

3.4.2. H-LINK SYSTEM


NOTE:

The H-LINK system cannot be applied to the cycle with the old unit models or with the units that have an old transmission.

■ Application

The new H-LINK wiring system requires only two transmission cables that connect each indoor unit and the outdoor unit for up to 16 refrigerant cycles. This new wiring system also requires the connect wires for all the indoor units and all the outdoor units in series. You can apply this H-LINK system to the following models.

Indoor unit	Outdoor unit
RCI	RAS-5~30FSN(E)
RCD	RAS-8~30FXN(E)
RPI	RAS-3~5FSVNE
RPK	
RPF	
RPFI	
RPC	

■ Features

The H-LINK has the following features and specifications:

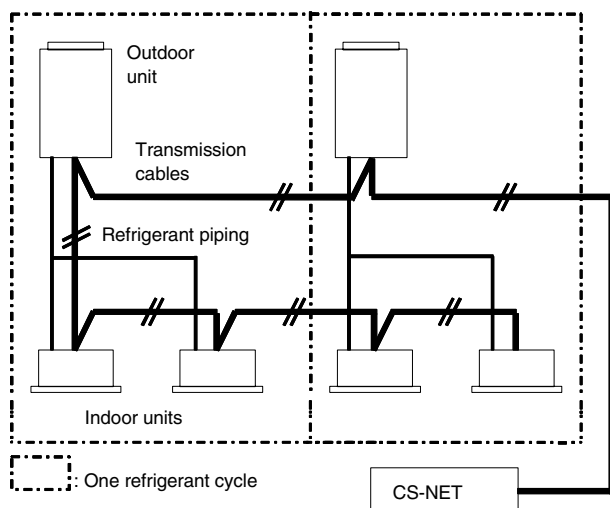
Features:

The total wiring length is remarkably reduced.

Only one (1) connection is required for the wiring between the indoor unit and outdoor unit.

Easy wiring connection to the central controllers

Example of H-LINK System:



■ Specifications:

- Transmission Wire: 2-Wire
- Polarity of Transmission Wire: Non-Polar Wire
- Maximum Outdoor Units To Be Connected: 16 Units per H-LINK system.
- Maximum Indoor Units To Be Connected: 2 Units per cycle and 128Units per H-LINK system (in case of all SET FREE Series).
- Maximum Wiring Length: Total 1000m (including CS-NET).
- Recommended Cable: Twist Shielded Pair Cable or Shielded pair cable over 0.75mm
- Voltage: DC5V

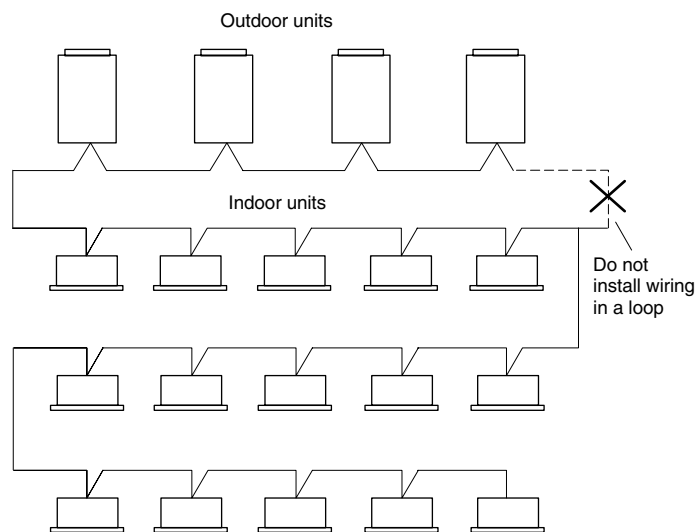
■ System Example of H-LINK

There are two typical cases of using H-LINK system;

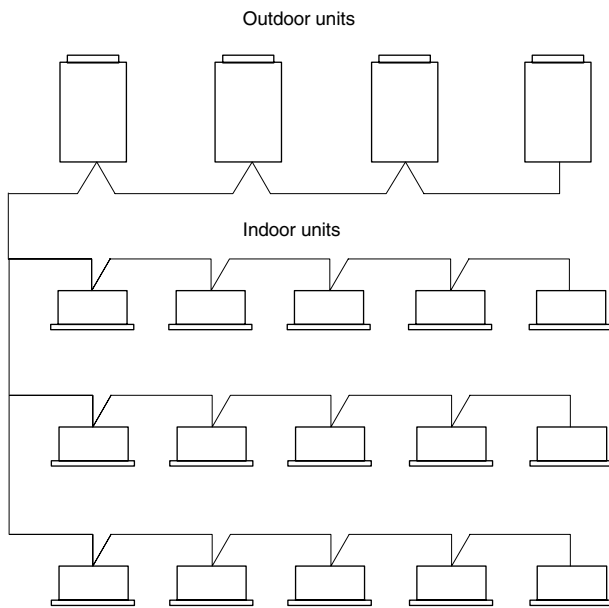
- 1 Using H-LINK System with Air Conditioners only, and
- 2 Using H-LINK System with Air Conditioners with Central Control Device, and the system examples are as shown

■ Using H-Link connection with Air Conditioners only

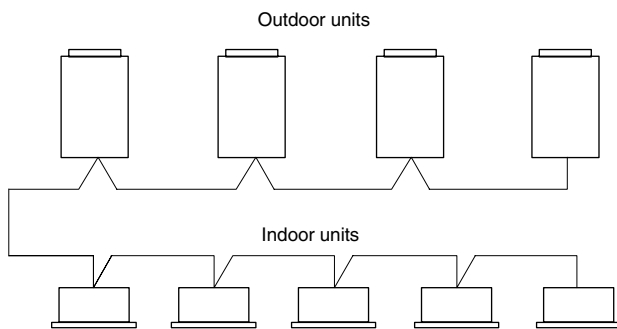
- Line connection with all the units



- Line connection for each floor

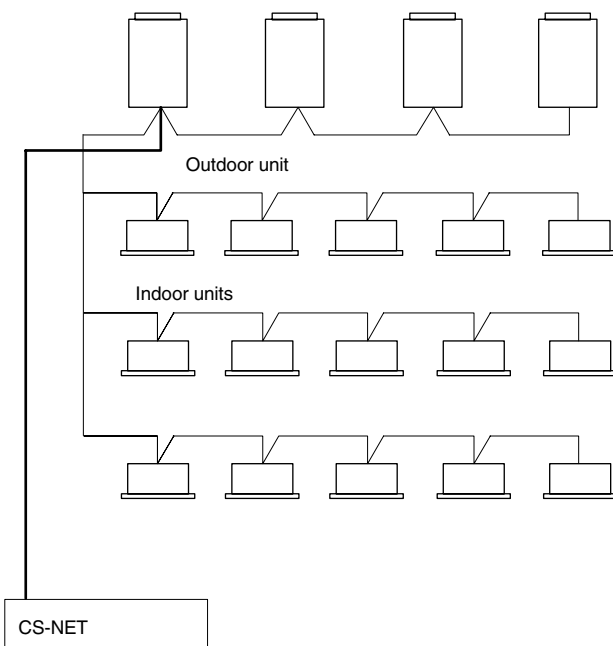


- Connection with one main line and with the branch lines for the units

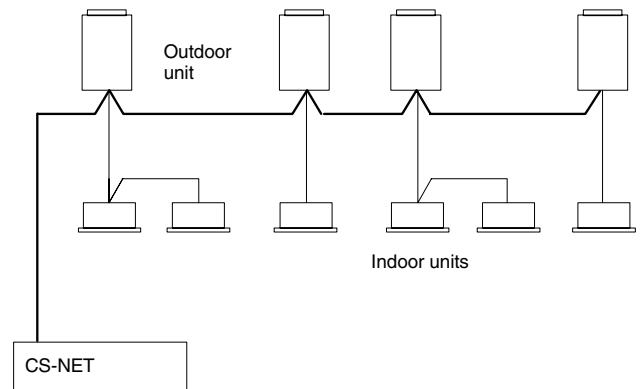


■ Using H-Link connection for conditioning with central control device

- In case that H-LINK is applied when electrical wiring is performed.



- In case that H-LINK is not applied when you are installing the electrical wiring

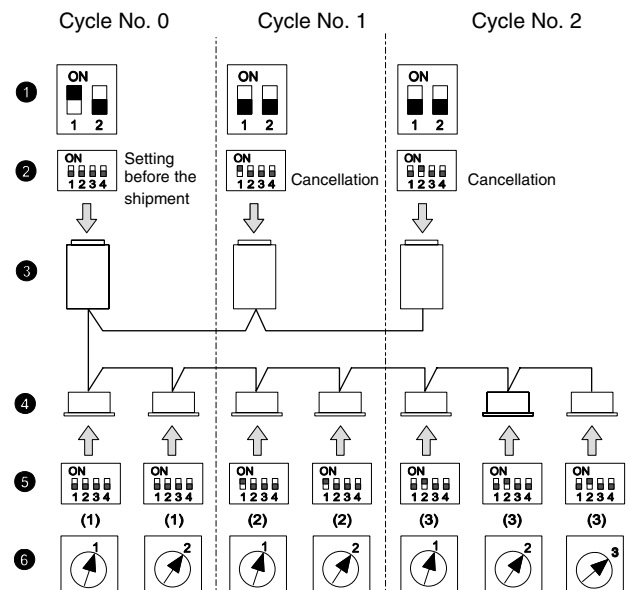


NOTE:

The maximum quantity of units to be connected is 16 outdoor units and 128 indoor units.
Do not make a wiring in a loop.

- DIP Switch setting of indoor PCB and Outdoor PCB.
It is required to set DIP switches of every indoor unit and outdoor unit.

■ Example of the settings of the DIP switches

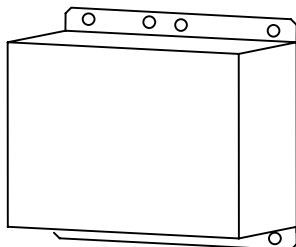


Mark	Description
	DSW10 (end terminal resistance)
	DSW1 (refrigerant cycle)
	Outdoor unit
	Indoor units
	DSW5 (refrigerant cycle)
	RSW (address of indoor unit)

3.4.3. PSC-5HR

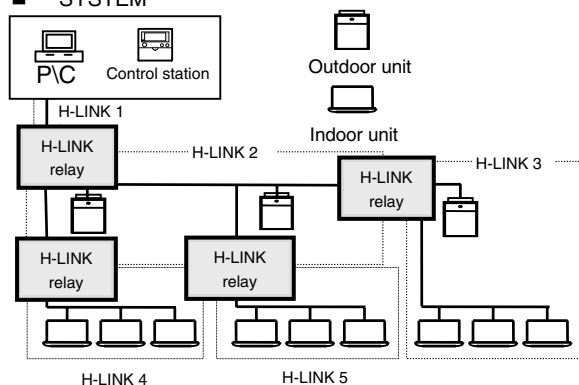
■ Installation of PSC-5HR

Refer to "Installation & Operation Manual of PSC-5HR (PMML 0094A)" for details concerning the safety summary and the installation work.



■ Electrical wiring

■ SYSTEM



NOTE:

You can install a maximum of Four H-LINK relays in one system.

Make sure that the quantity of connections is the following:

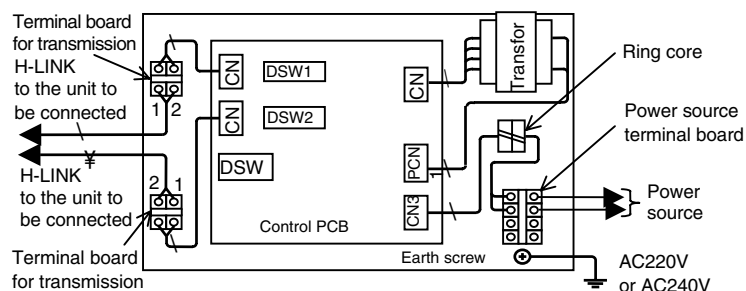
Ref. System Quantity: within 16

Indoor Unit Quantity: within 128

Total Length of each divided H-LINK: up to 1000m

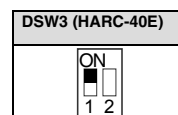
If the H-LINK is divided into five blocks as shown beside, set the end terminal resistance in each H-LINK relay. (For details, refer to the DIP switches below).

■ Internal layout

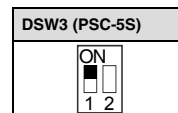


■ Setting the DIP switches

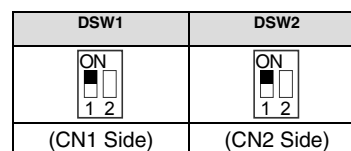
- If there is an outdoor unit in the driven H-LINK, set the end terminal resistance at one of the outdoor units.
- If there is a HARC-40E system, set the end terminal resistance at the HARC-40E.



