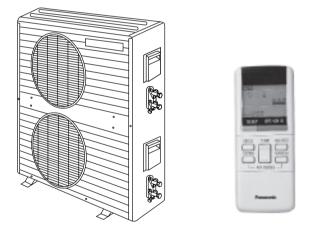
# Service Manual

Multi-Split Air Conditioners

CS-MA90KE / CU-MA180KE CS-MA120KE / CU-MA240KE CS-MA70KE / CU-MA190KE CS-MA120KE





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**Panasonic** 

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#### **△ WARNING**

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

#### ⚠ PRECAUTION OF LOW TEMPERATURE

In order to avoid frostbite, be assured of no refrigerant leakage during the installation or repairing of refrigeration circuit.

### **Features**

- High Efficiency
- Compact Design
- Comfort Improvement
  - Wider range of horizontal discharge air
  - Longer hours of sleep mode operation
- Auto Restart
  - Auto restart operation after power failure
- Removable and Washable Front Panel

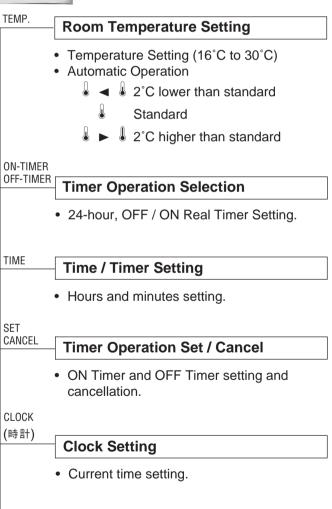
- Installation Work Improvement
  - Long piping up to 15 m
- Quality Improvement
  - Low voltage protection
  - Gas leakage protection
  - Prevent compressor reverse cycle
  - 2-stage OLP to protect compressor (CS-MA90KE / CS-MA120KE)
- Service Improvement
  - Easy fan motor replacement procedure

### **Functions**

#### **Remote Control**



#### OFF / ON ① **Operation OFF / ON** MODE **Operation Mode Selection** AUTO **Automatic Operation Mode Heating Operation Mode** HEAT Cooling Operation Mode COOL Soft Dry Operation Mode DRY FAN SPEED **Indoor Fan Speed Selection ₹** Low Speed ♣ ♣ Medium Speed **₹** High Speed Automatic Fan Speed AUTOFAN SWING / MANUAL **Airflow Direction Control Automatic Airflow Direction** SWING Control Airflow Direction Manual Control MANUAL



Sleep Mode Operation OFF / ON

SLEEP

### **Functions**

#### **Indoor Unit**



POWER ①

#### Power Switch OFF / ON

AUTO OFF / ON

#### **Auto Operation Switch**

Used when the remote control cannot be used.

# Remote Control Signal Receiving Sound Control

 It can be controlled by pressing Auto Operation Switch for 10 seconds.

TEST RUN OFF / ON

# Operation Test Running / Pump Down Switch

• Used when test running or servicing.

#### **Operation Indication Lamps (LED)**

POWER (Red)..... Lights up in operation,

blinks in Automatic Operation Mode judging and Hot Start operation

• SLEEP (Orange)..... Lights up in Sleep

Mode Operation

• TIMER (Orange)..... Lights up in Timer

Setting

#### **Operation Mode**

 Heating, Cooling, Soft Dry and Automatic Mode.

#### **Time Delay Safety Control**

Restarting is inhibited for appro. 3 or 4 minutes.

#### 7 Minutes Time Save Control

· Cooling Operation only.

#### **Auto Restart Control**

 Operation is restarted after power failure at previous setting mode.

#### **Anti-Freezing Control**

 Anti-Freezing control for indoor heat exchanger. (Cooling and Soft Dry)

#### **Hot-Start Control**

- The indoor fan stops until the indoor heat exchanger temperature over 30°C.
- The indoor fan operates at SLo and Lowhen indoor heat exchanger temperature reaches 30°C ~ 41°C.
- Hot Start is completed when indoor heat exchanger reaches 41°C.

#### **Sleep Mode Auto Control**

 The operation starts at SLo speed and stops after 8 hours.

#### **Indoor Fan Speed Control**

- · High, Medium and Low.
- Automatic Fan Speed Mode

Heating: Fan speed varies from Me
 → SLo in accordance with

indoor heat exchanger.

 Cooling: Fan rotates at Hi and Me speed. Deodorizing control is

available.

Soft Dry: Fan rotates at SLo speed.
 Deodorizing control is

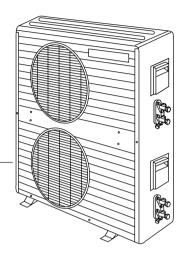
available.

#### **Airflow Direction Control**

- Automatic air swing and manual adjusted by remote control for vertical airflow.
- Manually adjusted by hand for horizontal airflow.

### **Functions**

#### **Outdoor Unit**



#### Compressor Reverse Rotation Protection Control

 To protect compressor from reverse rotation when there is a instantaneous power failure.

#### **Overload Protector**

- CS-MA90KE and CS-MA120KE
   2-stage OLP to protect the compressor.
   Overload Protector will trip when
  - Temperature of compressor increases to 120°C.
  - High temperature or high current flow to compressor.

(Refer circuit diagram for OLP characteristic)

- CS-MA70KE
  - OLP to protect the compressor.
  - OLP characteristic can be referred to circuit diagram.

#### **60 Secs. Forced Operation Control**

 Once the compressor is activated, it does not stop for 60 secs. (Stops immediate with remote control stop signal.)

#### **Deice Control**

- To prevent frosting at outdoor heat exchanger. (Only for Heating Operation)
- Outdoor indoor heat exchanger is sensed by TRS (Thermal Reed Switch).

#### **Overload Protection Control**

- Outdoor fan stops when indoor heat exchanger temperature rises to 51°C and restarts when the indoor heat exchanger temperature drops to 49°C.
- Compressor stops when indoor heat exchanger temperature reaches 65°C or above.

(Heating Operation only)

#### **Compressor Protection Control**

 If the outdoor fan motor is not running after compressor starts for 50 secs., compressor will stop. (Cooling and Soft Dry Operation only).

#### **4-Way Valve Control**

 When the unit is switched to "OFF" during Heating Operation, 4-way valve stays at Heating position for 5 minutes.

#### **Outdoor Fan Operation Control**

• Inner protector.

			Unit	CS-MA70KE, CS-MA120KE	CU-MA190KE
Cooling Capa	city		kW		, 3.50 - 3.45
- Cooming Capa			Btu/h		11,900 - 11,800
Heating Capa	city		kW Btu/h		, 4.10 - 4.00 14,000 - 13,600
			₽/h		, 2.0
Moisture Rem	noval		Pint/h		, 4.2
Power Source	2		Phase		ngle
1 ower oource	,		V		- 220
			Cycle OUTLET	SIDE VIEW	TOP VIEW
Airflow Metho	d		OUTLET	SIDE VIEW	1 OF VIEW
			= <del></del>		Z P
			INTAKE	<b>→</b>	<b></b>
			<b>~</b>		'U
Air Volume	Indoor Air	(Lo)	m³/min (cfm)	Cooling; 5.5 (190), 7.5 (260) Heating; 5.5 (190), 7.8 (280)	-
	Indoor Air	(Me)	m³/min (cfm)	Cooling; 6.0 (210), 8.4 (300) Heating; 6.0 (210), 8.7 (310)	-
	Indoor Air	(Hi)	m³/min (cfm)	Cooling; 6.7 (240), 9.3 (330) Heating; 6.7 (240), 9.7 (340)	-
	Outdoor A	ir	m³/min (cfm)	-	22.4 (790), 22.0 (780)
Noise Level	Noise Level		dB (A)	Cooling; High 36-35, 42-41, Low 30-29, 38-37 Heating; High 36-35, 43-42,	Cooling; High 47-45, 49-48 (51-50) Heating; High 49-47, 49-48 (52-51)
	1			Low 30-29, 38-37	00, 1,250 - 1,220
Electrical	Input		W	9 1	00, 1,280 - 1,230
Data	Running Current		А	Cooling; 3.2	- 3.0, 5.6 - 5.7
Training Garrent		A		- 3.0, 5.7 - 5.7	
	COP		W/W		- 3.3, 2.8 - 2.8
Starting Current		urrent	A	Heating ; 3.4 - 3.5, 3.2 - 3.3 13, 25	
Piping Conne			inch	G ; Half Union 3/8", 1/2"	G; 3-way valve 3/8", 1/2"
(Flare piping)		inch	L ; Half Union 1/4", 1/4"	L; 2-way valve 1/4", 1/4"	
Pipe Size			inch	G (gas side); 3/8", 1/2"	G (gas side) ; 3/8", 1/2"
(Flare piping) Drain	Innar diam	o to r	inch	L (liquid side) ; 1/4", 1/4" 12	L (liquid side); 1/4", 1/4"
Hose	Inner diam	ietei	mm m	0.7	
Power Cord L			111	2.1	_
	ber of core		m	3 (1.0 mm²)	_
Dimensions		Height	inch (mm)	11-7/16 (290)	39- 31/32(1015)
		Width Depth	inch (mm)	31-15/32 (799)	30-23/32 (780) 9-21/32 (245)
Net Weight		Deptil	inch (mm) Ib (kg)	6-29/32 (175) 18 (8.0)	159 (72)
Compressor	_	Turno	ib (kg)	10 (0.0)	Rotary (1 cylinder)
1		Гуре			rolling piston type
		Гуре		-	Induction (2-poles)
		Output	W		550, 1,100
Air Circulation		Type Material		Cross-flow Fan AS + Glass Fiber 30%	Propeller Fan AES + Glass Fiber 12%
		матепаі Туре		Transistor (4-poles)	Induction (6-poles)
		nput	W	-	58.6×2
		Rated Output	W	20	20×2
	Fan	Low	rpm	950, 1,210	_
	Speed	Medium	rpm	1,030, 1,350	
		High	rpm	1,150, 1,500	730

		Unit	CS-MA70KE	, CS-MA120KE	CU-M.	A190KE
Heat	Description		Evaporator		Con	denser
Exchanger	Tube material		Co	opper	Copper	
	Fin material		Aluı	minium	Alun	ninium
	Fin Type		SI	ot Fin	Corrug	ated Fin
	Row / Stage			(Plate fin configu	ration, forced draft)	
			$2 \times 12$	2×12	1 × 18	2×19
	FPI		18	21	19	16
	Size $(W \times H \times L)$	mm	600 × 2	252 × 25.4	856 × 457.2 × 22	$706.2 \times 482.6 \times 44$
						669.9
Refrigerant Con	trol Device		_		Capilla	ary Tube
Defeire estima O		(2.2)			SUNISC	4GDID or
Refrigeration Oi	I	(c.c)			ATMOS M60 (290, 430)	
Refrigerant (R-22)		g (oz)	_		860, 1,100	(30.4, 38.8)
Thermostat			Electronic Control			_
Protection Device	ce			_	Overload	d Protector
	Length	mm		_		, Heating ; 590, 550
Capillary Tube	Flow Rate	ℓ/min		_		Heating ; 8.2, 12.5
	Inner Diameter	mm		_	Cooling ; 1.1, 1.3	s, Heating ; 1.3, 1.5
Air Filter	Air Filter Material P.P.			_		
Style			Honeycomb			_
Capacity Control Capillary Tube						
Compressor Ca	pacitor	μF, VAC		_	15 μF, 440VAC	30 μF, 370VAC
Fan Motor Capacitor		μF, VAC			1.2 µF, 400VAC	1.2 µF, 400VAC

<sup>•</sup> Specifications are subject to change without notice for further improvement.

			Unit	CS-MA90KE	CU-MA180KE
Cooling Consoit	h		kW	2.65 × 2 -	
Cooling Capacity		Btu/h	9,000 × 2 -	•	
Heating Capacity		kW	3.15 × 2 -		
Treating Capacit	Ly .		Btu/h	10,700 × 2 -	
Moisture Remov	val		ℓ/h	1.6	
			Pint/h	3.4	
Power Source			Phase V	Sing 240 -	
			Cycle	50	*
			OUTLET	SIDE VIEW	TOP VIEW
Airflow Method			OUTLET	SIDE VIEW	NOF VIEW
			=		Z ×
			INTAKE		<b>→</b>
			<b>→</b>		
				Cooling ; 6.3 (220)	<u> </u>
Air Volume	Indoor A	Air (Lo)	m³/min (cfm)	Heating ; 6.4 (230)	_
				Cooling ; 7.4 (260)	
	Indoor A	Air (Me)	m³/min (cfm)	Heating ; 7.5 (260)	_
	l	\:- (I I:\	24 : 4 6 >	Cooling; 8.4 (300)	
	Indoor A	AIr (HI)	m³/min (cfm)	Heating; 8.6 (300)	_
	Outdoor	Λir	m³/min (cfm)	_	00.4 (700)
	Outdoor	All	III-/IIIIII (CIIII)	_	22.4 (790)
Noise Level	•		-ID (A)	Cooling ; High 38-38, Low 30-30	
TVOISE LEVEI			dB (A)	Heating ; High 39-39, Low 30-30	
Electrical	Input		W	Cooling; 940	
Data	Input		VV	Heating; 950	
	Running Current		Α	A Cooling; 4.1 × 2 - 4.1 × 2 Heating; 4.2 × 2 - 4.1 × 2	
	COP				
			W/W	Cooling;	
	Ot - otio -	0		Heating;	
Piping Connecti		Current	A	G ; Half Union 3/8"	G; 3-way valve 3/8"
(Flare piping)		inch inch	L; Half Union 1/4"	L ; 2-way valve 1/4"	
Pipe Size		inch	G (gas side) ; 3/8"	G (gas side) ; 3/8"	
(Flare piping)			inch	L (liquid side); 1/4"	L (liquid side); 1/4"
Drain	Inner dia	ameter	mm	12	- (iiquia sias) ; 17 1
Hose	Length		m	0.7	_
Power Cord Ler				2.1	_
N	umber of o	core-wire	m	3 (1.0mm²)	_
Dimensions		Height	inch (mm)	11-7/16 (290)	38-3/4 (985)
		Width	inch (mm)	31-15/32 (799)	30-23/32 (780)
		Depth	inch (mm)	6-29/32 (175)	9-21/32 (245)
Net Weight			lb (kg)	18 (8.0)	152 (69)
Compressor		Туре		_	Rotary (1 cylinder)
	Motor			_	rolling piston type
	Motor	Type	147	<u> </u>	Induction (2-poles)
	Rated	Output	W	Cross-flow Fan	750 × 2
		Type Material		AS + Glass Fiber 30%	Propeller Fan AES + Glass Fiber 12%
Air Circulation	Motor	Type		Transistor (4-poles)	Induction (6-poles)
	IVIOLOI	Input	W		58.6 × 2
		Rated Output	W	20	20 × 2
	Fan	Low	rpm	980	
	Speed	Medium	rpm	1,150	
	-,	High	rpm	1,310	730
L			P **	1 ,	7.00

