Installation manual for wired remote controller

Read together with indoor unit's installation manual.

⚠WARNING

- Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal.
  Loose connection or hold will cause abnormal heat generation or fire.
- Make sure the power supply is turned off when electric wiring work.
  Otherwise, electric shock, malfunction and improper running may occur.

⚠CAUTION

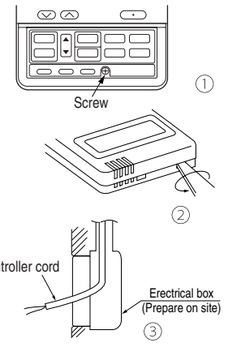
- DO NOT install the remote controller at the following places in order to avoid malfunction.
  (1) Places exposed to direct sunlight
  (2) Places near heat devices
  (3) High humidity places
  (4) Hot surface or cold surface enough to generate condensation
  (5) Places exposed to oil mist or steam directly
  (6) Uneven surface
- DO NOT leave the remote controller without the upper case.
  In case the upper cace needs to be detached, protect the remote controller with a packaging box or bag in order to keep it away from water and dust.

Accessories	Remote controller, wood screw (ø3.5×16) 2 pieces
Prepare on site	Remote controller cord (2 cores) the insulation thickness in 1mm or more. [In case of embedding cord] Erectrical box, M4 screw (2 pieces) [In case of exposing cord] Cord clamp (if needed)

Installation procedure

① Open the cover of remote controller , and remove the screw under the buttons without fail.

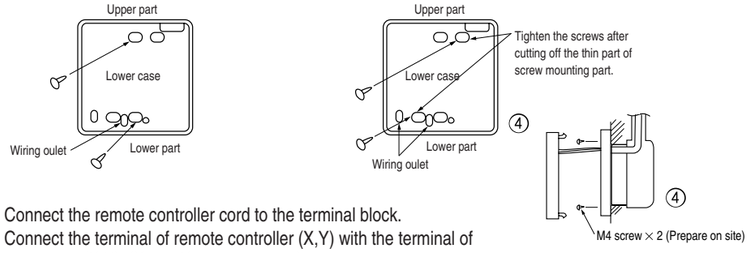
② Remove the upper case of remote controller.
Insert a flat-blade screwdriver into the dented part of the upper part of the remote controller, and wrench slightly.



[In case of embedding cord]

③ Embed the erectrical box and remote controller cord beforehand.

④ Prepare two M4 screws (recommended length is 12-16mm) on site, and install the lower case to erectrical box.
Choose either of the following two positions in fixing it with screws.



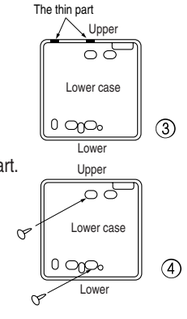
⑤ Connect the remote controller cord to the terminal block.
Connect the terminal of remote controller (X,Y) with the terminal of indoor unit (X,Y). (X and Y are no polarity)

⑥ Install the upper case as before so as not to catch up the remote controller cord, and tighten with the screws.

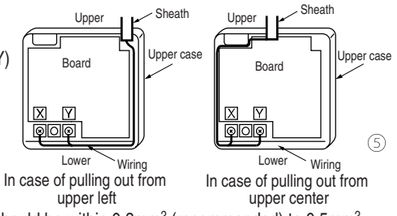
[In case of exposing cord]

③ You can pull out the remote controller cord from left upper part or center upper part.
Cut off the upper thin part of remote controller lower case with a nipper or knife, and grind burrs with a file etc.

④ Install the lower case to the flat wall with attached two wooden screws.

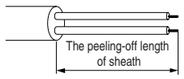


⑤ Connect the remote controller cord to the terminal block.
Connect the terminal of remote controller (X,Y) with the terminal of indoor unit (X,Y). (X and Y are no polarity)
Wiring route is as shown in the right diagram depending on the pulling out direction.



The wiring inside the remote controller case should be within 0.3mm² (recommended) to 0.5mm².
The sheath should be peeled off inside the remote controller case.
The peeling-off length of each wire is as below.

