# SPLIT TYPE ROOM AIR CONDITIONER WALL MOUNTED type INVERTER

# SERVICE INSTRUCTION

Models

**Indoor unit** 

**Outdoor unit** 

AS\*A18LEC

AO\*R18LEC



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# WALL MOUNTED type INVERTER

### 1. SPECIFICATIONS

#### **SPECIFICATIONS**

#### **ELECTRICAL DATA**

INDOOR UNIT	AS*A18LEC	
OUTDOOR UNIT	AO*R18LEC	
POWER SOURCE	230 V	
FREQUENCY	50 Hz	
COOLING CAPACITY	5.20 kW	
HEATING CAPACITY	6.30 kW	
RUNNING CURRENT (Cool)	6.8 A	
RUNNING CURRENT (Heat)	7.6 A	
INPUT WATTS (Cooling)	1.52 kW	
INPUT WATTS (Heating)	1.71 kW	
E.E.R. (Cooling)	3.42 kW/kW	
C.O.P. (Heating)	3.68 kW/kW	
MAXIMUM CURRENT (Cool)	9.0 A	
MAXIMUM CURRENT (Heat)	12.5 A	
MOISTURE REMOVAL	2.8 L/hr	
AIR CIRCULATION HIGH	900 m <sup>3</sup> /hr	

#### **FAN MOTOR**

POWER SOURCE		230 V
INDOOR UNIT	High speed	1,220 r.p.m.
	Middle	1,020 r.p.m.
INDOOR OR IT	Low	900 r.p.m.
	Quiet	710 r.p.m.
OUTDOOR UNIT		1,050 r.p.m.

#### NOISE LEVEL

	High	43 dB / 42 dB
INDOOR UNIT	Middle	37 dB / 37 dB
(Cooling / Heating)	Low	33 dB / 33 dB
	Quiet	26 dB / 25 dB
OUTDOOR UNIT (Cool / Heat)		50 dB / 52 dB

#### COMPRESSOR AND REFRIGERANT

TYPE	Hermetic type, 4 pole, Rotary, DC inverter motor		
DISCRIMINATION		808 903 80	
WEIGHT (with oil)		9.0 kg	
REFRIGERANT TYPE		R410A	
PRECHARGED REFRIG	PRECHARGED REFRIGERANT		
Pipe Length 15 m		1,200 g	
FULL CHARGE	20 m	1,300 g	
25 m		1,400 g	
ADDITIONAL CHARGE		20 g/m	
MAX HEIGHT		20 m	

#### DIMENSIONS

INDOOR UNIT	HxWxD	320 x 998 x 228 mm
OUTDOOR UNIT	HxWxD	620 x 790 x 298 mm

#### WEIGHT

INDOOR UNIT	Gross / Net	18 kg / 14 kg
OUTDOOR UNIT	Gross / Net	45 kg / 40 kg



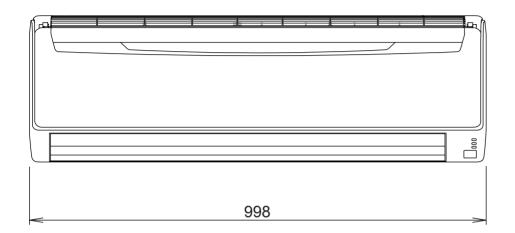
# WALL MOUNTED type INVERTER

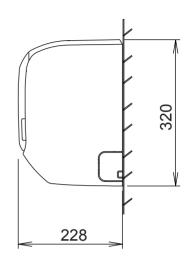
### 2. DIMENSIONS

### DIMENSIONS

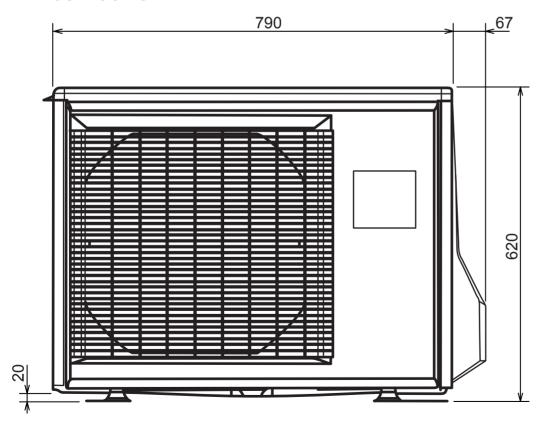
(unit: mm)

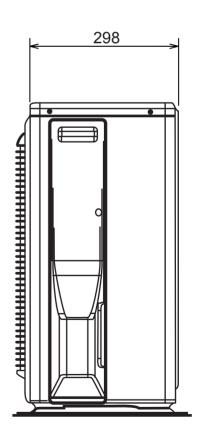
#### **INDOOR UNIT**





#### **OUTDOOR UNIT**



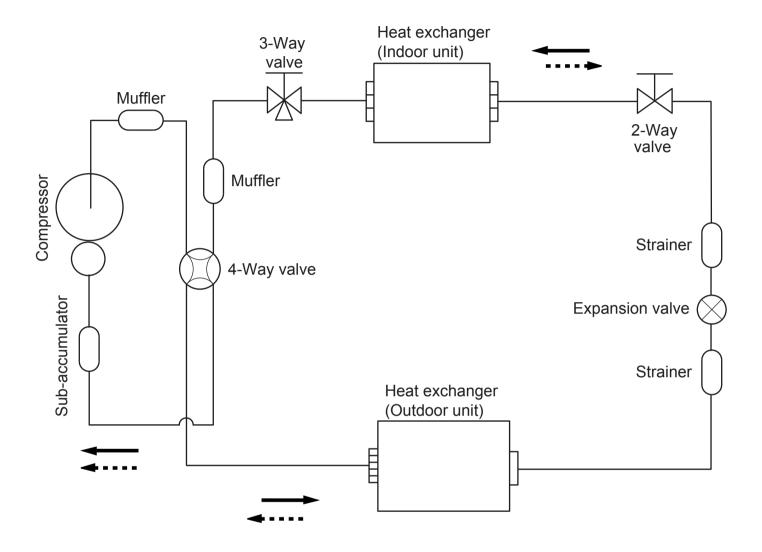




# WALL MOUNTED type INVERTER

### 3. REFRIGERANT SYSTEM DIAGRAM

#### REFRIGERANT SYSTEM DIAGRAM



#### Refrigerant direction



Refrigerant pipe diameter Liquid: 1/4" (6.35 mm) Gas: 1/2" (12.7 mm)

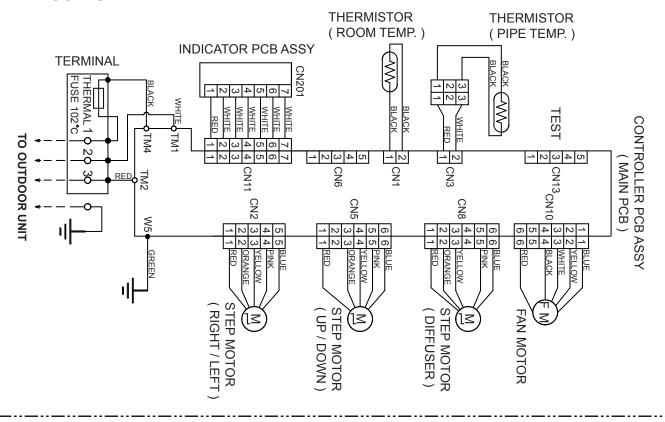


# WALL MOUNTED type INVERTER

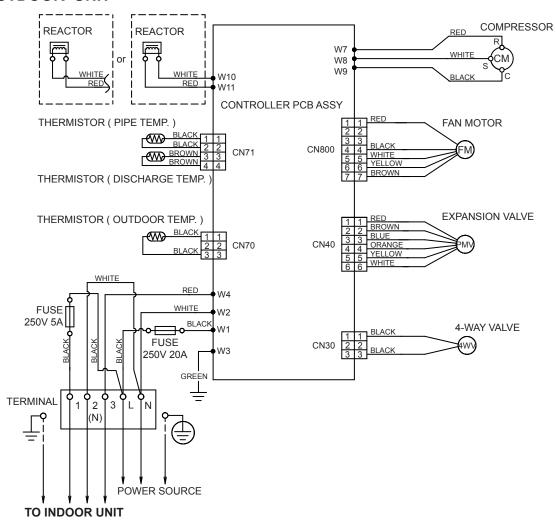
### 4. CIRCUIT DIAGRAM

#### **CIRCUIT DIAGRAM**

#### **INDOOR UNIT**



#### **OUTDOOR UNIT**





# WALL MOUNTED type INVERTER

# 5. DESCRIPTION OF EACH CONTROL OPERATION

#### 1. COOLING OPERATION

#### 1-1 COOLING CAPACITY CONTROL

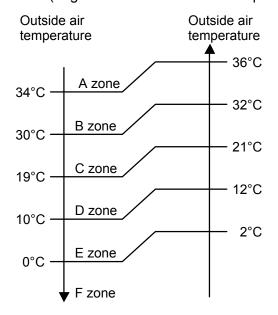
A sensor (room temperature thermistor) built in the indoor unit body will usually perceive difference or variation between a set temperature and present room temperature, and controls the operation frequency of the compressor.

- \* If the room temperature is 2°C higher than a set temperature, the compressor operation frequency will attain to maximum performance.
- \* If the room temperature is 2.5°C lower than a set temperature, the compressor will be stopped.
- \* When the room temperature is between +2°C to -2.5°C of the setting temperature, the compressor frequency is controlled within the range shown in Table1. However, the maximum frequency is limited in the range shown in Figure 1 based on the fan speed mode and the outdoor temperature.

(Table 1: Compressor Frequency Range)

minimum		maximum	maximum	
frequency		frequency II	frequency I	
AS*A18LEC	18Hz	70Hz	95Hz	

(Fig. 1: Limit of Maximum Frequency based on Outdoor Temperature)



		Hi	Me	Lo	Quiet
18LEC	A zone	95Hz	66Hz	54Hz	34Hz
	B zone	95Hz	66Hz	54Hz	34Hz
	C zone	95Hz	66Hz	54Hz	34Hz
	D zone	58Hz	45Hz	30Hz	24Hz
	E zone	58Hz	45Hz	30Hz	24Hz
	F zone	58Hz	45Hz	30Hz	24Hz

When the compressor operates for 30 minutes continuously at over the maximum frequency  $\mathbf{I}$ , the maximum frequency is changed from Maximum Frequency  $\mathbf{I}$  to Maximum Frequency  $\mathbf{I}$ .

#### 2. HEATING OPERATION

#### 2-1 HEATING CAPACITY CONTROL

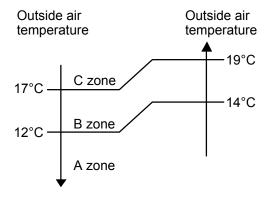
A sensor (room temperature thermistor) built in the indoor unit body will usually perceive difference or variation between a set temperature and present room temperature, and controls the operation frequency of the compressor.

- \* If the room temperature is lower by 3°C than a set temperature, the compressor operation frequency will attain to maximum performance.
- \* If the room temperature is higher 2.5°C than a set temperatire, the compressor will be stopped.
- \* When the room temperature is between +2.5°C to -3°C of the setting temperature, the compressor frequency is controlled within the range shown in Table2. However, the maximum frequency is limited in the range shown in Figure 2 based on the fan speed mode and the outdoor temperature.

( Table 2 : Compressor Frequency Range )

	minimum frequency	maximum frequency	
AS*A18LEC	18Hz	130Hz	

(Fig.2: Limit of Maximum Frequency based on Outdoor Temperature)



		Hi	Me+	Ме	Lo	Quiet
18LEC	A zone	130Hz	130Hz	95Hz	75Hz	62Hz
	B zone	130Hz	130Hz	95Hz	75Hz	62Hz
	C zone	130Hz	130Hz	95Hz	75Hz	62Hz

After 60 minutes, it is controlled based on the normal setting temperature.

<sup>\*</sup> The room temperature is controlled 2°C higher than the setting temperature for 60 minutes after starting the operation.

#### 3. DRY OPERATION

#### 3-1 INDOOR UNIT CONTROL

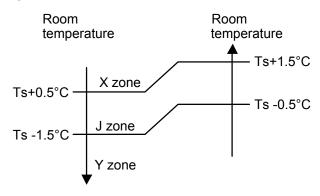
The compressor rotation frequency shall change according to the temperature, set temperature, and room temperature variation which the room temperature sensor of the indoor unit body has detected as shown in the Table 3.

However, after the compressor is driven, the indoor unit shall run at operation frequency of 40Hz, for a minute.

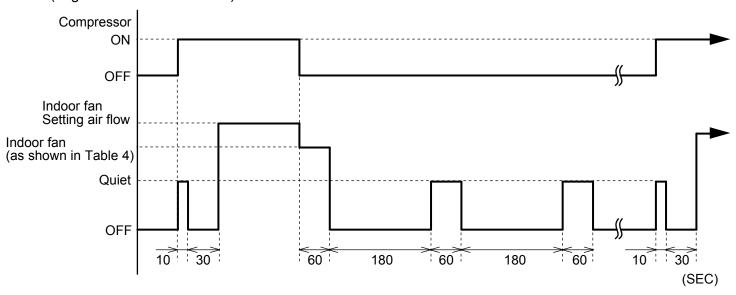
( Table 3 : Compressor frequency )

		Operating frequency
18LEC	X zone	34Hz
	J zone	20Hz
	Y zone	0Hz

(Fig.3: Compressor Control based on Room Temperature)



(Fig.4: Indoor Fan Control)



(Table 4: Indoor fan speed)

	X zone	J, Y zone
AS*A18LEC	710rpm	660rpm

#### 4. AUTO CHANGEOVER OPERATION

When the air conditioner is set to the AUTO mode by remote control, operation starts in the optimum mode from among the HEATING, COOLING, DRY and MONITORING modes. During operation, the optimum mode is automatically switched in accordance with temperature changes. The temperature can be set between 18°C and 30°C in 1°C steps.

① When operation starts, only the indoor and outdoor fans are operated for 1 minute. After 1 minute, the room temperature and outside air temperature are sensed and the operation mode is selected in accordance with the table below.

(Fig.5: Outside air temperature zone selection)

0000	C zone	
32°C —	B zone	
-10°C —		
	A zone	

#### ( Table.5 Operation mode selection table)

Outside air temperature (TO)  Room temperature (TB)	A zone	B zone	C zone
TB > TS+2°C	Monitoring	Cooling (automatic dry)	Cooling (automatic dry)
TS+2°C ≧TB ≧TS - 2°C	Monitoring	Monitoring	Monitoring
TB <ts-2°c< td=""><td>Heating</td><td>Heating</td><td>Monitoring</td></ts-2°c<>	Heating	Heating	Monitoring

- ② When COOING was selected at ①, the air conditioner operates as follow:
  - The same operation as COOLING OPERATION of item 1 above is performed.
  - When the room temperature has remained at (set temperature -1°C) for 8 minutes, operation is automatically switched to DRY and the same operation as DRY OPERATION of item 3 above is performed.
  - If the room temperature reaches (set temperature +2°C during DRY operation, operation returns to COOLING operation.
- ③ When HEATING was selected at ① , the same operation as HEATING OPERATION of item 2 above is performed.
- When the compressor was stopped for 6 consecutive minutes by the temperature control function after the COOLING or HEATING operation mode was selected at ① above, operation is switched to MONITORING and the operation mode is selected again.

