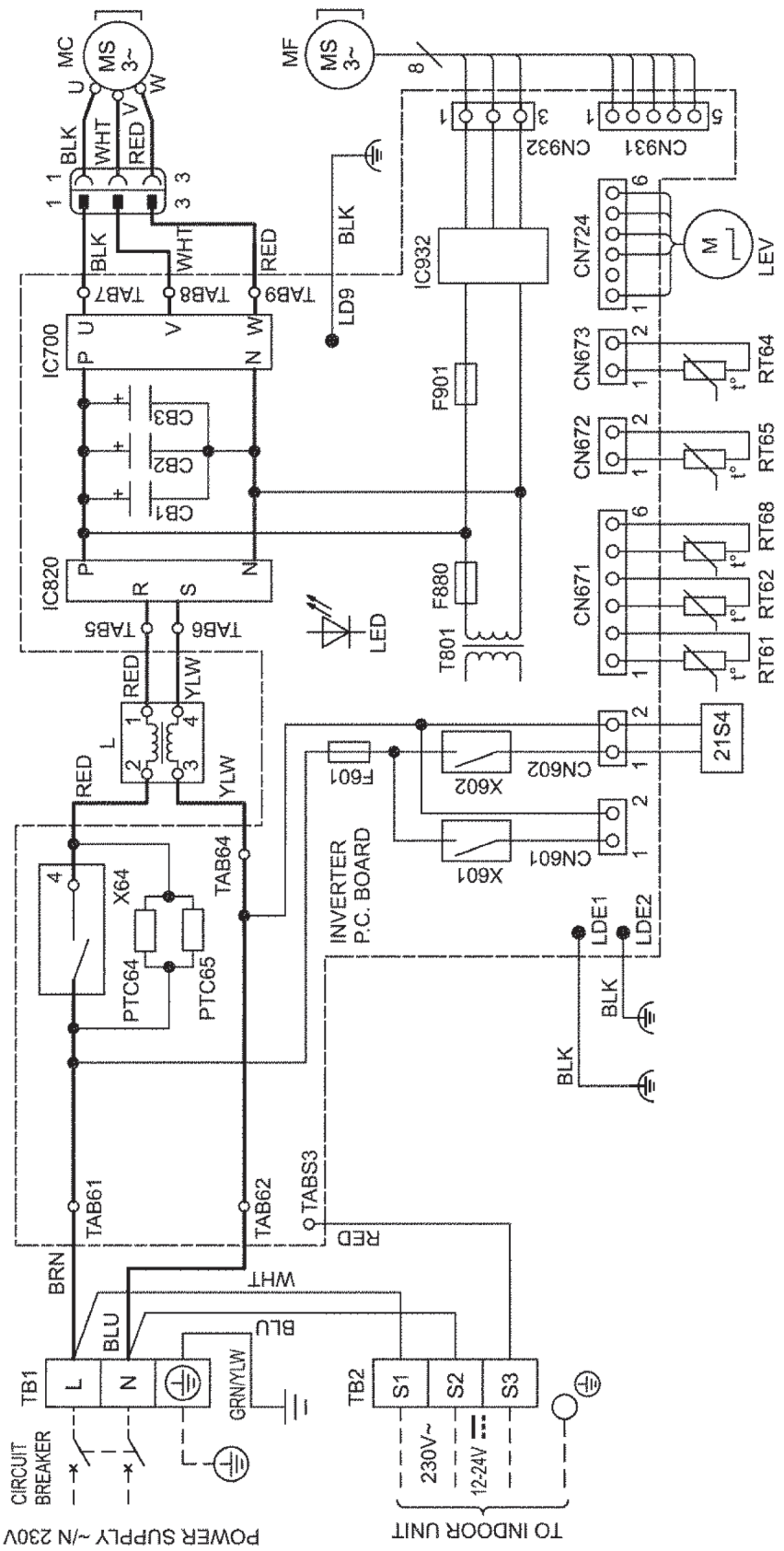






7 WIRING DIAGRAM

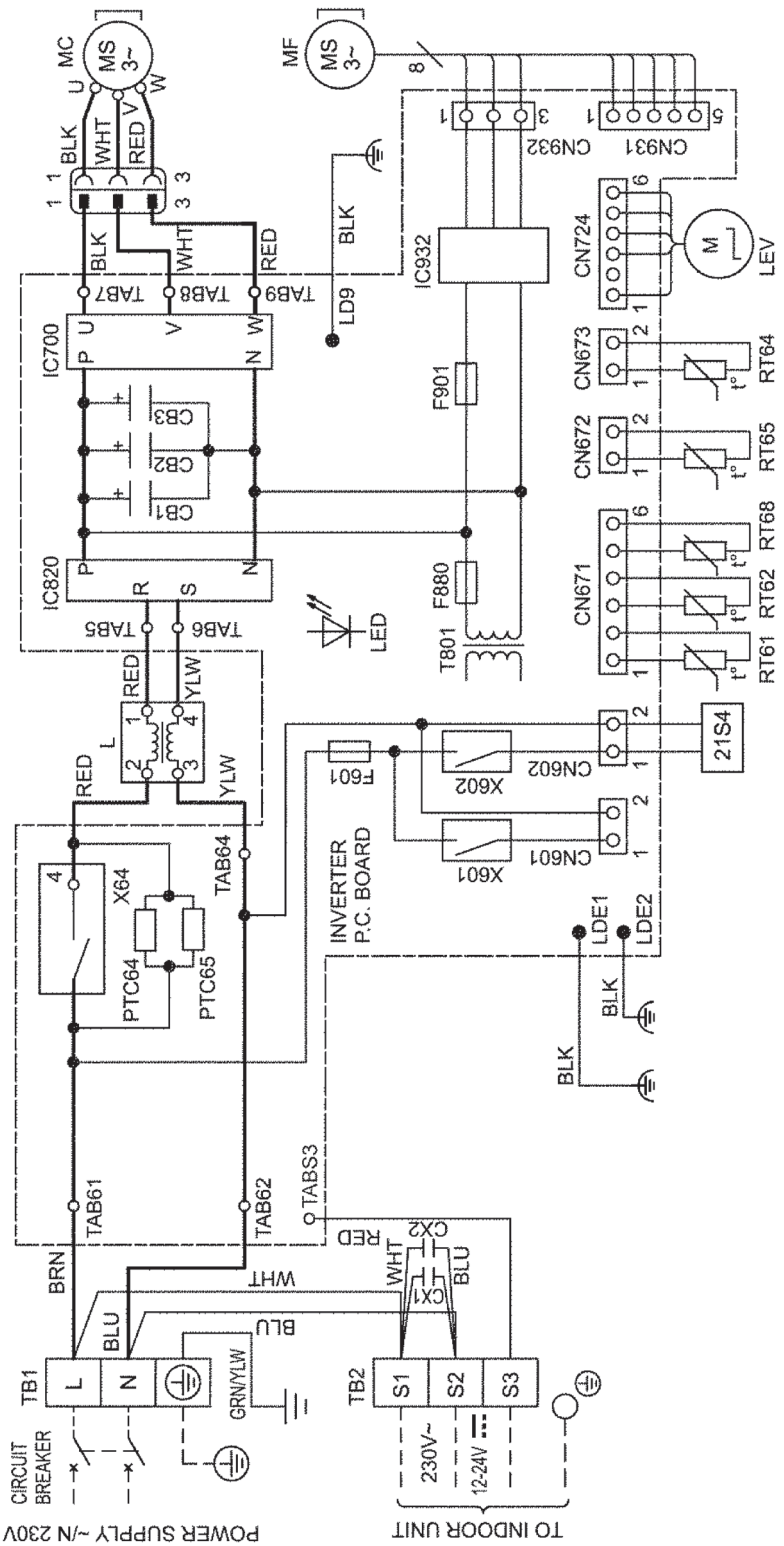
SUZ-SA71VA3.TH



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CB1~3	SMOOTHING CAPACITOR	L	REACTOR	RT61	DEFROST THERMISTOR	T801	TRANSFORMER
F601	FUSE(T3.15AL250V)	LED	LED	RT62	DISCHARGE TEMP.THERMISTOR	X601	RELAY
F880	FUSE(T3.15AL250V)	LEV	EXPANSION VALVE COIL	RT64	FIN TEMP.THERMISTOR	X602	RELAY
F901	FUSE(T3.15AL250V)	MC	COMPRESSOR	RT65	AMBIENT TEMP.THERMISTOR	X64	RELAY
IC700	IGBT Module	MF	FAN MOTOR	RT68	OUTDOOR HEAT EXCHANGER TEMP.THERMISTOR	21S4	REVERSING VALVE SOLENOID COIL
IC820	DIODE Module	PTC64	CIRCUIT PROTECTION				
IC932	IGBT Module	PTC65	CIRCUIT PROTECTION	TB1,TB2	TERMINAL BLOCK		

NOTES 1.About the indoor side electric wiring, refer to the indoor unit electric wiring diagram for servicing.
2.Use copper conductors only(for field wiring). 3.Symbols indicate, □□□ :Terminal block

SUZ-SA100VA2.TH



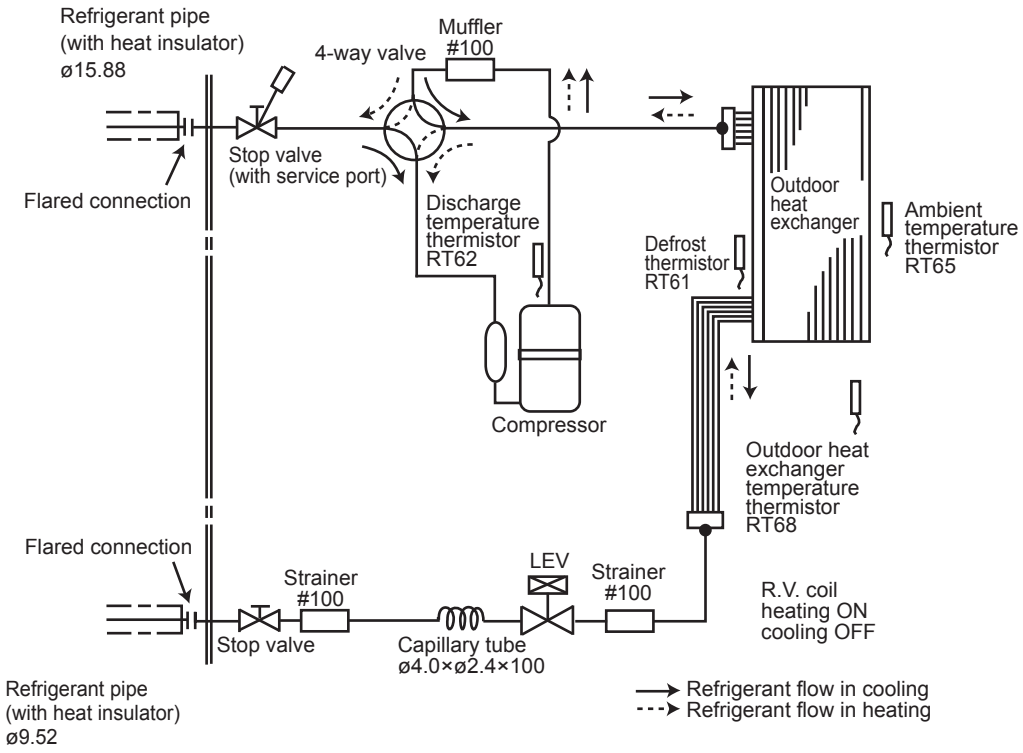
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CB1~3	SMOOTHING CAPACITOR	IC932	IGBT Module	PTC65	CIRCUIT PROTECTION	TB1,TB2	TERMINAL BLOCK
CX1,CX2	CAPACITOR	L	REACTOR	RT61	DEFROST THERMISTOR	T801	TRANSFORMER
F601	FUSE(T3.15AL250V)	LED	LED	RT62	DISCHARGE TEMP.THERMISTOR	X601	RELAY
F880	FUSE(T3.15AL250V)	LEV	EXPANSION VALVE COIL	RT64	FIN TEMP.THERMISTOR	X602	RELAY
F901	FUSE(T3.15AL250V)	MC	COMPRESSOR	RT65	AMBIENT TEMP.THERMISTOR	X64	RELAY
IC700	IGBT Module	MF	FAN MOTOR	RT68	OUTDOOR HEAT EXCHANGER TEMP.THERMISTOR	21S4	REVERSING VALVE SOLENOID COIL
IC820	DIODE Module	PTC64	CIRCUIT PROTECTION				

