ADVANCED AND EVER ADVANCING **MITSUBISHI ELECTRIC**

MITSUBISHI ELECTRIC

2000

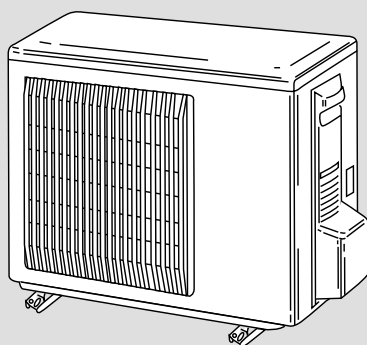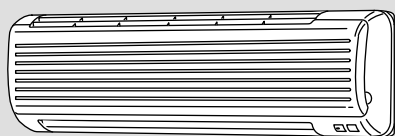SPLIT-TYPE, HEAT PUMP AIR CONDITIONERS

No. OB245

SERVICE MANUAL

**Wireless type
Models**

MSZ-G09SV - E1 (WH)   • MUZ-G09SV - E1
MSZ-G12SV - E1 (WH)   • MUZ-G12SV - E1

CONTENTS

1 | PART NAMES AND FUNCTIONS

MSZ-G09SV-⌷E1⌷
MSZ-G12SV-⌷E1⌷

INDOOR UNIT

- Air cleaning filter(white bellows type)
- Deodorizing filter (gray sponge type)
- Air filter
- Front panel
- Vertical vanes
- Grille
- Air inlet
- to Breaker
- Power supply cord
- Remote control receiving section
- Horizontal vane
- Remote controller

- Operation section
- (When the grille is open)
- Emergency operation switch

- Display section
- Operation Indicator lamp
- Receiving section

MUZ-G09SV-⌷E1⌷
MUZ-G12SV-⌷E1⌷

OUTDOOR UNIT

- Air inlet
- Piping
- Drain hose
- Air outlet
- Drain outlet
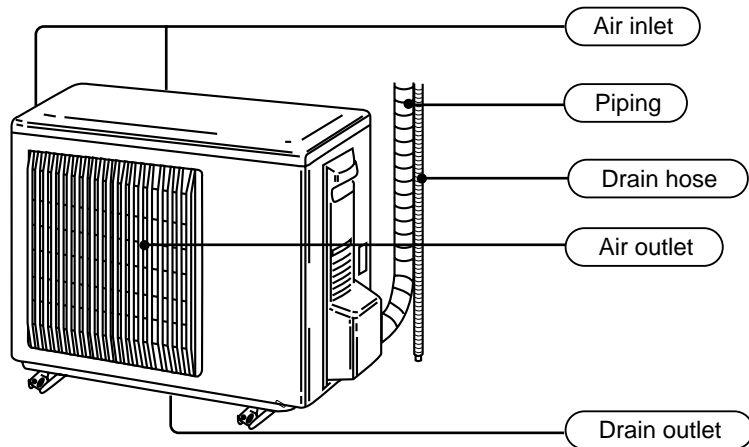
MSZ-G09SV-E1
MSZ-G12SV-E1

REMOTE CONTROLLER

Signal transmitting section

Operation display section

OPERATE /STOP
(ON /OFF)button

OPERATION SELECT button

FAN SPEED CONTROL button

ECONO COOL button

ON-TIMER button

CLOCK SET button

HR. button
MIN. button
(TIME SET button)

ON/OFF ▼TOO WARM ▲TOO COOL

MODE I FEEL COOL DRY HEAT

FAN   VANE

ECONO COOL   SWING

START   STOP

HR. CLOCK MIN.

RESET

MITSUBISHI ELECTRIC

TEMPERATURE buttons

VANE CONTROL button

SWING button

OFF-TIMER button

RESET button

2 SPECIFICATION

Indoor model			MSZ-G09SV - E1		MSZ-G12SV - E1	
Function			Cooling	Heating	Cooling	Heating
Power supply			Single phase 230V,50Hz		Single phase 230V,50Hz	
Capacity	Capacity	kW	2.6 (1.3-3.1)	3.6 (1.4-5.1)	3.5 (0.9-4.0)	4.8 (0.9-6.2)
	Air flow(Hi)	m³ /h	474	504	588	642
	Dehumidification	ℓ /h	1.2	—	1.6	—
Electrical data	Power outlet	A	10		10	
	Running current	A	4.54	5.50	6.20	7.40
	Power input	W	940 (440 - 1120)	1140 (430 - 1300)	1290 (290 - 1390)	1540 (290 - 2090)
	Auxiliary heater	A(kW)	—		—	
	Power factor	%	90		90	
	Starting current	A	5.50		7.40	
	Fan motor current	A	0.17		0.19	
Fan motor	Model		RC4V19- □□		RC4V19- □□	
	Winding resistance(at20℃)	Ω	WHT-BLK 292 BLK-RED 325		WHT-BLK 292 BLK-RED 325	
	Dimensions W×H×D	mm	850×278×191		850×278×191	
	Weight	kg	9		10	
	Air direction		5		5	
Special remarks	Sound level (Hi)	dB(A)	36	35	39	
	Fan speed (Hi)	rpm	950	1000	1020	1100
	Fan speed regulator		3		3	
	Thermistor RT11(at25℃)	kΩ	10		10	
	Thermistor RT12(at25℃)	kΩ	10		10	
	Thermistor RT13(at25℃)	kΩ	10		10	
Outdoor model			MUZ-G09SV - E1		MUZ-G12SV - E1	
Capacity	Outdoor air flow	m³ /h	1500		1560	
Electrical data	Compressor motor current	A	4.12	5.08	5.67	6.87
	Fan motor current	A	0.25		0.34	
	Coefficient of performance(C.O.P)		2.77	3.16	2.71	3.12
Compressor	Model		KHV-104FGK		SHV-130FEA	
	Output	W	900		1100	
	Winding resistance(at20℃)	Ω	U-V 2.14 U-W 2.14 V-W 2.14		U-V 0.45 U-W 0.45 V-W 0.45	
Fan motor	Model		RA6V18- □□		RA6V28- □□	
	Winding resistance(at20℃)	Ω	WHT-BLK 279 BLK-RED 198		WHT-BLK 201 BLK-RED 350	
	Dimensions W×H×D	mm	710(+69)×540×255		710(+69)×540×255	
	Weight	kg	28		34	
Special remarks	Sound level	dB(A)	45		48	
	Fan speed	rpm	600		720	
	Fan speed regulator		1		1	
	Refrigerant filling capacity(R-22)	kg	0.75		1.10	
	Refrigerating oil (Model)	cc	270 (MS56)		350 (MS56)	
	Thermistor RT61(at100℃)	kΩ	13.4		13.4	
	Thermistor RT62(at0℃)	kΩ	33.2		33.2	
	Thermistor RT64(at70℃)	kΩ	7.9		7.9	

NOTE : Test conditions are based on ISO (Refrigerant piping length (one way): 5m)
        Cooling : Indoor   DB27℃   WB19℃
                        Outdoor DB35℃   WB24℃
        Heating : Indoor   DB 20℃ WB -℃
                        Outdoor DB 7℃   WB 6℃

Specifications and rating conditions of main electric parts

INDOOR UNIT

Item \ Model		MSZ-G09SV - E1 MSZ-G12SV - E1
Indoor fan capacitor	(C11)	1.5μF 440V
Fuse	(F11)	250V 3.15A
Thermal fuse	(F12)	93.5℃ 5A 250V
Vane motor	(MV1, MV2)	MP24GA 12V 300Ω
Varistor	(NR11)	ERZV10D471
Solid state relay	(SR141)	S201DH1Y
Terminal block	(TB)	5P
Contactor	(52C)	JM1aN-ZTMP-DC12V
Indoor fan motor thermal fuse		136℃ ±3℃ 2A

OUTDOOR UNIT

Item \ Model		MUZ-G09SV - E1	MUZ-G12SV - E1
Current transformer	(CT61)	RR-18	
Power-facrtor capacitor	(C61)	100μF 420V	165μF 420V
Smoothing capacitor	(C63)	1500μF 420V	2500μF 420V
Outdoor fan capacitor	(C65)	1.8μF 440V	
Diode stack	(DS61, DS62)	S25VB80	
Fuse	(F801)	250V 2A	
Fuse	(F901)	250V 1A	
Expansion valve coil	(LEV)	LAM-MD12ME 12VDC	
Reactor	(L61)	8A 8mH	15A 4.3mH
Current-detecting resistor	(R61, R62)	70mΩ 5W	100mΩ 5W
Current-limiting resistor	(R64)	10Ω 15W	10Ω 20W
Solid state relay	(SSR61)	TLP3506	
Terminal block	(TB2)	4P	
Outdoor fan relay	(X61)	G5S-1	
Current-limiting relay	(X64)	G4A-1A	
R.V. coil	(21S4)	LB8 220-240V AC	
Noise filter		EM43261	EM43262
Transistor module		QM15TG-9B	QM20TG-9B

3 | NOISE CRITERIA CURVES

MSZ-G09SV-E1

NOTCH	FUNCTION	SPL(dB(A))	LINE
Hi	COOLING	36	●——●
	HEATING		

Test conditions,
Cooling : DB 27℃   WB 19℃
Heating : DB 20℃   WB - ℃
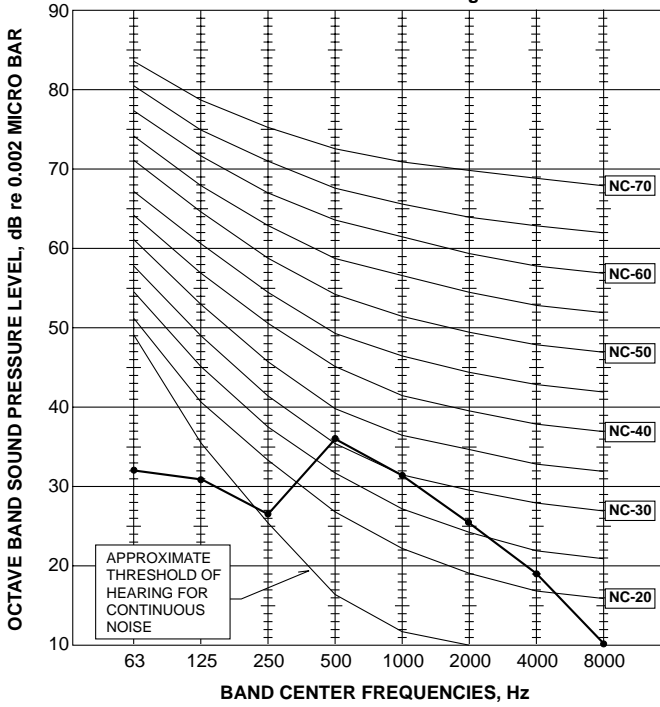
MUZ-G09SV-E1

NOTCH	FUNCTION	SPL(dB(A))	LINE
Hi	COOLING	45	●——●
	HEATING		○——○

Test conditions,
Cooling : DB 35℃   WB 24℃
Heating : DB 7℃   WB 6℃
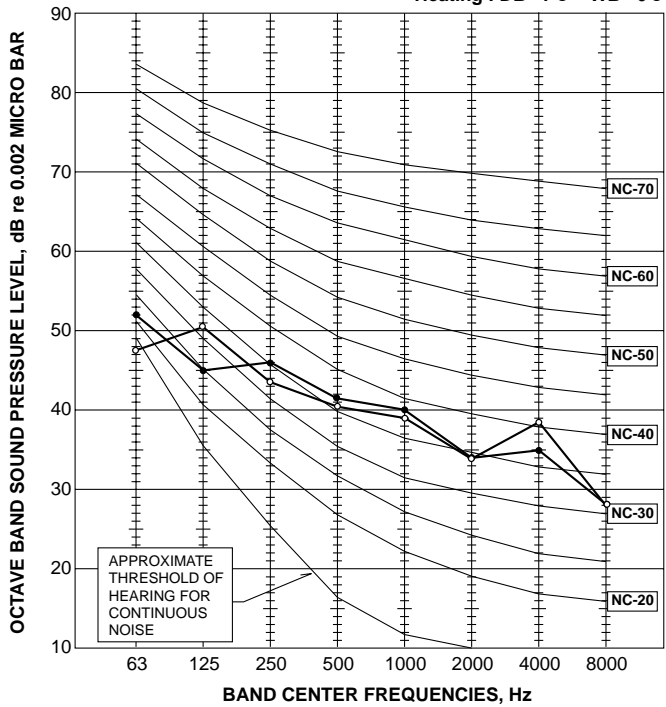
MSZ-G12SV-E1

NOTCH	FUNCTION	SPL(dB(A))	LINE
Hi	COOLING	39	●——●
	HEATING		

Test conditions,
Cooling : DB 27℃   WB 19℃
Heating : DB 20℃   WB - ℃
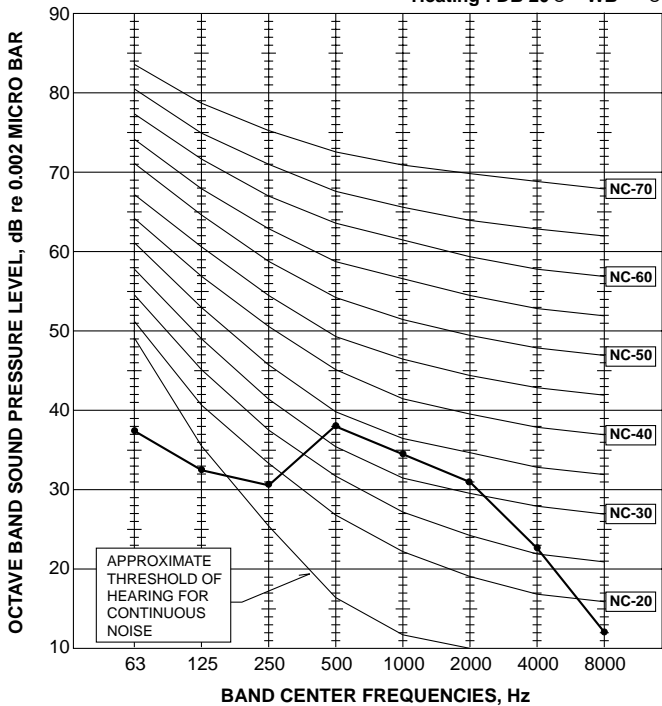
MUZ-G12SV-E1

NOTCH	FUNCTION	SPL(dB(A))	LINE
Hi	COOLING	48	●——●
	HEATING		○——○

Test conditions,
Cooling : DB 35℃   WB 24℃
Heating : DB 7℃   WB 6℃

6
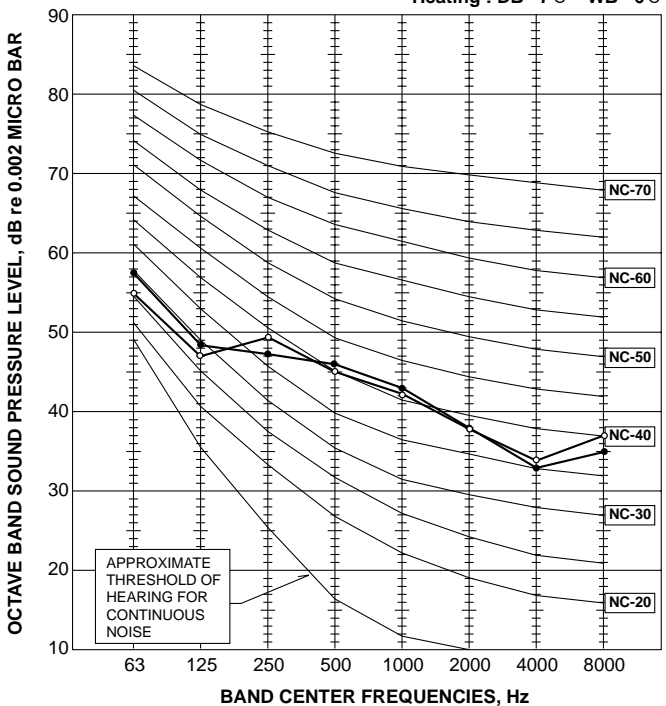
4 | OUTLINES AND DIMENSIONS

Unit: mm

MSZ-G09SV-E1
INDOOR UNIT

Installation plate

Indoor unit

818

82   169   4.5

231.5   271

41

2.5   42

81.5   326   326   116.5

Wall hole φ65

850

278

56   629   165

5

189   Installation plate

Air in   7 or more

Liquid line   φ6.35-0.5m
Gas line   φ9.52-0.43m
Insulation   φ37 O.D.
          φ21 I.D.

100   67   78

Air out

Drain hose φ16
(Connected part O.D.)
Insulation φ28

Power supply cord
Lead to right   1.0m
Lead to left   0.3m

56   17.5

160

Wireless remote controller

MSZ-G12SV-E1
INDOOR UNIT

Installation plate

Indoor unit

818

82   169   4.5

231.5   271

41

2.5   42

81.5   326   326   116.5

Wall hole φ65

850

278

56   629   165

5

189   Installation plate

Air in   7 or more

Liquid line   φ6.35-0.5m
Gas line   φ9.52-0.43m
Insulation   φ37 O.D.
          φ21 I.D.

100   67   78

Air out

Drain hose φ16
(Connected part O.D.)
Insulation φ28

Power supply cord
Lead to right   1.0m
Lead to left   0.3m

56   17.5

160

Wireless remote controller
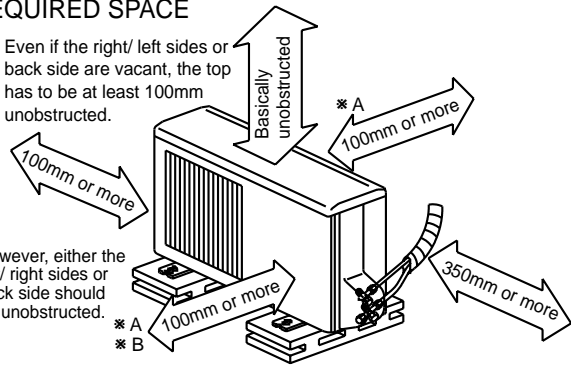
MUZ-G09SV-[E1]   MUZ-G12SV-[E1]   **Unit: mm**

OUTDOOR UNIT
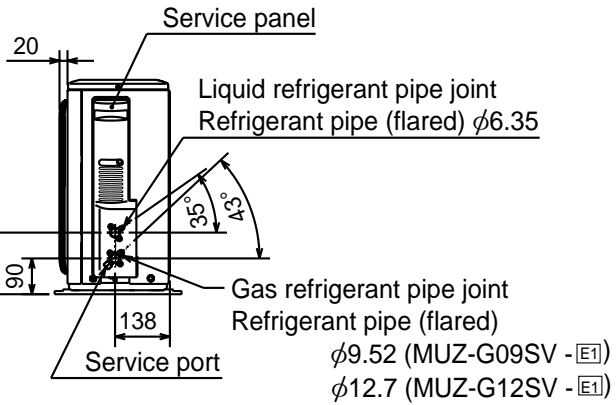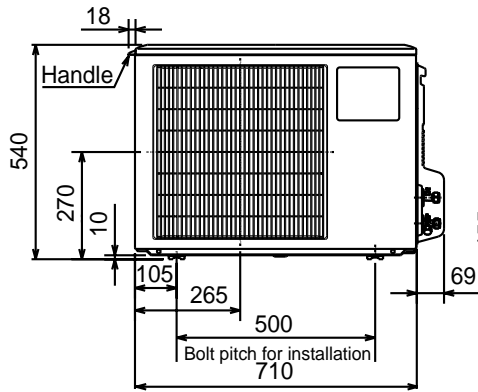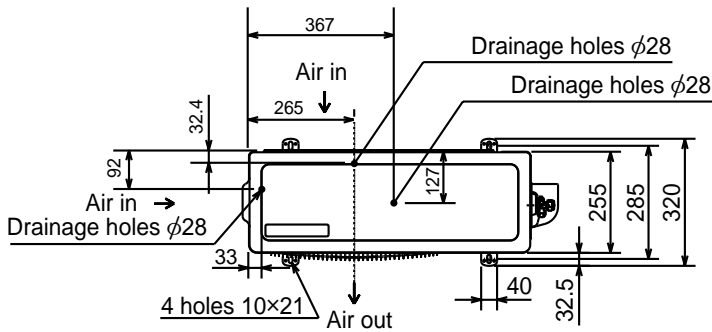
REQUIRED SPACE

Even if the right/ left sides or back side are vacant, the top has to be at least 100mm unobstructed.

Basically unobstructed

※A

100mm or more

100mm or more

However, either the left/ right sides or back side should be unobstructed.

※A
※B

100mm or more

350mm or more

※A In case of poorly-ventilated place, the front or the back has to be at least 200 mm unobstructed.

※B The wall may get dirty in case the air is discharged toward it.

367

Air in

265

Drainage holes φ28

Drainage holes φ28

32.4

92

127

Air in →
Drainage holes φ28

255

285

320

33

40

32.5

4 holes 10×21

Air out

18

Handle

540

270

10

105

265

500

Bolt pitch for installation

710

69

20

155

90

138

Service panel

Liquid refrigerant pipe joint
Refrigerant pipe (flared) φ6.35

35°

43°

Gas refrigerant pipe joint
Refrigerant pipe (flared)
    φ9.52 (MUZ-G09SV - [E1])
    φ12.7 (MUZ-G12SV - [E1])

Service port

5 | WIRING DIAGRAM

MSZ-G09SV- E1
MSZ-G12SV- E1　　　MODELS WIRING DIAGRAM

INDOOR UNIT

TO OUTDOOR UNIT CONNECTING

TB
L　BRN
BRN
12V 3
RED
230V~ 2　WHT
F12　BLU
BLU
N
BLU
BLU
GRN/YLW
GRN/YLW

POWER SUPPLY CORD
~/N 230V 50Hz
PE
CIRCUIT BREAKER

CN201
3
2
1
BLU

3
52C
4

HIC1
TRANS
NR11
F11
SR141

CN112
4
3
2
1
RT13
RT12

CN121　3

C11
1
2
3
CN211

MF
1 BLK
2 GRY
3 YLW
4 BRN
5 WHT
6 RED

CN111　RT11

ELECTRONIC CONTROL P.C. BOARD

CN151　LD101T
10　5

MV1　MV2

POWER MONITOR, RECEIVER P.C. BOARD

REMOTE CONTROLLER
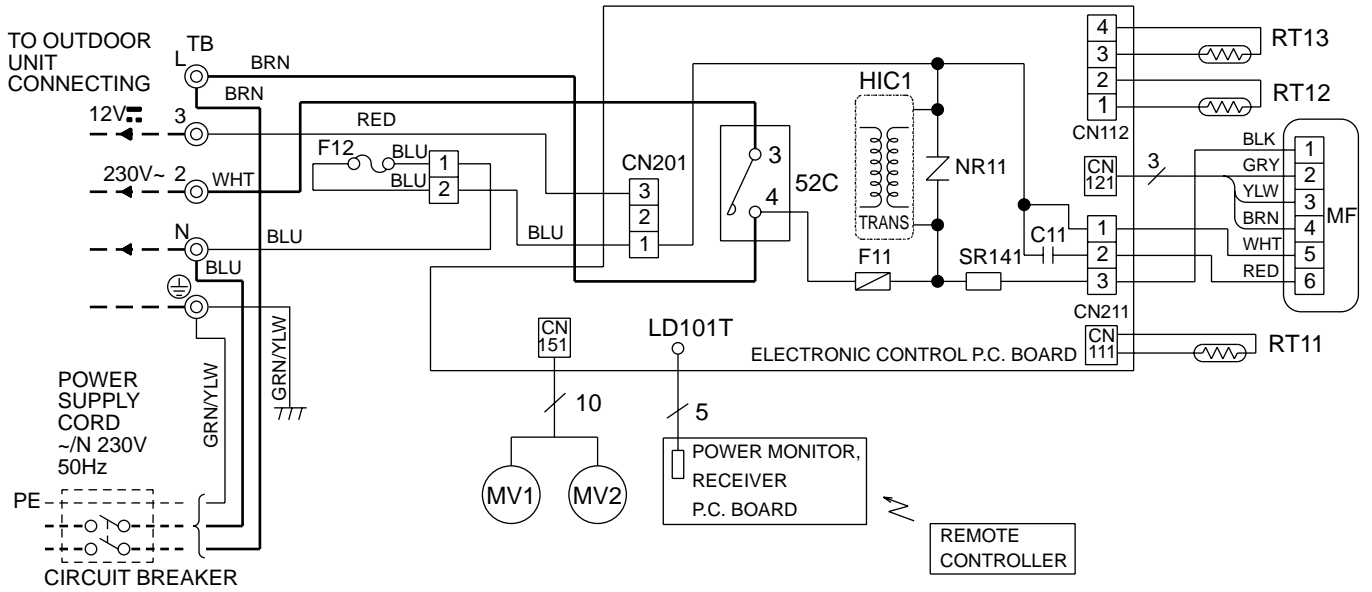
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARISTOR	SR141	SOLID STATE RELAY
F11	FUSE (3.15A)	RT11	ROOM TEMPERATURE THERMISTOR	TB	TERMINAL BLOCK
F12	THERMAL FUSE (93℃)			52C	CONTACTOR
HIC1	DC/DC CONVERTER	RT12	INDOOR COIL THERMISTOR (MAIN)		
MF	INDOOR FAN MOTOR(INNER FUSE)				
MV1	VANE MOTOR (HORIZONTAL)	RT13	INDOOR COIL THERMISTOR (SUB)		
MV2	VANE MOTOR (VERTICAL)				

NOTE:1. About the outdoor side electric wiring refer to the outdoor unit electric wiring diagram for servicing.
　　　2. Use copper conductors only. (For field wiring)
　　　3. Symbols below indicate.
　　　◎: Terminal block, ☐☐☐☐: Connector

MUZ-G09SV- □E1   MODEL WIRING DIAGRAM
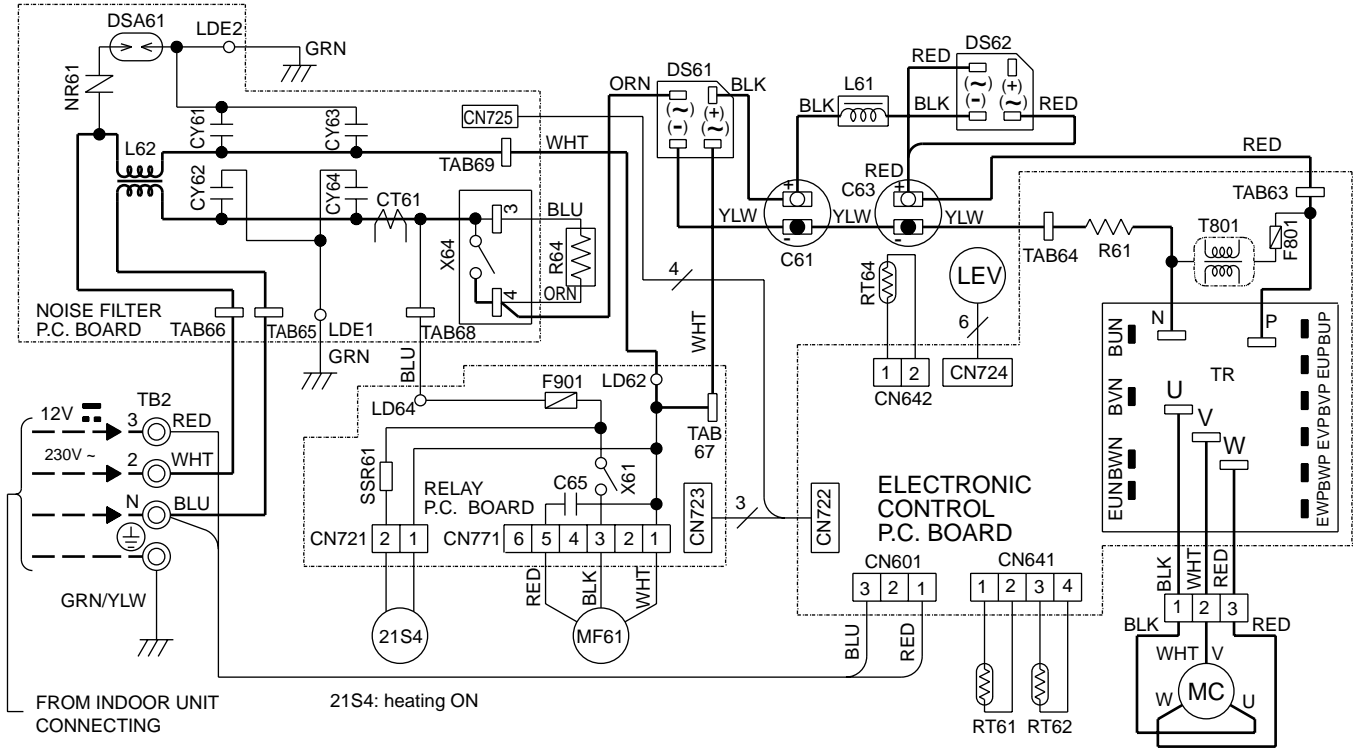
OUTDOOR UNIT

NOTE: 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 below indicate.
◎: Terminal block, ▭▭▭: Connector