		Unit	CS-MA90KE	CU-MA180KE
Heat	Description		Evaporator	Condenser
Exchanger	Tube material		Copper	Copper
	Fin material		Aluminium	Aluminium
	Fin Type		Slot Fin	Corrugated Fin
	Row / Stage		(Plate fin configur	ation, forced draft)
			2×12	1 × 18
	FPI		18	19
	Size $(W \times H \times L)$	mm	$600 \times 252 \times 25.4$	856 × 457.2 × 22
Refrigerant Con	trol Device		_	Capillary Tube
D = f = i = = = = t i = = = O :	1	(0.0)	-	SUNISO 4GDID or
Refrigeration Oi	I	(c.c)		ATMOS M60 (350 × 2)
Refrigeration (R	-22)	g (oz)	_	850 × 2 (30.0 × 2)
Thermostat			Electronic Control	_
Protection Device	ce		_	Overload Protector
	Length	mm	_	Cooling; 1,033, Heating; 585
Capillary Tube	Flow Rate	ℓ/min	_	Cooling; 4.8, Heating; 9.9
	Inner Diameter	mm	_	Cooling; 1.2, Heating; 1.4
Air Filter	Material		P.P.	_
All I litter	Style		Honeycomb	_
Capacity Control			Capilla	ry Tube
Compressor Capacitor		μF, VAC	-	25 μF, 370VAC
Fan Motor Capacitor		μF, VAC	_	(Upper unit) 1.0 μF, 400VAC (Lower unit) 1.2 μF, 400VAC

<sup>•</sup> Specifications are subject to change without notice for further improvement.

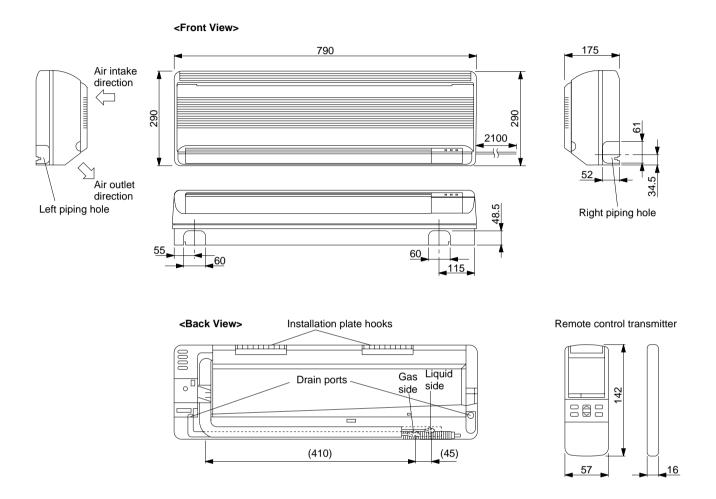
		Unit	CS-MA120KE	CU-MA240KE
Cooling Capacit	24	kW	$3.50 \times 2 - 3$	
Cooling Capacit	У	Btu/h	11,900 × 2 - 1	
Heating Capacity		kW	4.10 × 2 - 4	
Trouming Capacit	• 9	Btu/h ℓ/h	14,000 × 2 - 1	-
Moisture Remov	val	Pint/h	2.0 × 4.2 ×	
		Phase	Single	
Power Source		V	240 - 2	
		Cycle	50	
Airflow Method		OUTLET	SIDE VIEW	TOP VIEW
Aimow Method		<b>=</b>		\$ \$
		INTAKE		
		-0-0-	F	<b>\</b>
Air Volume	Indoor Air (Lo)	m³/min (cfm)	Cooling ; 7.5 (260) Heating ; 7.8 (280)	_
			Cooling; 8.4 (300)	
	Indoor Air (Me)	m³/min (cfm)	Heating; 8.7 (310)	_
	Indoor Air (Hi)	3/min (afma)	Cooling; 9.3 (330)	
	Indoor Air (HI)	m³/min (cfm)	Heating; 9.7 (340)	_
	Outdoor Air	m³/min (cfm)	_	22.0 (780)
Noise Level		4D (A)	Cooling; High 42-41, Low 38-37	
		dB (A)	Heating ; High 43-42, Low 38-37	
Electrical	Input	kW	Cooling ; 1.25 ×	
Data	mpat		Heating ; 1.28 × Cooling ; 5.6 ×	
	Running Current	A	Heating; 5.7 ×	
	COR	W/W	Cooling ; 2.	
	COP	V V / V V	Heating; 3.	2 - 3.3
	Starting Current	A	25 × 2	
Piping Connecti	on Port	inch	G ; Half Union 1/2"	G; 3-way valve 1/2"
(Flare piping)		inch	L; Half Union 1/4"	L ; 2-way valve 1/4"
Pipe Size (Flare piping)		inch inch	G (gas side) ; 1/2" L (liquid side) ; 1/4"	G (gas side) ; 1/2" L (liquid side) ; 1/4"
Drain	Inner diameter	mm	12	L (liquid side) , 1/4
Hose	Length	m	0.7	_
Power Cord Ler			2.1	_
	umber of core-wire	m	3 (1.0mm²)	_
Dimensions	Height	inch (mm)	11-7/16 (290)	41-5/32 (1045)
	Width	inch (mm)	31-15/32 (799)	30-23/32 (780)
N. ( ) A /	Depth	inch (mm)	6-29/32 (175)	9-21/32 (245)
Net Weight		lb (kg)	18 (8.0)	183 (83) Rotary (1 cylinder)
Compressor	Туре		_	rolling piston type
	Motor Type		_	Induction (2-poles)
	Rated Output	W	_	1,100 × 2
	Туре		Cross-flow Fan	Propeller Fan
Air Circulation	Material		AS + Glass Fiber 30%	AES + Glass Fiber 12%
	Motor Type		Induction (4-poles)	Induction (6-poles)
	Input	W	_	58.6 × 2
	Rated Output	W	20	20 × 2
	Fan Low Speed Medium	rpm	1,210	
	Speed Medium High	rpm	1,350	730
		rpm	1,500	130

		Unit	CS-MA120KE	CU-MA240KE
Heat	Description		Evaporator	Condenser
Exchanger	Tube material		Copper	Copper
	Fin material		Aluminium	Aluminium
	Fin Type		Slot Fin	Corrugated Fin
	Row / Stage		(Plate fin configurati 2 × 12	on, forced draft) 2 × 19
	FPI		21	16
	Size (W × H × L)	mm	$600 \times 252 \times 25.4$	706.2 × 482.6 × 44 669.9
Refrigerant Con	trol Device		_	Capillary Tube
Refrigeration Oil		(c.c)	-	SUNISO 4GDID or ATMOS M60 (430 × 2)
Refrigeration (R	-22)	g (oz)	_	$1,100 \times 2 (38.8 \times 2)$
Thermostat			Electronic Control	_
Protection Device	ce		_	Overload Protector
	Length	mm	_	Cooling; 720, Heating; 550
Capillary Tube	Flow Rate	ℓ/min	_	Cooling; 7.5, Heating; 12.5
	Inner Diameter	mm	_	Cooling; 1.3, Heating; 1.5
Air Filter	Material		P.P.	_
	Style		Honeycomb	_
Capacity Contro	ol		Capillary	Tube
Compressor Capacitor		μF, VAC	<del>-</del>	30 μF, 370VAC
Fan Motor Capacitor		μF, VAC	-	(Upper unit) 1.0 μF, 400VAC (Lower unit) 1.2 μF, 400VAC

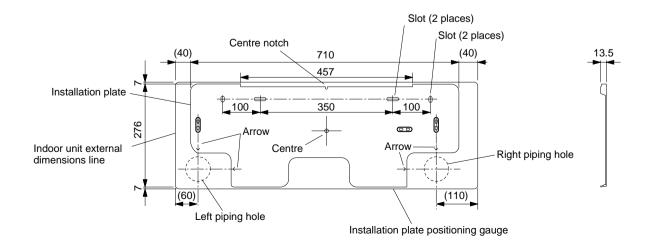
<sup>•</sup> Specifications are subject to change without notice for further improvement.

### **Dimensions**

#### CS-MA70KE / CS-MA90KE / CS-MA120KE



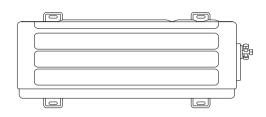
Relative position between the indoor unit and the installation plate <Front View>



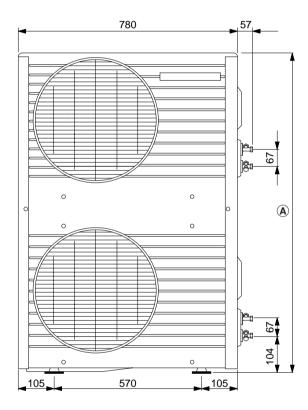
### Dimensions

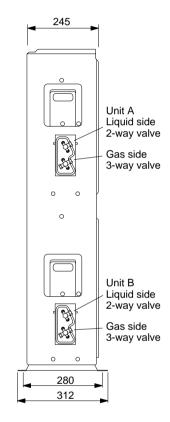
### CU-MA180KE, CU-MA190KE, CU-MA240KE

	CU-MA180K	CU-MA190K	CU-MA240K
<b>(A</b> )	985	1015	1045



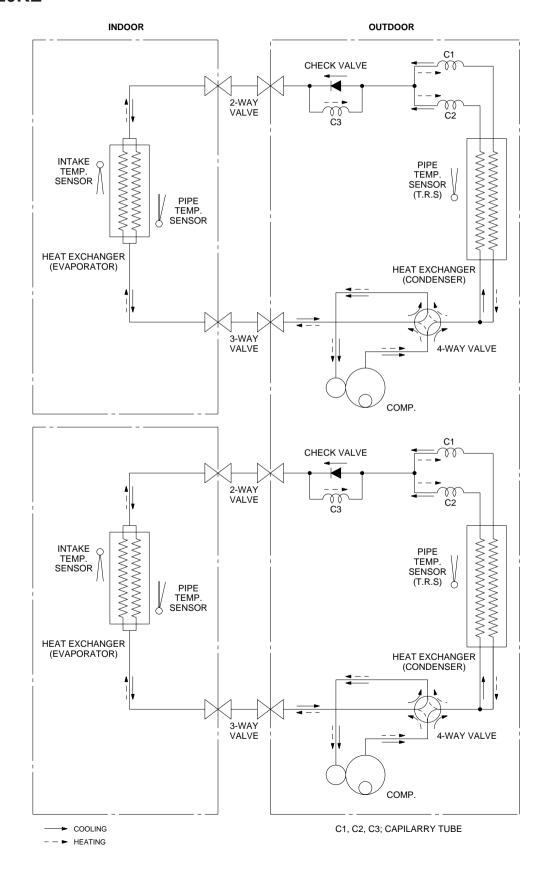






# **Refrigeration Cycle Diagram**

CS-MA90KE / CU-MA180KE CS-MA120KE / CU-MA240KE CS-MA70KE / CU-MA190KE CS-MA120KE

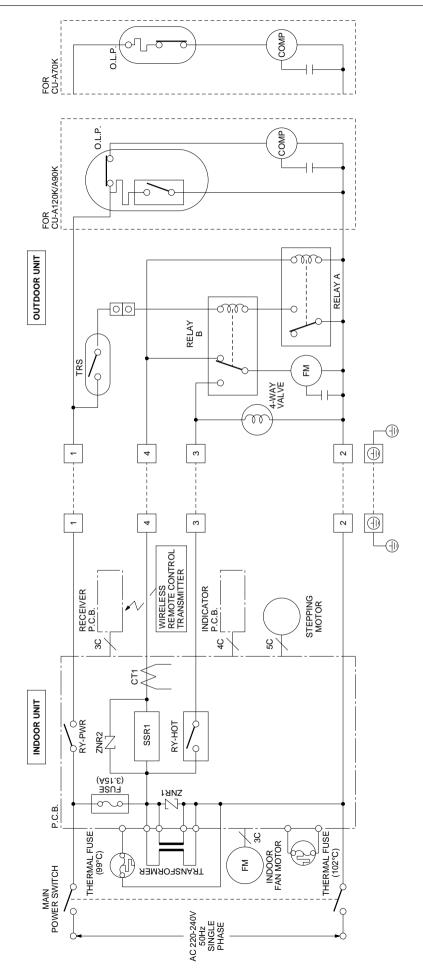


# **Block Diagram**

**CS-MA120KE / CU-MA240KE** CS-MA70KE / CU-MA190KE

CS-MA120KE

CS-MA90KE / CU-MA180KE

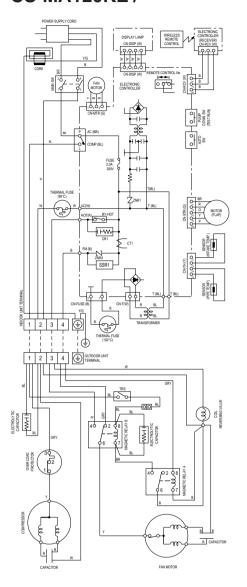


Indicates the electronic control unit.

