Koolsola

It saves more than the planet

Manual for the Installation of

Solar Thermal Air Conditioners

Koolsola TKFR-26GW

Koolsola TKFR-35GW

Koolsola TKFR-60GW

Koolsola TKFR-72GW

Notes to Users

We appreciate you purchasing a Koolsola Solar Air Conditioning System. With your purchase you will enjoy the benefits of power savings and affordable comfort for many years to come.
To understand how your Koolsola Solar Air Conditioning System works and to ensure the best performance from your System please read the following information before installing or using the system.

1) The **Koolsola Solar Air Conditioning System** must be installed by a qualified, licensed Air Conditioning Installer.
2) The 'Installation Guide' section on this manual is specifically for qualified, licensed Air Conditioning Installers to refer to whilst carrying out installation.
3) Please ensure that you read the 'Operating Instructions' section of this manual before using your system.

Contents

Section 1
General Information

1.1 System Specifications

Koolsola TKFR-26GW

Rated Cooling Capacity (Watts)	2600
Rated Heating Capacity (Watts)	2900
Rated Power Input (Volts/Hertz)	220V/50Hz/60Hz
Rated Cooling Power Input (Watts)	650 – 770
Rated Cooling Input Current (Amperes)	2.95 – 3.50
Maximum Cooling Power Input (Watts)	962
Maximum Cooling Input Current (Amperes)	4.38
Rated Heating Power Input (Watts)	650 – 780
Rated Heating Input Current (Amperes)	2.95 – 3.55
Maximum Heating Power Input (Watts)	975
Maximum Heating Input Current (Amperes)	4.44
Auxiliary Electric Heating Rated Power Input (Watts)	600
Auxiliary Electric Heating Rated Input Current (Amperes)	2.73
Inhaling Maximum Working Pressure (Megapascals)	1.15
Exhausting Maximum Working Pressure (Megapascals)	4.1
Type of Refrigerant	R-410A
Standard amount of Refrigerant (grams)	800
Air Circulation of Outdoor Unit (Metres cubed/hour)	450
Waterproof Grade	1PX4
Net Weight Outdoor Unit (Kilograms)	30
Net Weight Indoor Unit (Kilograms)	8
Dimensions Outdoor Unit (Millimetres – Length/Width/Height)	790/260/540
Dimensions Indoor Unit (Millimetres – Length/Width/Height)	700/230/160
Noise Level Outdoor Unit (Decibels)	< 50
Noise Level Indoor Unit (Decibels)	< 40

Parameters in this table are measured in the rated working state of an outdoor temperature of 35oC dry bulb/24oC wet bulb and an indoor temperature of 27oC dry bulb/19oC wet bulb. Working states at varying temperatures may change.

Koolsola TKFR-35GW

Rated Cooling Capacity (Watts)	3500
Rated Heating Capacity (Watts)	3800
Rated Power Input (Volts/Hertz)	220V/50Hz/60Hz
Rated Cooling Power Input (Watts)	800 – 1025
Rated Cooling Input Current (Amperes)	3.64 – 4.66
Maximum Cooling Power Input (Watts)	1280
Maximum Cooling Input Current (Amperes)	5.83
Rated Heating Power Input (Watts)	800 – 1050
Rated Heating Input Current (Amperes)	3.64 – 4.77
Maximum Heating Power Input (Watts)	1310
Maximum Heating Input Current (Amperes)	5.96
Auxiliary Electric Heating Rated Power Input (Watts)	800
Auxiliary Electric Heating Rated Input Current (Amperes)	3.63
Inhaling Maximum Working Pressure (Megapascals)	1.15
Exhausting Maximum Working Pressure (Megapascals)	4.1
Type of Refrigerant	R-410A
Standard amount of Refrigerant (grams)	1150
Air Circulation of Outdoor Unit (Metres cubed/hour)	550
Waterproof Grade	1PX4
Net Weight Outdoor Unit (Kilograms)	38
Net Weight Indoor Unit (Kilograms)	10.5
Dimensions Outdoor Unit (Millimetres – Length/Width/Height)	790/260/540
Dimensions Indoor Unit (Millimetres – Length/Width/Height)	785/285/210
Noise Level Outdoor Unit (Decibels)	< 52
Noise Level Indoor Unit (Decibels)	< 42

Parameters in this table are measured in the rated working state of an outdoor temperature of 35oC dry bulb/24oC wet bulb and an indoor temperature of 27oC dry bulb/19oC wet bulb. Working states at varying temperatures may change.

Koolsola TKFR-60GW

Rated Cooling Capacity (Watts)	6000
Rated Heating Capacity (Watts)	6600
Rated Power Input (Volts/Hertz)	220V/50Hz/60Hz
Rated Cooling Power Input (Watts)	1350 – 1560
Rated Cooling Input Current (Amperes)	6.14 – 7.09
Maximum Cooling Power Input (Watts)	1950
Maximum Cooling Input Current (Amperes)	8.86
Rated Heating Power Input (Watts)	1350 – 1590
Rated Heating Input Current (Amperes)	6.14 – 7.23
Maximum Heating Power Input (Watts)	2000
Maximum Heating Input Current (Amperes)	9
Auxiliary Electric Heating Rated Power Input (Watts)	1500
Auxiliary Electric Heating Rated Input Current (Amperes)	8.1
Inhaling Maximum Working Pressure (Megapascals)	1.15
Exhausting Maximum Working Pressure (Megapascals)	4.1
Type of Refrigerant	R-410A
Standard amount of Refrigerant (grams)	1600
Air Circulation of Outdoor Unit (Metres cubed/hour)	850
Waterproof Grade	1PX4
Net Weight Outdoor Unit (Kilograms)	55
Net Weight Indoor Unit (Kilograms)	21
Dimensions Outdoor Unit (Millimetres – Length/Width/Height)	940/300/755
Dimensions Indoor Unit (Millimetres – Length/Width/Height)	985/325/230
Noise Level Outdoor Unit (Decibels)	< 56
Noise Level Indoor Unit (Decibels)	< 46

Parameters in this table are measured in the rated working state of an outdoor temperature of 35oC dry bulb/24oC wet bulb and an indoor temperature of 27oC dry bulb/19oC wet bulb. Working states at varying temperatures may change.

Koolsola TKFR-72GW

Rated Cooling Capacity (Watts)	7200
Rated Heating Capacity (Watts)	7900
Rated Power Input (Volts/Hertz)	220V/50Hz/60Hz
Rated Cooling Power Input (Watts)	1700 – 1900
Rated Cooling Input Current (Amperes)	7.73 – 8.64
Maximum Cooling Power Input (Watts)	2375
Maximum Cooling Input Current (Amperes)	10.8
Rated Heating Power Input (Watts)	1700 – 1950
Rated Heating Input Current (Amperes)	7.73 – 8.64
Maximum Heating Power Input (Watts)	2440
Maximum Heating Input Current (Amperes)	10.8
Auxiliary Electric Heating Rated Power Input (Watts)	1800
Auxiliary Electric Heating Rated Input Current (Amperes)	8.18
Inhaling Maximum Working Pressure (Megapascals)	1.15
Exhausting Maximum Working Pressure (Megapascals)	4.1
Type of Refrigerant	R-410A
Standard amount of Refrigerant (grams)	1800
Air Circulation of Outdoor Unit (Metres cubed/hour)	1050
Waterproof Grade	1PX4
Net Weight Outdoor Unit (Kilograms)	62
Net Weight Indoor Unit (Kilograms)	19
Dimensions Outdoor Unit (Millimetres – Length/Width/Height)	940/300/755
Dimensions Indoor Unit (Millimetres – Length/Width/Height)	985/325/230
Noise Level Outdoor Unit (Decibels)	< 54
Noise Level Indoor Unit (Decibels)	< 42

Parameters in this table are measured in the rated working state of an outdoor temperature of 35oC dry bulb/24oC wet bulb and an indoor temperature of 27oC dry bulb/19oC wet bulb. Working states at varying temperatures may change.

Safety Information

Safety Warnings:

- ⚠ The Koolsola Solar Air Conditioning system should only be **installed repaired and maintained by a qualified, licensed air conditioning installer**.
- ⚠ Please switch off the power to the system in the event of an electrical storm in order to prevent damage to the system.
- ⚠ Please switch off the power to the system when it is not in use for long periods of time.
- ⚠ Please switch off the power to the system before conducting any cleaning of or maintenance of the system.
- ⚠ Never clean the system with liquid detergents liquefied cleaning agents or corrosive cleaning agents. Never allow the indoor unit to come into contact with liquid. Any of these actions may cause damage to the plastic accessories and casings or cause damage to the electrical components.
- ⚠ Never insert your hands or any other object into the air outlet of the indoor and outdoor units to ensure that there is no damage to the high-speed fan or the object being inserted.
- ⚠ Never allow children to play the system.
- ⚠ Never remove any of the coverings of the system.
- ⚠ Never allow moisture to get into the remote control.
- ⚠ Never put or use any combustible liquid or substance such as hair spray, paint or petrol near the machine to prevent the possibility of fire.
- ⚠ If any unusual circumstances occur, including but not limited to; strange noises or smells, smoke, abnormal temperature increases or changes to appearance of components please switch off the power immediately and contact your local distributor of the Koolsola Solar Air Conditioning System. Do not attempt to repair the system yourself.