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CT61	CURRENT TRANSFORMER	L61	REACTOR	SSR61	SOLID STATE RELAY
C61	POWER-FACTOR CAPACITOR	L62	CMC COIL	TB2	TERMINAL BLOCK
C63	SMOOTHING CAPACITOR	MC	COMPRESSOR	TR	POWER TRANSISTOR MODULE
C65	OUTDOOR FAN CAPACITOR	MF61	OUTDOOR FAN MOTOR(INNER PROTECTOR)	T801	TRANCEFORMER
CY61~64	CAPACITOR	NR61	VARISTOR	X61	OUTDOOR FAN RELAY
DSA61	SURGE ABSORBER	RT61	DEFROST THERMISTOR	X64	CURRENT-LIMITING RELAY
DS61,62	DIODE STACK	RT62	DISCHARGE TEMPERATURE THERMISTOR	21S4	R.V. COIL
F801	FUSE (2A)	RT64	FIN TEMPERATURE THERMISTOR		
F901	FUSE (1A)	R61	CURRENT-DETECTING RESISTOR		
LEV	EXPANSION VALVE COIL	R64	CURRENT-LIMITING RESISTOR		

MUZ-G12SV- [E1] MODEL WIRING DIAGRAM
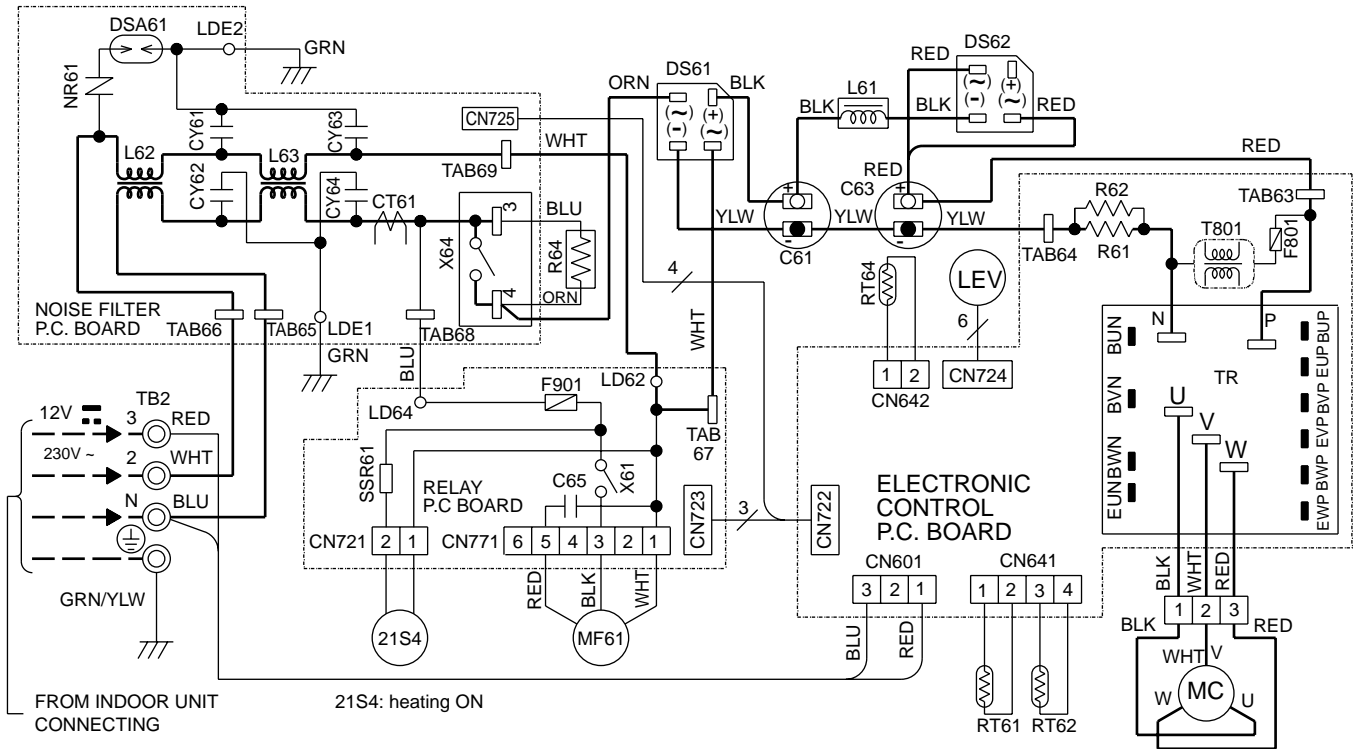
OUTDOOR UNIT

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CT61	CURRENT TRANSFORMER	L61	REACTOR	SSR61	SOLID STATE RELAY
C61	POWER-FACTOR CAPACITOR	L62, 63	CMC COIL	TB2	TERMINAL BLOCK
C63	SMOOTHING CAPACITOR	MC	COMPRESSOR	TR	POWER TRANSISTOR MODULE
C65	OUTDOOR FAN CAPACITOR	MF61	OUTDOOR FAN MOTOR(INNER PROTECTOR)	T801	TRANCEFORMER
CY61~64	CAPACITOR	NR61	VARISTOR	X61	OUTDOOR FAN RELAY
DSA61	SURGE ABSORBER	RT61	DEFROST THERMISTOR	X64	CURRENT-LIMITING RELAY
DS61,62	DIODE STACK	RT62	DISCHARGE TEMPERATURE THERMISTOR	21S4	R.V. COIL
F801	FUSE (2A)	RT64	FIN TEMPERATURE THERMISTOR		
F901	FUSE (1A)	R61, 62	CURRENT-DETECTING RESISTOR		
LEV	EXPANSION VALVE COIL	R64	CURRENT-LIMITING RESISTOR		

NOTE: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 below indicate.
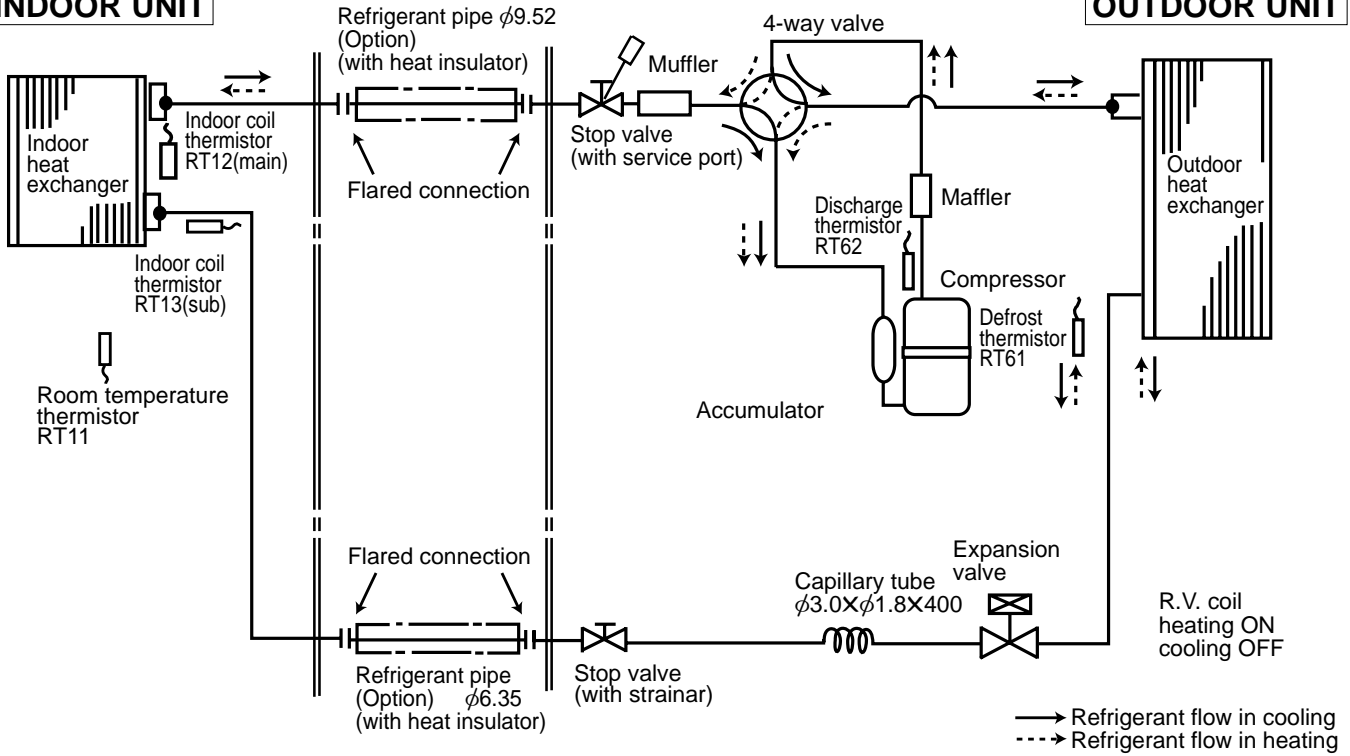   ◎: Terminal block, ▢▢▢▢: Connector

6 | REFRIGERANT SYSTEM DIAGRAM

Unit : mm

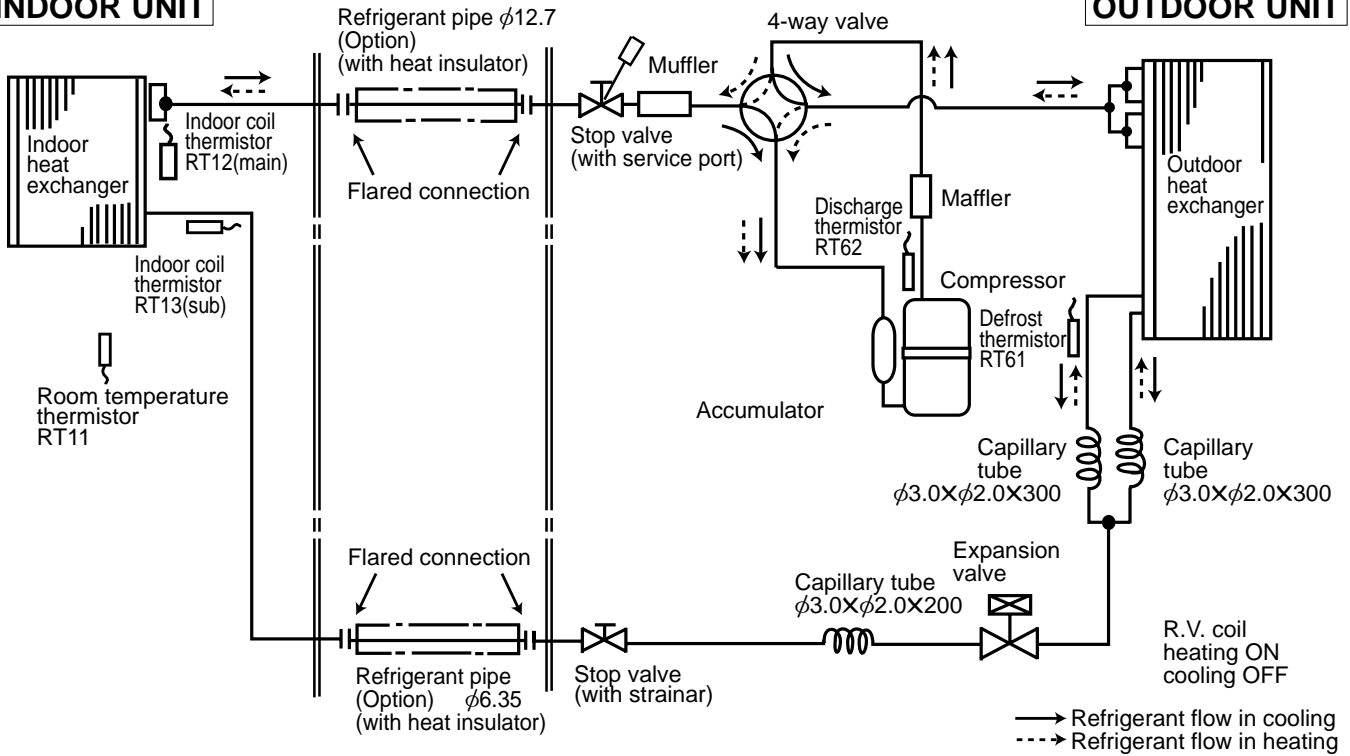**MSZ-G09SV -** E1   **MUZ-G09SV -** E1

INDOOR UNIT   OUTDOOR UNIT

Indoor heat exchanger

Indoor coil thermistor RT12(main)

Indoor coil thermistor RT13(sub)

Room temperature thermistor RT11

Refrigerant pipe φ9.52 (Option) (with heat insulator)

Flared connection

Muffler

Stop valve (with service port)

4-way valve

Maffler

Discharge thermistor RT62

Compressor

Defrost thermistor RT61

Accumulator

Outdoor heat exchanger

Flared connection

Refrigerant pipe (Option) φ6.35 (with heat insulator)

Stop valve (with strainar)

Capillary tube φ3.0✕φ1.8✕400

Expansion valve

R.V. coil heating ON cooling OFF

→ Refrigerant flow in cooling
---→ Refrigerant flow in heating

Unit : mm

MSZ-G12SV - E1   **MUZ-G12SV -** E1

INDOOR UNIT   OUTDOOR UNIT

Indoor heat exchanger

Indoor coil thermistor RT12(main)

Indoor coil thermistor RT13(sub)

Room temperature thermistor RT11

Refrigerant pipe φ12.7 (Option) (with heat insulator)

Flared connection

Muffler

Stop valve (with service port)

4-way valve

Maffler

Discharge thermistor RT62

Compressor

Defrost thermistor RT61

Accumulator

Outdoor heat exchanger

Capillary tube φ3.0✕φ2.0✕300

Capillary tube φ3.0✕φ2.0✕300

Flared connection

Refrigerant pipe (Option) φ6.35 (with heat insulator)

Stop valve (with strainar)

Capillary tube φ3.0✕φ2.0✕200

Expansion valve

R.V. coil heating ON cooling OFF
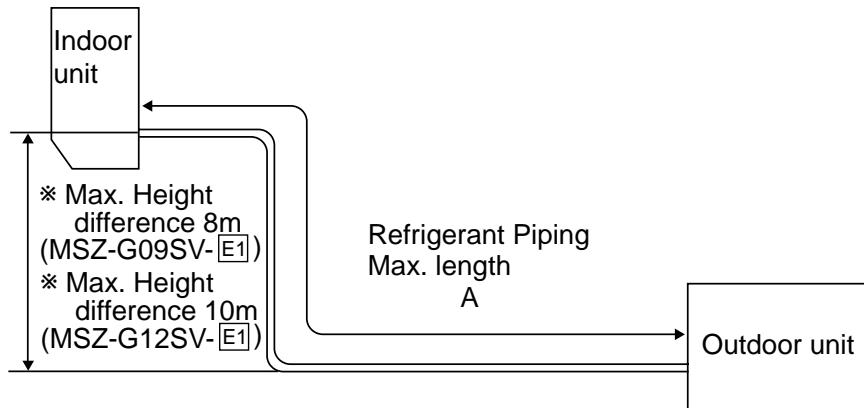
→ Refrigerant flow in cooling
---→ Refrigerant flow in heating

12

MAX. REFRIGERANT PIPING LENGTH

Model	Refrigerant piping Max. length : m	Piping size O.D : mm		Length of connecting pipe : m	
	A	Gas	Liquid	Indoor unit	Outdoor unit
MSZ-G09SV - E1	12	9.52	6.35	Gas 0.43 Liquid 0.5	———
MSZ-G12SV - E1	15	12.7			

MAX. HEIGHT DIFFERENCE

Indoor unit

※ Max. Height difference 8m (MSZ-G09SV- E1)
※ Max. Height difference 10m (MSZ-G12SV- E1)

Refrigerant Piping Max. length A

Outdoor unit

※ Height difference should be within 8m(MSZ-G09SV- E1)/ 10m(MSZ-G12SV- E1) regardless of which unit, indoor or outdoor position is high.

ADDITIONAL REFRIGERANT CHARGE (R-22:g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)										
		5m	6m	7m	8m	9m	10m	11m	12m	13m	14m	15m
MSZ-G09SV - E1	750	0	30	60	90	120	150	180	210			
MSZ-G12SV - E1	1100	0	30	60	90	120	150	180	210	240	270	300

Calculation : Xg=30g/m×(Refrigerant piping length(m) - 5)

7 | PERFORMANCE CURVES

MSZ-G09SV - E1
MSZ-G12SV - E1

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions. Since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE
Rated voltage : ±10% (207 ~ 253V),50Hz
(2) AIR FLOW
Air flow should be set at MAX.
(3) MAIN READINGS

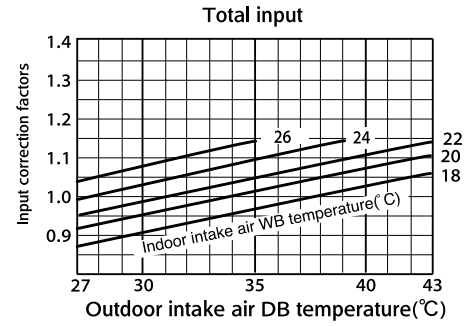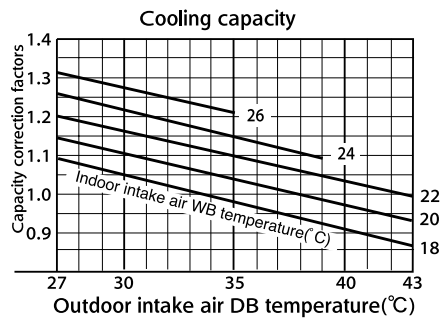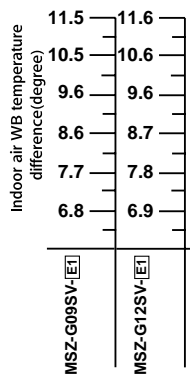|		
(1) Indoor intake air wet-bulb temperature	:℃ WB	
(2) Indoor outlet air wet-bulb temperature	:℃ WB	
(3) Outdoor intake air dry-bulb temperature	:℃ DB	Cooling
(4) Total input	:W	
(5) Indoor intake air dry-bulb temperature	:℃ DB	
(6) Outdoor intake air wet-bulb temperature	:℃ WB	Heating
(7) Total input	:W	

Indoor air wet/dry-bulb temperature difference on the left side of the chart on page 15 and 16 shows the difference between the indoor intake air wet/dry-bulb temperature and the indoor outlet air wet/dry-bulb temperature for your reference at service.

How to measure the indoor air wet-bulb/ dry-bulb temperature difference
1. Attach at least 2 sets of wet-and dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet-and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of wet-and dry-bulb thermometers to the outdoor air intake.
   Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of room.
5. Press the EMERGENCY OPERATION switch once (twice) to start the EMERGENCY COOL (HEAT) MODE.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.
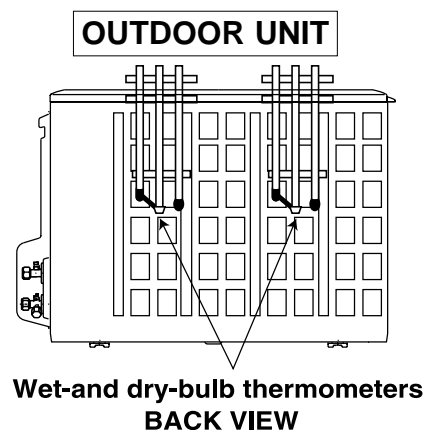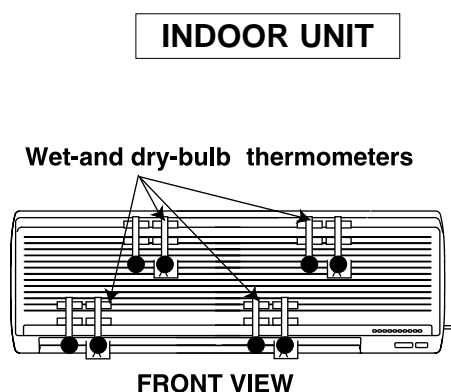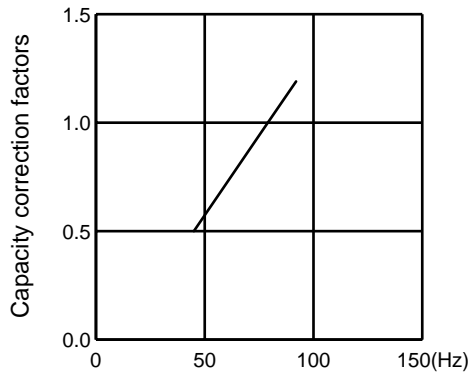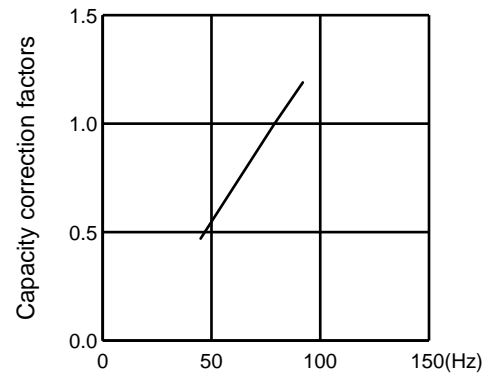

INDOOR UNIT

Wet-and dry-bulb thermometers

FRONT VIEW

OUTDOOR UNIT

Wet-and dry-bulb thermometers
BACK VIEW

Cooling capacity

Indoor air WB temperature difference(degree)

MSZ-G09SV-E1	MSZ-G12SV-E1
11.5	11.6
10.5	10.6
9.6	9.6
8.6	8.7
7.7	7.8
6.8	6.9

Cooling capacity

Capacity correction factors vs Outdoor intake air DB temperature(℃)
Indoor intake air WB temperature(℃): 26, 24, 22, 20, 18

Total input

Input correction factors vs Outdoor intake air DB temperature(℃)
Indoor intake air WB temperature(℃): 26, 24, 22, 20, 18

MUZ-G09SV - E1

Correction of Cooling capacity

Capacity correction factors vs The operational frequency of compressor (Hz)

MUZ-G09SV - E1

Correction of total input

Capacity correction factors vs The operational frequency of compressor (Hz)

MUZ-G12SV - E1

Correction of Cooling capacity

Capacity correction factors vs The operational frequency of compressor (Hz)

MUZ-G12SV - E1

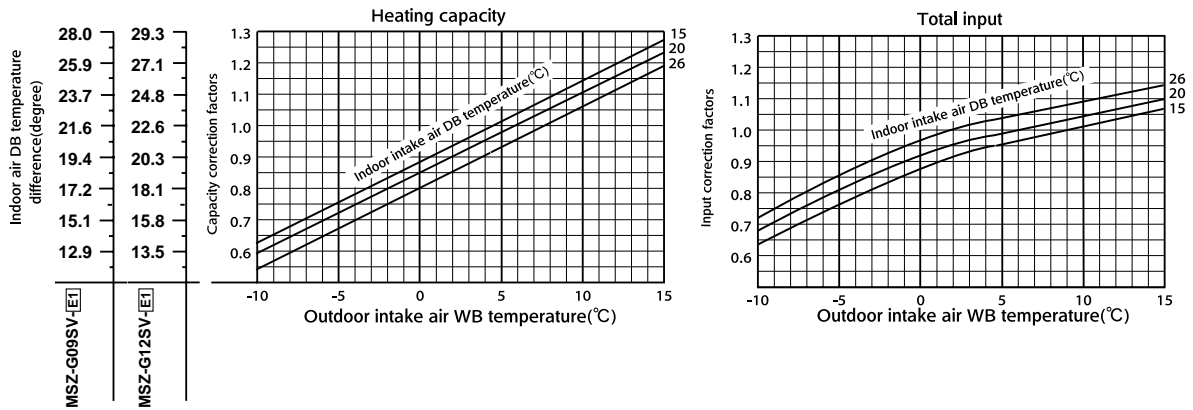**Correction of total input**

Capacity correction factors vs The operational frequency of compressor (Hz)
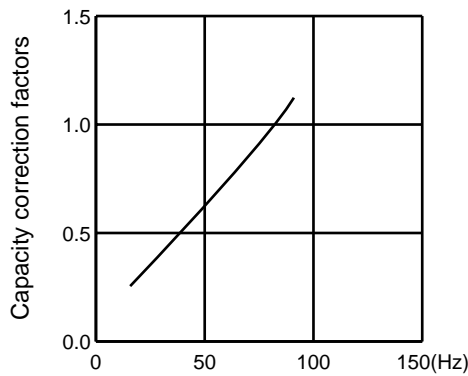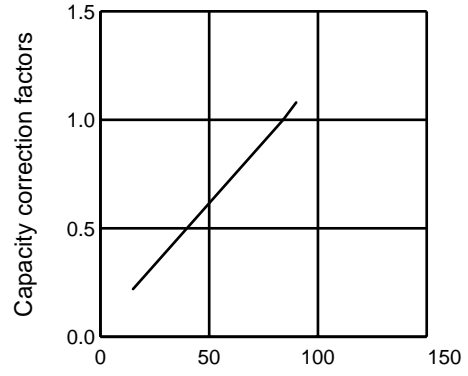
Heating capacity

NOTE:The above curves are for the heating operation without any frost.
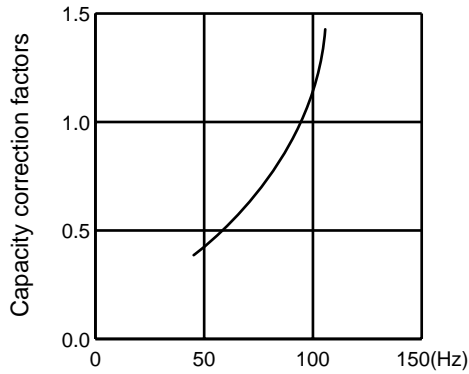
| Indoor air DB temperature difference(degree)	
28.0	29.3
25.9	27.1
23.7	24.8
21.6	22.6
19.4	20.3
17.2	18.1
15.1	15.8
12.9	13.5
MSZ-G09SV-[E1]	MSZ-G12SV-[E1]

Heating capacity

Capacity correction factors vs Outdoor intake air WB temperature(°C)
Indoor intake air DB temperature(°C): 15, 20, 26

Total input

Input correction factors vs Outdoor intake air WB temperature(°C)
Indoor intake air DB temperature(°C): 26, 20, 15

MUZ-G09SV -[E1]
Correction of Heating capacity

Capacity correction factors vs The operational frequency of compressor (Hz)

MUZ-G09SV -[E1]
Correction of total input

Capacity correction factors vs The operational frequency of compressor (Hz)

MUZ-G12SV -[E1]
Correction of Heating capacity

Capacity correction factors vs The operational frequency of compressor (Hz)

MUZ-G12SV -[E1]
Correction of total input

Capacity correction factors vs The operational frequency of compressor (Hz)

16
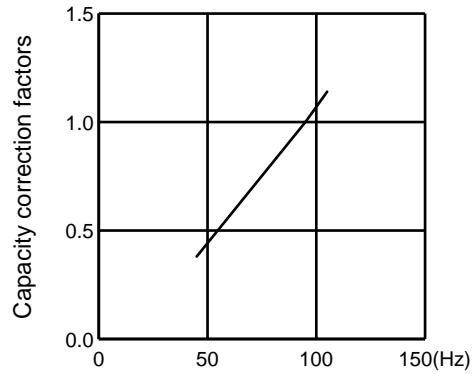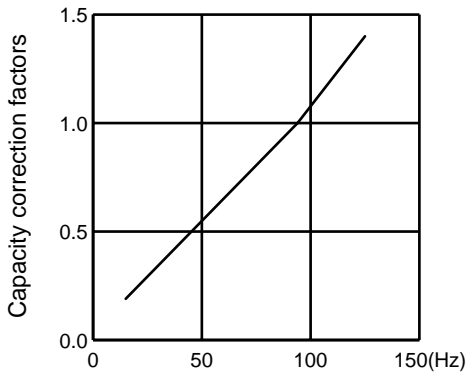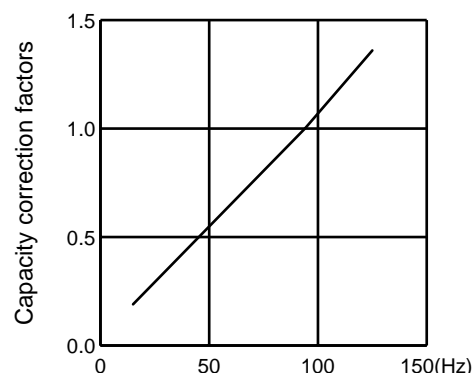
OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

How to operate with fixed operational frequency of the compressor.
1. Press the EMERGENCY OPERATION switch on the front of the indoor unit , and select either the COOL mode or the HEAT mode before starting to operate the air conditioner.
2. The compressor starts up.
   The operational frequency of the compressor is 82Hz in the COOL mode and 58Hz in the HEAT mode.
3. The fan speed of the indoor unit is Hi.
4. This operation continues for 30minutes.
5. In order to release this operation, press the EMERGENCY OPERATION switch again, press any button on the remote controller.

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/㎠ [Gauge])**

COOL operation

① Both indoor and outdoor unit are under the same temperature/humidity condition.

Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70

② Air flow should be set at Hi.