NOTES 1.About the indoor side electric wiring, refer to the indoor unit electric wiring diagram for servicing.
2.Use copper conductors only(for field wiring). 3.Symbols indicate, □□ : Terminal block

8 REFRIGERANT SYSTEM DIAGRAM

SUZ-SA71VA3.TH SUZ-SA100VA2.TH

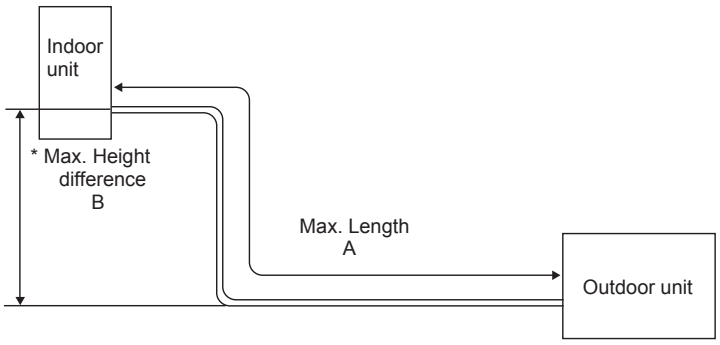
Unit: mm



MAX. REFRIGERANT PIPING LENGTH

Model	Refrigerant piping: m		Piping size O.D: mm	
	Max. Length A	Max. Height difference B	Gas	Liquid
SUZ-SA71VA3.TH **SUZ-SA100VA2.TH**	30	30	15.88	9.52

MAX. HEIGHT DIFFERENCE



* Height difference limitations are binding regardless of the height position at which either indoor or outdoor is placed higher.

ADDITIONAL REFRIGERANT CHARGE (R410A: g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)					
		7 m	10 m	15 m	20 m	25 m	30 m
SUZ-SA71VA3.TH	1,800	0	150	400	650	900	1,150
SUZ-SA100VA2.TH	2,200	0	150	400	650	900	1,150

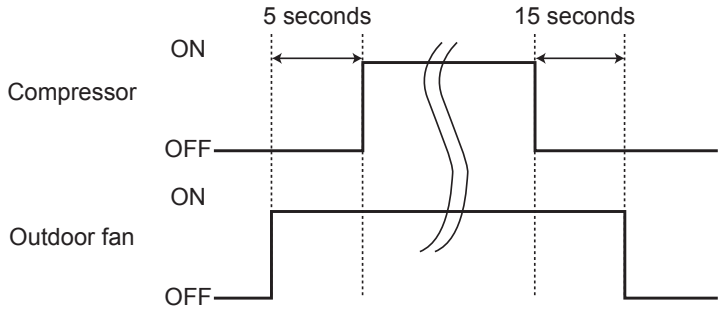
Calculation : Xg=50g/m × (Refrigerant piping length(m)−7)

9 ACTUATOR CONTROL

SUZ-SA71VA3.TH SUZ-SA100VA2.TH

9-1. OUTDOOR FAN MOTOR CONTROL

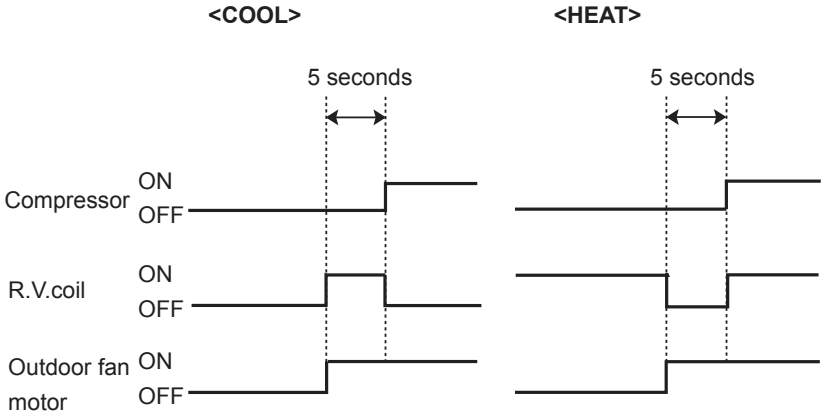
The fan motor turns ON/OFF, interlocking with the compressor.
[ON] The fan motor turns ON 5 seconds before the compressor starts up.
[OFF] The fan motor turns OFF 15 seconds after the compressor has stopped running.



9-2. R.V. COIL CONTROL

Heating ..... ON
Cooling ..... OFF
Dry ..... OFF

NOTE: The 4-way valve reverses for 5 seconds right before start-up of the compressor.



9-3. RELATION BETWEEN MAIN SENSOR AND ACTUATOR

Sensor	Purpose	Actuator				
		Compressor	LEV	Outdoor fan motor	R.V.coil	Indoor fan motor
Discharge temperature thermistor	Protection	○	○			
Indoor coil temperature thermistor	Cooling: Coil frost prevention	○				
	Heating: High pressure protection	○	○			
Defrost thermistor	Heating: Defrosting	○	○	○	○	○
Fin temperature thermistor	Protection	○		○		
Ambient temperature thermistor	Cooling: Low ambient temperature operation	○	○	○		
Outdoor heat exchanger temperature thermistor	Cooling: Low ambient temperature operation	○	○	○		
	Cooling: High pressure protection	○	○	○		

10 SERVICE FUNCTIONS

SUZ-SA71VA3.TH SUZ-SA100VA2.TH

CHANGE IN DEFROST SETTING

Changing defrost finish temperature

<JS> To change the defrost finish temperature, cut/solder the JS wire of the outdoor inverter P.C. board. (Refer to "11-6. Test point diagram and voltage".)

Jumper wire		Defrost finish temperature (°C)
		SUZ-SA71VA3.TH **SUZ-SA100VA2.TH**
JS	Soldered (Initial setting)	10
	None (cut)	18

11 TROUBLESHOOTING

SUZ-SA71VA3.TH SUZ-SA100VA2.TH

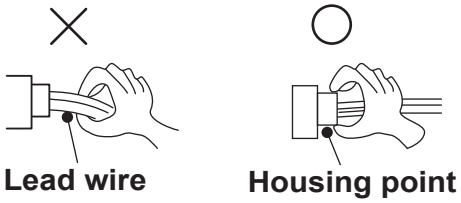
11-1. CAUTIONS ON TROUBLESHOOTING

1. Before troubleshooting, check the following items:

1) Check the power supply voltage.
2) Check the indoor/outdoor connecting wire for miswiring.

2. Take care the following during servicing.

1) Before servicing the air conditioner, be sure to turn OFF the main unit first with the remote controller, and turn off the breaker.
2) Be sure to turn OFF the power supply before removing the front panel, the cabinet, the top panel, and the electronic control P.C. board.
3) When removing the electrical parts, be careful of the residual voltage of smoothing capacitor.
4) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
5) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



3. Troubleshooting procedure

1) Check if the OPERATION INDICATOR lamp on the outdoor P.C. board is blinking on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is blinking on and off before starting service work.
2) Before servicing check that the connector and terminal are connected properly.
3) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
4) When troubleshooting, refer to "11-2.TROUBLESHOOTING CHECK TABLE" and "11-3.HOW TO PROCEED "SELF-DIAGNOSIS"".