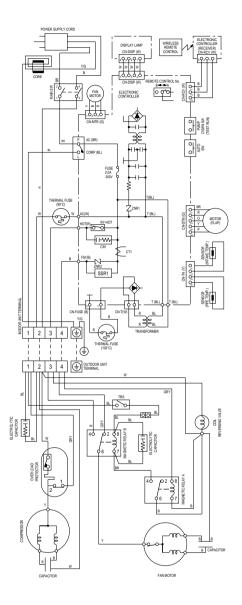
C. Indicates the number of core wires. (Example:5C=5 core wires).

### **Wiring Diagram**

### CS-MA70KE / CU-MA190KE CS-MA120KE /









#### REMARKS:

B : BLUE
BR : BROWN
BL : BLACK
W : WHITE
R : RED
O : ORANGE
P : PINK
Y/G : YELLOW/

GREEN GRY : GRAY

#### **Resistance of Outdoor Fan Motor Windings**

CONNECTION	CWA95245 (Ω)
BLUE - YELLOW	312.9
YELLOW - RED	419.7

# Resistance of Compressor Windings CS-MA70KE / CU-MA190KE

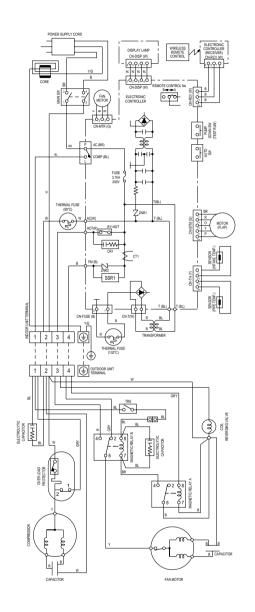
CONNECTION	2RS122D5AB02 (Ω)
C-R	5.63
C-S	12.17

#### CS-MA120KE / CU-MA190KE

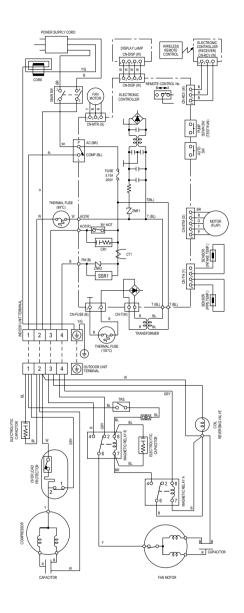
CONNECTION	2KS224D5AC02 (Ω)
C-R	2.45
C-S	3.86

### **Wiring Diagram**

### CS-MA90KE / CU-MA180KE CS-MA120KE / CU-MA240KE









#### **REMARKS**:

B : BLUE
BR : BROWN
BL : BLACK
W : WHITE
R : RED
O : ORANGE
P : PINK
Y/G : YELLOW/

GREEN GRY : GRAY

#### **Resistance of Outdoor Fan Motor Windings**

CONNECTION	CWA95245 (Ω)
BLUE - YELLOW	312.9
YELLOW - RED	419.7

# Resistance of Compressor Windings CS-MA90KE / CU-MA180KE

CONNECTION	2PS164D3AD02 (Ω)
C-R	3.43
C-S	4.76

#### CS-MA120KE / CU-MA240KE

CONNECTION	2KS224D5AC02 (Ω)
C-R	2.45
C-S	3.86

#### 1) Cooling Mode Operation

Cooling in operation according to Remote Control setting.

#### Time Delay Safety Control (3 minutes)

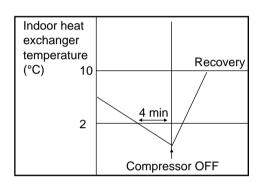
- When the compressor is stopped by Power Switch, Remote Control or there is a power failure, it restarts after 3 minutes when the Power Switch, Remote Control is turned ON or the power supply is resumed.
- When the setting temperature is reached during cooling operation, the compressor stops and it will not start for 3 minutes.

#### 7 minutes Time Saved Control

 The compressor will start automatically if it has stopped for 7 minutes even if the room temperature is below the compressor ON temperature.

#### **Anti-Freezing Control**

- If the temperature of the indoor heat exchanger falls continously below 2°C for 4 minutes, the compressor turns off to protect the indoor heat exchanger from freezing. The fan speed setting remains the same.
- Compressor recommences when the indoor heat exchanger temperature rises to 10°C (Recovery).
   3 minutes waiting of Time Delay Safety Control is valid for Cooling Operation.



#### **Compressor Protection Control**

• After the compressor starts for 50 seconds but the outdoor fan motor is still OFF, the compressor will stop and restart automatically. (Time Delay Safety Control is valid).

Comp. operates for 50 secs.

and
Fan Motor OFF

Compressor
OFF

Compressor
restarts
(3 minutes waiting)

- If the above phenomenon is repeated for 3 times, the compressor will stops.
- The above phenomenon is reset when there is a change to heating mode or stopped by Remote Control Switch.

### Compressor Reverse Rotation Protection Control

 If the compressor is operating continually for 5 minutes or longer and the temperature difference between intake air and indoor heat exchanger is 2.5°C or less for 2 minutes, compressor will stop and restart automatically. (Time Delay Safety Control is valid).



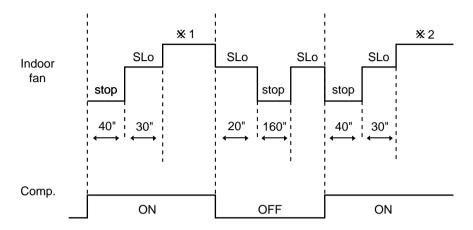
 $\Delta T$  = intake air temperature – indoor heat exchanger temperature

This is to protect reverse rotation of the compressor when there is a instantaneous power failure.

#### **Automatic Fan Speed Mode**

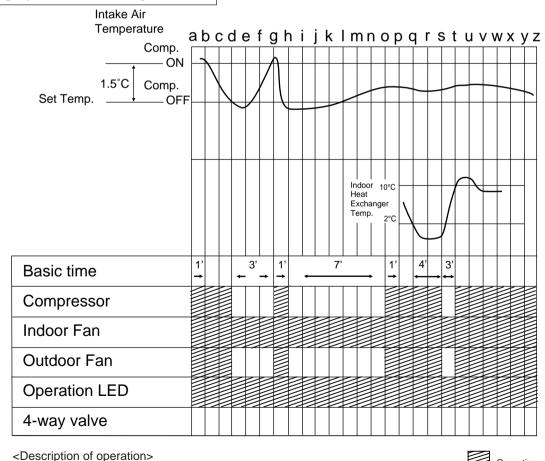
When Automatic Fan Speed is selected at Remote Control during cooling operation.

- Fan speed rotates in the range of Hi to Me.
- Deodorizing Control.



- \* 1 Fan Speed is Hi until the compressor stops (when the set temperature is reached).
- ※ 2 Fan Speed is Me after the compressor restarts.

#### **Cooling Operation Time Diagram**



Time Delay Safety Control (waiting for 3 minutes) d-g:

g – ĥ 60 sec. Forced Operation h-o: 7 min. Time Saved Control : Anti Freezing Control q - t

#### 2) Soft Dry Mode Operation

- The unit starts cooling operation until the room temperature reaches the setting temperature set on the Remote Control, and then Soft Dry operation will start.
  - (During Soft Dry operation, the indoor fan operates with SLo speed.)
- Once room temperature reaches below Soft Dry OFF temperature, Indoor Fan, Compressor and Outdoor Fan stop for 6 minutes.

#### **Time Delay Safety Control**

• Once the compressor stops, it will not start for 3 minutes during Cooling operation.

#### **Anti-Freezing Control**

 Same as Anti-Freezing Control for Cooling Mode operation. (For Soft Dry region, 6 minutes waiting is valid during compressor stops.)

#### **Compressor Protection Control**

• Same as Compressor Protection Control for Cooling Mode Operation. (Refer page 17)

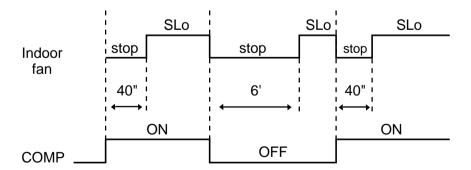
#### Compressor Reverse Rotation Protection

• Same as Compressor Reverse Rotation Protection Control for Cooling Mode Operation. (Refer page 17)

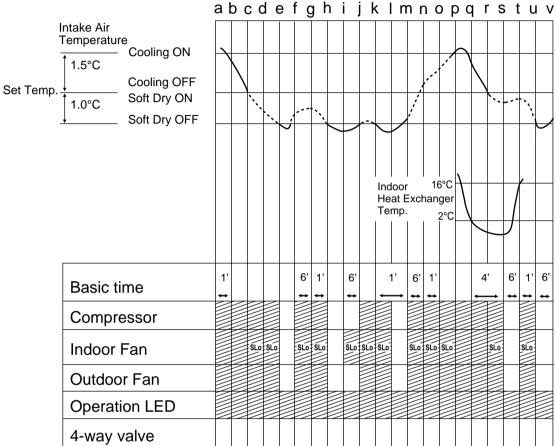
#### **Automatic Fan Speed Mode**

When Automatic Fan Speed is selected at Remote Control during Soft Dry Operation.

- Fan speed rotates at SLo.
- Deodorizing Control.



#### **Soft Dry Operation Time Diagram**



#### 3) Heating Mode Operation

Heating in operation according to Remote Control setting.

#### **Time Delay Safety Control**

- When the compressor is stopped by Power Switch, Remote Control or there is a power failure, it restarts after 3 minutes when the Power Switch, Remote Control is turned ON or the power supply is resumed.
- When the setting temperature is reached during heating operation, the compressor stops and it will not start for 4 minutes
- Indoor Fan stops for 1 minute after 3 minutes compressor stops. Then, it will operate with SLo fan speed.

#### **Overload Protection Control**

- If the temperature of the indoor heat exchanger rises to 51°C, Outdoor Fan stops.

  The Outdoor Fan restarts when the indoor heat exchanger temperature falls to 49°C.
- If the indoor heat exchanger becomes 65°C or more, the compressor will stop and restart automatically. (Time Delay Safety Control 4 minutes waiting)



#### Compressor Reverse Rotation Protection Control

 If the compressor is operating continually for 5 minutes or longer and temperature difference between intake air and indoor heat exchanger is 5°C or less for 2 minutes, compressor will stop and restart automatically. (Time Delay Safety Control is valid).



 $\Delta T$  = Indoor heat exchanger temperature – intake air temperature

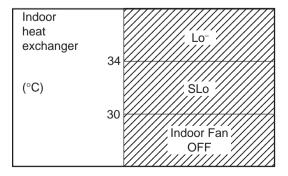
This is to protect reverse rotation of the compressor when there is a instantaneous power failure.

#### 4-way Valve Control

- 4-way valve always ON during Heating operation.
- When the unit is switched to "OFF" during Heating operation, 4-way valve stays at Heating position for 5 minutes.

### Hot Start Control

When Heating operation starts, Indoor Fan will not start until the indoor heat exchanger reaches 30°C as diagram shown.

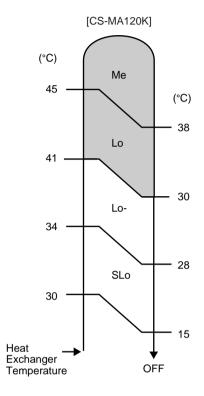


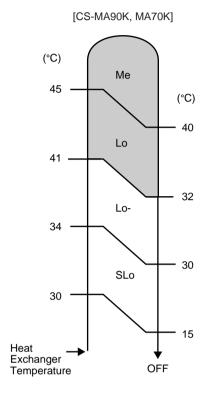
Hot Start is completed when indoor heat exchanger reaches 41°C.

#### **Automatic Fan Speed Mode**

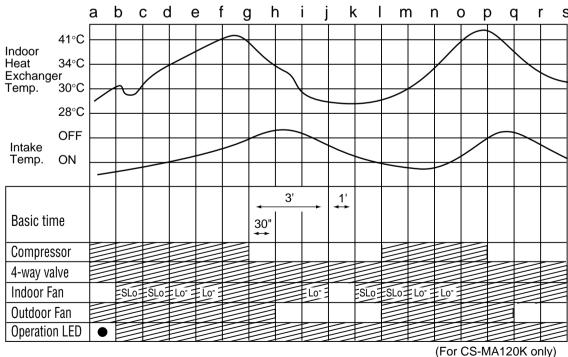
When Automatic Fan Speed is selected at Remote Control during heating operation.

• Fan speed rotates in the range of Me → SLo according to the heat exchanger temperature.





#### **Heating Operating Time Diagram**



<Description of operation>

a - b: Hot start (Indoor fan = OFF) b - d: Hot start (Indoor fan = SLo)

g - I : Indoor fan control (controlled during thermostat OFF)

g - h : Outdoor fan control (30 sec. Forced Operation) after compressor stops.

(For CS-MA120K only)

■ : Blinking

Operation

Stop

#### **Deicing Control**

Deice starts to prevent frosting at outdoor heat exchanger.

#### Normal Deicing

Deice operation detection commences after 30 minutes of Heating operation starts or 60 minutes after previous deice operation. If the TRS (Thermal Reed Switch) senses the outdoor piping temperature drops to –3°C (TRS CLOSE) or less for 50 sec. continuously during compressor is in operation, deice will start. (There is no detection during Outdoor Fan stops.)

#### Overload Deicing

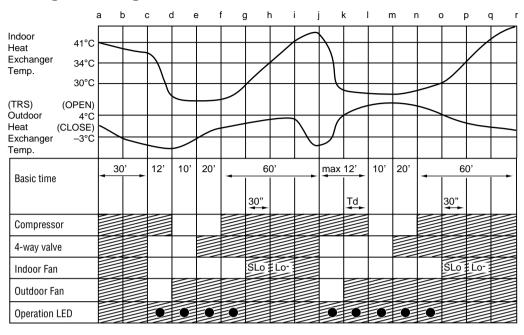
During heating operation, if the outdoor Fan OFF duration (due to overload control) is accumulated up to 60 minutes and after compressor starts for 1 minute, deicing starts.

- Deicing ends when
  - (a) 12 minutes after deicing operation starts;
  - (b) TRS senses the outdoor piping temperature rises to 4°C (TRS OPEN).
  - (c) Deicing will not end immediately as time delay (Td) is valid as shown below.