③ Operational frequency : 79Hz

MUZ-G09SV -E1
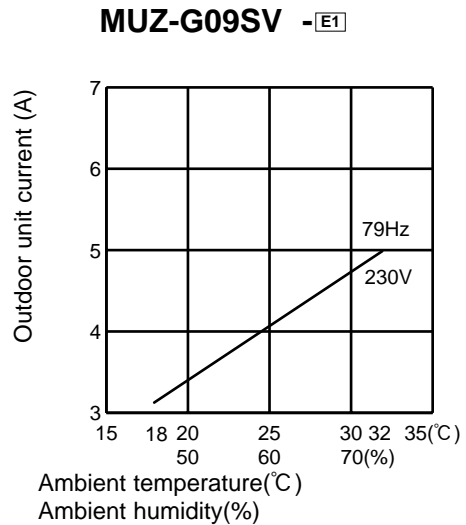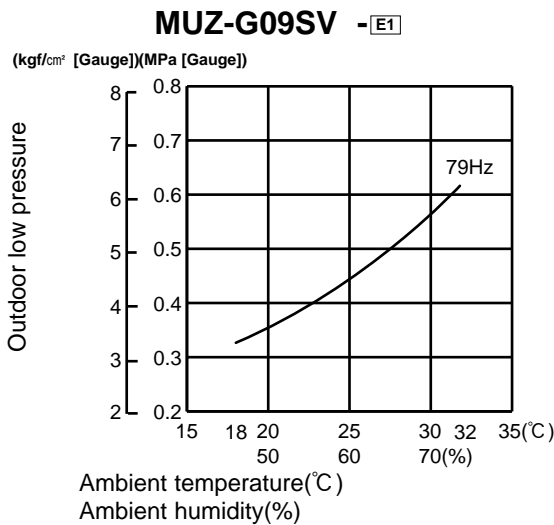
MUZ-G09SV -E1

Operational frequency : 85Hz

MUZ-G12SV -E1
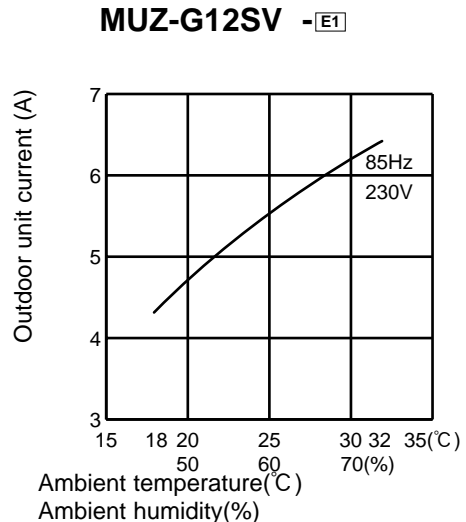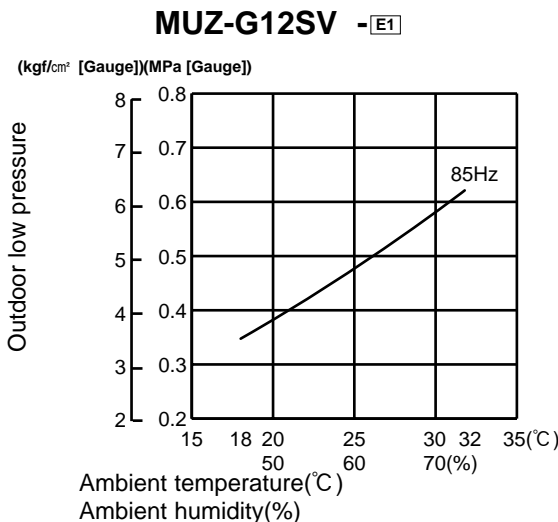
MUZ-G12SV -E1

HEAT operation

Condition Indoor : Dry bulb temperature 20.0℃   Outdoor : Dry bulb temperature | 2 | 7 | 15 | 20.0℃

Wet bulb temperature 14.5℃   Wet bulb temperature | 1 | 6 | 12 | 14.5℃

MUZ-G09SV - E1

Outdoor unit current (A) vs Ambient temperature(℃)

230V   58Hz

MUZ-G12SV - E1

Outdoor unit current (A) vs Ambient temperature(℃)

230V   58Hz

PERFORMANCE DATA COOL operation
MSZ-G09SV - E1 MUZ-G09SV - E1

CAPACITY:2.6(KW)   SHF:0.68   INPUT:940(W)

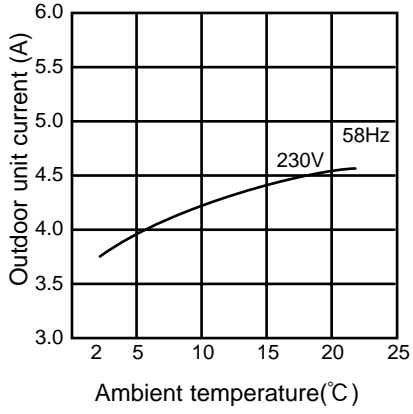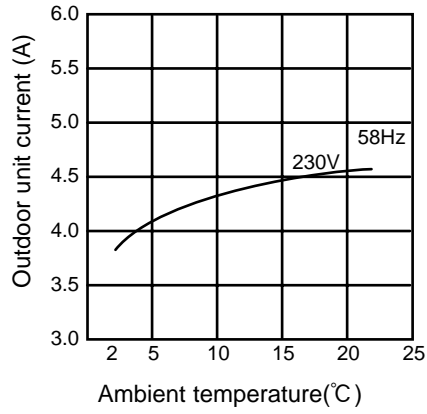| INDOOR DB(℃)	INDOOR WB(℃)	OUTDOOR DB(℃) 21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	3.06	1.53	0.50	752	2.93	1.46	0.50	790	2.81	1.40	0.50	827	2.70	1.35	0.50	865
21	20	3.19	1.21	0.38	790	3.06	1.16	0.38	837	2.96	1.13	0.38	855	2.86	1.09	0.38	893
22	18	3.06	1.65	0.54	752	2.93	1.58	0.54	790	2.81	1.52	0.54	827	2.70	1.46	0.54	865
22	20	3.19	1.34	0.42	790	3.06	1.28	0.42	837	2.96	1.24	0.42	855	2.86	1.20	0.42	893
22	22	3.32	0.99	0.30	818	3.20	0.96	0.30	870	3.12	0.94	0.30	893	2.99	0.90	0.30	931
23	18	3.06	1.77	0.58	752	2.93	1.70	0.58	790	2.81	1.63	0.58	827	2.70	1.57	0.58	865
23	20	3.19	1.47	0.46	790	3.06	1.41	0.46	837	2.96	1.36	0.46	855	2.86	1.32	0.46	893
23	22	3.32	1.13	0.34	818	3.20	1.09	0.34	870	3.12	1.06	0.34	893	2.99	1.02	0.34	931
24	18	3.06	1.89	0.62	752	2.93	1.81	0.62	790	2.81	1.74	0.62	827	2.70	1.68	0.62	865
24	20	3.19	1.59	0.50	790	3.06	1.53	0.50	837	2.96	1.48	0.50	855	2.86	1.43	0.50	893
24	22	3.32	1.26	0.38	818	3.20	1.22	0.38	870	3.12	1.19	0.38	893	2.99	1.14	0.38	931
24	24	3.48	0.91	0.26	855	3.35	0.87	0.26	902	3.28	0.85	0.26	931	3.17	0.82	0.26	978
25	18	3.06	2.02	0.66	752	2.93	1.93	0.66	790	2.81	1.85	0.66	827	2.70	1.78	0.66	865
25	20	3.19	1.72	0.54	790	3.06	1.65	0.54	837	2.96	1.60	0.54	855	2.86	1.54	0.54	893
25	22	3.32	1.39	0.42	818	3.20	1.34	0.42	870	3.12	1.31	0.42	893	2.99	1.26	0.42	931
25	24	3.48	1.05	0.30	855	3.35	1.01	0.30	902	3.28	0.98	0.30	931	3.17	0.95	0.30	978
26	18	3.06	2.14	0.70	752	2.93	2.05	0.70	790	2.81	1.97	0.70	827	2.70	1.89	0.70	865
26	20	3.19	1.85	0.58	790	3.06	1.77	0.58	837	2.96	1.72	0.58	855	2.86	1.66	0.58	893
26	22	3.32	1.52	0.46	818	3.20	1.47	0.46	870	3.12	1.44	0.46	893	2.99	1.38	0.46	931
26	24	3.48	1.18	0.34	855	3.35	1.14	0.34	902	3.28	1.11	0.34	931	3.17	1.08	0.34	978
26	26	3.59	0.79	0.22	902	3.48	0.77	0.22	949	3.43	0.76	0.22	978	3.33	0.73	0.22	1006
27	18	3.06	2.26	0.74	752	2.93	2.16	0.74	790	2.81	2.08	0.74	827	2.70	2.00	0.74	865
27	20	3.19	1.97	0.62	790	3.06	1.89	0.62	837	2.96	1.84	0.62	855	2.86	1.77	0.62	893
27	22	3.32	1.66	0.50	818	3.20	1.60	0.50	870	3.12	1.56	0.50	893	2.99	1.50	0.50	931
27	24	3.48	1.32	0.38	855	3.35	1.27	0.38	902	3.28	1.24	0.38	931	3.17	1.21	0.38	978
27	26	3.59	0.93	0.26	902	3.48	0.91	0.26	949	3.43	0.89	0.26	978	3.33	0.87	0.26	1006
28	18	3.06	2.38	0.78	752	2.93	2.28	0.78	790	2.81	2.19	0.78	827	2.70	2.11	0.78	865
28	20	3.19	2.10	0.66	790	3.06	2.02	0.66	837	2.96	1.96	0.66	855	2.86	1.89	0.66	893
28	22	3.32	1.79	0.54	818	3.20	1.73	0.54	870	3.12	1.68	0.54	893	2.99	1.61	0.54	931
28	24	3.48	1.46	0.42	855	3.35	1.41	0.42	902	3.28	1.38	0.42	931	3.17	1.33	0.42	978
28	26	3.59	1.08	0.30	902	3.48	1.05	0.30	949	3.43	1.03	0.30	978	3.33	1.00	0.30	1006
29	18	3.06	2.51	0.82	752	2.93	2.40	0.82	790	2.81	2.30	0.82	827	2.70	2.22	0.82	865
29	20	3.19	2.23	0.70	790	3.06	2.14	0.70	837	2.96	2.07	0.70	855	2.86	2.00	0.70	893
29	22	3.32	1.92	0.58	818	3.20	1.85	0.58	870	3.12	1.81	0.58	893	2.99	1.73	0.58	931
29	24	3.48	1.60	0.46	855	3.35	1.54	0.46	902	3.28	1.51	0.46	931	3.17	1.46	0.46	978
29	26	3.59	1.22	0.34	902	3.48	1.18	0.34	949	3.43	1.17	0.34	978	3.33	1.13	0.34	1006
30	18	3.06	2.63	0.86	752	2.93	2.52	0.86	790	2.81	2.41	0.86	827	2.70	2.33	0.86	865
30	20	3.19	2.36	0.74	790	3.06	2.26	0.74	837	2.96	2.19	0.74	855	2.86	2.12	0.74	893
30	22	3.32	2.06	0.62	818	3.20	1.98	0.62	870	3.12	1.93	0.62	893	2.99	1.85	0.62	931
30	24	3.48	1.74	0.50	855	3.35	1.68	0.50	902	3.28	1.64	0.50	931	3.17	1.59	0.50	978
30	26	3.59	1.36	0.38	902	3.48	1.32	0.38	949	3.43	1.30	0.38	978	3.33	1.26	0.38	1006
31	18	3.06	2.75	0.90	752	2.93	2.63	0.90	790	2.81	2.53	0.90	827	2.70	2.43	0.90	865
31	20	3.19	2.48	0.78	790	3.06	2.38	0.78	837	2.96	2.31	0.78	855	2.86	2.23	0.78	893
31	22	3.32	2.19	0.66	818	3.20	2.11	0.66	870	3.12	2.06	0.66	893	2.99	1.97	0.66	931
31	24	3.48	1.88	0.54	855	3.35	1.81	0.54	902	3.28	1.77	0.54	931	3.17	1.71	0.54	978
31	26	3.59	1.51	0.42	902	3.48	1.46	0.42	949	3.43	1.44	0.42	978	3.33	1.40	0.42	1006
32	18	3.06	2.87	0.94	752	2.93	2.75	0.94	790	2.81	2.64	0.94	827	2.70	2.54	0.94	865
32	20	3.19	2.61	0.82	790	3.06	2.51	0.82	837	2.96	2.43	0.82	855	2.86	2.35	0.82	893
32	22	3.32	2.32	0.70	818	3.20	2.24	0.70	870	3.12	2.18	0.70	893	2.99	2.09	0.70	931
32	24	3.48	2.02	0.58	855	3.35	1.95	0.58	902	3.28	1.90	0.58	931	3.17	1.84	0.58	978
32	26	3.59	1.65	0.46	902	3.48	1.60	0.46	949	3.43	1.58	0.46	978	3.33	1.53	0.46	1006

NOTE   Q :Total capacity (kW)   SHF :Sensible heat factor
SHC :Sensible heat capacity (kW)   INPUT :Total power input (W)

PERFORMANCE DATA COOL operation
MSZ-G09SV - E1 MUZ-G09SV - E1

CAPACITY:2.6(KW)　　SHF:0.68　　INPUT:940(W)

INDOOR DB(℃)	INDOOR WB(℃)	OUTDOOR DB(℃)														
		35				40				43				46			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	2.55	1.27	0.50	921	2.34	1.17	0.50	978	2.25	1.12	0.50	996	2.16	1.08	0.50	1015
21	20	2.68	1.02	0.38	959	2.50	0.95	0.38	1006	2.41	0.91	0.38	1034	2.31	0.88	0.38	1062
22	18	2.55	1.38	0.54	921	2.34	1.26	0.54	978	2.25	1.21	0.54	996	2.16	1.17	0.54	1015
22	20	2.68	1.12	0.42	959	2.50	1.05	0.42	1006	2.41	1.01	0.42	1034	2.31	0.97	0.42	1062
22	22	2.83	0.85	0.30	996	2.65	0.80	0.30	1053	2.56	0.77	0.30	1072	2.47	0.74	0.30	1090
23	18	2.55	1.48	0.58	921	2.34	1.36	0.58	978	2.25	1.30	0.58	996	2.16	1.25	0.58	1015
23	20	2.68	1.23	0.46	959	2.50	1.15	0.46	1006	2.41	1.11	0.46	1034	2.31	1.06	0.46	1062
23	22	2.83	0.96	0.34	996	2.65	0.90	0.34	1053	2.56	0.87	0.34	1072	2.47	0.84	0.34	1090
24	18	2.55	1.58	0.62	921	2.34	1.45	0.62	978	2.25	1.39	0.62	996	2.16	1.34	0.62	1015
24	20	2.68	1.34	0.50	959	2.50	1.25	0.50	1006	2.41	1.20	0.50	1034	2.31	1.16	0.50	1062
24	22	2.83	1.08	0.38	996	2.65	1.01	0.38	1053	2.56	0.97	0.38	1072	2.47	0.94	0.38	1090
24	24	2.99	0.78	0.26	1034	2.81	0.73	0.26	1081	2.73	0.71	0.26	1105	2.65	0.69	0.26	1128
25	18	2.55	1.68	0.66	921	2.34	1.54	0.66	978	2.25	1.48	0.66	996	2.16	1.42	0.66	1015
25	20	2.68	1.45	0.54	959	2.50	1.35	0.54	1006	2.41	1.30	0.54	1034	2.31	1.25	0.54	1062
25	22	2.83	1.19	0.42	996	2.65	1.11	0.42	1053	2.56	1.08	0.42	1072	2.47	1.04	0.42	1090
25	24	2.99	0.90	0.30	1034	2.81	0.84	0.30	1081	2.73	0.82	0.30	1105	2.65	0.80	0.30	1128
26	18	2.55	1.78	0.70	921	2.34	1.64	0.70	978	2.25	1.57	0.70	996	2.16	1.51	0.70	1015
26	20	2.68	1.55	0.58	959	2.50	1.45	0.58	1006	2.41	1.39	0.58	1034	2.31	1.34	0.58	1062
26	22	2.83	1.30	0.46	996	2.65	1.22	0.46	1053	2.56	1.18	0.46	1072	2.47	1.14	0.46	1090
26	24	2.99	1.02	0.34	1034	2.81	0.95	0.34	1081	2.73	0.93	0.34	1105	2.65	0.90	0.34	1128
26	26	3.15	0.69	0.22	1072	2.96	0.65	0.22	1119	2.87	0.63	0.22	1142	2.78	0.61	0.22	1166
27	18	2.55	1.89	0.74	921	2.34	1.73	0.74	978	2.25	1.66	0.74	996	2.16	1.60	0.74	1015
27	20	2.68	1.66	0.62	959	2.50	1.55	0.62	1006	2.41	1.49	0.62	1034	2.31	1.43	0.62	1062
27	22	2.83	1.42	0.50	996	2.65	1.33	0.50	1053	2.56	1.28	0.50	1072	2.47	1.24	0.50	1090
27	24	2.99	1.14	0.38	1034	2.81	1.07	0.38	1081	2.73	1.04	0.38	1105	2.65	1.01	0.38	1128
27	26	3.15	0.82	0.26	1072	2.96	0.77	0.26	1119	2.87	0.75	0.26	1142	2.78	0.72	0.26	1166
28	18	2.55	1.99	0.78	921	2.34	1.83	0.78	978	2.25	1.75	0.78	996	2.16	1.68	0.78	1015
28	20	2.68	1.77	0.66	959	2.50	1.65	0.66	1006	2.41	1.59	0.66	1034	2.31	1.53	0.66	1062
28	22	2.83	1.53	0.54	996	2.65	1.43	0.54	1053	2.56	1.38	0.54	1072	2.47	1.33	0.54	1090
28	24	2.99	1.26	0.42	1034	2.81	1.18	0.42	1081	2.73	1.15	0.42	1105	2.65	1.11	0.42	1128
28	26	3.15	0.94	0.30	1072	2.96	0.89	0.30	1119	2.87	0.86	0.30	1142	2.78	0.83	0.30	1166
29	18	2.55	2.09	0.82	921	2.34	1.92	0.82	978	2.25	1.84	0.82	996	2.16	1.77	0.82	1015
29	20	2.68	1.87	0.70	959	2.50	1.75	0.70	1006	2.41	1.68	0.70	1034	2.31	1.62	0.70	1062
29	22	2.83	1.64	0.58	996	2.65	1.54	0.58	1053	2.56	1.49	0.58	1072	2.47	1.43	0.58	1090
29	24	2.99	1.38	0.46	1034	2.81	1.29	0.46	1081	2.73	1.26	0.46	1105	2.65	1.22	0.46	1128
29	26	3.15	1.07	0.34	1072	2.96	1.01	0.34	1119	2.87	0.98	0.34	1142	2.78	0.95	0.34	1166
30	18	2.55	2.19	0.86	921	2.34	2.01	0.86	978	2.25	1.93	0.86	996	2.16	1.86	0.86	1015
30	20	2.68	1.98	0.74	959	2.50	1.85	0.74	1006	2.41	1.78	0.74	1034	2.31	1.71	0.74	1062
30	22	2.83	1.76	0.62	996	2.65	1.64	0.62	1053	2.56	1.59	0.62	1072	2.47	1.53	0.62	1090
30	24	2.99	1.50	0.50	1034	2.81	1.40	0.50	1081	2.73	1.37	0.50	1105	2.65	1.33	0.50	1128
30	26	3.15	1.20	0.38	1072	2.96	1.13	0.38	1119	2.87	1.09	0.38	1142	2.78	1.06	0.38	1166
31	18	2.55	2.29	0.90	921	2.34	2.11	0.90	978	2.25	2.02	0.90	996	2.16	1.94	0.90	1015
31	20	2.68	2.09	0.78	959	2.50	1.95	0.78	1006	2.41	1.88	0.78	1034	2.31	1.80	0.78	1062
31	22	2.83	1.87	0.66	996	2.65	1.75	0.66	1053	2.56	1.69	0.66	1072	2.47	1.63	0.66	1090
31	24	2.99	1.61	0.54	1034	2.81	1.52	0.54	1081	2.73	1.47	0.54	1105	2.65	1.43	0.54	1128
31	26	3.15	1.32	0.42	1072	2.96	1.24	0.42	1119	2.87	1.21	0.42	1142	2.78	1.17	0.42	1166
32	18	2.55	2.40	0.94	921	2.34	2.20	0.94	978	2.25	2.11	0.94	996	2.16	2.03	0.94	1015
32	20	2.68	2.20	0.82	959	2.50	2.05	0.82	1006	2.41	1.97	0.82	1034	2.31	1.90	0.82	1062
32	22	2.83	1.98	0.70	996	2.65	1.86	0.70	1053	2.56	1.79	0.70	1072	2.47	1.73	0.70	1090
32	24	2.99	1.73	0.58	1034	2.81	1.63	0.58	1081	2.73	1.58	0.58	1105	2.65	1.54	0.58	1128
32	26	3.15	1.45	0.46	1072	2.96	1.36	0.46	1119	2.87	1.32	0.46	1142	2.78	1.28	0.46	1166

NOTE　　Q :Total capacity (kW)　　　　　　SHF :Sensible heat factor
　　　　　SHC :Sensible heat capacity (kW)　　INPUT :Total power input (W)

PERFORMANCE DATA COOL operation
MSZ-G12SV -☐E1 MUZ-G12SV -☐E1

CAPACITY:3.5(KW)　SHF:0.67　INPUT:1290(W)

INDOOR DB(℃)	INDOOR WB(℃)	OUTDOOR DB(℃)														
		21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	4.11	2.02	0.49	1032	3.94	1.93	0.49	1084	3.78	1.85	0.49	1135	3.64	1.78	0.49	1187
21	20	4.29	1.59	0.37	1084	4.11	1.52	0.37	1148	3.99	1.48	0.37	1174	3.85	1.42	0.37	1226
22	18	4.11	2.18	0.53	1032	3.94	2.09	0.53	1084	3.78	2.00	0.53	1135	3.64	1.93	0.53	1187
22	20	4.29	1.76	0.41	1084	4.11	1.69	0.41	1148	3.99	1.64	0.41	1174	3.85	1.58	0.41	1226
22	22	4.46	1.29	0.29	1122	4.31	1.25	0.29	1193	4.20	1.22	0.29	1226	4.03	1.17	0.29	1277
23	18	4.11	2.34	0.57	1032	3.94	2.24	0.57	1084	3.78	2.15	0.57	1135	3.64	2.07	0.57	1187
23	20	4.29	1.93	0.45	1084	4.11	1.85	0.45	1148	3.99	1.80	0.45	1174	3.85	1.73	0.45	1226
23	22	4.46	1.47	0.33	1122	4.31	1.42	0.33	1193	4.20	1.39	0.33	1226	4.03	1.33	0.33	1277
24	18	4.11	2.51	0.61	1032	3.94	2.40	0.61	1084	3.78	2.31	0.61	1135	3.64	2.22	0.61	1187
24	20	4.29	2.10	0.49	1084	4.11	2.02	0.49	1148	3.99	1.96	0.49	1174	3.85	1.89	0.49	1226
24	22	4.46	1.65	0.37	1122	4.31	1.59	0.37	1193	4.20	1.55	0.37	1226	4.03	1.49	0.37	1277
24	24	4.69	1.17	0.25	1174	4.52	1.13	0.25	1238	4.41	1.10	0.25	1277	4.27	1.07	0.25	1342
25	18	4.11	2.67	0.65	1032	3.94	2.56	0.65	1084	3.78	2.46	0.65	1135	3.64	2.37	0.65	1187
25	20	4.29	2.27	0.53	1084	4.11	2.18	0.53	1148	3.99	2.11	0.53	1174	3.85	2.04	0.53	1226
25	22	4.46	1.83	0.41	1122	4.31	1.77	0.41	1193	4.20	1.72	0.41	1226	4.03	1.65	0.41	1277
25	24	4.69	1.36	0.29	1174	4.52	1.31	0.29	1238	4.41	1.28	0.29	1277	4.27	1.24	0.29	1342
26	18	4.11	2.84	0.69	1032	3.94	2.72	0.69	1084	3.78	2.61	0.69	1135	3.64	2.51	0.69	1187
26	20	4.29	2.44	0.57	1084	4.11	2.34	0.57	1148	3.99	2.27	0.57	1174	3.85	2.19	0.57	1226
26	22	4.46	2.01	0.45	1122	4.31	1.94	0.45	1193	4.20	1.89	0.45	1226	4.03	1.81	0.45	1277
26	24	4.69	1.55	0.33	1174	4.52	1.49	0.33	1238	4.41	1.46	0.33	1277	4.27	1.41	0.33	1342
26	26	4.83	1.01	0.21	1238	4.69	0.98	0.21	1303	4.62	0.97	0.21	1342	4.48	0.94	0.21	1380
27	18	4.11	3.00	0.73	1032	3.94	2.87	0.73	1084	3.78	2.76	0.73	1135	3.64	2.66	0.73	1187
27	20	4.29	2.62	0.61	1084	4.11	2.51	0.61	1148	3.99	2.43	0.61	1174	3.85	2.35	0.61	1226
27	22	4.46	2.19	0.49	1122	4.31	2.11	0.49	1193	4.20	2.06	0.49	1226	4.03	1.97	0.49	1277
27	24	4.69	1.74	0.37	1174	4.52	1.67	0.37	1238	4.41	1.63	0.37	1277	4.27	1.58	0.37	1342
27	26	4.83	1.21	0.25	1238	4.69	1.17	0.25	1303	4.62	1.16	0.25	1342	4.48	1.12	0.25	1380
28	18	4.11	3.17	0.77	1032	3.94	3.03	0.77	1084	3.78	2.91	0.77	1135	3.64	2.80	0.77	1187
28	20	4.29	2.79	0.65	1084	4.11	2.67	0.65	1148	3.99	2.59	0.65	1174	3.85	2.50	0.65	1226
28	22	4.46	2.37	0.53	1122	4.31	2.28	0.53	1193	4.20	2.23	0.53	1226	4.03	2.13	0.53	1277
28	24	4.69	1.92	0.41	1174	4.52	1.85	0.41	1238	4.41	1.81	0.41	1277	4.27	1.75	0.41	1342
28	26	4.83	1.40	0.29	1238	4.69	1.36	0.29	1303	4.62	1.34	0.29	1342	4.48	1.30	0.29	1380
29	18	4.11	3.33	0.81	1032	3.94	3.19	0.81	1084	3.78	3.06	0.81	1135	3.64	2.95	0.81	1187
29	20	4.29	2.96	0.69	1084	4.11	2.84	0.69	1148	3.99	2.75	0.69	1174	3.85	2.66	0.69	1226
29	22	4.46	2.54	0.57	1122	4.31	2.45	0.57	1193	4.20	2.39	0.57	1226	4.03	2.29	0.57	1277
29	24	4.69	2.11	0.45	1174	4.52	2.03	0.45	1238	4.41	1.98	0.45	1277	4.27	1.92	0.45	1342
29	26	4.83	1.59	0.33	1238	4.69	1.55	0.33	1303	4.62	1.52	0.33	1342	4.48	1.48	0.33	1380
30	18	4.11	3.50	0.85	1032	3.94	3.35	0.85	1084	3.78	3.21	0.85	1135	3.64	3.09	0.85	1187
30	20	4.29	3.13	0.73	1084	4.11	3.00	0.73	1148	3.99	2.91	0.73	1174	3.85	2.81	0.73	1226
30	22	4.46	2.72	0.61	1122	4.31	2.63	0.61	1193	4.20	2.56	0.61	1226	4.03	2.46	0.61	1277
30	24	4.69	2.30	0.49	1174	4.52	2.21	0.49	1238	4.41	2.16	0.49	1277	4.27	2.09	0.49	1342
30	26	4.83	1.79	0.37	1238	4.69	1.74	0.37	1303	4.62	1.71	0.37	1342	4.48	1.66	0.37	1380
31	18	4.11	3.66	0.89	1032	3.94	3.50	0.89	1084	3.78	3.36	0.89	1135	3.64	3.24	0.89	1187
31	20	4.29	3.30	0.77	1084	4.11	3.17	0.77	1148	3.99	3.07	0.77	1174	3.85	2.96	0.77	1226
31	22	4.46	2.90	0.65	1122	4.31	2.80	0.65	1193	4.20	2.73	0.65	1226	4.03	2.62	0.65	1277
31	24	4.69	2.49	0.53	1174	4.52	2.39	0.53	1238	4.41	2.34	0.53	1277	4.27	2.26	0.53	1342
31	26	4.83	1.98	0.41	1238	4.69	1.92	0.41	1303	4.62	1.89	0.41	1342	4.48	1.84	0.41	1380
32	18	4.11	3.82	0.93	1032	3.94	3.66	0.93	1084	3.78	3.52	0.93	1135	3.64	3.39	0.93	1187
32	20	4.29	3.47	0.81	1084	4.11	3.33	0.81	1148	3.99	3.23	0.81	1174	3.85	3.12	0.81	1226
32	22	4.46	3.08	0.69	1122	4.31	2.97	0.69	1193	4.20	2.90	0.69	1226	4.03	2.78	0.69	1277
32	24	4.69	2.67	0.57	1174	4.52	2.57	0.57	1238	4.41	2.51	0.57	1277	4.27	2.43	0.57	1342
32	26	4.83	2.17	0.45	1238	4.69	2.11	0.45	1303	4.62	2.08	0.45	1342	4.48	2.02	0.45	1380

NOTE　Q :Total capacity (kW)　　　SHF :Sensible heat factor
　　　　　SHC :Sensible heat capacity (kW)　INPUT :Total power input (W)

PERFORMANCE DATA COOL operation
MSZ-G12SV -□E1 MUZ-G12SV -□E1

CAPACITY:3.5(KW)   SHF:0.67   INPUT:1290(W)