11-2. TROUBLESHOOTING CHECK TABLE

SUZ-SA71VA3.TH SUZ-SA100VA2.TH

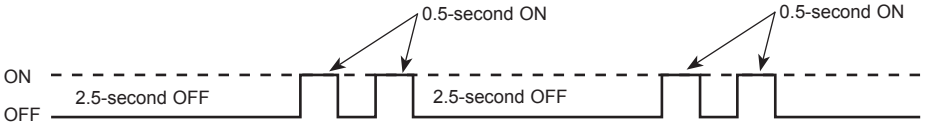
No.	Symptoms	LED indication	check code	Abnormal point/ Condition	Condition	Remedy
1	Outdoor unit does not operate.	1-time flash every 2.5 seconds	UP	Outdoor power system	Overcurrent protection cut-out operates 3 consecutive times within 1 minute after the compressor gets started.	•Reconnect connector of compressor. •Refer to 11-5. Ⓐ"How to check inverter/compressor". •Check stop valve.
2			U3	Outdoor thermistors	Discharge temperature thermistor shorts, or opens during compressor running.	•Refer to 11-5.Ⓕ"Check of outdoor thermistors".
			U4		Fin temperature thermistor, defrost thermistor, P.C. board temperature thermistor, outdoor heat exchanger temperature thermistor or ambient temperature thermistor shorts, or opens during compressor running.	
3			FC	Outdoor control system	Nonvolatile memory data cannot be read properly.	•Replace inverter P.C. board.
4		6-time flash 2.5 seconds OFF	E8 / E9	Serial signal	The communication fails between the indoor and outdoor unit for 3 minutes.	•Check of indoor/outdoor connecting wire. • Replace indoor or outdoor P.C. board if abnormality is displayed again.
5		11-time flash 2.5 seconds OFF	UE	Stop valve/ Closed valve	Closed valve is detected by compressor current.	• Check stop valve.
6		16-time flash 2.5 seconds OFF	PL	Outdoor refrigerant system abnormality	A closed valve and air trapped in the refrigerant circuit are detected based on the temperature sensed by the indoor and outdoor thermistors and the current of the compressor.	• Check for a gas leak in a connecting piping, etc. •Check stop valve. •Refer to 11-5 Ⓛ"Check of outdoor refrigerant circuit".
7	'Outdoor unit stops and restarts 3 minutes later' is repeated.	2-time flash 2.5 seconds OFF		Overcurrent protection	Large current flows into intelligent power module.	•Reconnect connector of compressor. •Refer to 11-5. Ⓐ"How to check inverter/compressor". •Check stop valve.
8		3-time flash 2.5 seconds OFF		Discharge temperature overheat protection	Temperature of discharge temperature thermistor exceeds 116°C, compressor stops. Compressor can restart if discharge temperature thermistor reads 100°C or less 3 minutes later.	•Check refrigerant circuit and refrigerant amount. •Refer to 11-5. Ⓘ"Check of LEV".
9		4-time flash 2.5 seconds OFF		Fin temperature /P.C. board temperature thermistor overheat protection	Temperature of fin temperature thermistor on the heat sink exceeds 72 to 86 °C or temperature of P.C. board temperature thermistor on the inverter P.C.board exceeds 72 to 85°C.	•Check around outdoor unit. •Check outdoor unit air passage. • Refer to 11-5.Ⓗ"Check of outdoor fan motor".
10		5-time flash 2.5 seconds OFF		High pressure protection	Indoor coil thermistor exceeds 70°C in HEAT mode. Defrost thermistor exceeds 70°C in COOL mode.	•Check refrigerant circuit and refrigerant amount. •Check stop valve.
11		8-time flash 2.5 seconds OFF		Compressor synchronous abnormality	The waveform of compressor current is distorted.	•Reconnect connector of compressor. •Refer to 11-5.Ⓐ"How to check inverter/compressor".
12		10-time flash 2.5 seconds OFF		Outdoor fan motor	Outdoor fan has stopped 3 times in a row within 30 seconds after outdoor fan start-up.	•Refer to 11-5.Ⓗ "Check of outdoor fan motor. •Refer to 11-5. Ⓙ"Check of inverter P.C. board.
13		12-time flash 2.5 seconds OFF		Each phase current of compressor	Each phase current of compressor cannot be detected normally.	•Refer to 11-5.Ⓐ"How to check inverter/compressor".
14		13-time flash 2.5 seconds OFF		DC voltage	DC voltage of inverter cannot be detected normally.	•Refer to 11-5.Ⓐ"How to check inverter/compressor".
15	Outdoor unit operates.	1-time flash 2.5 seconds OFF		Frequency drop by current protection	When the input current exceeds approximately 16A, compressor frequency lowers.	The unit is normal, but check the following. •Check if indoor filters are clogged. •Check if refrigerant is short. •Check if indoor/outdoor unit air circulation is short cycled.
16		3-time flash 2.5 seconds OFF		Frequency drop by high pressure protection	Temperature of indoor coil thermistor exceeds 55°C in HEAT mode, compressor frequency lowers.	
				Frequency drop by defrosting in COOL mode	Indoor coil thermistor reads 8°C or less in COOL mode, compressor frequency lowers.	
17		4-time flash 2.5 seconds OFF		Frequency drop by discharge temperature protection	Temperature of discharge temperature thermistor exceeds 111°C, compressor frequency lowers.	•Check refrigerant circuit and refrigerant amount. •Refer to 11-5. Ⓘ"Check of LEV". •Refer to 11-5. Ⓕ"Check of outdoor thermistors".
18		7-time flash 2.5 seconds OFF		Low discharge temperature protection	Temperature of discharge temperature thermistor has been 50°C or less for 20 minutes.	•Refer to 11-5. Ⓘ"Check of LEV". •Check refrigerant circuit and refrigerant amount.
19		8-time flash 2.5 seconds OFF		Zero cross detecting circuit	Zero cross signal for PAM control cannot be detected.	This is not malfunction. PAM protection will be activated in the following cases: 1. Instantaneous power voltage drop. (Short time power failure) 2. When the power supply voltage is high.
20		9-time flash 2.5 seconds OFF		Inverter check mode	The connector of compressor is disconnected, inverter check mode starts.	• Check if the connector of the compressor is correctly connected. • Refer to 11-5.Ⓐ"How to check inverter/compressor".

Note: 1. The location of LED is illustrated at the right figure. Refer to “11-6. TEST POINT DIAGRAM AND VOLTAGE”.
2. LED is lighted during normal operation.

Inverter P.C. board

Flashing → LED

The flashing frequency shows the number of times the LED blinks after every 2.5-second OFF.
(Example) When the flashing frequency is “2”.



11-3. HOW TO PROCEED "SELF-DIAGNOSIS"

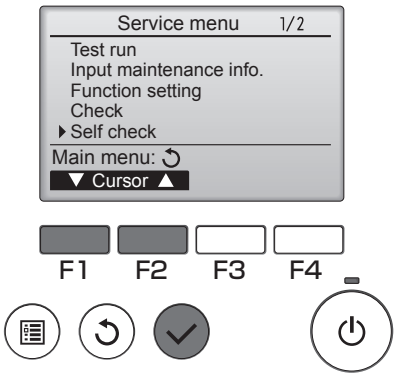
As this air conditioner has a function to memorize all the failures that had occurred, the latest failure detail can be recalled by following the procedure below.

Use this function when the check code is not displayed with wired remote controller or the remote controller at use is wireless type.

11-3-1. Self-diagnosis <PAR-30MAA> <PAR-31MAA>

① Select "Service" from the Main menu, and press the ✓ button.

Select "Self check" with the F1 or F2 button, and press the ✓ button.



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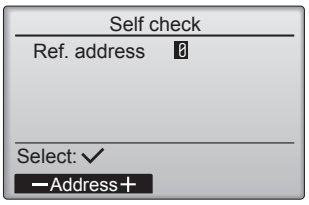
② With the F1 or F2 button, enter the refrigerant address, and press the ✓ button.



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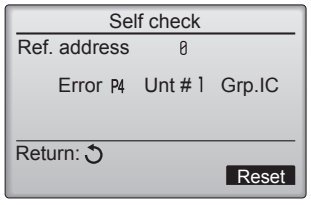
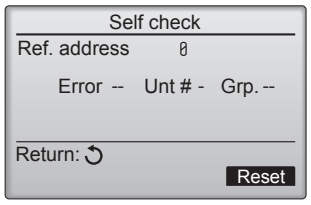
③ Check code, unit number, attribute will appear.
"-" will appear if no error history is available.



When there is no error history



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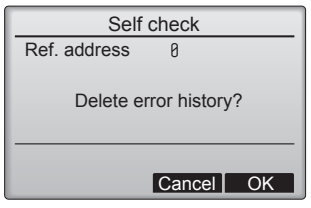
④ Resetting the error history.

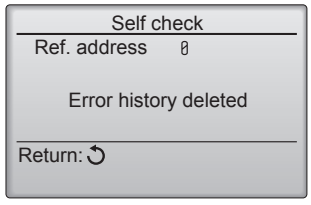
Press the F4 button (Reset) on the screen that shows the error history.

A confirmation screen will appear asking if you want to delete the error history.

Press the F4 button (OK) to delete the error history.

If deletion fails, "Request rejected" will appear.
"Unit not exist" will appear if no indoor units that are correspond to the entered address are found.





Navigating through the screens

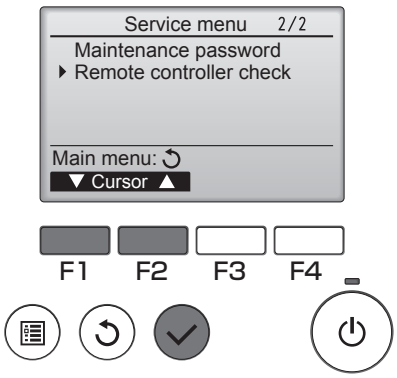
- To go back to the Main menu ..... ▣ button
- To return to the previous screen ..... ↺ button

11-3-2. Remote controller check <PAR-30MAA> <PAR-31MAA>

If operations cannot be completed with the remote controller, diagnose the remote controller with this function.

① Select "Service" from the Main menu, and press the ✓ button.

Select "Remote controller check" with the F1 or F2 button, and press the ✓ button.



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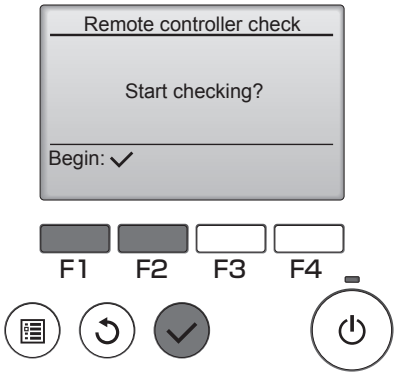
② Select "Remote controller check" from the Service menu, and press the ✓ button to start the remote controller check and see the check results.

To cancel the remote controller check and exit the Remote controller check menu screen, press the ☰ or the ↺ button.

The remote controller will not reboot itself.



---

③

OK: No problems are found with the remote controller. Check other parts for problems.

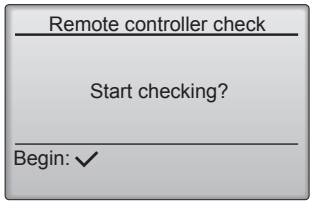
E3, 6832: There is noise on the transmission line, or the indoor unit or another remote controller is faulty. Check the transmission line and the other remote controllers.

NG (ALL0, ALL1): Send-receive circuit fault. Remote controller needs replacing.

ERC: The number of data errors is the discrepancy between the number of bits in the data transmitted from the remote controller and that of the data that was actually transmitted over the transmission line. If data errors are found, check the transmission line for external noise interference.

If the ✓ button is pressed after the remote controller check results are displayed, remote controller check will end, and the remote controller will automatically reboot itself.

Remote controller check results screen



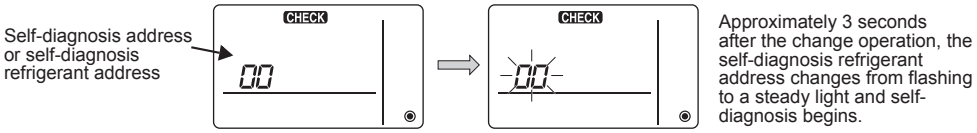
Check the remote controller display and see if anything is displayed (including lines). Nothing will appear on the remote controller display if the correct voltage (8.5–12 V DC) is not supplied to the remote controller. If this is the case, check the remote controller wiring and indoor units.

11-3-3. Self-diagnosis <PAC-YT52CRA>

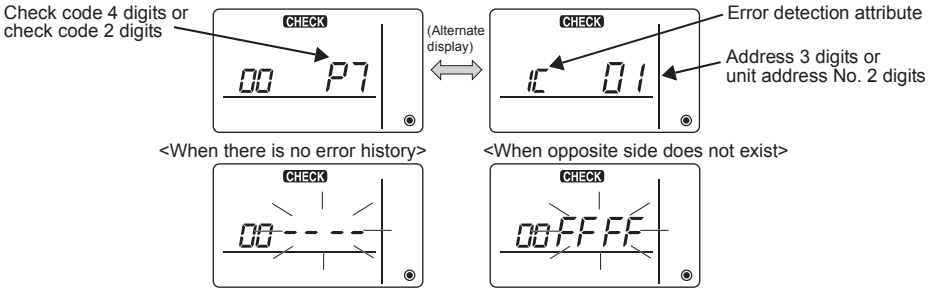
Retrieve the error history of each unit using the Simple MA controller.

① Switch to the self-diagnosis mode.
When the Ⓐ ON/OFF button and the Ⓒ TEMP. ▼ button are pressed for 5 seconds or longer, the figure shown below is displayed.

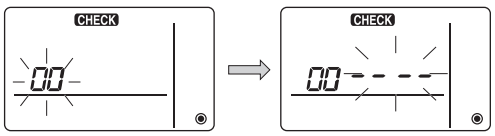
② Set the address or refrigerant address No. you want to self-diagnosis.
When the Ⓑ TEMP. ▲ and Ⓒ TEMP. ▼ are pressed, the address decreases and increases between 01 and 50 or 00 and 15.
Set it to the address No. or refrigerant address No. you want to self-diagnosis.



③ Self-diagnosis result display <error history>
(For the contents of the check code, refer to the indoor unit installation manual or service handbook.)