#### 5. INDOOR FAN CONTROL

#### 1. Fan speed

(Table 6: Indoor Fan Speed)

- AS\*A18LEC

Operation mode	Air flow mode	Speed (rpm)
Heating	Hi	1220
	Me+	1120
	Me	1020
	Lo	900
	Quiet	710
	Cool air prevention	660
	S-Lo	270
Cooling	Hi	1220
	Me	1020
	Lo	900
	Quiet	710
Dry		X zone: 710 J zone: 660

#### 2. FAN OPERATION

The airflow can be switched in 5 steps such as AUTO, QUIET, LOW, MED, HIGH, while the indoor fan only runs.

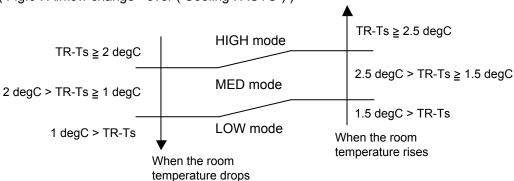
When Fan mode is set at (Auto), it operates on (MED) Fan Speed.

#### 3. COOLING OPERATION

Switch the airflow [AUTO], and the indoor fan motor will run according to a room temperature, as shown in Figure 6.

On the other hand, if switched in [HIGH]  $\sim$  [QUIET], the indoor motor will run at a constant airflow of [COOL] operation modes QUIET, LOW, MED, HIGH, as shown in Table 6.

(Fig.6: Airflow change - over (Cooling: AUTO))



TR : Room temperature Ts : Setting temperature

#### 4. DRY OPERATION

Refer to the Table 6.

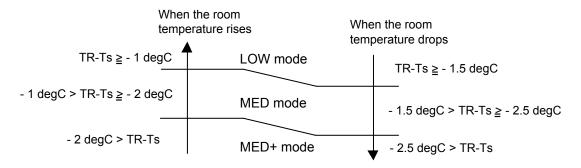
During the dry mode operation, the fan speed setting can not be changed.

#### **5. HEATING OPERATION**

Switch the airflow [AUTO], and the indoor fan motor will run according to a room temperature, as shown in Figure 7.

On the other hand, if switched in [HIGH]  $\sim$  [QUIET], the indoor motor will run at a constant airflow of [HEAT] operation modes QUIET, LOW, MED, HIGH, as shown in Table 6.

(Fig.7: Airflow change - over (Heating: AUTO))

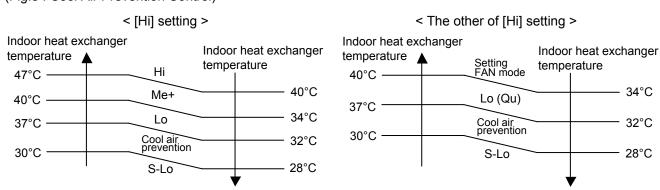


TR : Room temperature Ts : Setting temperature

#### 6. COOL AIR PREVENTION CONTROL (Heating mode)

The maximum value of the indoor fan speed is set as shown in Figure 8, based on the detected temperature by the indoor heat exchanger sensor on heating mode.

(Fig.8: Cool Air Prevention Control)



#### 6. OUTDOOR FAN CONTROL

#### 1. Outdoor Fan Motor

Following table shows the type of the outdoor fan motor. The control method is different between AC motor and DC motor.

(Table 7: Type of Motor)

	AC Motor	DC Motor
AS*A18LEC		0

#### 2. Fan Speed

(Table 8: Outdoor fan speed)

(rpm)

	ZONE*	Cooling	Dry	Heating
AS*A18LEC	A - C	1050/ 870/ 720/ 530	530	
	D	870/ 530/ 300	550	870/ 780/ 720/ 590/ 480
	Е	300	300	010/100/120/390/400
	F	250/ 200	250/ 200	

X Refer to Fig1.

- \* It runs at 500(A-D ZONE)/200(E,F ZONE) rpm for 20 seconds after starting up the outdoor fan.
- \* The outdoor fan speed mentioned avobe depends on the compressor frequency. (When the compressor frequency increases, the outdoor fan speed also changes to the higher speed. When the compressor frequescy decreases, the outdoor fan speed also changes to the lower speed.)
- \* Outdoor temperature falls, and if it becomes E and F zone(Refer to Fig1), rotations of fan speed will fall.
- \* After the defrost control is operated on the heating mode, the fan speed keeps at the higher speed as table 9 without relating to the compressor frequency.

( Table 9 : Outdoor fan speed after the defrost )

	Min
AS*A18LEC	1100rpm

#### 7. LOUVER CONTROL

#### 1. LOUVER CONTROL

When the indoor control interface device receives a control signal light from the remote control, it will actuate, the step motor according to the control signal, and set the louver to each position. In addition, if the air conditioner is stopped, vertical louver will be closed automatically.

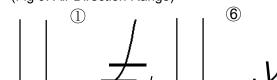
#### **Vertical Air Direction Adjustment**

(Function Range)

Each time the button is pressed, the air direction range will change as follow:

 $0 \stackrel{\rightarrow}{\smile} 2 \stackrel{\rightarrow}{\smile} 3 \stackrel{\rightarrow}{\smile} 4 \stackrel{\rightarrow}{\smile} 5 \stackrel{\rightarrow}{\smile} 6$ 

(Fig 9: Air Direction Range)



(Operation Range)

Cooling / Dry mode : (1-2-3)Heating mode : (4-5-6)Fan mode : (1-2-3-4-5-6)

Use the air direction adjustments within the ranges shown above.

#### **Horizontal Air Direction Adjustment**

(Function Range)

Each time the button is pressed, the air direction range will change as follow:

• The vertical airflow direction is set automatically as shown, in accordance with the type of operation selected.

Cooling / Dry mode : Horizontal flow ①
Heating mode : Downward flow ⑥

- When the temperature of the air being blown out is low at the start of heating operation or during defrosting, the airflow direction temporarily becomes ⑥ to prevent cold air being blown onto the body.
- During use of the Cooling and Dry modes, do not set the Air Flow Direction Louver in the Heating range ( $\textcircled{4}\sim\textcircled{6}$ ) for long period of time, since water vapor many condense near the outlet louvers and drop of water may drip from the air conditioner. During the Cooling and Dry modes, if the Air Flow Direction Louvers are left in the hating range for more than 20minutes, they will automatically return to position 3.
- During Monitor operation in AUTO CHANGEOVER mode, the airflow direction automatically becomes ①, the horizontal airflow direction does not cahnge, and it cannot be adjusted.

#### 2. SWING OPERATION

#### To select Vertical Airflow Swing Operation

When the swing signal is received from the remote controller, the vertical louver starts to swing.

#### (Swinging Range)

```
Cooling mode / Dry mode / Fan mode(1)\sim3) : 1 \leftrightarrow 4 Heating mode / Fan mode(4)\sim6) : 3 \leftrightarrow 6
```

• When the indoor fan is at S-Lo or Stop mode, the swinging operation is interrrupted and it stops at either right end or left end.

#### To select Horizontal Airflow Swing Operation

When the swing signal is received from the remote controller, the horizontal louver starts to swing.

#### (Swinging Range)

All mode :  $\textcircled{1} \Leftrightarrow \textcircled{5}$ 

• When the indoor fan is S-Lo or Stop mode, the swinging operation is interrrupted and it stops at either upper end or bottom end.

#### To select Vertical and Horizontal Airflow Swing Operation

• When the horizontal swing signal is input from remote control, the combination of the vertical and horizontal swing operation is performed.

#### 8. COMPRESSOR CONTROL

#### 1. OPEARTION FREQUENCY RANGE

The operation frequency of the compressor is different based on the operation mode as shown in the table 10.

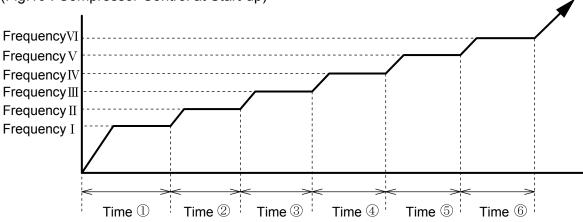
(Table 10 : Compressor Operation Frequency Range)

	Coo	ling	Hea	ting	D	ry
	Min	Max	Min	Max	Min	Max
AS*A18LEC	18Hz	95Hz	18Hz	130Hz	20Hz	34Hz

#### 2. OPEARTION FREQUENCY CONTROL AT START UP

The compressor frequency soon after the start-up is controlled as shown in the figure 10.

(Fig.10 : Compressor Control at Start-up)



#### (Frequency)

	Frequency I	Frequency II	Frequency III	FrequencyIV	FrequencyV	FrequencyVI
AS*A18LEC	40Hz	59Hz	72Hz	85Hz	101Hz	110Hz

#### (Time)

	Time ①	Time ②	Time ③	Time ④	Time 5	Time ⑥
AS*A18LEC	120sec	60sec	40sec	50sec	80sec	60sec

#### 9. TIMER OPEARTION CONTROL

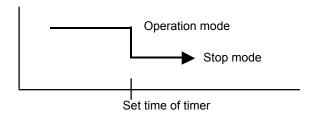
The table 11 shows the available timer setting based on the product model.

(Table 11 : Timer Setting)

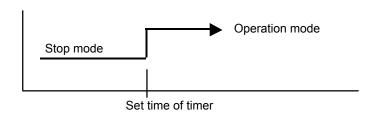
	ON TIMER / OFF TIMER	PROGRAM TIMER	SLEEP TIMER
AS*A18LEC	0	0	0

#### 1. OPEARTION FREQUENCY RANGE

· OFF timer: When the clock reaches the set time, the air conditioner will be turned off.

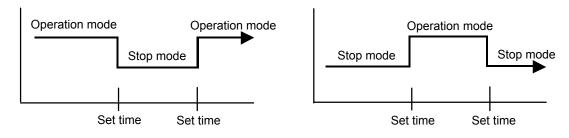


· ON timer: When the clock reaches the set time, the air conditioner will be turned on.



#### 2. PROGRAM TIMER

• The program timer allows the OFF timer and ON timer to be used in combination one time.



- Operation will start from the timer setting (either OFF timer or ON timer) whichever is closest to the clock's current timer setting.
- The order of operations is indicated by the arrow in the remote control unit's display.
- · SLEEP timer operation cannot be combined with ON timer operation.

#### 3. SLEEP TIMER

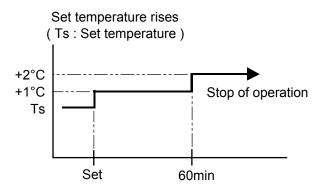
If the sleep is set, the room temperature is monitored and the operation is stopped automatically. If the operation mode or the set temperature is change after the sleep timer is set, the operation is continued according to the changed setting of the sleep timer from that time ON.

#### In the cooling operation mode

When the sleep timer is set, the setting temperature is increased 1°C.

It increases the setting temperature another 1°C after 1 hour.

After that, the setting temperature is not changed and the operation is stopped at the time of timer setting.

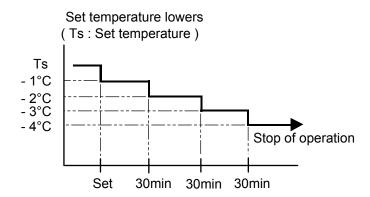


#### In the heating operation mode

When the sleep timer is set, the setting temperature is decreased 1°C.

It decreases the setting temperature another 1°C every 30 minutes.

Upon lowering 4°C, the setting temperature is not changed and the operation stops at the time of timer setting.



#### 10. ELECTRONIC EXPANSION VALVE CONTROL

The most proper opening of the electronic expansion valve is calculated and controlled under the present operating condition based on the following values.

The compressor frequency, the temperatures detected by the discharge temperature sensor, the indoor heat exchanger sensor, the outdoor heat exchanger sensor, and the outdoor temperature sensor.

- \* The pulse range of the electronic expansion valve control is between 60 to 480 pulses.
- \* The expansion valve is set at 480 pulses after 110 seconds of stopping compressor.
- \* At the time of supplying the power to the outdoor unit, the initialization of the electronic expansion valve is operated (528 pulses are input to the closing direction).

#### 11. TEST OPERATION CONTROL

Under the condition where the air conditioner runs, press the test run button of the remote control, and the test operation control mode will appear. During test running, the operation lamp and timer lamp of the air conditioner body twinkle simultaneously. Set the test operation mode, and the compressor will continue to run regardless of whether the room temperature sensor detects. The test operation mode is released if 60 minutes have passed after setting up the test operation.

#### 12. PREVENT TO RESTART FOR 3 MINUTES (3 MINUTES ST)

The compressor won't enter operation status for 3 minutes after the compressor is stopped, even if any operation is given.

#### 13. FOUR-WAY VALVE EXTENSION SELECT

At the time when the air conditioner is switched from the cooling mode to heating mode, the compressor is stopped, and the four-way valve is switched in 3 minutes later after the compressor stopped.

#### 14. AUTO RESTART

When the power was interrupted by a power failure, etc. during operation, the operation contents at that time are memorized and when power is recovered, operation is automatically started with the memorized operation contents.

When the power is interrupted and recovered during timer operation, since the timer operation time is shifted by the time the power was interrupted, an alarm is given by blinking (7 sec ON/2 sec OFF) the indoor unit body timer lamp.

[Operation contents memorized when the power is interrupted]

- · Operation mode
- · Set temperature
- · Set air flow
- · Timer mode and timer time
- · Set air flow Direction
- Swing
- · 10°C HEAT

#### 15. MANUAL AUTO OPERATION (Indoor unit body operation)

If MANUAL AUTO Button is set, the operation is controlled as shown in Table 12. If the remote control is lost or battery power dissipated, this function will work without the remote control.

(Table 12)

	Manual auto operation	Forced cooling operation
OPERATION MODE	Auto changeover	Cooling
FAN CONT. MODE	Auto	Hi
TIMER MODE	Continuous (No timer setting available)	-
SETTING TEMP.	24°C	Room Temp is not controlled
SETTING LOUVER	Standard	Horizontal
SWING	OFF	OFF

#### 16. FORCED COOLING OPERATION

Forced cooling operation is started when pressing MANUAL AUTO button for 10 seconds or more. During the forced cooling operation, it operates regardless of room temperature sensor. Operation LED and timer LED blink during the forced cooling operation. They blink for 1 second ON and 1 second OFF on both operation LED and timer LED (same as test operation). Forced cooling operation is released after 60 minutes of starting operation.