INDOOR DB(℃)	INDOOR WB(℃)	OUTDOOR DB(℃)														
		35				40				43				46			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	3.43	1.68	0.49	1264	3.15	1.54	0.49	1342	3.03	1.48	0.49	1367	2.91	1.42	0.49	1393
21	20	3.61	1.33	0.37	1316	3.36	1.24	0.37	1380	3.24	1.20	0.37	1419	3.12	1.15	0.37	1458
22	18	3.43	1.82	0.53	1264	3.15	1.67	0.53	1342	3.03	1.60	0.53	1367	2.91	1.54	0.53	1393
22	20	3.61	1.48	0.41	1316	3.36	1.38	0.41	1380	3.24	1.33	0.41	1419	3.12	1.28	0.41	1458
22	22	3.82	1.11	0.29	1367	3.57	1.04	0.29	1445	3.45	1.00	0.29	1471	3.33	0.96	0.29	1496
23	18	3.43	1.96	0.57	1264	3.15	1.80	0.57	1342	3.03	1.73	0.57	1367	2.91	1.66	0.57	1393
23	20	3.61	1.62	0.45	1316	3.36	1.51	0.45	1380	3.24	1.46	0.45	1419	3.12	1.40	0.45	1458
23	22	3.82	1.26	0.33	1367	3.57	1.18	0.33	1445	3.45	1.14	0.33	1471	3.33	1.10	0.33	1496
24	18	3.43	2.09	0.61	1264	3.15	1.92	0.61	1342	3.03	1.85	0.61	1367	2.91	1.77	0.61	1393
24	20	3.61	1.77	0.49	1316	3.36	1.65	0.49	1380	3.24	1.59	0.49	1419	3.12	1.53	0.49	1458
24	22	3.82	1.41	0.37	1367	3.57	1.32	0.37	1445	3.45	1.28	0.37	1471	3.33	1.23	0.37	1496
24	24	4.03	1.01	0.25	1419	3.78	0.95	0.25	1484	3.68	0.92	0.25	1516	3.57	0.89	0.25	1548
25	18	3.43	2.23	0.65	1264	3.15	2.05	0.65	1342	3.03	1.97	0.65	1367	2.91	1.89	0.65	1393
25	20	3.61	1.91	0.53	1316	3.36	1.78	0.53	1380	3.24	1.72	0.53	1419	3.12	1.65	0.53	1458
25	22	3.82	1.56	0.41	1367	3.57	1.46	0.41	1445	3.45	1.41	0.41	1471	3.33	1.36	0.41	1496
25	24	4.03	1.17	0.29	1419	3.78	1.10	0.29	1484	3.68	1.07	0.29	1516	3.57	1.04	0.29	1548
26	18	3.43	2.37	0.69	1264	3.15	2.17	0.69	1342	3.03	2.09	0.69	1367	2.91	2.00	0.69	1393
26	20	3.61	2.05	0.57	1316	3.36	1.92	0.57	1380	3.24	1.85	0.57	1419	3.12	1.78	0.57	1458
26	22	3.82	1.72	0.45	1367	3.57	1.61	0.45	1445	3.45	1.55	0.45	1471	3.33	1.50	0.45	1496
26	24	4.03	1.33	0.33	1419	3.78	1.25	0.33	1484	3.68	1.21	0.33	1516	3.57	1.18	0.33	1548
26	26	4.24	0.89	0.21	1471	3.99	0.84	0.21	1535	3.87	0.81	0.21	1567	3.75	0.79	0.21	1600
27	18	3.43	2.50	0.73	1264	3.15	2.30	0.73	1342	3.03	2.21	0.73	1367	2.91	2.12	0.73	1393
27	20	3.61	2.20	0.61	1316	3.36	2.05	0.61	1380	3.24	1.97	0.61	1419	3.12	1.90	0.61	1458
27	22	3.82	1.87	0.49	1367	3.57	1.75	0.49	1445	3.45	1.69	0.49	1471	3.33	1.63	0.49	1496
27	24	4.03	1.49	0.37	1419	3.78	1.40	0.37	1484	3.68	1.36	0.37	1516	3.57	1.32	0.37	1548
27	26	4.24	1.06	0.25	1471	3.99	1.00	0.25	1535	3.87	0.97	0.25	1567	3.75	0.94	0.25	1600
28	18	3.43	2.64	0.77	1264	3.15	2.43	0.77	1342	3.03	2.33	0.77	1367	2.91	2.24	0.77	1393
28	20	3.61	2.34	0.65	1316	3.36	2.18	0.65	1380	3.24	2.10	0.65	1419	3.12	2.02	0.65	1458
28	22	3.82	2.02	0.53	1367	3.57	1.89	0.53	1445	3.45	1.83	0.53	1471	3.33	1.76	0.53	1496
28	24	4.03	1.65	0.41	1419	3.78	1.55	0.41	1484	3.68	1.51	0.41	1516	3.57	1.46	0.41	1548
28	26	4.24	1.23	0.29	1471	3.99	1.16	0.29	1535	3.87	1.12	0.29	1567	3.75	1.09	0.29	1600
29	18	3.43	2.78	0.81	1264	3.15	2.55	0.81	1342	3.03	2.45	0.81	1367	2.91	2.35	0.81	1393
29	20	3.61	2.49	0.69	1316	3.36	2.32	0.69	1380	3.24	2.23	0.69	1419	3.12	2.15	0.69	1458
29	22	3.82	2.17	0.57	1367	3.57	2.03	0.57	1445	3.45	1.97	0.57	1471	3.33	1.90	0.57	1496
29	24	4.03	1.81	0.45	1419	3.78	1.70	0.45	1484	3.68	1.65	0.45	1516	3.57	1.61	0.45	1548
29	26	4.24	1.40	0.33	1471	3.99	1.32	0.33	1535	3.87	1.28	0.33	1567	3.75	1.24	0.33	1600
30	18	3.43	2.92	0.85	1264	3.15	2.68	0.85	1342	3.03	2.57	0.85	1367	2.91	2.47	0.85	1393
30	20	3.61	2.63	0.73	1316	3.36	2.45	0.73	1380	3.24	2.36	0.73	1419	3.12	2.27	0.73	1458
30	22	3.82	2.33	0.61	1367	3.57	2.18	0.61	1445	3.45	2.10	0.61	1471	3.33	2.03	0.61	1496
30	24	4.03	1.97	0.49	1419	3.78	1.85	0.49	1484	3.68	1.80	0.49	1516	3.57	1.75	0.49	1548
30	26	4.24	1.57	0.37	1471	3.99	1.48	0.37	1535	3.87	1.43	0.37	1567	3.75	1.39	0.37	1600
31	18	3.43	3.05	0.89	1264	3.15	2.80	0.89	1342	3.03	2.69	0.89	1367	2.91	2.59	0.89	1393
31	20	3.61	2.78	0.77	1316	3.36	2.59	0.77	1380	3.24	2.49	0.77	1419	3.12	2.40	0.77	1458
31	22	3.82	2.48	0.65	1367	3.57	2.32	0.65	1445	3.45	2.24	0.65	1471	3.33	2.16	0.65	1496
31	24	4.03	2.13	0.53	1419	3.78	2.00	0.53	1484	3.68	1.95	0.53	1516	3.57	1.89	0.53	1548
31	26	4.24	1.74	0.41	1471	3.99	1.64	0.41	1535	3.87	1.59	0.41	1567	3.75	1.54	0.41	1600
32	18	3.43	3.19	0.93	1264	3.15	2.93	0.93	1342	3.03	2.82	0.93	1367	2.91	2.70	0.93	1393
32	20	3.61	2.92	0.81	1316	3.36	2.72	0.81	1380	3.24	2.62	0.81	1419	3.12	2.52	0.81	1458
32	22	3.82	2.63	0.69	1367	3.57	2.46	0.69	1445	3.45	2.38	0.69	1471	3.33	2.29	0.69	1496
32	24	4.03	2.29	0.57	1419	3.78	2.15	0.57	1484	3.68	2.09	0.57	1516	3.57	2.03	0.57	1548
32	26	4.24	1.91	0.45	1471	3.99	1.80	0.45	1535	3.87	1.74	0.45	1567	3.75	1.69	0.45	1600

NOTE   Q :Total capacity (kW)   SHF :Sensible heat factor
SHC :Sensible heat capacity (kW)   INPUT :Total power input (W)

PERFORMANCE DATA
HEAT operation

MSZ-G09SV - E1 MUZ-G09SV - E1

CAPACITY:3.6(KW)   INPUT:1140(W)

INDOOR DB(℃)	OUTDOOR DB(℃)												
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	2.27	741	2.74	889	3.20	1003	3.67	1083	4.14	1151	4.57	1186	5.04	1208
21	2.16	798	2.59	946	3.06	1049	3.49	1129	3.96	1186	4.39	1220	4.84	1265
26	1.94	855	2.41	1003	2.84	1106	3.31	1186	3.78	1243	4.21	1277	4.68	1311

MSZ-G12SV - E1 MUZ-G12SV - E1

CAPACITY:4.8(KW)   INPUT:1540(W)

INDOOR DB(℃)	OUTDOOR DB(℃)												
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	3.02	1001	3.65	1201	4.27	1355	4.90	1463	5.52	1555	6.10	1602	6.72	1632
21	2.88	1078	3.46	1278	4.08	1417	4.66	1525	5.28	1602	5.86	1648	6.46	1709
26	2.59	1155	3.22	1355	3.79	1494	4.42	1602	5.04	1679	5.62	1725	6.24	1771

NOTE   Q :Total capacity (kW)   INPUT :Total power input (W)

8 | MICROPROCESSOR CONTROL

MSZ-G09SV-[E1]
MSZ-G12SV-[E1]

WIRELESS REMOTE CONTROLLER

- Signal transmitting section
- Operation display section
- OPERATE /STOP (ON /OFF)button
- OPERATION SELECT button
- FAN SPEED CONTROL button
- ECONO COOL button
- ON-TIMER button
- CLOCK SET button
- HR. button MIN. button (TIME SET button)
- TEMPERATURE buttons
- VANE CONTROL button
- SWING button
- OFF-TIMER button
- RESET button

MITSUBISHI ELECTRIC
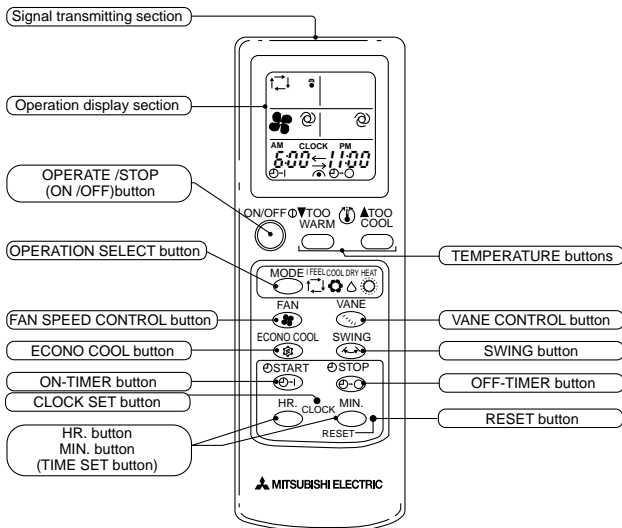
INDOOR UNIT DISPLAY SECTION

Operation Indicator lamp

The operation indicator at the right side of the indoor unit indicates the operation state.

Operation Indicator

- lighting
- not lighting
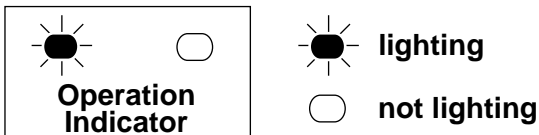
Indication	Operation state	Difference betweeen set temperature and room temperature
	This shows that the air conditioner is operating to reach the target temperature. Please wait until the target temperature is obtained.	Approx. 2 ℃ or more
	This shows that the room temperature is approaching the target temperature.	Approx. 2 ℃ or less

Once the operation mode are set, the same operation mode can be repeated by simply turning the OPERATE/STOP(ON/OFF) button ON.

Indoor unit receives the signal with a beep tone.

When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

8-1. "I FEEL CONTROL" (▢) OPERATION

1. Press OPERATE/STOP(ON/OFF) button on the remote controller. OPERATION INDICATOR lamp of the indoor unit will turn on with a beep tone.
2. Select "I FEEL CONTROL"(▢) mode with the OPERA-TION SELECT button.
3. The operation mode is determined by the room temperature at start-up of the operation.

Initial room temperature	Mode
25℃ or more	COOL mode of "I FEEL CONTROL"
23℃ to 25℃	DRY mode of "I FEEL CONTROL"
less than 23℃	HEAT mode of "I FEEL CONTROL"

- ● Once the mode is fixed, the mode does not change by room temperature afterwards.
- ● Under the ON-TIMER (⊕−|) operation, mode is determined according to the room temperature at set time the operation starts.
- ● When the system is stopped on the remote controller, and restarted within 2 hours in "I FEEL CONTROL" (▢) mode, the system operates in previous mode automatically regardless of the room temperature.

Example

Previous operation
COOL mode of
"I FEEL CONTROL" or
COOL mode
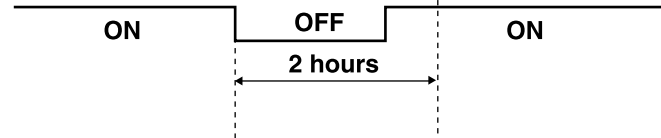
Restart
COOL mode of "I FEEL CONTROL"

ON   OFF   ON

2 hours

When the system is restarted after 2 hours and more, the operation mode is determined by the room temperature at start-up of the operation.

Example

Previous operation
COOL mode of "I FEEL CONTROL" or COOL mode

Restart
COOL or DRY or HEAT mode of "I FEEL CONTROL" that determined by room temperature at start-up of the operation.

ON   OFF

2 hours

4. The initial set temperature is decided by the initial room temperature.

Model	Initial room temperature	Initial set temperature	
COOL mode of "I FEEL CONTROL"	26℃ or more	24℃	※1
	26℃ to 26℃	Initial room temperature minus 2℃	
DRY mode of "I FEEL CONTROL"	23℃ to 25℃	Initial room temperature minus 2℃	
HEAT mode of "I FEEL CONTROL"	less than 23℃	26℃	

※1 When the system is restarted with the remote controller, the system operates with the previous set temperature regardless of the room temperature at restart.
　 The set temperature is calculated by the previous set temperature.

5. TEMPERATURE buttons
　In "I FEEL CONTROL" (⟳)mode, set temperature is decided by the microprocessor based on the room temperature.
　In addition, set temperature can be controlled by TOO WARM or TOO COOL buttons when you feel too cool or too warm.
　Each time the TOO WARM or TOO COOL button is speed, the indoor unit receives the signal emits a beep tone.
　● Fuzzy control
　　When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user's preference to heat or cool. So this is called "Fuzzy control", and works only in "I FEEL CONTROL" mode.
　　In DRY mode of "I FEEL CONTROL", the set temperature doesn't change.

　▼ TOO
COOL ⋯ To raise the set temperature 1 ~ 2 degrees (℃)

　▲ TOO
WARM ⋯ To lower the set temperature 1 ~ 2 degrees (℃)

— Cool mode of "I FEEL CONTROL" —

1. Indoor fan speed control
　Indoor fan operates continuously at the set speed by FAN SPEED CONTROL button regardless of the thermostat's OFF-ON.
　In AUTO the fan speed is as follows.

Initial temperature difference　　Fan speed

Difference between room temperature and set temperature during operation.

Room temperature minus set temperature: 2 degrees or moreover ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ Hi
Room temperature minus set temperature: Between 1 and 2 degrees ⋯⋯⋯⋯⋯⋯⋯⋯ Me
Room temperature minus set temperature: less than 1 degree ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ Lo

2 deg.　4 deg.
1 deg.　1.7 deg.

2. Coil frost prevention
　① Temperature control
　　The operational frequency of the compressor is controlled based on the temperature of the indoor coil thermistor(RT12).

Temperature of indoor coil thermistor:RT12	Operation frequency
approx. 8°C or above	normal
approx. 6°C to 8°C	fixed
approx. 3°C to 6°C	lower at the rate of 3Hz/min.
approx. 3°C or below	lower at the rate of 6Hz/min Compressor is turned OFF for 5 minutes when left temperature continues for 5 minutes or more.

• The indoor fan maintains the actual speed of the moment.
② Time control
　When the three conditions as follows have been satisfied for 1 hour and 45 minutes, compressor stops for 3 minutes.
　The indoor fan operates at set speed.
　a. Compressor has been continuously operating.
　b. Indoor fan speed is Lo or Me
　c. Room temperature is below 26℃.
　When compressor stops, the accumulated time is cancelled. When compressor restarts, time counting starts from the beginning.
　Time counting also stops temporarily when the indoor fan speed becomes Hi or the room temperature exceeds 26℃.
　However, when two of the above conditions(b and c.) are satisfied again. Time accumulation is resumed.

—DRY mode of "I FEEL CONTROL"—
The system for dry operation uses the same refrigerant circuit as the cooling circuit.
The compressor and the indoor fan are controlled by the room temperature.
By such controls, indoor flow amounts will be reduced in order to lower humidity without much room temperature decrease.
1. The operation of the compressor and indoor fan/ outdoor fan
Compressor operates by temperature control and time control.
① Set temperature is controlled to fall 2°C as initial set temperature.
② Indoor fan and outdoor fan operate in the same cycle as the compressor.
③ Operational frequency control of compressor is fixed 30Hz.

NOTE ● Coil frost prevention during DRY mode of "I FEEL CONTROL"
　　　　 The operation is same as coil frost prevention during COOL mode of "I FEEL CONTROL" .

3. Coil frost prevention
The operational frequency of the compressor is controlled based on the temperature of the indoor coil thermistor (RT12).

Temperature of indoor coil thermistor:RT12	Operation frequency
approx. 8°C or above	normal
approx. 6°C to 8°C	fixed
approx. 3°C to 6°C	lower at the rate of 3Hz/min.
approx. 3°C or below	lower at the rate of 6Hz/min. Compressor is turned OFF for 5 minutes when left temperature continues for 5 minutes or more.

The indoor fan maintains the actual speed of the moment. However, it changes to Lo speed when the compressor stops.

— HEAT mode of "I FEEL CONTROL" —

1. Indoor fan speed control
(1) Indoor fan operates at the set speed by FAN SPEED CONTROL button.
　 In Auto the fan speed is as follows.

Initial temperature difference　　　　　　Fan speed

Difference between room temperature and set temperature during operation

Set temperature minus room temperature: 2 degrees or more·· Hi
Set temperature minus room temperature: Between 1 and 2 degrees ···························· Me
Set temperature minus room temperature: less than 1 degree···································· Lo

2 deg. 4 deg.
1 deg. 1.7 deg.
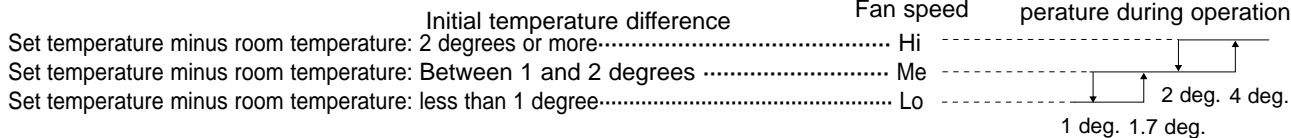
(2) Cold air prevention control
　　① When the compressor is not operating,
　　　　(Ⅰ) if the temperature of indoor coil thermistor RT12 is 18°C or less, the fan stops.
　　　　(Ⅱ) if the temperature of indoor coil thermistor RT12 is more than 18°C, the fan operates at VLo.
　　② When the compressor is operating,
　　　　(Ⅰ) if the temperature of RT12 is 22°C or more, the fan operates at set speed.
　　　　(Ⅱ) if the temperature of RT12 is less than 22°C and
　　　　　　　(ⅰ) if the temperature of room temperature thermistor RT11 is 15°C or less, the fan stops.
　　　　　　　(ⅱ) if the temperature of room temperature thermistor RT11 is more than 15°C, the fan operates at VLo.

Indoor coil thermistor　　　　　　　　　　　Fan speed
RT12 temperature
　　　　　　　　　　Released ------　　　Set speed
　　　Cold Air Prevention　　　　　　　　VLo or stop
　　　　　　　　RT12　　18℃　22℃
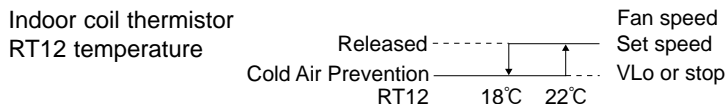
NOTE : If the temperature of RT12 reads from 18℃ to 22℃ at the air conditioner starting and also after defrosting, this control works.

(3) Warm air control.

When the following any condition of ①(a. ~ d.) and the condition of ② are satisfied at the same time, warm air control works.

① a.) when the operation mode has been changed to HEAT mode
   b.) when cold air prevention has been released
   c.) when defrosting has been finished
   d.) when the compressor starts in HEAT mode
② When the temperature of indoor coil thermistor RT12 is less than 37°C.

When warm air control works, the fan speed changes as follows to blow out warm air gradually.
Gradation of fan speed in initial

<Time condition>	<Indoor fan speed>
less than 2 minutes ------------	Lo
2 minutes to 4 minutes ----------	Me
more than 4 minutes -----------	Hi

The upper limit of the fan speed in MANUAL is the set speed.
The upper limit of the fan speed in AUTO is the speed decided by indoor fan speed control.
When the temperature of RT12 has been 37°C or more, or when the set speed has been changed, this control is released and the fan speed is the set speed.

(4) Flow soft control

When the thermostat (compressor) is off, the indoor fan operates as follows.

Compressor	Fan
OFF	VLo
ON	Set speed

NOTE : When the thermostat(compressor) turns on, the fan will operate at set speed. But until cold air prevention and warm air control is released, the fan speed follow them.

2. High pressure protection

In HEAT mode and manually-operated HEAT mode, the indoor coil thermistor detects the temperature at the indoor heat exchanger and controls the compressor rotational frequency to prevent the condensing pressure from increasing excessively.

3. Overload starting

When the room temperature thermistor reads 18°C or above, the compressor runs with its maximum frequency regulated for 3 minutes after the start-up.

4. Defrosting

(1) Starting conditions of defrosting
   a) The defrost thermistor attached to the outdoor heat exchanger read -3°C or below.
   b) The cumulative operation time of the compressor has reached any of the set values: 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105 minutes.
   c) More than 5 minutes have passed since the start-up of the compressor.
      When the above three conditions, a), b), and c), are satisfied, the defrosting starts.
   ※ Set value of compressor operation time(hereinafter referred to as defrost interval)
      The first defrost interval is 32 minutes long, and the second 35 minutes long.The third and subsequent intervals are set to be longer, and less frequent, depending on defrosting time.
      The third and subsequent defrost intervals follow any of the three patterns ···5 or 10 minutes longer, the same, or 5 or 10 minutes shorter compared with the previous defrost interval ··· with the longest 115 minutes and the shortest 30 minutes.

(2) Releasing conditions of defrosting
   Defrosting is released when any of the following condition is satisfied:
   a) The defrost thermistor reads 13°C or above.
   b) Defrosting time has exceeded 10 minutes.
   c) Some other mode than HEAT mode is set during defrosting.

Time chart of defrost in HEAT mode (reverse type)

Vertical vane	normal — horizontal — normal	

Indoor fan — VLo (temperature of indoor coil thermistor > 18℃) / STOP — normal

30 seconds

\<outdoor unit\>

105Hz (MSZ-G09SV)
125Hz (MSZ-G12SV)

MAX Hz — MAX Hz

Compressor normal

1 second | 30 seconds | 5 seconds | 30 seconds | 1 second

5 seconds

Outdoor fan motor — normal — OFF — normal

R.V. coil (21S4) — ON — OFF — ON
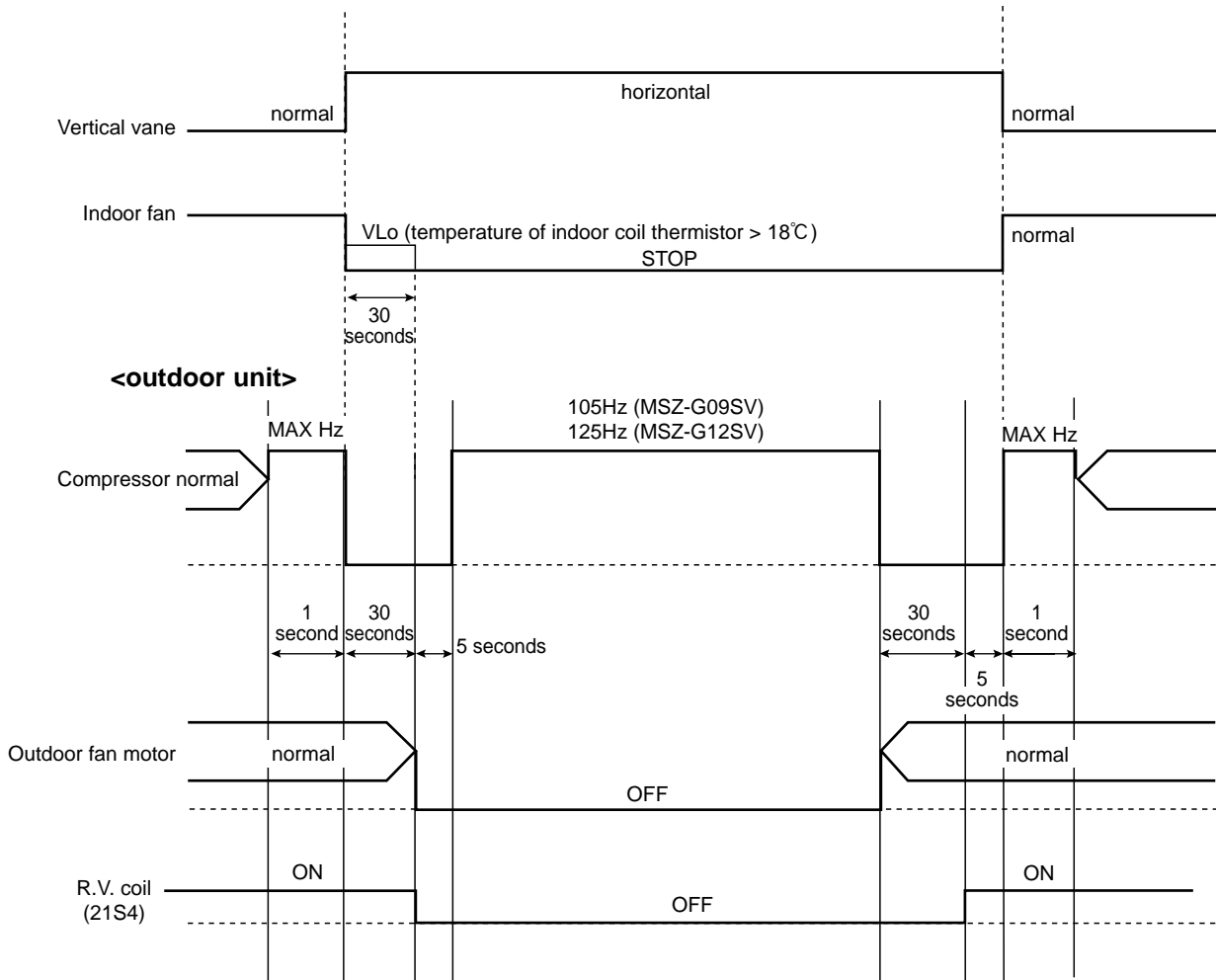
8-2. COOL (✿) OPERATION

      (1) Press OPERATE/STOP(ON/OFF) button. OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
(2) Select COOL mode with the OPERATION SELECT button.
(3) Press TEMPERATURE buttons (TOO WARM or TOO COOL button)to select the desired temperature.
   The setting range is 16 ~ 31°C
   ＊ Indoor fan continues to operate regardless of thermostat's OFF-ON
   ＊ Coil frost prevention is same as COOL mode of "I FEEL CONTROL"

8-3. DRY (△) OPERATION

(1) Press OPERATE/STOP(ON/OFF) button.
   OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
(2) Select DRY mode with the OPERATION SELECT button.
(3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.
(4) DRY operation will not function when the room temperature is 13°C or below.
(5) In DRY operation the fan speed Hi or Me notch is lower than that in COOL operation, but the fan speed Lo notch is same in DRY and COOL operation.

Set temperature and initial room temperature in dry mode

Set temperature (℃) vs Initial room temperature (℃)

28
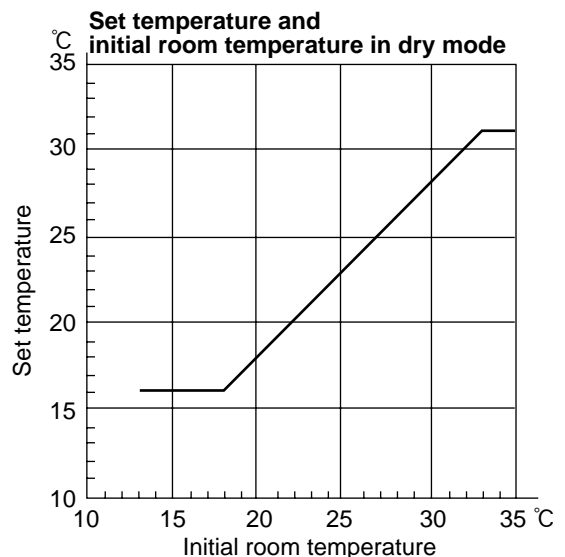
8-4. HEAT (☼) OPERATION
(1) Press OPERATE/STOP(ON/OFF) button.
   OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
(2) Select HEAT mode with the OPERATION SELECT button.
(3) Press TEMPERATURE buttons (TOO WARM or TOO COOL button) to select the desired temperature.
   The setting range is 16 ~ 31°C.
(4) Indoor fan speed control, high pressure protection, defrosting, 4-way valve control are the same as HEAT mode of "I FEEL CONTROL"

8-5. FAN MOTOR CONTROL
1. Rotational frequency feedback control
   The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feedback the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (Hi,Me,Lo) the microprocessor controls SR141 and adjusts fan motor electric current to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.
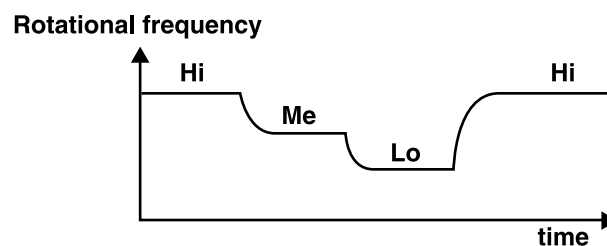
2. Fan motor lock-up protection
   When the rotational frequency feedback signal is not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the OPERATION INDICATOR lamp flashes on and off to show the fan motor abnormality. (See page 42.)

