

1.5 Application data

RPC012A200

Models SCM40ZS-S, 45ZS-S, 50ZS-S

Model SCM40,45,50,60
R410A REFRIGERANT USED

This installation manual deals with an outdoor unit installation only. For an indoor unit installation, refer to page 81.

NOTE This model requires a minimum of 2 indoor units.

SAFETY PRECAUTIONS

- Before installation, read the "SAFETY PRECAUTIONS" carefully and strictly follow it during the installation work in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, **WARNING** and **CAUTION**.
 - WARNING** Indicates a potentially hazardous situation which, if not avoided, can result in serious consequences such as death or severe injury.
 - CAUTION** Indicates a potentially hazardous situation which, if not avoided, can result in personal injury or property damage.
- Both mention the important items to protect your health and safety. Therefore, strictly follow them by any means.
- Be sure to confirm no operation problem on the equipment after completing the installation. If unusual noise can be heard during the test run, consult the dealer.
- Be sure to explain the operating methods as well as the maintenance methods of this equipment to the user according to the user's manual.
- Be sure to keep the installation manual together with user's manual at a place where it is easily accessible to the user any time. Moreover, ask the user to hand the manuals to a new user, whenever required.




WARNING

- **Be sure to use only for residential purpose.**
If this unit is installed in inferior environment such as machine shop, vehicle (like ship), warehouse, etc., it can malfunction.
- **Installation must be carried out by the qualified installer completely in accordance with the installation manual.**
Installation by non qualified person or incorrect installation can cause serious troubles such as water leak, electric shock, fire and personal injury.
- **Be sure to wear protective goggles and gloves while performing installation work.**
Improper safety measures can result in personal injury.
- **Use the original accessories and the specified components for the installation.**
Using parts other than those prescribed may cause water leak, electric shock, fire and personal injury.
- **Do not install the unit near the location where leakage of flammable gases can occur.**
If leaked gases accumulate around the unit, it can cause fire resulting in property damage and personal injury.
- **When installing the unit in small rooms, make sure that refrigerant density does not exceed the limit (Reference: ISO5149) in the event of leakage.**
If refrigerant density exceeds the limit, consult the dealer and install the ventilation system. Otherwise lack of oxygen can occur resulting in serious accident.
- **Install the unit in a location where unit will remain stable, horizontal and free of any vibration transmission.**
Unsuitable installation location can cause the unit to fall resulting in material damage and personal injury.
- **Do not run the unit with removed panels or protections.**
Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shock.
- **This unit is designed specifically for R410A.**
Using any other refrigerant can cause unit failure and personal injury.
- **Do not vent R410A into atmosphere.**
R410A is a fluorinated greenhouse gas with a Global Warming Potential(GWP)=2088.
- **Make sure that no air enters the refrigerant circuit when the unit is installed and removed.**
If air enters the refrigerant circuit, the pressure in the refrigerant circuit will become too high, which can cause burst and personal injury.
- **Be sure to use the prescribed pipes, flare nuts and tools for R410A.**
Using existing parts (for R22 or R407C) can cause refrigerant circuit burst resulting in unit failure and personal injury.
- **Be sure to connect both liquid and gas connecting pipes properly before operating the compressor. Do not open the liquid and gas service valves before completing piping work, and evacuation.**
If the compressor is operated when connecting pipes are not connected and service valves are open, air can be sucked into the refrigerant circuit which can cause anomalous high pressure resulting in burst or personal injury.
- **Be sure to tighten the flare nuts to specified torque using the torque wrench.**
Tightening flare nuts with excess torque can cause burst and refrigerant leakage after a long period.
- **During pump down work, be sure to stop the compressor before closing service valves and removing connecting pipes.**
If the connecting pipes are removed when the compressor is in operation and service valves are open, air can be sucked into the refrigerant circuit which can cause anomalous high pressure resulting in burst or personal injury.
- **In the event of refrigerant leakage during installation, be sure to ventilate the working area properly.**
If the refrigerant comes into contact with naked flames, poisonous gases will be produced.
- **Electrical work must be carried out by the qualified electrician, strictly in accordance with national or regional electricity regulations.**
Incorrect installation can cause electric shock, fire or personal injury.
- **Make sure that earth leakage breaker and circuit breaker of appropriate capacities are installed.**
Circuit breaker should be able to disconnect all poles under over current. Absence of appropriate breakers can cause electric shock, personal injury or property damage.
- **Be sure to switch off the power source in the event of installation, maintenance or service.**
If the power source is not switched off, there is a risk of electric shock, unit failure or personal injury.
- **Be sure to tighten the cables securely in terminal block and relieve the cables properly to prevent overloading the terminal blocks.**
Loose connections or cable mountings can cause anomalous heat production or fire.
- **Do not process, splice or modify the power cable, or share the socket with other power plugs.**
Improper power cable or power plug can cause fire or electric shock due to poor connection, insufficient insulation or over-current.
- **Do not perform any change in protective device or its setup condition yourself.**
Changing protective device specifications can cause electric shock, fire or burst.
- **Be sure to clamp the cables properly so that they do not touch any internal component of the unit.**
If cables touch any internal component, it can cause overheating and fire.
- **Be sure to install service cover properly.**
Improper installation can cause electric shock or fire due to intrusion of dust or water.
- **Be sure to use the prescribed power and connecting cables for electrical work.**
Using improper cables can cause electric leak, anomalous heat production or fire.
- **This appliance must be connected to main power source by means of a circuit breaker or switch with a contact separation of at least 3mm.**
Improper electrical work can cause unit failure or personal injury.
- **When plugging this unit, a plug conforming to the norm IEC60884-1 must be used.**
Using improper plug can cause electric shock or fire.
- **Be sure to connect the power source cable with power source properly.**
Improper connection can cause intrusion of dust or water resulting in electric shock or fire.