Time taken from deicing starts to TRS OPEN (T)	Td (seconds)
T , 3 minutes	0
3 minutes < T , 6 minutes	60
6 minutes < T , 9 minutes	120
T > 9 minutes	180

- · Once deicing operation starts, it will not end for 60 seconds.
- After deicing operation, compressor stops for 30 seconds and 4-way valve stays at cooling position for 10 seconds.

#### **Normal Deicing Time Diagram**



<Description of operation>

a – c : Deicing operation judging condition established

 $\begin{array}{lll} c-d & : & \text{Deicing operation (timer detected)} \\ d-e, l-m & : & \text{Time delay for 4-way valve} \\ e-f, m-n & : & \text{Time delay for Compressor} \\ f-g, n-o & : & \text{Hot start (no thermo OFF)} \end{array}$ 

g-h, o-p: No thermo OFF (after finished hot start) j-l: Deicing operation (TRS detected)

: Blinking

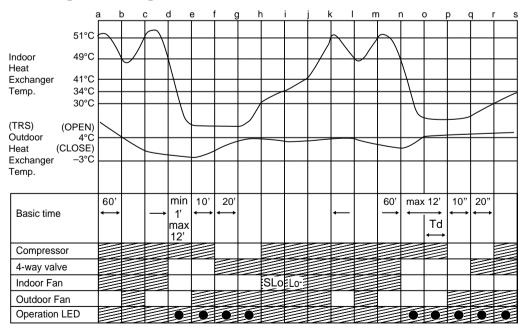


Stop

#### **Overload Deicing Time Diagram**

<Description of operation>

a-d, k-h:



 $\begin{array}{lll} d-g & : & \text{Overload Deicing (timer detected)} \\ g-h & : & \text{Hot Start (indoor fan OFF)} \\ h-i & : & \text{Hot Start (indoor fan SLo)} \\ n-p & : & \text{Overload Control (TRS detected)} \end{array}$ 

Overload Control

Blinking
 Operation

Stop

#### 4) Automatic Mode Operation

#### **Standard for Determining Operation Mode**

↑ Intake Air Temperature	23°C 20°C	Cooling Mode  Soft Dry Mode  Heating Mode
	20°C	

	Setting Temperature (Standard)
Cooling Mode	25°C
Soft Dry Mode	22°C
Heating Mode	21°C

- (a) Indoor fan operates at SLo fan speed for 20 seconds.
- (b) After judging indoor air temperature, the operation mode is determined and operation continued at the mode determined.
- (c) If indoor intake air is less than 16°C, Heating mode will immediate operate.
- (d) After the operation mode has been determined, the mode does not change. However, Soft Dry mode operation includes Cooling mode operation.
- (e) If Automatic Mode operation is started while the air conditioner is operating, operation will continue. If current operation is in Cooling mode (including the operation which is a part of Soft Dry mode operation), it will be maintained, for 20 seconds at SLo fan speed. Then, the selected operation mode will continue.
- (f) Room temperature adjustment.

The following are added to the setting temperature specified as above.

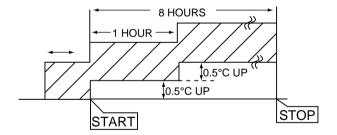
Higher →	+2°C
Standard →	±0°C
Lower →	–2°C

#### 5) Sleep Mode Auto Operation

#### **Cooling or Soft Dry operation**

When you press the SLEEP Mode, the following movement will start to avoid overcooling.

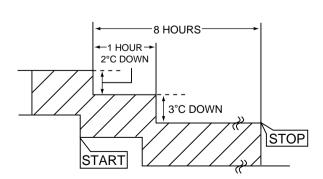
- The fan speed is automatically set to Low.
- The setting temperature will be risen by 0.5°C at the start of operation and by 0.5°C one hour later.
- The operation will stop after 8 hours.



#### **Heating operation**

When you press the SLEEP Mode, the following movement will start to avoid overheating.

- The fan speed is automatically set to Low or Super Low.
- The setting temperature will be dropped by 2°C at the start of operation and by 3°C one hour later.
- The operation will stop after 8 hours.



#### 6) Auto Restart Control

- If there is a power failure, operation will be automatically restarted when the power is resumed.
   It will start with previous operation mode and airflow direction.
   (Time Delay Safety Control is valid)
- · Auto Restart Control is not available when Timer or Sleep Mode is set.
- This control can be omitted by cutting the jumper wire J2. (Refer Circuit Diagram)

#### 7) Indoor Fan Motor Control

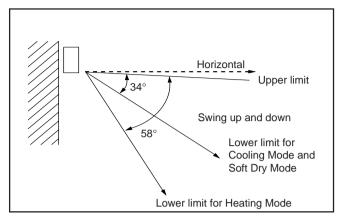
- Auto Fan Speed Control
   When set to Auto Fan Speed, the fan speed is adjusted between maximum and minimum setting as shown in the table.
- Manual Fan Speed Control
   Basic fan speed adjustment (3 settings, from Lo to Hi) can be carried out by using the Fan Speed selection button.

Fan Speed		High Speed ↔ Low Speed								
N	0.	8	7	6	5	4	3	2	1	0
	Manual		0	0	0					
Cooling	Auto		0	0						
	Sleep					0				
Soft Dry							0			0
	Manual	0		0	0	0	0			0
Heating	Auto			0	0	0	0			0
	Sleep					0	0			0
Voltage to Fan	CS-MA70K	21.0	21.0	18.6	17.0	15.8	11.0	11.0	7.2	0
Motor Drive Transistor (V)	CS-MA90K	26.7	25.9	21.5	18.1	15.8	11.0	11.0	7.2	0
	CS-MA120K	32.0	31.0	26.0	22.5	21.5	16.5	11.0	7.2	0
		SHi	Hi	Ме	Lo	Lo-	SLo	MID START	START	STOP

#### 8) Airflow Direction Control

#### **Airflow Direction Auto-Control**

- When set a Airflow Direction Auto-Control with remote control, the louver swings up and down as shown in the diagram.
- The louver does not swing when the Indoor Fan stops during operation.
- When stopped with remote control, the discharge vent is closed with the louver.

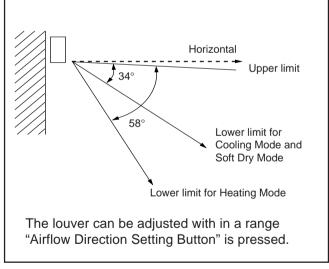


X The left and right airflow direction louvers can be adjusted manually.

- \* 1 There is no swinging while indoor fan is stopped during Cooling and Soft Dry operation.
- ※ 2 In Heating operation, when the indoor heat exchanger temperature rises to 38°C, the airflow direction is changed from upper limit to lower limit. When the indoor heat exchanger temperature falls to 35°C, the airflow direction is changed from lower limit to upper limit.

#### **Airflow Direction Manual Control**

- When the airflow direction set button is pressed, the automatic airflow is released and the airflow direction louver move up and down in the range shown in the diagram.
  - The louver can be stopped by releasing the button at the desired louver position.
- When the remote control is used to stop the operation, the discharge vent is closed with airflow direction louver.



X The left and right airflow direction louvers can be adjusted manually.

#### 9) Delay ON Timer Control

- When the Delayed ON Timer is set by using the remote control, the unit will start operate slightly before the set time, so that the room will reach nearly to the set temperature by the desired time.
- For Cooling and Soft Dry mode, the operation will start 15 minutes before the set time.
- For Heating mode, the operation will start 30 minutes before the set time.
- For Automatic mode, the indoor fan will operate at SLo speed for 20 seconds 30 minutes before the set time to detect the intake air temperature to determine the operation mode. The operation indication lamp will blink at this time.

### **Installation Information**

#### Attached accessories

No.	Accessories part	Qty.	No.	Accessories part	Qty.
1	Installation plate	1	6	Drain elbow	1
2	Installation plate fixing screw	6	7	Clamping cover of piping	1
3	Remote control	1	8	Vinyl tape	3
4	Battery ⊕	2	9	Vinyl tape	1
5	Air purifying filter	2	פו		1

Accessories: Flaring piping kit

CZ-4F5, 7, 10 AN

#### SELECT THE BEST LOCATION

#### INDOOR UNIT

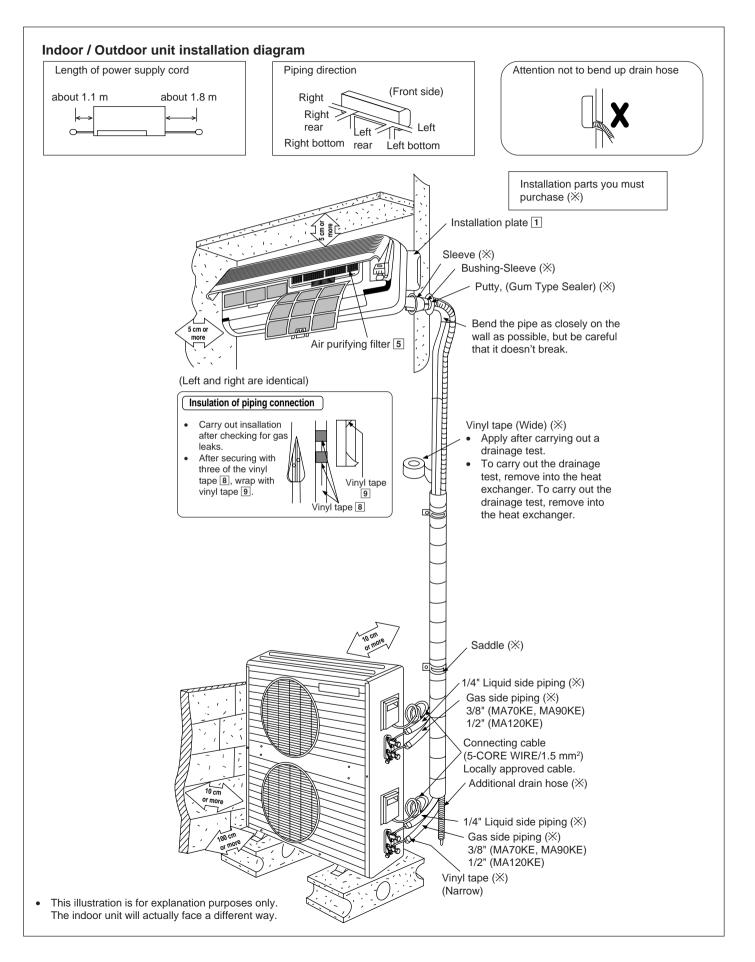
- There should not be any heat source or steam near the unit.
- There should not be any obstacles blocking the air circulation.
- A place where air circulation in the room is good.
- A place where drainage can be easily done.
- A place where noise prevention is taken into consideration.
- Do not install the unit near the door way.
- Ensure the spaces indicated by arrows from the wall, ceiling, fence or other obstacles.
- Indoor unit of this room air conditioner shall be installed on the wall in a height of at least 2.3 m.

#### **OUTDOOR UNIT**

- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.
- If piping length is over the rated length, additional refrigerant should be added as shown in the table.

	Pipin	g size	Rated	Max.	Max. Piping	Additional Refrigerant (g/m)	
MODEL	Gas	Liquid	Length	Elevation (m)	Length (m)		
MA70KE	3/8"	1/4"	7	5	15	15	
MA90KE	3/8"	1/4"	7	5	15	30	
MA120KE	1/2"	1/4"	7	5	15	30	

### **Installation Information**



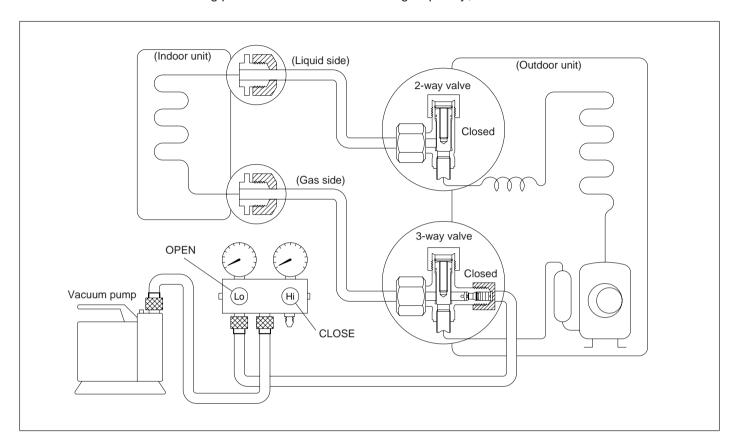
# 2-way • 3-way Valve

	2-way Valve (Liquid Side)	3-way Valve	(Gas Side)	
	Flare nut Hexagonal wrench (4 mm) Open position Closed position To outdoor unit	Flare nut To piping connection To outdo	Open position Closed position Pin Service port port cap	
Works	Shaft Position	Shaft Position	Service Port	
Shipping	Close (With valve cap)	Closed (With valve cap)	Closed (With cap)	
Evacuation (Installation and Re-installation)	Closed (Counter-Clockwise)	Closed (Clockwise)	Open (Push-pin)	
Operation	Open (With valve cap)	Open (With valve cap)	Closed (With cap)	
Pumping down (Transferring)	Closed (Clockwise)	Open (Counter-clockwise)	Open (Connected manifold gauge)	
Evacuation (Servicing)	Open	Open	Open With vacuum pump	
Gas charging (Servicing)	Open	Open	Open (With charging cylinder)	
Pressure check (Servicing)	Open	Open	Open (Connected manifold gauge)	
Gas releasing (Servicing)	Open	Open	Open (Connected manifold gauge)	

#### 1 Evacuation of Installation

WHEN INSTALLING AN AIR CONDITIONER, BE SURE TO EVACUATE THE AIR INSIDE THE INDOOR UNIT AND PIPES in the following procedure.

If air remain in the indoor unit and refrigeration pipes, it will affect the compressor, reduce to cooling capacity, and could lead to a malfunction.



#### **Procedure:**

- (1) Connect a charging hose with a push pin to the Low side of a charging set and the service port of a 3-way valve.
  - Be sure to connect the end of the charging hose with the push pin to the service port.
- (2) Connect the centre hose of the charging set to a vacuum pump.
- (3) Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 MPa (0 cmHg) to -0.1 MPa (-76 cmHg). Then evacuate the air for approximately ten minutes.
- (4) Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.