Pulling out from upper left	Pulling out from upper center
X wiring : 215mm Y wiring : 195mm	X wiring : 170mm Y wiring : 190mm



⑥ Install the upper case as before so as not to catch up the remote controller cord, and tighten with the screws.

⑦ In case of exposing cord, fix the cord on the wall with cord clamp so as not to slack.

Installation and wiring of remote controller

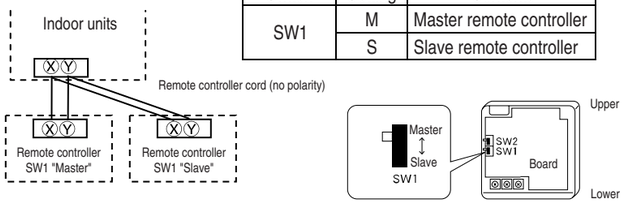
① Wiring of remote controller should use 0.3mm² × 2 core wires or cables. (on-site configuration)

② Maximum prolongation of remote controller wiring is 600 m.
If the prolongation is over 100m, change to the size below.
But, wiring in the remote controller case should be under 0.5mm² . Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire connecting section. Be careful about contact failure.

100 - 200m·····0.5mm² × 2 cores
Under 300m·····0.75mm² × 2 cores
Under 400m·····1.25mm² × 2 cores
Under 500m·····2.0mm² × 2 cores

Master/ slave setting when more than one remote controllers are used

A maximum of two remote controllers can be connected to one indoor unit (or one group of indoor units.)



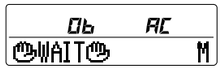
Switch	Setting	Contents
SW1	M	Master remote controller
	S	Slave remote controller

Set SW1 to "Slave" for the slave remote controller. It was factory set to "Master" for shipment.
Note: The setting "Remote controller thermistor enabled" is only selectable with the master remote controller in the position where you want to check room temperature.
The air conditioner operation follows the last operation of the remote controller regardless of the master/ slave setting of it.

The indication when power source is supplied

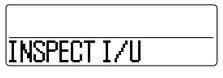
When power source is turned on, the following is displayed on the remote controller until the communication between the remote controller and indoor unit settled.
Master remote controller : "WAIT M"
Slave remote controller : "WAIT S"

At the same time, a mark or a number will be displayed for two seconds first.
This is the software's administration number of the remote controller, not an error cord.



※ The left mark is only an example. Other marks may appear.

When remote controller cannot communicate with the indoor unit for half an hour, the below indication will appear.
Check wiring of the indoor unit and the outdoor unit etc.



The range of temperature setting

When shipped, the range of set temperature differs depending on the operation mode as below.
Heating : 16~30˚C (55~86˚F)
Except heating (cooling, fan, dry, automatic) : 18~30˚C (62~86˚F)

●Upper limit and lower limit of set temperature can be changed with remote controller.

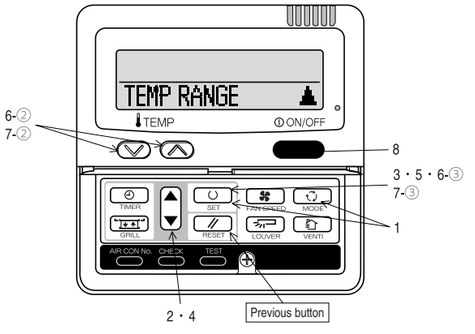
Upper limit setting: valid during heating operation. Possible to set in the range of 20 to 30˚C (68 to 86˚F).
Lower limit setting: valid except heating (automatic, cooling, fan, dry) Possible to set in the range of 18 to 26˚C (62 to 79˚F).
When you set upper and lower limit by this function, control as below.