Pre-checking before operation:

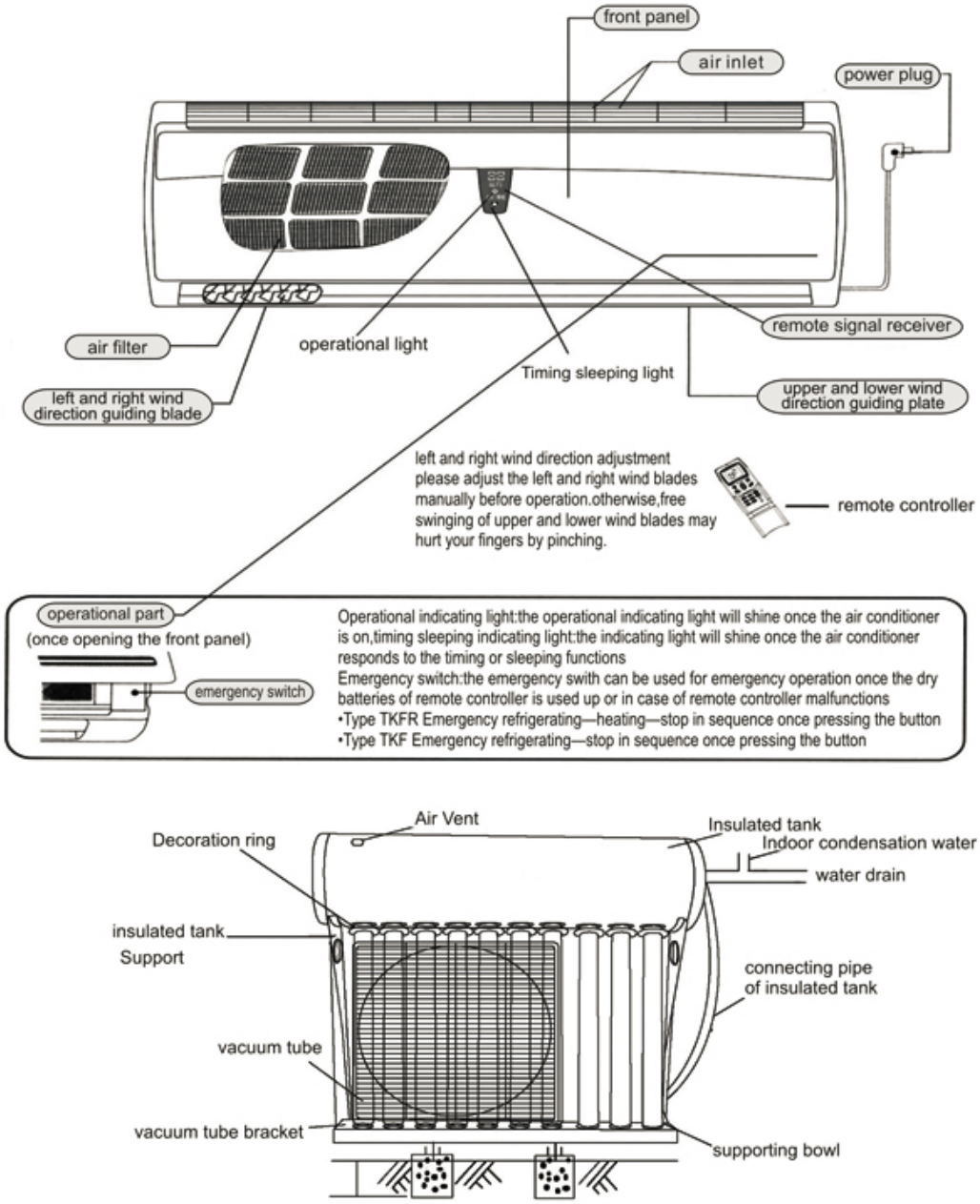
- Please refer to the Section 2.3 – Routine Maintenance to establish the correct method for cleaning the air filter and checking/filling the solar collector with water.
- If the system has been switched off/idle for a long period of time please clean the air filter before turning the system back on.
- If the system has been switched off/idle for a long period of time please check the level of the water in the solar collector and add water if required.
- In normal operating conditions please clean the air filter every 2 weeks.
- In normal operating conditions please check the level of the water in the solar collector every 3 months and add water if required.

1.2 System Operating Principles

- The **Koolsola Solar Air Conditioning System** uses both mains electrical power and solar thermal energy. The **Koolsola Solar Air Conditioning System** always requires mains electrical power to operate fans and electrical control components.
- The **Koolsola Solar Air Conditioning System** uses solar thermal energy as an energy source to help maintain the refrigeration process which in turn reduces the amount of electrical energy required to run the compressor.
- The **Koolsola Solar Air Conditioning System** operates under the same principles as a Conventional Air Conditioning System where refrigeration takes place as a result of the phase transition of the refrigerant.
- The difference between a **Koolsola Solar Air Conditioning System** and a Conventional System is how the vapour is changed back into a liquid state in the refrigeration cycle.
- A Conventional System uses a compressor to increase the pressure of the refrigerant when it's in a vapour state so that when it enters the condenser coil the combination of pressure and cooling from ambient air condenses it into a liquid in the coil. The change of state of refrigerant begins to take place approximately two thirds of the way down the condenser. The **Koolsola Solar Air Conditioning System** improves on this basic method by using solar thermal energy collected in a solar collector to add thermal energy to the refrigerant vapour. By using this method it reduces the amount of compression required to achieve the refrigeration cycle, as well as utilising more of the cooling face of the condenser coil.
- By reducing the amount of compression required to achieve the refrigeration process the **Koolsola Solar Air Conditioning System** can use an undersized compressor in comparison to a Conventional System. Similarly if enough solar thermal energy is being collected and utilised the compressor will run less often in a **Koolsola Solar Air Conditioning System** than a Conventional System.
- The **Koolsola Solar Air Conditioning System** incorporates off centre fan blade technology, insulated foam ducts and high performance brand name compressors to achieve optimum performance at a minimum level of noise. The **Koolsola Solar Air Conditioning System** typically creates 10dBA less noise than a Conventional System.

1.4 System Components

Please note that the graphic example below is based on the standard **Koolsola Solar Air Conditioning System** and may be slightly different in various configurations.



Section 2
Operating Instructions

2.1 General Operating Instructions

Optimum Operation

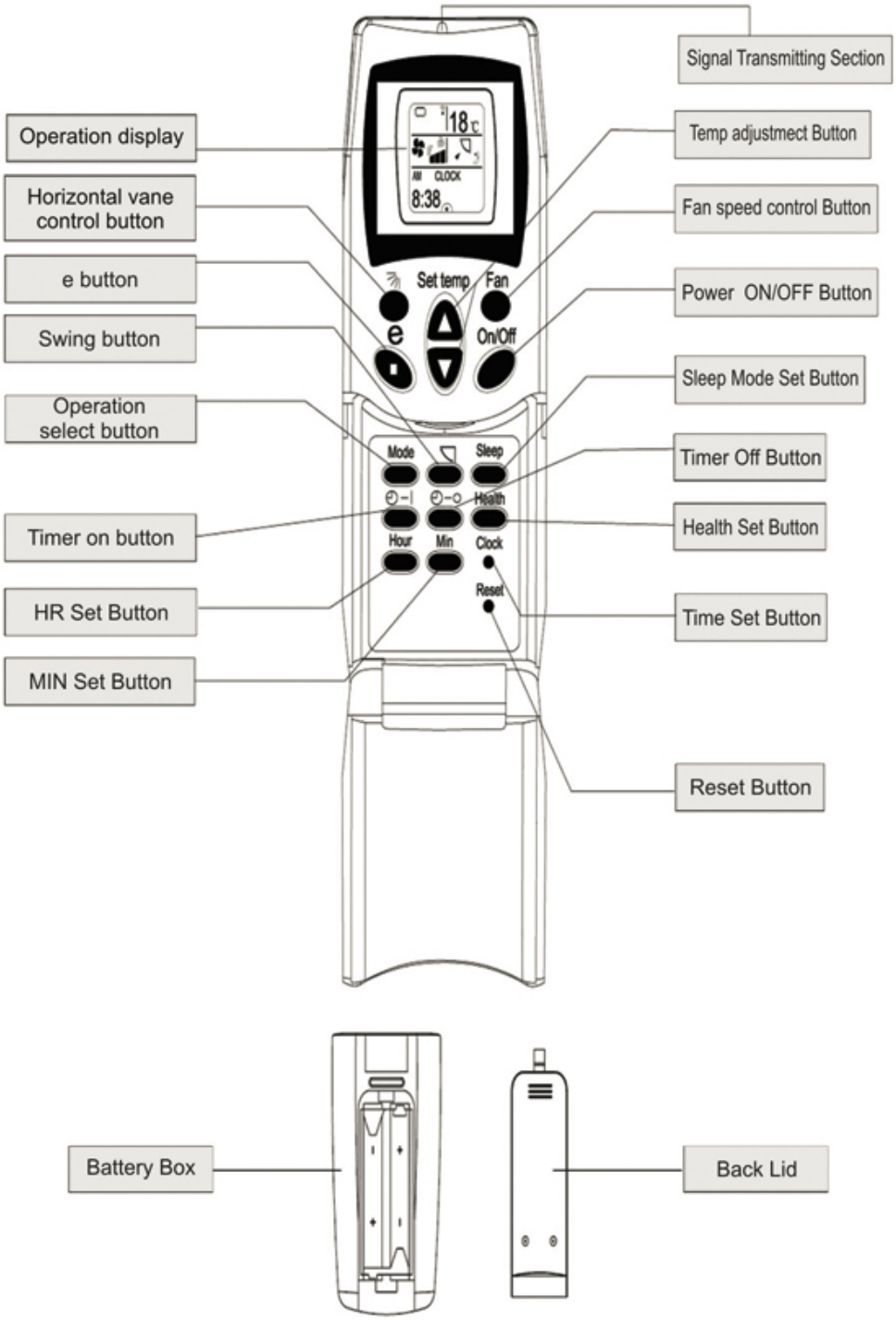
- To ensure maximum efficiency please set the indoor temperature at a sensible level. In Australia an indoor temperature of 24°C is recommended to achieve a sustainable balance between comfort and energy efficiency.
- When cooling please ensure that curtains or shutters are closed to reduce the heating effect of direct sunlight.
- When heating or cooling please ensure any relevant windows, doors and other openings are closed to avoid convection of indoor and outdoor air which will decrease the efficiency of the system.
- Never place barriers near the indoor or outdoor units which have the ability to block the airflow to or from the system as this can limit the efficiency of the system.
- Please follow the procedure in the 'Routine Maintenance' section of this manual regarding the cleaning of the filter and checking/filling of the water in the solar collector to ensure maximum efficiency of the system.