CAUTION

- **Take care when carrying the unit by hand.**
If the unit weight is more than 20kg, it must be carried by two or more persons. Do not carry the unit by the plastic straps. Always use the carry handle.
- **Do not install the outdoor unit in a location where insects and small animals can inhabit.**
Insects and small animals can enter the electrical parts and cause damage resulting in fire or personal injury. Instruct the user to keep the surroundings clean.
- **If the outdoor unit is installed at height, make sure that there is enough space for installation, maintenance and service.**
Insufficient space can result in personal injury due to falling from the height.
- **Do not install the unit near the location where neighbours are bothered by noise or air generating from the unit.**
It can affect surrounding environment and cause a claim.
- **Do not install in the locations where unit is directly exposed to corrosive gases (like sulphide gas, chloride gas), sea breeze or salty atmosphere.**
It can cause corrosion of heat exchanger and damage to plastic parts.
- **Do not install the unit close to the equipments that generate electromagnetic waves and/or high-harmonic waves.**
Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.
- **Do not install the unit in the locations where:**
 - There are heat sources nearby.
 - Unit is directly exposed to rain or sunlight.
 - There is any obstacle which can prevent smooth air circulation from inlet and outlet side of the unit.
 - Unit is directly exposed to oil mist and steam such as kitchen.
 - Chemical substances like ammonia (organic fertilizer), calcium chloride (snow melting agent) and acid (sulfurous acid etc.), which can harm the unit, will generate or accumulate.
 - Drain water can not be discharged properly.
 - TV set or radio receiver is placed within 1m.
 - Height above sea level is more than 1000m.
 - It can cause performance degradation, corrosion and damage of components, unit malfunction and fire.
- **Dispose of all packing materials properly.**
Packing materials contain nails and wood which can cause personal injury. Keep the polybag away from children to avoid the risk of suffocation.
- **Do not put anything on the outdoor unit.**
Object may fall causing property damage or personal injury.
- **Do not touch the aluminum fin of the outdoor unit.**
Aluminium fin temperature is high during heating operation. Touching fin can cause burn.
- **Do not touch any refrigerant pipe with your hands when the system is in operation.**
During operation the refrigerant pipes become extremely hot or extremely cold depending on the operating condition. Touching pipes can cause personal injury like burn (hot/cold).
- **Install isolator or disconnect switch on the power source wiring in accordance with the local codes and regulations.**
The isolator should be locked in OFF state in accordance with EN60204-1.