8-6. AUTO VANE OPERATION
(1) Vane motor drive
   These models are equipped with a stepping motor for the horizontal vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from indoor microprocessor.
(2) The horizontal vane angle and mode changes as follows by pressing the VANE CONTROL (⌕VANE) button.

AUTO → 1 ▽ → 2 ▽ → 3 ◁ → 4 ◁ → 5 △ → SWING ↖↘
        Horizontal   Middle   Downward
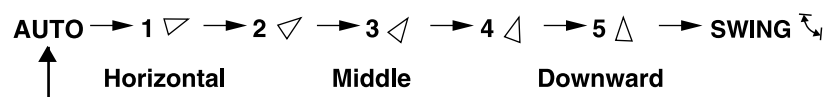
(3) Positioning
   The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle.
   Confirming of standard position is performed in case of follows.
   (a) When the OPERATE/STOP(ON/OFF) button is pressed.
   (b) When the vane control is changed AUTO to MANUAL.
   (c) When the SWING is finished.
   (d) When the test run starts.
   (e) When the power supply turns ON.

(4) VANE AUTO (◎) mode
   In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

(1) In COOL and DRY operation   Vane angle is fixed to Angle 1.
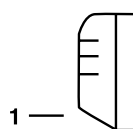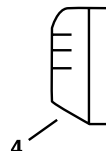
(2) In HEAT operation   Vane angle is fixed to Angle 4.

(5) Dew prevention

During COOL or DRY operation with the vane angle at Angle 4 or 5 when the compressor cumulative operation time exceeds 1 hour, the vane angle automatically changes to Angle 1 for dew prevention.

(6) SWING MODE (↔)

By pressing the SWING button (_{SWING}),vane swings horizontally. The remote controller displays "↔".

SWING MODE is cancelled when any of the following operations are performed.

● The unit is turned off.
   The vertical vane will return to their positions just before the swing operation was started.
● The operation mode(AUTO, COOL, DRY or HEAT)is changed.
   The vertical vane will return to their positions just before the swing operation was started.
● The SWING button (^{SWING}) is pressed.
   The vertical vane stop at the position when the button is pressed.

(7) Horizontal AIR FLOW ( )

The auto vane angle changes as follows by pressing the SWING button (^{SWING}).

● Press the SWING button (^{SWING}).
   The vertical vane begin moving.
● When the vane move to the desired position, press the SWING button (^{SWING})again.
   The vane stop moving.

NOTE

If the SWING button (^{SWING}) is not pressed again within 30 seconds in COOL or DRY mode or within 1 minute in HEAT mode after the vane start moving, the vane will automatically return to their original positions.

Horizontal AIR FLOW blowing range

About 100°
COOL and DRY
About 150°
HEAT
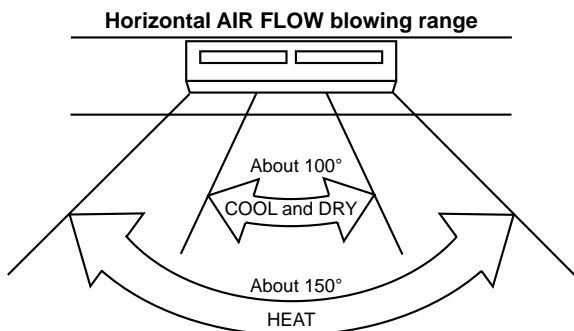
(8) Cold air prevention in HEAT mode.

When any of the following conditions occurs in HEAT mode, the auto vane angle changes to Angle 1 automatically to prevent cold air blowing on users.

① Compressor is not operating.

② Defrosting is performed.

③ Indoor coil thermistor RT12 reads 24℃ or below.

④ Indoor coil thermistor RT12 temperature is raising from 24°C or below, but it does not exceed 28℃.

(8) ECONO COOL (⌂) operation (ECONOmical operation)
  When the ECONO COOL button is pressed in COOL mode, set temperature is automatically set 2°C higher than that in COOL mode.
  Also the horizontal vane swings in various cycle according to the temperature of indoor heat exchanger(RT12).
  SWING operation makes you feel cooler than set temperature. So, even though the set temperature is higher than that in COOL mode, the air conditioner can keep comfort. As a result, energy can be saved.

  NOTE : ECONO COOL operation not work in COOL mode of "I FEEL CONTROL".

  SWING operation
  In swing operation of ECONO COOL operation air flow is initially blew out upward(levelly).
  According to the temperature of indoor coil thermistor RT12 at starting of this operation, next downward blow time is decided. Then when the downward blow has been finished, next upward blow time is decided.
  For initial 10 min. the swing operation is performed in table G~H for quick cooling(but G : RT 12 is 24℃ or less).
  Also, after 10 min. when the difference of set temperature and room temperature is more than 2 degrees, the swing operation is performed in table D~H for more cooling(but D: RT12 is 20℃ or less).
  The air conditioner repeats the swing operation in various cycle as follows.

	Temperature of indoor coil thermistor RT12	Downward blow time (sec.)	Upward(level) blow time (sec.)
A	15°C or less	2	23
B	15°C to 17°C	5	20
C	17°C to 18°C	8	17
D	18°C to 20°C	11	14
E	20°C to 21°C	14	11
F	21°C to 22°C	17	8
G	22°C to 24°C	20	5
H	more than 24°C	23	2

8-7. TIMER OPERATION
  1. How to set the timer
  (1) Press OPERATE/STOP(ON/OFF) button to start the air conditioner.
  (2) Check that the current time is set correctly.
  NOTE : Timer operation will not work without setting the current time. Initially "AM0:00" blinks at the current time display of TIME MONITOR, so set the current time correctly with CLOCK SET button.
  (3) Press ON or OFF TIMER buttons to select the operation.
   " ⌚→| " button... AUTO START operation (ON timer)
   " ⌚→○ " button... AUTO STOP operation (OFF timer)
  (4) Press HR. and MIN. button to set the timer. Time setting is 10-minute units.

   HR. and MIN. button will work when " ⌚→| " or " ⌚→○ " mark is flashing.
   These marks disappear in 1 minute.
   After setting the ON timer, check that OPERATION INDICATOR lamp of the indoor unit lights.
  NOTE1 : Be sure to place the remote controller at the position where its signal can reach the air conditioner even during TIMER operation, or the set time may deviate within the range of about 10 minutes.
  NOTE2 : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.
       ● A power failure occurs.
       ● The circuit breaker functions.

  2. Cancel

   TIMER setting can be cancelled with the ON or OFF TIMER buttons. (" ⌚→| " or " ⌚→○ ")

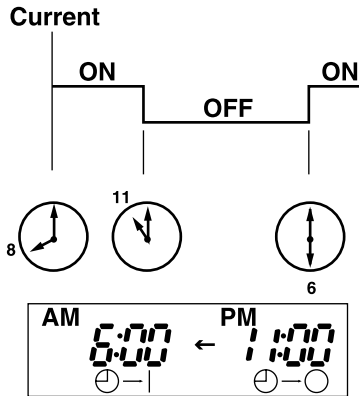   To cancel the ON timer, press the " ⌚→| " button.

   To cancel the OFF timer, press the " ⌚→○ " button.
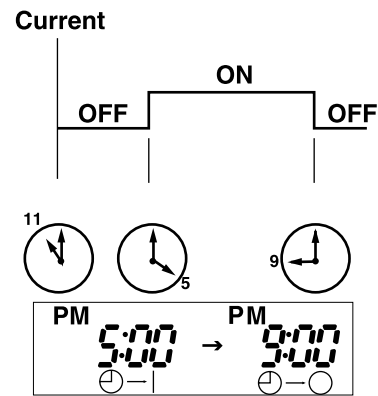   TIMER is cancelled and the display of set time disappears.

PROGRAM TIMER

● The OFF timer and ON timer can be used in combination.

● " → " and " ← " display shows the order of the OFF timer and ON timer operation.

(Example 1) The current time is 8:00 PM.
The unit turns off at 11:00 PM, and on at 6:00 AM.

(Example 2) The current time is 11:00 AM.
The unit turns on at 5:00 PM, and off at 9:00 PM.

Current

Current

NOTE : TIMER setting will be cancelled by power failure or breaker functioning.

8-8. EMERGENCY-TEST OPERATION

When the remote controller is missing, has failed or the batteries run down, use the EMERGENCY OPERATION switch on the front of the indoor unit. The unit will start and the OPERATION INDICATOR lamp will light.

The first 30 minutes of operation is the test run operation. This operation is for servicing. The indoor fan speed runs at Hi notch and the system is in continuous operation. (The thermostat is ON)

After 30 minutes of test run operation the system shifts to EMERGENCY COOL, HEAT MODE with a set temperature of 24°C.

The fan speed shifts to Me notch.

This operation continues until the EMERGENCY OPERATION switch button is pressed once or twice or the unit receives any signal from the remote controller. In case of latter normal operation will start.

The coil frost prevention works even in this operation, and defrosting too.

In the test run or emergency operation, the horizontal vane operates in VANE AUTO mode.

NOTE : Do not press the EMERGENCY OPERATION switch during normal operation.
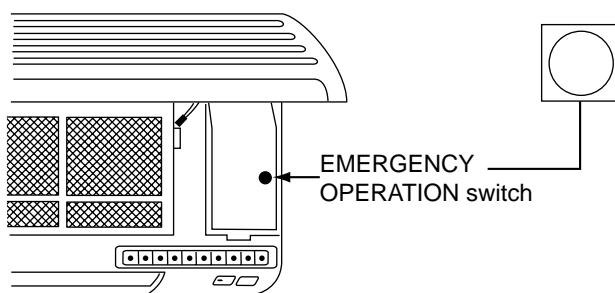
OPERATION INDICATOR lamp

Press once <Cool>

Press again <Heat>

Press once again <Stop>

lighting

not lighting

8-9. Operational frequency control of outdoor unit

1. Outline

The operational frequency is decided by following:

First, set the target operational frequency based on the difference between the room temperature and the set temperature.

Second, regulate the target operational frequency by discharge temperature protection, high pressure protection, electric current protection and overload protection and also by the maximum/minimum frequency.

(1) Maximum/minimum frequency in each operation mode.

Applied model	COOL			HEAT			DRY
	minimum frequency	rating frequency	maximum frequency	minimum frequency	rating frequency	maximum frequency	
MSZ-G09SV- E1	45	79	92	45	95	105	45
MSZ-G12SV- E1	15	85	105	15	96	125	30

※ The maximum frequency in COOL mode varies according to operation hours, as shown below.

※ However, it is under 79Hz(MSZ-G09SV)/ 85Hz(MSZ-G12SV) when indoor fan speed set to MANUAL Lo or AUTO Lo.
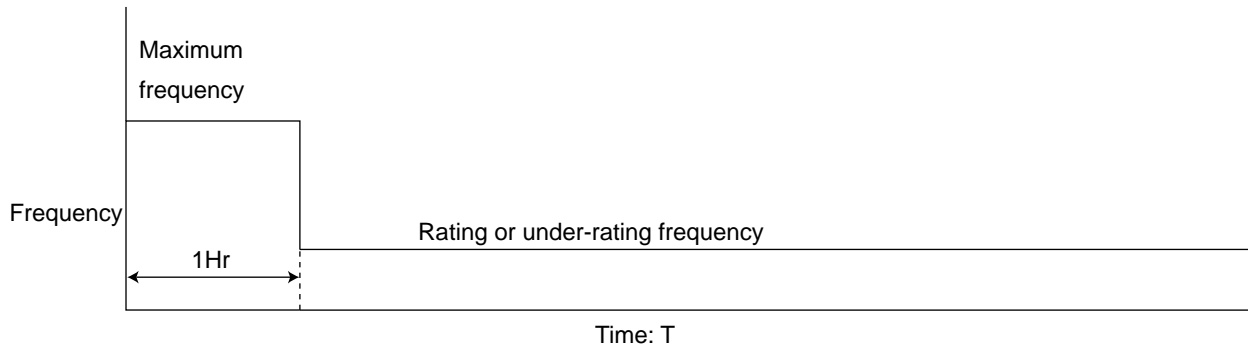
(2) Frequency change speed

During increasing frequency

Operational frequency	**MUZ-G09SV-** E1 **MUZ-G12SV-** E1
10Hz~14Hz	0.5 sec./Hz
15Hz~79Hz	10 sec./Hz
80Hz~150Hz	0.5 sec./Hz

During decreasing frequency

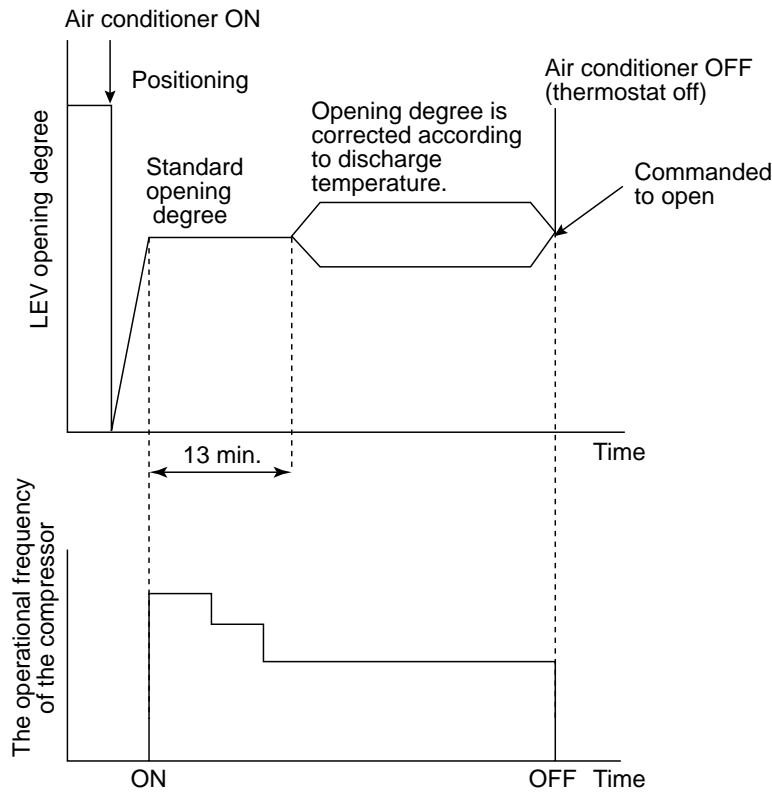| Operational frequency	**MUZ-G09SV-** E1 **MUZ-G12SV-** E1
10Hz~42Hz	1 sec./Hz
43Hz~150Hz	0.5 sec./Hz

8-10. Electronic expansion valve control (LEV control)

(1) Outline of LEV control

The LEV basic control is comprised of setting LEV opening degree to the standard opening degrees set for each operational frequency of the compressor. However, when any change in indoor/outdoor temperatures or other factors cause air conditioning load fluctuation, the LEV control also works to correct LEV opening degree based on discharge temperature (Shell temperature) of the compressor, developing the unit's performance.

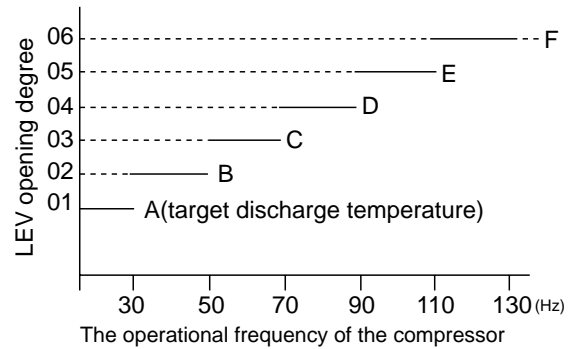|		
standard specification	Control range	from min. 33 pulse to max. 350 pulse.
	Actuating speed	LEV opens 40 pulse/sec. and close 90 pulse/sec.
	Opening degree adjustment	LEV opening degree is always adjusted in opening direction. (When reducing the opening degree, LEV is once over-closed, and then adjusted to the proper degree by opening.
general operation	Unit OFF	LEV remains at max. opening degree (reaches max. opening degree approx. 15 minutes after compressor stops)
	Remote controller ON	LEV is positioned. (first full-closed at zero pulse and then positioned.)
	During 2 to 13 minutes after compressor starts	Opening degree is adjusted according to standard opening degree. (Standard opening degree is set for each rotational frequency of compressor)
	More than 13 minutes have passed since compressor start-up	LEV opening degree is corrected to get target discharge temperature of compressor. (For discharge temperature lower than target temperature, LEV is corrected in closing direction.) (For discharge temperature higher than target temperature, LEV is corrected in opening direction.) ※It may take more than 30 minutes to reach target temperature, depending on operating conditions.
	Thermostat OFF	LEV starts to open every 3 pulse/sec. from the same opening degree as that when the Unit turned OFF (and becomes full-opened after approx. 15 minutes.)
	Thermostat ON	LEV is controlled in the same way as that is after the compressor has started up.
	Defrosting in HEAT mode	LEV is adjusted to open 350 pulse.

(2) Time chart

Air conditioner ON

Positioning

LEV opening degree

Air conditioner OFF
(thermostat off)

Opening degree is
corrected according
to discharge
temperature.

Commanded
to open

Standard
opening
degree

Time

13 min.

The operational frequency
of the compressor

ON   OFF Time

(3) Control data

(a) Reference value of target discharge temperature
(Cooling ℃ / Heating ℃)

	A	B	C	D	E	F
MSZ-G09SV-E1	58/49	63/58	69/66	74/71	74/76	74/78
MSZ-G12SV-E1	57/48	60/57	67/66	75/71	78/76	78/78

LEV opening degree

06 ---------------------------------- F
05 ------------------------------ E
04 -------------------------- D
03 ------------------ C
02 ------------ B
01 ──── A(target discharge temperature)

30   50   70   90   110   130 (Hz)
The operational frequency of the compressor

In COOL mode, the two indoor coil thermistor (one main and one sub) sense temperature ununiformity (super heat) at the heat exchanger, And when temperature difference have developed, the indoor coil thermistors adjust LEV opening to get approximate 10 degrees lower temperature than the target temperature in the table above, thus diminishing super heat.

(b) Reference value of LEV standard degree opening
(COOL/ HEAT pulse)

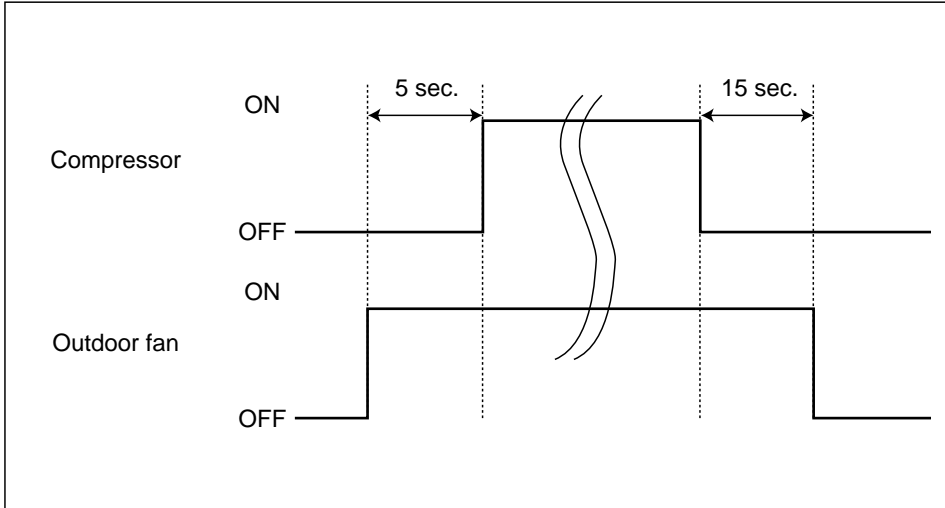|	01	02	03	04	05	06
MSZ-G09SV-E1	150/70	170/90	180/110	190/140	200/150	200/160
MSZ-G12SV-E1	160/90	190/120	200/140	220/160	240/180	255/200

8-11. Outdoor fan motor control

The AC fan motor turns ON/OFF, interlocking with the compressor.
[ON]
The AC fan motor turns on 5 seconds before the compressor starts up.
[OFF]
The AC fan motor turns off 15 seconds after the compressor stops running.

```
                              5 sec.              15 sec.
            ON  ───────────┬───────── ))) ────┬───────────
Compressor                 │                   │
            OFF ───────────┘                   └───────────

            ON  ───────┬───────────── ))) ────────┬────────
Outdoor fan            │                          │
            OFF ───────┘                          └────────
```

8-12. 4-way valve control

COOL&DRY mode · · · · · · · OFF(Voltage is not supplied from relay P.C. board to R.V. Coil.)
. . . . During normal COOL operation the 4-way valve is OFF.
HEAT mode · · · · · · · · · · · ON(Voltage is supplied from relay P.C. board to R.V. Coil.)
. . . . The 4-way valve is ON as soon as thermostat turns ON.
. . . . The 4-way valve is OFF 15 minutes after the thermostat turns OFF.

※ The 4-way valve isn't ON before the compressor starts up.

<COOL>   **<HEAT>**

5 seconds   5 seconds

```
              ON  ─────────┌────     ──────────┌────
Compressor    OFF ─────────┘         ──────────┘

              ON   ──┌──┐             ──┌──┐
4-way valve   OFF  ──┘  └──           ──┘  └──

              ON   ─┌─┐               ─┌─┐
Outdoor fan   OFF  ─┘ └──────         ─┘ └──────
```

36
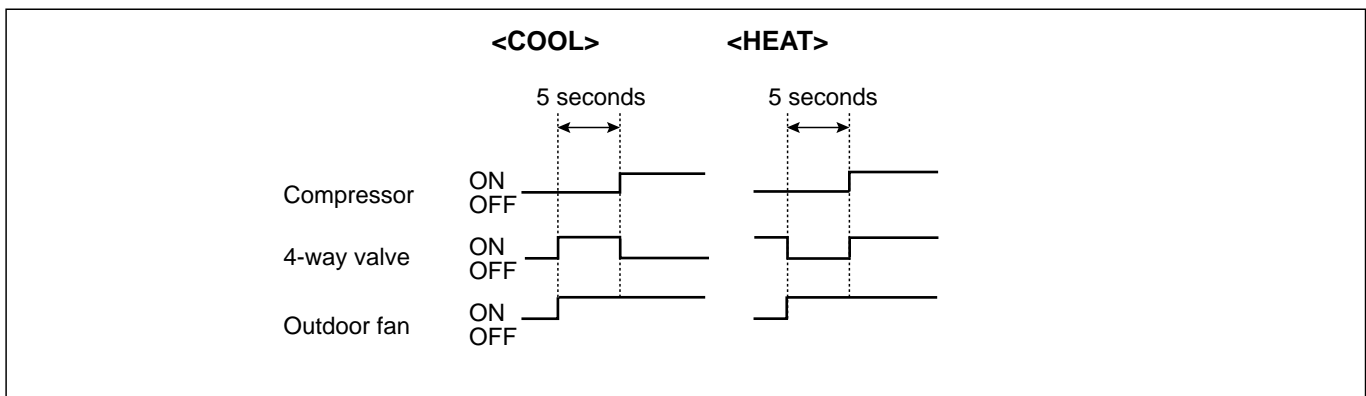
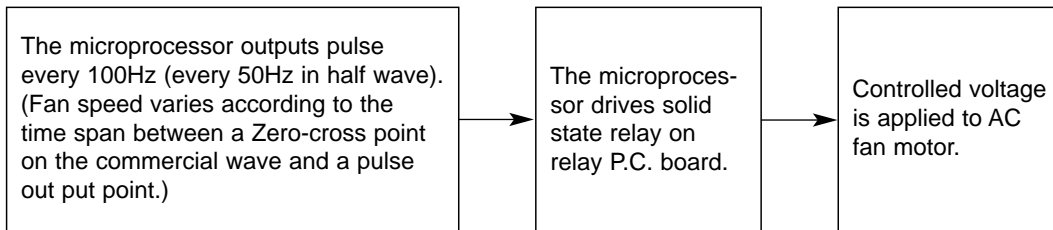## 8-13. Indoor fan motor control

The detected rotational frequency of the fan motor is feed backed to the microprocessor and then the microprocessor works to keep the rotational frequency at a fixed value against load fluctuation.
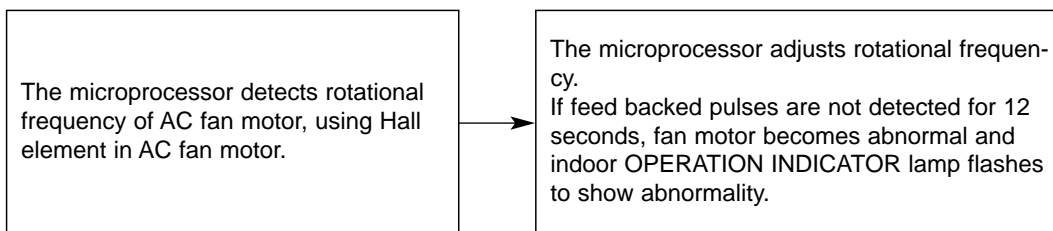
(1) Circuit block diagram

```
                    every 100Hz pulse output         Solid state
                   ┌──────────────────────┐          relay output
┌──────────────┐   │   AC motor           │ ─────────────────────▶  ┌──────────────┐
│Microprocessor│──▶│   actuator           │                         │   AC motor   │
└──────────────┘   │  (Solid state relay) │                         │              │
       ▲           └──────────────────────┘      230V AC            │ ┌──────────┐ │
       ┊                        ▲                   ～───┤├──────────┤ │rotational│ │
       ┊        Rotational frequency                                 │ │frequency │ │
       ┊┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄│ │sensor    │ │
                                                                    │ │part      │ │
                                                                    │ └──────────┘ │
              Controller board                                      └──────────────┘

                                          ◀─────────────  output
                                          ◀┄┄┄┄┄┄┄┄┄┄┄┄┄  input
```

(2) Control system

\<Output side\>

The microprocessor outputs pulse every 100Hz (every 50Hz in half wave). (Fan speed varies according to the time span between a Zero-cross point on the commercial wave and a pulse out put point.)	The microprocessor drives solid state relay on relay P.C. board.	Controlled voltage is applied to AC fan motor.

\<Input side\>

The microprocessor detects rotational frequency of AC fan motor, using Hall element in AC fan motor.	The microprocessor adjusts rotational frequency. If feed backed pulses are not detected for 12 seconds, fan motor becomes abnormal and indoor OPERATION INDICATOR lamp flashes to show abnormality.

9 | SERVICE FUNCTIONS

MSZ-G09SV -A1
MSZ-G12SV -A1

9-1. CHANGE IN DEFROST SETTING

<JS> When the JS wire of the outdoor electronic control P.C. board is cut, the defrost temperature will be changed.

(Refer to page 55.)

Jumper wire	Change point
JS	**Deforst finish temperature changes from 13℃ to 15℃.**

9-2. TIMER SHORT MODE

For service, set time can be shortened by short circuit of JPS on and the electronic control P.C. board.
The time will be shortened as follows.
3-minute delay : 3-minute ➔ 3-second.
AUTO START : 1 hour ➔ 1-minute
AUTO STOP : 1 hour ➔ 1-minute   } Short the connector during the timer mode.

9-3. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

A maximum of 4 indoor units with wireless remote controllers can be used in a room. In this case, to operate each indoor unit individually by each remote controller, P.C. boards of remote controller must be modified according to the indoor unit number.

How to modify the remote controller P.C. board

Remove batteries before modification.
The board has a print as shown below;
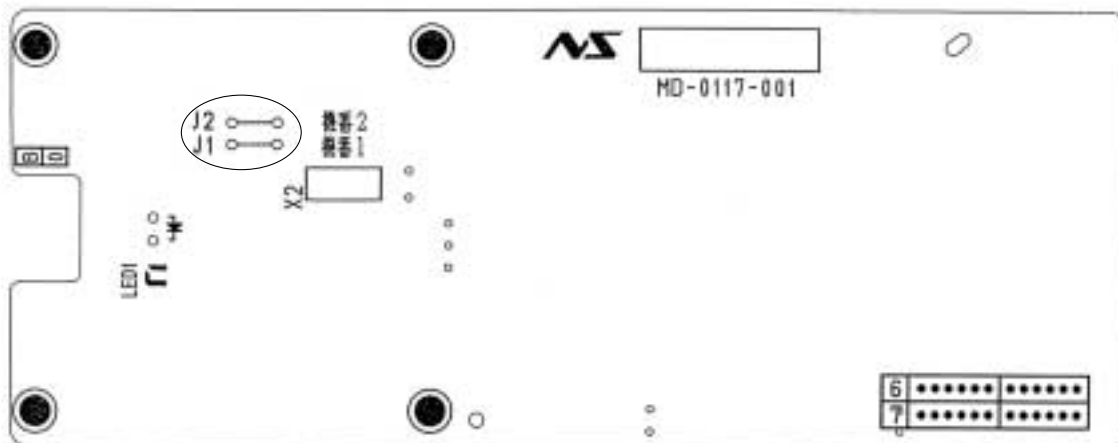
NOTE : For remodelling, take out the batteries at first.
After finish remodelling, put back the batteries then push the RESET-button.