④ Error history reset
The error history is displayed in ③ self-diagnosis results display.
When the Ⓓ button is pressed two times successi vely within 3 seconds, the self- diagnosis object address and refrigerant address flash.
When the error history was reset, the display shown below appears.
When error history reset is failed, the error contents are displayed again.

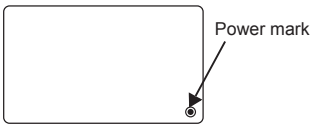


⑤ Self-diagnosis reset
There are the following two ways of resetting self-diagnosis.
Press the Ⓐ ON/OFF button and the Ⓒ TEMP. ▼ button simultaneously for 5 seconds or longer.
→ Resets self-diagnosis and returns to the state before self-diagnosis.
Press the Ⓐ ON/OFF button. → Self-diagnosis resets and indoor units stop.
(When operation is prohibited, this operation is ineffective.)

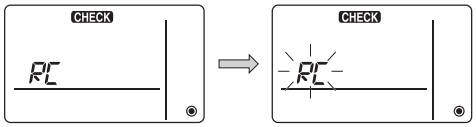
11-3-4. Remote Controller Check <PAC-YT52CRA>

When the air conditioner cannot be controlled from the Simple MA controller, use this function to check the remote controller.

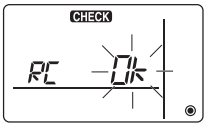
① First, check the power mark.
When normal voltage (12 V DC) is not applied to the remote controller, the power mark goes off.
When the power mark is off, check the remote controller wiring and the indoor unit.



② Switch to the remote controller check mode.
When the Ⓑ [TEMP. ▲] button and Ⓓ [fan] button are pressed simultaneously for 5 seconds or longer, the figure shown below is displayed.
When the Ⓐ [ON/OFF] button is pressed, remote controller check begins.



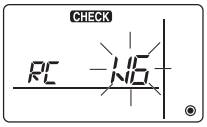
③ Remote controller check result
<When remote controller is normal>



Since there is no problem at the remote controller, check for other causes.

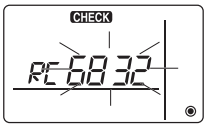
(Error display 1) "NG" flashes → Remote controller send/receive circuit abnormal

<When remote controller is faulty>



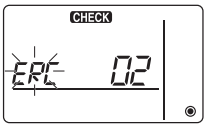
Remote controller switching is necessary.

When the problem is other than the checked remote controller



(Error display 2) "E3" "6833" "6832" flash → Cannot send

There is noise on the transmission line, or the indoor unit or another remote controller is faulty.
Check the transmission line and the other remote controllers.

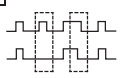


(Error display 3) "ERC" and data error count are displayed → Data error generation

"Data error count" is the difference between the number of bits of remote controller send data and the number of bits actually sent to the transmission line. In this case, the send data was disturbed by the noise, etc. Check the transmission line.

When data error count is 02

Remote controller send data
Send data on transmission line



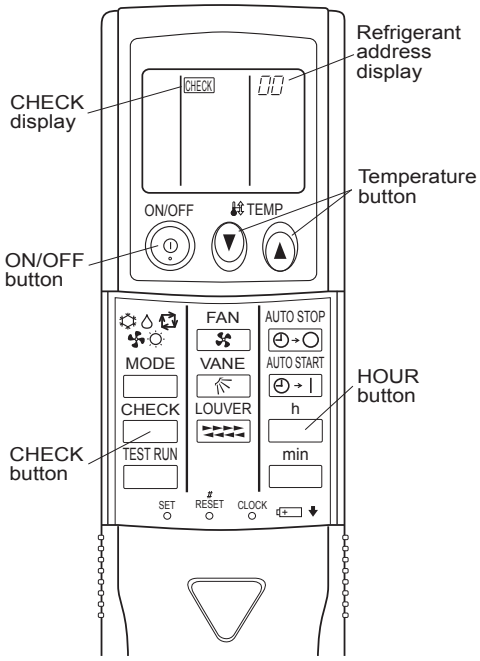
④ Remote controller check reset
When the Ⓑ [TEMP. ▲] button and Ⓓ [fan] button are pressed simultaneously for 5 seconds or longer, remote controller diagnosis is reset, the [HO] and run lamp flash for a certain period of time, and then the remote controller returns to its state before diagnosis.

11-3-5. Self-diagnosis <Wireless remote controller>

<In case of trouble during operation>

When a malfunction occurs to air conditioner, both indoor unit and outdoor unit will stop and operation lamp blinks to inform unusual stop.

<Malfunction-diagnosis method at maintenance service>



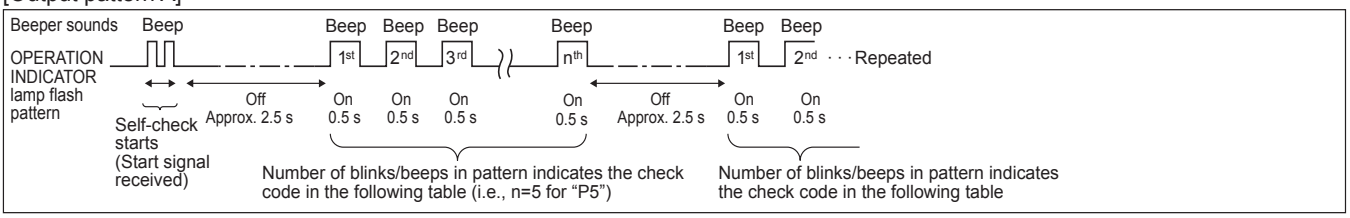
[Procedure]

1. Press the CHECK button twice.
   - "CHECK" lights, and refrigerant address "00" flashes.
   - Check that the remote controller's display has stopped before continuing.
2. Press the TEMP ▼ ▲ buttons.
   - Select the refrigerant address of the indoor unit for the self-diagnosis.

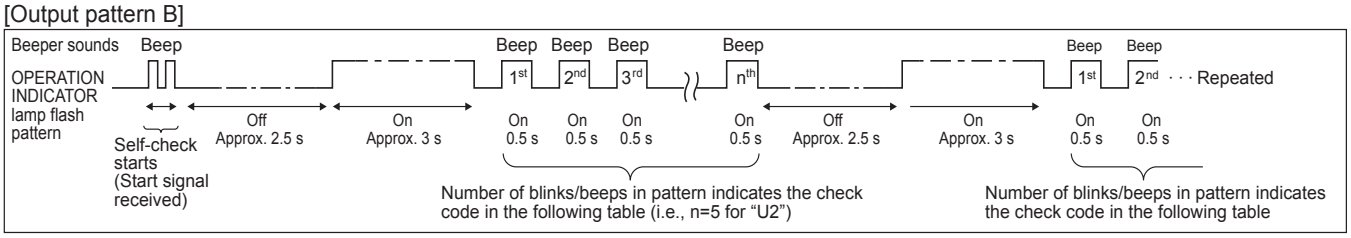
   Note: Set refrigerant address using the outdoor unit's DIP switch (SW1). (For more information, see the outdoor unit installation manual.)
3. Point the remote controller at the sensor on the indoor unit and press the HOUR button.
   - If an air conditioner error occurs, the indoor unit's sensor emits an intermittent buzzer sound, the operation light flashes, and the check code is output. (It takes 3 seconds at most for check code to appear.)
4. Point the remote controller at the sensor on the indoor unit and press the ON/OFF button.
   - The check mode is cancelled.

• Refer to the following tables for details on the check codes.

[Output pattern A]



[Output pattern B]



[Output pattern A] Errors detected by indoor unit

Wireless remote controller	Wired remote controller	Symptom	Remark
Beeper sounds/OPERATION INDICATOR lamp flashes (Number of times)	Check code		
1	P1	Intake sensor error	As for indoor unit, refer to indoor unit's service manual.
2	P2	Pipe (TH2) sensor error	
	P9	Pipe (TH5) sensor error	
3	E6,E7	Indoor/outdoor unit communication error	
4	P4	Drain sensor error/Float switch connector (CN4F) open	
5	P5	Drain pump error	
	PA	Forced compressor stop (due to water leakage abnormality)	
6	P6	Freezing/Overheating protection operation	
7	EE	Communication error between indoor and outdoor units	
9	E4, E5	Remote controller signal receiving error	
12	Fb (FB)*	Indoor unit control system error (memory error, etc.)	
14	PL	Abnormality of refrigerant circuit	
–	E0, E3	Remote controller transmission error	
–	E1, E2	Remote controller control board error	

[Output pattern B] Errors detected by unit other than indoor unit (outdoor unit, etc.)

Wireless remote controller	Wired remote controller	Symptom
Beeper sounds/OPERATION INDICATOR lamp flashes (Number of times)	Check code	
1	E9	Indoor/outdoor unit communication error (Transmitting error) (Outdoor unit)
2	UP	Compressor overcurrent interruption
3	U3,U4	Open/short of outdoor unit thermistors
14	PL or others	Abnormality of refrigerant circuit or other errors (Refer to the technical manual for the outdoor unit.)

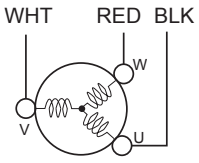
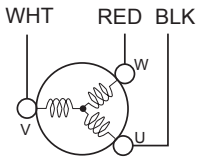
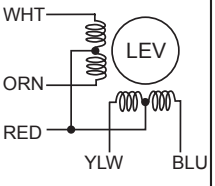
Notes: 1. If the beeper does not sound again after the initial 2 beeps to confirm the self-check start signal was received and the OPERATION INDICATOR lamp does not come on, there are no error records.

2. If the beeper sounds 3 times continuously "beep, beep, beep (0.4 + 0.4 + 0.4 seconds)" after the initial 2 beeps to confirm the self-check start signal was received, the specified refrigerant address is incorrect.

*The check code in the parenthesis indicates PAR-30/31MAA model.