1. When ⑫TEMP RANGE SET, remote controller function of function setting mode is "INDN CHANGE" (factory setting),
   【If upper limit value is set】
   During heating, you cannot set the value exceeding the upper limit.
   【If lower limit value is set 】
   During operation mode except heating, you cannot set the value below the lower limit.
2. When ⑫TEMP RANGE SET, remote controller function of function setting mode is "NO INDN CHANGE"
   【If upper limit value is set】
   During heating, even if the value exceeding the upper limit is set, upper limit value will be sent to the indoor unit.
   But, the indication is the same as the temperature set.
   【If lower limit value is set 】
   During except heating, even if the value lower than the lower limit is set, lower limit value will be sent to the indoor unit.
   But, the indication is the same as the temperature set.

●How to set upper and lower limit value

1. Stop the air-conditioner, and press (SET) and (MODE) button at the same time for over three seconds .
   The indication changes to "FUNCTION SET ▼".
2. Press ▼ button once, and change to the "TEMP RANGE ▲ " indication.
3. Press (SET) button, and enter the temperature range setting mode.
4. Select "UPPER LIMIT ▼" or "LOWER LIMIT ▲" by using ▲ ▼ button.
5. Press (SET) button to fix.
6. When "UPPER LIMIT ▼" is selected (valid during heating)
   ① Indication: " ∨ ∧ SET UP" → "UPPER 30˚C ∨"
   ② Select the upper limit value with temperature setting button ∨ ∧. Indication example: "UPPER 26˚C ∨ ∧" (blinking)
   ③ Press (SET) button to fix. Indication example: "UPPER 26˚C" (Displayed for two seconds)
   After the fixed upper limit value displayed for two seconds, the indication will return to "UPPER LIMIT ▼".
7. When "LOWER LIMIT ▲" is selected (valid during cooling, dry, fan, automatic)
   ① Indication: " ∨ ∧ SET UP" → "LOWER 18˚C ∧"
   ② Select the lower limit value with temperature setting button ∨ ∧. Indication example: "LOWER 24˚C ∨ ∧" (blinking)
   ③ Press (SET) button to fix. Indication for example: "LOWER 24˚C" (Displayed for two seconds)
   After the fixed lower limit value displayed for two seconds, the indication will return to "LOWER LIMIT ▼".
8. Press ON/OFF button to finish.

- It is possible to finish by pressing ON/OFF button on the way, but unfinished change of setting is unavailable.
- During setting, if you press (RESET) button, you return to the previous screen.



The functional setting

●The initial function setting for typical using is performed automatically by the indoor unit connected, when remote controller and indoor unit are connected.
As long as they are used in a typical manner, there will be no need to change the initial settings.
If you would like to change the initial setting marked "○", set your desired setting as for the selected item.
The procedure of functional setting is shown as the following diagram.

[Flow of function setting]

Start : Stop air-conditioner and press "○(SET)" and "◇(MODE)" buttons at the same time for over three seconds.
Finalize : Press "○(SET)" button.
Reset : Press "//(RESET)" button.
Select : Press ▲ ▼ button.
End : Press ON/OFF button.
It is possible to finish above setting on the way, and unfinished change of setting is unavailable.
"○" : Initial settings
"※" : Automatic criterion

Record and keep the setting

Consult the technical data etc. for each control details

Stop air-conditioner and press ○(SET) + ◇(MODE) buttons at the same time for over three seconds.

FUNCTION SET ▼

FUNCTION ▼ (Remote controller function)