The FORCED COOLING OPERATION will start as shown in Table 12.

#### 17. COMPRESSOR PREHEATING

When the outdoor heat exchanger temperature is lower than 5°C and the heating operation has been stopped for 30 minutes, power is applied to the compressor and the compressor is heated. (By heating the compressor, warm air is quickly discharged when operation is started.) When operation was started, and when the outdoor temperature rises to 7°C or greater, preheating is ended.

#### 18. COIL DRY OPERATION CONTROL

The coil-dry operation functions by pressing COIL DRY button on the remote controller. The coil-dry operation is consisted of Fan operation 50 minutes, Heating operation 3 minutes, and Fan operates for 30 minutes at last before ending the air conditioner operation.

(Table 13: COIL-DRY Operating Functions)

	Indoor Fan Speed	Compressor Frequency	Louver Position	Main Unit Indication
AS*A18LEC	900rpm	30Hz	1	COIL-DRY : ON Other indication : OFF

#### 19. DEFROST OPERATION CONTROL

#### 1. CONDITION OF STARTING THE DEFROST OPERATION

The defrost operation starts when the outdoor heat exchanger temperature sensor detects the temperature lower than the values shown in Table 14.

(Table 14 : Condition of starting Defrost Operation)

	Compressor operating time		
	Less than 25 minutes	25 minutes to 4 hours	After 4 hours
AS*A18LEC	Does not operate	- 6°C	- 3°C

#### 2. CONDITION OF THE DEFROST OPERATION COMPLETION

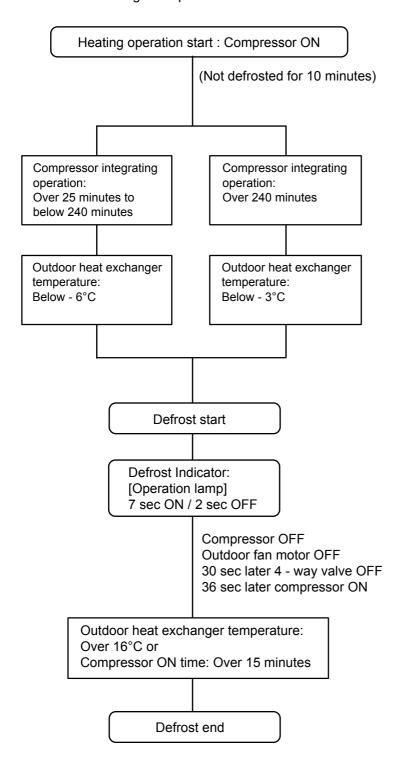
Defrost operation is released when the conditions become as shown in Table 15.

(Table 15 : Defrost Release Condition)

	Release Condition	
AS*A18LEC	Outdoor heat exchanger temperature sensor value is higher than 16°C or Compressor operation time has passed 15 minutes.	

#### **Defrost Flow Chart**

The defrosting shall proceed by the integrating operation time and outdoor heat exchanger temperature as follows.



#### 20. OFF DEFROST OPEARTION CONTROL

When operation stops in the [Heating operation] mode, if frost is adhered to the outdoor unit heat exchanger, the defrost operation will proceed automatically. In this time, if indoor unit operation lamp flashes slowly (7 sec ON / 2 sec OFF), the outdoor unit will allow the heat exchanger to defrost, and then stop.

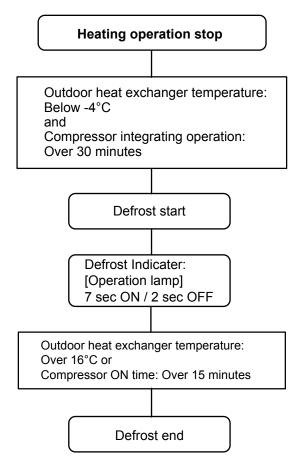
#### 1. OFF DEFROST OPERATION CONDITION

In heating operation, the outdoor heat exchanger temperature is less than -4°C, and compressor operation integrating time lasts for more than 30 minutes.

#### 2. OFF DEFROST END CONDITION

	Release Condition
AS*A18LEC	Outdoor heat exchanger temperature sensor value is higher than 16°C or Compressor operation time has passed 15 minutes.

#### **OFF Defrost Flow Chart**



#### 21. 10°C HEAT OPERATION

The 10°C HEAT operation functions by pressing 10°C HEAT button on the remote controller. The 10°C HEAT operation is almost the same operation as below settings.

#### (Table 16)

( 10.010 10 )	
mode	HEAT
setting temperature	10°C
fan mode	AUTO

#### 22. VARIOUS PROTECTIONS

#### 1. DISCHARGE GAS TEMPERATURE OVERRISE PREVENSION CONTROL

The discharge gas thermosensor (discharge thermistor : Outdoor side) will detect discharge gas temperature.

When the discharge temperature becomes higher than Temperature I, the compressor frequency is decreased 20 Hz, and it continues to decrease the frequency for 20 Hz every 120 seconds until the temperature becomes lower than Temperature I.

When the discharge temperature becomes lower than Temperature II, the control of the compressor frequency is released.

When the discharge temperature becomes higher than Temperature III, the compressor is stopped and the indoor unit LED starts blinking.

(Table 17: Discharge Temperature Over Rise Prevension Control / Release Temperature)

	Temperature I	Temperature II	Temperature III
AS*A18LEC	104°C	101°C	110°C

#### 2. CURRENT RELEASE CONTROL

The compressor frequency is controlled so that the outdoor unit input current does not exceeds the current limit velue that was set up with the outdoor temperature.

The compressor frequency returns to the designated frequency of the indoor unit at the time when the frequency becomes lower than the release value.

(Table 18: Current Release Operation Value / Release Value)

#### [ Heating ]

AS*A18LEC			
OT (C	OT (Control / Release)		
17°C -	7.0A/	6.5A	
•	9.0A/	8.5A	
12°C - 5°C -	10.0A/	10.0A	
50	12.0A/	11.5A	

OT : Outdoor Temperature

#### [Cooling]

AS*A18LEC		
OT (Control / Release)		
46°C	4.5A/ 4.0A	
	6.0A/ 5.5A	
42°C ·	8.5A/ 8.0A	

OT: Outdoor Temperature

#### 3. ANTIFREEZING CONTROL (Cooling and Dry mode)

The compressor frequency is decrease on cooling & dry mode when the indoor heat exchanger temperature sensor detects the temperature lower than Temperature I.

Then, the anti-freezing control is released when it becomes higher than Temperature II.

(Table 19 : Anti-freezing Protection Operation / Release Temperature)

Outdoor temperature	Temperature I	Temperature <b>I</b>
Over than 10°C *1 or 12°C *2		7°C
Less than 10°C *1 or 12°C *2	4°C	13°C

<sup>\*1.</sup> When the temperature rises.

<sup>\*2.</sup> When the temperature drops.

#### 4. COOLING PRESSURE OVERRISE PROTECTION

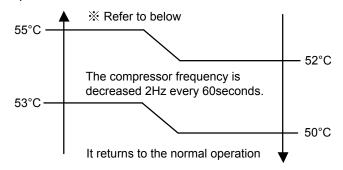
When the outdoor unit heat exchange sensor temperature rises to 67°C or greater, the compressor is stopped and trouble display is performed.

#### 5. HIGH TEMPERATURE RELEASE CONTROL (HEATING MODE)

On heating mode, the compressor frequency is controlled as following based on the detection value of the indoor heat exchanger temperature sensor.

#### [Control System]

Indoor heat exchange temperature



#### Compressor Operation

[ AS\*A18LEC ]

80Hz or greater  $\rightarrow$  75Hz

 $30 \sim 75 Hz \rightarrow Frequency down every 120 sec$ 

 $21 \sim 27 \text{Hz} \rightarrow 20 \text{Hz} \text{ (120 sec)}$ 

 $18 \sim 20 Hz \rightarrow OFF$ 



# WALL MOUNTED type INVERTER

6. REFRIGERANT CAUTION -R410A-

#### 1. R410A TOOLS

This air conditioner used R410A.

For installation and servicing, it is necessary to prepare the tools and machines that are different from the previous refrigerant.

#### Mark shows the exclusive use for R410A.

Gauge manifold	(Fig.4-1)
The specification of the gauge is different due	
to higher pressure	

The size of connection pipe is also different to prevent mis-use.

© Charge hose ....... (Fig.4-2) Since the normal pressure is high, the connection pipe size is also different.

Refrigerant cylinder ...... (Fig.4-3) Confirm the refrigerant type before charging. Always charge liquid-phase refrigerant.

Electronic balance for refrigerant charging . . . . . . . . . (Fig.4-4)

Electronic balance is recommended as in the case of R410A.

Vacuum pump with adapter to prevent reverse flow ...... (Fig.4-5) Conventional pump can be used.

Vacuum holder ..... (Fig.4-6)
Conventional pump can be used if adapter for preventing vacuum pump oil from flowing back is used.

Gas leakage tester ..... (Fig.4-7)
 Exclusive for HFC

Refrigerant cleaner ...... (Fig.4-8)
Brown paint as designated by the ARI, USA

Flare tool ...... (Fig.4-9)
The shape of flare is different for

high pressure condition.

**◎ Torque wrench ...... (Fig.4-10)** 

Refrigerant recoveringAguinment (Collector)

equipment (Collector) ..... (Fig.4-11)

The type which can be used for any refrigerant is available **Nitrogen cylinder ...... (Fig.4-12)** 

This prevents an oxide film from forming in the pipe silveralloy brazing work by turning the air out of the pipe and preventing the inside combustion.

Safety charger . . . . . . . . . . . . . . (Fig.4-13)

It is always compulsory to change the liquid, because R410A is a mixed refrigerant and there is some fear that a mixing ratio changes. In order to avoid the refrigerant from returning to the compressor in a liquid state, the refrigerant can be charged instead of giving a load to the compressor with a safety charger.

Control valve ..... (Fig.4-14)

The control valve prevents the refrigerant from spouting when it is removed, as the charging hose side and the service port side are possible to open and close at the same time.

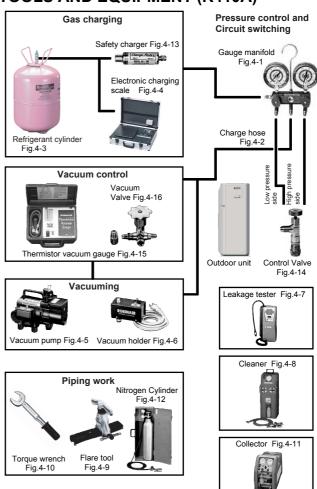
#### Thermistor vacuum gauge ..... (Fig.4-15)

To remove moisture from the refrigerating cycle completely, it is necessary to perform appropriate vacuum drying. For that reason, vacuum conditions can be confirmed certainly.

#### Vacuum valve ..... (Fig.4-16)

This valve builts in a check valve, and it is easily possible to vacuum a refrigerating cycle or check for degree of vacuum with it.

#### **TOOLS AND EQUIPMENT (R410A)**



#### \*1 Gauge Manifold

	R410A	R22, R407C
High pressure gauge	-0.1~5.3 Mpa	-0.1 <b>~</b> 3.5 Mpa
Compond gauge	-0.1 <b>~</b> 3.8 Mpa	-0.1 <b>~</b> 1.7 Mpa
Port size	1/2UNF 5/16"	7/16UNF 1/4"

#### \*2 Charge hose

	R410A	R22, R407C						
Normal pressure	5.1 Mpa	3.4 Mpa						
Breaking pressure	27.4 Mpa	17.2 Mpa						
Port size	1/2UNF	7/16UNF						

### 2. PRECAUTION FOR INSTALLATION

#### Precaution for installation

#### Pipe diameter, recommended material and wall thickness

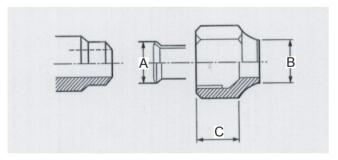
Nominal diameter (in)	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 3/8"	1 1/2"
Outside diameter (mm)	6.35	9.52	12.70	15.88	19.05	22.22	25.40	28.58	31.75	34.92	38.10
Material	COPPER JIS H3300-C1220T-O or equivalent 1)				COPPER JIS H3300-C1220T-H or equivalent <sup>2)</sup>						
Wall thickness <sup>3)</sup> (mm)	0.8	0.8	0.8	1.0	1.2	1.0	1.0	1.0	1.1	1.2	1.3

<sup>1)</sup> Allowable tensile stress ≧ 33 (N/mm²); 2) Allowable tensile stress ≧ 61 (N/mm²); 3) Design pressure 4.2MPa.

The pipe must be properly pressure rated for R410A The pipe must be an air-conditioning refrigerant pipe.

#### Flare and flare nuts

Diameter	1/4"(6.3	35mm)	) 3/8" (9.52mm)		1/2" (12.7mm)		3/8" (15.88mm)		3/4" (19.05mm)	
Refrigerant	R410A	R22 /R407C	R410A	R22 /R407C	R410A	R22 /R407C	R410A	R22 /R407C	R410A	R22 /R407C
Α	9.1	9.0	13.2	13.0	16.6	16.2	19.7	19.4	24	23.7
В	13	12	20	15	13	20	25	23	29	29
С	12	11	16	12.5	19	16	22	20	24	24
Nut width	17 22		22		26	24	29	27	3	6

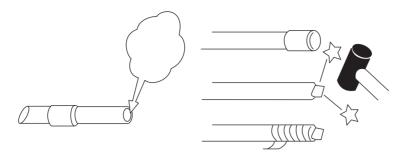


Always use the flare nut that is packed with the product.

Do not use existing (for R22) pipes

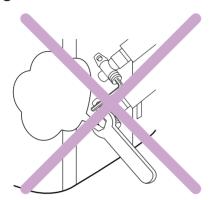
- Be sure to use new pipes when replacing conventional (R22) model with HFC (R407C, R410A) model.
- If you use existing pipes, it may cause resolution of compressor oil by remaining mineral oil.

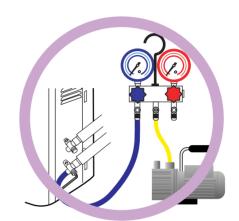
# Be careful not to mix moisture and contamination into the pipe



Moisture and contamination in the pipe is a cause of trouble.

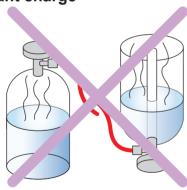
#### Air purge

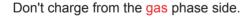


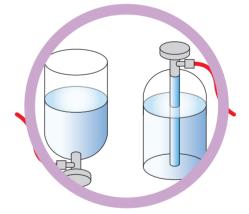


Always use a vacuum pump to purge air.

#### Refrigerant charge







Do it always from the liquid phase side.