Working Temperature Range

	Cooling	Heating
Indoor Temperature	≥ 18°C	≤ 31°C
Outdoor Temperature	18°C – 53°C	-7°C – 24°C

2.2 Remote Control

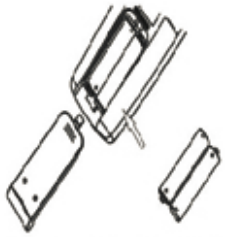
Remote Control Buttons/Displays



Remote Control Operating Instructions

Set Remote Controler Clock

1.Remove the back lid and insert two batteries



Do not confuse(+)and(-)

2.Reset button

Press it by sharp object

3.Clock set button

Press it by sharp object

Warning

- The batteries must be removed form the appliance before it is scrapped and that they are disposed.
- The range that the signal can reach is about 6metres of safely.One or two beeps will be heart affer the unit receiving the signal.
- When the signal does not operate the indoor unit,or the display becomes dim,replace the 2 batteries with new ones of the same type.
- Use the remote controller carefully. If it is dropped,thrown or gets wet,it may not operate.
- Do not use rechargeable batteries

4.Press the buttons HR and MIN to set the current time,press HR button each time,the it time adds 1hour,press MIN button each time,time will adds 1 minute.

5.Press clock set button again

Press it by sharp object

Operate automatically

According to the room temperature when the operation starts,the operation mode is automatically selected between COOL,DRY and HEAT.However,when operation is started again within 2hours after the operation is stopped,the same operation mode before it is stopped is selected.

Room temperature when started	Operation mode
About 25℃ or higher	COOL
About 20℃-25℃	DRY
About 20℃ or lower	HEAT FAN

To start operation

1.The signal transmitting section of the controller should be pointed at the receiving section.
2.Press the ON/OFF to start air-conditioner
3.To select the Auto mode,each time the button is pressed,the operation mode is changed in sequence form:AUTO-COOL-DRY-HEAT

To stop operation

Press the ON/OFF button

While too warm or too cool

When about3-15min passes,press after operation start,if you feel slightly warm or cool

1.Press the ▲ button to raise the temperature,One press raises the temperature by about 1℃

2.Press the ▼ button to lower the temperature,One press lowers the temperature by about 1℃

Remote Control Functions

To select the "COOL" "DRY" "FAN" "ON/OFF" modes

1. Press the ON/OFF button to start the machine
2. Select the operation mode by pressing the MODE. Each time this function is pressed, the operation mode is changed in sequence, from" AUTO→COOL→DRY→HEAT" (Example) To select the cool operation mode, press MODE button continually until "COOL" is on display screen.
3. Press the Fan button to select the fan speed
4. Press the button to select air flow blowing direction
5. Press the button to stop machine.

Note:
1. Once the operation mode has been selected, the same operation mode will start after the ON/OFF button pressed on
2. For TKFR unit no FAN mode
3. For TKF unit no HEAT

Change the set temperature

To lower the temperature, press the button.
Press once, the set temperature drops 1℃.
To raise the temperature, press the button.
Press once, the set temperature raise 1℃.

In "HEAT" operation

1. The solar air conditioner's efficiency is related to the outdoor temperature. If the unit is used in cold area, a heater can be sued together if the air conditioner's heat is not enough.
2. Defrosting operationwhen outdoor temperature is very low, the fans in the outdoor and indoor unit are stopped, meanwhile defrosting operates for 2-10minutes to protect the outdoor heat exchanger from frozen.

In "DRY" Operation

1. In "DRY" operation the fan speed can't be changed.
2. Controlled by the microprocessor, the fans in the outdoor and indoor unit operate occasionally for "DRY" operation.
3. The room temperature is slightly lowered in the operation mode, the "DRY" function can't be done when room temperature is 13℃ or lower.

CATUION
1.When the temperature is slightly lowered in the outdoor and indoor unit,operate occasionally for "DRY" operation
2.3 min delay start
3.In order to reduce the compressor high load,the unit cannot be operated for 3 minutes when restarted with only the electric fan works,This will be effectieve in following conditiins.
4.-Power cut -Power source cut off
-Main power breaker turn off

Air Flow Velocity Adjustment

1.Press the button Fan to adjust the air flow velocity,Each time the button is pressed,Fan speed is changed as follows:AUTO→LOW→MEDIUM→HIGH
2.To adjust the up/down fan,please press the button , Each time press the button on position of " "

1.In daily time,please select swing.
2.When "COOL"or"DRY",please select the position of"-/"and "HEAT"select to"/ |"Position

Note: To change the horizontal directin of the air flow .Adjust the vertical vanes manually before operation starts.Since horizontal vane moves automatically your may be caught.

Override Opera

TKFR Type:Each time the switch is pressed,the unit alternates between the override COOL mode,HEAT mode and STOP mode.
TKF Type: Each time the switch is pressed,the unit alternates between the override COOL Mode and STOP mode

Remote Control Functions Continued

To set timer on/off function

Press the timer on button , the appears in the display and begins to glitter. It will last 1 min, to inform you that you can start to set the timer on function. Press the timer on button again, the function will be cancelled. When the unit is on, press the timer off button, or press the timer on button first to set the timer on, then press the timer off button, the appears in the display and begins to glitter, and it will last 1 minute to inform you that you can start to sent the timer off function. Press the timer off button again, the function will be cancel. Press the and button to set timer on and timer off function which you need. Each press of the , the set time will raise by 1 hour. Each press the , the set time will raise by 10minutes.

To use the timer on/off function together

Press the timer on button to set the timer on function first and then press the timer off button to set the timer off function. At the time, the timer on/off functions are used together.
Stands the operation order of the timer on/off function.

Note:
1. Before setting the timer on/off function, please confirm whether the electric clock is rightly set or not.
2. If the current time is the time of the timer on/off, and the state of the machine is the same as the requirement of the time set, the operating mode will not change.
3. The remote controller has the function of setting daily recycle of timer on/off function (everyday set the timer on/off function rotatively.); and setting weekly recycle of timer on/off function rotatively from Monday to Friday, and stop the unit on Saturday and Sunday). Some other air conditioner may not have this function and will not be informed.
4. In the stop state, press the "temperature+" and "temperature -" at the same time to set or cancel the weekly display state easily.

Set the comfortable sleeping mode function

1. The machine is on
2. Press the sleeping button to enter the operation for this function.

Sleeping function

1. The indoor fan changes to the low speed
2. In cooling function, each hour the temperature will raise by 1℃ but changing range is only 2℃.
3. In heating function, each hour the temperature will decrease by 1℃ but changing range is only 2℃.
4. In dehumidify function, the room temperature doesn't change.