1. ACCESSORIES AND TOOLS

Standard accessories (Supplied with outdoor unit)	Q'ty	Locally procured parts	Tools for installation work		
(1) Drain grommet 	1	(a) Anchor bolt(M10-M12)×4 pcs	Plus headed driver	Spanner wrench	Vacuum pump*
(2) Drain elbow 	1	(b) Putty	Knife	Torque wrench [14.0-62.0N/m(1.4-6.2kgf·m)]	Gauge manifold *
(3) Variable diameter joint  ø9.52→ø12.7	1	(c) Electrical tape	Saw	Wrench key (Hexagon) [4m/m]	Charge hose *
	2	(d) Connecting pipe	Tape measure	Flaring tool set *	Vacuum pump adapter* (Anti-reverse flo type)
		(e) Connecting cable	Pipe cutter	Flare adjustment gauge	Gas leak detector *
		(f) Power cable			
		(g) Clamp and screw (for finishing work)			

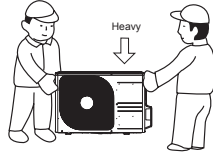
*Designed specifically for R410A

2. OUTDOOR UNIT INSTALLATION

NOTE Do not step on a top and the service cover of the unit.

1. Haulage

- Always carry or move the unit with two or more persons.
 - The right hand side of the unit as viewed from the front (outlet side) is heavier.
- A person carrying the right hand side must take care of this fact. A person carrying the left hand side must hold the handle provided on the front panel of the unit with his right hand and the corner column section of the unit with his left hand.



CAUTION

When a unit is hauled, take care of its gravity center position which is shifted towards right hand side. If the unit is not hauled properly, it can go off balance and fall resulting in serious injury.

2. Selecting the installation location

Select the suitable installation location where:

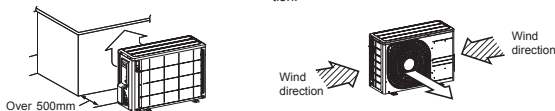
- Unit will be stable, horizontal and free of any vibration transmission.
- There is no obstacle which can prevent smooth air circulation from inlet and outlet side of the unit.
- There is enough space for service and maintenance of unit.
- Neighbours are not bothered by noise or air generating from the unit.
- Outlet air of the unit does not blow directly to animals or plants.
- Drain water can be discharged properly.
- There is no risk of flammable gas leakage.
- There are no other heat sources nearby.
- Unit is not directly exposed to rain or sunlight.
- Unit is not directly exposed to oil mist and steam.
- Chemical substances like ammonia (organic fertilizer), calcium chloride (snow melting agent) and acid (sulfurous acid etc.), which can harm the unit, will not generate or accumulate.
- Unit is not directly exposed to corrosive gases (like sulphide gas, chloride gas), sea breeze or salty atmosphere.
- No TV set or radio receiver is placed within 1m.
- Unit is not affected by electromagnetic waves and/or high-harmonic waves generated by other equipments.
- Strong wind does not blow against the unit outlet.
- Heavy snowfalls do not occur (if installed, provide proper protection to avoid snow accumulation).

NOTE

If the unit is installed in the area where there is a possibility of strong wind or snow accumulation, the following measures are required.

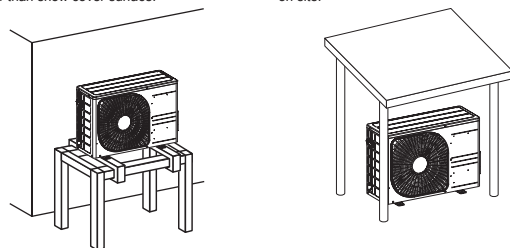
(1) Location of strong wind

- Place the unit with its outlet side facing the wall.
- Place the unit such that the direction of air from the outlet gets perpendicular to the wind direction.



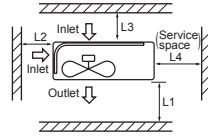
(2) Location of snow accumulation

- Install the unit on the base so that the bottom is higher than snow cover surface.
- Install the unit under eaves or provide the roof on site.



3. Installation space

- There must be 1 meter or larger space between the unit and the wall in at least 1 of the 4 sides. Walls surrounding the unit from 4 sides is not acceptable. The wall height on the outlet side should be 1200 mm or less. Refer to the following figure and table for details.



	Installation space (mm)	
	Model SCM40/45	Model SCM50/60
L1	280 or more	600 or more
L2	100 or more	100 or more
L3	80 or more	100 or more
L4	250 or more	No obstacles (Service space or electrical parts)

NOTE

When more than one unit are installed side by side, provide a 250mm or wider interval between them as a service space.