#### Compressor oil is changed

- We developed new synthetic oil, since HFC refrigerant doesn't dissolve in mineral (for R22)oil.
- Be careful to handle synthetic oil, since it resolves easily by moisture and contamination.
- Don't mix new synthetic oil and mineral oil. It may cause trouble.

#### 3. PRECAUTION FOR SERVICING

#### Feature 1 Refrigerant oil is different from before.

## Refrigerant oil for New Refrigerant

Synthetic oil

**Ether** 

**Esther** 

※ Previously it was mineral oil.

Different point from previous one

- Absorbent character is high.
- Contamination occurs when mixed withe other kind of oil.

#### Precaution on Tools

- Use the gauge manifold and charge hose for New Refrigerant(HFC), which shall be segregated from those of R22.
- Attach the stop valve on the vacuum pump and avoid the oil from reverse frow.
- It is necessary to use the vacuum pump which can obtain the high vacuum condition.

# R410A R22 Feature 2 New Refrigerant has Approx 1.6 times higher pressure than previous refrigerant.

#### R410A

#### **High Pressure**

\* 1.6 times of R22.

Different point from previous one

- Diameter of Service port has been changed from 1/4 Flare to 5/16 Flare.
- JIS standard of flare process It became lager
- To keep thethickness of copper tube.
   (1/4,3/3=more than 0.8mm)

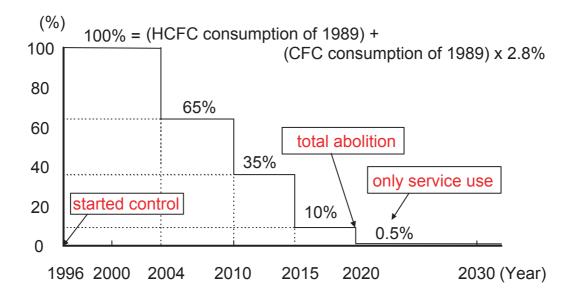
#### Precaution on Tools

- It requires the gauge manifold and charge hose exclusively for R410A.
- It requires the flare tool and torque wrench that satisfies New JIS standard.
- ※ Previous flare tool + flare adapter can be used as well.

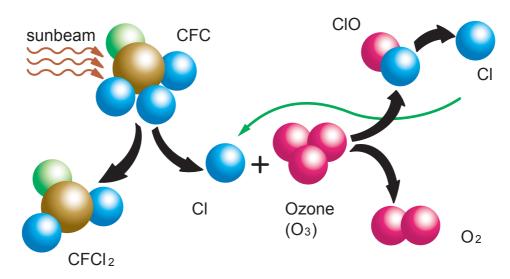
### 4. NEW REFRIGERANT R410A

### \*What is HFC?

### Phase-out schedule of HCFC according to Montreal protocol



### Ozone Layer depleting mechanism



#### What is CFC and HCFC?

### **CFC**: Chloro-Fluoro-Carbon

High ODP( ozone depletion potential ) chemical compound, including chlorine. (ODP:0.6-1.0) For example: R12 (for refrigerator and car air-conditioner)

### **HCFC**: Hydro-Chloro-Fluoro-Carbon

Low ODP chemical compound, including chlorine and hydrogen. (ODP:0.02-01)

For example: R22 (for air-conditioner)

### HFC<sub>3</sub>: Hydro-Fluoro-Carbon

R134a (for Car air conditioner) R407C (for air conditioner)

### Refrigerant characteristics

	R410A	R407C	R22
Composition (wt%)	R32/R125 (50/50)	R32/R125/R134a (23/25/52)	R22 (100)
Boiling Point	- 51.4	- 43.6	- 40.8
Behavior	near azeotrope	zeotrope	
Pressure at 54.5°C (kPa)	3,406	2,262	2,151
Temperature Glide (deg)	0.11	5.4	0
ODP	0	0	0.055

### Summary of R407C and R410A characteristics

	R410A	R407C
Advantage	<ul><li>higher system</li></ul>	• similar pressure as R22 (possible to design large equipment)
Disadvantage	1.6 times higher     pressure than R22     (difficult to design against     pressure resistance)	Zeotropic refrigerant     (handle with care)
Suitable for	Small Air-Conditioners	Large Air-Conditioners

### \*Desighed pressure of R410A refrigerant

Relation between R410A condensing temperature and saturated pressure.

< Pressure →Temp >

Pressure → Lemp >			
Pressure (Mpa)	Temp (℃)		
2.20	37.9		
2.25	38.7		
2.30	39.6		
2.35	40.5		
2.40	41.3		
2.45	42.1		
2.55	43.8		
2.60	44.6		
2.65	45.3		
2.70	46.1		
2.75	46.8		
2.80	47.6		
2.85	48.3		
2.90	49.0		
2.95	49.8		
3.00	50.5		
3.05	51.2		
3.10	51.9		
3.15	52.6		
3.15 3.20	53.2		
3.25	53.9		
3.30	54.6		
3.35	55.3		
3.40	55.9		
3.45	56.5		
3.50	57.1		
2.55	57.8		
3.60	58.4		
3.65	59.0		
3.70	59.6		
3.75	60.2		
3.80	60.8		
3.85	61.4		
3.90	52.0		
3.95	62.5		
4.00	63.1		
4.05	63.6		
4.10	64.2		
4.15	64.8		
4.10	04.0		

< Temp → Pressure >

remp→Pressure >			
Temp (°C)	Pressure (Mpa)		
39	2.27		
40	2.32		
41	2.38		
42	2.44		
44	2.57		
45	2.63		
46	2.69		
47	2.76		
48	2.83		
49	2.90		
51	3.04		
52	3.11		
53	3.18		
54	3.26		
56	3.41		
57	3.49		
58	3.57		
59	3.65		
61	3.82		
62	3.90		
63	3.99		
64	4.08		

### 5. DEFFERENCE FROM CONVENTIONAL MODEL (R22) AND PRECAUTIONS

#### OIL

- Use new synthetic oils such as ester because HFC series refrigerant has less solubility with mineral oils conventionally used for R22.
- As these new synthetic oils are easily influenced by moisture and dusts, they must be treated more carefully than the conventional lubricating oils.

#### **CAUTION**

For installation/servicing, take more precautions than the case of conventional refrigerants to avoid moisture and dusts entering the refrigerant circuit. Also, for storing parts, more precautions must be taken.

### **COMPRESSOR**

- Use better grade of material for sliding parts for securing good lubrication of sliding part as HFC refrigerant does not contain chloride.
- · Review insulating materials
- · Increase pressure resistance strength

#### CAUTION

Check if the compressor is suitable for the refrigerant (model) when replacing. Complete welding within 15 minutes after opening the cap when replacing.

### **HEAT EXCHANGER**

- Review the water, contaminants controlling level
- Use thinner tube to increase pressure Increase capacity for resistance strength (only outdoor unit) improving performance

#### **CAUTION**

During storage, due care must be taken so that foreign matters such as dust and water do not enter.

#### **4-WAY VALVE**

Review materials

#### **CAUTION**

Check if the valve is suitable for the refrigerant (model) when replacing.

### 2, 3-WAY VALVE

• Review material O-ring, valve core seal for securing suitability with oil.

#### **CAUTION**

Check if the valve is suitable for the refrigerant (model) when replacing.



# WALL MOUNTED type INVERTER

### 7. TROUBLE SHOOTING

- 1. When the unit does not operate at all (Operation lamp and Timer lamp do not light up)
- 2. Self Diagnosis Function (Either Operation lamp or Timer lamp is blinking)
  - \* How to operate the self-diagnosis function
  - \* Self- diagnosis table and Check points
- 3. Trouble shooting method
  - \* Serial signal check
  - \* IPM protection check
  - \* Refrigeration cycle diagnosis

#### Does not operate at all (Operation Lamp and Timer Lamp do not light up)

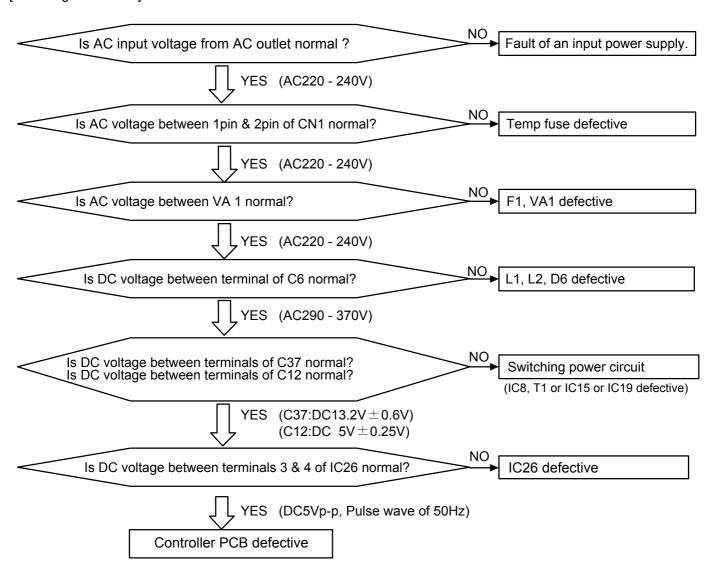
### [Notes in service]

This model is non-insulated PCB that doesn't take the insulated structure on the PCB from this fiscal year. Be careful that it is likely to get a hock when it touches the charge part when checking. Moreover, there is a possibility of getting a shock even if it touches the secondary circuit of the display PCB or the stepping motor, etc.

#### [Check Point]

- (1) Is the input power voltage from the exclusive circuit AC outlet normal?
- (2) Is the AC plug inserted to the AC outlet securely and not loose?
- (3) Does not connected cable do wrong wiring?
- (4) Check if each connector is inserted securely.

#### [Checking Flow Chart]



#### **SELF-DIAGNOSIS FUNCTION**

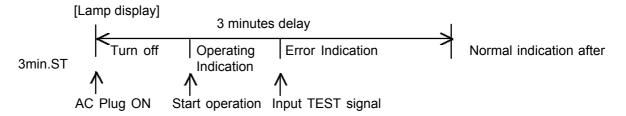
This function memorizes the self-diagnosis function (lamp display) in the in door control P.C.Board when trouble occurs.

(The memory contents are not destroyed even when the power cord is unplugged from the AC outlet.) The self-diagnosis function (lamp display) can also be switched between major classification display and minor classification display and precise diagnosis can be made.

#### Self-diagnosis function [lamp display] (memory reading)

- (1) When error occurs, it is indicated by blinking [Operation lamp (Green)] and [Timer lamp (Orange)].
- (2) Upon pulling out and inserting the AC plug, the starts to operates from remote control. (At this state, a normal operation indication is performed.)
- (3) By pressing [TEST] button of remote control, [Error Indication] is indicated only during [3 minutes ST].

(3 minutes ST: 2 minutes 20 seconds from the timing AC plug is ON)



#### **How to erase Memory**

(1) While [Error indication] is ON by the self-diagnosis function, the memorized contents can be erased by pressing [Forced Auto Button] on the main unit. (Indoor unit buzzer beeps 3 seconds.)

Error Indication		Error	Diagnosis Method	
Operation (RED)	Timer (GREEN)	(Protection)	Diagnosis Wethod	
OFF	0.5 sec 2 times	Serial reverse transfer error at starting up operation	At the start up, the indoor unit does not receive the signal for 10 consecutive seconds from the time when the power relay was ON. >Permanent stop after 30 seconds.	
			[Diagnosis Point]  • Check the indoor /outdoor cable connection (in order). If the cable wiring is not abnormal, measure the voltage of the outdoor unit terminals and diagnose the defective location.  (Refer to the after mentioned [Serial Signal Diagnosis] for the voltage measuring method and diagnosis method.)	
	0.5 sec 3 times	Serial reverse transfer error during the operation	When the indoor unit does not receive the signal for 10 consecutive seconds during the operation >Permanent stop after 30seconds.	
			<ul> <li>[Diagnosis Point]</li> <li>Check the indoor /outdoor cable connection (in order). If the cable wiring is not abnormal, measure the voltage of the outdoor unit terminals and diagnose the defective location.         (Refer to the after mentioned [Serial Signal Diagnosis] for the voltage measuring method and diagnosis method.)     </li> </ul>	
	0.5 sec 4 times	Serial forward transfer error at starting up operation	The outdoor unit does not receive the signal for 10 consecutive seconds from the time when the power relay was ON.  >Outdoor unit stops.  [Diagnosis Point]  • Check the indoor /outdoor cable connection (in order). If the cable wiring is not abnormal, measure the voltage of the outdoor unit terminals and diagnose the defective location.  (Refer to the after mentioned [Serial Signal Diagnosis] for the voltage measuring method and diagnosis method.)	
	0.5 sec 5 times	Serial forward transfer error during the operation	When the outdoor unit does not receive the signal for 10 consecutive seconds during the operation > Outdoor unit stops.  [Diagnosis Point]  • Check the indoor /outdoor cable connection (in order). If the cable wiring is not abnormal, measure the voltage of the outdoor unit terminals and diagnose the defective location.  (Refer to the after mentioned [Serial Signal Diagnosis] for the voltage measuring method and diagnosis method.)	
	0.5 sec 8 times	Wired remote controller error	When the communication is cut off longer than 1 minutes upon connection. > Compressor , Outdoor fan : OFF (If the communication becames normal, they automatically resume operation.  [Diagnosis Point]  • Check wiring • Controller PCB failure	
0.5 sec 2 times	0.5 sec 2 times	Room temperature thermistor defective	The room temperature thermistor detective a abnormal temperature when the power was turned on.  > Remote control does not operate.  [Diagnosis Point]  • Check thermistor resistance value (Refer to "Themistor characteristics table").  • Controller PCB defective.	
	0.5 sec 3 times	Indoor heat exchanger thermistor error	The detection value of the indoor heat exchanger thermistor is either open or shoted when the power is ON.  > Remote control does not operate.  [Diagnosis Point]  • Check thermistor resistance value (Refer to "Thermistor characteristic table").  • Controller PCB defective.	

Error In	dication	Error	Diagnosis Method	
Operation (RED)	Timer (GREEN)	(Protection)	Diagnosis Metrica	
0.5 sec 3 times	0.5 sec 2 times	Discharge thermistor error	The detection value of the discharge thermistor is either open or shorted.  > Compressor, outdoor fan : OFF (It automatically releases when the normal value is detected.)  [Diagnosis Point]  • Check thermistor resistance value (Refer to "Themistor characteristics table").  • Controller PCB defective.	
	0.5 sec 3 times	Outdoor heat exchanger thermistor error	The detection value of the outdoor heat exchanger thermistor is either open or shorted.  > Compressor, outdoor fan : OFF (It automatically releases when the normal value is detected.)  [Diagnosis Point]  • Check thermistor resistance value (Refer to "Themistor characteristics table").  • Controller PCB defective.	
	0.5 sec 4 times	Outdoor temperature ther- mistor error	The detection value of the outdoor temperature thermistor is either open or shorted.  > Compressor, outdoor fan : OFF (It automatically releases when the normal value is detected.)  [Diagnosis Point]  • Check thermistor resistance value (Refer to "Themistor characteristics table").  • Controller PCB defective.	
0.5 sec 4 times	0.5 sec 2 times	Forced auto switch error	Forced auto switch becomes ON for 30 consecutive seconds.  It indicates the error but the operation continues.  [Diagnosis Point]  • Check if forced auto switch is kept pressed.  • Forced auto switch defective.  • Controller PCB defective.	
	0.5 sec 3 times	Main relay error	After 3 minutes of stopping operation, the signal from outdoor unit is received even though the main relay is OFF.  > Main relay OFF continues (outdoor unit OFF command)  [Diagnosis Point]  • Main relay defective  • Controller PCB defective.	