To cancel the Sleeping mode function

You can cancel the sleeping mode function by selecting one way below:
1. Press the sleeping mode set button again
2. Press the on/off button or stop the machine automatically
3. Press the mode button to change the mode
4. Press the fan speed button to change the fan speed.

"e" button function

Press "e" button once the unit goes on "AUTO" function mode, fan speed. Press it again, the same function works. Press "ON/OFF" or "MODE" to cancel "e" function.

The night light function

The button ON/OFF has night light indication

NOTE

1. If the instruction of this remote controller has different from the object, please confirm by this instruction.
2.If this remote controller is used together with the floor standing type, please press button o times then the mode is the current mode.
3.This remote controller doesn't set anion function.

2.3 Routine Maintenance

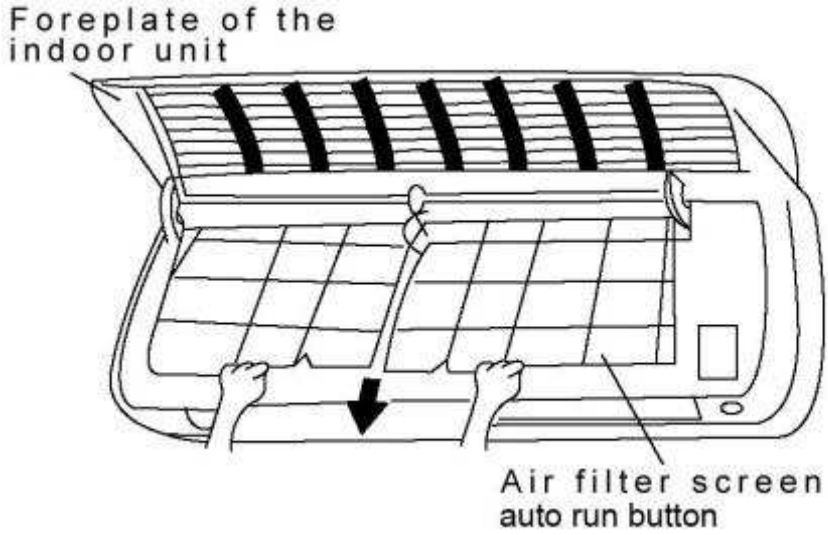
Solar Collector

- ⚠ Always turn off the **Koolsola Solar Air Conditioning System** power at the power switch before conducting any maintenance.
- ⚠ The water inside the solar collector and the copper piping entering and exiting the solar collector can reach temperature of up to 85oC, please take care when checking and filling the water level.
- ⚠ Take particular care with water exiting the water drain.
- These instructions apply to both the Flat Panel solar collector and the Evacuated Tube solar collector.
- In most situations (when the indoor unit sits higher than the solar collector) the water tank inside the solar collector is constantly topped up by the condensation drain pipe coming from the indoor unit that is attached to the vertical inlet on the right hand side of the collector. In these this typical situation the water level is constantly being topped up by the condensate and the water level only needs to be checked once every 3 months.
- If the condensation drain pipe from the indoor unit isn't attached to the solar collector the water level needs to be checked every 2 weeks.
- If upon inspection is water periodically exiting out of the water drain (the horizontal outlet on the right of the collector) then there is no need to check the water level further as the water tank inside the solar collector is full.
- Check the water level on the solar collector by unscrewing the Red Cap from the top left hand corner of the solar collector and removing the dipstick, ensure that the water mark is above the marking on the dipstick.
- If the water level is below the mark on the dipstick add water through the opening that you have removed the dipstick from, the water tank inside the solar collector is full when water starts to exit out of the water drain.
- Water added to the solar collector must be of drinking quality, if your tap water is not of drinking quality then distilled water can be used.
- Ensure that the dipstick and red cap are inserted back in their original positions once filling is complete.
- The solar collector can be cleaned by wiping with a soft cloth, damp with clean room temperature water.

Indoor Unit

- ⚠ Always turn off the **Koolsola Solar Air Conditioning System** power at the power switch before conducting any maintenance.
- The air filter should be removed and cleaned every 2 weeks to ensure maximum efficiency of the **Koolsola Solar Air Conditioning System**.
- Remove the front panel of the indoor unit by holding the both ends of the front panel/grille and pulling upwards and forwards simultaneously to expose the air filters.
- Pull both of the air filters downwards gently once they are exposed.
- Clean the excess dust off the air filters with a vacuum cleaner set at low suction.
- Clean the remaining dust off the air filters by wiping with a soft cloth, damp with room temperature water.
- Ensure that the air filters are dry before re-inserting into the indoor unit, ensure that they are dried in the shade rather than in direct sunlight.

- Re-install the air filters as per the diagram on the indoor unit and close the front panel/grille when complete.
- The indoor unit can be cleaned with a soft cloth, damp with clean room temperature water. Care should be taken to ensure that no water enters any openings on the unit.



Outdoor Unit

⚠ Always turn off the **Koolsola Solar Air Conditioning System** power at the power switch before conducting any maintenance.

⚠ The copper piping entering and exiting the outdoor unit can reach temperature of up to 85°C, please take care when inspecting or cleaning the outdoor unit.

- The outdoor unit can be cleaned with cleaning products suitable for cleaning powder coated surfaces.
- Care should be taken to ensure that no cleaning products enter any of the openings on the unit.
- Particular care should be taken when cleaning around the interconnecting electrical cable opening and plastic handles.

2.4 Troubleshooting

Common Fault Diagnosis

Issue	Possible Cause	Solution
The system is out of operation	Disconnected power supply	Ensure that the power cord is plugged in, the switch is turned on and the power point is operating correctly.
	The Koolsola System is in defrosting mode	Wait for 3 minutes to see if the system begins to operate normally.
	The circuit breaker is tripping	Check circuit breaker and contact electrician if problem persists.
	The fuse inside the Koolsola System has burnt out	Contact either the tradesman who installed the system or the distributor of the product.
	The voltage is exceedingly low	Contact either the tradesman who installed the system or the distributor of the product.

Poor Cooling or Heating effect	The filters are dirty or blocked	Follow the procedure in section 2.3 to remove, clean and replace the filters.
	The air inlet or air outlet of the indoor or outdoor unit is blocked	Inspect both the indoor and outdoor units and ensure that there is nothing occluding the air inlets and outlets.
	The outdoor temperature is outside the operating temperature of the Koolsola System	Check the outdoor temperature range of operation in section 2.1, if the outdoor temperature is outside this range of operation use a complimentary cooling or heating appliance to assist the Koolsola System.
	The water in the Solar Collector is low	Follow the procedure in section 2.3 to ensure that the Solar Collector is filled to the correct level.
	There is a heating or cooling source in the room affecting the effect of the Koolsola System	Remove the heating or cooling source if possible to ensure optimum performance of the Koolsola System.
	Air is escaping through a window, door or other opening	Ensure that all possible doors, windows or other opening are closed to ensure optimum performance of the Koolsola System.
Loud water flowing sound	Cooling fluid is flowing into the machine when the air conditioner switches on and off	Please wait for a moment, if the sound is unusual or persistent please contact the tradesman who installed the system or the distributor of the product.
Loud exhausting sound	The four way valve is switching	Please wait for a moment, if the sound is unusual or persistent please contact the tradesman who installed the system or the distributor of the product.
Loud, constant unusual noise	The operation of the system is unstable	Please wait for a moment, if the sound is unusual or persistent please contact the tradesman who installed the system or the distributor of the product.
Compressor is not turning on	The temperature setting is incorrect	Reset the temperature.
	The LCD display on the remote is indicating that timing is on	Cancel the timing and reset remote.
	To prevent damage to the compressor, it isn't turning on as the system is starting up.	Please wait 3 minutes to see if normal operation resumes.
	To prevent damage to the compressor, it isn't turning on as the inlet pressure isn't high enough	If after 3 minutes the system hasn't resumed normal operation please contact the tradesman who installed the system or the distributor of the product.
The compressor starts and stops	The input voltage is exceedingly low	Ensure that there aren't too many appliances connected to the same line. If the problem persists contact and electrician, the tradesman who installed the system or the distributor of the

frequently		product.
	The insulation of the room is very poor	Ensure that all windows, doors and other openings are closed. If the problem persists contact the tradesman who installed the system or the distributor of the product.
The display of the remote control is not clear or not working	The batteries are dead	Replace with new alkaline batteries.
	The batteries are incorrectly installed	Ensure that the batteries are installed in the correct orientation.
	The remote control is faulty	If the problem persists contact the distributor of the product.

Non Failure Conditions

- When the **Koolsola Solar Air Conditioning System** is turned on or off sometimes you will hear a sizzling sound, this is the flowing sound of the refrigerant and is not a malfunction.
- The **Koolsola Solar Air Conditioning System** cannot instantly restart after it is stopped, even though it is switch on. The compressor will take 3 minutes before it resumes operation if it has been switched off then back on.
- Occasionally stale/uncomfortable air is emitted by the system, if this happens follow the procedure in section 2.3 for removing, cleaning and re-fitting the filters.
- If while heating, the indoor and outdoor units stop simultaneously but the compressor is still running the **Koolsola Solar Air Conditioning System** is in defrosting mode. This is not a malfunction, the heating will continue once the defrosting process is finished.
- While heating, the outdoor unit may generate condensation. This is a result of the defrosting process and thawing, it is not a malfunction.