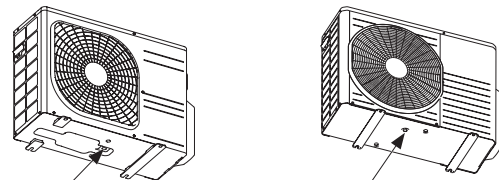
CAUTION

When more than one unit are installed in parallel directions, provide sufficient inlet space so that short-circuiting may not occur.

4. Drain piping work (If necessary)

Carry out drain piping work by using a drain elbow and a drain grommet supplied separately as accessories if condensed water needs to be drained out.

- (1) Install drain elbow and drain grommet.
- (2) Seal around the drain elbow and drain grommet with putty or adequate caulking material.



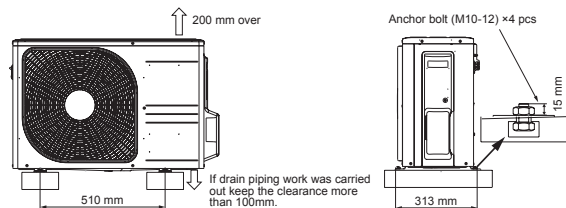
Do not put a grommet on this hole. This is a supplementary drain hole to discharge drain water, when a large amount of it is gathered.

CAUTION

Do not use drain elbow and drain grommet if there is a possibility to have several consecutive days of sub zero temperature. (There is a risk of drain water freezing inside and blocking the drain.)

5. Installation

- Install the unit on a fla level base.
- While installing the unit, keep space and fix the unit's legs with 4 anchor bolts as shown in the figure below. The protrusion of an anchor bolt from the foundation surface must be kept within 15mm.



CAUTION

- Install the unit properly so that it does not fall over during earthquake, strong wind, etc.
- Make sure that unit is installed on a fla level base. Installing unit on uneven base may result in unit malfunction.

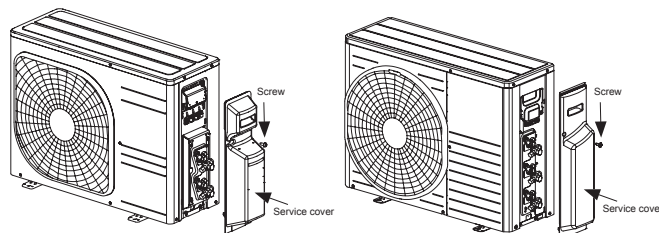
3. PREPARATION FOR WORK

1. Removing service cover

Remove the screw. Slide service cover downwards and remove it.

<SCM40/45>

<SCM50/60>

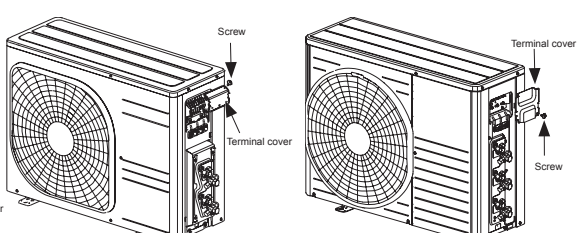


2. Removing terminal cover

Remove the screw and take out terminal cover.

<SCM40/45>

<SCM50/60>



4. CONNECTING PIPING WORK

1. Restrictions on unit installation

Abide by the following restrictions on unit installation. Improper installation can cause compressor failure or performance degradation.

	Model SCM40/45	Model SCM50/60
pipng length	one indoor unit MAX 25m all indoor unit MAX 30m	one indoor unit MAX 25m all indoor unit MAX 40m
height difference		

2. Preparation of connecting pipe

2.1. Selecting connecting pipe

Select connecting pipe according to the following table.

Indoor unit	Model 20/25/35	Model 50/60
Gas pipe	ø9.52	ø12.7
Liquid pipe	ø6.35	ø6.35

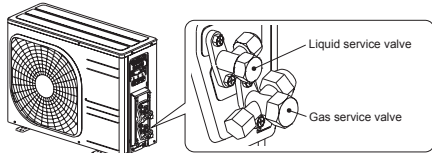
- Pipe wall thickness must be greater than or equal to 0.8 mm.
- Pipe material must be O-type (Phosphorus deoxidized seamless copper pipe ICS 23.040.15, ICS 77.150.30).

2.2. Cutting connecting pipe

- (1) Cut the connecting pipe to the required length with pipe cutter.
- (2) Hold the pipe downward and remove the burrs. Make sure that no foreign material enters the pipe.
- (3) Cover the connecting pipe ends with the tape.