BE SURE TO TAKE THIS PROCEDURE IN ORDER TO AVOID GAS LEAKAGE.

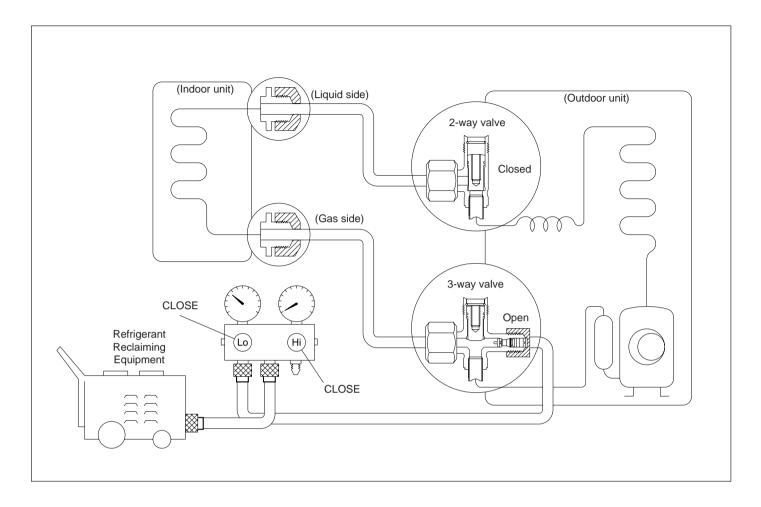
- (5) Disconnect the charging hose from the vacuum pump and from the service port of the 3-way valve.
- (6) Tighten the service port cap at a torque of 18 N•m with a torque wrench.
- (7) Remove the valve caps of the 2-way valve and the 3-way valve. Position both of the valves to "open" using a hexagonal wrench (4 mm).
- (8) Mount the valve caps onto the 2-way and 3-way valves.
  - Be sure to check for gas leakage.

#### Caution

If gauge needle does not move from 0 cmHg to -76 cmHg in step (3) above, take the following measures:

If the leaks stop when the piping connections are tightened further, continue working from step (3). If the leaks do not stop when the connections are retightened, repair the location of the leak.

### 2 Pumping down



#### Procedure:

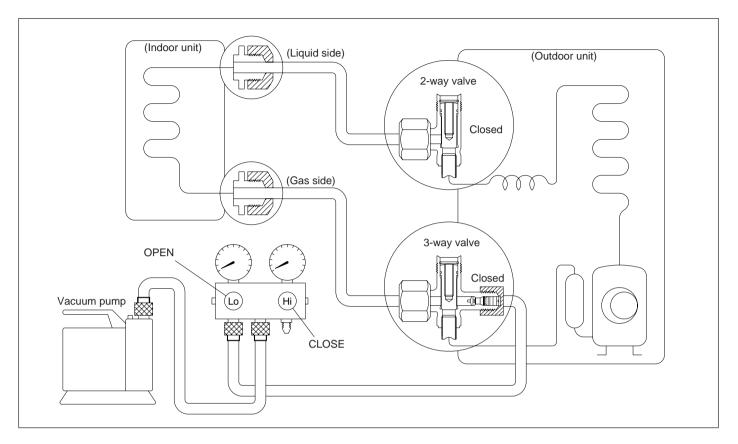
- (1) Confirm that both the 2-way and 3-way valves are set to the opened position.
  - Remove the valve stem caps and confirm that the valve stems are in the opened position.
  - Be sure to use a hexagonal wrench to operate the valve stems.
- (2) Operate the unit for 10 to 15 minutes.
- (3) Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.
  - Connect the charge hose with the push pin to the Gas service port.
- (4) Air purging of the charge hose.
  - Open the low-pressure valve on the charge set slightly to purge air from the charge hose.
- (5) Set the 2-way valve to the closed position.

- (6) Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0 MPa (0 kg/cm²G).
  - If the unit cannot be operated at the cooling condition (weather is rather cool), short the Pumping Down pins on the Main Control P.C.B.
  - (Simply press the pumping down button if it is equipped.)
  - So that the unit can be operated.
- (7) Immediately set the 3-way valve to the closed position.
  - Do this quickly so that the gauge ends up indicating 0.1 MPa (1 kg/cm²G) to 0.3 MPa (3 kg/cm²G)
- (8) Use refrigerant reclaiming equipment to collect refrigerant from indoor unit and pipes.
- (9) Disconnect the charge set, and mount the 2-way and 3-way valve's stem caps and the service port caps.
  - Use a torque wrench to tighten the service port cap to a torque of 18 N•m.
  - Be sure to check for gas leakage.
- (10) Disconnect pipes from indoor unit and outdoor unit.

#### 3 Evacuation of Re-installation

WHEN RE-INSTALLING AN AIR CONDITIONER, BE SURE TO EVACUATE THE AIR INSIDE THE INDOOR UNIT AND PIPES in the following procedure.

If air remain in the indoor unit and refrigeration pipes, it will affect the compressor, reduce to cooling capacity, and could lead to a malfunction.



#### **Procedure:**

- (1) Connect a charging hose with a push pin to the Low side of a charging set and the service port of the 3-way valve.
  - Be sure to connect the end of the charging hose with the push pin to the service port.
- (2) Connect the center hose of the charging set to a vacuum pump.
- (3) Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 MPa (0 cmHg) to -0.1 MPa (-76 cmHg). Then evacuate the air for approximately ten minutes.
- (4) Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.
  - BE SURE TO TAKE THIS PROCEDURE IN ORDER TO AVOID GAS LEAKAGE.
- (5) Disconnect the charging hose from the vacuum
- (6) Charge the pipes and indoor unit with gas refrigerant from 3-way valve service port, and then discharge the refrigerant until low side (gas side) gauge needle indicates 0.3 MPa (3 kg/cm²)

- (7) Tighten the service port cap at a torque of 18N·m with a torque wrench.
- (8) Remove the valve caps of the 2-way valve and the 3-way valve. Position both of the valves to "open" using a hexagonal wrench (4 mm).
- (9) Mount valve caps onto the 2-way and 3-way valves.
  - BE SURE TO USE REFRIGERANT RECLAIM-ING EQUIPMENT WHILE DISCHARGING THE REFRIGERANT.
  - Purge the air from charge set's centre hose.
  - Be sure to check for gas leakage.

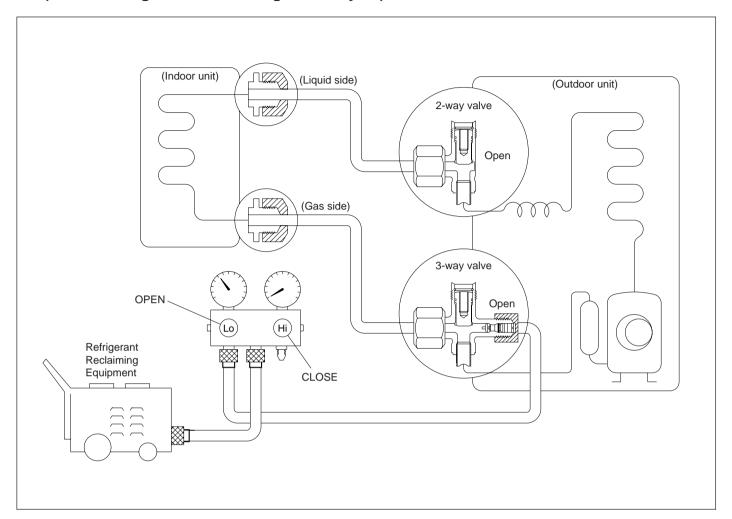
#### Caution

If gauge needle does not move from 0 MPa (0 cmHg) to -0.1 MPa (-76 cmHg) in step (3) above, take the following measures:

If the leaks stop when the piping connections are tightened further, continue working from step (3). If the leaks do not stop when the connections are retightened, repair the location of the leak.

### 4 Balance refrigerant of the 2-way, 3-way valve

(Lack of refrigerant in the refrigeration cycle)

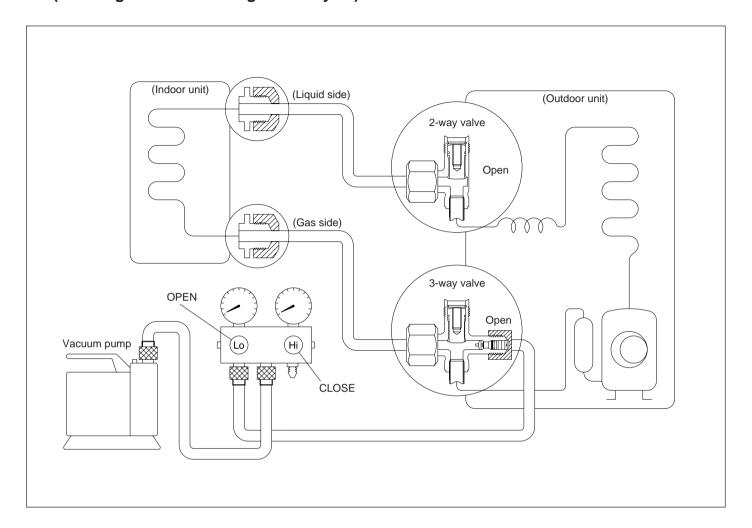


#### Procedure:

- (1) Confirm that both the 2-way and 3-way valves are set to the open position.
- (2) Connect the charge set to the 3-way valve's service port.
  - Leave the valve on the charge set closed.
  - Connect the charge hose with the push-pin to the service port.
- (3) Connect the charge set's centre hose to refrigerant reclaiming equipment.
  - Purge the air from charge hose.
- (4) Open the valve (Low side) on the charge set and discharge the refrigerant until the gauge indicates 0.05 MPa (0.5 kg/cm²G) to 0.1 MPa (1 kg/cm²G).
  - If there is no air in the refrigeration cycle (the pressure when the air conditioner is not running is higher than 0.1 MPa (1 kg/cm²G), discharge the refrigerant until the gauge indicates 0.05 MPa (0.5 kg/cm²G) to 0.1 MPa (1 kg/cm²G). If this is the case, it will not be necessary to apply a evacuation.
  - Discharge the refrigerant gradually; if it is discharged too suddenly, the refrigeration oil will also be discharged.
- (5) Turn on refrigerant reclaiming equipment.

#### 5 Evacuation

(No refrigerant in the refrigeration cycle)

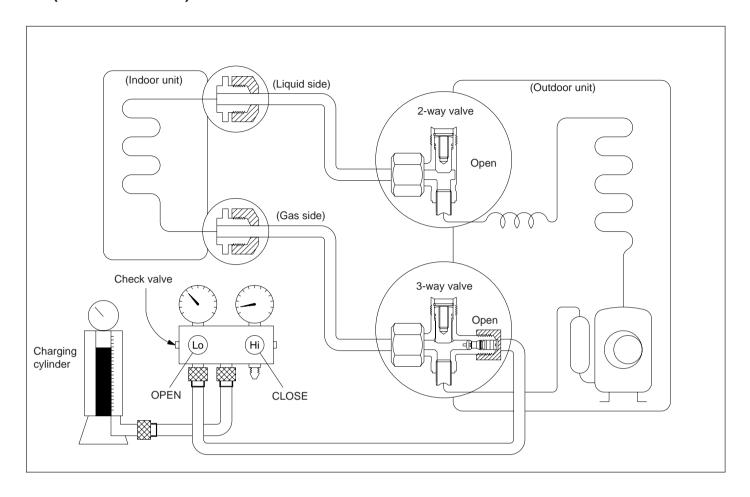


#### **Procedure:**

- (1) Connect the vacuum pump to the charge set's centre hose.
- (2) Evacuation for approximately one hour.
  - Confirm that the gauge needle has moved toward -0.1 MPa (-76 cmHg) [vacuum of 4 mmHg or less.]
- (3) Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
- (4) Disconnect the charge hose from the vacuum pump.
  - Vacuum pump oil
     If the vacuum pump oil becomes dirty or depleted, replenish as needed.

### 6 Gas charging

(After Evacuation)



#### Procedure:

## (1) Connect the charge hose to the charging cylinder.

 Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder.

#### (2) Purge the air from the charge hose.

 Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

## (3) Open the valve (Low side) on the charge set and charge the system with liquid refrigerant.

• If the system cannot be charged with the specified amount of refrigerant, it can be charged with a little at a time (approximately 150 g each time) while operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure. (pumping down-pin)

This is different from previous procedures. Because you are charging with liquid refrigerant from the gas side, absolutely do not attempt to charge with large amount of liquid refrigerant while operating the air conditioner.

## (4) Immediately disconnect the charge hose from the 3-way valve's service port.

- Stopping partway will allow the refrigerant to be discharged.
- If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.

## (5) Mount the valve stem caps and the service port cap.

- Use torque wrench to tighten the service port cap to a torque of 18 N•m.
- Be sure to check for gas leakage.

### Inspection points for the Indoor Electronic Controller

1. The Electronic Controller, a signal Receiver and an Indicator can be seen by removing the Front Grille and Control Board Cover, as shown in the Fig. 1.

 $[A \leftrightarrow B]$  selection switch [SW1] (Used when there are two units in one room)

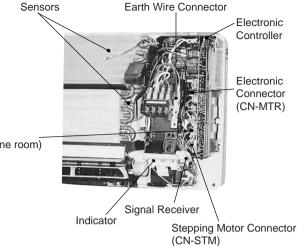


Fig. 1

#### • Indoor Fan Motor removal procedure

- Remove the connector CN-MTR (GREEN) of Fan Motor and connector CN-STM (GREEN) of stepping motor from the electronic controller. Release the earth wire (YELLOW-GREEN) from the control board and sensors from its holders. (Refer Fig. 1)
- 2. Remove the Control Board
  The Control Board can be removed by releasing the top, left and right tabs shown in Fig. 2, 3, 4.

Releasing the 2 right tabs by pressing down the top tab and pushing up the bottom tab.