The P.C. board has the print "J1" and "J2". Jumper wires are mounted to each "J1" and "J2".Cut "J1" and "J2" according to the number of indoor unit as shown in Table 1.
After modification, push the RESET. button near the MIN-button on the remote controller.

Table1.

	1 unit operation	2 unit operation	3 unit operation	4 unit operation
No.1 unit	No modification	Same as at left	Same as at left	Same as at left
No.2 unit	——————	Cut J1	Same as at left	Same as at left
No.3 unit	——————	——————	Cut J2	Same as at left
No.4 unit	——————	——————	——————	Cut both J1 and J2

NOTE : At power supply failure or installation, indoor unit deletes the memory about remote controller. When the power supply is turned on and indoor unit receives the first signals from the remote controller, the remote controller number is designated as the indoor unit number. Therefore at and after the second time indoor unit accepts the remote controller of the initial setting number.
At setting - error, turn the power supply off to cancel the individual operation and then turn the power supply on to restart the setting.

9-4. AUTO RESTART FUNCTION

When the indoor unit is controlled with the remote controller, the operation mode, the set temperature, and the fan speed are memorized by the indoor electronic control P.C.board. The "AUTO RESTART FUNCTION" sets to work the moment the power has restored after power failure. Then, the unit will restart automatically. However if the unit is operated in "I FEEL CONTROL." mode before power failure, the operation is not memorized. In "I FEEL CONTROL." mode, the operation is decided by the initial room temperature.

How to set "AUTO RESTART FUNCTION"
①Turn off the main power for the unit.
②Pull out the indoor electronic control P.C. board and the display P.C.board.(See page 58.)
③Cut the RESISTOR JR07 on the indoor electronic control P.C. board.
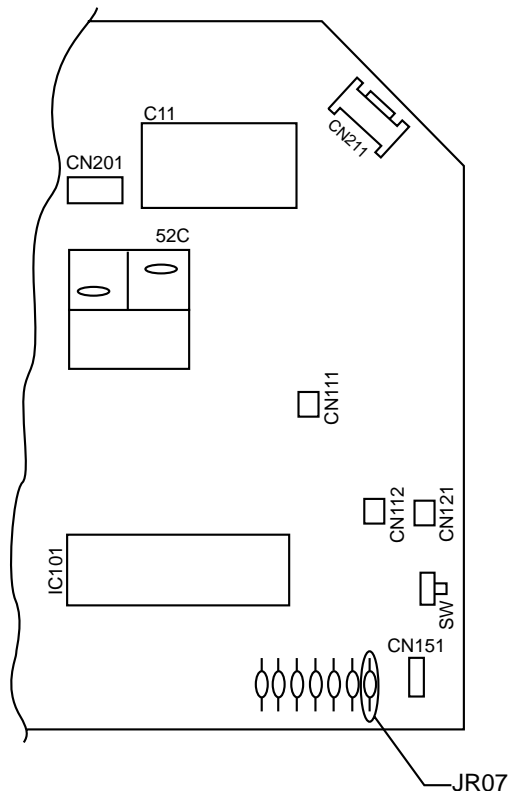
Operation
①If the main power (230V AC) has been cut, the operation settings remain.
②After the power is restored, the unit restarts automatically according to the memory.(However, it takes at least 3 minutes for the compressor to start running.)

NOTE:
• The operation settings are memorized when 10 seconds have passed after the indoor unit was operated with the remote controller.
• If the main power is turned off or a power failure occurs while AUTO START/STOP timer is active, the timer setting is cancelled.
• If the unit has been off with the remote controller before power failure, the auto restart function does not work as the power button of the remote controller is off.
• To prevent breaker off due to the rush of starting current, systematize other home appliances not to turn on at the same time.
• When some air conditioners are connected to the same supply system, if they are operated before power failure, the starting current of all the compressors may flow simultaneously at restart.
  Therefore, the special counter-measures are required to prevent the main voltage-drop or the rush of the starting current by adding to the system that allows the units to start one by one.
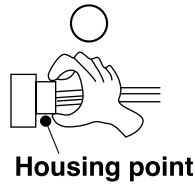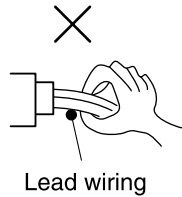
10 | TROUBLESHOOTING

MSZ-G09SV -E1
MSZ-G12SV -E1

11-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:
 1) Check the power supply voltage.
 2) Check the indoor/outdoor connecting wire for mis-wiring.

2. Take care the following during servicing.
 1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
 2) Be sure to unplug the power cord before removing the front panel, the cabinet, the top panel, and the electronic control P.C. board.
 3) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
 4) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.

Lead wiring

Housing point

3. Troubleshooting procedure
 1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing 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 the flow chart on page 41 and the check table on page 42 and 43.

4. How to replace batteries
 Weak batteries may cause the remote controller malfunction.
 In this case, the remote controller can not be repaired only by the battery replacement. To operate the remote controller normally, replace the batteries in the following order.
 This remote controller has the RESET button. After refilling new batteries, press the RESET button with tip end of ball point pen or the like, and then use the remote controller.
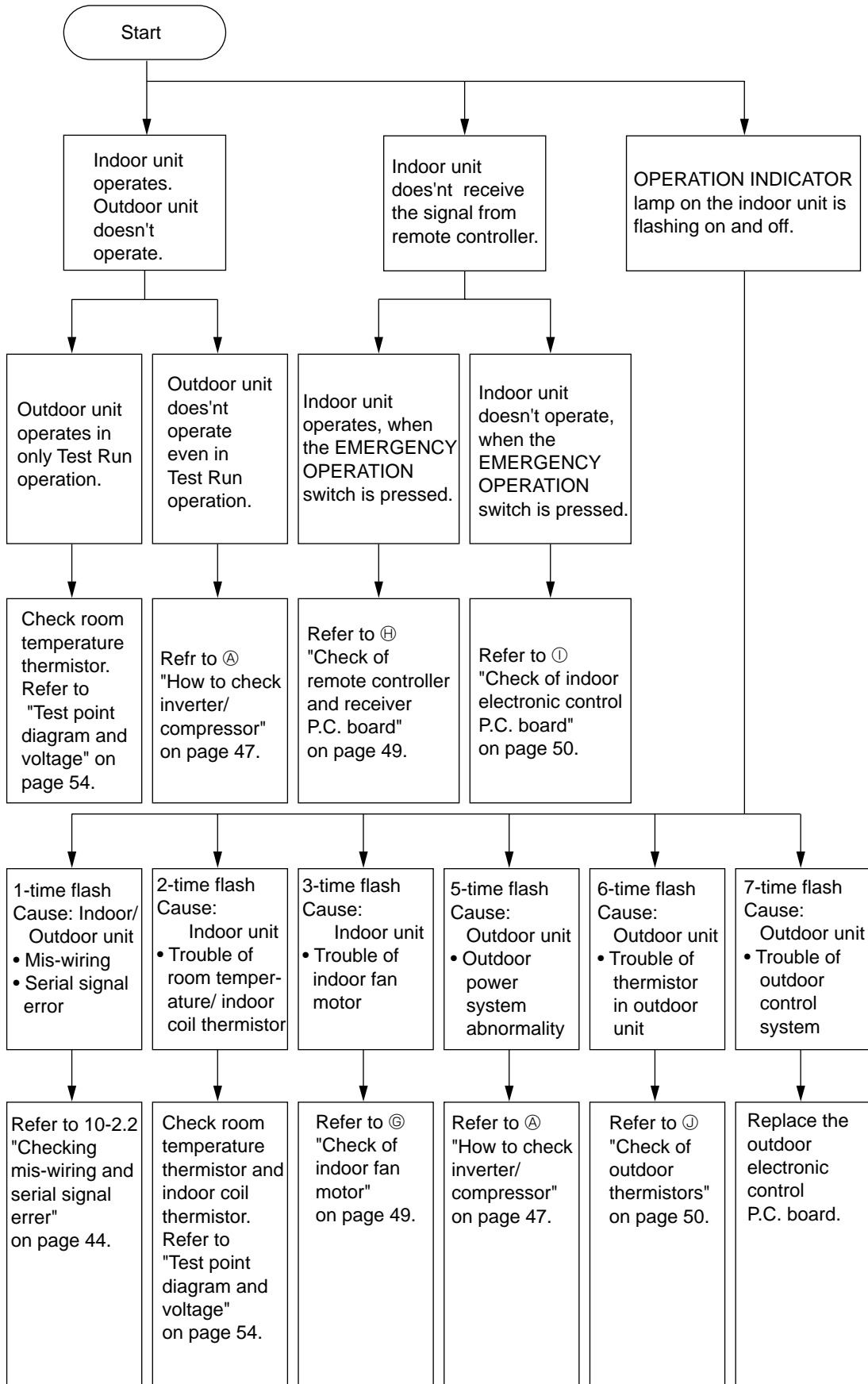
Reset button
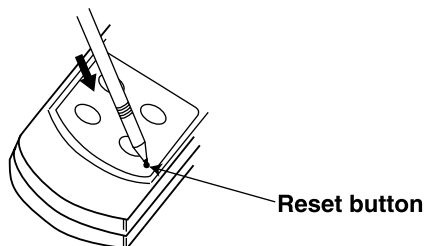
10-2. Troubleshooting procedure

The following procedure facilitates identifying defective points.
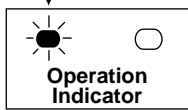Details of OPERATION INDICATOR lamp flashing can be located on page 42 and 43.

Start

- Indoor unit operates. Outdoor unit doesn't operate.
  - Outdoor unit operates in only Test Run operation.
    - Check room temperature thermistor. Refer to "Test point diagram and voltage" on page 54.
  - Outdoor unit does'nt operate even in Test Run operation.
    - Refr to Ⓐ "How to check inverter/ compressor" on page 47.

- Indoor unit does'nt receive the signal from remote controller.
  - Indoor unit operates, when the EMERGENCY OPERATION switch is pressed.
    - Refer to Ⓗ "Check of remote controller and receiver P.C. board" on page 49.
  - Indoor unit doesn't operate, when the EMERGENCY OPERATION switch is pressed.
    - Refer to Ⓘ "Check of indoor electronic control P.C. board" on page 50.

- OPERATION INDICATOR lamp on the indoor unit is flashing on and off.
  - 1-time flash Cause: Indoor/ Outdoor unit
    - • Mis-wiring
    - • Serial signal error
    - → Refer to 10-2.2 "Checking mis-wiring and serial signal errer" on page 44.
  - 2-time flash Cause: Indoor unit
    - • Trouble of room temper- ature/ indoor coil thermistor
    - → Check room temperature thermistor and indoor coil thermistor. Refer to "Test point diagram and voltage" on page 54.
  - 3-time flash Cause: Indoor unit
    - • Trouble of indoor fan motor
    - → Refer to Ⓖ "Check of indoor fan motor" on page 49.
  - 5-time flash Cause: Outdoor unit
    - • Outdoor power system abnormality
    - → Refer to Ⓐ "How to check inverter/ compressor" on page 47.
  - 6-time flash Cause: Outdoor unit
    - • Trouble of thermistor in outdoor unit
    - → Refer to Ⓙ "Check of outdoor thermistors" on page 50.
  - 7-time flash Cause: Outdoor unit
    - • Trouble of outdoor control system
    - → Replace the outdoor electronic control P.C. board.

1. Troubleshooting check table   (Indoor unit troubleshooting check table)

MSZ-G09SV -E1

MSZ-G12SV -E1

flashing

Operation Indicator

· Flashing of the operation indicator lamp (on the left-hand side) indicates possible abnormalities.
· The operation indicator lamp (on the left-hand side) is lighting during normal operation.

No.	Symptom	Operation indicator lamp	Abnormal point	Detection method	Checkpoint
1	Outdoor unit does not operate	repeated flashes every 0.5 seconds	Mis-Wiring	When indoor electronic control P.C. board does not receive serial signals for 4 to 5 seconds with OPERATION/ STOP(ON/ OFF) button of remote controller ON and 52C relay ON for the first time. NOTE: In case of serial signal error, mis-wiring indication will appear by turning power off and then turning it back on.	Refer to 'Checking serial signal error' on page 44.
※2		1-time flash 2.5 seconds OFF	Serial signal	When indoor electronic control P.C. board does not receive serial signals from outdoor unit for 4 to 5 seconds,	
※3		2-time flash 2.5 seconds OFF	Indoor coil thermistor Auxiliary indoor coil thermistor Room temperature thermistor	Indoor electronic control P.C. board constantly detects resistance every 8 seconds. When thermistor shorts or opens.	Refer to the characteristics of indoor coil thermistor, auxiliary indoor coil thermistor, and room temperature thermistor on page 54.
※4		3-time flash 2.5 seconds OFF	Indoor fan motor	When rotational frequency feedback signal is not emit during 12-second indoor fan operation.	Refer to Ⓖ "Check of indoor fan motor" on page 49.
5		5-time flash 2.5 seconds OFF	Outdoor power system	When compressor has stopped due to over current protection or start-up failure protection 3 times in a row within 1 minute after start-up.	Refer to Ⓐ "How to check inverter/ compressor" on page 47.
6		6-time flash 2.5 seconds OFF	Outdoor thermistors	<Thermistor short> Thermistors are abnormal when they short after compressor start-up. <Thermistor open> Thermistors are abnormal when they open after compressor start-up. However, discharge temperature thermistor is abnormal when open circuit is detected more than 10 minutes after compressor start-up.	· Shortage of refrigerant · Outdoor electronic control P.C. board Refer to Ⓙ "Check of outdoor thermistors" on page 50.
7		7-time flash 2.5 seconds OFF	Outdoor control system	When nonvolatile memory data cannot be read properly on outdoor control P.C. board, outdoor unit stops and restarts 3 minutes later.	Replace outdoor electronic control P.C. board.

※ When the indoor unit has started operation and the above detection method has detected an abnormality (the first detection after the power ON), the electronic control P.C. board turns OFF the 52C and the indoor fan motor with the operation indicator lamp lighting.
When the 52C and the indoor fan motor are turned ON again 3 minutes later and the same abnormality is detected (a second detection of the above abnormality after the power ON), the control P.C. board turns OFF the 52C and the indoor fan motor with the operation indicator lamp flashing.
However, the first detection is cleared in case the power is turned OFF after the first detection.
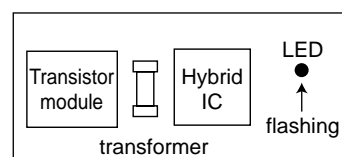
(Outdoor LED indication table)
MUZ-G09SV - E1
MUZ-G12SV - E1
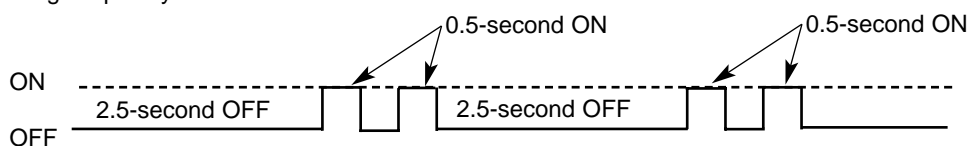NOTE 1. The location of LED is illustrated at the right figure.
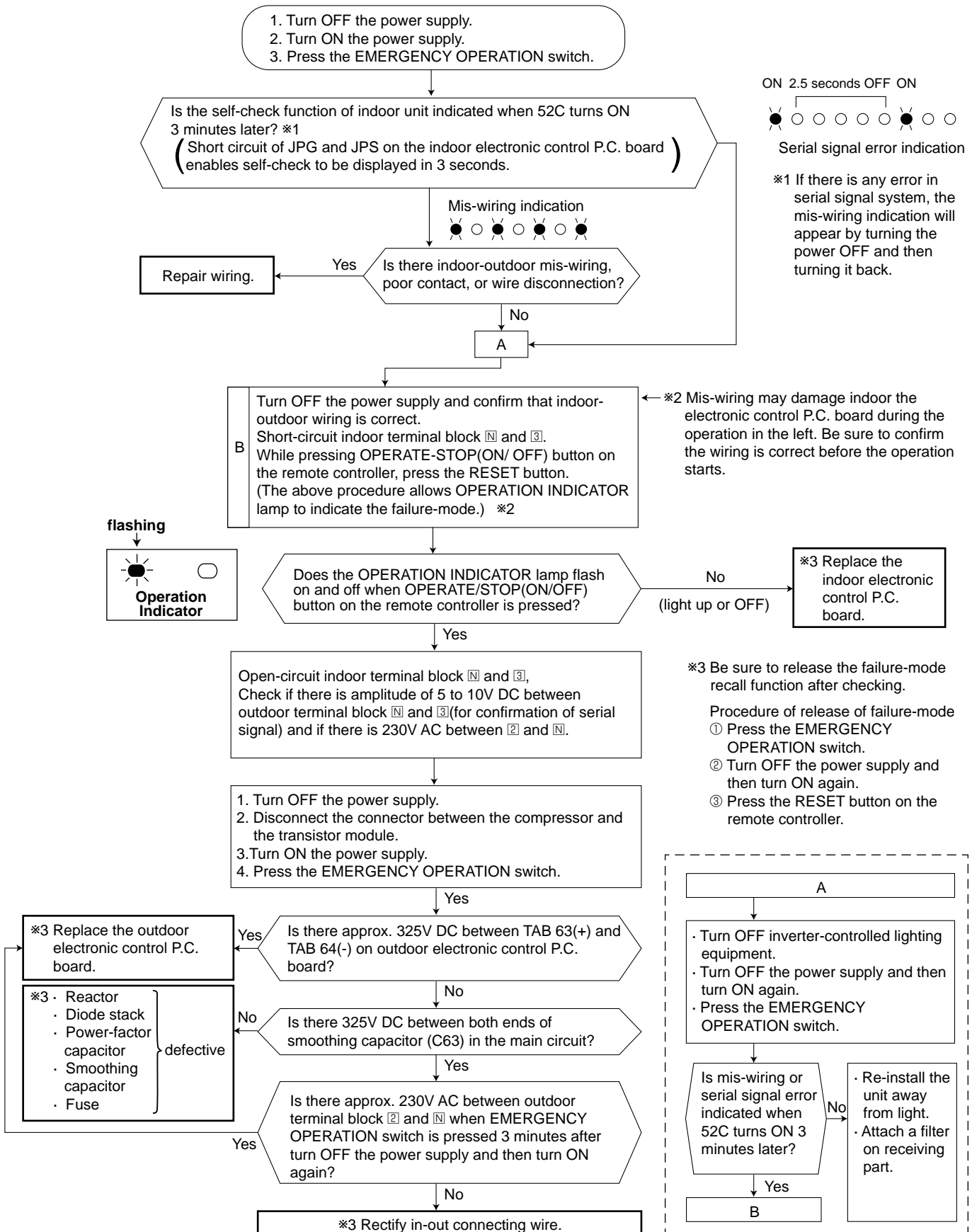 2. LED lights up during normal operation.

\<Outdoor electronic control P.C. board\>

No.	Symptom	LED indication	Abnormal point	Detection method	Checkpoint
1	Outdoor unit does not operate	1-time flash every 2.5 seconds	Serial signal	When serial signal stops from indoor unit for 60 seconds, compressor stops and then restarts 3 minutes later.	· Refer to 'Checking serial signal error' on page 44. · Refer to Ⓜ 'Check of power supply' on page 52.
2		NOTE: For abnormality location, refer to 'Indoor troubleshooting check table' on page 41.	Outdoor power system	When compressor has stopped by over current protection within 1 minute after compressor start-up 3 times in a row, compressor stops and then restarts 3 minutes later.	· Refer to Ⓐ 'How to check inverter/ compressor' on page 47.
3			Outdoor thermistors	When discharge temperature thermistor or fin temperature thermistor shorts or opens during compressor running, compressor stops and restarts 3 minutes later.	· Refer to Ⓙ 'Check of outdoor thermistors' on page 50.
4			Outdoor control system	When nonvolatile memory date cannot be read properly, compressor stops and restarts 3 minutes later.	Replace outdoor electronic control P.C. board.
5	'Outdoor unit stops and restarts 3 minutes later' is repeated	2-time flash 2.5 seconds OFF	Over current protection	When 19A(MUZ-G09SV)/ 29A(MUZ-G12SV) current flows into power transistor, compressor stops and restarts 3 minutes later.	Refer to Ⓐ 'How to check inverter/ compressor on page 47.
6		3-time flash 2.5 seconds OFF	Discharge temperature overheat protection	When discharge temperature thermistor exceeds 116℃, compressor stops and restarts 3 minutes later. (Compressor restarts when discharge temperature thermistor reads 100℃ or below.)	· Check refrigerant circuit and refrigerant amount. · Refer to Ⓙ 'Check of outdoor thermistors' on page 50.
7		4-time flash 2.5 seconds OFF	Fin temperature thermistor overheat protection	When temperature at heat sink exceeds 78℃ (MUZ-G09SV)/ 80℃ (MUZ-G12SV) or outdoor electronic control P.C. board exceeds 68℃ (MUZ-G09SV)/ 78℃ (MUZ-G12SV), compressor stops and restarts 3 minutes later.	· Check around outdoor unit. · Check outdoor unit air passage.
8		5-time flash 2.5 seconds OFF	High pressure protection	When indoor coil thermistor exceeds 75℃, compressor stops and restarts 3 minutes later.	· Check refrigerant circuit and refrigerant amount. · Check stop valve.
9	Outdoor unit operates (at low frequency)	1-time flash 2-5 seconds OFF	Frequency drop by current protection	When current from power outlet exceeds 8A(MUZ-G09SV)/ 9A(MUZ-G12SV), 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 outlets are short cycled.
10		3-time flash 2-5 seconds OFF	Frequency drop by high pressure protection	When indoor coil thermistor exceeds 55℃ in HEAT mode, compressor frequency lowers.	
			Frequency drop by defrosting in COOL mode	When indoor coil thermistor reads 8℃ or below in COOL mode, compressor frequency lowers.	
11		4-time flash 2-5 seconds OFF	Frequency drop by, discharge temperature protection.	When discharge temperature thermistor exceeds 111℃, compressor frequency lowers.	
12	Outdoor unit operates	5-time flash 2-5 seconds OFF	Outdoor thermistors. Defrost thermistor.	When defrost thermistor short or open. ※ In this case, compressor continues running.	Refer to Ⓙ 'Check of outdoor thermistors' on page 50.
13		6-time flash 2-5 seconds OFF	Power factor detection	When power factor of compressor is not detected. ※ In this case, compressor continues running.	Check compressor wiring.
14		7-time flash 2-5 seconds OFF	Low discharge temperature protection	When discharge temperature has been 50℃ or below for 20 minutes.	· Refer to Ⓟ 'Check of LEV' on page 53. · Check refrigerant circuit and refrigerant amount.

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

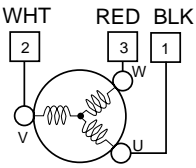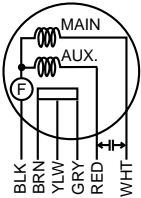## 2. Checking mis-wiring and serial signal error

Outdoor unit does not operate. When the OPERATION INDICATOR lamp (on the left-hand side) flashes on and off continuously or only once.
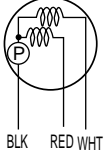
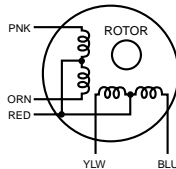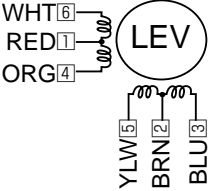1. Turn OFF the power supply.
2. Turn ON the power supply.
3. Press the EMERGENCY OPERATION switch.

Is the self-check function of indoor unit indicated when 52C turns ON 3 minutes later? ※1
(Short circuit of JPG and JPS on the indoor electronic control P.C. board enables self-check to be displayed in 3 seconds.)

ON 2.5 seconds OFF ON
●○○○○○●○○
Serial signal error indication

※1 If there is any error in serial signal system, the mis-wiring indication will appear by turning the power OFF and then turning it back.

Mis-wiring indication
●○●○●○●

Is there indoor-outdoor mis-wiring, poor contact, or wire disconnection?
Yes → Repair wiring.
No → A

B Turn OFF the power supply and confirm that indoor-outdoor wiring is correct.
Short-circuit indoor terminal block Ⓝ and ③.
While pressing OPERATE-STOP(ON/ OFF) button on the remote controller, press the RESET button.
(The above procedure allows OPERATION INDICATOR lamp to indicate the failure-mode.) ※2

※2 Mis-wiring may damage indoor the electronic control P.C. board during the operation in the left. Be sure to confirm the wiring is correct before the operation starts.

flashing

Operation Indicator

Does the OPERATION INDICATOR lamp flash on and off when OPERATE/STOP(ON/OFF) button on the remote controller is pressed?
No (light up or OFF) → ※3 Replace the indoor electronic control P.C. board.
Yes ↓

Open-circuit indoor terminal block Ⓝ and ③,
Check if there is amplitude of 5 to 10V DC between outdoor terminal block Ⓝ and ③(for confirmation of serial signal) and if there is 230V AC between ② and Ⓝ.

※3 Be sure to release the failure-mode recall function after checking.

Procedure of release of failure-mode
① Press the EMERGENCY OPERATION switch.
② Turn OFF the power supply and then turn ON again.
③ Press the RESET button on the remote controller.

1. Turn OFF the power supply.
2. Disconnect the connector between the compressor and the transistor module.
3. Turn ON the power supply.
4. Press the EMERGENCY OPERATION switch.

Is there approx. 325V DC between TAB 63(+) and TAB 64(-) on outdoor electronic control P.C. board?
Yes → ※3 Replace the outdoor electronic control P.C. board.
No ↓

※3 · Reactor
· Diode stack
· Power-factor capacitor
· Smoothing capacitor
· Fuse
} defective

Is there 325V DC between both ends of smoothing capacitor (C63) in the main circuit?
No → (to defective box)
Yes ↓

Is there approx. 230V AC between outdoor terminal block ② and Ⓝ when EMERGENCY OPERATION switch is pressed 3 minutes after turn OFF the power supply and then turn ON again?
Yes → (to defective box)
No ↓

※3 Rectify in-out connecting wire.

A

· Turn OFF inverter-controlled lighting equipment.
· Turn OFF the power supply and then turn ON again.
· Press the EMERGENCY OPERATION switch.

Is mis-wiring or serial signal error indicated when 52C turns ON 3 minutes later?
No → · Re-install the unit away from light.
· Attach a filter on receiving part.
Yes ↓

B

44

3. Trouble shooting procedure of main parts
   (Simple check method of main parts)
   MSZ-G09SV -E1   MUZ-G09SV -E1
   MSZ-G12SV -E1   MUZ-G12SV -E1

Part name	Checking method and criterion		
Room temperature thermistor (RT11)	Disconnect the connector and measure the resistance with a tester. (Part temperature : 10℃~30℃)		
Indoor coil thermistor (RT12, RT13)	Normal	Abnormal	
	8kΩ~20KΩ	Open or short circuit	
Defrost thermistor (RT61)	Disconnect the connector and measure the resistance with a tester. (Part temperature : -10℃~40℃)		
	Normal	Abnormal	
	5kΩ~55KΩ	Open or short circuit	
Discharge temperature thermistor (RT62)	Disconnect the connector and measure the resistance with a tester. Before measurement, hold the thermistor with your hands to warm it up. (Part temperature : 20℃~40℃)		
	Normal	Abnormal	
	100kΩ~250KΩ	Open or short circuit	
Fin temperature thermistor (RT64)	Disconnect the connector and measure the resistance with a tester. (Part temperature : -10℃~80℃)		
	Normal	Abnormal	
	5kΩ~30KΩ	Open or short circuit	

Compressor (MC)

WHT   RED BLK
[2]   [3] [1]
W
V   U

Compressor motor

Disconnect the connector and measure the resistance between the terminals with a tester.
(Winding temperature : -10℃~40℃)

	Normal	Abnormal
MUZ-G09SV	1.88Ω~2.31Ω	Open or short
MUZ-G12SV	0.39Ω~0.50Ω	circuit

Indoor fan motor (MF)

MAIN
AUX.
F
BLK BRN YLW GRY RED WHT

Motor part

Measure the resistance between the terminals with a tester.
(Winding temperature : 10℃~30℃)

(CN211)	Normal	Abnormal
WHT-BLK	280Ω~304Ω	Open or short circuit.
BLK-RED	311Ω~338Ω	

Sensor part

Measure the voltage Power ON.

	Normal	Abnormal
BRN-YLW	4.5 ~ 5.5V	Remain 0V or 5V
YLW-GRY	(When fan revolved one time) 0V→5V→0V (Approx.)	

