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ENGLISH
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OWNER'S MANUAL

AIR CONDITIONER

Please read this manual carefully before operating your set and retain it for future reference.

TYPE : Outside unit

MODELS: A(B,C)RWN~~~LAS4 A(B,C)RWB~~~LAS4
A(B,C)RWN~~~BAS4 A(B,C)RWB~~~BAS4
A(B,C)RWN~~~DAS4 A(B,C)RWB~~~DAS4

P/NO : MFL65003504

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Safety Precautions

To prevent injury to the user or other people and property damage, the following instructions must be followed.

■ Incorrect operation due to ignoring instruction will cause harm or damage. The seriousness is classified by the following indications.

⚠WARNING	This symbol indicates the possibility of death or serious injury.
⚠CAUTION	This symbol indicates the possibility of injury or damage to properties only.

■ Meanings of symbols used in this manual are as shown below.

	**Be sure not to do.**
	**Be sure to follow the instruction.**

⚠WARNING

■ Installation

Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit.

- If the power source capacity is inadequate or electric work is performed improperly, electric shock or fire may result.

Ask the dealer or an authorized technician to install the air conditioner.

- Improper installation by the user may result in water leakage, electric shock, or fire.

Always ground the product.

- There is risk of fire or electric shock.

Always intstall a dedicated circuit and breaker.

- Improper wiring or installation may cause fire or electric shock.

For re-installation of the installed product, always contact a dealer or an Authorized Service Center.

- There is risk of fire, electric shock, explosion, or injury.

Do not install, remove, or re-install the unit by yourself (customer).

- There is risk of fire, electric shock, explosion, or injury.

Do not store or use flammable gas or combustibles near the air conditioner.

- There is risk of fire or failure of product.

Use the correctly rated breaker or fuse.

- There is risk of fire or electric shock.

Prepare for strong wind or earthquake and install the unit at the specified place.

- Improper installation may cause the unit to topple and result in injury.

Do not install the product on a defective installation stand.

- It may cause injury, accident, or damage to the product.

When installing and moving the air conditioner to another site, do not charge it with a different refrigerant from the refrigerant specified on the unit.

- If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.

Do not reconstruct to change the settings of the protection devices.

- If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by LGE are used, fire or explosion may result.

Ventilate before operating air conditioner when gas leaked out.

- It may cause explosion, fire, and burn.

Securely install the cover of control box and the panel.

- If the cover and panel are not installed securely, dust or water may enter the outdoor unit and fire or electric shock may result.

If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit when the refrigerant leaks.

- Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, harzards due to lack of oxygen in the room could result.

Don't use the existing manifold gage for R22 refrigerant.

- Use the manifold gage for high pressure (R410A) as possible as for stable refrigerant filling.

Don't mix and use the R22 pipe and the installation appliances that were used until now

- Mixing the oil of R22 and R410A may cause failure of the unit due to hydrolysis.

■ Operation

Do not damage or use an unspecified power cord.

- There is risk of fire, electric shock, explosion, or injury.

Use a dedicated outlet for this appliance.

- There is risk of fire or electrical shock.

Be cautious that water could not enter the product.

- There is risk of fire, electric shock, or product damage.

Do not touch the power switch with wet hands.

- There is risk of fire, electric shock, explosion, or injury.

Take care so that children should not randomly operate the wire remote control for play.

- Frequent conversion to cold or heat mode may cause failure of the unit.

When the product is soaked (flooded or submerged), contact an Authorized Service Center.

- There is risk of fire or electric shock.

Be cautious not to touch the sharp edges when installing.

- It may cause injury.

Take care to ensure that nobody could step on or fall onto the outdoor unit.

- This could result in personal injury and product damage.

Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)

- There is risk of physical injury, electric shock, or product failure.

⚠ CAUTION

■ Installation

Always check for gas (refrigerant) leakage after installation or repair of product.

- Low refrigerant levels may cause failure of product.

Keep level even when installing the product.

- To avoid vibration or water leakage.

Use power cables of sufficient current carrying capacity and rating.

- Cables that are too small may leak, generate heat, and cause a fire.

Keep the unit away from children. The heat exchanger is very sharp.

- It can cause the injury, such as cutting the finger. Also the damaged fin may result in degradation of capacity.

Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.

- It may cause a problem for your neighbors.

Do not install the unit where combustible gas may leak.

- If the gas leaks and accumulates around the unit, an explosion may result.

Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigeration system.

- There is risk of damage or loss of property.

When installting the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.

- The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.

Do not install the product where it is exposed to sea wind (salt spray) directly.

- It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

■ Operation

Do not use the air conditioner in special environments.

- Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.

Make the connections securely so that the outside force of the cable may not be applied to the terminals.

- Inadequate connection and fastening may generate heat and cause a fire.

Do not block the inlet or outlet.

- It may cause failure of appliance or accident.

Be sure the installation area does not deteriorate with age.

- If the base collapses, the air conditioner could fall with it, causing property damage, product failure, and personal injury.

Install and insulate the drain hose to ensure that water is drained away properly based on the installation manual.

- A bad connection may cause water leakage.

Be very careful about product transportation.

- Only one person should not carry the product if it weighs more than 20 kg.
- Some products use PP bands for packaging. Do not use any PP bands for a means of transportation. It is dangerous.
- Do not touch the heat exchanger fins. Doing so may cut your fingers.
- When transporting the outdoor unit, suspending it at the specified positions on the unit base. Also support the outdoor unit at four points so that it cannot slip sideways.

Safely dispose of the packing materials.

- Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
- Tear apart and throw away plastic packaging bags so that children may not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.