Function	setting		
01 GRILLE ↑↓ SET	↑↓ INVALID	○	
	50Hz ZONE ONLY		When you use at 50Hz area
	60Hz ZONE ONLY		When you use at 60Hz area
02 AUTO RUN SET			
	AUTO RUN ON	※	
	AUTO RUN OFF	※	Automatical operation is impossible
03 TEMP SW			
	VALID	○	
	INVALID		Temperature setting button is not working
04 MODE SW			
	VALID	○	
	INVALID		Mode button is not working
05 ON/OFF SW			
	VALID	○	
	INVALID		On/Off button is not working
06 FAN SPEED SW			
	VALID	※	
	INVALID	※	Fan speed button is not working
07 LOUVER SW			
	VALID	※	
	INVALID	※	Louver button is not working
08 TIMER SW			
	VALID	○	
	INVALID		Timer button is not working
09 SENSOR SET			
	SENSOR OFF	○	Remote thermistor is not working.
	SENSOR ON		Remote thermistor is working.
	SENSOR +3.0℃		Remote thermistor is working, and to be set for producing +3.0˚C increase in temperature.
	SENSOR +2.0℃		Remote thermistor is working, and to be set for producing +2.0˚C increase in temperature.
	SENSOR +1.0℃		Remote thermistor is working, and to be set for producing +1.0˚C increase in temperature.
	SENSOR -1.0℃		Remote thermistor is working, and to be set for producing -1.0˚C increase in temperature.
	SENSOR -2.0℃		Remote thermistor is working, and to be set for producing -2.0˚C increase in temperature.
	SENSOR -3.0℃		Remote thermistor is working, and to be set for producing -3.0˚C increase in temperature.
10 AUTO RESTART			
	INVALID	○	
	VALID		
11 VENT LINK SET			
	NO VENT	○	
	VENT LINK		In case of Single split series, by connecting ventilation device to CNT of the indoor printed circuit board (in case of VRF series, by connecting it to CND of the indoor printed circuit board), the operation of ventilation device is linked with the operation of indoor unit.
	NO VENT LINK		In case of Single split series, by connecting ventilation device to CNT of the indoor printed circuit board (in case of VRF series, by connecting it to CND of the indoor printed circuit board), you can operate /stop the ventilation device independently by (VENT) button.
12 TEMP RANGE SET			
	INDN CHANGE	○	If you change the range of set temperature, the indication of set temperature will vary following the control.
	NO INDN CHANGE		If you change the range of set temperature, the indication of set temperature will not vary following the control, and keep the set temperature.
13 I/U FAN			
	HI-MID-LO	※	Airflow of fan becomes the three speed of ❋-❋-❋ or ❋-❋-❋.
	HI-LO	※	Airflow of fan becomes the two speed of ❋-❋.
	HI-MID		Airflow of fan becomes the two speed of ❋-❋.
	1 FAN SPEED	※	Airflow of fan is fixed at one speed.
14 POSITION			If you change the remote controller function "14 POSITION", you must change the indoor function "04 POSITION" accordingly.
	4POSITION STOP	○	You can select the louver stop position in the four.
	FREE STOP		The louver can stop at any position.
15 MODEL TYPE			
	HEAT PUMP	※	
	COOLING ONLY	※	
16 EXTERNAL CONTROL SET			
	INDIVIDUAL	○	If you input signal into CNT of the indoor printed circuit board from external, the indoor unit will be operated independently according to the input from external.
	FOR ALL UNITS		If you input into CNT of the indoor printed circuit board from external, all units which connect to the same remote controller are operated according to the input from external.
17 ROOM TEMP INDICATION SET			
	INDICATION OFF	○	
	INDICATION ON		In normal working indication, indoor unit temperature is indicated instead of airflow. (Only the master remote controller can be indicated.)
18 ❋ INDICATION			
	INDICATION ON	○	
	INDICATION OFF		Heating preparation indication should not be indicated.
19 ℃/℉ SET			
	℃	○	Temperature indication is by degree C
	℉		Temperature indication is by degree F

(Indoor unit function) I/U FUNCTION ▲

Indoor unit No. are indicated only when plural indoor units are connected.

I/U000 ▲
I/U001 ≑
I/U002 ≑
I/U003 ≑
I/U004 ≑

To set other indoor unit, press AIRCON NO. button, which allows you to go back to the indoor unit selection screen (for example: I/U 000 ▲).