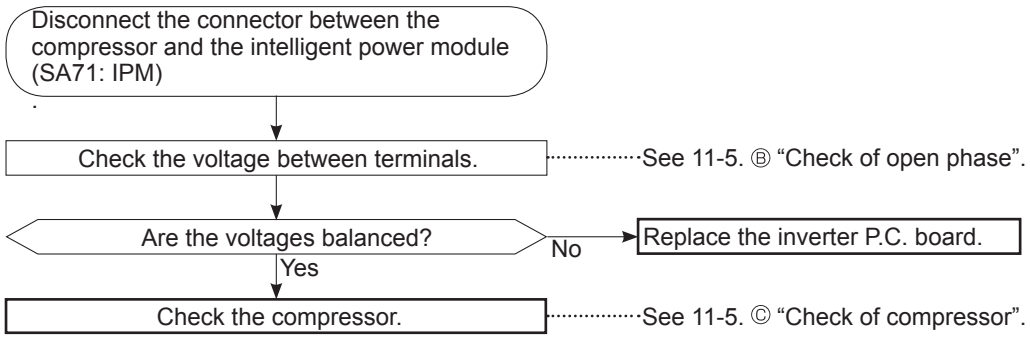
11-4. TROUBLE CRITERION OF MAIN PARTS

SUZ-SA71VA3.TH SUZ-SA100VA2.TH

<table>
<tr><th>Parts name</th><th>Check method and criterion</th><th>Figure</th></tr>
<tr><td>Defrost thermistor (RT61)
Fin temperature thermistor (RT64)
Ambient temperature thermistor (RT65)
Outdoor heat exchanger temperature thermistor(RT68)</td><td>Measure the resistance with a tester.
Refer to “11-6. TEST POINT DIAGRAM AND VOLTAGE” for the chart of thermistor.</td><td></td></tr>
<tr><td>Discharge temperature thermistor (RT62)</td><td>Measure the resistance with a tester.
Before measurement, hold the thermistor with your hands to warm it up.
Refer to “11-6. TEST POINT DIAGRAM AND VOLTAGE” for the chart of thermistor.</td><td></td></tr>
<tr><td>Compressor</td><td>Measure the resistance between terminals with a tester.
(Temperature: −10 to 40°C)<table><tr><th></th><th colspan="2">Normal</th></tr><tr><th></th><th>SUZ-SA71VA3.TH</th><th>SUZ-SA100VA2.TH</th></tr><tr><td>U-V
U-W
V-W</td><td>0.91 to 1.13 Ω</td><td>0.83 to 1.03 Ω</td></tr></table></td><td> 
</td></tr>
<tr><td>Outdoor fan motor</td><td>Measure the resistance between terminals with a tester.
(Temperature: −10 to 40°C)<table><tr><th>Color of the lead wire</th><th>Normal</th></tr><tr><td>WHT - BLK</td><td rowspan="3">12 to 17 Ω</td></tr><tr><td>BLK - RED</td></tr><tr><td>RED - WHT</td></tr></table></td><td> 
</td></tr>
<tr><td>R.V. coil (21S4)</td><td>Measure the resistance between terminals with a tester.
(Temperature: −10 to 40°C)<table><tr><th>Normal</th></tr><tr><td>1.19 to 1.78 kΩ</td></tr></table></td><td></td></tr>
<tr><td>Expansion valve coil (LEV)</td><td>Measure the resistance with a tester.
(Temperature: −10 to 40°C)<table><tr><th>Color of the lead wire</th><th>Normal</th></tr><tr><td>RED - ORN</td><td rowspan="4">37 to 54 Ω</td></tr><tr><td>RED - WHT</td></tr><tr><td>RED - BLU</td></tr><tr><td>RED - YLW</td></tr></table></td><td> 
</td></tr>
</table>

11-5. TROUBLESHOOTING FLOW

Ⓐ How to check inverter/compressor



Ⓑ Check of open phase

● With the connector between the compressor and the intelligent power module disconnected, activate the inverter and check if the inverter is normal by measuring **the voltage balance** between the terminals.

Output voltage is 50–130 V. (The voltage may differ according to the tester.)

<< Operation method (Test run operation)>>

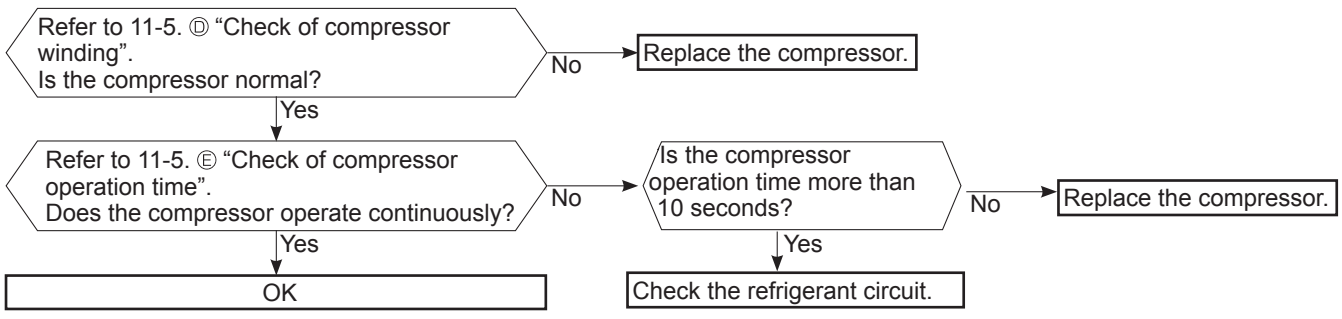
- For the PAR-31MAA, select "Service" → "Test run" from the main menu to start the test run, and then select the cooling mode.
- For details or for other information about starting the test run when using remote controllers, refer to the installation manual for the indoor unit or the remote controller.

<<Measurement point>>
At 3 points
BLK (U) - WHT (V)
BLK (U) - RED (W)
WHT (V) - RED (W)

Measure AC voltage between the lead wires at 3 points.

Notes: 1. Output voltage varies according to power supply voltage.
2. Measure the voltage by analog type tester.
3. During this check, LED of the inverter P.C. board flashes 9 times. (SA71: "11-6. TEST POINT DIAGRAM AND VOLTAGE".)

Ⓒ Check of compressor



Ⓓ Check of compressor winding

● Disconnect the connector between the compressor and intelligent power module, and measure the resistance between the compressor terminals.

<<Measurement point>>

at 3 points

BLK-WHT

BLK-RED Measure the resistance between the lead wires at 3 points.

WHT-RED

<<Judgement>>

Refer to "11-4. TROUBLE CRITERION OF MAIN PARTS".

0 [Ω] ·····Abnormal [short]

Infinite [Ω] ·····Abnormal [open]

NOTE: Be sure to zero the ohmmeter before measurement.

Ⓔ Check of compressor operation time

● Connect the compressor and activate the inverter. Then measure the time until the inverter stops due to overcurrent.

<<Operation method>>

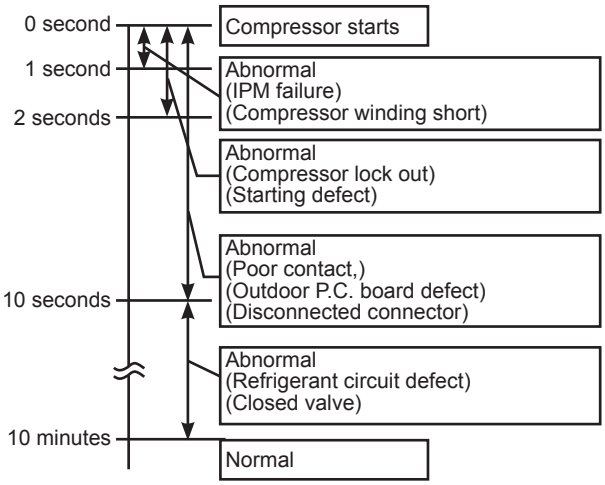
Start heating or cooling test run.

(TEST RUN OPERATION : Refer to 11-5 Ⓑ.)

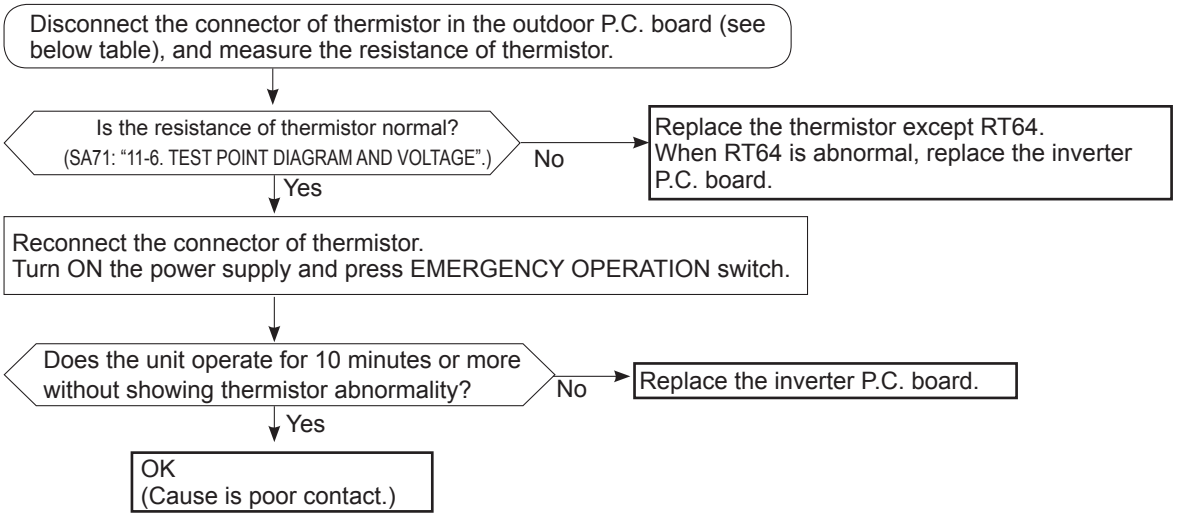
<<Measurement>>

Measure the time from the start of compressor to the stop of compressor due to overcurrent.

<<Judgement>>



Ⓕ Check of outdoor thermistors

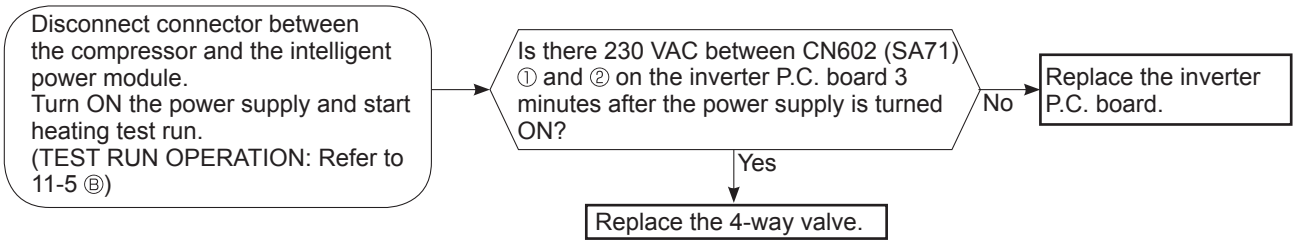


Thermistor	Symbol	Connector, Pin No. (SUZ-SA71VA3.TH, SUZ-SA100VA2.TH)	Board
Defrost	RT61	Between CN671 pin1 and pin2	Inverter P.C. board
Discharge temperature	RT62	Between CN671 pin3 and pin4	
Fin temperature	RT64	Between CN673 pin1 and pin2	
Ambient temperature	RT65	Between CN672 pin1 and pin2	
Outdoor heat exchanger temperature	RT68	Between CN671 pin5 and pin6	

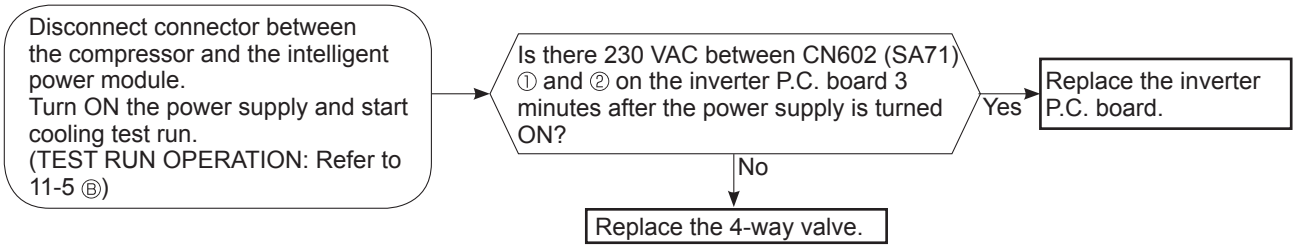
Ⓖ Check of R.V. coil

First of all, measure the resistance of R.V. coil to check if the coil is defective. Refer to "11-4. TROUBLE CRITERION OF MAIN PARTS".
In case CN602 (SA71) is not connected or R.V. coil is open, voltage is generated between the terminal pins of the connector although any signal is not being transmitted to R.V. coil.
Check if CN602 (SA71) is connected.