Failure Display Indicators

Model No.'s TKFR-26GW and TKFR-35GW	
Failure Type	**Display Status**
Indoor Temperature Sensor Failure	E1
Indoor Coil Transmitter Failure	E2
System Failure	E4
If any of these failure display indicator occur please contact either the tradesman who installed the system or the distributor of the product.	

Model No.'s TKFR-60GW and TKFR-72GW	
Failure Type	**Display Status**
Indoor Temperature Sensor Failure	Indicator light shines 1 time for 8 seconds
Indoor Coil Transmitter Failure	Indicator light shines 2 times for 8 seconds
System Failure	Indicator light shines 4 times for 8 seconds
If any of these failure display indicator occur please contact either the tradesman who installed the system or the distributor of the product.	

Section 3
Installation Guide

3.1 General Installation Information

Electrical Information

- ⚠ The **Koolsola Solar Air Conditioning System** should only be installed, repaired and maintained by a qualified, licensed Air Conditioning Installer.
- ⚠ All Electrical work involved in the installation must be completed by a qualified, licensed Electrician to the standards relevant to the location of the installation.
- ⚠ Ensure that the system is not installed in an environment that does not contain air with unusually high levels of oil, sulphide gas, flammable gas, alkaline, or where high frequency equipment is present.
- ⚠ If the installation site does not have compliant electrical infrastructure the installer shall use their judgement as to whether the installation is suitable.
- ⚠ If voltage fluctuations are greater than +/- 10% measures should be taken to regulate the voltage.
- ⚠ The power cord should be provided with effective grounding.
- ⚠ The power circuit should be dedicated solely to the Koolsola System.

Specific power distribution equipment and electrical cable for Koolsola System			**Specific power distribution equipment and electrical cable for circuit**		
System Maximum Current	**Electrical conductor's cross sectional area (mm^2)**	**Standard specification of the switch/fuse (A)**	**Circuit's maximum current**	**Electrical conductor's cross sectional area (mm^2)**	**Standard specification of the switch/fuse (A)**
≤ 10	**1 – 1.5**	**16/16**	**≤ 16**	**1.5 – 4**	**32/25**
≤ 16	**1.5 – 2.5**	**32/25**	**≤ 25**	**2.5 – 4**	**63/50**
≤ 25	**2.5 – 4**	**63/50**	**≤ 32**	**4 – 10**	**63/50**
≤ 32	**4 – 6**	**63/50**	**≤ 40**	**6 – 16**	**100/80**
			≤ 63	**10 – 25**	**125/125**

General Solar Collector Installation

- The collector operates at optimum performance in direct sunlight.
- For optimum performance the solar collector should face NORTH in the southern hemisphere and SOUTH in the northern hemisphere.
- If the optimum position is not available the next best option is for the system to face EAST.
- If neither the optimum position or and East facing position are available the next best option is for the system to face WEST.
- It is not advised to install the collector facing in the opposite direction to the optimum position.
- To ensure the condensate drained from the indoor unit is able to be used to fill the water tank in the solar collector it is best to ensure that the indoor unit it positioned higher than the top of the solar collector.
- If it is not possible to mount the indoor unit higher than the solar collector please bring the customer's attention to the water level filling/checking procedure in section 2.3.

Refrigerant Piping

All refrigerant piping must be rated for R-410A refrigerant.

The maximum length of the refrigerant piping between the outdoor unit and the solar collector is 2m. This length can't be exceeded and should be noted before the installation is commenced.
Refrigerant must be added if the length between the indoor and outdoor units exceeds the standard, supplied piping lengths;

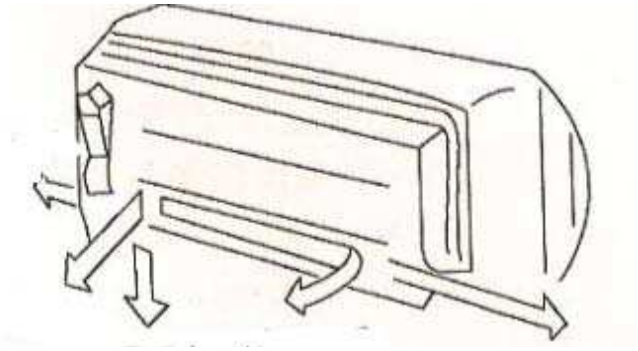
Model No.	Standard Piping Length (m)	Maximum Possible Piping Length (m)	Maximum Head Drop (m)	Maximum No. of Elbows	Liquid Pipe Diameter (mm(in.))	Gas Pipe Diameter (mm(in.))	Amount of added R-410A required for lengths more than standard (g/m)
TKFR-26GW	3.6	7	5	6	6.35 (7/16)	9.52 (5/8)	35
TKFR-35GW	3.6	10	7	8	6.35 (7/16)	12.7 (3/4)	50
TKFR-60GW	3.6	10	7	8	6.35 (7/16)	12.7 (3/4)	70
TKFR-72GW	4.0	15	7	10	9.52 (5/8)	15.88 (7/8)	100

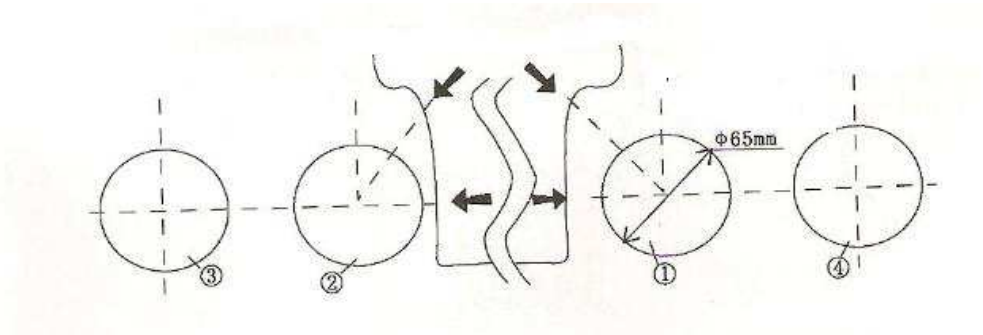
⚠ When the piping is extended above the Standard Piping Length the cooling/heating capacity will start to decrease and there is a possibility that the power consumption will increase.
⚠ A liquid stopping ring and oil collector shall be applied to the system when the head drop is over 5m, and then one for every 5m drop.
⚠ When bending the copper pipe, please use a bender in order to prevent pipe damage.
⚠ If the installation site is unique and the above guidelines can't be followed please contact the distributor of the product to discuss.

3.2 Indoor Unit Installation

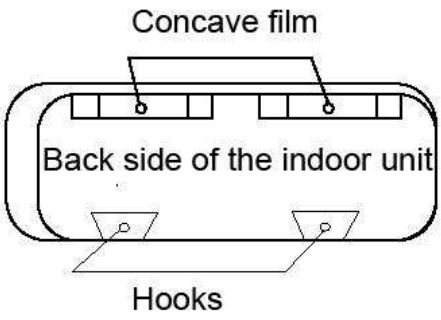
- The indoor unit should be installed on a firm, vibrationless wall.
- The entrance and vent can't be occluded; the outlet should face the centre of the room.
- The location of outdoor unit should be taken into consideration when selecting the location of the indoor unit, see the table in section 3.1 for the refrigerant piping lengths.
- It is preferable for the indoor unit to be located higher than the top of the solar collector, see section 3.1 for explanation.
- It is preferable for the location of the indoor unit to avoid direct sunlight.
- The indoor unit should be installed where drainage is convenient.
- The indoor unit should be mounted with the following surrounding empty space dimensions in mind; > 40cm to ceiling, > 20cm left and right, > 60cm below.
- A mounting bracket is supplied in order to fix the indoor unit to the wall. Use fasteners specific to the construction material of the wall, the installed bracket should be able to bear 50kg.

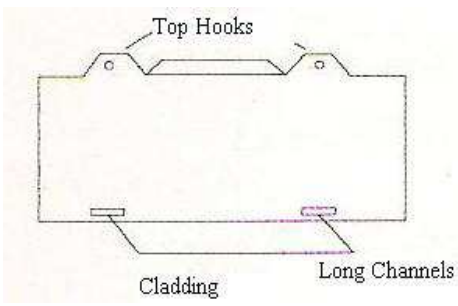
- As shown in the following pictures, pipelines are connected in five directions from the indoor unit. When the pipelines are connected in the 3 or 4 direction, please use a saw to open a preformed groove on the panel. When the pipelines are connected in the 5 direction, please use the saw to open a preformed groove under the panel.