Function	setting		
02 FAN SPEED SET	STANDARD	※	
	HIGH SPEED 1	※	
	HIGH SPEED 2		
03 FILTER SIGN SET			
	INDICATION OFF		
	TYPE 1	○	The filter sign is indicated after running for 180 hours.
	TYPE 2		The filter sign is indicated after running for 600 hours.
	TYPE 3		The filter sign is indicated after running for 1000 hours.
	TYPE 4		The filter sign is indicated after running for 1000 hours, then the indoor unit will be stopped by compulsion after 24 hours.
04 POSITION			If you change the indoor function "04 POSITION", you must change the remote controller function "14 POSITION" accordingly.
	4POSITION STOP	○	You can select the louver stop position in the four.
	FREE STOP		The louver can stop at any position.
05 EXTERNAL INPUT			
	LEVEL INPUT	○	
	PULSE INPUT		
06 OPERATION PERMISSION/PROHIBITION			
	INVALID	○	
	VALID		Permission/prohibition control of operation will be valid.
07 EMERGENCY STOP			
	INVALID	○	
	VALID		With the VRF series, it is used to stop all indoor units connected with the same outdoor unit immediately. When stop signal is inputed from remote on-off terminal "CNT-6", all indoor units are stopped immediately.
08 ❋ SP OFFSET	OFFSET +3.0℃		To be reset for producing +3.0˚C increase in temperature during heating.
	OFFSET +2.0℃		To be reset for producing +2.0˚C increase in temperature during heating.
	OFFSET +1.0℃		To be reset for producing +1.0˚C increase in temperature during heating.
	NO OFFSET	○	
09 RETURN AIR TEMP	OFFSET +2.0℃		To be reset producing +2.0˚C increase in return air temperature of indoor unit.
	OFFSET +1.5℃		To be reset producing +1.5˚C increase in return air temperature of indoor unit.
	OFFSET +1.0℃		To be reset producing +1.0˚C increase in return air temperature of indoor unit.
	NO OFFSET	○	
	OFFSET -1.0℃		To be reset producing -1.0˚C increase in return air temperature of indoor unit.
	OFFSET -1.5℃		To be reset producing -1.5˚C increase in return air temperature of indoor unit.
	OFFSET -2.0℃		To be reset producing -2.0˚C increase in return air temperature of indoor unit.
10 ❋ FAN CONTROL			
	LOW FAN SPEED	○	When heating thermostat is OFF, fan speed is low speed.
	SET FAN SPEED		When heating thermostat is ON, fan speed is set speed.
	INTERMITTENCE		When heating thermostat is OFF, fan speed is operated intermittently.
	FAN OFF		When heating thermostat is OFF, the fan is stopped. When the remote thermistor is working, "FAN OFF" is set automatically. Do not set "FAN OFF" when the indoor unit's thermistor is working.
11 FROST PREVENTION TEMP			Change of indoor heat exchanger temperature to start frost prevention control.
	TEMP HIGH		
	TEMP LOW	○	
12 FROST PREVENTION CONTROL			Working only with the Single split series.
	FAN CONTROL ON	○	To control frost prevention, the indoor fan tap is raised.
	FAN CONTROL OFF		
13 DRAIN PUMP LINK			
	❋	○	Drain pump is run during cooling and dry.
	❋ AND ≋		Drain pump is run during cooling, dry and heating.
	❋ AND ❋ AND ≋		Drain pump is run during cooling, dry, heating and fan.
	❋ AND ≋		Drain pump is run during cooling, dry and fan.
14 ❋ FAN REMAINING			
	NO REMAINING	○	After cooling is stopped or cooling thermostat is OFF, the fan does not perform extra operation.
	0.5 HOUR		After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for half an hour.
	1 HOUR		After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for an hour.
	6 HOUR		After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for six hours.
15 ❋ FAN REMAINING			
	NO REMAINING	○	After heating is stopped or heating thermostat is OFF, the fan does not perform extra operation.
	0.5 HOUR		After heating is stopped or heating thermostat is OFF,the fan perform extra operation for half an hour.
	2 HOUR		After heating is stopped or heating thermostat is OFF,the fan perform extra operation for two hours.
	6 HOUR		After heating is stopped or heating thermostat is OFF, the fan perform extra operation for six hours.
16 ❋ FAN INTERMITTENCE			
	NO REMAINING	○	
	2min OFF 5min ON		During heating is stopped or heating thermostat is OFF, the fan perform intermittent operation for five minutes with low fan speed after twenty minutes' OFF.
	5min OFF 5min ON		During heating is stopped or heating thermostat is OFF, the fan perform intermittent operation for five minutes with low fan speed after five minutes' OFF.
17 PRESSURE CONTROL			
	STANDARD	※	
	TYPE1	※	Connected "OA Processing" type indoor unit, and is automatically defined.