- If there is a central control device (PSC-5S), set the end terminal resistance at the PSC-5S.



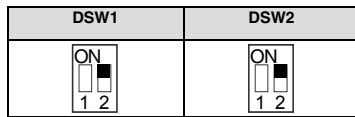
- If there are only indoor units, set the end terminal resistance at the H-LINK relay. If the H-LINK relay is connected to CN1, set the No.1 pin of DSW1 at the ON side. If the H-LINK relay is connected to CN2, set the No.1 pin of DSW2 at the ON side.



- If the H-LINK relays are directly connected to each other, set the end terminal resistance at one of the H-LINK relays. If the H-LINK relay is connected to CN1, set the No.1 pin of DSW1 at the ON side. If the H-LINK relay is connected to CN2, set the No.1 pin of DSW2 at the ON side.

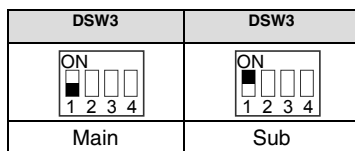
■ Fuse recovery setting

If the fuse is blown out, you can recover by setting the No. 2 pin of DSW1 (at CN1 side) at the ON side or by setting the No. 2 pin of DSW2 (at CN2 side) at the ON side.



■ Setting the main\sub relays

- Set the main\sub relays by means of the No.1 pin of DSW3 on the control PCB as shown below. (The No.2 pin, the No.3 pin and the No.4 pin are not used).
- The setting of the main\sub relays depends on the number of H-LINK relays. Set the main\sub relays as follows:
 - If the number of H-LINK relays is only one, then choose Main. (No setting is required).
 - If the number of H-LINK relays is more than one, then choose Main for one H-LINK relay and choose Sub for the other H-LINK relays.



ATTENTION:

If you do not set this pin correctly, there may appear communication alarms.

■ Test run

After completing the installation of the H-LINK, you need to perform the test run of the PSC-5HR. Check the following items:

- Connection conditions of the air conditioning systems:
 - Check the model code and the quantity of connected units by means of the remote control switch.
 - If control equipment is used, perform the connection check at the central control device.
- Transmission alarm:
 - Perform the RUN/STOP procedure by means of the central control device or the remote control switch.
 - Make sure that no transmission alarm, such as alarm numbers 03, 32, 35, 60, 61 and 256, occurs. The alarm numbers 60, 61 and 256 correspond only to the central control device.
- Activation state:
 - Monitor the activation state of the LED on the Control PCB.
 - Make sure that the LED1 does not stay ON due to the continuous collision. The LED can stay ON due to the following causes: Incorrect setting of the master H-LINK relay, incorrect setting of the slave H-LINK relay, incorrect setting of the end terminal resistance, presence of wiring loops, and others. Make sure that setting is correctly performed. Also, make sure that the wiring is correctly installed.
 - Make sure that the LED2, the LED3 and the LED4 are flickering. If those LED are not flickering, check the transmission state on the LED of the PCB in the other unit. If the above LED on the H-LINK relay is not flickering despite the sending signal from the other unit, check the wiring connection, the setting of the end terminal resistance, the types of wires and the wiring length. If the fuse in the transmission circuit is blown out due to the incorrect wiring, refer to "Fuse Recovery Setting" in item 4.

9.7. H-LINK II System

The H-LINK II is the wiring connection system between units.

The H-LINK II wiring system only needs:

- Two transmission wires connecting each indoor and outdoor unit for a total of 64 refrigerant cycles.
- Connection wiring for all indoor and outdoor units in series.

9.7.1. Application

The H-LINK II system can be applied to the following models:

Indoor Unit	Outdoor Unit
RCI RCIM RCD RPI RPIM RPK RPF RPII RPC	RAS-3~12H(V)RNM(E)

System Free



WARNING:

The H-LINK II system cannot be applied to the models with the old cycle, nor to units with an old transmission.



NOTE:

CSNET WEB is a centralized control system which allows the installation to be controlled remotely. It can be connected at any point of the local corporate network, or even via the Internet.



WARNING:

For the H-LINK II system you must use twisted shielded pair cable or shielded pair cable

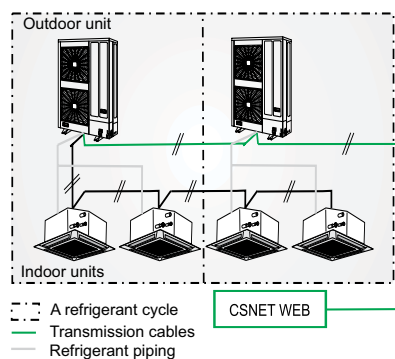
9.7.2. Features

- The total wiring length is considerably reduced compared to traditional connections.
- Only one connection is required for the wiring between the indoor and outdoor units.
- The wiring connection of the complementary central control devices is easy.

9.7.3. Specifications

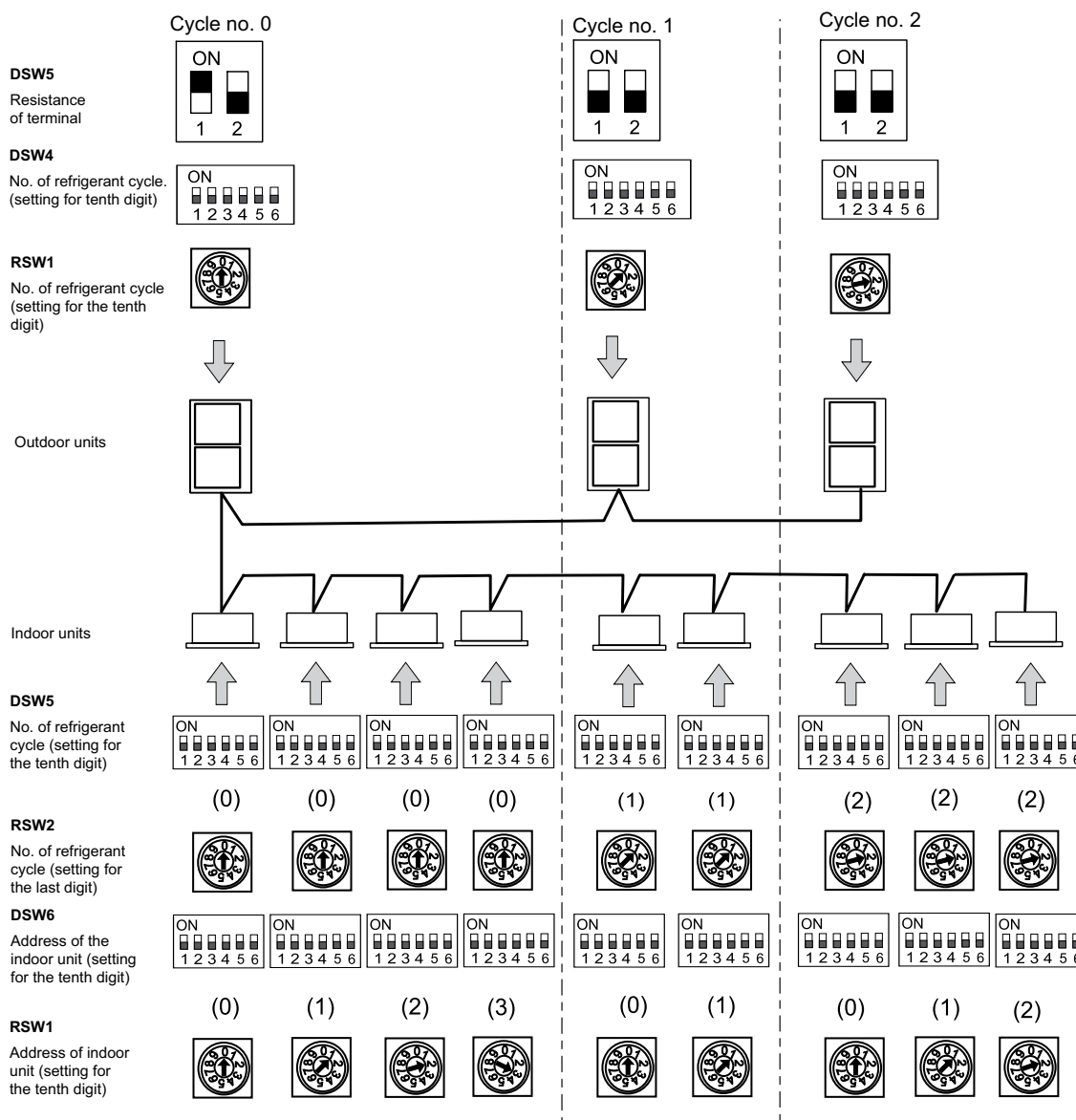
- Transmission cable: 2-wire.
- Polarity of transmission cable: non-polar wire.
- Maximum number of outdoor units that can be connected: 64 units per H-LINK II system.
- Maximum number of indoor units that can be connected: 4 units per cycle and 160 units per H-LINK II system.
- Maximum wiring length: total 1000 m (including CSNET WEB).
- It is possible to increase the maximum wiring length up to 5000 m by using up to four PSC-5HR units.
(Refer to section 9.8 of this catalog.)
- Recommended cable: shielded twisted pair cable, over 0.75mm² (equivalent to KPEV-S).
- Voltage: 5V DC.

Example of H-LINK II Connection



9.7.4. DIP Switch Setting for Single, Double and Triple Systems

- ◆ Dip switch setting of indoor PCB and outdoor H-LINK II
 The DIP switches of all the indoor and outdoor units have to be set and the impedance of the transmission circuit adapted.
- Example of the setting of the DIP switches

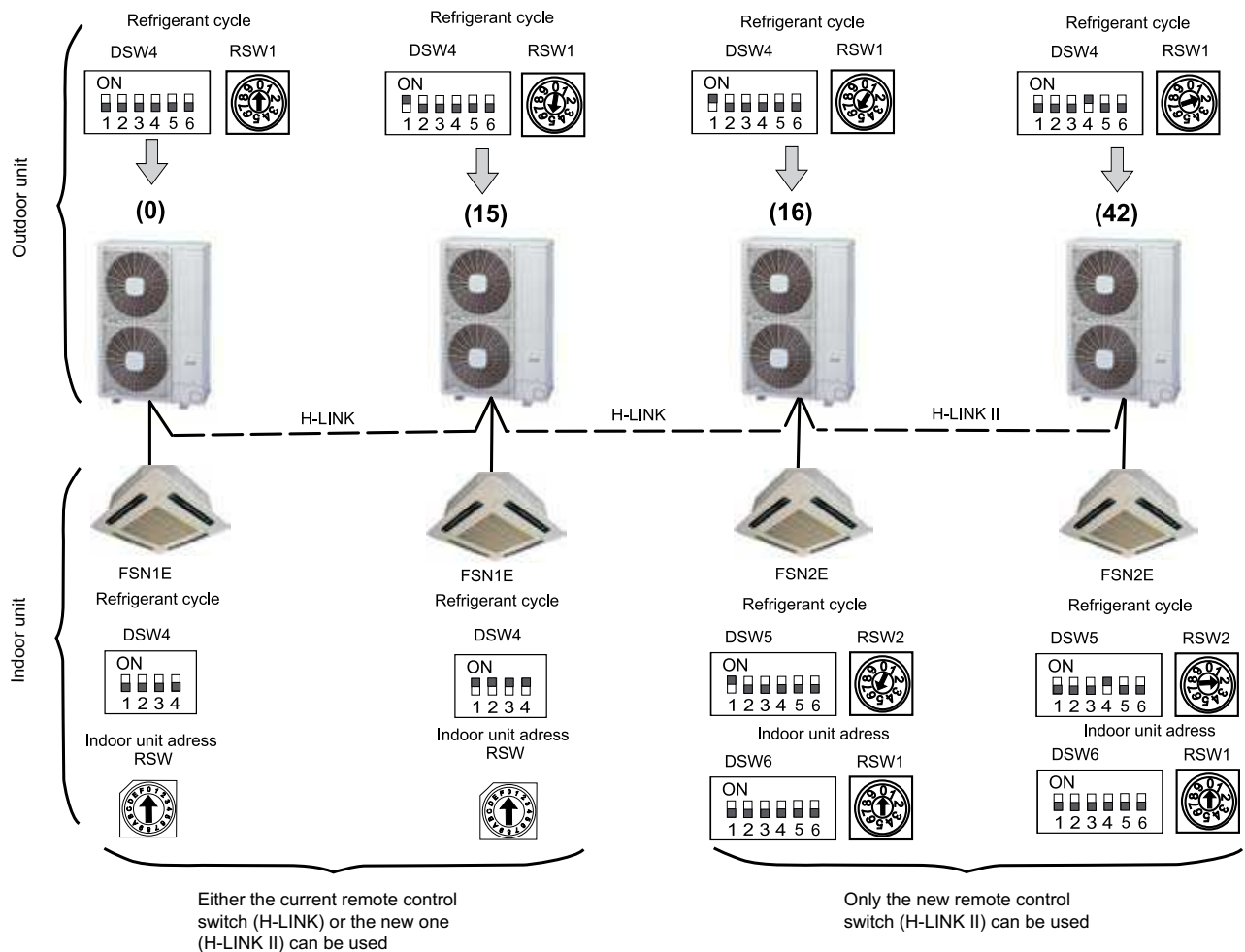


9

Unit	Name of DIP Switch	Mark	Setting before the Shipment	Function
Outdoor unit	Refrigerant cycle	DSW4 RSW1		For setting the refrigerant cycle address of the outdoor unit. Set the DSW4 and RSW1 to overlap the setting of other outdoor units in the same H-LINK system.
	Resistance of terminal	DSW5		To adapt the impedance of the transmission circuit, adjust DSW5 according to the number of outdoor units of the H-LINK system.
Indoor unit	Refrigerant cycle	DSW5 RSW2		For setting the refrigerant cycle address of the indoor unit. Set the DSW5 and RSW2 corresponding to the address of outdoor unit in the same refrigerant cycle.
	Address of the indoor unit	DSW6 RSW1		Setting indoor unit address. Set the DSW6 and RSW1 not to overlap the setting of other indoor units in the same refrigerant cycle. (If not set, the automatic address function is performed.)