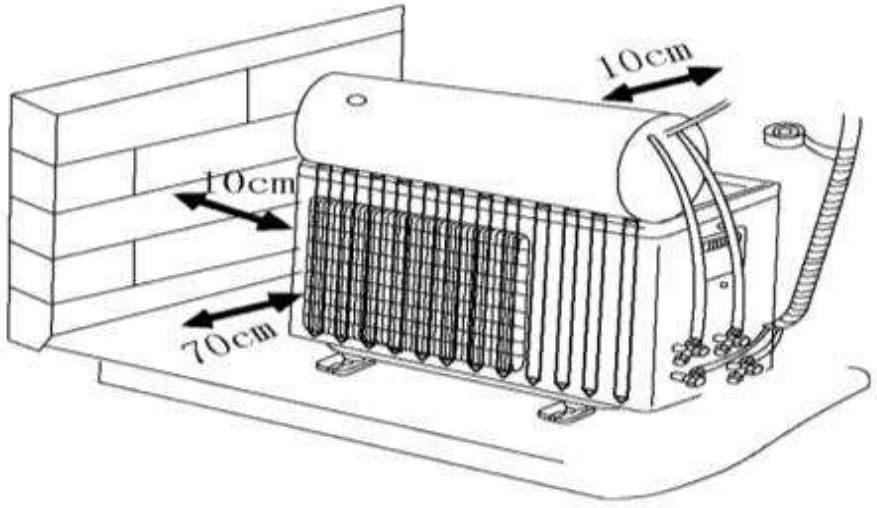
- It is recommended that a weight dropper be used to ensure that the bracket is sitting perfectly horizontal.
- Based on the junction direction of the pipeline (please consult picture above), a hole which is provided with a diameter of 65mm is drilled in the corresponding place on the wall. Then the wall bushing and the tube cap are placed into the hole. If the pipeline is connected in the 3 or 4 direction, the hole in the 3 or 4 direction should be opened a little lower than the height of the hole in the 1 or 2 direction. The aim is to ensure the condensate flow out of the pipe effectively.
- Please install the pipe of the indoor unit according to the direction of the wall hole; the outflow pipe, cable line and the inflow pipe should be bundled with adhesive tape, the outflow pipe should sit below the other two.
- Lead the taped pipes through the wall bushing and hang the indoor unit on the top hooks of the bracket then attach to the long channels at the bottom of the bracket.





3.3 Outdoor Unit Installation

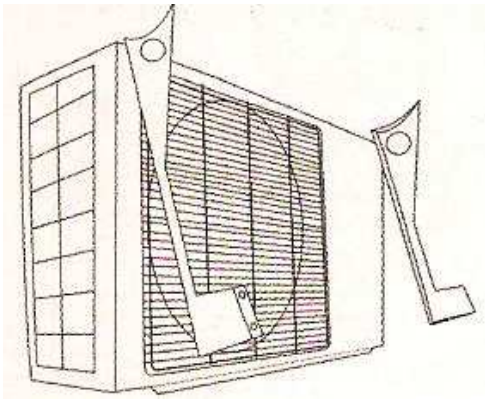
- The outdoor unit should be installed on a solid foundation, preferably on rubber vibration padding to ensure stable, quiet operation.
- The footing bolts of the outdoor unit should be either M8 or M10.
- The maximum allowable gradient in any direction is 5°.
- In areas of strong winds it is advisable to ensure that the unit is mounted where it is going to be least affected by the wind.
- Any barriers which may block the airflow or heat dissipation should be removed.
- If the system is going to be mounted on a frame or bracket, please bear in mind the unit weight in the specifications in section 1.1, as a general rule the frame or bracket should be rated to 180kg.
- The following dimensions should be taken into account when installing the outdoor unit;



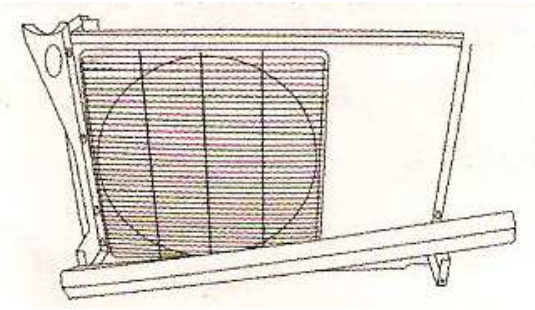
3.4 Evacuated Tube Solar Collector Installation

⚠ Please handle the Evacuated Tubes with care as they are made of glass and can be easily shattered.

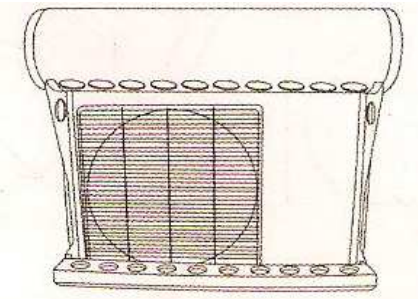
- Install the tank supports on the panel of the outdoor unit using the bolts provided and the threaded holes in the panel of the outdoor unit;



- Install the evacuated tube bracket on the lower part of the tanks supports using the nuts and bolts provided;

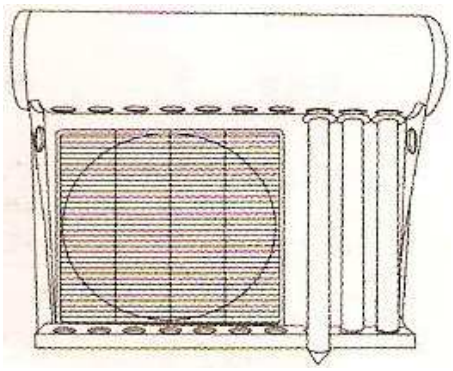


- Install the tank on the upper part of the tank supports using the threaded studs pre-inserted in the tank and the nuts provided;

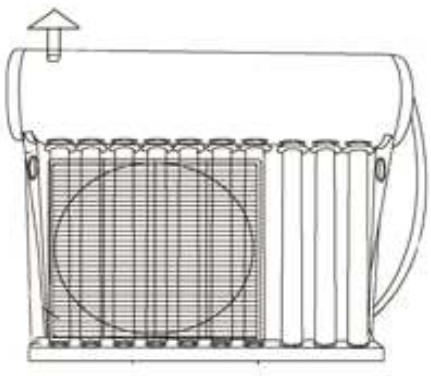


- Insert the white plastic collars provided into the holes in the evacuated tube bracket.
- Lightly lubricate the black rubber seals provided with a detergent solution and slide them onto the evacuated tubes with the open end of the seal facing up towards the open end of the tube.
- Push the each tube softly into the silicon hole in the tank until it is secure, then push across and down into the white collar in the evacuated tube bracket.

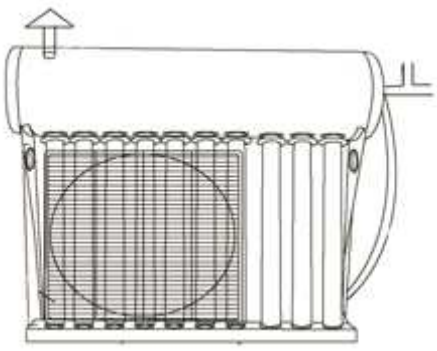
- Slide the black rubber seal up to seal off the silicon sealing section from the elements;



- Lubricate the air vent (assembly with red cap) lightly with the detergent solution then push softly through the hole located at the top left hand side of the tank, gently twist as you push to ensure that the silicon sealing ring inside isn't dislodged;



- Lubricate the white plastic tee joint (water drain) with the detergent solution then push softly through the hole located on the right hand side of the tank, gently twist as you push to ensure that the silicon sealing ring inside isn't dislodged;



- Fill the evacuated tube solar collector with water by unscrewing the red cap on top of the air vent and filling through the hole until water starts to exit out of the water drain on the right hand side.
- If in use or in installation one of the glass evacuated tubes is broken, it is possible to plug the corresponding hole in the bottom tank with a similar sized and shaped object until a

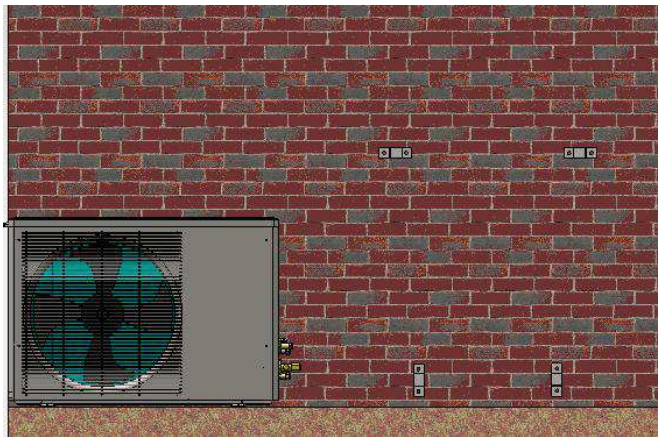
replacement tube can be sourced from the distributor of the product. This is only recommended as a temporary fix until a replacement can be sourced as it will negatively affect the efficiency of the solar collector.