Error In	dication	Error	Diagnosis Method	
Operation (RED)	Timer (GREEN)	(Protection)	Diagnosis Wethod	
0.5 sec 5 times	0.5 sec 2 times	IPM protection	Abnormal current value of IPM is detected. > Permanent stop.	
			<ul> <li>[Diagnosis Point]</li> <li>Heat radiation is blocked (inlet/outlet).</li> <li>Check if outdoor fan is defetcive (does not rotate).</li> <li>Controller PCB defective (Refer to after mentioned "IPM diagnosis").</li> <li>Refrigeration cycle defective (Refer to after mentioned "refrigeration cycle diagnosis").</li> </ul>	
	0.5 sec 3 times	CT error	The current value during the operation after 1 minute from starting up the compressor is 0A.  > permanent stop.  [Diagnosis Point]	
			Controller PCB defective.	
	0.5 sec 5 times	Compressor location error	The compressor speed does not synchronze with the control signal. (Including start up failure of the compressor).  > permanent stop.  [Diagnosis Point]  • Check if 2-way valve or 3-way valve is left open.  • Check the compressor (Winding resistance value, loose lead wire).  • Refrigeration cycle defective (Refer to after mentioned "refrigerant cycle diagnosis")	
	0.5 sec 6 times	Outdoor fan error (DC motor)	Either the outdoor fan motor abnormal current or location error was detected.  > Permanent stop.  [Diagnosis Point]  • Fan motor connector loose/ defective contact.  • Fan motor defective.  • Controller PCB defective.	
0.5 sec 6 times	0.5 sec 2 times	Indoor fan lock error	The indoor fan speed is 0 rpm after 56 seconds from starting operation or from the time the fan mode was changed.  > Operation stop. (It releases by sending the operation stop signal from the remote controller).  [Diagnosis Point]  • Fan motor connector loose /defective contact.  • Fan motor defective  • Controller PCB defective.	
	0.5 sec 3 times	Indoor fan speed error	The indoor fan speed is 1/3 of the target frequency after 56 seconds from starting operation or from the time the fan mode was changed. > Operation stop. (It releases by sending the operation stop signal from the remote controller).  [Diagnosis Point]  • Fan motor connector loose /defective contact.  • Fan motor defective  • Controller PCB defective.	

Error In	dication	Error	Diagnosis Method	
Operation (RED)	Timer (GREEN)	(Protection)		
0.5 sec 7 times	0.5 sec 2 times	Discharge temperature error	The discharge temperature error is activated.  > Permanent stop.  [Diagnosis Point]  • Check if 2-way valve or 3-way valve is left open.  • Heat radiation is blocked (Inlet /outlet).  • Check if outdoor fan is defective (does not rotate).  • Refrigeration cycle defective (Refer to after mentioned "refrigerant cycle disagnosis").	
	0.5 sec 3 times	Excessive high pressure protection on cooling	Excessive high pressure protection on cooling mode has been activated.  > Compressor, outdoor fan : Off (It releases after 3 minute ST).  [Diagnosis Point]  • Heat radiation is blocked (Inlet /outlet).  • Check if outdoor fan is defective (does not rotate).  • Refrigeration cycle defective (Refer to after mentioned "refrigerant cycle disagnosis").	
0.5 sec 8 times	0.5 sec 4 times	PFC circuit error	Excessive voltage of DC voltage on PFC circuit in inverter PCB is detected, or the excessive current in the circuit is detected.  > Permanent stop.  [Diagnosis Point]  • Controller PCB defective (Refer to after mentioned "PFC circuit diagnosis")	

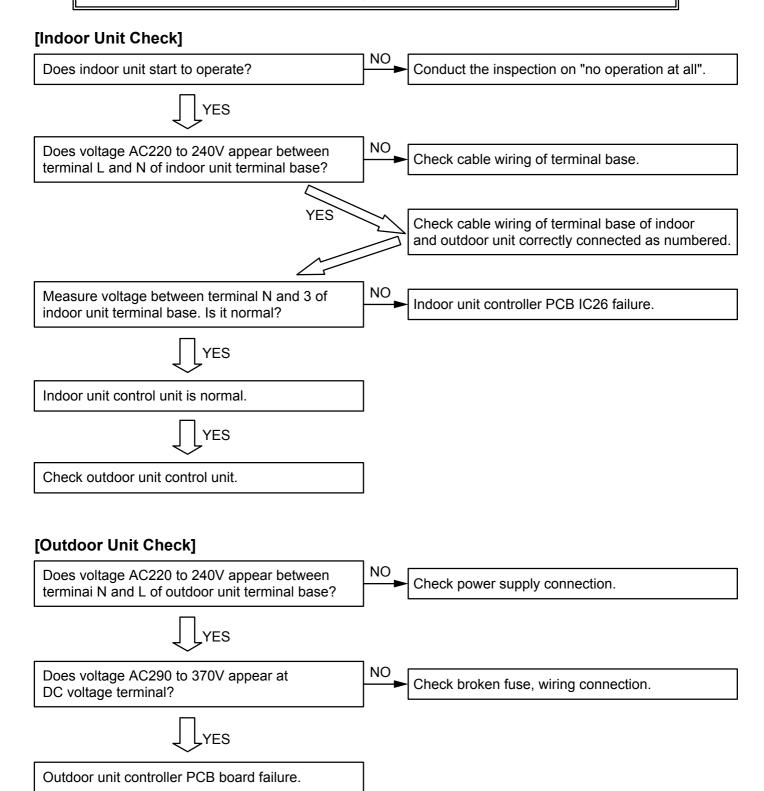
### **Serial Signal Receiving Error**

[Check Point] Check which has a cause of error, either Indoor unit or Outdoor unit.

- \* Remove indoor unit front panel and cable clampers and keep the terminal block clear so that it can be measured with a meter.
- \* Remove AC power and reset the power, and press Test Operation switch on remote control.

### [Check Procedure]

CAUTION: Keep out hands from terminal base and electrical components. Voltage is applied on them and you may get electric shock.



### **IPM Protection**

### [Checking Points]

Check the following points and locate the cause in the outdoor unit.

### [Cause]

- (1) Compressor failure
- (2) Refrigeration cycle failure
- (3) PC Board defective
- (4) IPM defective
- (5) Incorrect wiring

### [First step]

Measure the DC voltage at terminals (between Electrolytic Capacitor and discharge resistance) in the Inverter Controller Assy, and make sure it is lower than DC5V. If it is higher than 5V, wait until the discharging is over.

Check point (1) No	(Abnormal)		
Open the Inverter Controller Assy and check if there is abnormal points.		Incorrect wiring > Correct and recheck Parts touched > Correct and recheck	
Yes(Normal)		Parts broken > Change the broken part	
Check point (2)			
<ol> <li>Remove the lead of compressor.</li> <li>Connect the P to minus and measure the 3, Check the balance of resistance. (+/- 10% 4, Connect the N to plus and measure the L 5, Check the balance of resistance. (+/- 10% *0Ω is failure even when resistance is the connect the N to plus and measure the L 5, Check the balance of resistance.</li> </ol>	%) J, V and W. %)	No(Abnormal) IPM defective	
Yes(Normal)			
Check point (3)	No(Not rota	ating)	
Turn on the power and press TEST button on Remote Control. Is the outdoor fan rotating?		PCB or Compressor defective	
Yes(Rotating)	_		
Check point (4)	No(Not ope	erating)	
Operate the unit for certain time and check if the compressor is operating.		IPM or PCB defective > Replace PCB	
Yes(Operating)			
Check point (5)	No(Not ope	erating)	
Recheck, is compressor normal?		Please redo from the start. (Refrigerant cycle has the possibility of abnormalities.)	
Yes(Operating)	,		
The unit is normal.			

### **Trouble Shooting of Refrigerant Cycle**

### [Diagnosis Table for Defective Component]

#### O: Item of most possible cause

	IPM Protection	Compressor Location error	Discharge Temperature Error	Cooling High Pressure Protection
Refrigerant leak			0	
Compressor failure(*)	0	0		
EEV failure (*)	0	0	0	0
Thermistor failure (*)	0	0	0	0

#### (\*) Trouble Shooting Method

#### (1) Checking method of the compressor failure

Insert the AC plug and start up the cooling operation. Input Test operation signal and check if the compressor operates.

If it does not operate, measure the resistance value of compressor windings between U-V, V-W, W-U. If any of the resistance value between U-V, V-W, W-U is not same as others, the compressor is defective.

#### Compressor Failure

	NORMAL
AS*A18LEC	Compressor Case Temperature at 25°C: 0.482 ohm

(The above resistance value is a typical value. There is some distribution. As it also changes by the compressor temperature, the measured value may be much different from the above table when measured right after stopping operation.)

#### (2) Checking method of EEV failure

Insert the AC plug and start up the operation. Check if the EEV operates just before compressor is turned on. (Touch EEV by hand and check it.)

If it does not operate, check if the coil or connector of EEV is removed or loose.

If it operates, check the discharge thermistor / outdoor heat exchanger thermistor / indoor heat exchanger thermistor. (Refer to (3) for checking method.)

#### (3) Checking method of Thermistor

Check each thermistor if it is removed or the connector is loose.

If there is no problem, remove the connector of the thermistor from the PCB and check the resistance value. (refer to the thermitor characteristics table).



# WALL MOUNTED type INVERTER

### 8. APPENDING DATA

- 1. Jumper & Function setting
- 2. Thermistor Resistance Values

### 8-1. JP(Jumper) & Function SETTING

### [Indoor Unit]

- Remote control custom code

When multiple number of indoor units are installed in the same room, erroneous receipt of the signal can be avoided by setting up the remote control custom code separately.

To set up the remote control custom code, always set up the same code on both indoor unit PCB and remote control PCB.

(When the indoor unit PCB is changed to Code B, it can not receive the signal unless remote control PCB is also changed to Code B.)

	Indoor Unit JM8 (JP) JM10 (JP)		
Code A (Default)	0	0	
Code B	×	0	
Code C	0	×	
Code D	×	×	

#### - Auto Restart

It is possible to disengage Auto Restart function if it is not needed.

	Indoor Unit
	JM5 (JP)
With Auto Restart function (Default)	0
Without Auto Restart function	×

#### - Correct coefficient of Room temperature

Indo	or unit		Coefficient	
JM6 (JP)	JM7 (JP)	Cooling	Dry	Heating
0	0		*Default	
×	0	0	0	0
0	×	0	0	4
×	×	- 2	- 2	4

<sup>\*</sup>Default value changes by the setting temperature and the outside temperature.

### [Remote Controller]

- 1. Press the MODE button for more than five seconds to start the code change.
- 2. Press the ▲ or ▼ button to select the desired code.

$$A \rightarrow B \rightarrow C \rightarrow D$$

3. Press the MODE button again to end the code change.



#### [Outdoor Unit]

			J	Р	
		JM500	JM103	JM102	JM101
18LEC	Normal Preheat	0	0	×	0
	Higher Preheat	×	0	×	0

- it is possible to select the higher or standard level of preheating function.
- When it is set up at the higher level of preheat, the magnetic noise of the compressor becomes higher.

### 8-2. Thermistor Resistance Values

### 8-2-1 INDOOR UNIT

	mperature t	
Temp (℃)	$Resistance(k\Omega)$	Voltage(V)
0.00	33.62	1.15
5.00	25.93	1.39
10.00	20.18	1.66
15.00	15.84	1.94
20.00	12.54	2.22
25.00	10.00	2.50
30.00	8.04	2.77
35.00	6.51	3.03
40.00	5.30	3.27
45.00	4.35	3.48
50.00	3.59	3.68
55.00	2.98	3.85
60.00	2.47	4.00
65.00	2.09	4.14
70.00	1.76	4.25
75.00	1.49	4.35
80.00	1.27	4.44
85.00	1.09	4.51
90.00	0.93	4.57
95.00	0.81	4.63
100.00	0.70	4.67

Indoor heat	t exchanger t	hermistor
Temp (℃)	$Resistance(k\Omega)$	Voltage(V)
0.00	176.03	1.10
5.00	134.23	1.36
10.00	103.34	1.63
15.00	80.28	1.92
20.00	62.91	2.21
25.00	49.70	2.51
30.00	39.57	2.79
35.00	31.74	3.06
40.00	25.64	3.30
45.00	20.85	3.53
50.00	17.06	3.73
55.00	14.10	3.90
60.00	11.64	4.55
65.00	9.69	4.19
70.00	8.12	4.30
75.00	6.83	4.40
80.00	5.78	4.48
85.00	4.91	4.55
90.00	4.19	4.61
95.00	3.59	4.66
100.00	3.09	4.71

### 8-2-2 OUTDOOR UNIT

Discharge thermistor			
Temp (℃)	Resistance(k $\Omega$ )	Voltage(V)	
0.00	168.6	0.36	
5.00	130.7	0.45	
10.00	102.2	0.56	
15.00	80.51	0.70	
20.00	63.89	0.85	
25.00	51.05	1.01	
30.00	41.07	1.20	
35.00	33.26	1.41	
40.00	27.09	1.62	
45.00	22.20	1.85	
50.00	18.29	2.08	
55.00	15.15	2.31	
60.00	12.62	2.54	
65.00	10.56	2.76	
70.00	8.878	2.97	
75.00	7.498	3.17	
80.00	6.361	3.36	
85.00	5.419	3.53	
90.00	4.635	3.69	
95.00	3.980	3.83	
100.00	3.430	3.96	
105.00	2.967	4.07	
110.00	2.575	4.17	
115.00	2.243	4.26	
120.00	1.960	4.34	

Outdoor heat exchanger thermistor		
Temp (℃)	$Resistance(k\Omega)$	Voltage(V)
-20.00	48.13	0.45
-15.00	36.07	0.58
-10.00	27.29	0.74
-5.00	20.84	0.93
0.00	16.05	1.14
5.00	12.45	1.38
10.00	9.736	1.64
15.00	7.672	1.91
20.00	6.090	2.19
25.00	4.869	2.47
30.00	3.918	2.74
35.00	3.173	3.00
40.00	2.586	3.24
45.00	2.120	3.46
50.00	1.747	3.66
55.00	1.448	3.83
60.00	1.206	3.99
65.00	1.009	4.12
70.00	0.849	4.24
75.00	0.717	4.34
80.00	0.608	4.43
85.00	0.518	4.51
90.00	0.444	4.57
95.00	0.381	4.63
100.00	0.328	4.68