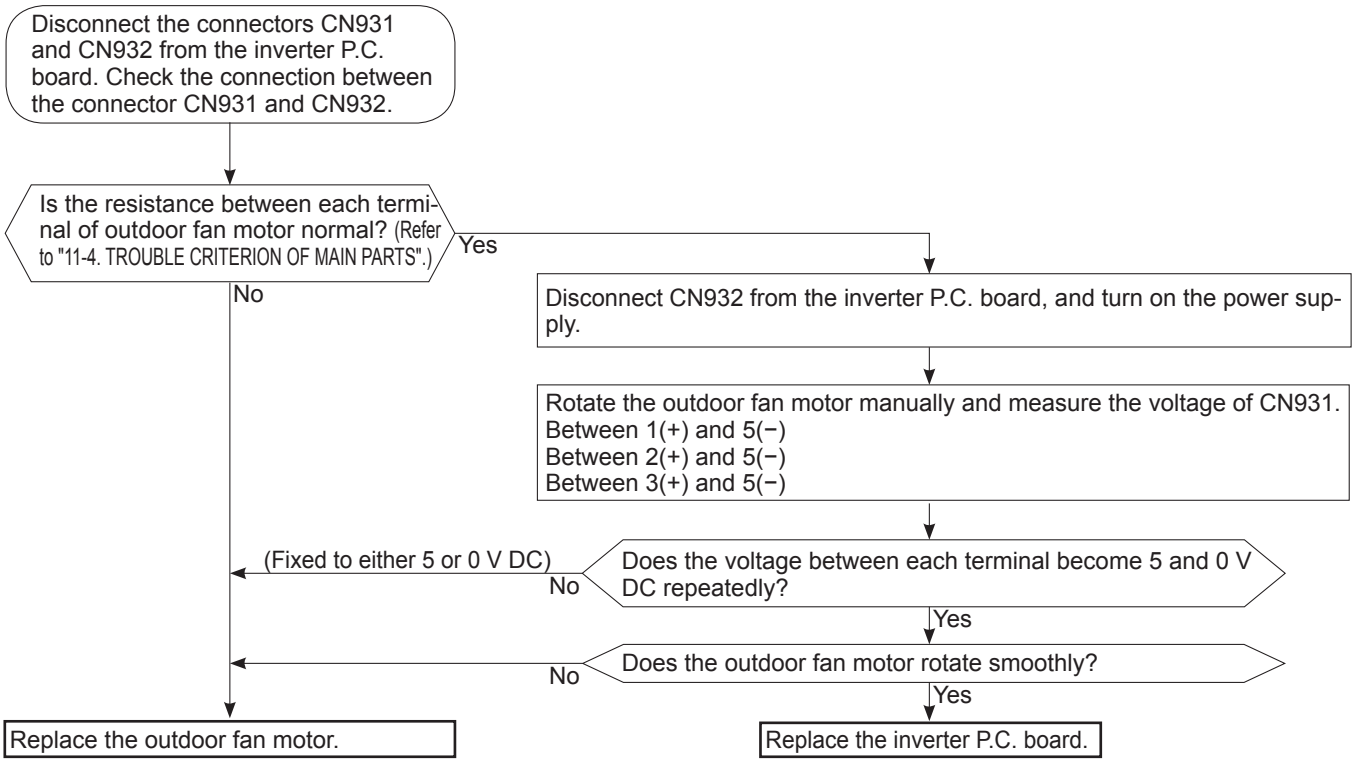
Unit operates COOL mode even if it is set to HEAT mode.



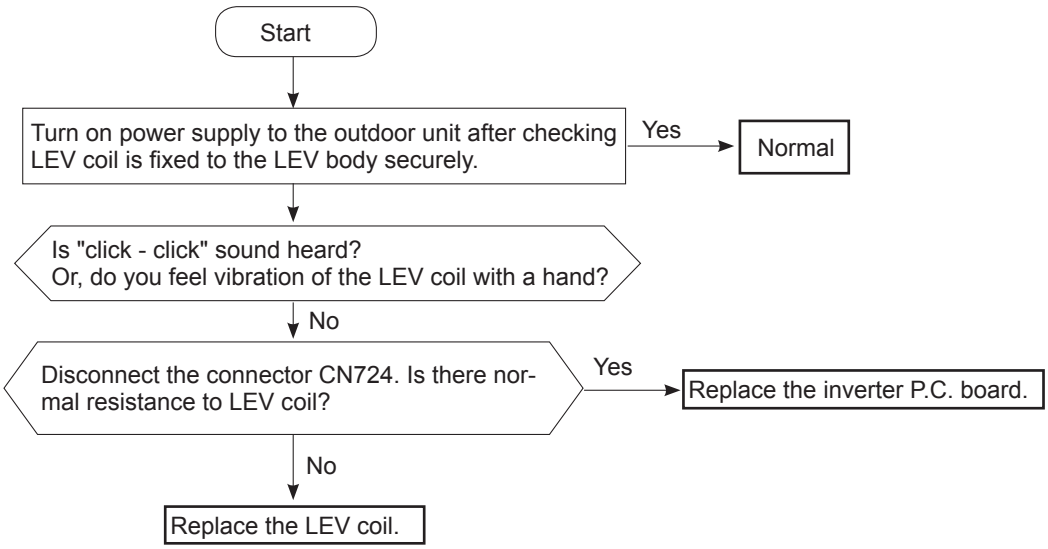
Unit operates HEAT mode even if it is set to COOL mode.