9.7.5. Examples of the System of Connection between H-LINK and H-LINK II Units

In the case of mixed systems with H-LINK and H-LINK II, set the H-LINK units in the first 16 positions of the system, as in the following example where 42 systems are connected, 16 with indoor FSN1E units and 26 with indoor FSN2E units.



NOTE:

The maximum number of indoor units that an H-LINK II can control is 160.

If you use PSC-5S and the CSNET WEB 2.0 (systems only compatible with H-LINK) bear in mind that it will only recognize 16 indoor and 16 outdoor units.

**WARNING:**

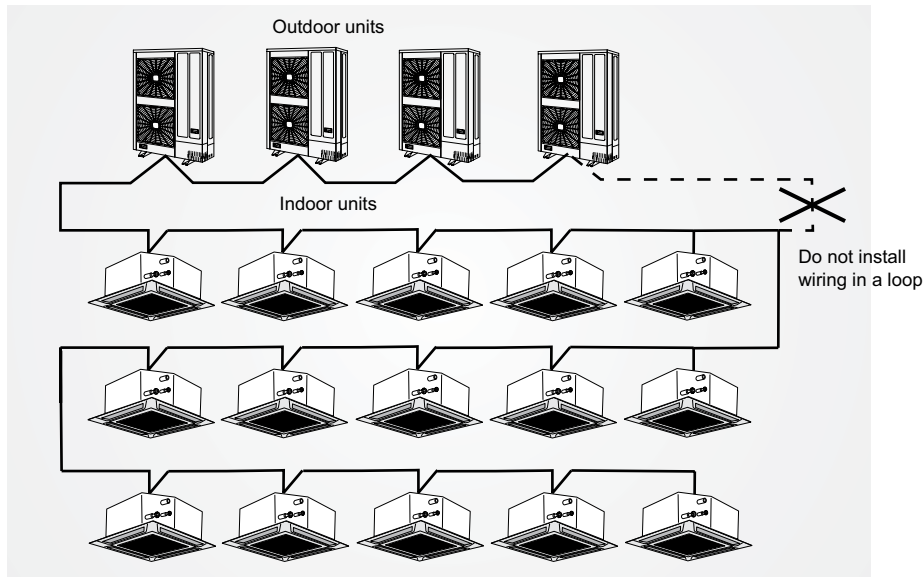
- The maximum number of units than can be connected is 64 outdoor units and 160 indoor units (including Utopia and/or Set-Free, Mini Set-Free).
- Do not install the wiring in a loop.
- If the H-LINK II system is not used when carrying out the electrical wiring as shown above, it must be used once the wiring of the instrument is completed. The DIP switches must therefore be set as specified in the section "Setting the DIP switches on the PCB".

9.7.5. Examples of H-LINK II System

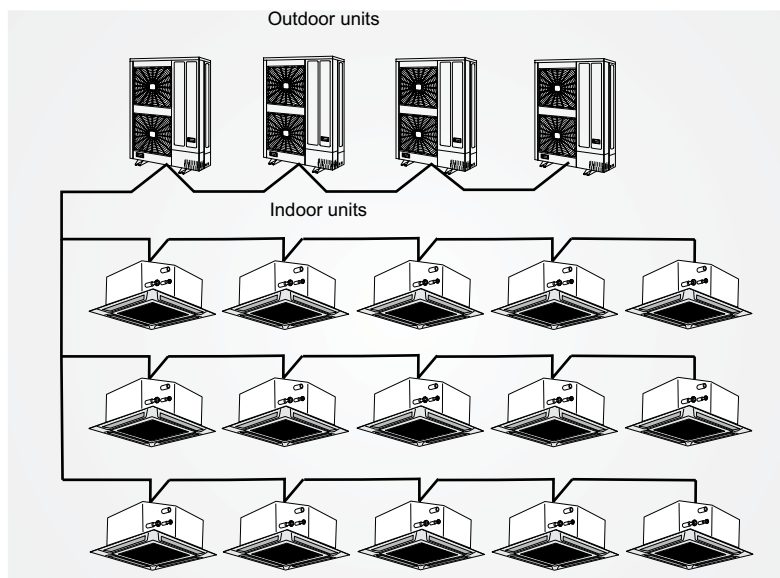
◆ Two Cases:

◆ (1) Using H-LINK II system for air conditioning systems without a central control device (CSNET WEB or PSC-A64S).

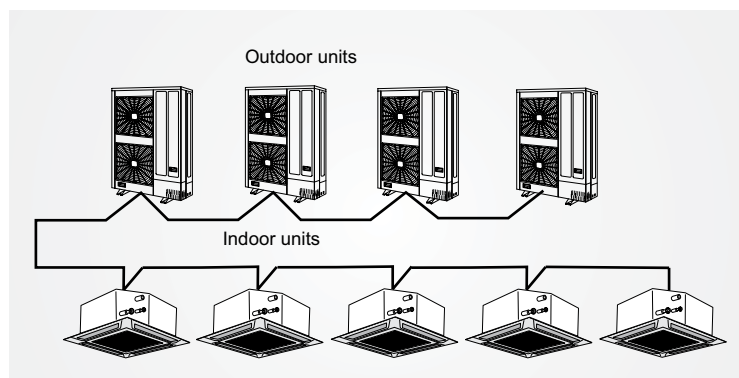
- Line connection with all units (including Utopia and/or Set-Free, Mini Set-Free and DC Inverter).



- Line connection for each floor.

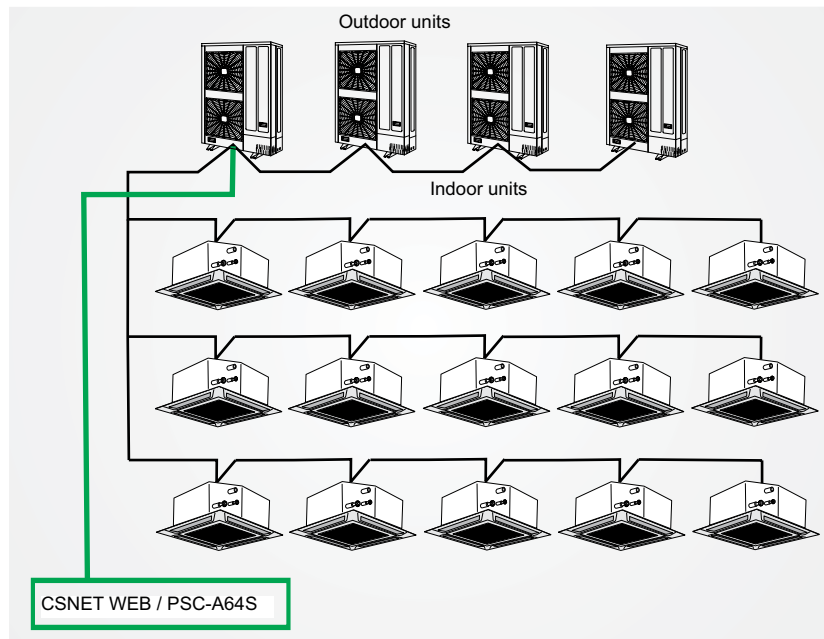


- Connection with one main line and with the branch lines for the units.



◆ (2) Using the H-LINK II system for air conditioning systems with a central control device (CSNET WEB or PSC-A64S).

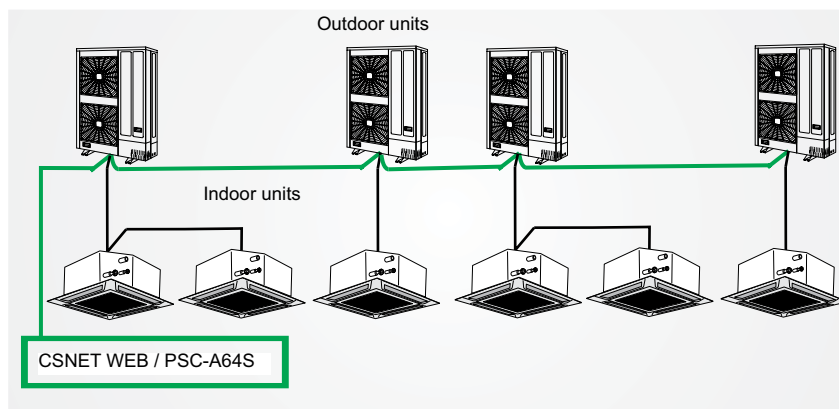
- If the central control device is used when carrying out electrical wiring, the CS-NET WEB can be connected at any point of the H-LINK II wiring.



NOTE:

For CSNET WEB 2.0 the limitations are those corresponding to H-LINK.

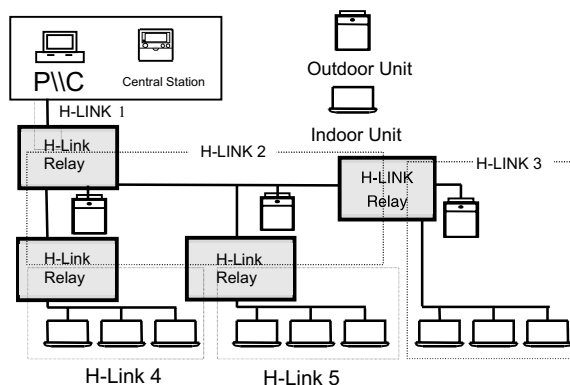
- If the central control device is not used when electrical wiring is carried out, you must connect the H-LINK II wiring to all the systems. The easiest method is usually to connect the outdoor units.



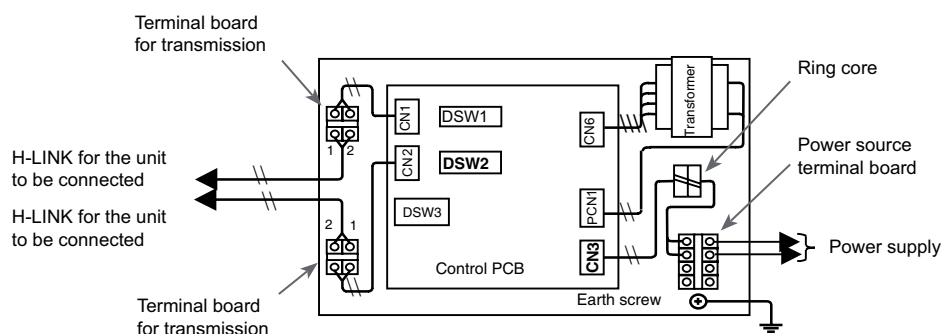
9.8. PSC-5HR

The PSC-5HR (H-link relay) is an accessory that allows use of CSNET WEB when the length of the system wiring is over 1,000 meters.

9.8.1. Example of a System with PSC-5HR



9.8.2. Internal Layout of the Components



i NOTES:

You can install a maximum of four H-LINK relays in one system.

Make sure that the number of connections is as follows:

- No. of refrigerant systems: maximum of 64
- No. of indoor units: maximum of 160

Total length of each divided H-LINK: up to 1,000m

If the H-LINK is divided into five blocks as shown, set the end terminal resistance in each H-LINK relay.