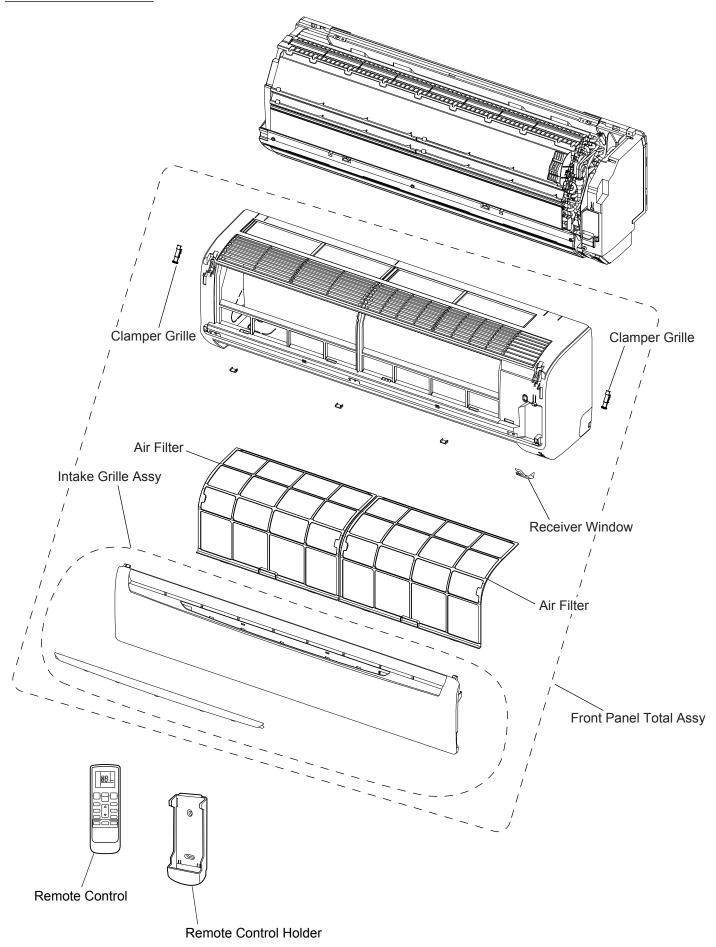
Outdoor temperature thermistor			
Temp (℃)	$Resistance(k\Omega)$	Voltage(V)	
-20.00	101.7	1.37	
-15.00	76.31	1.67	
-10.00	57.73	1.99	
-5.00	44.01	2.33	
0.00	33.80	2.66	
5.00	26.14	2.97	
10.00	20.35	3.27	
15.00	15.96	3.53	
20.00	12.59	3.76	
25.00	10.00	3.96	
30.00	7.990	4.14	
35.00	6.423	4.28	
40.00	5.192	4.40	
45.00	4.222	4.50	
50.00	3.451	4.59	
55.00	2.836	4.66	
60.00	2.343	4.71	
65.00	1.945	4.76	
70.00	1.623	4.80	
75.00	1.361	4.83	
80.00	1.146	4.85	
85.00	0.970	4.88	
90.00	0.824	4.89	
95.00	0.703	4.91	
100.00	0.602	4.92	



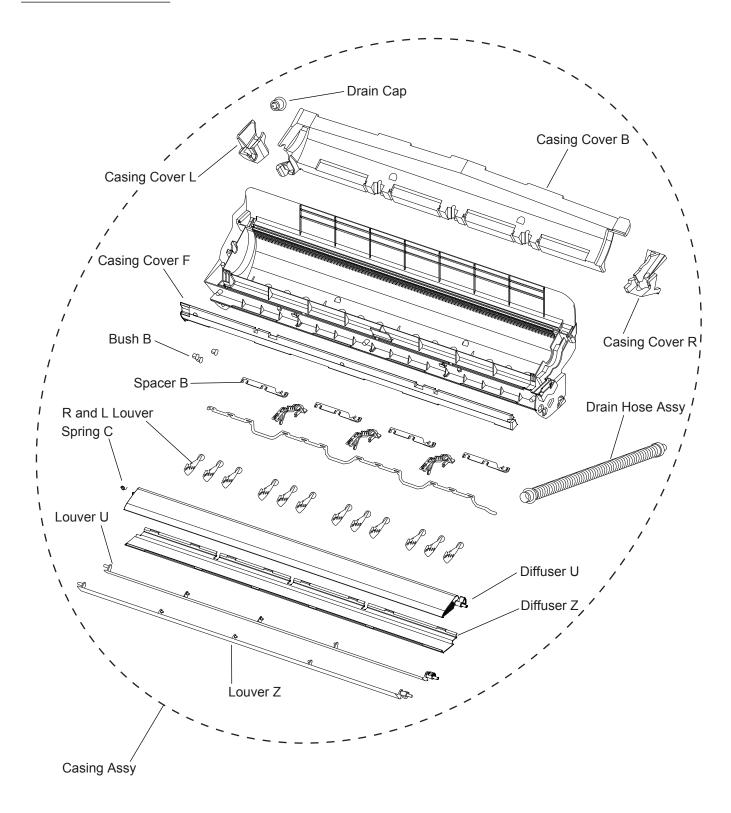
# WALL MOUNTED type INVERTER

### 9. REPLACEMENT PARTS

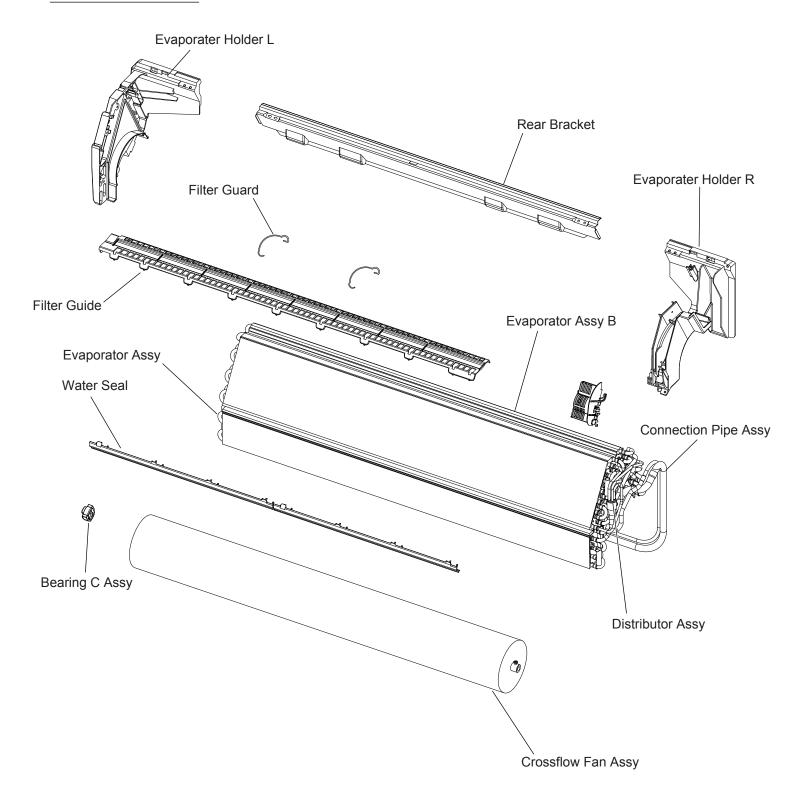




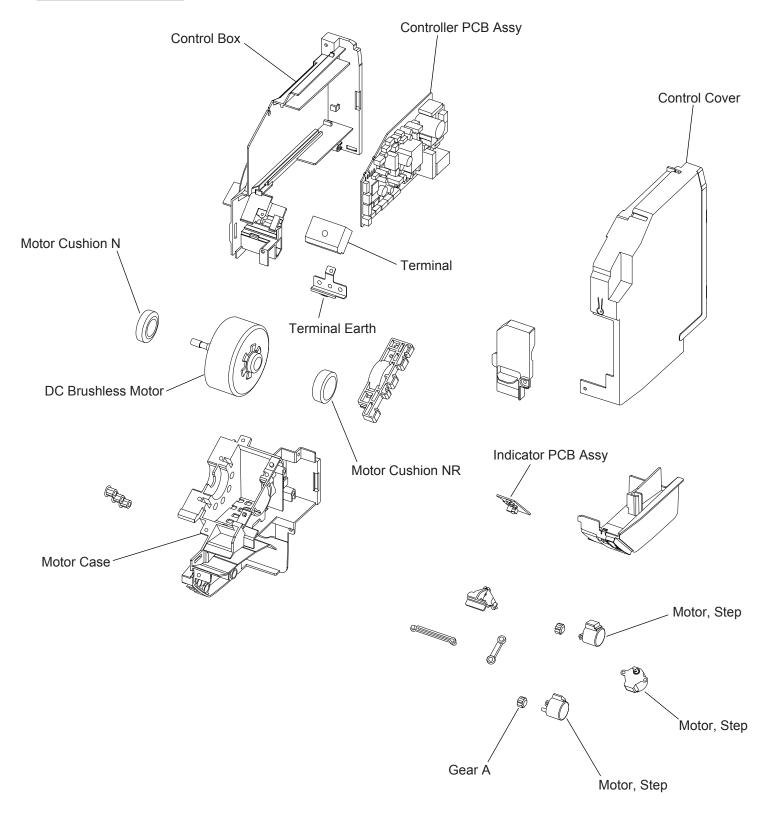
### Models : AS\*A18LEC



### Models : AS\*A18LEC

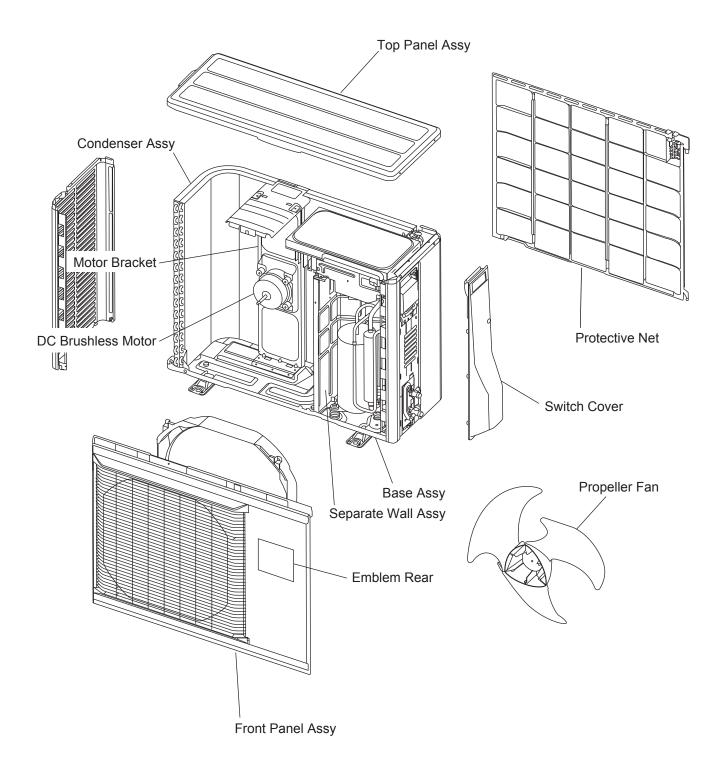


### Models: AS\*A18LEC

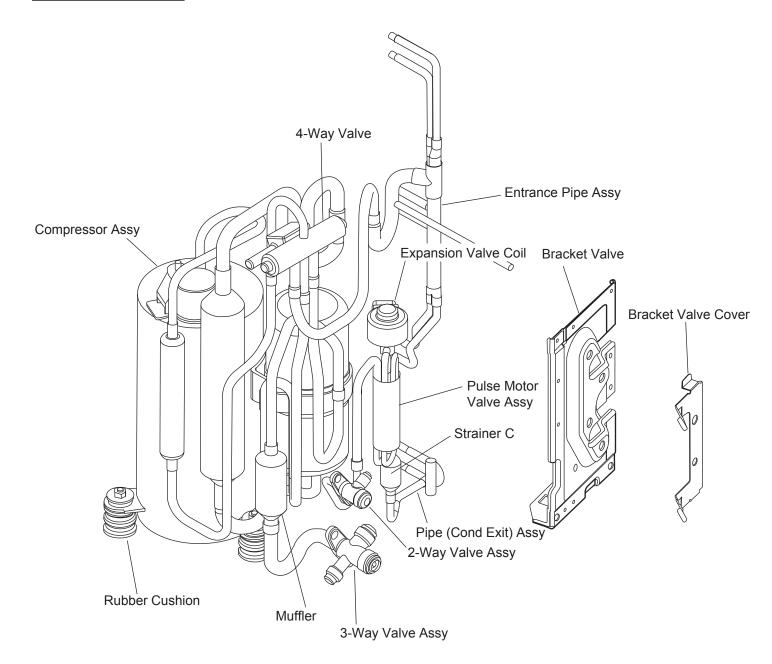


Room thermistor is tied to a Controller PCB assy.

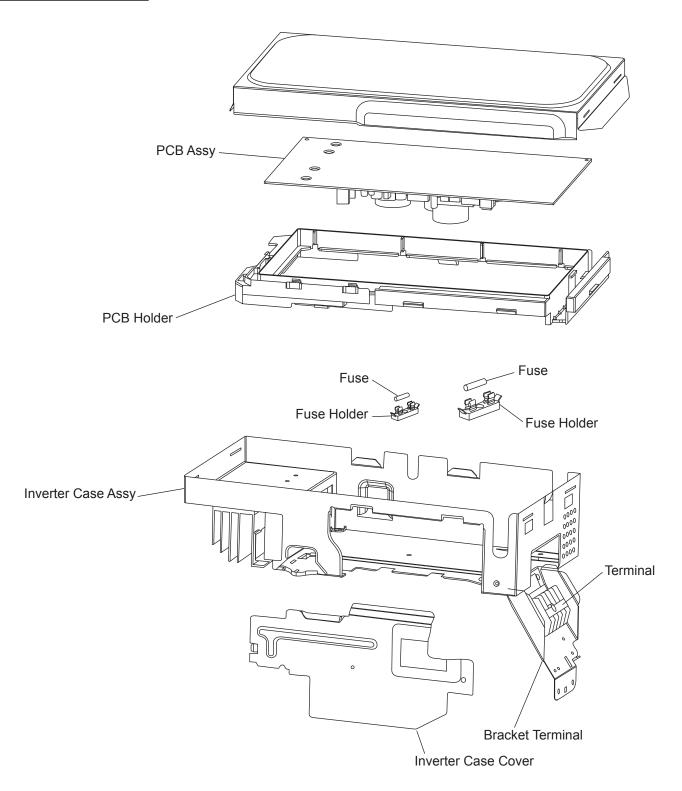
### Models : AO\*R18LEC



### Models : AO\*R18LEC



### Models : AO\*R18LEC





# WALL MOUNTED type INVERTER

### 10. INSTALLATION MANUAL

## **SPLIT TYPE ROOM AIR CONDITIONER** INSTALLATION MANUAL

(PART No. 9315342546-01)

### This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant (R22) models. However, pay careful attention to the following points:

- (1) Since the working pressure is 1.6 times higher than that of conventional refrigerant (R22) models. some of the piping and installation and service tools are special. (See the table below.) Especially, when replacing a conventional refrigerant (R22) model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.
- (2) Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant (R22) and for safety. Therefore, check beforehand.[The charging port thread diameter for R410A is 1/2 UNF 20 threads per inch.] (3) Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant
- (R22) models. Also, when storing the piping ,securely seal the opening by pinching ,taping, etc. (4) When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is

### Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals-0.1 to 5.3 MPa (-1 to 53 bar) for high pressure0.1 to 3.8 MPa (-1 to 38 bar) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion value or capillary tube may become blocked with

As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials.