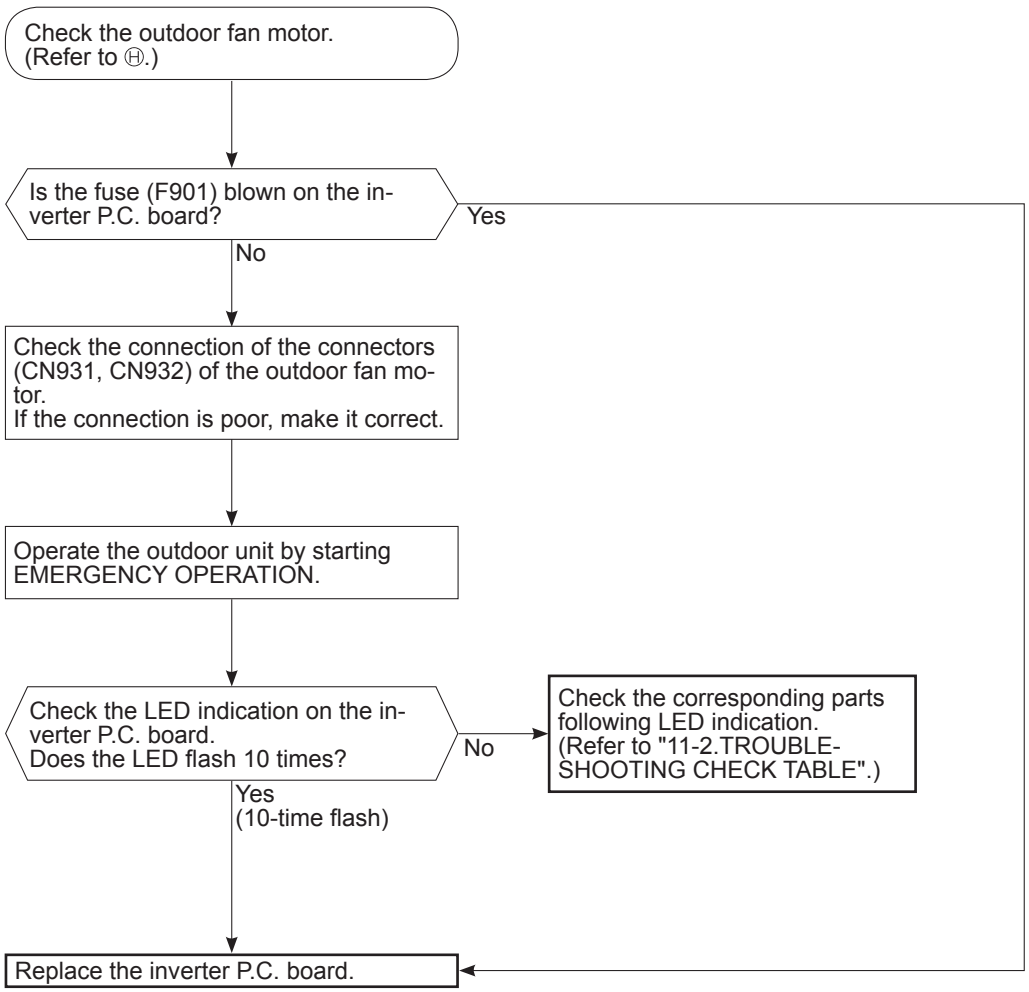
Ⓗ Check of outdoor fan motor



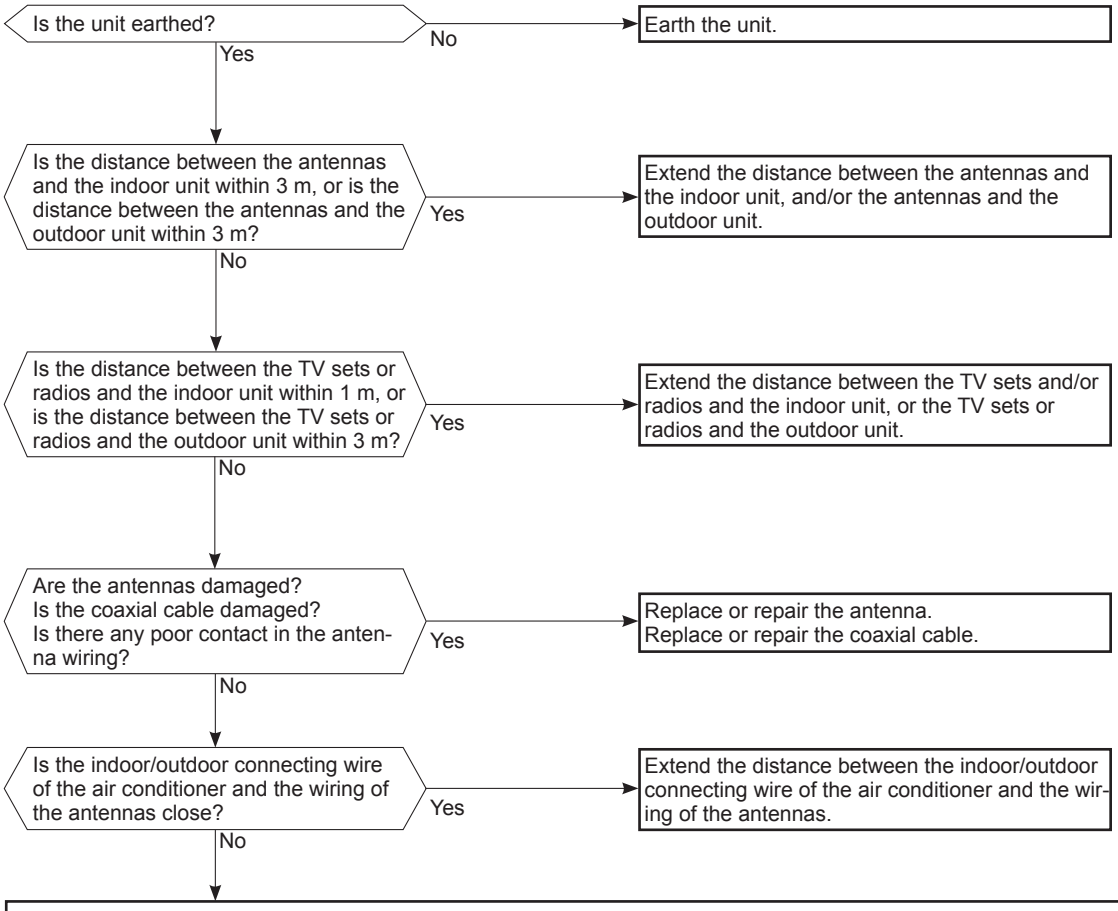
Ⓘ Check of LEV



Ⓙ Check of inverter P.C. board



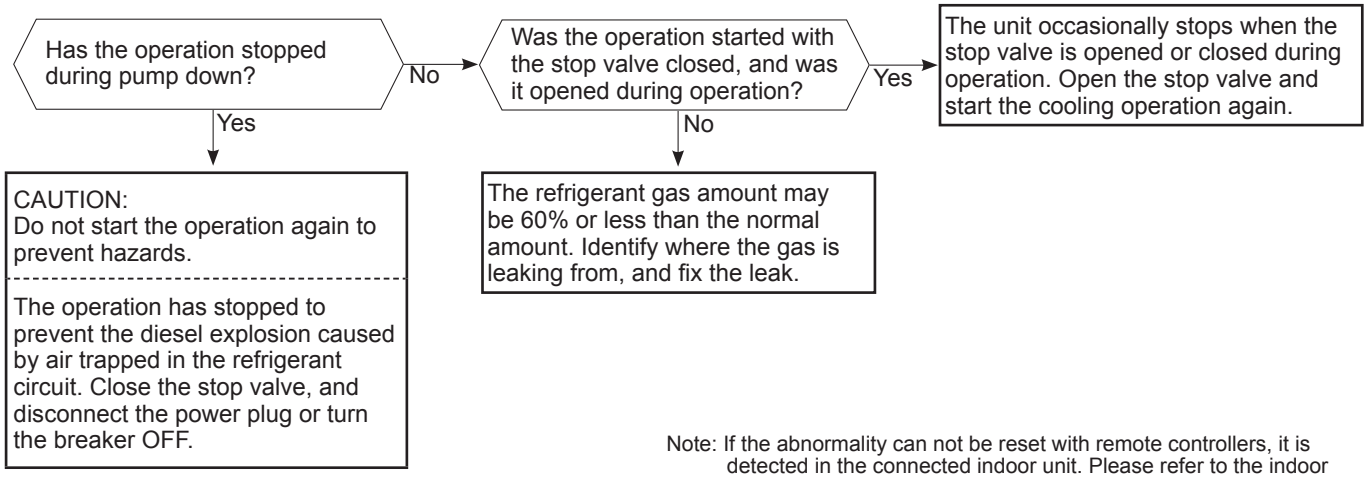
Ⓚ Electromagnetic noise enters into TV sets or radios



Even if all of the above conditions are fulfilled, the electromagnetic noise may enter, depending on the electric field strength or the installation condition (combination of specific conditions such as antennas or wiring).
Check the following before asking for service.

1. Devices affected by the electromagnetic noise
   TV sets, radios (FM/AM broadcast, shortwave)
2. Channel, frequency, broadcast station affected by the electromagnetic noise
3. Channel, frequency, broadcast station unaffected by the electromagnetic noise
4. Layout of ;
   indoor/outdoor unit of the air conditioner, indoor/outdoor wiring, earth wire, antennas, wiring from antennas, receiver
5. Electric field intensity of the broadcast station affected by the electromagnetic noise
6. Presence or absence of amplifier such as booster
7. Operation condition of air conditioner when the electromagnetic noise enters in
   1) Turn OFF the power supply once, and then turn ON the power supply. In this situation, check for the electromagnetic noise.
   2) Within 3 minutes after turning ON the power supply, press OPERATE/STOP (ON/OFF) button on the remote controller for power ON, and check for the electromagnetic noise.
   3) After a short time (3 minutes later after turning ON), the outdoor unit starts running. During operation, check for the electromagnetic noise.
   4) Press OPERATE/STOP (ON/OFF) button on the remote controller for power OFF, when the outdoor unit stops but the indoor/outdoor communication still runs on. In this situation, check for the electromagnetic noise.

Ⓛ Check of outdoor refrigerant circuit

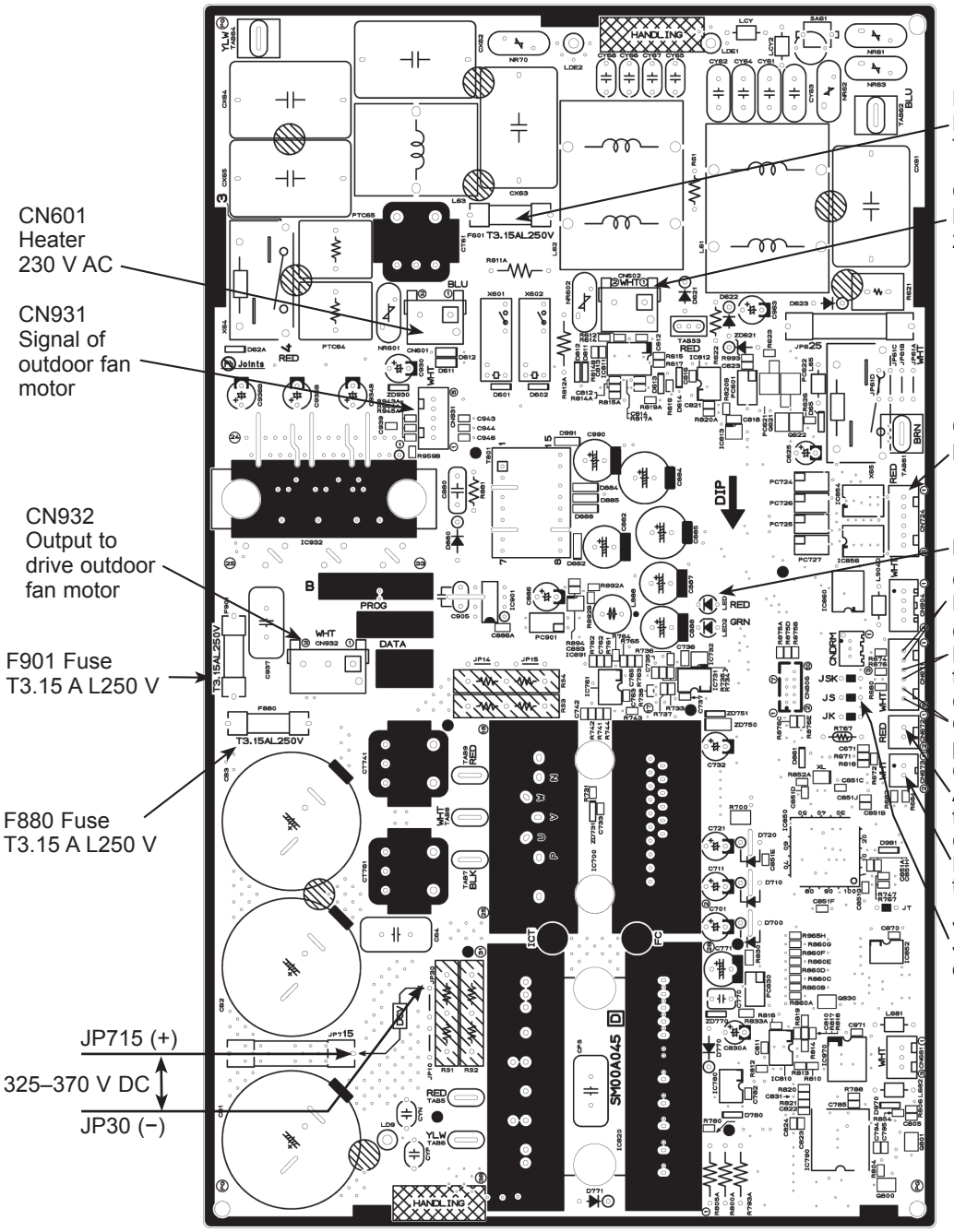


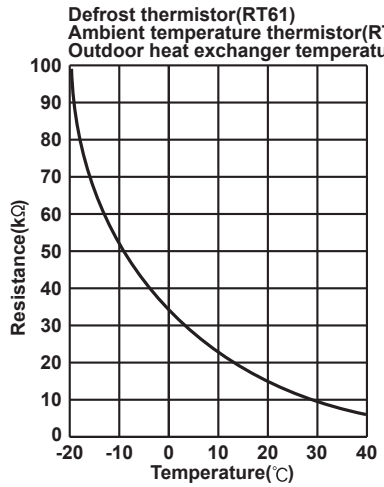
Note: If the abnormality can not be reset with remote controllers, it is detected in the connected indoor unit. Please refer to the indoor unit's service manual.

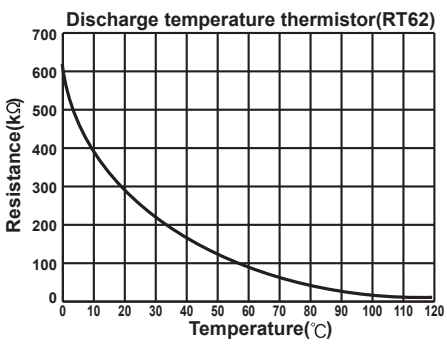
11-6. TEST POINT DIAGRAM AND VOLTAGE

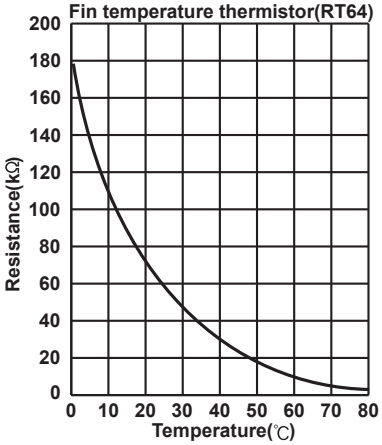
Inverter P.C. board

SUZ-SA71VA3.TH SUZ-SA100VA2.TH







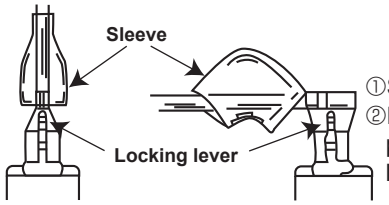


12 DISASSEMBLY INSTRUCTIONS

<"Terminal with locking mechanism" Detaching points>

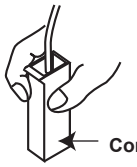
The terminal which has the locking mechanism can be detached as shown below.
There are two types (Refer to (1) and (2)) of the terminal with locking mechanism.
The terminal without locking mechanism can be detached by pulling it out.
Check the shape of the terminal before detaching.

(1) Slide the sleeve and check if there is a locking lever or not.



①Slide the sleeve.
②Pull the terminal while pushing the locking lever.