⚠ WARNING:

Make sure that the power source voltage is correct.

An incorrect wiring may cause a breakdown of the PSC-5HR transformer or the units.

In particular, DO NOT connect the power source to the terminal board for transmission.

DO NOT install the H-LINK wires along the power supply wire or any other signal wires, etc. If you do so, the electrical noise may cause a malfunction. If you need to install the H-LINK wires near these wires, leave a distance of 15cm or more. Alternatively, insert the wires into a steel pipe and ground one end of the pipe.

6.4. FSN(E)/FXN(E) OUTDOOR UNITS

The system has 9 input and four output signals that are programmed in the PCB of the outdoor unit by means of connectors CN17 and CN18 for the input signals and CN16 for the output signals.

Connectors CN17 and CN18 have two and one ports respectively to configure three input options out of the nine options the system has.

Input connector CN16 has two ports to configure two input options out of the four options the system has.

The system has 11 optional functions that are programmed in the PCB of the outdoor unit.

6.4.1. AVAILABLE PORTS.

The system has the following input and output ports.

Indication

Content	Setting of the port in the PCB of the indoor unit	Remarks	Outlet
Inputs	1-2 of CN17		Contact
	2-3 of CN17		Contact
	1-2 of CN18		Contact
Outputs	1-2 of CN7		DC 12V
	1-3 of CN8		DC 12V

Connection:

The system has the following connections.

Input connections

Indication	Connections
1	
2	
3	

Output connections

Indication	Connections
1	
2	

Specification of the components for a correct installation

Component	Manufacturer or specifications	Remarks
Auxiliary relay (X3)	OMRON Mini Power Relay Model: MY1F or Equivalent	Voltage between relay terminals 12 Vdc - 75 mA
(SS1) (x1), (x2) contact example	Manual Type	Voltage between terminals of the 230V - 5 mA contactor
3P Connector cable	Optional part PCC-1A (capable of connecting the JST XHP -3 connector)	Five wires with connectors as one set
Wire (control)	Voltage: 12V DC.	0.5 mm ²
Wire (power)	Voltage 230V	2.0 mm ²



Notes:

- The connection of the input signal is only an example.
- Keep the CN17 and CN18 wires as short as possible.
- Do not run the wires along 230 V/400 V CA power cables. Separately install them at a distance of more than 30cm. (The cables may intersect.)
- If you install the wires along a power supply wire, insert the wires in a metal conduit tube and ground one end of the tube.
- The maximum wiring length is 70 m. If you use this function, it is recommended that you use safety devices such as an electrical leakage breaker or a smoke detector.

6.4.2. CONFIGURATION.

Available optional signals

FSN(E)/FXN(E) units have the following signals that are described in the following table.

These signals are set up through the PCB of the outdoor unit.

■ Input signals

Ind.	Output signal	Application	Port
01	Fixing the heating mode	This signal allows to pre-fix the operation mode, in this case the heating mode, independently of what the indoor unit requests. . This is very useful to set up an unique operation mode	CN17 and CN 18
02	Fixing the Cooling mode	This signal allows to pre-fix the operation mode,in this case the cooling mode, independently of what the indoor unit requests. .This is very useful for computer rooms where the cooling mode is fixed throughout the year.	CN17 and CN 18
03	Demand	This signal allows to stop the compressor if it reaches a certain power as well as to put the indoor unit in Thermo-OFF. This is very useful for installations with high power consumption.	CN17 and CN 18
04	Snow sensor	This signal allows to plug in the fans even if the compressor is turned off. This is very useful for cold regions where it snows, which could cause the machine to break due to weight or ice...	CN17 and CN18
05	Enforced stoppage	This signal allows tocontrol the stoppage of the compressor and the fans of the indoor as well as outdoor units. This is very useful when used with the alarm signals of the fire prevention systems.	CN17 and CN18
06	Current control demand 60%	This signal allows to regulate Current consumption and establish a maximum consumption of 60% of the rate point. This is very useful for installations that run 24 hours a day.	CN17 and CN18
07	Current control demand 70%	This signal allows to regulate Current consumption andestablish a maximum consumption of 70% of the rate .This is very useful for installations that run 24 hours a day.	CN17 and CN18
08	Current control demand 80%	This signal allows to regulate Current consumption and establish a maximum consumption of 80% of the rate point. This is very useful for installations that run 24 hours a day.	CN17 and CN18
09	Current control demand 100%	This signal allows to regulate Current consumption and establish a maximum consumption of 100% of the rate point. This is very useful for installations that run 24 hours a day	CN17 and CN18

■ Output signals

Ind.	Output signal	Application	Port
01	Operation Signal	This signal allows to pick up the machine's operation signal. This is very useful to start up additional systems such as humidifiers, fans and other additional air-conditioning systems.	CN16
02	Alarm Signal	This signal picks up the machine's alarm. This is very useful to warn that an alarm has been tripped.	CN16
03	Compressor ON signal	This single allows to pick up the compressor's operation signal. It is very useful for checking signals during remote-control operation and for the interlock of the outdoor unit.	CN16
04	Defrost operation signal	This signal allows to pick up the defrosting of the unit. This is very useful to know how the indoor unit is operating if there is an abnormal situation. .	CN16

Programming

The optional signals are programmed through the PCB of the outdoor unit.

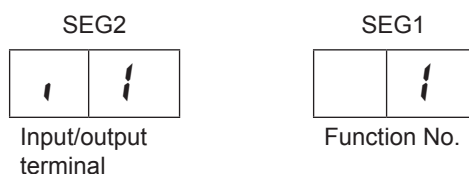
Setting of the optional signals

The optional signals of the outdoor unit are set up from the PCB of the outdoor unit and push switches PSW1, PSW2 and PSW3

■ Selection of the input signal

If the below setting change is required on-site, perform the following instructions:

1. While the outdoor unit is ON, set the following DIP switches on the printed circuit board of the indoor unit as follows: set pin 4 of DSW4 to ON; set pin 7 of DSW5 to ON. Because of these settings, the function selection mode becomes available and the following indication appears on the 7-segment display.



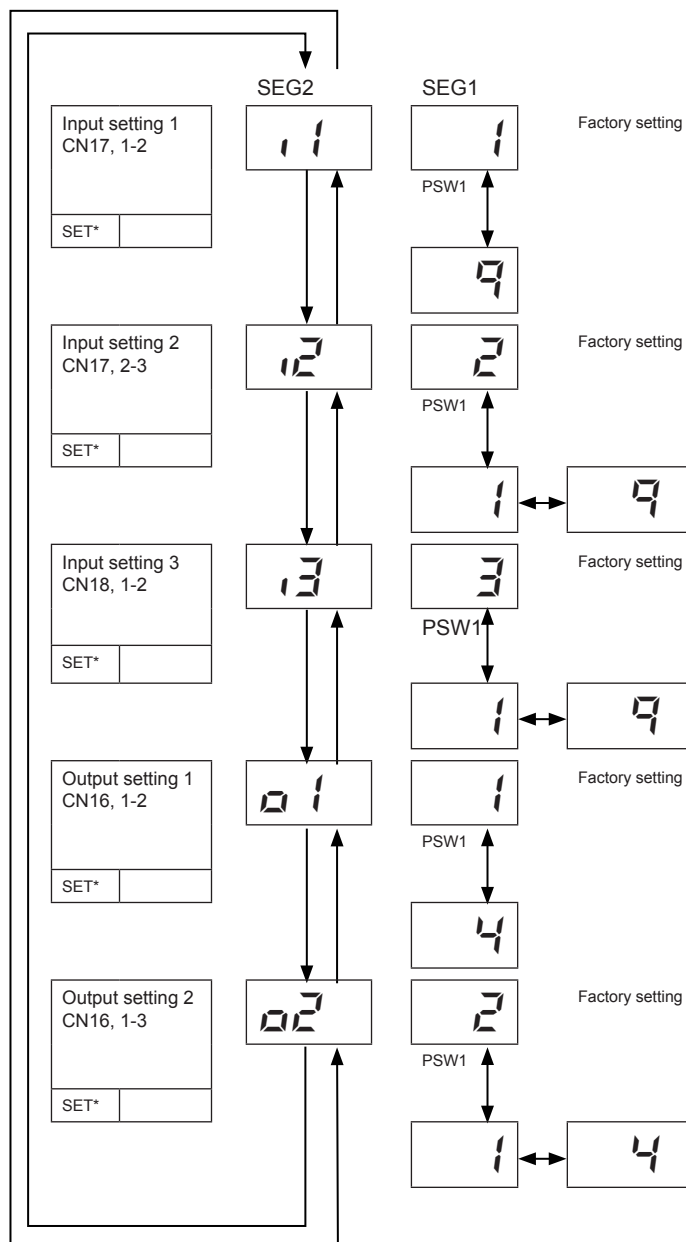
This indicates that function No.1 (set heating mode) is set at input 1.

2. By pressing the push switches PSW2 and PSW3, you change the input/output terminal name. The flowchart shown on the side reflects the changes on the 7-segment display when you press PSW2 and PSW3.
3. After selecting the input/output terminal name, select your required function by pushing the PSW1.



*) This number is increased by 1 by pushing the PSW2 while you are pushing the PSW1. This number is decreased by 1 by pressing PSW3 while pressing PSW1

4. After setting the pin 4 of DSW4 and pin 7 of DSW5 to OFF, the selected contents are memorized in the PCB of the outdoor unit, and, immediately afterwards, the function selection mode is set to OFF. The memorized data is maintained even when the power supply wires are disconnected. The connection details of each function, as well as the required parts, are described in the first section.



(*) Set

6.4.3. DESCRIPTION OF OPTIONAL INPUT SIGNALS.

■ Fixing Operation Mode (Heating / □ Cooling)

This input function is fixed in terminals CN 17 or CN18 of the PCB of the outdoor unit, to use it as a cooling and heating mode. CN1 must be set up as follows

Short circuit between the terminals 1 and 2 of CN17: set heating mode.

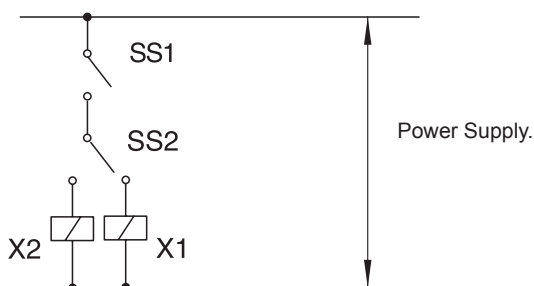
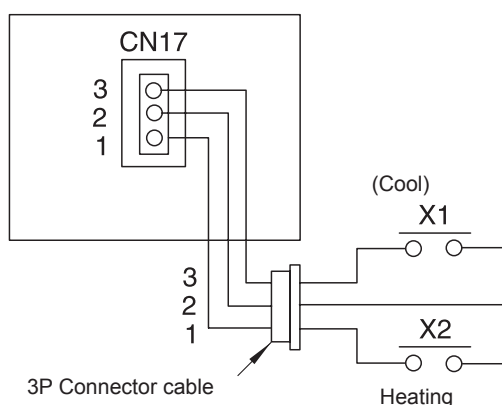
Short circuit between the terminals 2 and 3 of CN17: set cooling mode.

After having pre-fixed the established mode, the remote control can only be used to adjust the temperatures.

Stoppage code "d1" "20" will be displayed if an attempt is made to change the operation mode of any of the indoor units with the remote control.

Example of wiring diagram of fixing the operation mode.

Outdoor Unit PCB:



SS1: Fixing operation mode switch

SS2: Changeover switch

X2: Cooling

X1: Heating

■ Demand (3)

This is an input function to control the maximum power that the compressor can consume. When this option is turned on, the outdoor units are stopped completely, and the indoor units go into THERMO-OFF. Alarm "10" is displayed on the remote control. If the switch of this function is disconnected it becomes available again.

Connect the cabling and use the materials as shown in section 6.4.1

■ Snow sensor (4)

This is an input function that turns on when the sensor detects snow on the fans. At that time the fans turn on at full speed although the compressor is stopped.

Connect the cabling and use the materials as shown in section 6.4.1

■ Forced stoppage (5)

This is an input function that turns on when the switch receives a signal that causes the compressor and the fan motor of the indoor unit to stop; alarm "10" displays on a remote-controlled when this option turns on. If the switch of this function is disconnected it becomes available again.