ON/OFF button (finished)

Note 1: The initial setting marked "※" is decided by connected indoor and outdoor unit, and is automatically defined as following table.

Function No.	Item	Default	Model
Remote controller function02	AUTO RUN SET	AUTO RUN ON	"Auto-RUN" mode selectable indoor unit.
		AUTO RUN OFF	Indoor unit without "Auto-RUN" mode
Remote controller function06	FAN SPEED SW	VALID	Indoor unit with two or three step of air flow setting
		INVALID	Indoor unit with only one of air flow setting
Remote controller function07	LOUVER SW	VALID	Indoor unit with automatically swing louver
		INVALID	Indoor unit without automatically swing louver
Remote controller function13	I/U FAN	HI-MID-LO	Indoor unit with three step of air flow setting
		HI-LO	Indoor unit with two step of air flow setting
		HI-MID	
		1 FAN SPEED	Indoor unit with only one of air flow setting
Remote controller function15	MODEL TYPE	HEAT PUMP	Heat pump unit
		COOLING ONLY	Exclusive cooling unit

Note 3: As for plural indoor unit, set indoor functions to each master and slave indoor unit.
But only master indoor unit is received the setting change of indoor unit function "05 EXTERNAL INPUT" and "06 PERMISSION / PROHIBISHION".

Note2: Fan setting of "HIGH SPEED"

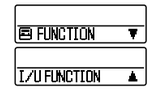
Fan tap		Indoor unit air flow setting				
		❋-❋-❋-❋	❋-❋-❋	❋-❋-❋	❋-❋	❋-❋
FAN SPEED SET	STANDARD	UH - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me	
	HIGH SPEED1, 2	UH - UH - Hi - Me	UH - Hi - Me	UH - Me	UH - Hi	

Initial function setting of some indoor unit is "HIGH SPEED".

How to set function

1. **Stop air-conditioner and press ○(SET) ◇(MODE) buttons at the same time for over three seconds, and the "FUNCTION SET ▼" will be displayed.**

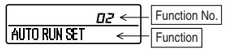
2. **Press ○(SET) button.**
3. **Make sure which do you want to set, "FUNCTION ▼" (remote controller function) or "I/U FUNCTION ▲" (indoor unit function).**
4. **Press ▲ or ▼ button.**
Selecct "FUNCTION ▼" (remote controller function) or "I/U FUNCTION ▲" (indoor unit function).



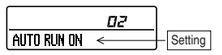
5. **Press ○(SET) button.**
6. **【On the occasion of remote controller function selection】**

① "DATA LOADING" (Indication with blinking)
↓
Display is changed to "01 GRILLE ↑↓SET".

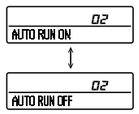
② Press ▲ or ▼ button.
"No. and function"are indicated by turns on the remote controller function table, then you can select from them.
(For example)



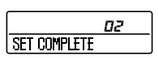
③ Press ○(SET) button.
The current setting of selected function is indicated.
(for example) "AUTO RUN ON" ← If "02 AUTO RUN SET" is selected



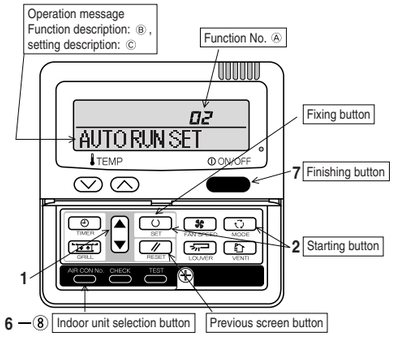
④ Press ▲ or ▼ button.
Select the setting.