3.5 Flat Panel Solar Collector Installation

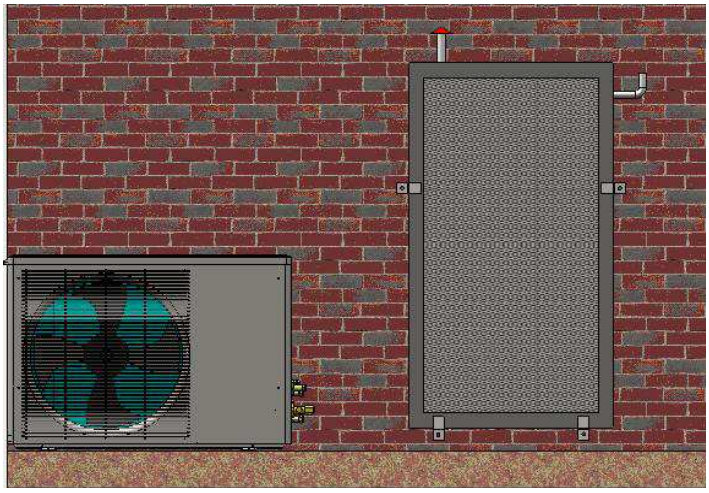
⚠ The flat panel solar collector must be installed as close to vertically as possible, the maximum angle the panel can be installed from vertical is 10^{o}.

⚠ The maximum refrigerant piping length between the flat panel solar collector and the outdoor unit is 2m, please ensure that the installation site will not require more than 2m of refrigerant piping from the outdoor unit.

- Fix the bottom brackets provided to the wall using the relevant fasteners for the construction material of the wall, then place the collector on the bottom brackets to determine the position of the upper brackets;



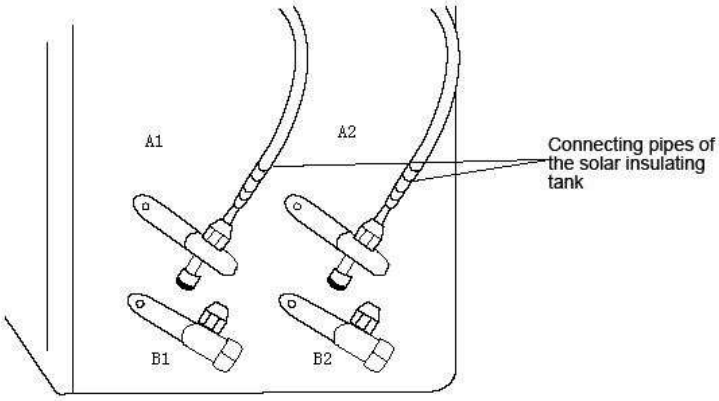
- Install the bracket and fasten to the wall, lubricate the air vent (assembly with red cap) lightly with the detergent solution then push softly through the hole located at the top left hand side of the panel, gently twist as you push to ensure that the silicon sealing ring inside isn't dislodged.
- Lubricate the white plastic tee joint (water drain) with the detergent solution then push softly through the hole located on the right hand side of the panel, gently twist as you push to ensure that the silicon sealing ring inside isn't dislodged;



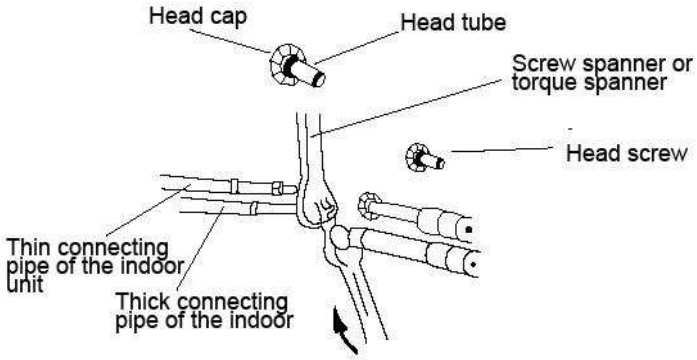
- Fill the flat panel solar collector with water by unscrewing the red cap on top of the air vent and filling through the hole until water starts to exit out of the water drain on the right hand side.
- The flat panel solar collector doesn't need to be mounted to the side of the outdoor unit as pictured above. It can be mounted directly above the outdoor unit if there are space limitations as long as it is ensured that the water exiting the water drain doesn't drip directly onto the outdoor unit.

3.6 Gassing Installation

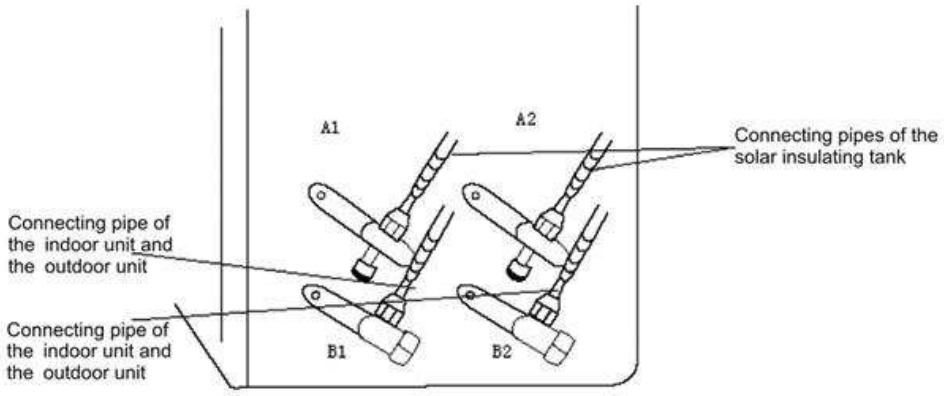
- Remove the protective covering caps and connect the copper refrigerant piping from the two top connections on the bottom right of the outdoor unit to the connections on the top right hand side of the solar collector;



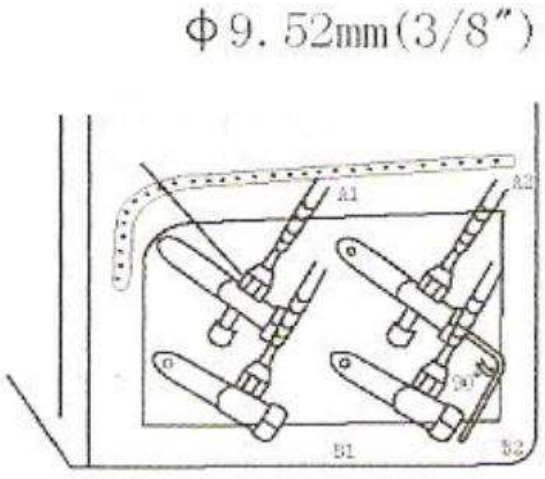
- Connect the condensate drain tube from the indoor unit to the vertical stem of the white tee joint on the top right of the solar collector.
- Release the nitrogen filled in the radiator of the indoor unit when the air conditioner leaves the factory. Remove the cover cap of the thick connecting pipe and the cover cap of the thin connecting pipe of the radiator.
- Remove the caps of the two connecting pipes, and tighten the nuts of the low pressure and the high pressure connecting pipes;



- Remove the caps on the stop valves of the low pressure and the high pressure connecting pipes, screw one end of the thick connecting pipe and one end of the thin connecting pipe on the stop valves of the low pressure and the high pressure connecting pipes, and tighten the nuts of the thick and thin connecting pipes using a spanner;

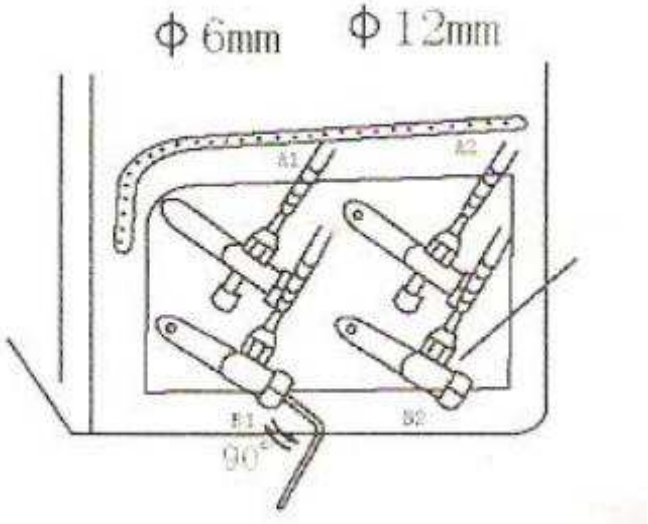


- Pressure test with Nitrogen for leaks.
- Vac down the solar panel tank and indoor unit completely to below 900microns for as long as possible (1 hour minimum).
- If air, water or other impurities, enter the solar air conditioner system, it will cause excessive working current, capillary blockage etc. which will affect the performance of the air conditioner.
- Ensure complete elimination of air, water and other impurities in the cooling pipe of solar tank and side tube of indoor unit.
- To eliminate the air in the solar collector please use a spanner to remove the A1 and the A2 cut-off valve caps of the outdoor unit;



- Use a spanner to loosen the stud type copper sealing attachment half a circle upon the air pipe of A1 cut-off valve.
- Use an inner hexagonal wrench to loosen the center of A2 cut-off valve 90°.
- After 7 to 11 seconds, fasten up the A2 cut-off valve. Air is exhausted from A1 air stud type copper sealing attachment.
- When there is no air escaping, according to the moment from 20 to 25NM, please fasten the stud type copper sealing attachment.
- Use the inner hexagonal wrench to open the A1 and A2 cut-off valve cores.
- Fasten A1 and A2 cut-off valve caps.