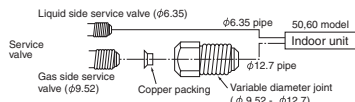
3. Piping work

Check that both liquid and gas operation valves are fully closed. Carry out the piping work with operation valves fully closed.



3.1. Flaring pipe

- (1) <SCM40/45>
Take out flare nuts from the service valves of outdoor unit and engage them onto connecting pipes.
<SCM50/60>
Take out flare nuts from the service valves of outdoor unit.
If a 5.0, 6.0 kw class indoor unit (gas side pipe 12.7) is going to be connected to the service valves (9.52), variable joints available as accessories must be applied to the gas side service valves. Securely fit the copper packing between the service valve and the variable diameter joint to prevent shifting.
Engage flare nuts onto connecting pipes.



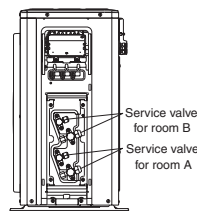
- (2) Flare the pipes according to table and figure shown below. Flare dimensions for R410A are different from those for conventional refrigerant. Although it is recommended to use the flaring tools designed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a flare adjustment gauge.

Copper pipe outer diameter	A	B	Rigid (clutch) type	
			R410A	Conventional
ø6.35	0-0.4	ø12.7	0-0.5	1.0-1.5
ø9.52	9.1	ø12.7		
ø12.7	13.2	ø12.7		
ø12.7	16.6	ø12.7		

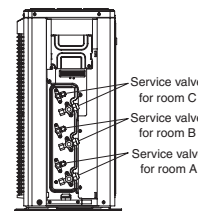
3.2. Connecting pipes

- (1) Connect pipes on both liquid and gas sides.

<SCM40/45>

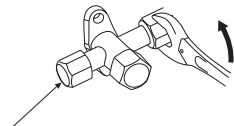


<SCM 50/60>



- (2) Tighten nuts to specific torque shown in the table below.

Service valve size (mm)	Tightening torque (N·m)
ø6.35 (1/4")	14-18
ø9.52 (3/8")	34-42
ø12.7 (1/2")	49-61



Do not hold the valve cap area with a spanner

CAUTION

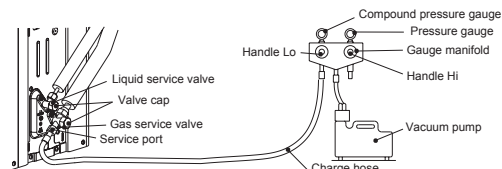
- Do not apply refrigerating machine oil to the flare surface. It can cause refrigerant leakage.
- Do not apply excess torque to the flare nuts. The flare nuts may crack resulting in refrigerant leakage.

4. Evacuation

- (1) Connect vacuum pump to gauge manifold. Connect charge hose of gauge manifold to a service port of outdoor unit.
- (2) Run the vacuum pump for at least one hour after the vacuum gauge shows -0.1MPa (-76cm Hg).
- (3) Confirm that the vacuum gauge indicator does not rise even if the system is left for 15 minutes or more. Vacuum gauge indicator will rise if the system has moisture left inside or has a leakage point. Check the system for the leakage point. If leakage point is found, repair it and return to (1) again.
- (4) Close the Handle Lo and stop the vacuum pump. Keep this state for a few minutes to make sure that the compound pressure gauge pointer does not swing back.
- (5) Remove valve caps from liquid service valve and gas service valve.
- (6) Turn the liquid service valve's rod 90 degree counterclockwise with a hexagonal wrench key to open valve. Close it after 5 seconds, and check for gas leakage. Using soapy water, check for gas leakage from indoor unit's flare and outdoor unit's flare and valve rods. Wipe off all the water after completing the check.
- (7) Disconnect charging hose from gas service valve's service port and fully open liquid and gas service valves. (Do not attempt to turn valve rod beyond its stop.)
- (8) Tighten service valve caps and service port cap to the specific torque shown in the table below.

Service valve size (mm)	Service valve cap tightening torque (N·m)	Service port cap tightening torque (N·m)
ø6.35 (1/4")	20-30	10-12
ø9.52 (3/8")		
ø12.7 (1/2")	25-35	

- (9) Repeat the above steps (1) to (8) for all connected indoor units.