⑤ Press ○(SET)
"SET COMPLETE" will be indicated, and the setting will be completed.
Then after "No. and function" indication returns, Set as the same procedure if you want to set continuously ,and if to finish, go to 7.



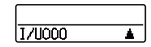
7. **Press ON/OFF button.**
Setting is finished.



【On the occasion of indoor unit function selection】

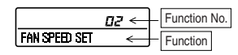
① "DATA LOADING" (Blinking for 2 to 23 seconds to read the data)
↓
Indication is changed to "02 FAN SPEED SET".
Go to ②.

[Note]
(1) If plural indoor units are connected to a remote controller, the indication is "I/U 000" (blinking) ← The lowest number of the indoor unit connected is indicated.

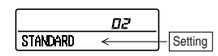


(2) Press ▲ or ▼ button.
Select the number of the indoor unit you are to set
If you select "ALL UNIT ▼", you can set the same setting with all unites.
(3) Press ○(SET) button.

② Press ▲ or ▼ button.
"No. and function" are indicated by turns on the indoor unit function table, then you can select from them.
(For example)



③ Press ○(SET) button.
The current setting of selected function is indicated.
(For example) "STANDARD" ← If "02 FAN SPEED SET" is selected.



④ Press ▲ or ▼ button.
Select the setting.

⑤ Press ○(SET) button.
"SET COMPLETE" will be indicated, and the setting will be completed.
Then after "No. and function" indication returns, set as the same procedure if you want to set continuously , and if to finish, go to 7.

※ When plural indoor units are connected to a remote controller, press the AIRCON NO. button, which allows you to go back to the indoor unit selection screen. (example "I/U 000 ▲")

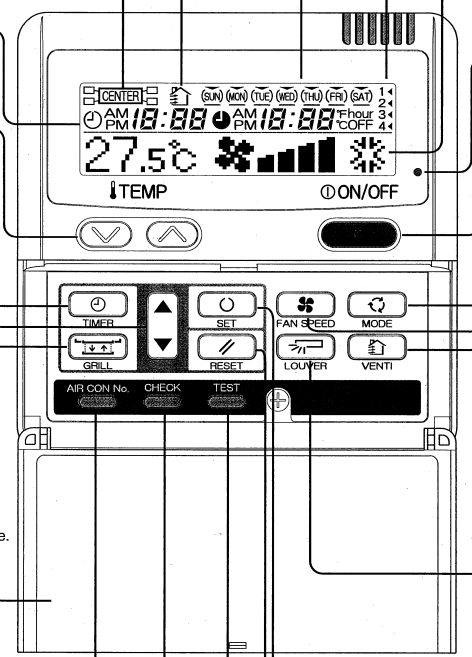
- It is possible to finish by pressing ON/OFF button on the way, but unfinished change of setting is unavailable.
- During setting, if you press //(RESET) button, you return to the previous screen.
- Setting is memorized in the controller and it is saved independently of power failure.

【How to check the current setting】
When you select from "No. and funcion" and press set button by the previous operation, the "Setting" displayed first is the current setting.
(But, if you select "ALL UNIT ▼", the setting of the lowest number indoor unit is displayed.)

RC-E4

Unit:mm

The figure below shows the remote control with the cover opened.



Ventilation display
Displayed during ventilation operation

Central control display
Displayed when the air conditioning system is controlled by centralized remote control.

Timer operation display
Displays the timer operation setting.

Temperature setting buttons
These buttons are used to set the temperature of the room.

Timer button
This button is used to set the timer mode.

Timer setting buttons
These buttons are used to set the timer mode and the time.

GRILL button
This button has no function.
When this button is pressed,
INVALID OPER (Invalid Operation)
is displayed,but it does not mean a failure.

Cover

AIR CON No. button
Display the indoor unit number connected to this remote control.

CHECK button
This button is used at servicing.

TEST button
This button is used during test operation.