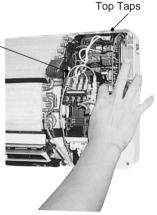


Fig. 2

Releasing the 2 left tabs by pressing down the top tab and pushing up the bottom tabs

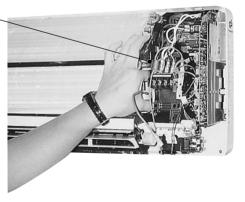


Fig. 3

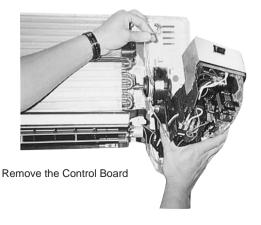


Fig. 4

3. Remove the Fan Motor Loosen the Fan Motor securing screw at the junction with Cross Flow Fan. (Fig. 5)

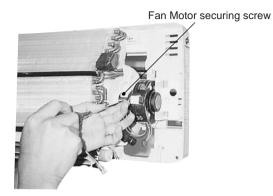
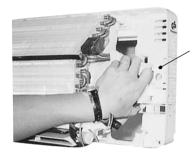


Fig. 5

Remove the particular piece and the Fan Motor can be taken off as shown in Fig. 6 and 7.



Particular piece

Fig. 6



Fig. 7

4. To fix the Indoor Fan Motor, ensure that the Fan Motor securing screw is positioned at the rear end and the Fan Motor lead wire is positioned parallel to the Fan Motor. (Fig. 8)

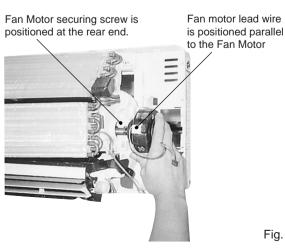
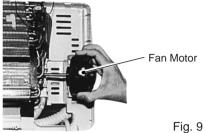


Fig. 8

#### Cross Flow Fan Removal Procedure

1. Remove the Indoor Fan Motor. (Refer to the removal procedure of the Indoor Fan Motor.) (Fig. 9)



2. Remove the Air Discharge Grille by taking off the screws that hold the Air Discharge Grille and then pull the Air Discharge Grille in a down and forward direction. (Fig. 10)



Fig. 10

3. Pull off the Bearing at the left of the Cross Flow Fan. (Fig. 11)

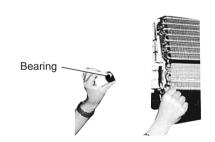


Fig. 11

4. Take off the mounting tab on the left side of the Heat Exchanger, pull the Heat Exchanger forward (left side) and remove the Cross Flow Fan. (Fig. 12)

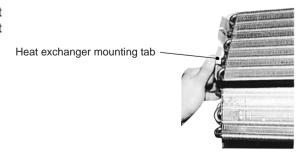
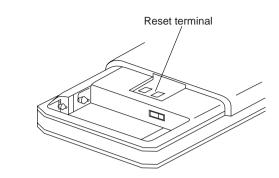


Fig. 12

#### Remote Control Reset

When the batteries are inserted for the first time, or the batteries are replaced, all the indications will blink and the remote control might not work.

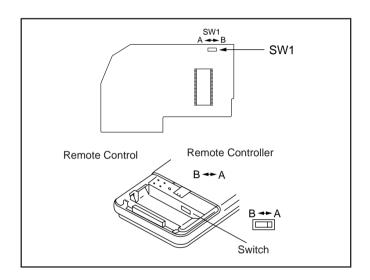
If this happens, remove the back cover of the remote control and you will find a resetting terminal, and by shorting it with a minus screwdriver, it will return to normal



Changing the wireless remote control transmission code

When two indoor units are installed in the same room, in order to prevent operating errors caused by using two remote controls, set up the remote control  $[B \leftrightarrow A]$  switch (SW1).

The unit is set to A when it is shipped.



By adding a jumper wire to the remote control side and a carbon resistor (1/4 W, 10 kΩ) to the indoor printed circuit board, it is possible to select 4 types of transmission codes including one at time of delivery condition (1).

	Remote control		Indoor printed	Note	
	Switch SW B $\leftrightarrow$ A	J – B	Switch SW1	RX	Note
1	А		А		At product delivery
2	В		В		
3	А	Jumper wire	А	10kΩ	
4	В	Jumper wire	В	10kΩ	



## **Troubleshooting Guide**

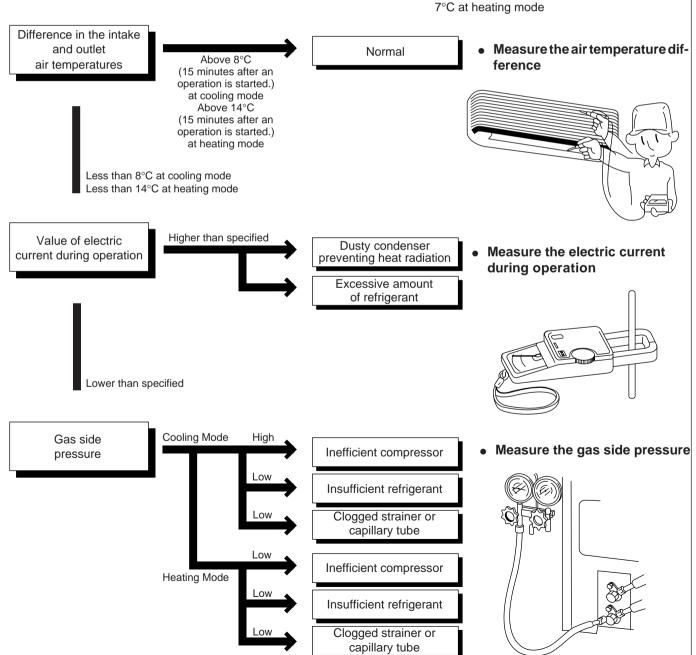
#### Refrigeration cycle system

In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor or a fan.

The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions; the standard values for them are shown in the table on the right. Normal Pressure and Outlet Air Temperature (Standard)

	Gas pressure MPa (kg/cm²G)	Outlet air temperature (°C)
Cooling mode	0.4 ~ 0.6 (4 ~ 6)	12 ~ 16
Heating Mode	1.5 ~ 2.1 (15 ~ 21)	36 ~ 45

★ Condition: Indoor fan speed; High Outdoor temperature 35°C at cooling mode and



# **Troubleshooting Guide**

# 1. Relationship between the condition of the air conditioner and pressure and electric current

		Cooling Mode		Heating Mode			
Condition of the air conditioner	Low Pressure	High Pressure	Electric current during operation	Low Pressure	High Pressure	Electric current during operation	
Insufficient refrigerant (gas leakage)	*	•	•	•	•	*	
Clogged capillary tube or Strainer	*	•	*	•	*	*	
Short circuit in the indoor unit	•	•	•	1	1	1	
Heat radiation defi- ciency of the outdoor unit	1	1	1	*	*	*	
Inefficient compression	1	•	•	1	•	•	

<sup>•</sup> Carry out the measurements of pressure, electric current, and temperature fifteen minutes after an operation is started.

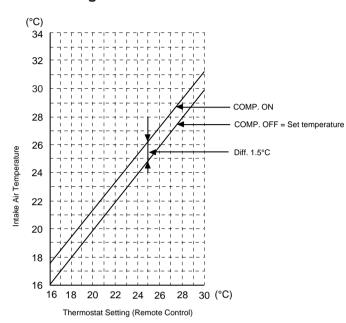
### 2. Diagnosis methods of a malfunction of a compressor and a 4-way valve

Nature of fault	Symptom
	Electric current during operation becomes approximately 20% lower than the normal value.
Insufficient compressing of a compressor	The discharge tube of the compressor becomes abnormally hot (normally 70 to 90°C).
	The difference between high pressure and low pressure becomes almost zero.
Locked compressor	Electric current reaches a high level abnormally, and the value exceeds the limit of an ammeter. In some cases, a breaker turns off.
	The compressor is a humming sound.
Inefficient switches of the 4-way valve	Electric current during operation becomes approximately 80% lower than the normal value.
	The temperature difference between from the discharge tube to the 4-way valve and from suction tube to the 4-way valve becomes almost zero.

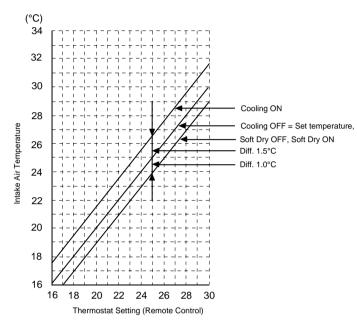
#### ■ Thermostat characteristics

#### CS-MA70KE / CS-MA90KE / CS-MA120KE

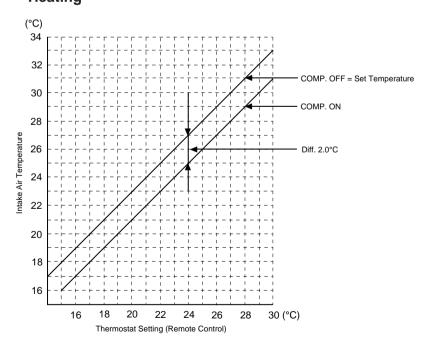
#### Cooling



### • Soft Dry



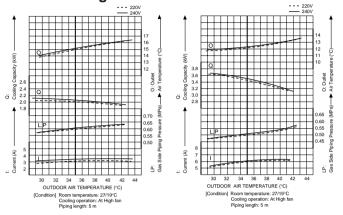
### Heating



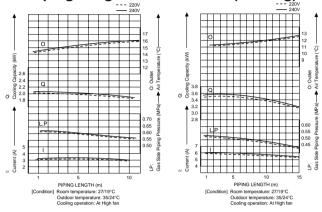
### Operation characteristics

### CS-MA70KE, CS-MA120KE / CU-MA190KE

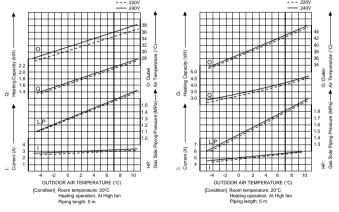
• Cooling Characteristic



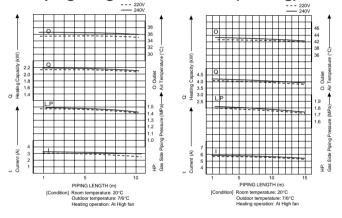
Piping Length Characteristic (Cooling)



• Heating Characteristic



• Piping Length Characteristic (Heating)



#### Operation characteristics

#### CS-MA90KE / CU-MA180KE

The capability value shown is the value for one unit. For a total for two units, multiply by 2.

**Cooling Characteristic** --- 220V 240V 17 16 15 ပ္ပ O 14 Cooling Capacity (kW) ▶ Air Temperature ( 13 O: Outlet 2.9 2.8 2.7 ä 2.6 Side Piping Pressure (MPa)— 2.5 2.4 0.60 LP 0.55 0.50 0.45 6 Current (A) 5 4 LP: Gas 3 34 36 38 OUTDOOR AIR TEMPERATURE (°C)

[Condition] Room temperature: 27/19°C Cooling operation: At High fan Piping length: 5 m

**Piping Length Characteristic (Cooling)** 240V 16 15 O ▼ Air Temperature (°C) 14 Cooling Capacity (kW) 13 3.0 Q 2.8 ä 2.6 2.4 Piping Pressure (MPa)-0.65 0.60 0.55 0.50

> PIPING LENGTH (m) [Condition] Room temperature: 27/19°C Outdoor temperature: 35/24°C Cooling operation: At High fan

6

5

4

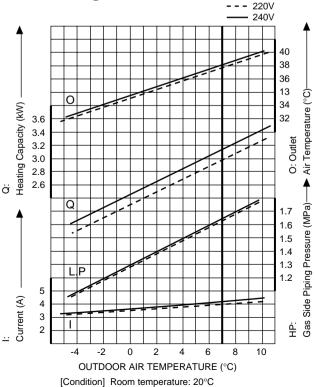
3

Current (A)

0.45

LP: Gas Side F

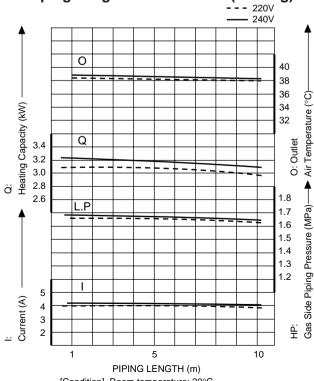
#### **Heating Characteristic**



Piping length: 5 m

Heating operation: At High fan

### **Piping Length Characteristic (Heating)**

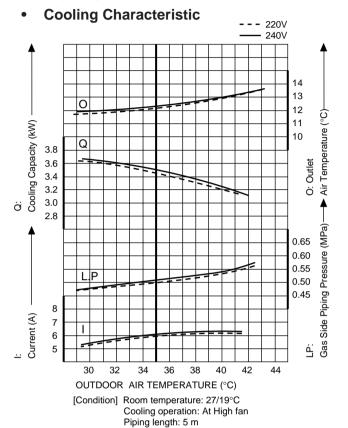


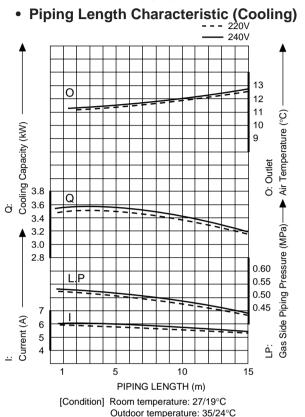
[Condition] Room temperature: 20°C Outdoor temperature: 7/6°C Heating operation: At High fan

### Operation characteristics

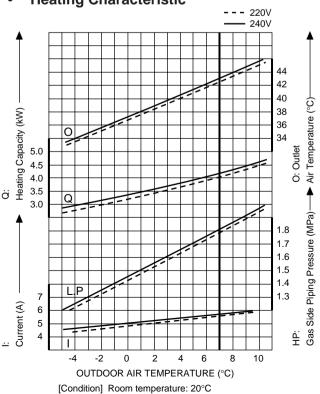
#### CS-MA120KE / CU-MA240KE

The capability value shown is the value for one unit. For a total for two unit, multiply by 2.