Ⓕ:INNER FUSE

Part name	Checking method and criterion
Outdoor fan motor (MF61)	Measure the resistance between the terminals with a tester. (Winding temperature : -10℃~40℃)

	Normal		abnormal
	MUZ-G09SV	MUZ-G12SV	
WHT-BLK	246Ω~302Ω	177Ω~217Ω	Open or short circuit
BLK-RED	174Ω~214Ω	308Ω~378Ω	

Part name	Checking method and criterion
Vane motor (MV1, MV2)	Measure the resistance between the RED terminal and the other ones. (Winding temperature : 10℃~30℃)

Normal	Abnormal
approx. 282~306Ω in each phase	Open or short circuit

Part name	Checking method and criterion
R.V. coil (21S4)	Measure the resistance between the terminals with a tester. (Part temperature : -10℃~40℃)

Normal	Abnormal
2.6kΩ~3.3kΩ	Open or short circuit

Part name	Checking method and criterion
Expansion valve (LEV)	Measure the resistance with a tester. (Part temperature : -10℃~40℃)

(CN724)	Normal	Abnormal
WHT-RED		
RED-ORN	39Ω~56Ω	Open or short circuit
YLW-BRN		
BRN-BLU		

Ⓟ:INNER PROTECTOR

A — How to check inverter/ compressor

Disconnect the connector between compressor and transistor module.

↓

Check the voltage between terminals. ·········· See Ⓑ 'Check of open phase' on page 47.

↓

Are voltages balanced? ── No ──→ Check the resistance of transistor module. ·········· See Ⓒ 'Check of transistor module' on page 47.

↓ Yes

Check the compressor. ········· See Ⓓ 'Check of compressor' on page 48.

Is resistance infinite? ── Yes ──→ Replace the outdoor electronic control P.C. board.

No (0~several Ω) ──→ Replace the transistor module.

B — Check of open phase

● Be sure to use the analog voltmeter for measurement.
● With the connector between compressor and transistor module disconnected, activate the inverter and measure the balance of voltage between terminals.

Model	Operation mode	Operational frequency [Hz]	Output voltage [V]
MSZ-G09SV- A1	COOL	79	190
	HEAT	58	155
MSZ-G12SV- A1	COOL	85	190
	HEAT	58	155
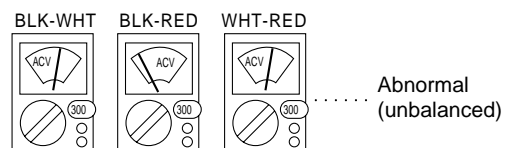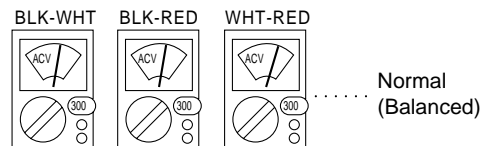
<< Operation method>>
  Start heating operation by pressing the EMERGENCY OPERATION switch on the indoor unit. (test-run mode)
<<Measurement point>>
  at 3 points
  BLK-WHT
  BLK-RED   ※ Measure AC voltage between
  WHT-RED   the lead wires at 3 points.
<<Judgment>>
  Balanced··································normal
  Unbalanced····························abnomal (open phase)
  Shutdown by overcurrent·······abnormal (short)
 NOTE 1. Measure AC voltage, at 3 points more than one minute after the
              outdoor fan motor starts running.
        2. The output voltage values in above table have tolerance within ±20%.

Voltmeter indication

BLK-WHT   BLK-RED   WHT-RED   ······ Normal (Balanced)

BLK-WHT   BLK-RED   WHT-RED   ······ Abnormal (unbalanced)

C — Check of transistor module

● Disconnect the connector between compressor and transistor module, and measure resistance between terminals on the transistor module.
<<Measurement point>>
  at 6 points
  BLK-WHT, WHT-BLK
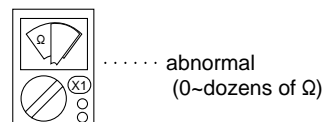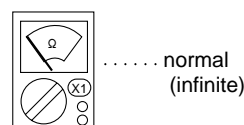 BLK-RED, RED-BLK   ※ Measure resistance between
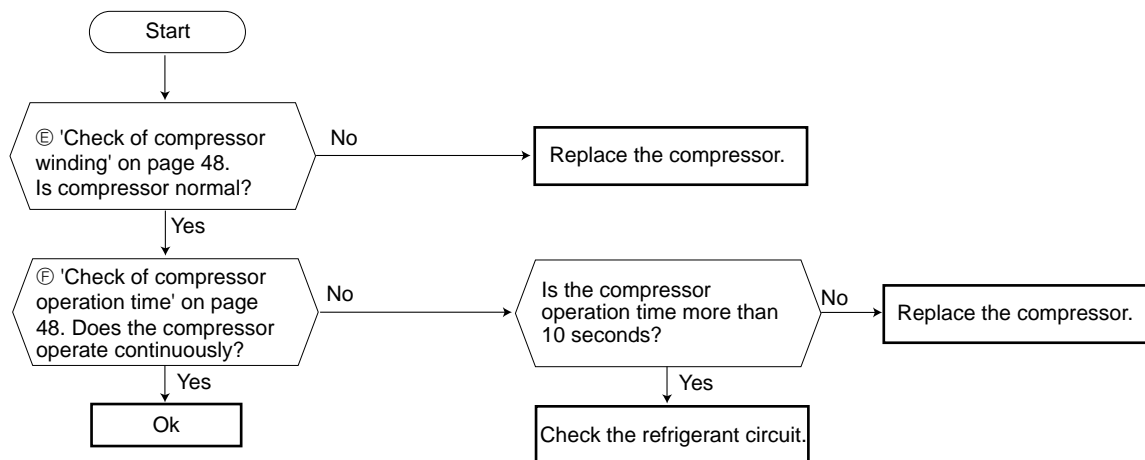 WHT-RED, RED-WHT   the lead wires at 3 points

<<Judgment>>
Infinite [Ω]···········normal
0~dozens of ······abnormal (short)

ohmmeter indication

Ω ······ normal (infinite)

Ω ······ abnormal (0~dozens of Ω)

D Check of compressor

Start

Ⓔ 'Check of compressor winding' on page 48. Is compressor normal? — **No** → Replace the compressor.

↓ **Yes**

Ⓕ 'Check of compressor operation time' on page 48. Does the compressor operate continuously? — **No** → Is the compressor operation time more than 10 seconds? — **No** → Replace the compressor.

↓ **Yes** (from Ⓕ) → Ok

↓ **Yes** (from operation time) → Check the refrigerant circuit.

E Check of compressor winding

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

<<Measurement point>>
 at 3 points
 BLK-WHT
 BLK-RED
 WHT-RED   ※ Measure resistance between the
<<Judgment>>   lead wires at 3 points.
 1.88 to 2.31Ω(MUZ-G09SV)/ 0.39 to 0.50Ω(MUZ-G12SV)at -10℃
 to 40℃ of part temperature
 0[Ω] ···············abnormal [short]
 Infinite[Ω] ·······abnormal [open]
 NOTE 1. Be sure to zero the ohmmeter before measurement.
       2. Winding resistance for each phase is 2.14Ω(MUZ-G09SV)/
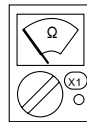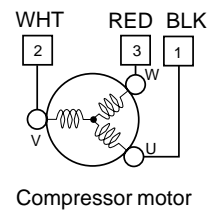   0.45Ω(MUZ-G12SV)at 20℃ .

Ohmmeter indication
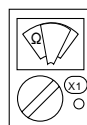
...... normal (1~several Ω)
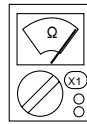
...... abnormal (0Ω ····· short)

...... abnormal (infinite····· open)

WHT   RED BLK
 2   3   1

Compressor motor

F Check of compressor operation time

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

<<Operation method>>
 Start heating or cooling operation by pressing the EMERGENCY OPERATION switch on the indoor unit. (Test-run mode)
<<Measurement>>
 Measure the time from the start of outdoor fan running till the stop of the inverter due to over current.
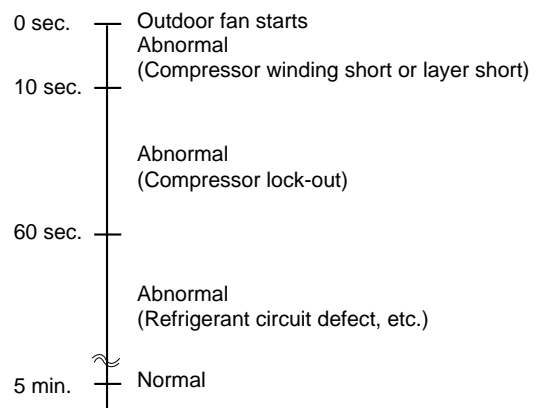<<Judgment>>
 For reference
 0~10 seconds····················abnormal (short)
 10~60 seconds··················abnormal (compressor lock-out)
 60 seconds~5 minutes·······abnormal (refrigerant circuit defect)
 more than 5 minutes···········normal

0 sec. — Outdoor fan starts
Abnormal (Compressor winding short or layer short)

10 sec. —

Abnormal (Compressor lock-out)

60 sec. —

Abnormal (Refrigerant circuit defect, etc.)

5 min. — Normal

(How to check main parts)

G Check of indoor fan motor.

Indoor fan does not operate.

Turn OFF the power supply and check the connector CN 211 visually. → Yes → Disconnect lead wires from CN 211 on indoor electronic control P.C. board. Measure resistance between lead wire ① and ③ and then ② and ③. → Is resistance 0Ω(short circuit) or ∞(open circuit)?

Yes(0 or ∞) → Replace the indoor fan motor.

No(othes) → Replace the indoor electronic control P.C. board.

CN211

Indoor electronic control P.C. board

| 3 |
| 2 |
| 1 |

Fan motor

H Check of remote controller and power monitor, receiver P.C. board.

Indoor unit operates by pressing the EMERGENCY OPERATION switch, but does not operate with the remote controller.
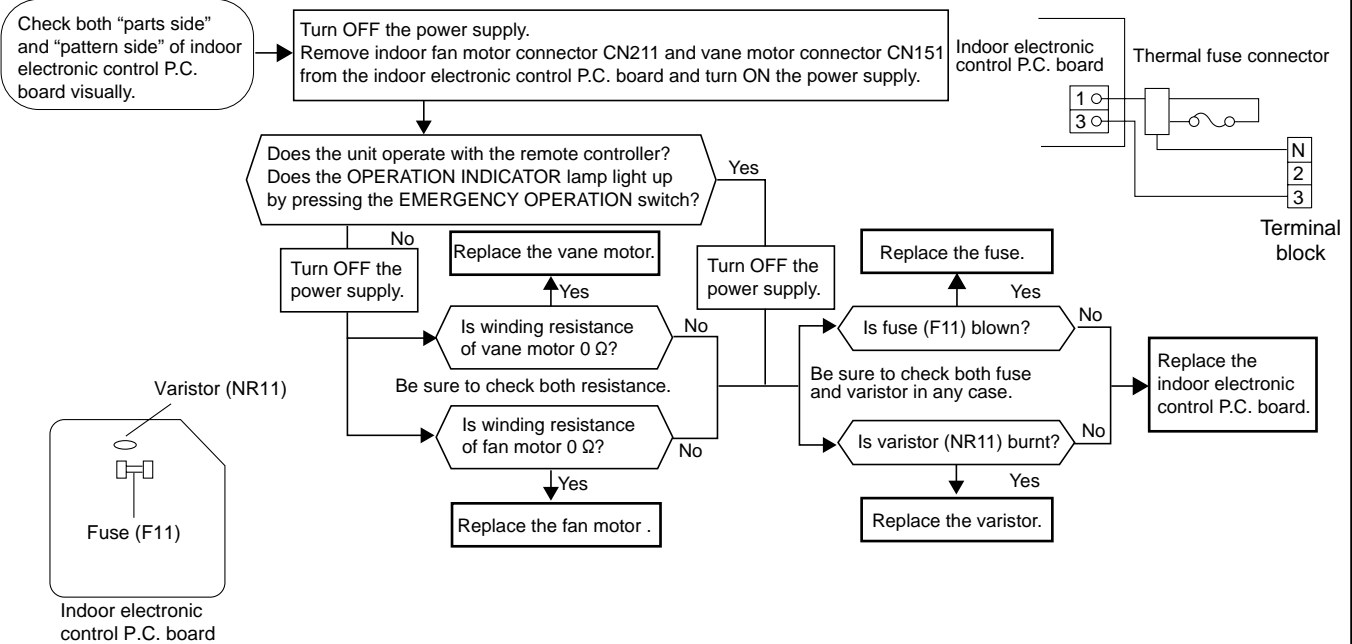※ Check if the remote controller is exclusive for this air conditioner.

Switch on the remote controller.

Is LED display on remote controller visible? → No (not clear) → Replace batteries and then press RESET button. See page 40.

Yes ↓

Remove batteries and set them back. Check again if indoor unit operates with remote controller.

↓

Does the unit operate with remote controller? → No → Tune a radio in to AM and press OPERATE/STOP (ON/OFF) button on remote controller. → Is noise heard from the radio? → Yes → Are there any fluorescent lights of inverter or radio start type within 1 meter? → No → Replace the indoor electronic control P.C. board with power monitor, receiver P.C. board.

Yes ↓ Ok

Is noise heard from the radio? → No → Replace the remote controller.

Are there any fluorescent lights... → Yes → ● Re-install the unit away from the lights. ● Attach a filter on receiving part.

Power monitor, receiver P.C. board

LD101T

Remote controller)))

1	1
2	2
3	3
4	4
5	5

Indoor electronic control P.C. board

49

I Check of indoor electronic control P.C. board

The unit does not operate with the remote controller.
The OPERATION INDICATOR lamp does not light up either, with the EMERGENCY OPERATION switch ON.

Check both "parts side" and "pattern side" of indoor electronic control P.C. board visually.

→ Turn OFF the power supply.
Remove indoor fan motor connector CN211 and vane motor connector CN151 from the indoor electronic control P.C. board and turn ON the power supply.

Indoor electronic control P.C. board

Thermal fuse connector

1 ○
3 ○

N
2
3

Terminal block

Does the unit operate with the remote controller?
Does the OPERATION INDICATOR lamp light up by pressing the EMERGENCY OPERATION switch?

Yes →

No ↓

Turn OFF the power supply.

Replace the vane motor.

↑ Yes

Is winding resistance of vane motor 0 Ω?   No →

Be sure to check both resistance.

Is winding resistance of fan motor 0 Ω?   No

↓ Yes

Replace the fan motor .

Turn OFF the power supply.

Is fuse (F11) blown?   Yes → Replace the fuse.   No →

Be sure to check both fuse and varistor in any case.

Is varistor (NR11) burnt?   No →

Replace the indoor electronic control P.C. board.

↓ Yes

Replace the varistor.

Varistor (NR11)

Fuse (F11)

Indoor electronic control P.C. board

J Check of outdoor thermistors

The thermistors in the outdoor unit are abnormal.

● Disconnect the connectors CN 641 and CN 642 from the outdoor electronic control P.C. board.
(Check the characteristics of each thermistor.)

(Defrost thermistor)
Measure resistance between CN 641 ① and ②.

(Discharge temperature thermistor)
Measure resistance between CN 641 ③ and ④.

(Fin temperature thermistor)
Measure resistance between CN 642 ① and ②.

→ As per the characteristics on page 55?   Yes →

↓ No

Replace the thermistor.

① Connect CN 641 and CN 642.
② Disconnect the connector between the compressor and transistor module.

⇩

Turn ON the power supply to indoor unit and press the EMERGENCY OPERATION switch.

→ Does the unit operate 10 minutes or more?   No → Replace the outdoor electronic control P.C. board.

↓ Yes

Is LED in the outdoor electronic control P.C. board flashing 5 minutes?   Yes →

↓ No

Reconnect the connector.

K Check of R.V. coil

Cooling operates when heating is expected.

- First, measure resistance of the R.V. coil to check if it is defective or not.
- If the connector CN 721 is not connected or the R.V. coil is open, the voltage occurs between the terminals even when the control is OFF.
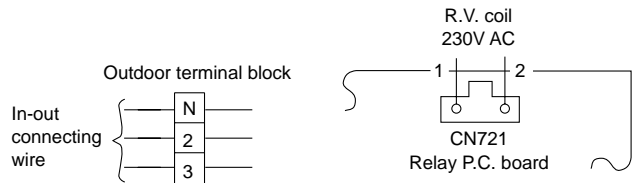
R.V. coil 230V AC

1 2

Outdoor terminal block

In-out connecting wire

N
2
3

CN721
Relay P.C. board

Disconnect the connector between the compressor and transistor module.
Turn ON the power supply to indoor unit, and press twice (heating) the EMERGENCY OPERATION switch.

→ 3 minutes after power ON, is there voltage of 230V AC between CN 721 ① and ② on the relay P.C. board?

No → Replace the relay P.C. board.

Yes ↓

Replace the R.V. coil.

L Check of outdoor fan motor

Outdoor fan motor does not work.

Disconnect the connector CN 771 on the relay P.C. board.
Disconnect the connector between compressor and transistor module.
Turn ON the power supply to indoor unit and press the EMERGENCY OPERATION switch.

↓

3 minutes after power ON, is there voltage of 230V AC between outdoor terminal block ② and Ⓝ?

No → Press the EMERGENCY OPERATION switch again. Does the 52C work?

Yes → Repair in-out connecting wire.

No → Replace the indoor electronic control P.C. board.

Yes ↓

Is there voltage of approx. 230V AC either between ① and ③ or between ③ and ⑤ at CN 771?

No → Replace the relay P.C. board.

Yes ↓

Replace the outdoor fan motor.

Fan motor

Outdoor terminal block

In-out connecting wire

N
2
3

1 2 3
4 5 6

CN771
Relay P.C. board
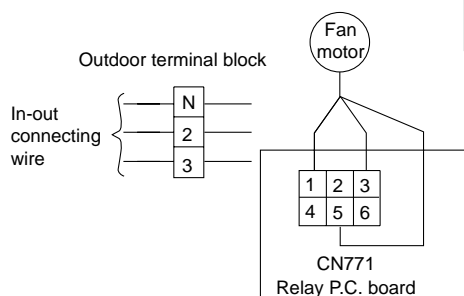
(How to check power supply and others)

M Check of power supply.

Inverter does not work.

Disconnect the connector between compressor and transistor module.
Turn ON power supply to indoor unit and press EMERGENCY OPERATION switch.

Outdoor terminal block

In-out connecting wire

| N |
| 2 |
| 3 |

3 minutes after power ON, is there voltage of approx. 230V AC between outdoor terminal block ② and Ⓝ?

No →

Press the EMERGENCY OPERATION switch again.
Does the 52C work?

Yes → Repair wiring.

No → Replace the indoor electronic control P.C. board.

Yes ↓

Is there voltage of approx. 340V DC between TAB 64(-) and TAB 63(+)?

Yes → Dose LED light up or flash?

No → Replace the outdoor electronic control P.C. board.

Yes ↓ Ok

No ↓

Check the electric parts in main circuit.

N Check of thermal fuse

Turn OFF the power supply.

Is resistance ∞ between the connector CN 201 ① on indoor electronic control P.C. board and the terminal block Ⓝ?

Yes → Replace the thermal fuse (F12).

No ↓

Ok

Indoor electronic control P.C. board — CN201
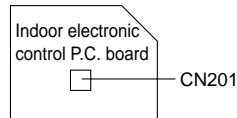
O Check of rush current limiting circuit

Outdoor unit does not operate at all or stops immediately due to over current.

NOTE : When the current limiting resistor is open, the rush current limiting relay may not be working properly. Therefore confirm the limiting resistor works properly after replacing it.

Start → Does current limiting resistor (R64) detect 10Ω?

No ∞ → Replace the current limiting resistor (R64).

Yes ↓

Ok
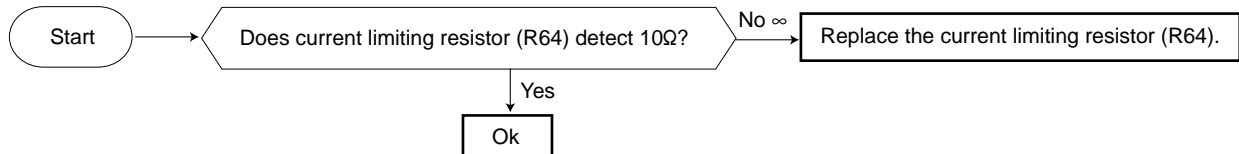
P Check of linear expansion valve (LEV)

Heating/ Cooling do not operate.

①Press the EMERGENCY OPERATION switch.
②Turn OFF the power supply.
③Turn ON the power supply.

↓

With remote controller set toward the indoor unit,
press OPERATE/ STOP(ON/ OFF)
button and confirm one beep tone.

↓

LEV operates in full-opening
direction.

↓

Do you hear LEV "click,
click·······"?
Do you touch LEV and
feel it vibrate? — Yes → Ok

No ↓

Is LEV coil properly fixed to
the body? — No → Properly fix LEV coil to
the body.

Yes ↓

Is LEV coil resistance as per
characterictics below? — Yes → Replace the outdoor
electronic control P.C.
board. → Confirm again that LEV
is operating.

No ↓   ↓

Replace the
LEV coil.   Do you hear LEV
                                                      "click, click·········"? — Yes → Ok

Characteristics of LEV coil   No ↓

LEV (CN 724)	Resistance
WHT–RED	
RED–ORN	39Ω~56Ω
YLW–BRN	
BRN–BLU	

Replace the LEV.

53

TEST POINT DIAGRAM AND VOLTAGE
MSZ-G09SV -E1
MSZ-G12SV -E1
Indoor electronic control P.C. board

Varistor (NR11)

Fuse (F11) 250V AC 3.15A

Fan motor power supply

Power supply input 220-240V AC

12V DC

Room temperature thermistor (RT11)

Timer short mode point (JPG, JPS) (Refer to page 44.)

Indoor coil thermistor (RT12)

Indoor coil thermistor (RT13)

Emergency operation switch

5V DC

4V DC
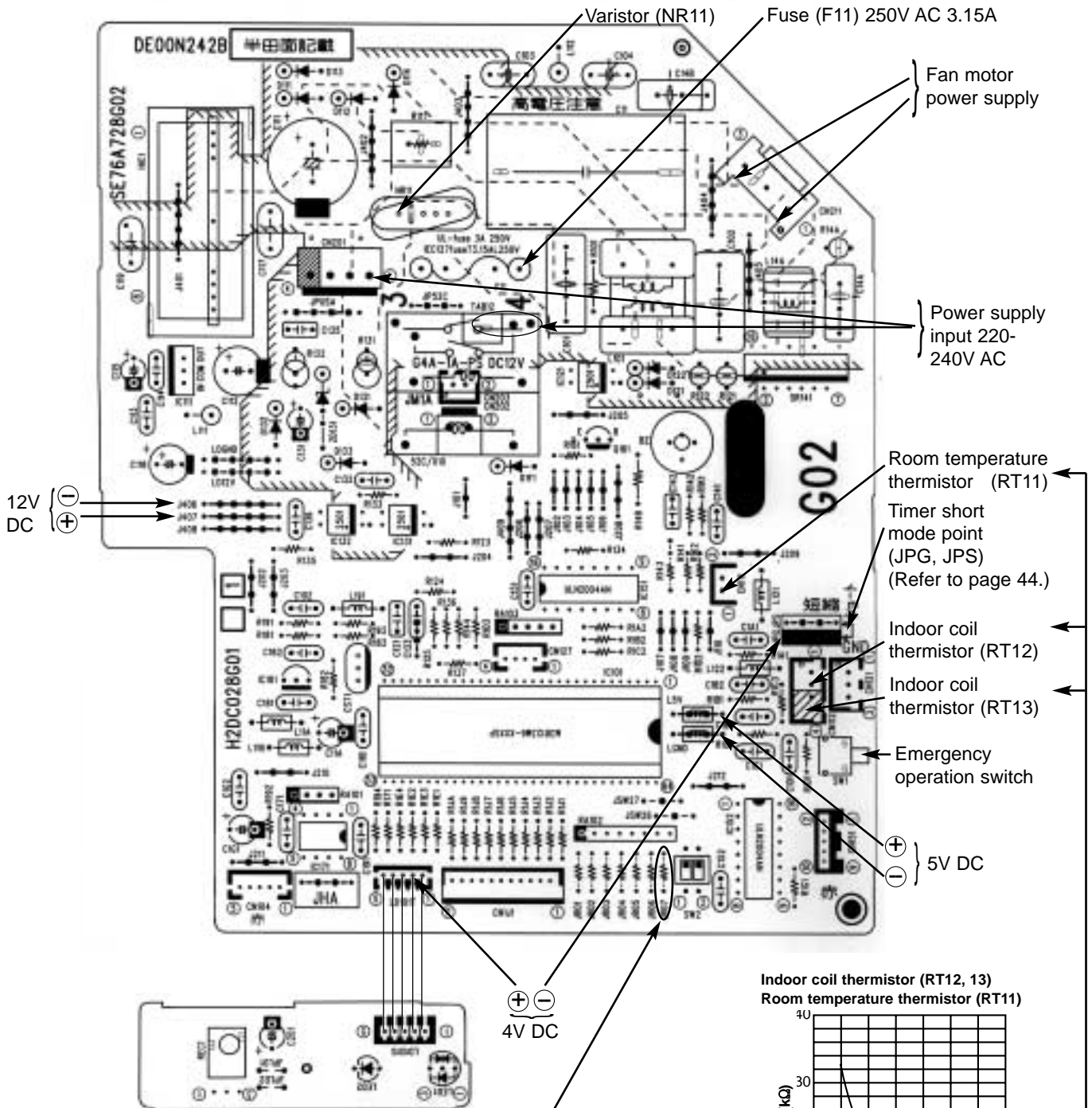
How to set "Auto restart function"
Cut the Resistor JR07. (Refer page 39.)

Indoor coil thermistor (RT12, 13)
Room temperature thermistor (RT11)

Resistance (kΩ)

Temperature (℃)
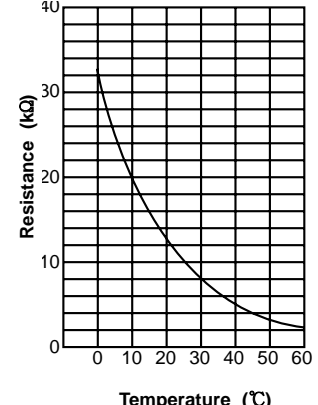
MUZ-G09SV - E1
MUZ-G12SV - E1
Outdoor electronic control P.C. board

Fin temperature thermistor(RT64)

Resistance(kΩ) vs Temperature(℃)

200
180
160
140
120
100
80
60
40
20
0

0 10 20 30 40 50 60 70 80

Defrost thermistor(RT61)

Resistance(kΩ) vs Temperature(℃)

100
90
80
70
60
50
40
30
20
10
0

-20 -10 0 10 20 30 40

Discharge temperature thermistor(RT62)

Resistance(kΩ) vs Temperature(℃)

700
600
500
400
300
200
100
0

0 10 20 30 40 50 60 70 80 90 100 110 120

Fin temperature thermistor (RT64)

Defrost thermistor (RT61)

Discharge temperature thermistor (RT62)

LEV connector (CN724)

LED monitor lamp

Connector for indoor/outdoor communication (CN601)

325V DC

SE00A778

BLK   WHT RED
Transistor module measurement point

Jumper wire for change in defrost setting (JS)
(Refer to page 38.)