Thicknesses of copper pipes used with R410A are as shown in the table. Never use copper pipes thinner than that in the table even when it is available on the market.

### **↑** WARNING

- (1) Do not use the existing (for R22) piping and flare nuts.
- If the existing materials are used, the pressure inside the refrigerant cycle will rise and cause breakage, injury, etc.(Use the special R410A materials.)
- (2) When installing and relocating the air conditioner, do not mix gases other than the specified refrigerant(R410A) to enter the refrigerant cycle.
- If air or other gas enters the refrigerant cycle, the pressure inside the cycle will rise to an abnormally high value and cause breakage, injury, etc.

### **↑** CAUTION

When installing pipes shorter than 3m, sound of the outdoor unit will be transferred to the indoor unit, which will cause large operating sound or some abnormal sound.

### For authorized service personnel only.

### **↑** WARNING

- 1) For the room air conditioner to operate satisfactory, install it as outlined in this installation manual. (2) Connect the indoor unit and outdoor unit with the air conditioner piping and cords available standards parts. This installation manual describes the correct connections using the standard accessories and the parts specified in this installation manual.
- B) Have installation work done by authorized service personnel only.
- Do not use an extension cord.
- (5) Do not turn on the power until all installation work is complete.
- Be careful not to scratch the air conditioner when handling it.
- After installation, explain correct operation to the customer, using the operating manual.
- Let the customer keep this installation manual because it is used when the air conditioner is serviced or moved. • The maximum length of the piping is 25 m. The maximum height difference of the piping is 20 m, if the units are further apart than these, correct operation can not be guaranteed.

### STANDARD ACCESSORIES

The following installation accessories are supplied.

One set of following parts are necessary in istallation of this product.

Name

Name and Shape	Q'ty	Name and Shape	Q'ty
Wall hook bracket	1	Cloth tape	1
Remote control unit	1	Tapping screw (big)	8
Datte and	·	Tapping screw (small)	2
Battery	2	Air cleaning filter	2
Remote control unit holder		Air cleaning filter frame	
	1		2
Drain pipe		Insulation (Drain hose)	
	1		1

### Connection pipe assembly Connection cord Wall pipe Vinyl tape Wall cap Drain hose

### ELECTRICAL REQUIREMENT

· Electric wire size and fuse capacity:

Tapping screws

Power supply cord (mm²)	MAX.	4.0
Tower supply cord (IIIIII )	MIN.	3.5
Connection cord (mm <sup>2</sup> )	MAX.	2.5
Connection cord (IIIIII )	MIN.	1.5
Fuse capaciity (A)		30

- Install the disconnect device with a contact gap of at least 3 mm nearby the units. (Both indoor unit and outdoor unit)
- Always make the air conditioner power supply a spe-
- cial branch circuit and provide a special breaker. • Always use H07RN-F or equivalent as the power supply cord and the connection cord.

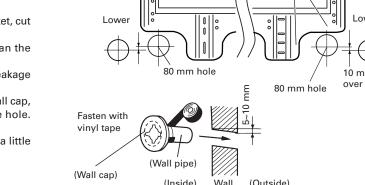
### **INDOOR UNIT**

### -CUTTING THE HOLE IN THE WALL FOR THE CONNECTING PIPING

- (2) When cutting the wall hole at the inside of the wall hook bracket, cut the hole to a point of intersection of center marks.
- When cutting the wall hole at the outside of the wall hook bracket, cut the hole at a point of 10mm below (3) Cut the hole so that the outside end is lower (5 to 10 mm) than the

(1) Cut a 80 mm diameter hole in the wall at the position shown in the

- inside end. (4) Always align the center of the wall hole. If misaligned, water leakage (5) Cut the wall pipe to match the wall thickness, stick it into the wall cap,
- fasten the cap with vinyl tape, and stick the pipe through the hole. (The connection pipe is supplied in the installation set.) (6) For left piping and right piping and center piping, cut the hole a little lower so that drain water will flow freely.



Wall hook bracket

perpendicularly.

### $^{ extsf{-}}$ installing the wall hook bracket

- (1) Install the wall hook bracket so that it is correctly positioned horizontally and vertically. If the wall hook bracket is tiled, water will drip to
- (2) Install the wall hook bracket so that it is strong enough to withstand the weight of an adult. Fasten the wall hook bracket to the wall with 6 or more screws through
- the holes near the outer edge of the bracket.

### • Check that there is no rattle at the wall hook bracket.

### **↑** WARNING If the wall pipe is not used, the cord interconnecting the indoor and outdoor units may touch metal and

## cause electric leakage.

 $^ extstyle
olimits$  FORMING THE DRAIN HOSE AND PIPE

- [Rear piping, Right piping, Bottom piping] • Install the indoor unit piping in the direction of the wall hole and bind
- the drain hose and pipe together with vinvl tape. • Install the piping so that the drain hose is at the bottom. • Wrap the pipes of the indoor unit that are visible from the outside

### [For Left rear piping, Left piping] Interchange the drain cap and the drain hose.

with decorative tape.

### **∴** CAUTION (1) In order to align the drain hose and drain cap, be

- sure to insert securely and vertically. Incline inser tion will cause water leakage.
- (2) When inserting, be sure not to attach any material besides water. If any other material is attached. it will cause deterioration and water leakage.
- (3) After removing drain hose, be sure not to forget mounting drain cap. (4) Be sure to fix the drain hose with tape to the bottom
- of piping. (5) Prevent drain water frozen under low tempera-
- ture environment When installing indoor unit's drain hose outdoors, necessary
- measure for frost protection should be taken to prevent drain . Under low temperature environment (when outdoor tem
- perature under 0 °C), after cooling operation is executed, water in the drain hose could be frozen. Once drain water is frozen, the drain hose will be blocked and water leakage may be resulted for indoor unit.

## Insert the drain hose and drain cap into the drain port, making sure that it comes in contact with the back of the drain port, and then mount it. If the drain hose is not connected properly, leaking will occur. Attach the Insulation (Drain hose) to the drain hose

**A** CAUTION

Install the wall hook bracket horizontally and

Rear piping

drain hose Drain cap the cap with pliers, etc.

**↑** CAUTION

For left outlet piping, cut off the

Remove the drain cap by pulling

at the projection at the end of

piping outlet cutting groove

with a hacksaw.

Bottom Indoor unit drain hose

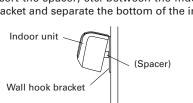
piping (bottom)

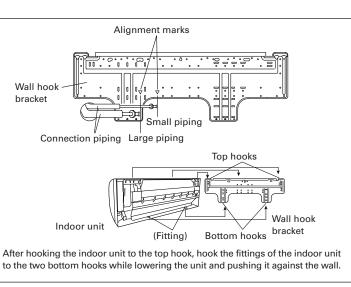
#### • For left piping and left rear piping, align the marks on the wall hook bracket and shape the connection pipe.

- Bend the connection piping at the bend radius of 100 mm or more and install no more than 35 mm from the wall.
- After passing the indoor piping and drain hose through the wall hole, hang the indoor unit on the hooks at the top and bottom of the wall

### [Installing the indoor unit]

• Hang the indoor unit from the hooks at the top of the wall hook bracket. Insert the spacer, etc. between the indoor unit and the wall hook bracket and separate the bottom of the indoor unit from the wall.





### FRONT PANEL REMOVAL AND INSTALLATION

### THE INTAKE GRILLE REMOVAL

- (1) Open the intake grille. (2) Pull down the knob.
- (3) Lift the intake grille upward, until the axle at the top of the intake grille is removed.

### THE INTAKE GRILLE INSTALLATION

(1) The fixing axle of the intake grille is installed on the Panel. (2) Lay down the intake grille.

- THE FRONT PANEL REMOVAL (1) Remove intake grille (Reference the intake grille removal.)
- (2) Remove six screws.
- (3) The thumb is hung on the lower part as shown in the figure, and it pulls to the front, pushing [-] mark , and bottom hooks
- (two position) is removed from wall hook bracket. (4) The front panel is pulled to the front, raising the upper surface,

### and a front panel is removed. THE FRONT PANEL INSTALLATION

- (1) Firstly, fit the lower part of the front panel, and insert top and
- (2) Six screws is attached.

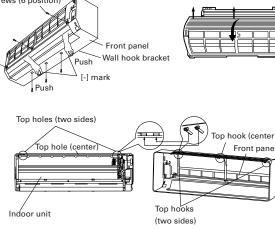
a stove, etc.

bottom hooks. (Three top sides)



(3) The intake grille is attached.





### **⚠** CAUTION

Install the front panel and INTAKE GRILLE securely. If installation is imperfect, the front panel or INTAKE GRILLE may fall off and cause injury.

### - REMOTE CONTROL UNIT INSTALLATION

**↑** CAUTION

(1) Check that the indoor unit correctly receives the signal from the remote control unit, then install the remote

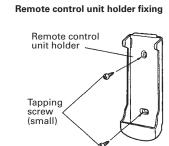
control unit holder. Select the remote control unit holder selection site by paying careful attention to the following:

Avoid places in direct sunlight. Select a place that will not be affected by the heat fron

# tapping screw

Install the remote control unit with a distance of 7 m between the re mote control unit and the photocell as the criteria. However, when installing the remote control unit, check that it operates positively. Install the remote control unit holder to a wall, pillar, etc. with the

REMOTE CONTROL UNIT HOLDER INSTALLATION





## - SELECTING THE MOUNTING - INSTALLATION DIAGRAM OF

**CONNECTION PIPE REQUIREMENT** 

1/2in 12.7mm 0.8mm

length indoor and

25m(82ft) 20m(66ft)

liameter diameter

### **POSITION**

Decide the mounting position with the customer as follows:

- 1. INDOOR UNIT 1) Install the indoor unit level on a strong wall which is not subject to
- (2) The inlet and outlet ports should not be obstructed: the air should be able to blow all over the room. (3) Install the unit near an electric outlet or special branch circuit (4) Do not install the unit where it will be exposed to direct sunlight.

(5) Install the unit where connection to the outdoor unit is easy.

#### (6) Install the unit where the drain pipe can be easily installed. (7) Take servicing, etc. into consideration and leave the spaces shown

in the figure. Also install the unit where the filter can be removed. 2. OUTDOOR UNIT (1) If possible, do not install the unit where it will be exposed to direct

sunlight. (If necessary, install a blind that does not interfere with the air flow.) 2) Do not install the unit where a strong wind blows or where it is very

front, rear, and both sides.

the units will not topple or fall.

[Indoor unit piping direction]

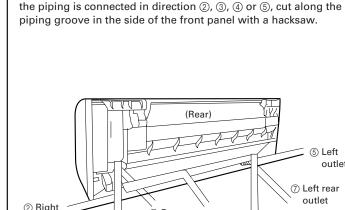
(3) Do not install the unit where people pass. (4) Take your neighbors into consideration so that they are not disturbed by air blowing into their windows or by noise. 5) Provide the space shown in the figure so that the air flow is not blocked.

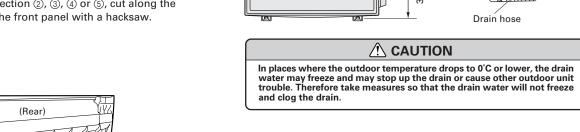
Also for efficient operation, leave open three of the four directions

### **↑** WARNING Install at a place that can withstand the weight of the indoor and outdoor units and install positively so that

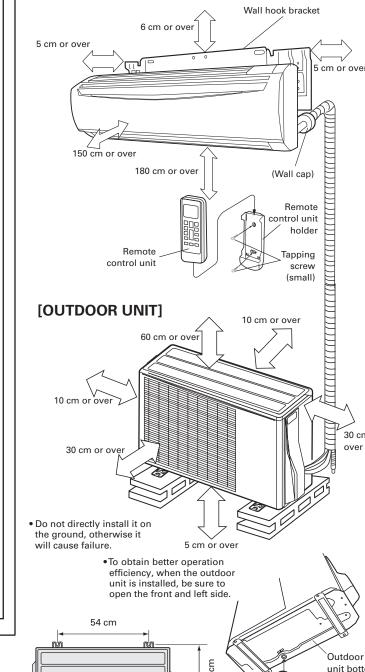
- **CAUTION** (1) Do not install where there is the danger of combustible gas leakage. (2) Do not install near heat sources. (3) If children under 10 years old may approach the
- unit, take preventive measures so that they cannot reach the unit. (4) Install the indoor unit on the wall where the height from the floors more than 180 cm.

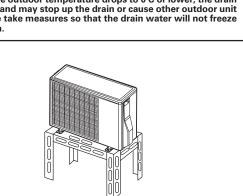
The piping can be connected in the 7 directions in the figure. When





## INDOOR AND OUTDOOR UNITS [INDOOR UNIT]



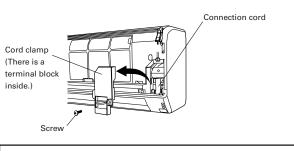


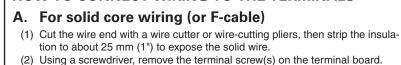
## -CONNECTING THE PIPING

- CONNECTION (1) Install the outdoor unit wall cap (supplied with the optional installation set or procured at the site) to the wall pipe.
- (2) Connect the outdoor unit and indoor unit piping. (3) After matching the center of the flare surface and tightening the nut hand tight, tighten the nut to the specified tightening torque with a torque wrench.
- **FLARING** (1) Cut the connection pipe to the necessary length Check if [L] is flared uniformly
- with a pipe cutter. (2) Hold the pipe downward so that cuttings will not enter the pipe and remove the burrs. (3) Insert the flare nut onto the pipe and flare the pipe with a flaring tool. Insert the flare nut (always use the flare nut attached to the indoor and outdoor units
- processing with a flare tool. Use the special R410A flare tool, or the conventional (for R22) flare tool. When using the conventional flare tool, always

- (1) When bending the pipe, be careful not to crush it.
- (3) If the copper pipe is bend the pipe or pulled to often, it will become stiff. Do not bend the pipes more than three times at one place.