#### Heating Characteristic

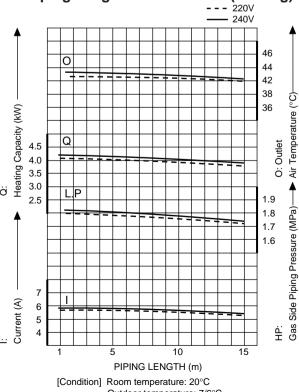


Heating operation: At High fan

Piping length: 5 m

#### Piping Length Characteristic (Heating)

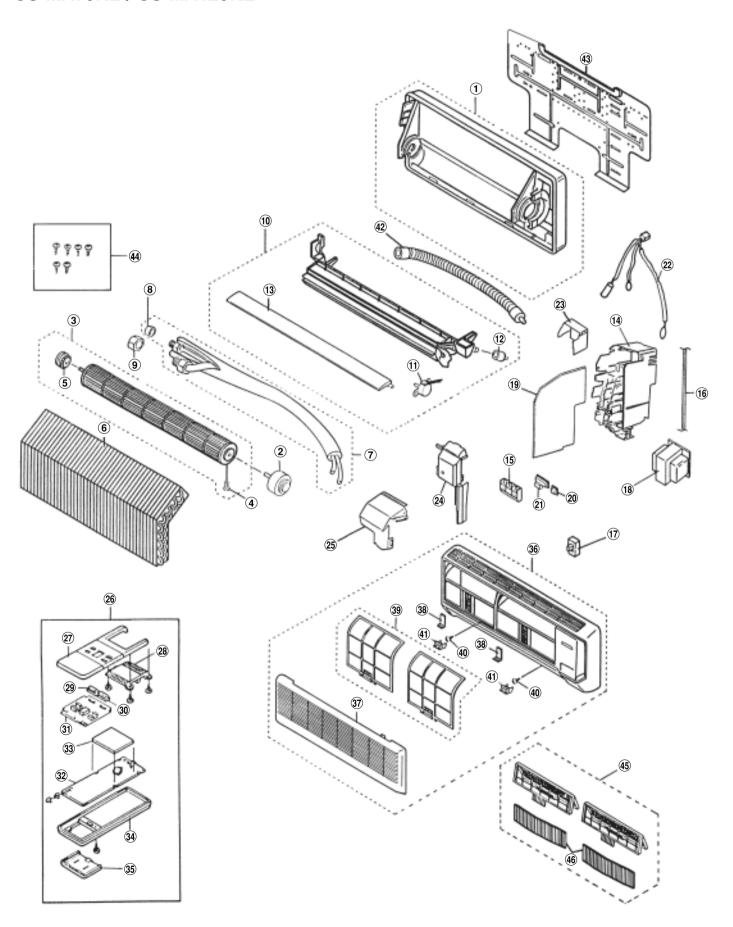
Cooling operation: At High fan



[Condition] Room temperature: 20°C Outdoor temperature: 7/6°C Heating operation: At High fan

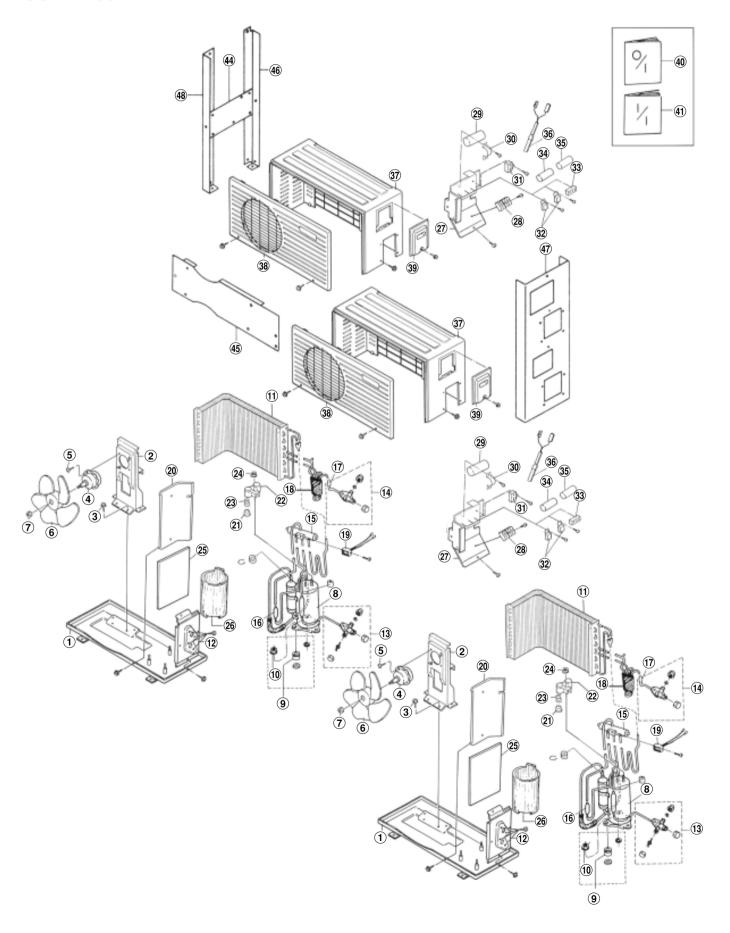
## Exploded View (CS-MA70KE, CS-MA120KE / CU-MA190KE)

### CS-MA70KE / CS-MA120KE



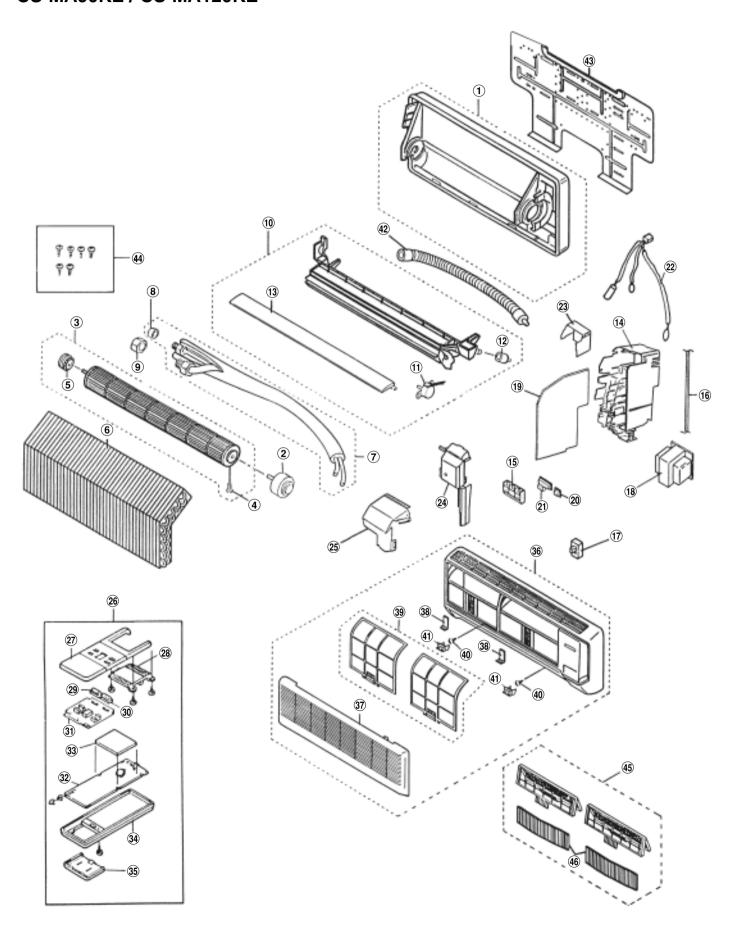
## Exploded View (CS-MA70KE, CS-MA120KE / CU-MA190KE)

### CU-MA190KE



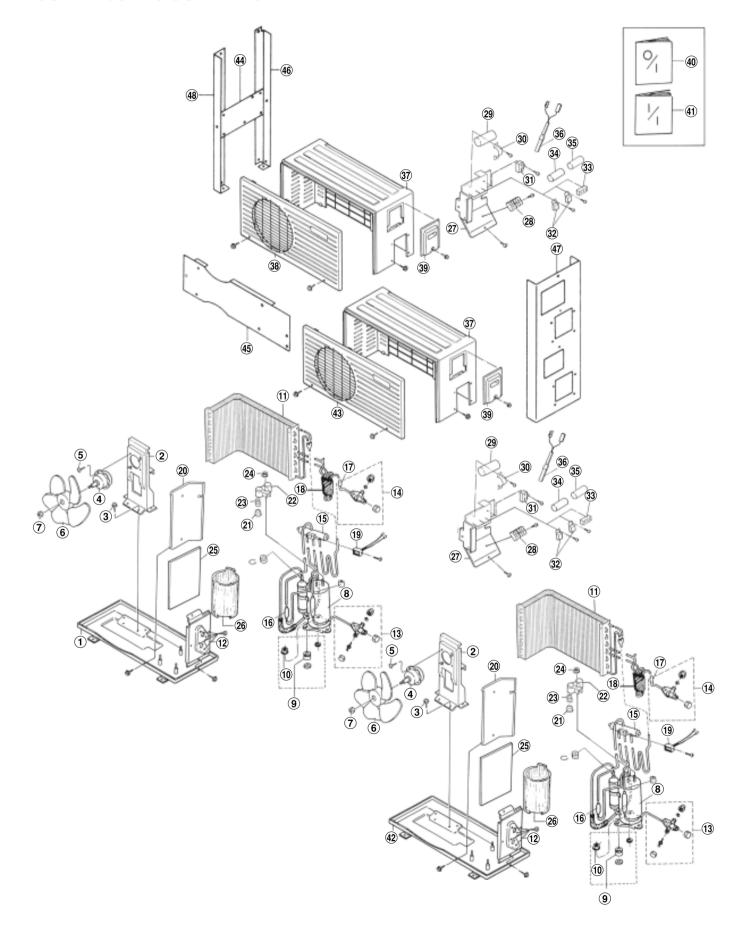
## Exploded View (CS-MA90KE / CU-MA180KE, CS-MA120KE / CU-MA240KE)

### CS-MA90KE / CS-MA120KE



## Exploded View (CS-MA90KE / CU-MA180KE, CS-MA120KE / CU-MA240KE)

### CU-MA180KE / CU-MA240KE



#### <Model: CS-MA70KE, CS-MA120KE>

NO.	<b>DESCRIPTION &amp; NAME</b>	QTY	CS-MA70KE	CS-MA120KE	REMARKS
1	CHASSY COMPLETE	1	CWD50C202	<b>←</b>	
2	FAN MOTOR	1	CWA98244	<b>←</b>	0
3	CROSS FLOW FAN COMPLETE	1	CWH02C053	<b>←</b>	
4	SCREW – CROSS FLOW FAN	1	CWH4580304	<b>←</b>	
5	BEARING ASS'Y	1	CWH64K007	<b>←</b>	
6	EVAPORATOR	1	CWB30C145	CWB30C146	
7	TUBE ASS'Y COMPLETE	1	CWT01C237	CWT01C238	
8	FLARE NUT (1/4")	1	CWH6002140	<b>←</b>	
9	FLARE NUT (1/2") OR (3/8")	1	CWT25005 (3/8")	CWT25007 (1/2")	
10	DISCHARGE GRILLE COMPLETE	1	CWE20C480	CWE20C481	
11	MOTOR – AIR SWING	1	CWA98245	<b>←</b>	0
12	TAP – DRAIN TRAY	1	CWH52C003	<b>←</b>	
13	VANE	1	CWE24394	<b>←</b>	
14	CONTROL BOARD	1	CWH10887	<b>←</b>	
15	TERMINAL BOARD COMPLETE	1	CWA28C469	CWA28C470	0
16	POWER SUPPLY CORD	1	CWA20C656	CWA20C620	
17	SLIDE SWITCH	1	CWA04088	<b>←</b>	0
18	TRANSFORMER COMPLETE	1	CWA40C246	<b>←</b>	0
19	ELETRONIC CONTROLLER	1	CWA74900	CWA74804	0
20	RECEIVER	1	CWA74321	<b>←</b>	0
21	INDICATOR COMPLETE	1	CWE39C271	<b>←</b>	0
22	SENSOR COMPLETE	1	CWA50C521	<b>←</b>	0
23	CONTROL BOARD TOP COVER	1	CWH13383	<b>←</b>	
24	CONTROL BOARD FRONT COVER	1	CWH13C256	<b>←</b>	
25	CONTROL BOARD COVER PIECE	1	CWH13385	<b>←</b>	
26	REMOTE CONTROL COMPLETE	1	CWA75C556	<b>—</b>	0
27	REMOTE CONTROL CASE CO.	1	CWE15C241	<b>←</b>	
28	CONTROL PANEL	1	CWE311064	<b>←</b>	
29	KNOB	1	CWE17196A	<b>←</b>	
30	KNOB	1	CWE17197A	<b>←</b>	
31	CONTACTOR	1	CWA65036C	<b>←</b>	
32	PCB – REMOTE CONTROL	1	CWA74224	<b>—</b>	
33	INDICATOR	1	CWE39199	<b>←</b>	
34	REMOTE CONTROL CASE	1	CWE15128A	<b>←</b>	
35	COVER	1	CWB80040A	<b>—</b>	
36	FRONT GRILLE COMPLETE	1	CWE11C590	-	
37	INTAKE GRILLE COMPLETE	1	CWE22C287	-	
38	PARTICULAR PIECE	2	CWD93C070	-	
39	AIR FILTER	2	CWD00215	-	
40	SCREW – FRONT GRILLE	2	XTN4+16C	<b>←</b>	
41	CAP – FRONT GRILLE	2	CWH52230	-	
42	DRAIN HOSE	1	CWH5880580	<b>←</b>	
43	INSTALLATION PLATE	1	CWH36122	+	
44	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C194	<b>←</b>	
45	AIR PURIFYING FILTER COMPLETE	1	CWD00C111	-	
46	AIR PURIFYING FILTER	2	CWD00220	<b>←</b>	0

- The above parts are kept for seven years in accordance with MEI service policy. However, longer lead time will be taken in supplying the non-numbered parts.
- O marked parts are recommended to be kept in stock.