CAUTION

- To prevent the entering of different oil into the refrigeration system, do not use tools designed for any other refrigerant type (R22, R407C, etc.).
- To prevent vacuum pump oil from entering into the refrigerant system, use a counterflow prevention adapter.

5. ELECTRICAL WIRING WORK

WARNING

- Make sure that all the electrical work is carried out in accordance with the national or regional electrical standards.
- Make sure that the earth leakage breaker and circuit breaker of appropriate capacities are installed (Refer to the table given below).
- Do not turn on the power until the electrical work is completed.
- Do not use a condensive capacitor for power factor improvement under any circumstances. (It does not improve power factor. Moreover, it can cause an abnormal overheat accident).

Breaker specification

Model	Phase	Earth leakage breaker	Circuit breaker
SCM40/45/50/60	Single phase	Leakage current: 30mA, 0.1sec or less	Over current: 25A

Main fuse specificatio

Model	Specificatio	Parts No.
SCM40/45/50	250V 15A	SSA564A136
SCM60	250V 20A	SSA564A136A

1.Preparing cable

- (1) Selecting cable

Select the power source cable and connecting cable in accordance with the specification mentioned below.

(a) Power source cable

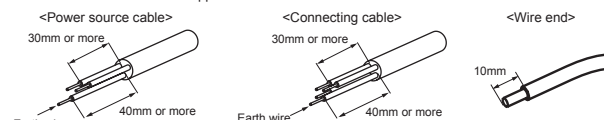
- 3-core * 4.0mm² or more, conformed with 60245 IEC57(CENELEC H05RN-F)
- When selecting the power source cable length, make sure that voltage drop is less than 2%. If the wire length gets longer, increase the wire diameter.

(b) Connecting cable

- 4-core * 1.5mm², conformed with 60245 IEC57(CENELEC H05RN-F)
- * 1 Earth wire is included (Yellow/Green).

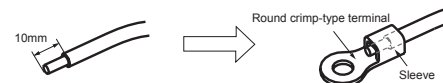
- (2) Arrange each wire length as shown below.

Make sure that each wire is stripped 10mm from the end.



- (3) Attach round crimp-type terminal to each wire as shown in the below.

Select the size of round crimp-type terminal after considering the specification of terminal block and wire diameter.



CAUTION

- Power source cable and connecting cable must conform to the specification mentioned in the manual. Using cables with wrong specification may result in unit malfunction.

5. ELECTRICAL WIRING WORK

2. Connecting cable

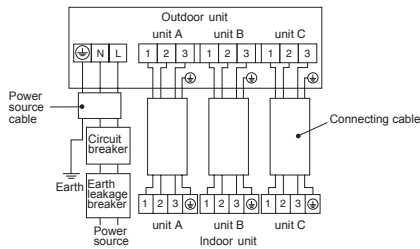
- (1) Remove the service cover and the terminal cover.
- (2) Connect the cables according to the instructions and figure given below.
 - (a) Connect the earth wire of power source cable.

An earth wire must be connected before connecting the other wires of power source cable. Keep the earth wire longer than the remaining two wires of power source cable.
 - (b) Connect the remaining two wires (N and L) of power source cable.
 - (c) Connect the wires of connecting cables. Make sure that for each wire, outdoor and indoor side terminal numbers match. Terminal number A of the outdoor unit is used for A indoor unit and terminal number B for B indoor unit respectively.

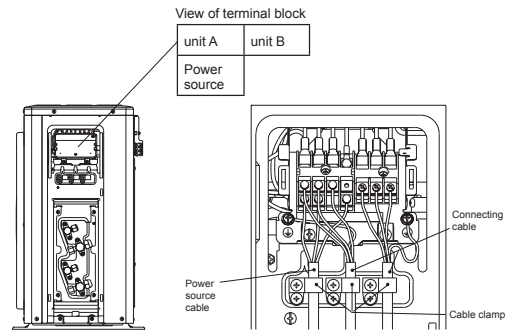
Earth wire shall be Yellow/Green (Y/G) in color and longer than other wires for safety reason.
- (3) Fasten the cables properly with cable clamps so that no external force may work on terminal connections.

Moreover, make sure that cables do not touch the piping, etc. When cables are connected, make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection.