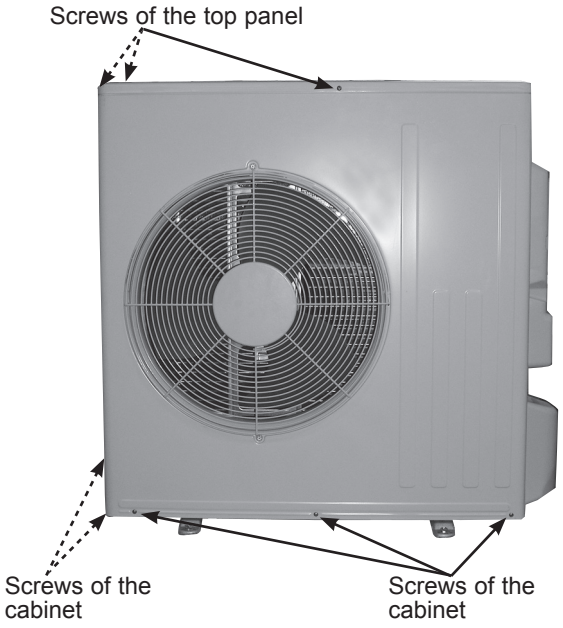
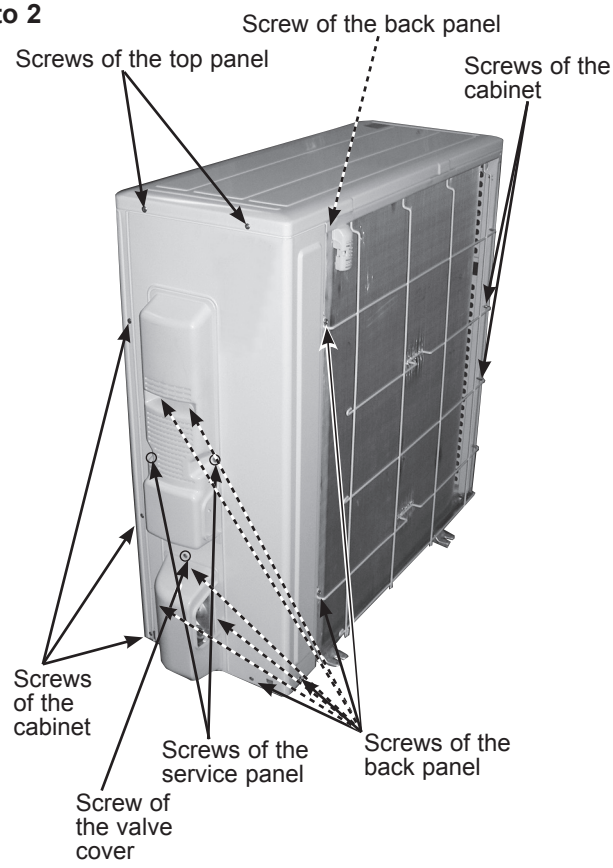
(2) The terminal with this connector has the locking mechanism.

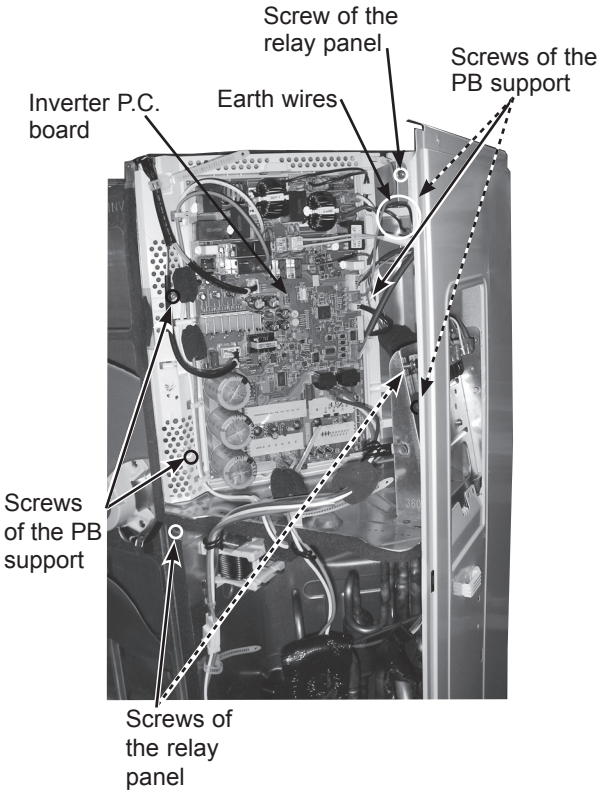
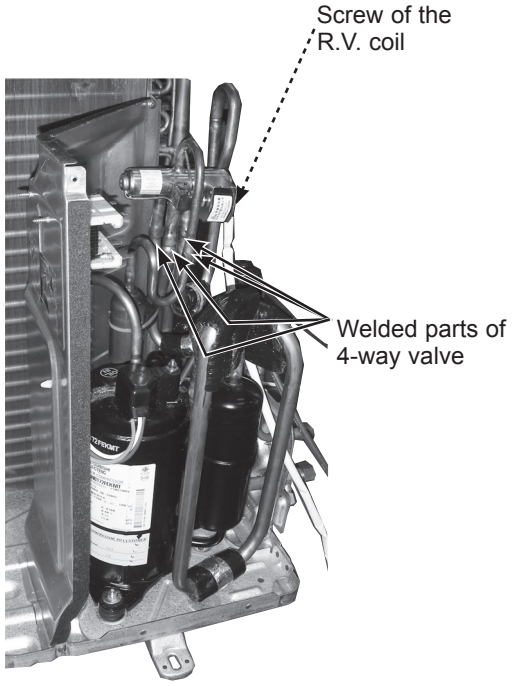


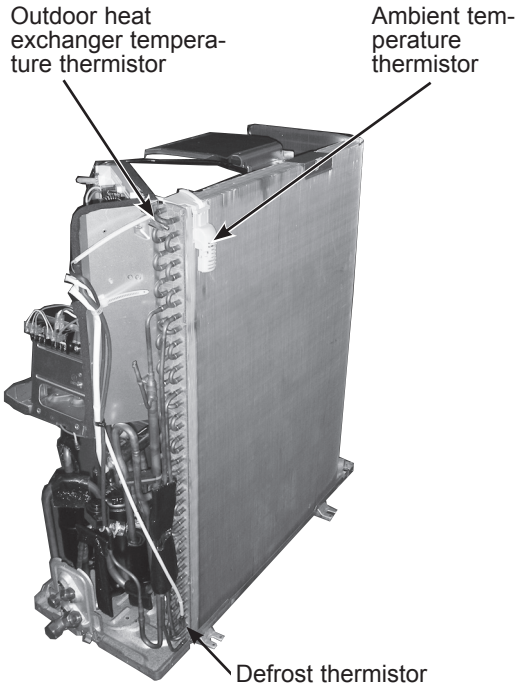
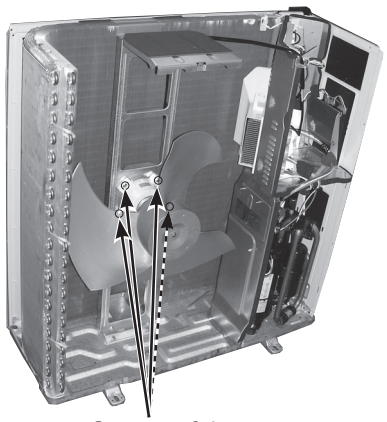
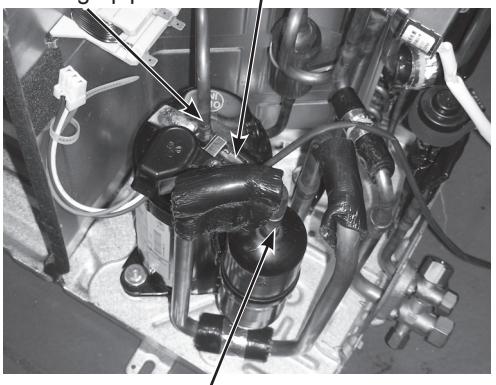
①Hold the sleeve, and pull out the terminal slowly.

SUZ-SA71VA3.TH SUZ-SA100VA2.TH

NOTE: Turn OFF power supply before disassembling.

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the service panel. (2) Remove the screws of the top panel. (3) Remove the screw of the valve cover. (4) Remove the service panel. (5) Remove the top panel. (6) Remove the valve cover. (7) Disconnect the power supply and indoor/outdoor connecting wire. (8) Remove the screws of the cabinet. (9) Remove the cabinet. (10) Remove the screws of the back panel. (11) Remove the back panel.	**Photo 1** 
Photo 2  	

OPERATING PROCEDURE	PHOTOS
2. Removing the inverter assembly, inverter P.C. board (1) Remove the cabinet and panels. (Refer to procedure 1.) (2) Disconnect the lead wire to the reactor and the following connectors: <Inverter P.C. board> CN602 (R.V. coil) CN931, CN932 (Fan motor) CN671 (Defrost thermistor, discharge temperature thermistor and outdoor heat exchanger temperature thermistor) CN672 (Ambient temperature thermistor) CN724 (LEV) (3) Remove the compressor connector. (4) Remove the screws fixing the relay panel. (5) Remove the relay panel. (6) Remove the earth wires and the lead wires of the inverter P.C. board. (7) Remove the screws of the PB support. (8) Remove the inverter P.C. board from the relay panel.	**Photo 3** 
3. Removing R.V. coil (1) Remove the cabinet and panels. (Refer to procedure 1.) (2) Disconnect the following connector: <Inverter P.C. board> CN602 (R.V. coil) (3) Remove the R.V. coil.	**Photo 4** 

OPERATING PROCEDURE	PHOTOS
4. Removing the discharge temperature thermistor, defrost thermistor, outdoor heat exchanger temperature thermistor and ambient temperature thermistor (1) Remove the cabinet and panels. (Refer to procedure 1.) (2) Disconnect the lead wire to the reactor and the following connectors: <Inverter P.C. board> CN671 (Defrost thermistor, discharge temperature thermistor and outdoor heat exchanger temperature thermistor) CN672 (Ambient temperature thermistor) (3) Pull out the discharge temperature thermistor from its holder. (Photo 7) (4) Pull out the defrost thermistor from its holder. (5) Pull out the outdoor heat exchanger temperature thermistor from its holder. (6) Pull out the ambient temperature thermistor from its holder.	**Photo 5** 
5. Removing outdoor fan motor (1) Remove the top panel, cabinet and service panel. (Refer to procedure 1.) (2) Disconnect the following connectors: <Inverter P.C. board> CN931 and CN932 (Fan motor) (3) Remove the propeller. (4) Remove the screws fixing the fan motor. (5) Remove the fan motor.	**Photo 6** 
6. Removing the compressor and 4-way valve (1) Remove the top panel, cabinet and service panel. (Refer to procedure 1.) (2) Remove the back panel. (Refer to procedure 1.) (3) Remove the inverter assembly. (Refer to procedure 2.) (4) Recover gas from the refrigerant circuit. **NOTE:** Recover gas from the pipes until the pressure gauge shows 0 kg/cm² (0 MPa). (5) Detach the welded part of the suction and the discharge pipe connected with compressor. (6) Remove the compressor nuts. (7) Remove the compressor. (8) Detach the welded part of 4-way valve and pipe. (Photo 4)	**Photo 7** 

Mr.SLIM

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