#### <Model: CU-MA190KE>

NO.	IO. DESCRIPTION & NAME		CU-MA190KE		REMARKS	
			(Upper)		(Lower)	
1	CHASSY ASS'Y	1	CWD50K627A		CWD50K612A	
2	FAN MOTOR BRACKET	1	CWD54113		CWD54155	
3	SCREW – FAN MOTOR BRACKET	8		CWH4580399		
4	FAN MOTOR	2		CWA95245		0
5	SCREW – FAN MOTOR MOUNT	6		CWH55027		
6	PROPELLER FAN	2		CWH00K052		
7	NUT – PROPELLER FAN	2		CWH56032		
8	COMPRESSOR	1	2RS122D5AB02		2KS224D5AC02	0
9	ANTI – VIBRATION BUSHING	3	CWH50077		CWH50055	
10	NUT - COMPRESSOR MOUNT	3	CWH56000		CWH4582065	
11	CONDENSER	1	CWB32C043		CWB32C225	
12	HOLDER COUPLING ASS'Y	1	CWH35K017A		CWH35K019A	
13	3-WAY VALVE	1	CWB01343		CWB01379	0
14	2-WAY VALVE	1	CWB02224		CWB02269	0
15	4-WAY VALVE	1	CWB00002		CWB00003	0
16	TUBE ASS'Y (RECEIVER)	1	CWT01537		CWT01C240	
17	STRAINER	2		CWB11025		
18	TUBE ASS'Y (CHECK VALVE, CAPILLARY)	1	CWT01C260		CWT01C241	
19	V – COIL COMPLETE	1	CWA43C424		CWA43C439	0
20	SOUND PROOF BOARD	1	CWH15C081		CWH15264	
21	OVERLOAD PROTECTOR	1	CWA67C1349		CWA67C1212	0
22	TERMINAL COVER	1	CWH17006		CWH17038	
23	HOLDER – O.L.P.	1	_		CWH34033	
24	NUT – TERMINAL COVER	2		CWH7080300		
25	SOUND PROOF MATERIAL	1	_		CWG30779	
26	SOUND PROOF MATERIAL	1	CWG30786		_	
27	CONTROL BOARD	1	CWH10881		CWH10878	
28	TERMINAL BOARD ASS'Y	1	CWA28C500		CWA28C502	
29	CAPACITOR - COMPRESSOR	1	CWA31653		CWA31647	0
30	HOLDER CAPACITOR	2		CWH30057		
31	CAPACITOR – FAN MOTOR (1.2 µF, 400 V)	2		CWA31342		0
32	ELECTRO MAGNETIC SWITCH	4		CWA00059		0
33	TERMINAL BOARD ASS'Y	2		CWA4711012		
34	ELECTROLYTIC CAPACITOR	2		CWA32C045		0
35	ELECTROLYTIC CAPACITOR	2		CWA32C067		0
36	TEMPERATURE RELAY	2		CWA14C000		0
37	CABINET ASS'Y	1	CWE00K268A		CWE00K251A	
38	CABINET FRONT PLATE	1	CWE06C046E		CWE06C108A	
39	CONTROL BOARD COVER	2		CWH13C286		
40	OPERATING INSTRUCTIONS	1		CWF561247		
41	INSTALLATION INSTRUCTIONS	1		CWF61482		
44	FLAT PLATE	1		CWD64188A		
45	FLAT PLATE	1		CWD91184A		
46	FLAT PLATE	1		CWD91179A		
47	FLAT PLATE	1		CWD91180A		
48	FLAT PLATE	1		CWD91181A		

- The above parts are kept for seven years in accordance with MEI service policy. However, longer lead time will be taken in supplying the non-numbered parts.
- O marked parts are recommended to be kept in stock.

### <Model: CS-MA90KE, CS-MA120KE>

NO.	DESCRIPTION & NAME	QTY	CS-MA90KE	CS-MA120KE	REMARKS
1	CHASSY COMPLETE	1	CWD50C202	-	
2	FAN MOTOR	1	CWA98244	<b>←</b>	0
3	CROSS FLOW FAN COMPLETE	1	CWH02C053	<b>←</b>	
4	SCREW – CROSS FLOW FAN	1	CWH4580304	<b>←</b>	
5	BEARING ASS'Y	1	CWH64K007	<b>←</b>	
6	EVAPORATOR	1	CWB30C145	CWB30C146	
7	TUBE ASS'Y COMPLETE	1	CWT01C237	CWT01C238	
8	FLARE NUT (1/4")	1	CWH6002140	<b>+</b>	
9	FLARE NUT (1/2") OR (3/8")	1	CWT25005 (3/8")	CWT25007 (1/2")	
10	DISCHARGE GRILLE COMPLETE	1	CWE20C480	CWE20C481	
11	MOTOR – AIR SWING	1	CWA98245	<b>←</b>	0
12	TAP – DRAIN TRAY	1	CWH52C003	<b>←</b>	
13	VANE	1	CWE24394	<b>←</b>	
14	CONTROL BOARD	1	CWH10887	<b>←</b>	
15	TERMINAL BOARD COMPLETE	1	CWA28C469	CWA28C470	0
16	POWER SUPPLY CORD	1	CWA20C620	-	
17	SLIDE SWITCH	1	CWA04088	<b>←</b>	0
18	TRANSFORMER COMPLETE	1	CWA40C246	<b>←</b>	0
19	ELETRONIC CONTROLLER	1	CWA74899	CWA74804	0
20	RECEIVER	1	CWA74321	<b>←</b>	0
21	INDICATOR COMPLETE	1	CWE39C271	<b>←</b>	0
22	SENSOR COMPLETE	1	CWA50C521	<b>←</b>	0
23	CONTROL BOARD TOP COVER	1	CWH13383	-	
24	CONTROL BOARD FRONT COVER	1	CWH13C256	<b>←</b>	
25	CONTROL BOARD COVER PIECE	1	CWH13385	<b>—</b>	
26	REMOTE CONTROL COMPLETE	1	CWA75C556	<b>←</b>	0
27	REMOTE CONTROL CASE CO.	1	CWE15C241	<b>←</b>	
28	CONTROL PANEL	1	CWE311064	<b>←</b>	
29	KNOB	1	CWE17196A	<b>←</b>	
30	KNOB	1	CWE17197A	<b>←</b>	
31	CONTACTOR	1	CWA65036C	<b>←</b>	
32	PCB – REMOTE CONTROL	1	CWA74224	<b>←</b>	
33	INDICATOR	1	CWE39199	<b>←</b>	
34	REMOTE CONTROL CASE	1	CWE15128A	<b>←</b>	
35	COVER	1	CWB80040A	<b>—</b>	
36	FRONT GRILLE COMPLETE	1	CWE11C590	-	
37	INTAKE GRILLE COMPLETE	1	CWE22C287	<b>+</b>	
38	PARTICULAR PIECE	2	CWD93C070	-	
39	AIR FILTER	2	CWD00215	<b>←</b>	
40	SCREW – FRONT GRILLE	2	XTN4+16C	<b>←</b>	
41	CAP – FRONT GRILLE	2	CWH52230	-	
42	DRAIN HOSE	1	CWH5880580	-	
43	INSTALLATION PLATE	1	CWH36122	-	
44	BAG COMPLETE – INSTALLATION SCREW	1	CWH82C194	<b>←</b>	
45	AIR PURIFYING FILTER COMPLETE	1	CWD00C111	-	
46	AIR PURIFYING FILTER	2	CWD00220	<b>←</b>	0

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- O marked parts are recommended to be kept in stock.

#### <Model: CU-MA180KE / CU-MA240KE>

NO.	DESCRIPTION & NAME	QTY	CU-MA180KE	CU-MA240KE	REMARKS
1	CHASSY ASS'Y	1	CWD50K562A	CWD50K626A	
2	FAN MOTOR BRACKET	2	CWD54113	CWD54155	
3	SCREW – FAN MOTOR BRACKET	8	CWH4580399	<b>←</b>	
4	FAN MOTOR	2	CWA95245	<b>←</b>	0
5	SCREW – FAN MOTOR MOUNT	6	CWH55027	<b>←</b>	
6	PROPELLER FAN	2	CWH00K052	<b>←</b>	
7	NUT – PROPELLER FAN	2	CWH56032	<b>←</b>	
8	COMPRESSOR	2	2PS164D3AD02	2KS224D5AC02	0
9	ANTI – VIBRATION BUSHING	6	CWH50077	CWH50055	
10	NUT - COMPRESSOR MOUNT	6	CWH56000	CWH4582065	
11	CONDENSER	2	CWB32C043	CWB32C225	
12	HOLDER COUPLING ASS'Y	2	CWH35K017A	CWH35K019A	
13	3-WAY VALVE	2	CWB01343	CWB01379	0
14	2-WAY VALVE	2	CWB02224	CWB02269	0
15	4-WAY VALVE	2	CWB00002	CWB00003	0
16	TUBE ASS'Y (RECEIVER)	2	CWT01537	CWT01C240	
17	STRAINER	2	CWB11025	<b>←</b>	
18	TUBE ASS'Y (CHECK VALVE, CAPILLARY)	2	CWT01C257	CWT01C241	
19	V – COIL COMPLETE	2	CWA43C424	CWA43C439	0
20	SOUND PROOF BOARD	2	CWH15C081	CWH15264	
21	OVERLOAD PROTECTOR	2	CWA67C1210	CWA67C1212	0
22	TERMINAL COVER	2	CWH17038	<b>←</b>	
23	HOLDER – O.L.P.	2	CWH34033	<b>←</b>	
24	NUT – TERMINAL COVER	2	CWH7080300	<b>←</b>	
25	SOUND PROOF MATERIAL	2	_	CWG30779	
26	SOUND PROOF MATERIAL	2	CWG30786	_	
27	CONTROL BOARD	2	CWH10881	CWH10878	
28	TERMINAL BOARD ASS'Y	2	CWA28C501	CWA28C502	
29	CAPACITOR - COMPRESSOR	2	CWA31646	CWA31647	0
30	HOLDER CAPACITOR	2	CWH30057	<b>←</b>	
31	CAPACITOR – FAN MOTOR (1.2 $\mu$ F, 400 V)	1, 1	CWA31341, CWA31342	CWA31341, CWA31342	0
32	ELECTRO MAGNETIC SWITCH	4	CWA00059	<b>←</b>	0
33	TERMINAL BOARD ASS'Y	2	CWA4711012	<b>←</b>	
34	ELECTROLYTIC CAPACITOR	2	CWA32C045	<b>←</b>	0
35	ELECTROLYTIC CAPACITOR	2	CWA32C067	<b>←</b>	0
36	TEMPERATURE RELAY	2	CWA14C000	<b>←</b>	0
37	CABINET ASS'Y	2	CWE00K268A	CWE00K251A	
38	CABINET FRONT PLATE	1	CWE06C046E	CWE06C104A	
39	CONTROL BOARD COVER	2	CWH13302	CWH13C286	
40	OPERATING INSTRUCTIONS	1	CWF561247	-	
41	INSTALLATION INSTRUCTIONS	1	CWF61481	-	
42	CHASSY ASSY'Y (LOWER)	1	CWD50K456D	CWD50K612A	
43	CABINET FRONT PLATE	1	CWE06C066A	CWE06C108A	
44	FLAT PLATE	1	CWD64188A	CWD64189A	
45	FLAT PLATE	1	CWD90964A	CWD90955A	
46	FLAT PLATE	1	CWD90962A	CWD90960A	
47	FLAT PLATE	1	CWD90973A	CWD90977A	
48	FLAT PLATE	1	CWD90961A	CWD90959A	

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- O marked parts are recommended to be kept in stock.

## **Electronic Parts List**

#### <Model: CWA74900 / CWA74899 / CWA74804>

SYMBOL	DESCRIPTION & NAME	PART NO.
BZ	SOUND GENERATOR	A48004
CT1	TRANSFORMER	A40322
D1	DIODE	A54RB44-08V
D2	DIODE	A54C197
D3	DIODE	A541SS131T
D6	DIODE	A54RA15-01KB
D24	DIODE	A54MA723TA
D7 ~ D13, D15 ~ D23	DIODE	A54MA165TA5
DB1	DIODE	A54D3SBA60F1
DB2	DIODE	A54CS1VB20E
FUSE	FUSE	XBA2C20TR0
IC1	INTEGRATED CIRCUIT	A52D011W164
IC2	INTEGRATED CIRCUIT	A52C096
IC3	INTEGRATED CIRCUIT	A52C040
IC4	INTEGRATED CIRCUIT	A52MPA2003C
IC5	INTEGRATED CIRCUIT	A52BR9011B
IC6	INTEGRATED CIRCUIT	A52MPC393C
IC7	INTEGRATED CIRCUIT	A52BX7809
L1	V-COIL	A43101T
L2 ~ L6	V-COIL	A43036
LF1	NOISE FILTER	A49221
Q1	TRANSISTOR	A55C081
Q10 ~ Q12	TRANSISTOR	A55DTA143XST
Q16	TRANSISTOR	A52STA302A
Q17	TRANSISTOR	A52STA303A
Q2	TRANSISTOR	A55D2220QTA
Q3, Q5, Q7 ~ Q9, Q13 ~ Q15, Q18	TRANSISTOR	A55DTC114EST
Q4	TRANSISTOR	A55C1740STPQ
Q6	TRANSISTOR	A55C1741ASTR
RY-HOT	ELECTRO MAGNETIC RELAY	A00161
RY-PWR	ELECTRO MAGNETIC RELAY	A00106
SSR1	TYRISTOR	A56W2DEH1–5
SW1	SLIDE SWITCH	A04042
SW2, SW3	PUSH SWITCH	A01059
T1	TRANSFORMER	A40235
T2	TRANSFORMER	A40263
VR1	VARIABLE RESISTOR	A44VG67TP152
X1	RESONATOR	A45ST8.0MTWT
ZD1	DIODE	A54D8.2EL2TB
ZNR1	DIODE	A54C036

(Note) • All parts are supplied from MACC, Malaysia (Vendor Code: 086).