- Use soapy water or halogen detection instrument to detect leakage. If you find leakage, you need to fasten A1 and A2 cut-off valve caps. And then you can introduce refrigerant from outside of the system to expel air.
- Empty the connecting pipe of the indoor unit
- To eliminate the air in the solar collector please use a spanner to remove the B1 and the B2 cut-off valve caps of the outdoor unit;

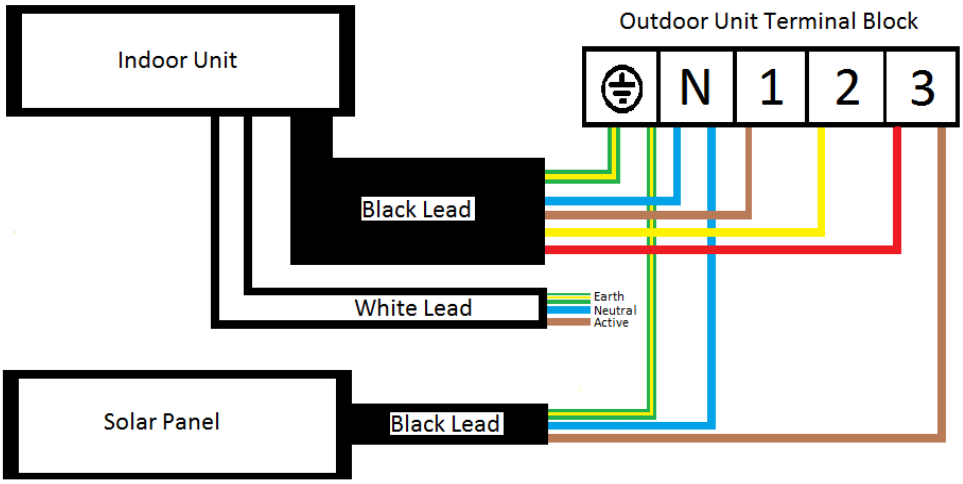


- Use a spanner to remove the B1 and the B2 cut-off valve caps of the outdoor unit.
- Use a spanner to loosen the stud type copper sealing attachment half a circle upon the air pipe of B2 cut-off valve.
- Use the inner hexagonal wrench to loosen the centre of B1 cut-off valve by 90°. After 7 to 11 seconds, fasten up the B1 cut-off valve. Air is exhausted from B2 air stud type copper sealing attachment. When there is no air escaping, according to the moment from 20 to 25NM, please fasten the stud type copper sealing attachment.
- Use the inner hexagonal wrench to open the of B1 and B2 cut-off valve cores.
- Fasten B1 and B2 cut-off valve caps.
- Use soapy water or halogen detection instrument to detect leakage. If you find leakage, you need to fasten B1 and B2 cut-off valve caps. And then you can use refrigerant gas from outside of the system to expel air.

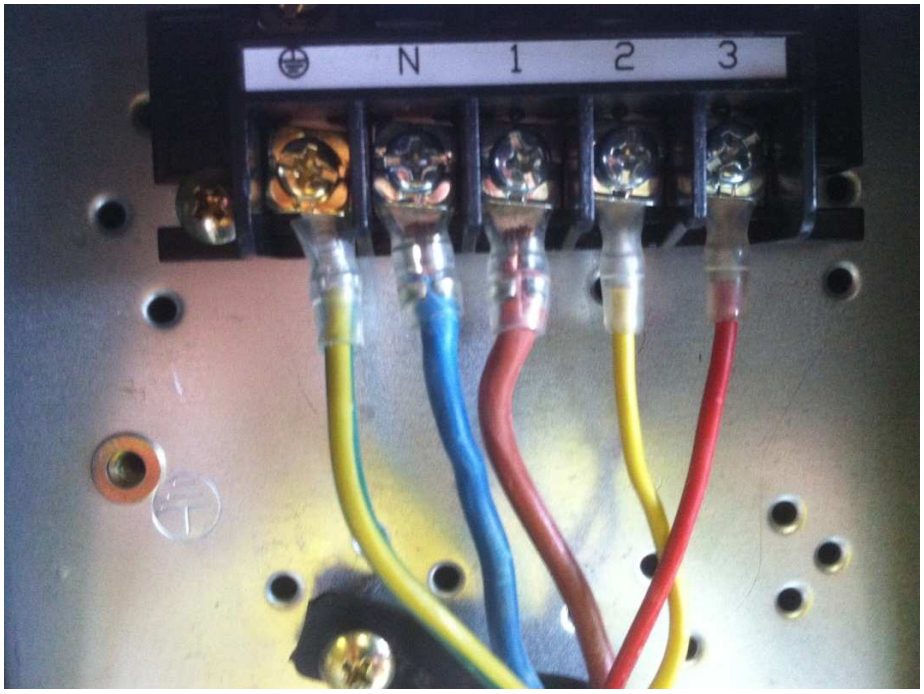
3.7 Wiring Installation

⚠ Always turn off the Koolsola System power at the power switch before conducting any wiring.

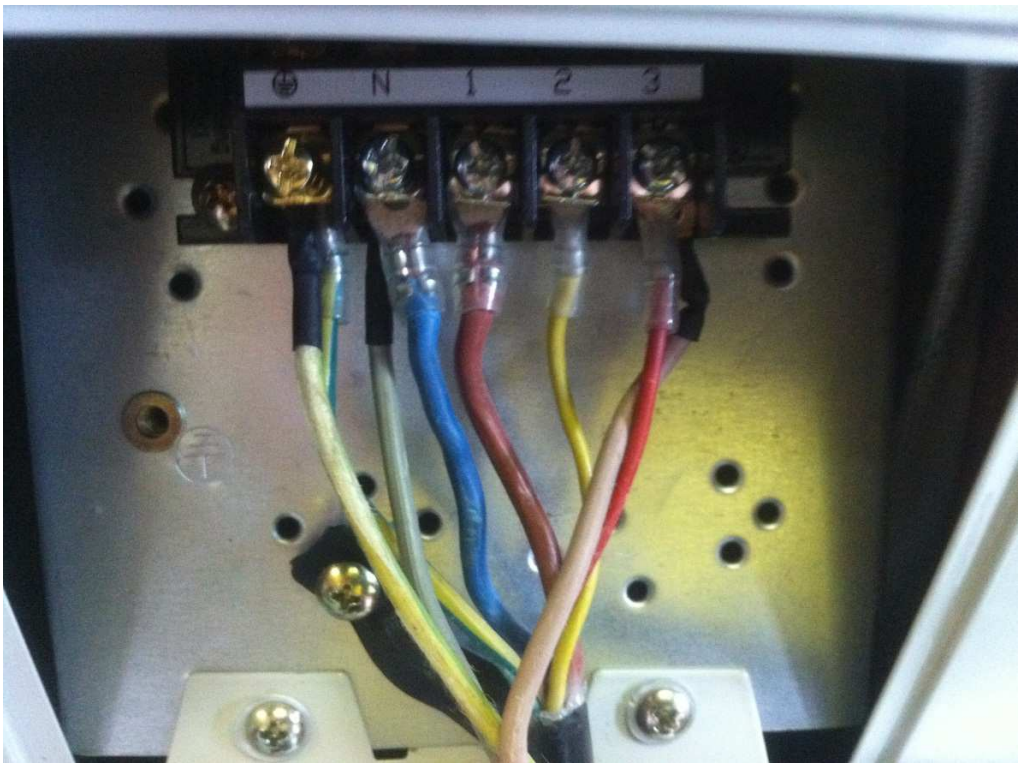
- The wiring installation differs slightly from the evacuated tube solar collector to the flat panel solar collector; the flat panel solar collector has a backup heater to maintain the temperature of the water in cold weather.
- For the evacuated tube solar collector only the interconnecting cable from the indoor unit needs to be connected to the outdoor unit.
- For the flat panel solar collector both the interconnecting cable from the indoor unit and the interconnecting cable from the solar collector need to be connected.
- The terminal board is located on the upper right hand side of the outdoor unit, it can be accessed by removing the screw holding on the plastic handle and sliding the handle off.
- The wiring configuration is as follows;



- Wiring configuration for Koolsola System with evacuated tube solar collector;



Wiring configuration for Koolsola Sytem with flat panel solar collector;


N
1
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