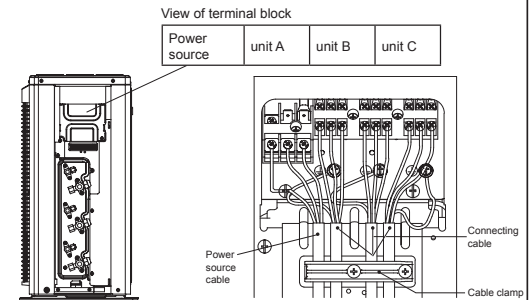
<Circuit diagram>



<SCM40/45>



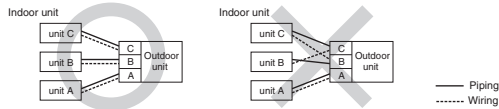
<SCM 50/60>



6. FINISHING WORK

NOTE

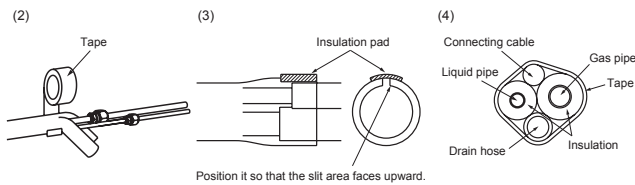
- Make sure to match the piping and wiring from each unit to the outdoor unit.
- Be careful because if connections are wrong, normal operation cannot be achieved and may damage the compressor.



1. Heating and condensation prevention

- (1) Dress the connecting pipes (both liquid and gas pipes) with insulation to prevent it from heating and dew condensation.

Use the heat insulating material which can withstand 120°C or higher temperature. Make sure that insulation is wrapped tightly around the pipes and no gap is left between them.
- (2) Wrap the refrigerant pipings of indoor unit with indoor unit heat insulation using tape.
- (3) Cover the flare-connect joints (indoor side) with the indoor unit heat insulation and wrap it with an insulation pad (standard accessory provided with indoor unit).
- (4) Wrap the connecting pipes, connecting cable and drain hose with the tape.



NOTE

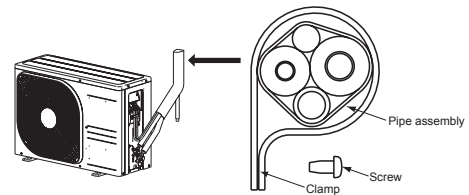
Locations where relative humidity exceeds 70%, both liquid and gas pipes need to be dressed with 20mm or thicker heat insulation materials.

CAUTION

- Improper insulation can cause condensate(water) formation during cooling operation. Condensate can leak or drip causing damage to household property.
- Poor heat insulating capacity can cause pipe outer surface to reach high temperature during heating operation. It can cause cable deterioration and personal injury.

2. Finishing work

- (1) Make sure that the exterior portion of connecting pipes, connecting cable and drain hose is wrapped properly with tape. Shape the connecting pipes to match with the contours of the pipe assembly route.
- (2) Fix the pipe assembly with the wall using clamps and screws. Pipe assembly should be anchored every 1.5m or less to isolate the vibration.
- (3) Install the terminal cover and the service cover securely. Water may enter the unit if service cover is not installed properly, resulting in unit malfunction and failure.

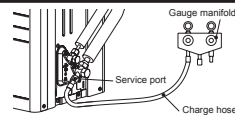


CAUTION

Make sure that the connecting pipes do not touch the components within the unit. If pipes touch the internal components, it may generate abnormal sounds and/or vibrations.

7. PUMP DOWN

- (1) Connect charge hose of gauge manifold to a service port of outdoor unit.
- (2) Close the liquid service valves for all connected indoor units with hexagonal wrench key.
- (3) Fully open the gas service valves with hexagonal wrench key.
- (4) Carry out forced cooling operation for all connected indoor units (For forced cooling operation procedure, refer to indoor unit installation manual).
- (5) When the low pressure gauge becomes 0.01MPa, close the gas service valves and stop forced cooling operation.



8. INSTALLATION TEST CHECK POINTS

After finishing the installation work, check the following points again before turning on the power. Conduct test run (Refer to indoor unit installation manual) and ensure that the unit operates properly.

Power source voltage complies with the rated voltage of air-conditioner.		No gas leaks from the joints of the service valves.	
Earth leakage breaker and circuit breaker are installed.		Indoor and outdoor side pipe joints have been insulated.	
Power cable and connecting cable are securely fixed to the terminal block.		Drain hose (if installed) is fixed properly.	
Both liquid and gas service valves are fully open.		Screw of the service cover is tightened properly.	