Weekly timer display
Displays the settings of the weekly timer.

Operation setting display area
Displays setting temperature, airflow volume, operation mode and operation message.

Operation/check indicator light
During operation: Lit in green
In case of error: Flashing in red

Operation/stop button
This button is used to operate and stop the air conditioning system.
Press the button once to operate the system and press it once again to stop the system.

MODE button
This button is used to change the operation mode.

FAN SPEED button
This button is used to set the airflow volume.

VENT button
This button is used to operate external ventilator.

LOUVER button
This button is used to operate/stop the swing louver.

SET button
•This button is used to fix the setting.
•This button is used to set the silent mode.

RESET button
•Press this button while making settings to go back to the previous operation.
•This button is also used to reset the "FILTER CLEANING" display. (Press it after cleaning the air filter)

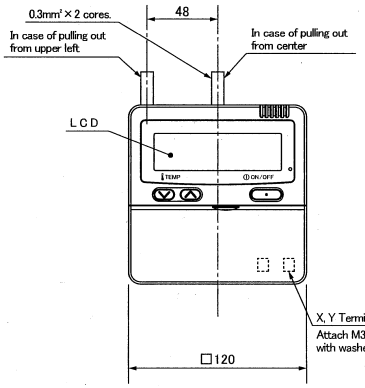
* All displays are described in the liguid crystal display for explanation.

Installation of remot control

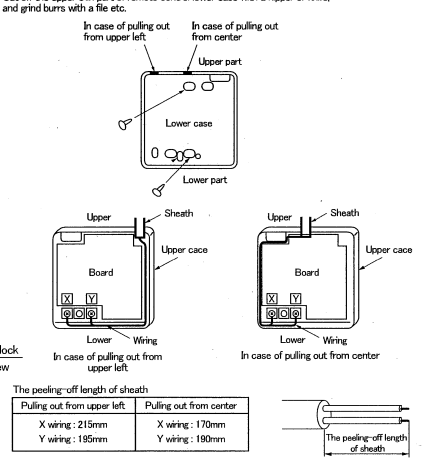
DO NOT install it on the following places in order to avoid malfunction.

(1) Places exposed to direct sunlight
(2) Places near heat devices
(3) High humidity places
(4) Hot surface or cold surface enough to generate condensation
(5) Places exposed to oil mist or steam directly
(6) Uneven surface

Exposed mounting

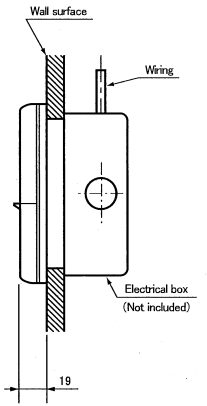


Wiring outlet
Cut off the upper thin part of remote control lower case with a nipper or knife, and grind burrs with a file etc.

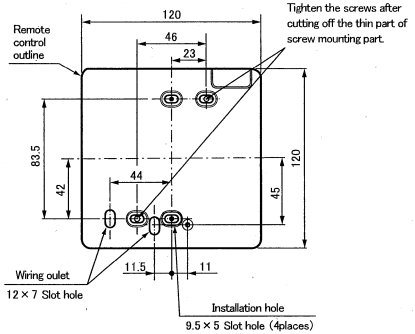


The peeling-off length of sheath	
Pulling out from upper left	Pulling out from center
X wiring : 215mm Y wiring : 195mm	X wiring : 170mm Y wiring : 190mm

Embedded mounting



Remote control installation dimensions



(1) Installation screw for remote control
M4 Screw (2 pieces)

Wiring specifications

(1) If the prolongation is over 100m, change to the size below.
But, wiring in the remote controller case should be under 0.5mm². Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire connecting section. Be careful about contact failure.

Length	Wiring thickness
100 to 200m	0.5mm² × 2 cores
Under 300m	0.75mm² × 2 cores
Under 400m	1.25mm² × 2 cores
Under 600m	2.0mm² × 2 cores

Adapted to **RoHS** directive