### INDOOR UNIT WIRING (1) Remove the cord clamp. (2) Bend the end of the connection cord as shown in the figure.





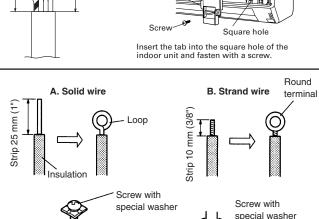
curely with the terminal screw using a screwdriver. 3. For strand wiring (1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 10 mm (3/8") to expose the strand wiring. (2) Using a screwdriver, remove the terminal screw(s) on the terminal board.

cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric

block. Imperfect installation may cause a fire.

each stripped wire end.

using a screwdrive



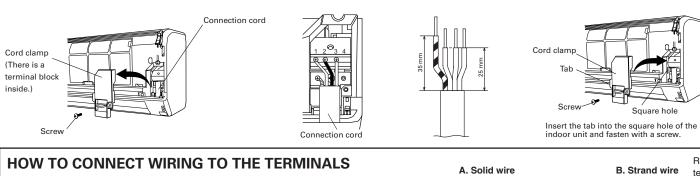
Match the terminal block numbers and connection (3) Always fasten the outside covering of the connec-

- Flare nut size and tightening torque Flare nut Diameter (mm) × Torque (N.m)
- $26 \times 49 \sim 61$ 12.7 mm dia. Pipe outside diameter | R410A, clutch type | Clutch type | Wing nut type | 0 to 0.5 | 1.0 to 1.5 | 1.5 to 2.0 |

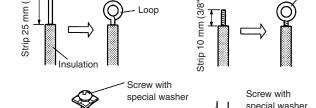
# **⚠** CAUTION

#### ) Fasten a flare nut with a torque wrench as instructed in this manual. If fastened too tight, the flare nut may be broken after a long period of time and cause a leakage of refrigerant. 2) During installation, make sure that the refrigerant pipe is attached firmly before you run the compressor. Do not operate the compressor under the condition of refrigerant piping not attached properly with 2-way or 3-way

valve open. This may cause abnormal pressure in the refrigeration cycle



that leads to breakage and even injury.



tion cord with the cord clamp. (If the insulator is

### - CUSTOMER GUIDANCE

When using the remote control unit

Explain the following to the customer in accordance with the operating manual: (1) Starting and stopping method, operation switching, temperat-ure adjustment, timer, air flow switching, and other remote control unit operations. (2) Air filter removal and cleaning, and how to use the air louvers. (3) Give the operating and installation manuals to the customer.

### PUMP DOWN OPERATION (FORCED COOLING OPERATION)

- To avoid discharging refrigerant into the atmosphere at the time of relocation or disposal, recover refrigerant by doing the cooling operation or forced cooling operation according to the following procedure. (When the cooling operation cannot start in winter, and so on, start the forced
- (1) Do the air purging of the charge hose by connecting the charging hose of gauge manifold to the charging port of 3 way valve and opening the low-pressure valve slightly (2) Close the valve stem of 2 way valve completely (3) Start the cooling operation or following forced cooling operation.
- Press the TEST RUN button after starting the cooling operation by the remote control unit. The operation indicator lamp and timer indicator lamp will begin to flash simultaneously during test run. When using the MANUAL AUTO button of the indoor unit (The remote control unit is lost, and so on.)

• Press the START/STOP button of the remote control unit to stop the operation.

in the refrigeration cycle that leads to breakage and even injury.

Use a circuit breaker and receptacle matched to the capacity of

• Press the MANUAL AUTO button when stopping the operation from indoor unit side.

Keep on pressing the MANUAL AUTO button of the indoor unit for more than 10 seconds. (The forced cooling operation cannot start if the MANUAL AUTO button is not kept on pressing for more than 10 seconds.) (4) Close the valve stem of 3 way valve when the reading on the compound pressure gage becomes 0.05~0 MPa (0.5~0 kg/cm²). (5) Stop the operation.

### (It is not necessary to press on keeping for more than 10 seconds.)

**⚠** CAUTION During the pump-down operation, make sure that the compressor is turned off before you remove the refrigerant piping.

Do not remove the connection pipe while the compressor is in operation with 2 way or 3 way valve open. This may cause abnormal pressure

**POWER** 

the air conditioner

**⚠** WARNING (1) The rated voltage of this product is 230 V AC 50 Hz. (5) Do not extend the power cord. Before turning on the power, check if the voltage is within the (6) Perform wiring work in accordance with standards so that the 220 V -10 % to 240 V +10 % range. air conditioner can be operated safely and positively Always use a special branch circuit and install a special recepta-Install a leakage circuit breaker in accordance with the related cle to supply power to the room air conditione laws and regulations and electric company standards

### **⚠** CAUTION

(1) The power source capacity must be the sum of the air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity. (2) When the voltage is low and the air conditioner is difficult to start, contact the power company the voltage raised

### **↑** CAUTION

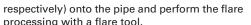
Install heat insulation around both the gas and liquid pipes. Failure to do so may cause water leaks. Use heat insulation with heat resistance above 120 °C. (Reverse cycle model only) In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70%, install heat insulation around the refrigerant piping. If the expected humidity level is 70-80%, use heat insulation that is 15 mm or thicker and if the

expected humidity exceeds 80%, use heat insulation that is 20 mm or thicker. If heat insulation is used that is not as thick as specified, condensation may form on the surface of the insulation. In addition, use heat insulation with heat conductivity of 0.045 W/(m·K) or less (at 20 °C).

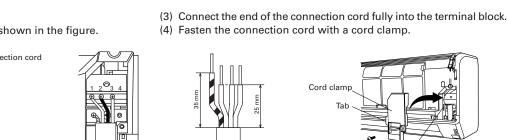
Installation instruction on the back

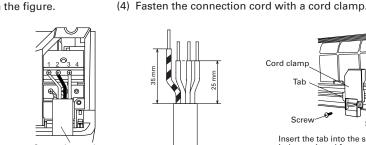


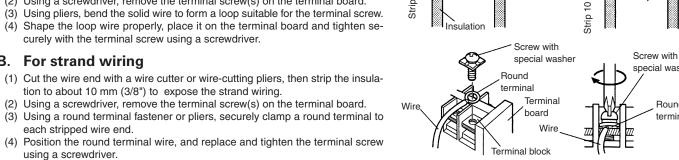


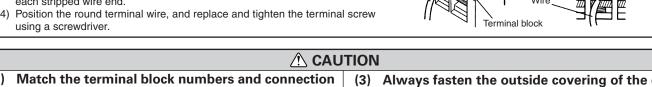


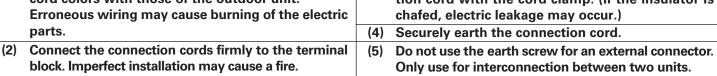
- use an allowance adjustment gauge and secure the A dimension shown in the table. **BENDING PIPES**
- (2) To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 150mm or over.













### **OUTDOOR UNIT**

### **OUTDOOR UNIT INSTALLATION**

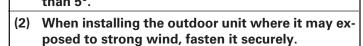
- Set the unit on a strong stand, such as one made of concrete blocks to minimize shock and vibration.
- Do not set the unit directly on the ground because it will cause trou-

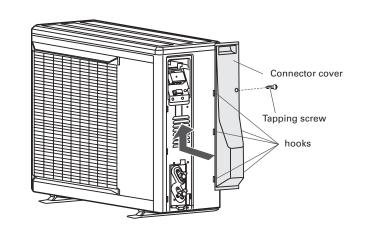
#### Connector cover removal Remove the tapping screws.

### Installing the connector cover

(1) After inserting the two front hooks, then insert the rear hook. (2) Tighten the tapping screws.

	<b>⚠ WARNING</b>
(1)	Install the unit where it will not be tilted by more than 5°.
	tilali 5 .





### - AIR PURGE

### Always use a vacuum pump to purge the air. Refrigerant for purging the air is not charged in the outdoor unit at the factory.

Close the high pressure side valve of the gauge manifold fully and do not operate it during the following work.

1. Check if the piping connections are secure.

2. Check that the stems of 2-way valve and 3-way valve are closed

3. Connect the gauge manifold charge hose to the charging port of the 3-way valve (side with the projection for pushing in the valve core).

4. Open the low pressure side valve of the gauge manifold fully. 5. Operate the vacuum pump and start pump down.

6. Slowly loosen the flare nut of the 3-way valve and check if air enters, then retighten the flare nut. (When the flare nut is loosened the operating sound of the vacuum pump changes and the reading of the compound pressure gauge goes from minus to zero.)

7. Pump down the system for at least 15 minutes, then check if the compound pressure gauge reads -0.1 MPa (-76 cmHg, -1 bar).

8. At the end of pump down, close the low pressure side gauge of the gauge manifold fully and stop the vacuum pump.

9. Slowly loosen the valve stem of the 3-way valve. When the compound pressure gauge reading reaches 0.1-0.2 MPa, retighten the valve stem and disconnect the charge hose from the 3-way valve charging port. (If the stem of the 3-way valve is opened fully before the charge hose is disconnected, it may be difficult to disconnect the charge hose.)

### Additional charge

#### Refrigerant suitable for a piping length of 15 m is charged in the outdoor unit at the factory.

When the piping is longer than 15 m, additional charging is necessary. For the additional amount, see the table below.

Pipe length 25 m 20 m Additional refrigerant 100 g 200 g

### **CAUTION** (1) Refrigerant must not be discharged into

(2) After connecting the piping , check the joints for gas leakage with gas leak detector.

10. Fully open the valve stems of the 2-way valve and 3-way valve using a hexagon wrench. (After the valve stem begins to turn, turn it with a torque of less than 2.9 Nom (30 kgfocm) until it 11. Firmly tighten the 2-way valve and 3-way valve blank cap and ` the charging port cap. Gauge manifold Compound pressure gauge -0.1 MPa 3-way valve 2-way valve (-76 cmHg -1 bar) Low pressure side valve side valve Charging port

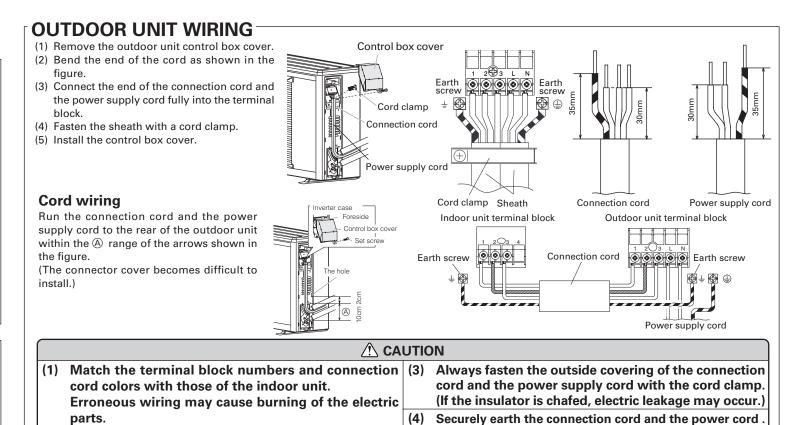
		Tightening torque
Blank cap	6.35mm(1/4in)	20 to 25 Nem (200 to 250 kgfecm)
	12.7mm(1/2in)	28 to 32 N•m (280 to 320 kgf•cm)
Charging port cap		12.5 to 16 N•m (125 to 160 kgf•cm)

### **⚠** CAUTION

### When adding refrigerant, add the refrigerant from the charging port at the completion of work. The maximum length of the piping is 25 m. If

the units are further apart than this, correct operation can not be guaranteed.

Between 15 m and 25 m, when using a connection pipe other than that in the table, charge additional refrigerant with 20g/1 m as the



(2) Connect the connection cords firmly to the terminal (5) Do not use the earth screw for an external connector.

### FINISHING -

(1) Insulate between pipes. For rear, right, and bottom piping, overlap the connection pipe heat insulation and indoor unit pipe heat insulation and bind them with vinyl tape so that there is no gap. For left and left rear piping and center piping, butt the connection pipe heat insulation and indoor unit pipe heat insulation together and bind them with and vinyl tape so that

block. Imperfect installation may cause a fire.

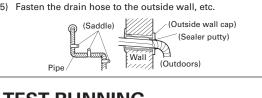
there is no gap. For left and left rear piping and center piping, wrap the area which accommodates the rear piping housing section with cloth tape.

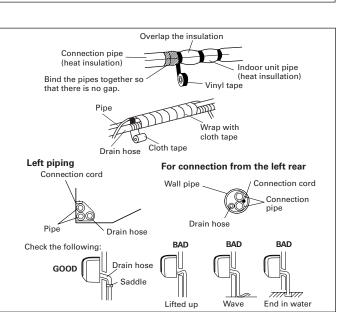
For left and left rear piping and center piping, bind the connection cord to the top of the pipe with vinyl tape. For left and left rear piping and center piping, bundle the piping and drain hose to-

gether by wrapping them with cloth tape over the range within which they fit into the rear piping housing section. ) Temporarily fasten the connection cord along the connection pipe with vinyl tape. (Wrap to about 1/3 the width of the tape from the bottom of the pipe so that water does not enter.)

3) Fasten the connection pipe to the outside wall with saddles, etc.

(4) Fill the gap between the outside wall pipe hole and the pipe with sealer so that rain water and wind cannot blow in. ) Fasten the drain hose to the outside wall, etc.

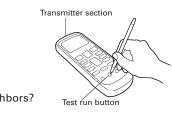




Only use for interconnection between two units.

### TEST RUNNING

- Perform test operation and check items 1 and 2 below.
- For the test operation method, refer to the operating manual.
- The outdoor unit, may not operate, depending on the room temperature. In this case, press the test run button on the remote control unit while the air conditioner is running, (Point the transmitter section of the remote control unit toward the air conditioner and press the test run button with the tip of a ball-point pen, etc.)
- To end test operation, press the remote control unit START/STOP button. (When the air conditioner is run by pressing the test run button, the OPERATION indicator lamp and TIMER indicator lamp will simultaneously flash slowly.)
- 1. INDOOR UNIT (1) Is operation of each button on the remote control unit normal?
- (2) Does each lamp light normally?
- (3) Do the air flow-direction louver operate normally?
- (4) Is the drain normal?
- 2. OUTDOOR UNIT
- (1) Is there any abnormal noise and vibration during operation? (2) Will noise, wind, or drain water from the unit disturb the neighbors? (3) Is there any gas leakage?



P/N 9315342546-01







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