Connect the cabling and use the materials as shown in section 6.4.1

■ Current control demand (5/7/8/9)

This is an input function that turns on when it detects that the frequency of the compressor reaches 60% or 70% or 80% or 100%. The frequency of the compressor is determined when the maximum current reaches the established limit

Connect the cabling and use the materials as shown in section 6.4.1

If the running current of the outdoor unit exceeds the maximum limit, the unit changes to the Thermo-OFF condition. Stoppage cause code "10" will appear. When the input terminal is opened during the demand current control, the control of the input terminal is reset.

6.4.4. DESCRIPTION OF OPTIONAL OUTPUT SIGNALS

■ Operation signal (1)

This optional signal is utilized to pick up the operation signal. It can be used to turn on or off complementary units of the air-conditioning system, such as fans, humidifiers, etc.

Connect the cabling and use the materials as shown in section 6.4.1.

Note that the contact of auxiliary relay X3 is closed when an operation signal is issued

■ Alarm signal (2)

This optional signal is used to pick up the activation of safety devices.

Connect the cabling and use the materials as shown in section 6.4.1.

Note that the contact of auxiliary relay X3 is closed when an operation signal is issued

■ Operation signal of the compressor (3)

This optional signal is used to pick up the signal when the compressor is ON. It can be used to check how the compressor is running at all times. It is very useful for locking the compressor when the fans are locked.

Connect the cabling and use the materials as shown in section 6.4.1.

Note that the contact of auxiliary relay X3 is closed when an operation signal is issued

■ Defrosting signal (4)

This optional signal is used to pick up when defrosting turns on. It is very useful to check if the indoor unit is in Thermo-OFF.

Connect the cabling and use the materials as shown in section 6.4.1.

Note that the contact of auxiliary relay X3 is closed when an operation signal is issued

6.4.5. OPTIONAL FUNCTIONS FOR FSN(E)/FXN(E)

Programming

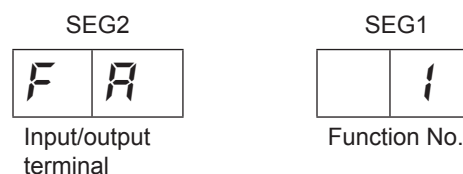
The optional signals are programmed through the PCB of the outdoor unit.

Setting of the optional signals

The optional signals of the outdoor unit are set up from the PCB of the outdoor unit and push switches PSW1, PSW2 and PSW3

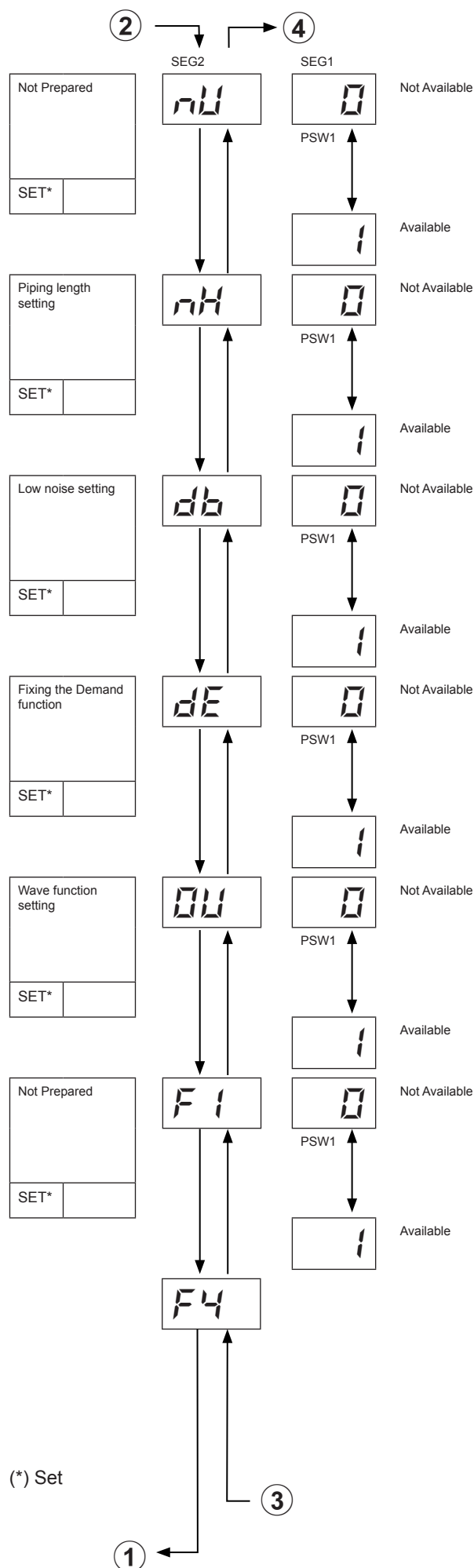
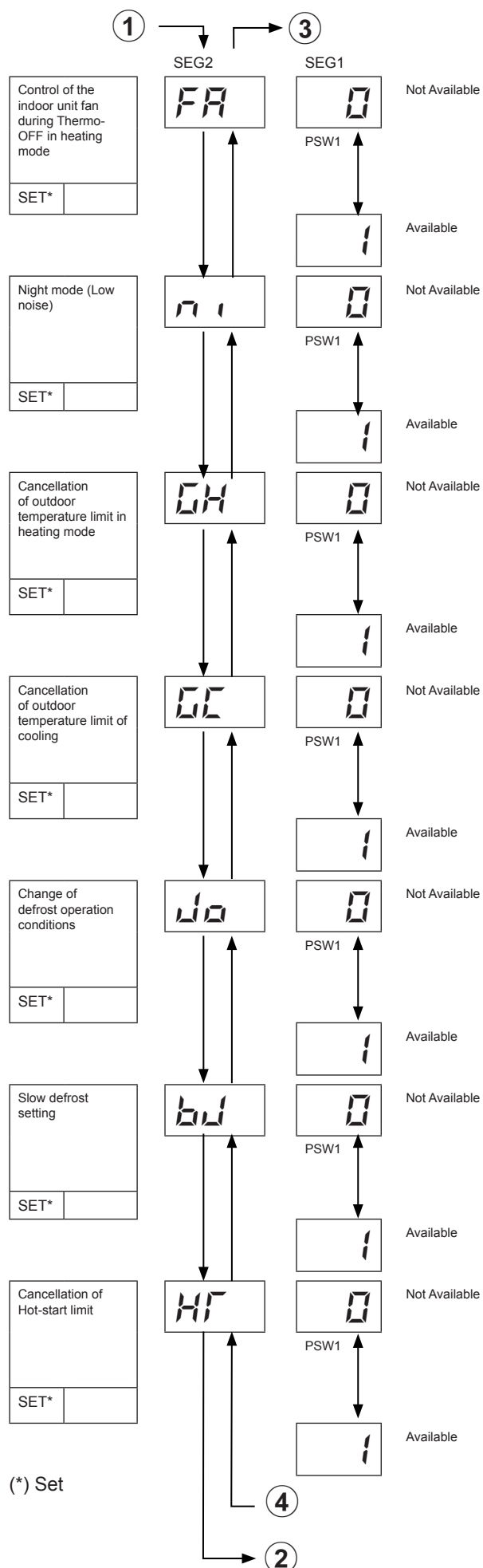
■ Selecting the optional function

1. While the outdoor unit is ON, set the following DIP switches on the printed circuit board of the indoor unit as follows: set pin 4 of DSW4 to ON; set pin 8 of DSW5 to ON. Because of these settings, the function selection mode becomes available and the following indication appears on the 7-segment display.



This indicates that the “Control of the indoor unit fan during Thermo-OFF” function is available.

2. By pressing push switches PSW2 and PSW3, you change the input/output terminal name. The flowcharts shown on the next page reflect the changes on the 7-segment display when you press PSW2 and PSW3.
(See the flowcharts on the next page)
3. After selecting the terminal of the function setting, select the availability function by pressing the PSW1.
4. After setting the pin 4 of DSW4 and pin 8 of DSW5 to OFF, the selected contents are memorized in the PCB of the outdoor unit, and, immediately afterwards, the function selection mode is set to OFF. The memorized data is maintained even when the power supply wires are disconnected.



Control of the indoor unit fan during Thermo-OFF in heating mode.

This optional function is used to set up the indoor unit fan during Thermo-OFF in heating mode.

If it is used in standard mode, the indoor unit fan will run until the activation conditions of the outdoor unit are met.

This optional function allows to create a cycle in which the unit fan runs cyclically for 2 minutes and then stops for 6 minutes until the activation conditions are met.

Operation condition	Operate
Under compressor operation except defrost operation.	When the indoor unit is at thermo-OFF during heating operation, the indoor fan operates for 2 minutes and stops for 6 minutes, and then repeats this cycle.
	<p>Standard mode</p> <p>Optional mode Start at random</p>

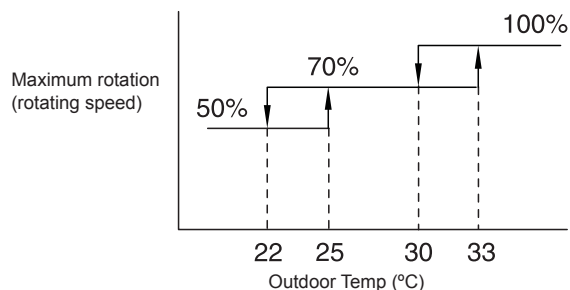


Note: (min.)
When the indoor fan is stopped by another control, the operation of the indoor fans is not available.

Night mode, (Low noise)

When you set the operation mode to night mode (low noise), which is used especially during the nighttime, the cooling capacity is decreased to 60%. You should use the night shift operation only when the remaining cooling capacity can supply the requested temperature.

Outdoor Fan



Note:
The maximum rotation (rotating speed) is always 100% for the standard unit. (No limitation of the outdoor temperature).

Frequency range

	Outdoor unit capacity (HP)	Frequency		Minimum
		conditions	maximum.	
When Night Shift Is Not Set	5	30Hz	82Hz	Except for the conditions below
	8		132Hz	
	10		165 Hz	
	12		187 Hz	
	14		230 Hz	
	16		256 Hz	
	18		274 Hz	
	20		330 Hz	
	22		361 Hz	
	24		396 Hz	
	26		429 Hz	
	28		465 Hz	
When Night Shift Is Set	30		510 Hz	1. Night shift operation 2. Cooling process 3. Outdoor fan: below 70%
	32		528 Hz	
	5	30Hz	50Hz	
	8		80 Hz	
	10		100 Hz	
	12		120 Hz	
	14		140 Hz	
	16		160 Hz	
	18		180 Hz	
	20		200 Hz	
	22		220 Hz	
	24		240 Hz	
	26		260 Hz	
	28		280 Hz	
	30		300 Hz	
	32		320 Hz	

Frequency of the constant speed inverter compressor

Outdoor unit capacity (HP)	Frequency of the 50 Hz power supply
8	65Hz
10	78 Hz
12	78 Hz
14	78x2 Hz
16	78x2 Hz
18	78x2 Hz
20	78x3 Hz
22	78x3 Hz
24	78x4 Hz
26	78x4 Hz
28	78x5 Hz
30	78x5 Hz
32	78x5 Hz

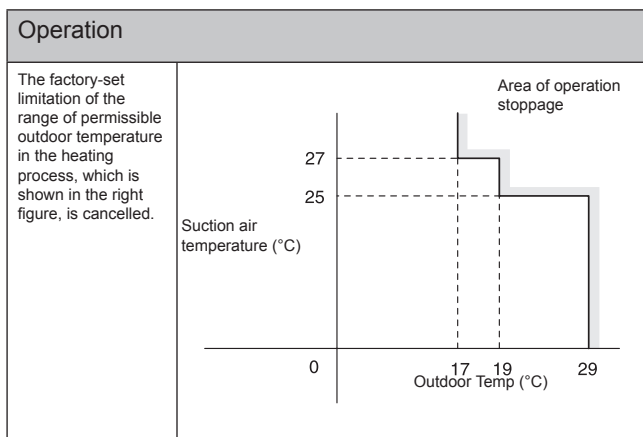


Note

The maximum frequency for the 8~32 HP outdoor unit is the following: frequency of the Inverter + frequency of the constant speed compressor.

■ Cancellation of outdoor temperature limit in heating mode

This function allows to operate in heating mode without any outdoor temperature limit.

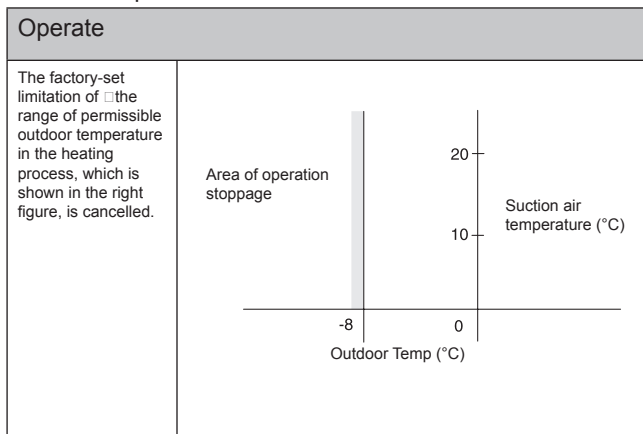


Note:

Due to the protection control against the high outdoor temperature, the operation may be OFF because the protection control is not cancelled.