55

MUZ-G09SV - E1
Noise filter P.C. board

Current -limit-
ing relay
(X64)

Surge absorber
(DSA61)

Varistor (NR61)

230V AC
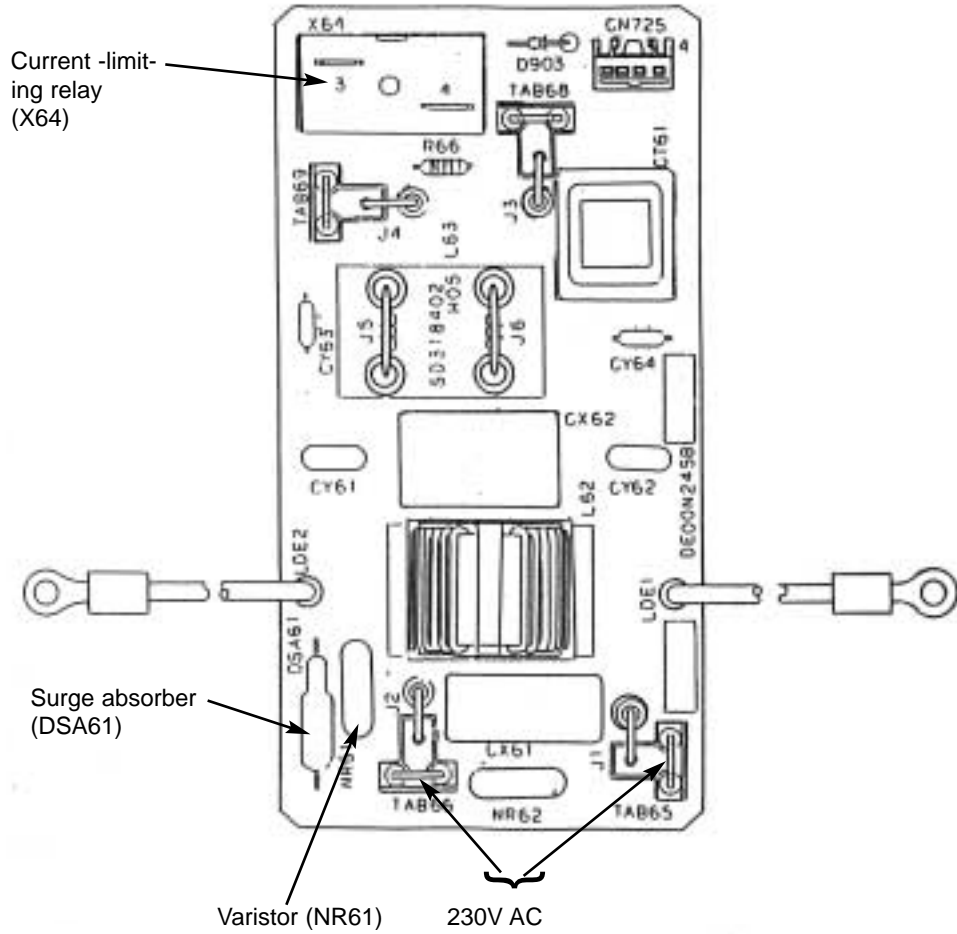
MUZ-G12SV - E1
Noise filter P.C. board

Current -limit-
ing relay (X64)

Surge absorber
(DSA61)

Varistor (NR61)

230V AC
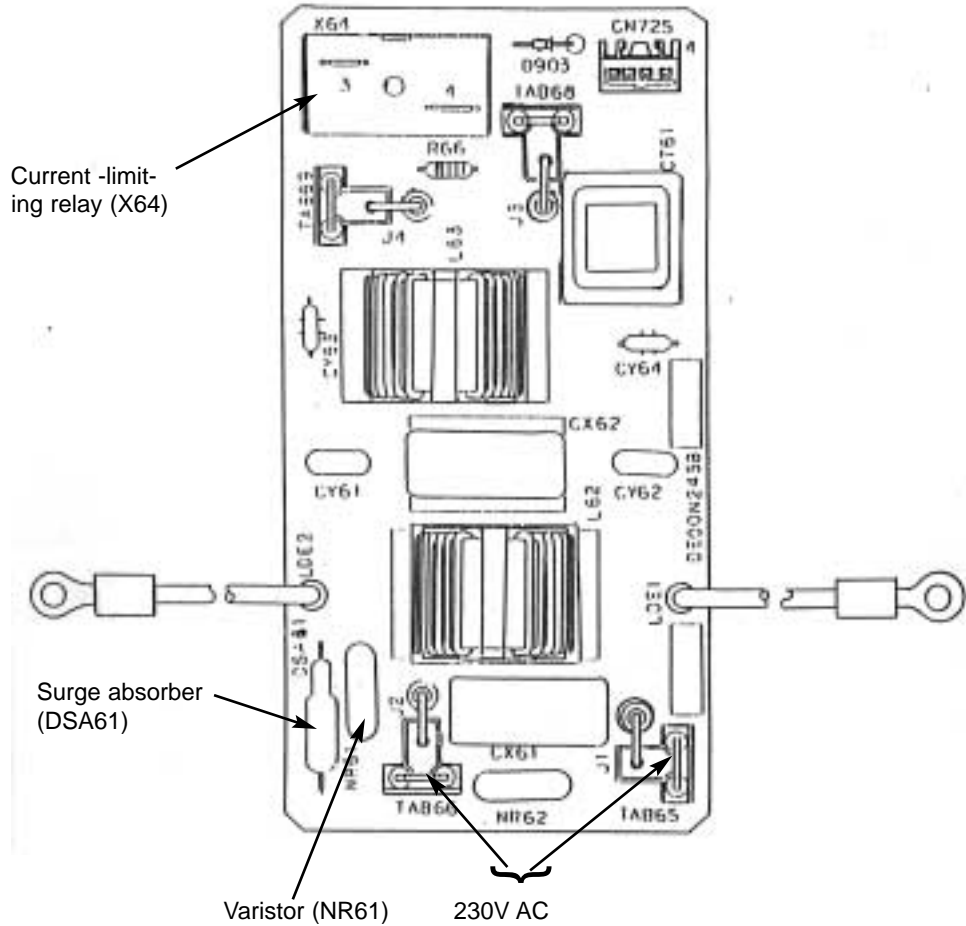
MUZ-G09SV -E1
MUZ-G12SV -E1
Relay P.C. board

R.V. coil(21S4)
230V AC

Outdoor fan motor (MF61)
230V AC
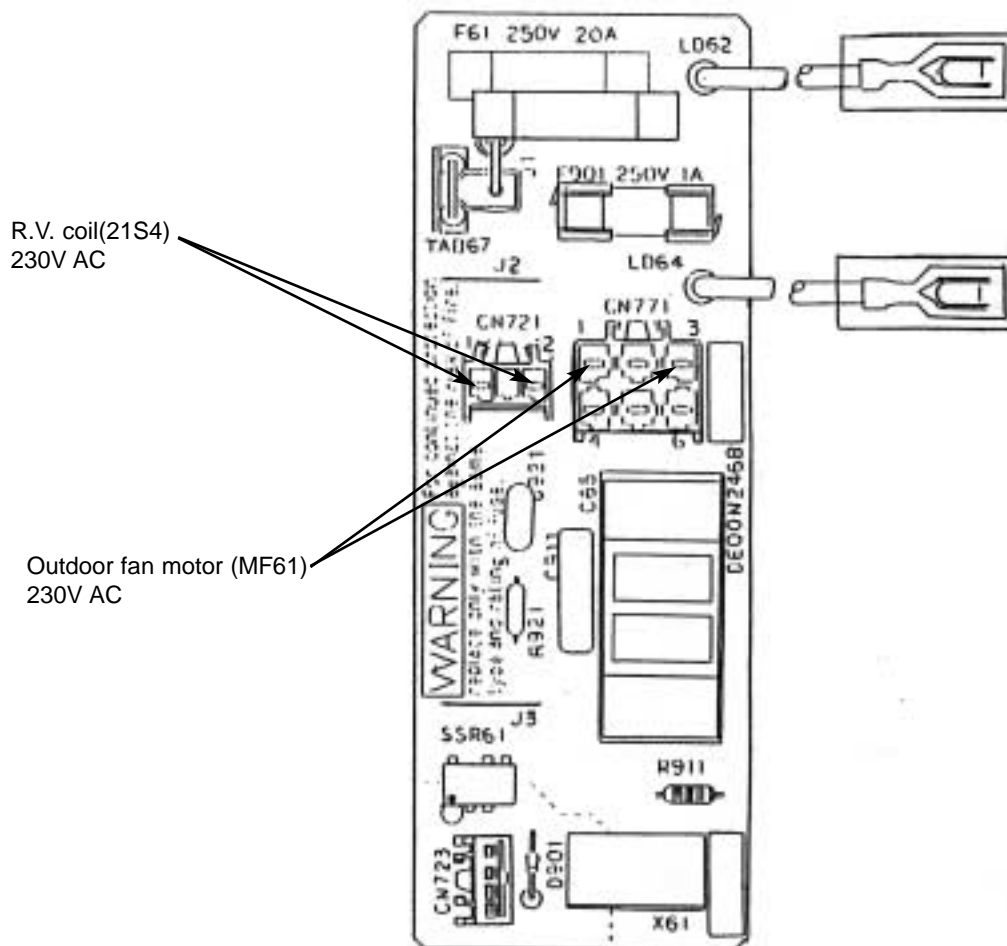
<"Terminal with lock mechanism" Detaching points>

In case of terminal with lock mechanism, detach the terminal as shown below.
There are two types (Refer to (1) and (2)) of the terminal with lock mechanism.
The terminal with no lock mechanism can be removed by pulling it out.
Check the shape of the terminal and work.

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

Sleeve

Locking lever

①Slide the sleeve.
②Pull the terminal while pushing the locking lever.
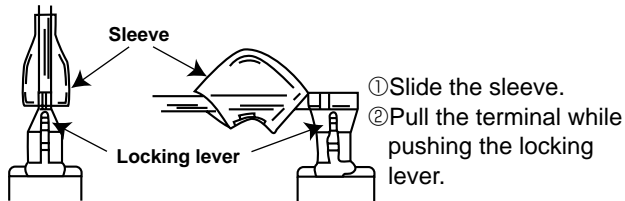
(2) The terminal with this connector is a terminal with lock mechanism

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

Connector

11-1. MSZ-G09SV -E1 MSZ-G12SV -E1
INDOOR UNIT

OPERATING PROCEDURE	PHOTOS

1. Removing the front panel
  (1) Remove the screw caps of the front panel.
     Remove the screws.
  (2) Pull the panel down to your side slightly and unhook the catches at the top.
	Photo 1
	
	Front panel
	
	Screws

2. Removing the electronic control P.C. board and the display P.C. board
  (1) Remove the front panel. (Refer to 1)
  (2) Remove the screw of the electrical cover.
     Remove the electrical cover.
  (3) Remove the V.A. clamp.
  (4) Remove the cord clamp.
  (5) Remove the screw of the terminal block.
  (6) Remove the screw of the ground wire.
  (7) Disconnect all the connectors and all the lead wires on the electronic control P.C. board.
  (8) Remove the R.L holder.
  (9) Remove the electronic control P.C. board and the display P.C. board.
	Photo 2
	
	Screw of the ground wire
	Fan motor connector
	V.A. clamp
	Room temperature thermistor connector
	Indoor electronic control P.C. board
	Vane motor connector
	Cord clamp
	Screw of the V.A. clamp
	R.L holder

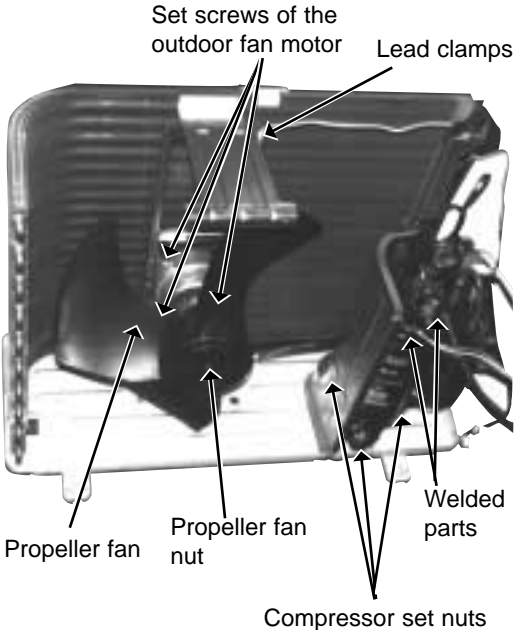| OPERATING PROCEDURE	PHOTOS
3. Removing the electrical box 　(1) Remove the front panel. (Refer to 1) 　(2) Remove the electrical cover. (Refer to 2) 　(3) Disconnect the connector of the indoor coil thermistor. 　(4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board. 　(5) Remove the screw of ground wire. 　(6) Remove the fan motor lead wire and indoor coil thermistor from the electrical box. 　(7) Remove the lead wire of vane motor from the bottom of electrical box. 　(8) Remove the screw fixing the electrical box, remove the electrical box.	**Photo 3**　Screw of the ground wire Screw of the electrical box
4. Removing the vane motor 　(1) Remove the front panel. 　(2) Remove the screws of the vane motor, disconnect the vane motor connectors from the electronic control P.C. board. 　(3) Disconnect the R.L. holder. 　(4) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly. 　(5) Remove the vane motors. 　**Photo 5** Screws of the vane motor	**Photo 4** Vane motors　　　Drain hose
5. Removing the line flow fan and the indoor fan motor 　(1) Remove the front panel. (Refer to 1) 　(2) Remove the electrical box. (Refer to 3) 　(3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly. 　(4) Remove the hexagon socket set screw from the line flow fan. 　(5) Remove the screws fixing the fan motor, remove the fan motor. 　(6) Remove the screws fixing the left side of the heat exchanger. 　(7) Lifting the left side of the heat exchanger. 　(8) Remove the line flow fan. 　**Photo 6** Screws fixing the left side of the heat exchanger	**Photo 7** Indoor coil thermistor screws of the fan motor
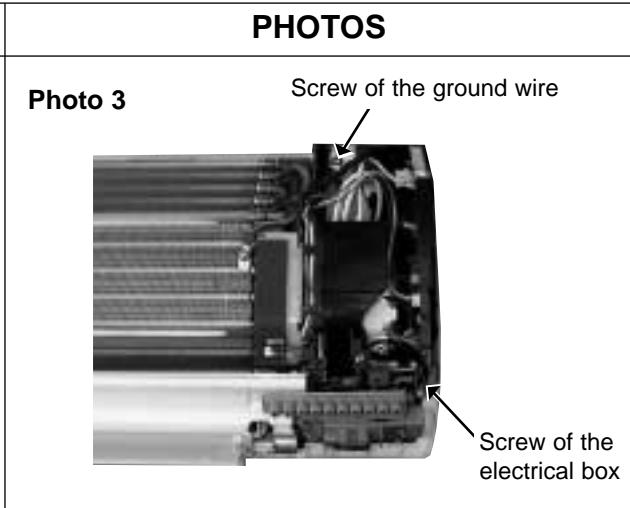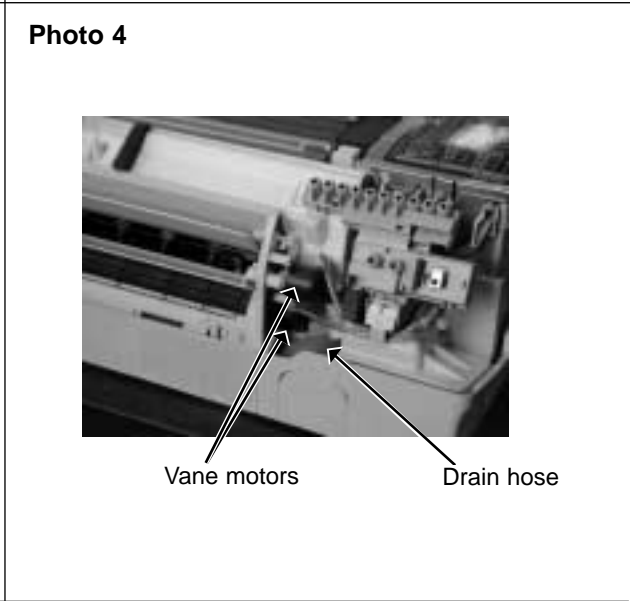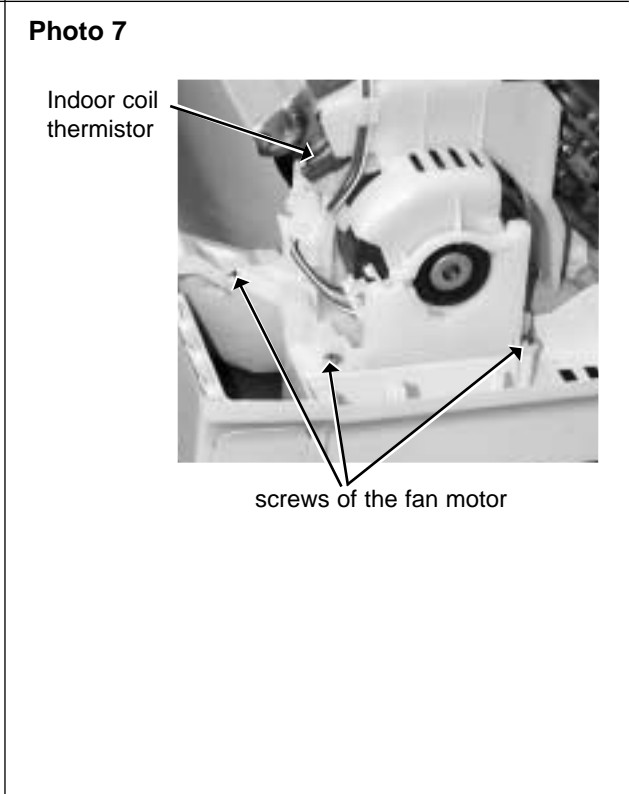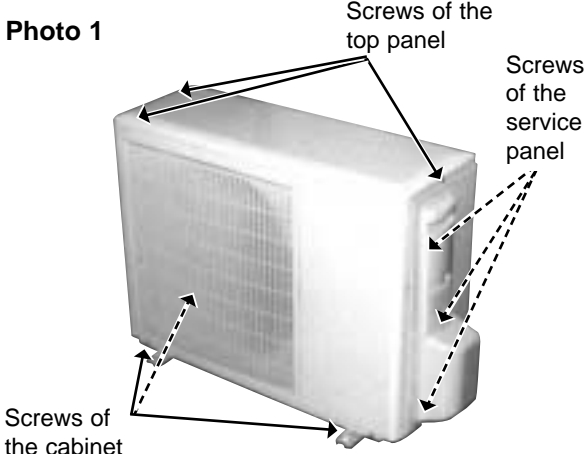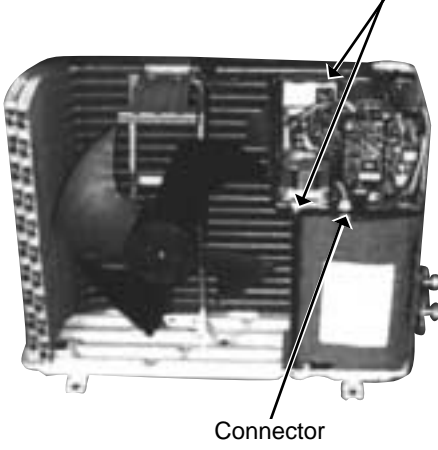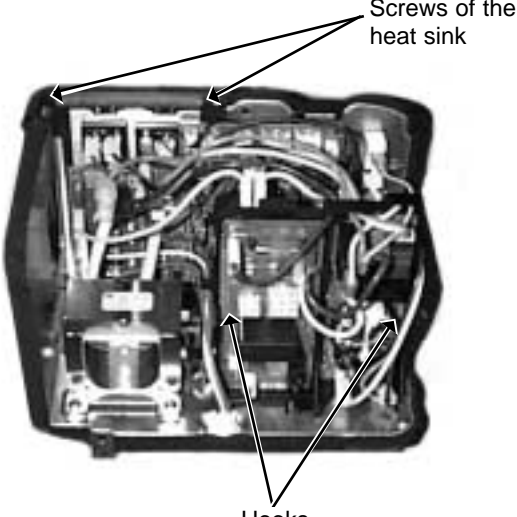
11-2. MUZ-G09SV -E1 MUZ-G12SV -E1
OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws fixing the service panel. (2) Pull down the service panel and remove it from the cabinet. (3) Remove the screws fixing the cabinet and top panel. **Photo 2** Top panel Screws of the service panel Cabinet Hooks	**Photo 1** Screws of the top panel Screws of the service panel Screws of the cabinet
2. Removing the inverter assembly (1) Remove the service panel, top panel and the cabinet. (Refer to 1) (2) Disconnect the connectors (CN641, CN642, CN601 and CN724) on the electronic control P.C. board. (3) Remove the connectors (CN771 and CN721) on the relay P.C. board. (4) Remove the screws fixing the inverter assembly. (5) Remove the compressor connector. (6) Remove the inverter assembly. **3. Removing the noise filter P.C. board** (1) Remove the service panel, top panel and the cabinet. (Refer to 1) (2) Remove all the connectors and the terminals on the noise filter P.C. board. (3) Remove the screw of ground wire on the relay panel. (4) Remove the hook of T.B. support. Then, remove the noise filter P.C. board.	**Photo 3** Screws of the inverter assembly Connector
4. Removing the relay P.C. board (1) Remove the service panel, top panel and the cabinet. (Refer to 1) (2) Remove all the connectors and the terminals on the relay P.C. board. (3) Remove the hook of T.B. support. Then, remove the relay P.C. board. **5. Removing the electronic control P.C. board** (1) Remove the service panel, top panel and the cabinet. (Refer to 1) (2) Remove the inverter assembly. (3) Remove the terminal of diode stack. (4) Remove all the connectors and the terminals on the electronic control P.C. board. (5) Remove the screws fixing the P.B. support. (6) Pull up the heat sink and remove the electronic control P.C. board from the relay panel. (7) Remove the screws fixing the heat sink and the transistor module. (8) Remove the electronic control P.C. board from the heat sink.	**Photo 4** Screws of the heat sink Hooks

| OPERATING PROCEDURE	PHOTOS

6. Removing the outdoor fan motor
  (1) Remove the service panel, top panel and the cabinet.
     (Refer to 1)
  (2) Disconnect the connector remove the clamp of fan motor
     lead wire.
  (3) Remove the propeller fan nut and remove the propeller fan.
  (4) Remove screws fixing the outdoor fan motor.
	Photo 5
	
	Set screws of the outdoor fan motor Lead clamps
	
	Propeller fan Propeller fan nut Welded parts
	
	Compressor set nuts

7. Removing the compressor
  (1) Remove the service panel, top panel and the cabinet.
     (Refer to 1)
  (2) Remove the soundproof felt.
  (3) Remove the terminal cover on the compressor.
  (4) Remove the electrical assembly. (Refer to 2)
  (5) Release gas from the refrigerant circuit.
  (6) Disconnect the welded part of the discharge pipe.
  (7) Disconnect the welded part of the suction pipe.
  (8) Remove nuts fixing the compressor.
  (9) Remove the compressor.	

12 PARTS LIST

MSZ-G09SV - E1 (WH)
MSZ-G12SV - E1 (WH)

12-1. INDOOR UNIT STRUCTURAL PARTS

12-2. INDOOR UNIT HEAT EXCHANGER

4 (※)
10
1
6
SCREW CAP
7
CATCH
2
8
3 (※)
5
9
11
12

13 (※)
15
14
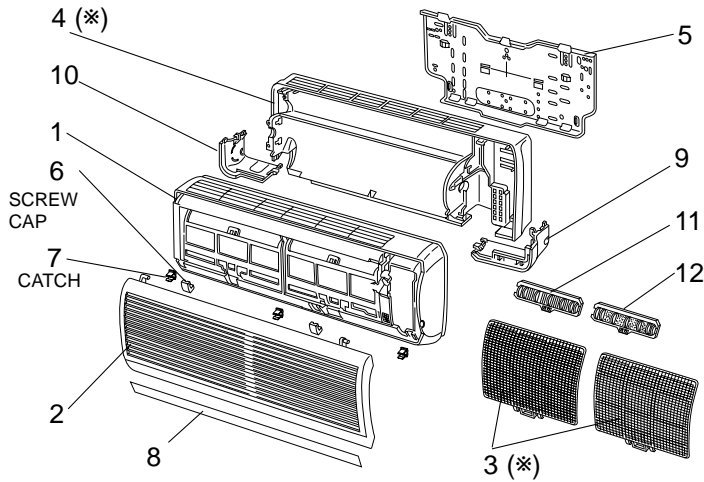
(※) These figures show about MSZ-G12SV.

12-1. INDOOR UNIT STRUCTURAL PARTS

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit MSZ-G09SV- E1 (WH)	Q'ty/unit MSZ-G12SV- E1 (WH)	Remarks
1	E02 424 000	FRONT PANEL (WH)		1	1	
2	E02 424 010	GRILLE (WH)		1	1	
3	E02 408 100	AIR FILTER		2		
	E02 410 100	AIR FILTER			2	
4	E02 409 234	BOX (WH)		1		
	E02 411 234	BOX (WH)			1	
5	E02 408 970	INSTALLATION PLATE		1	1	
6	E02 409 067	SCREW CAP (WH)		2	2	2PCS/SET
7	E02 408 142	CATCH		3	3	3PCS/SET
8	E02 424 020	DECORATION COVER (WH)		1	1	
9	E02 409 975	CORNER BOX RIGHT (WH)		1	1	
10	E02 409 976	CORNER BOX LEFT (WH)		1	1	
11	—	AIR CLEANING FILTER		1	1	See page 66. (MAC-1300FT)
12	—	DEODORIZING FILTER		1	1	See page 66. (MAC-1800DF)

12-2. INDOOR UNIT HEAT EXCHANGER

13	E02 518 620	INDOOR HEAT EXCHANGER		1		
	E02 448 620	INDOOR HEAT EXCHANGER			1	
14	E02 151 667	UNION (LIQUID)		1	1	ϕ6.35
15	E02 151 666	UNION (GAS)		1		ϕ9.52
	E02 155 666	UNION (GAS)			1	ϕ12.7

MSZ-G09SV - E1 (WH)
MSZ-G12SV - E1 (WH)

12-3. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS
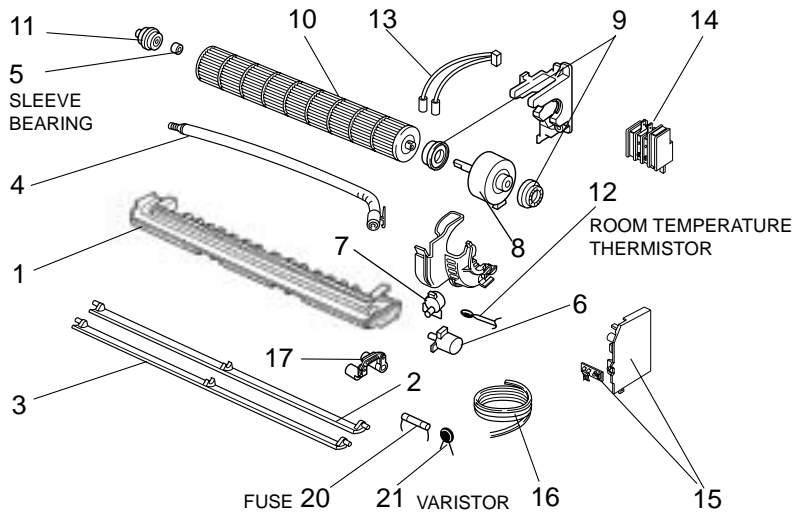
12-4. ACCESSORY AND REMOTE CONTROLLER PART
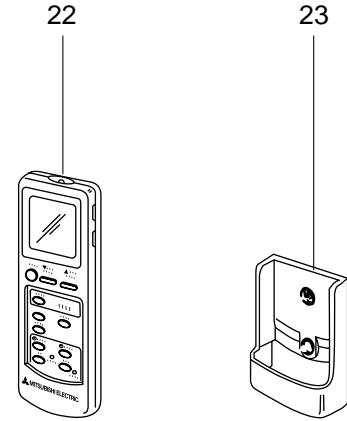
12-3. INDOOR UNIT FUNCTIONAL PARTS AND ELECTRICAL PARTS

Part numbers that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	MSZ-G09SV- E1 (WH)	MSZ-G12SV- E1 (WH)	Remarks
1	E02 448 235	NOZZLE (WH)		1	1	
2	E02 409 040	VANE UPPER (WH)		1	1	
3	E02 409 041	VANE LOWER (WH)		1	1	
4	E02 408 702	DRAIN HOSE		1	1	
5	E02 001 504	SLEEVE BEARING		1	1	
6	E02 408 303	VANE MOTOR (HORIZONTAL)	MV1	1	1	UP & DOWN
7	E02 448 303	VANE MOTOR (VERTICAL)	MV2	1	1	RIGHT & LEFT
8	E02 151 300	INDOOR FAN MOTOR	MF	1	1	RC4V19 -☐☐
9	E02 151 505	FAN MOTOR RUBBER MOUNT		2	2	2PES/SET
10	E02 408 302	LINE FLOW FAN		1	1	
11	E02 408 509	BEARING MOUNT		1	1	
12	E02 408 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	
13	E02 448 307	INDOOR COIL THERMISTOR	RT12, 13	1	1	
14	E02 448 375	TERMINAL BLOCK	TB	1	1	3P
15	E02 518 452	ELECTRONIC CONTROL P.C. BOARD		1		AUTO RESTART
15	E02 519 452	ELECTRONIC CONTROL P.C. BOARD			1	AUTO RESTART
16	E02 424 395	POWER SUPPLY CORD		1	1	
17	E02 408 034	VANE CLANK SET		1	1	UP & DOWN
⑱	E02 448 034	VANE MOTOR SUPPORT SET		1	1	RIGHT & LEFT
⑲	E02 408 381	THERMAL FUSE	F12	1	1	93℃
20	E02 127 382	FUSE	F11	1	1	3.15A
21	E02 336 385	VARISTOR	NR11	1	1	

12-4. ACCESSORY AND REMOTE CONTROLLER PART

22	E02 448 426	REMOTE CONTROLLER		1	1	
23	E02 141 083	REMOTE CONTROLLER HOLDER		1	1	

13 OPTIONAL PARTS

13-1. AIR CLEANING FILTER

● AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
● Normal life of AIR CLEANING FILTER is 4 months. However, when it becomes dirty, replace it as soon as possible.
● Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
● DO NOT reuse AIR CLEANING FILTER even if it is washed.
● DO NOT remove or attach AIR CLEANING FILTER during unit operation.

| Model	Part No.
MSZ-G09SV - E1 **MSZ-G12SV -** E1	MAC-1300FT
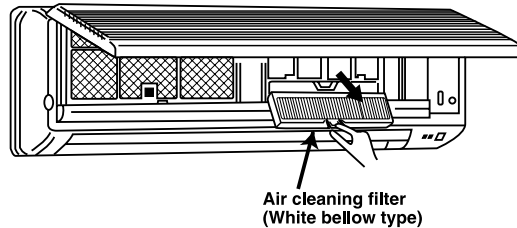
Air cleaning filter
(White bellow type)

13-2. DEODORIZING FILTER

● DEODORIZING FILTER removes ammonia and hydrogen sulfide emitted from tobacco, and odor of pets.
● Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
● For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
● When the filter color is still dark even after cleaning, replace the filter with a new one.
  Replace the filter at least once a year.

Model	Part No.
MSZ-G09SV - E1 **MSZ-G12SV -** E1	MAC-1800DF
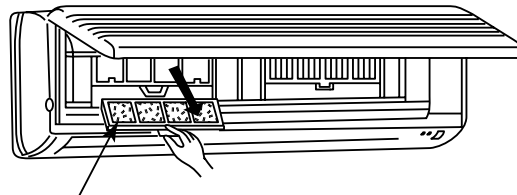
Deodorizing filter (Gray sponge type)

● DEODORIZING FILTER and AIR CLEANING FILTER can be attached on either side.

MITSUBISHI ELECTRIC CORPORATION