■ Cancellation of outdoor temperature limit in cooling mode

This function allows to operate in cooling mode without any outdoor temperature limit.



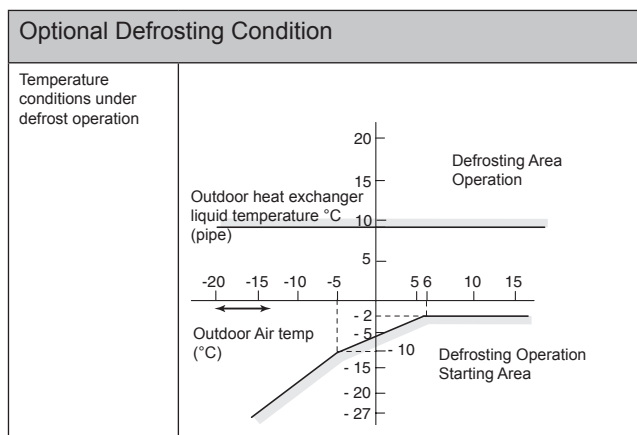
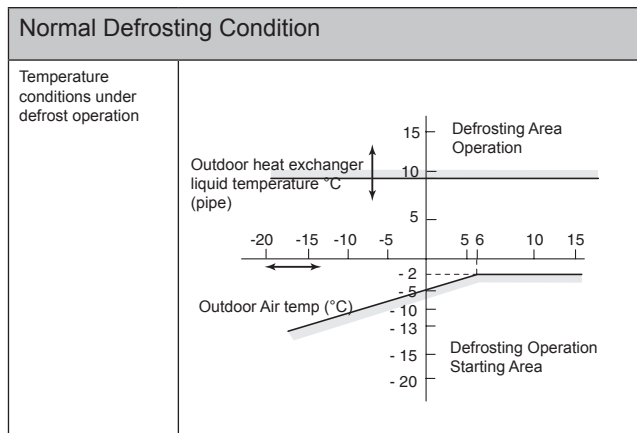
Note:

Due to the protection control against the high outdoor temperature, the operation may be OFF because the protection control is not cancelled.

■ Change of defrost operation conditions

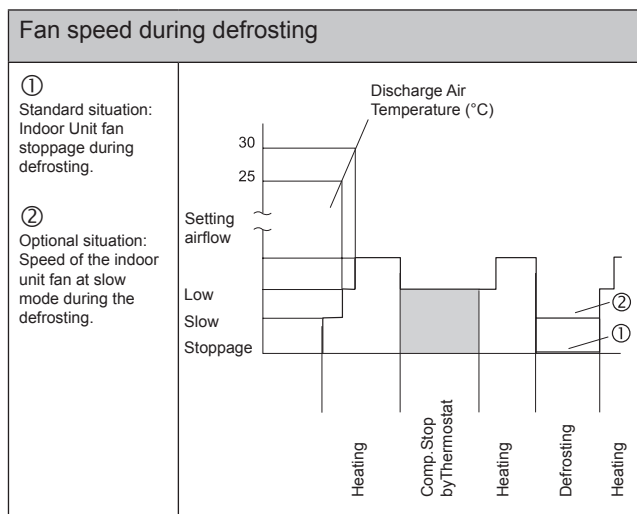
This function allows to change the operation conditions in defrosting mode.

The change is shown in the following illustrations:



■ Setting defrosting at low-speed

By means of this option, you can select the speed of the indoor unit fan during the defrost period.



■ Cancellation of outdoor unit Hot-start limit

By means of this function, you do not need to wait for the compressor temperature to rise above 40 °C in order to start the outdoor unit.

■ Setting according to piping length

This function tells the unit the distance between the outdoor unit and the farthest indoor unit.

If it exceeds 100 m, a bigger diameter has to be installed (greater than 100 m).

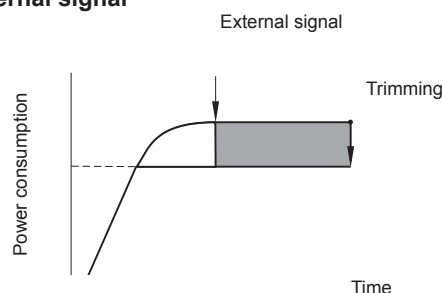
■ Setting due to low noise

This function reduces the maximum speed of the fan motor, consequently the noise level is reduced. There are 14 steps for the regulation.

■ Demand function

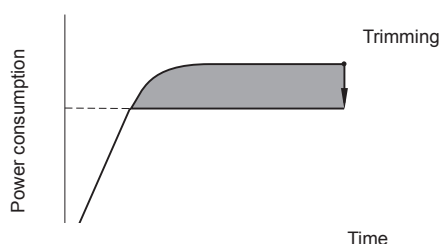
This function regulates the running current of the outdoor unit. If the demanded current is above the set current, the indoor unit capacity is reduced. The running current can be regulated both from an external signal or an internal signal. The capacity regulation is between 60% and 100%.

External signal



The external signal can be generated with different switches, such as that of the timer switch.

Internal input



The PCB can control the internal input.

6.5. FSVNE OUTDOOR UNITS

The system has two input and one output signals that are programmed in the PCB of the outdoor unit by means of connectors CN2 and CN1 for the input signals and CN7 for the output signals.

The system has 8 optional functions that are programmed in the PCB of the outdoor unit.

6.5.1. AVAILABLE PORTS.

The system has the following input and output ports.

	Settings of the port in the PCB of the outdoor unit	Remarks	Outlet
Inputs	CN2	1 0 2 0 3 0	Contact
	CN1	1 0 2 0 3 0	Contact
Outlet	CN7	1 0 2 0 3 0	DC 12V

Specification of the components for a correct installation

Component		Manufacturer or specifications	Remarks
Auxiliary relay (X3)		OMRON Mini Power Relay Model: MY1F or Equivalent	Voltage between relay terminals 12 Vdc - 75 mA
(SS1) (X1), (X2) contact example		Manual Type	Voltage between terminals of the 230 V - 5 mA contactor
3P Connector cable		Optional part PCC-1A (capable of connecting the JST XHP -3 connector)	Five wires with connectors as one set
Wire (control)	Voltage: 12V DC	0.5 mm ²	
Wire (power)	Voltage 230V	2.0 mm ²	



Notes:

- The connection of the input signal is only an example.
- Keep the CN1 and CN2 wires as short as possible.
- Do not run the wires along 230 V/400 V CA power cables. Separately install them at a distance of more than 30cm. (The cables may intersect.)
- If you install the wires along a power supply wire, insert the wires in a metal conduit tube and ground one end of the tube.
- The maximum wiring length is 70 m. If you use this function, it is recommended that you use safety devices such as an electrical leakage breaker or a smoke detector.

5.1. INDOOR UNITS

The system has eight input and six output optional signals. Both signals are programmed in the PCB of the indoor unit: with the CN3 connector for the input signals and the CN7 and CN8 connectors for the output signals. Input connector CN3 has two ports to configure two input options out of the eight options the system has. The output connectors have two ports (CN7) and one port (CN8) respectively to configure three output options out of the eight options the system has

5.1.1. Available ports

The system has the following input and output ports.

Indication		Setting of the port in the PCB of the indoor unit	Remarks	Output
Input	1 1	1-2 of CN3		Contact
	1 2	2-3 of CN3		Contact
Output	0 1	1-2 of CN7		DC 12V
	0 2	1-3 of CN7		DC 12V
	0 3	1-2 of CN8		DC 12V

Connection:

The system has the following connections:

• Input connections

Indication	Connections
1 1	
1 2	

• Output connections

Indication	Connections
0 1	
0 2	
0 3 (Not for RPK)	

• **Specification of the components for a correct installation**

Component		Manufacturer or specifications	Remarks
Auxiliary relay (X2)		OMRON mini power relay model: MY1F or equivalent	Voltage between relay terminals 12 Vdc - 75 mA
(SS1) (X1) contact (example)		Manual type	Voltage between terminals of the 230V - 5 mA contactor
3P connector cable		De optional part PCC-1A (capable of connecting the JST connector XHP-3)	Five cords with connectors as one set
Wire (control)	Voltage: 12V DC.	0.5 mm ²	
Wire (power)	Voltage 230V	2.0 mm ²	



NOTE

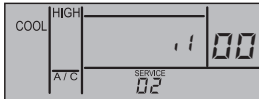
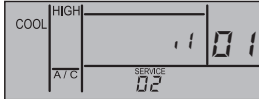
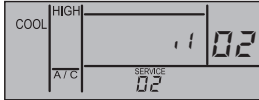
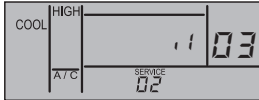
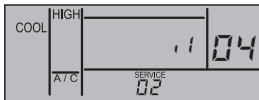


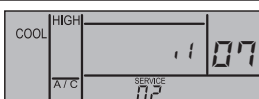
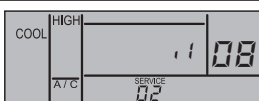

- The connection of the input signal is only an example.
- Make the CN3 wires as short as possible.
- Do not run the wires along 230 V/400 V AC power cables. Separately install them at a distance of more than 30cm. (Intersecting as applicable.)
- If you install the wires along a power supply wire, insert the wires in a metal conduit tube and ground one end of the tube.
- If you use this function, it is recommended that you use safety devices such as an electrical leakage breaker or a smoke detector.

5.1.2. Configuration

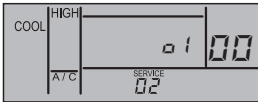

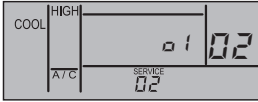
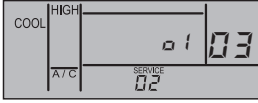
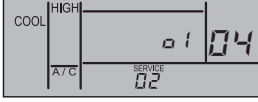

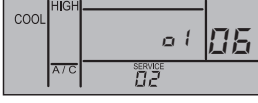

Available optional signals

Indoor units have optional signals that are described in the following table. The configuration of the signals is performed via remote control, except for RPK-(0.8~4.0)FSNM units where the configuration is performed via DIP switches.

• Optional input signals

Indic.	Input signal	Application	Display remote control (input signal)	Port
00	Not set	Not set		CN3
01	Control using the field-supplied room thermostat (cooling)	This signal allows to control the unit using an external thermostat. This could reduce cooling problems in summer for certain applications.		CN3
02	Control using the field-supplied room thermostat (heating)	This signal allows to control the unit using an external thermostat. This could reduce the problems due to stratification of indoor air		CN3
03	Function 1 - remote ON/OFF of the unit (by contact)	This signal allows to control the stoppage and start-up of the system from a remote place. This optional function is very useful to hotels and offices buildings to control the indoor units from building management system.		CN3
04	Function2 - turns unit ON. (by pulse)	This signal allows to control the start-up of the system from a remote place. This optional function is very useful in hotels and office buildings to control the indoor units from the building management system.		CN3
05	Function2 - turns unit OFF. (by pulse)	This signal allows to control the stoppage of the system from a remote place. This optional function is very useful in hotels and offices to control the indoor units from the building management system.		CN3
06	Cancellation of commands from remote control switch after forced stoppage	This signal stops the indoor unit and cancels the commands from the remote control while it is activated.		CN3
07	Setting of the cooling mode or the heating mode	This signal provides a control to change the operation mode from a remote place.		CN3
08	Input signal for the UP/DOWN grille (not available)	Not available		CN3
<div>  NOTE </div> <div> - After setting an input signal, the next signal to set shown on the display changes from "i1" to "i2". </div>				

• **Optional output signals**

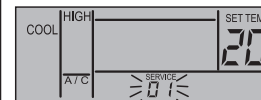
Indic.	Output signal	Application	Remote control display (output signal)	Port
00	Not set	Not set		CN7 or CN8 (only CN7 for RPK)
01	Operation signal	This signal allows to control the status of the machine at all times; it is very useful for centralized applications		CN7 or CN8 (only CN7 for RPK)
02	Alarm signal	This signal allows to activate mechanisms that protect from and warn of possible failures in the unit; it is very useful for rooms that must always be air-conditioned		CN7 or CN8 (only CN7 for RPK)
03	Cooling signal	This signal allows to control the status of the compressor. It is very useful to control the THERMO-OFF of the indoor units.		CN7 or CN8 (only CN7 for RPK)
04	Thermo-ON signal during cooling	It is very useful to control requests from the indoor unit to activate the compressor.		CN7 or CN8 (only CN7 for RPK)
05	Heating signal	This signal allows to control the status of the compressor. It is very useful to control the THERMO-OFF of the indoor units.		CN7 or CN8 (only CN7 for RPK)
06	Thermo-ON signal during heating	It is very useful to control requests from the indoor unit to activate the compressor.		CN7 or CN8 (only CN7 for RPK)
<div>  NOTE </div> <ul style="list-style-type: none"> - 01 must be taken as an example. It may appear 01, 02 or 03. - After setting an output signal, the next signal to set shown on the display changes from "01" to "02" and to "03" (not for RPK) 				

5.1.3. Programming with the PC-ART

The optional signals are programmed using the remote control switch.

• Programming and setting mode

Make sure the unit is stopped. Press the "OK" and the "RESET" switches on the remote control switch simultaneously more than 3 seconds, and the remote control switch is changed to the field setting mode.
The "SERVICE" indication is displayed, and "01" flickers below it.

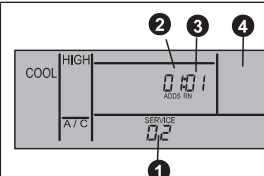


• Selecting SERVICE 02

When in the programming and setting mode, press the "TEMP \odot " or the "TEMP \ominus " switch, and the number that flickers below the "SERVICE" indication will change (01 \rightarrow 02). Set the flickering number to "02", maintain it during 7 seconds or press the "OK" switch, and the remote control switch will change to optional setting mode.

• Selection of indoor unit

- a. In SERVICE 02 selection mode, the indication of the remote control switch will change as shown in the figure.
 - ① The "02" indication is activated.
 - ② The address of the indoor unit for which the optional function is to be set is indicated in the segments for timer setting time indication and "ADD5" is indicated below.
 - ③ The refrigerant cycle number of the outdoor unit for which the optional function is to be set is indicated in the segments for timer setting time indication and "RN" is indicated below.
 - ④ The indication of the setting temperature is turned OFF.
- b. In previous point (a), press the "TEMP \odot " switch or the "TEMP \ominus " switch of the remote control switch and the indoor unit for which the optional function is to be set, can be changed.

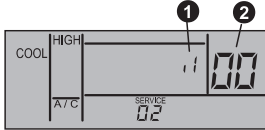
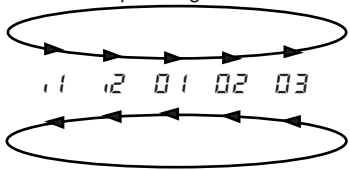



NOTE

- The indoor unit can be selected among the indoor units connected to the remote control switch.
- If both the indication of the address and the refrigerant cycle number is "AA", the settings of all the indoor units are the same.

- c. After selecting the indoor unit, leave the condition for 7 seconds or press the "OK" switch, the remote control switch is changed to the optional setting mode.

• Changing the optional signals and setting conditions

<p>a. At the optional setting mode, the indication on the remote control switch is changed as shown below.</p> <p>❶ The allocated port for the input signal and the output signal is displayed in the segments of the time indication of the timer setting. Refer to the table below for the displayed port and the connector of the indoor unit PCB.</p> <p>❷ The codes of the input and output signals are indicated in the segments for setting temperature indication.</p>	
<p>b. Press the Time ▲ switch or the Time ▼ switch. Then, the port indication at the segments for time indication of the timer setting changes as shown below. Select the port for allocating the input signal and the output signal.</p>	<p>When pressing "Time ▲"</p>  <p>When pressing "Time ▼"</p>
<p>c. Press the "OK" switch. Then, the input signal code and the output signal code at the segments for the setting temperature indication changes as shown below. Select the input signal and the output signal that you need to allocate to the port.</p>	<p>When pressing the "OK" switch.</p> 


• Return from optional function setting mode

Press the "RESET" switch to memorize the optional functions settings and return to normal mode.

• Selection of other indoor unit

When in optional settings mode, press the "TEMP ☺" switch or the "TEMP ☹" switch, the condition of the remote control switch is changed so that the indoor unit can be selected to set the optional function described above.

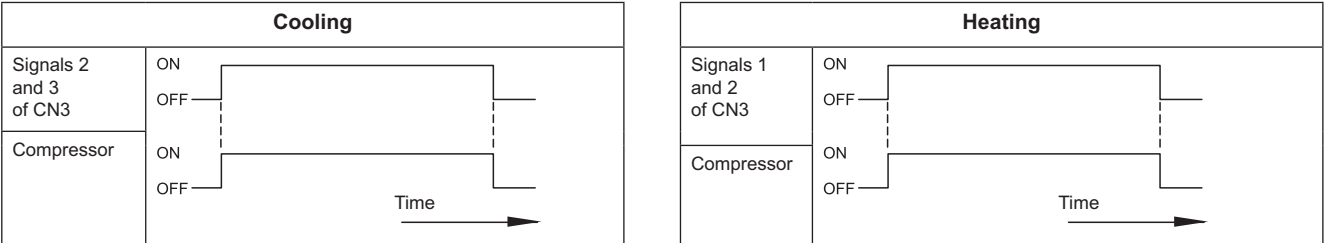
Connectors CN3, CN7 and CN8 are factory set with the following optional functions

	Connector		Function	Factory fixed settings
	N0.	Pin		
Input	CN3	1-2 (*)	03	Function 1 - remote ON/OFF of the unit
		2-3	05	Cancellation of commands from the remote control switch after forced stoppage
Output	CN7	1-2	01	Operation signal
		1-3	02	Alarm signal
	CN8 (Not for RPK)	1-2	05	Thermo-ON signal during heating
<div>  CAUTION </div>				
- If you connect the Econofresh kit, pins 1 and 2 of CN3 are locked for the enthalpy sensor or CO2 sensor.				


5.1.4. Description of optional input signals

• Control by field-supplied room thermostat (□ 1□2)

When operating with a field supplied room thermostat instead of the inlet thermistor of the indoor unit, connect the cable and use the materials as shown in section 5.1.1.



Component	Manufacturer or specifications
Thermostat	Equivalent of YAMAKATE R7031P005, R7031Q005




NOTE

- When you use a field-supplied room thermostat, select the specified thermostat as explained below:
Contactor Load: DC 12V
Differential more than 1.5 degrees
- Do not use a thermostat using mercury.
- The remote control switch must remain connected to the unit. When the power supply is restored, you must start the unit by pressing the RUN button. The compressor will then operate under the control of the field supplied thermostat. All other functions are controlled by the remote control in the usual way.

• Function 1 - remote ON/OFF of unit (□ 3)

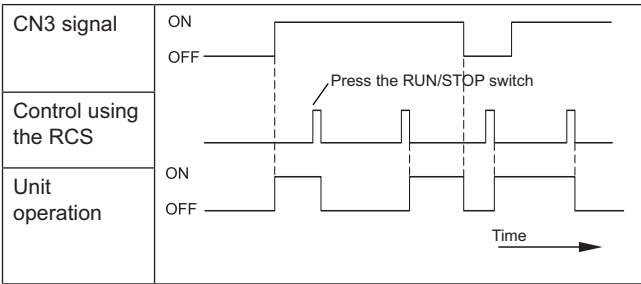
This is a remote ON/OFF optional signal that uses the level signal (ON/OFF). Connect the cabling and use the materials as shown in section 5.1.1.




NOTE

- When you start the unit using the remote ON/OFF switch, the fan speed is subject to the mode that is memorized in the remote control switch.

Time chart:



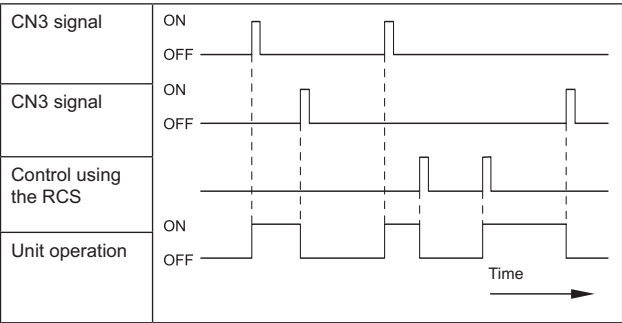


NOTE

- Operation priority is given to the remote ON/OFF signal or the signal of the remote control switch that is given last.
- Due to the initialization of the components, picking up the signal within 10 seconds after turning ON the main switch is not available.

- **Function 2 - Remote ON of the unit (□4) (pulse signal input)**
This is a remote ON/OFF optional signal that uses the pulse signal.
Connect the cabling and use the materials as shown in section 5.1.1.
- **Function 2 - Remote OFF of the unit (□5) (pulse signal input)**
This is a remote OFF optional signal that uses the pulse signal.
Connect the cabling and use the materials as shown in section 5.1.1.
A time chart with the uses of functions 04/05 is shown below.

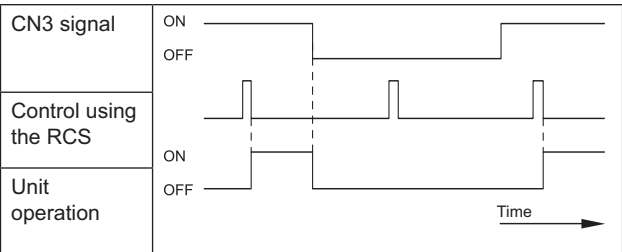
Time chart



	NOTE
- Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.	

- **Cancellation of the commands from the remote control switch following a forced stoppage (□5)**
You can stop the air conditioning systems using the signal from a building management system. Then, the individual commands from the remote control switch are cancelled.
Connect the cabling and use the materials as shown in section 5.1.1.

Time chart

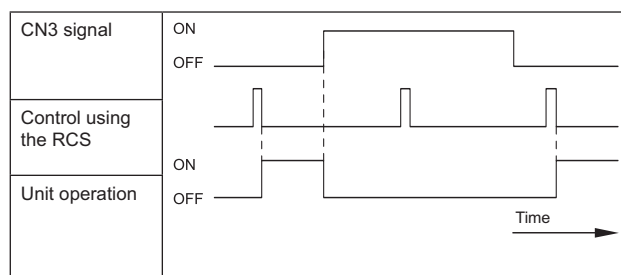


	NOTE
- Due to the initialization of the components, picking up the signal within ten seconds after turning ON the main switch is not available.	

With this optional signal, you can use the B contact using the optional setting of the remote control switch. The time chart, which provides the information about when you can use the B contact, is shown below.

Refer to section 5.4 “optional functions available through the remote-control switch” for more details about contacts A and B.

Time chart

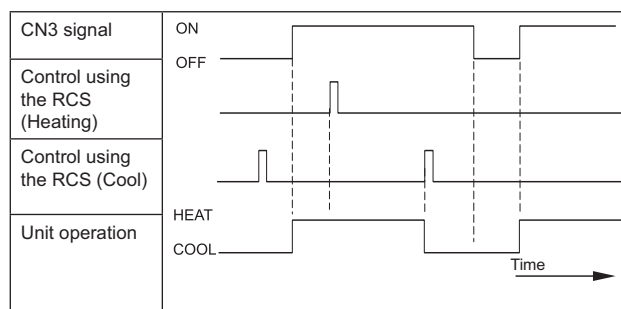


- **Setting the cooling mode or the heating mode (07)**

By using this optional signal, the cooling or heating operation mode can be changed by sending a contact signal from outside the unit. The operation mode is followed by the field-supplied switch or the remote control switch, which is used last.

Connect the cabling and use the materials as shown in section 5.1.1.

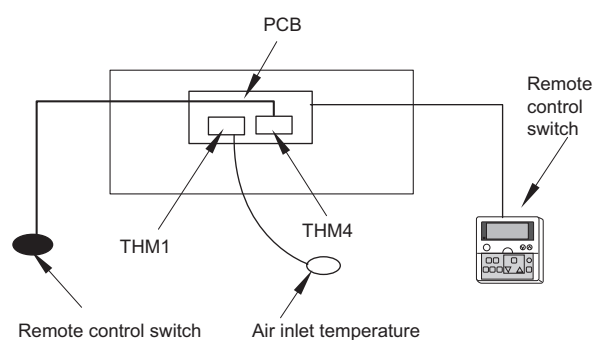
Time chart:



- **Control using a remote temperature sensor (CB)**

By using an optional remote temperature sensor, the following functionalities are available:

1. The unit is controlled by the average temperature of the air inlet thermistor and the remote temperature sensor.
2. When the discharge air temperature exceeds 60 °C, the fan speed is increased from medium to high or from low to medium.





NOTE

- The remote control thermistor cannot be used if a remote temperature sensor is being used
- During the heating process, the function "heating temperature calibration" is automatically cancelled. (Refer to section 5.4.2).
- If you are using this remote sensor, select the location for installing the remote sensor according to the following requirements:
 - A location where the average room temperature can be detected.
 - A location where the thermistor (sensor) is not directly exposed to the sunlight.
 - A location where a heat source is not near the thermistor.
 - A location where the outdoor air that is caused by opening and closing the doors does not affect the room temperature.

5.1.5. Description of optional output signals

- **Picking up the operation signal (□1)**

This optional signal is used to pick up the operation signal. Using this function, you can check the operation signal at a remote place.

You can use it to lock the operation of the fresh air intake fan.

Connect the cabling and use the materials as shown in section 5.1.1.

Note that the contact of auxiliary relay X2 is closed when an operation signal is issued.

- **Alarm signal (□2)**

This optional signal is used to pick up the activation of safety devices. The signal is normally displayed on the remote control switch.

However, this function is not available under abnormal transmission conditions. Connect the wires as shown below.

Connect the cabling and use the materials as shown in section 5.1.1.

Note that the contact of auxiliary relay X2 is closed when an operation signal is issued.

- **Cooling operation signal (□3)**

This optional signal is used to pick up the cooling operation signal.

The contact of auxiliary relay X2 is closed when the cooling operation signal is ON, regardless of whether the thermostat signal is ON or OFF.

Connect the cabling and use the materials as shown in section 5.1.1.

The contact of auxiliary relay X2 is closed when the cooling operation signal is ON, regardless of whether the thermostat signal is ON or OFF.

- **Thermo-ON signal during the cooling process (□4)**

You use this optional signal to pick up the Thermo-ON signal of the running compressor during the cooling process.

Connect the cabling and use the materials as shown in section 5.1.1.

The contact of auxiliary relay X is closed when the thermostat signal is ON during cooling mode.

- **Heating operation signal (□5)**

This optional signal is used to pick up the heating operation signal. The contact of auxiliary relay X2 is closed when the heating operation signal is ON, regardless of whether the thermostat signal is ON or OFF.

Connect the cabling and use the materials as shown in section 5.1.1.

The contact of auxiliary relay X2 is closed when the cooling operation signal is ON, regardless of whether the thermostat signal is ON or OFF.

- **Thermo-ON signal during the heating process (□6)**

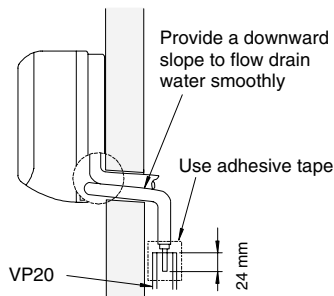
You use this optional signal to pick up the Thermo-ON signal of the running compressor during the heating process.

You use this function in order to control a circulator or a humidifier.

Connect the cabling and use the materials as shown in section 5.1.1.

The contact of auxiliary relay X2 is closed when the thermostat indication is ON during the heating mode.

3. Provide a vinyl chloride tube, of a 26mm outer diameter
4. Connect a drain piping according to figure.



- Do not create an upward slope from the unit.
- Use vinyl chloride type adhesive for connecting the drain pipe.

5. Tightly squeeze the drain hose with the wire clamp after inserting the drain pipe into the drain hose completely.
6. Pour water onto the drain pan and check to ensure that water flows smoothly.

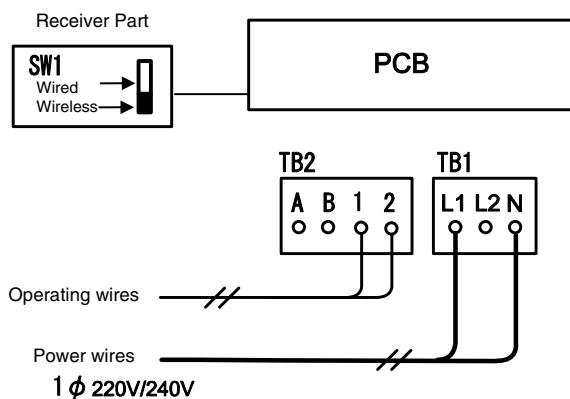
5. ELECTRICAL WIRING

5.1. ELECTRICAL WIRING CONNECTION FOR INDOOR UNIT

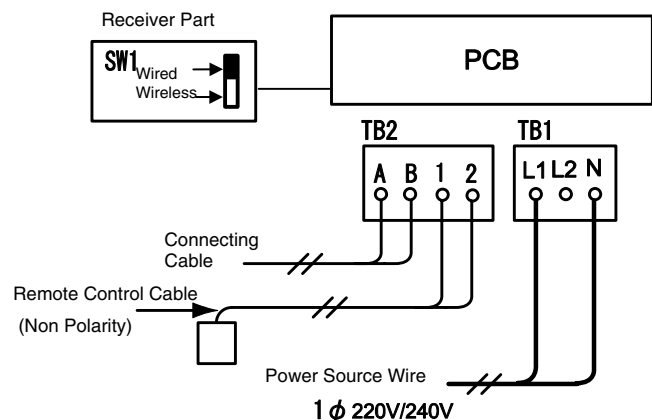
The electrical wiring connection for the indoor unit is shown below.

1. Connect the power supply and earth wires to the terminals in the electrical box.
2. Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.
3. In case of using PC-P1HE/PC-P2HTE connect the cables to A,B on the TB2. Set the slide switch (SW1) at the "wired" side. (See the drawings)

In the case of wireless remote control:



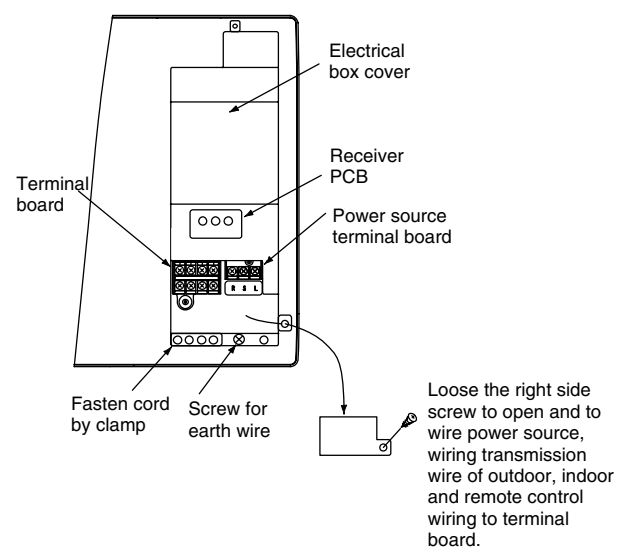
In the case of wired remote control:



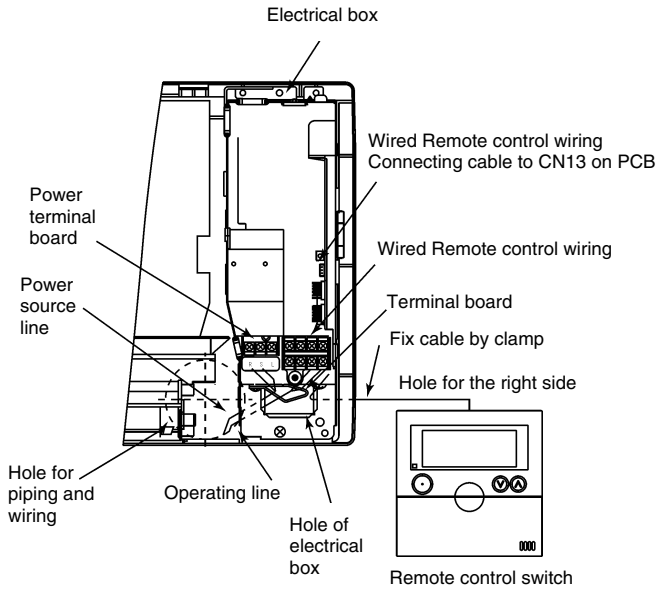
NOTE:

In the case of "twin" or "triple" combination, if the H-Link wiring between Indoor Units are wrong, only one unit (Nº 1) will run without an alarm during "Test Run" mode.

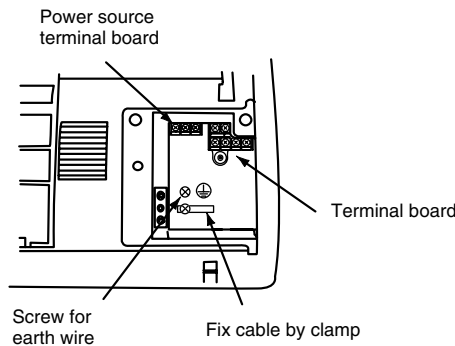
■ RPK-1.0/1.5 HP



■ RPK-2.0 HP

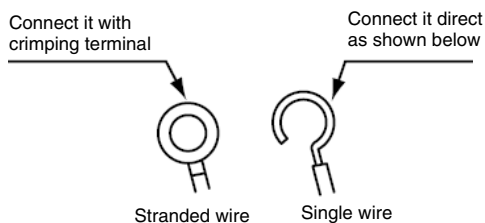


■ RPK-2.5~4.0 HP



■ WIRING CONNECTION

Check to ensure that the terminal specification, shall be applied to the screw (M4 for power supply, M3.5 for operating line) of the terminal box.
Use the crimping terminal when the stranded wire.
If a single wire is used, connect the wire direct shown in the below figure.



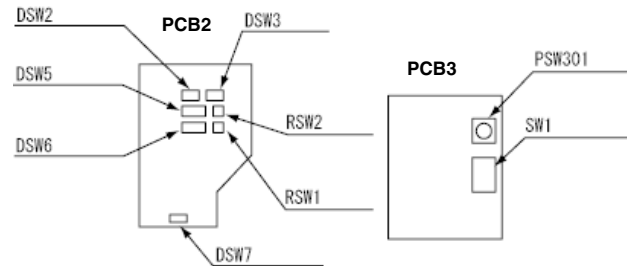
5.1.1. SETTING OF DIP SWITCHES

■ Quantity and position of Dip Switches

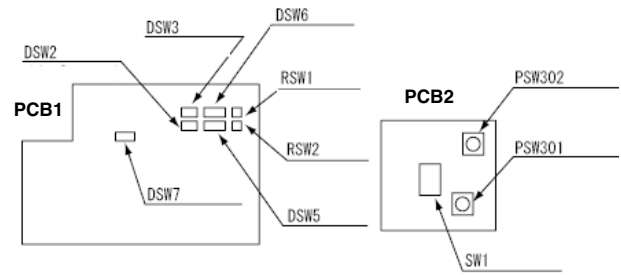
Dips switches position is the following.

Dips switches position is the following.

- RPK-1.0/1.5 HP



- RPK-2.0~4.0 HP

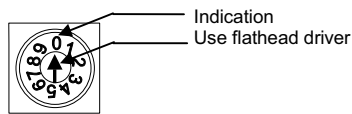


CAUTION:

Before setting dips switches, firstly turn off power source and set the position of the dips switches. If the switches are set without turning off the power source, the contents of the setting are invalid.

■ DSW6 and RSW1: Unit No. Setting

The below figure indicates the position before shipment.



DSW6	RSW1
Here is set DSW6 and RSW1 before shipment up to 63 can be set.	
Ex. Setting n°16	RSW1
<p>N° 1 PIN is on</p>	<p>Fix to 6</p>

■ DSW3: Capacity Code Setting

No setting is required, due to setting before shipment. This dip switch is utilized for setting the capacity code which corresponds to the Horse Power of the indoor unit.

HP	0.8	1.0	1.5	2.0
Setting position				
HP	2.5	3.0	4.0	
Setting position				

■ DSW5 and RSW2: Refrigerant Cycle No. Setting

Setting is required. Setting position before shipment in

DSW5	RSW2
Here is set DSW5 and RSW2 before shipment up to 63 can be set.	
Ex. Setting 5 system	RSW2
<p>All pins are OFF</p>	<p>Fix to 5</p>

■ DSW7: Fuse Recover and Remote control switch system

- 1.0/1.5 HP

Not setting is required. Setting position before shipment is OFF.	
In case of applying high voltage to the terminal 1,2 of TB1, the fuse on the PCB1(M) is cut. In such a case, firstly correct the wiring to TB1 and then turn on (as showing beside)	

- 2.0~4.0 HP

Not setting is required. Setting position before shipment is all OFF.	
In case of applying high voltage to the terminal 1,2 of TB1, the fuse on the PCB1(M) is cut. In such a case, firstly correct the wiring to TB1 and then turn on #1. (as showing beside)	