Turn on the power at least 6 hours before starting operation.(In case of outdoor temperature below 10°C)

- Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.

Do not touch any of the refrigerant piping during and after operation.

- It can cause a burn or frostbite.

Do not operate the air conditioner with the panels or guards removed.

- Rotating, hot, or high-voltage parts can cause injuries.

Do not directly turn off the main power switch after stopping operation.

- Wait at least 5 minutes before turning off the main power switch. Otherwise it may result in water leakage or other problems.

Auto-addressing should be done in condition of connecting the power of all indoor and outdoor units. Auto-addressing should also be done in case of changing the Indoor unit PCB.

Use a firm stool or ladder when cleaning or maintaining the air conditioner.

- Be careful and avoid personal injury.

Do not insert hands or other objects through the air inlet or outlet while the air conditioner is plugged in.

- There are sharp and moving parts that could cause personal injury.

Avoid a place where rain may enter since the HR unit is for indoor

- There is risk of property damage, failure of product or electric shock.

Install the HR unit at a place in which it is not affected by operation mode changing noise.

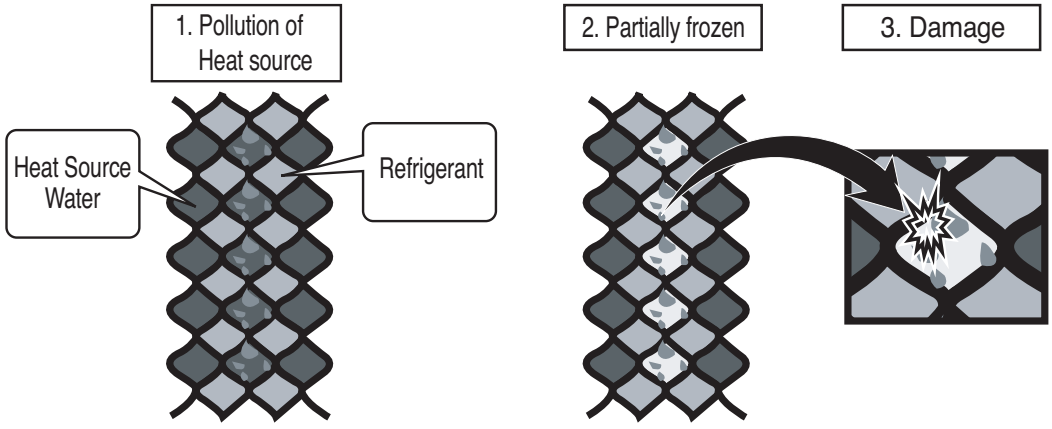
- Installation within cell such as meeting room etc, may disturb business due to noise.

Device protection unit

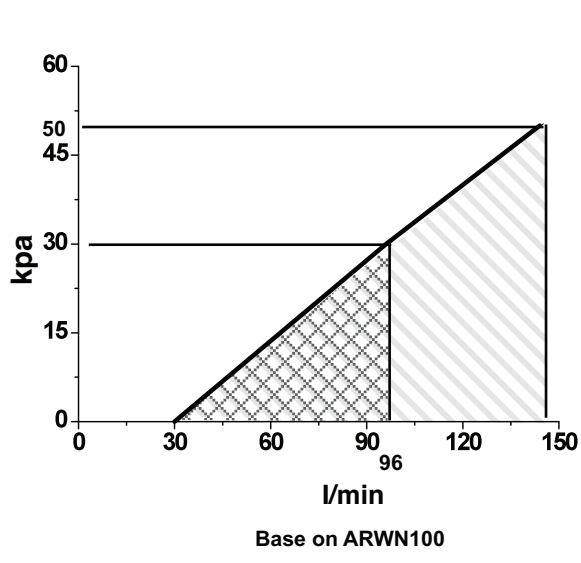
Strainer on water pipe

To protect the water cooling type product, you must install a strainer with 50 mesh or more on the heat water supply pipe.
If not installed, it can result in damage of heat exchanger by the following situation.

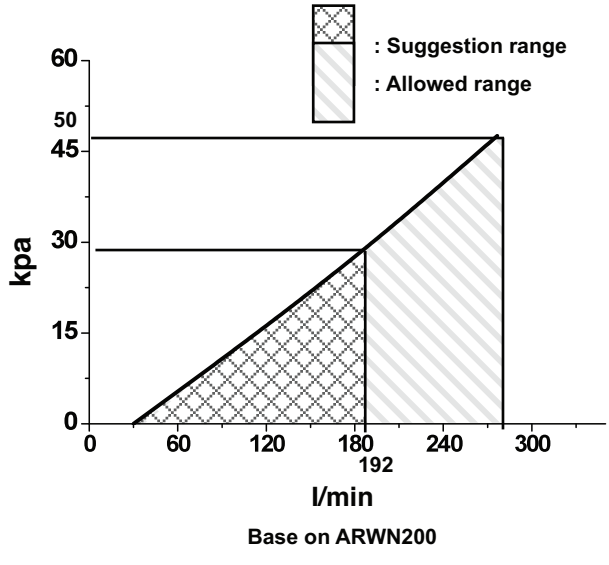
1. Heat water supply within the plate type heat exchanger is composed of multiple small paths.
2. If you do not use a strainer with 50 mesh or more, alien particles can partially block the water paths.
3. When running the heater, the plate type heat exchanger plays the role of the evaporator, and at this time, the temperature of the coolant side drops to drop the temperature of the heat water supply, which can result in icing point in the water paths.
4. And as the heating process progresses, the water paths can be partially frozen to lead to damage in plate type heat exchanger.
5. As a result of the damage of the heat exchanger from the freezing, the coolant side and the heat water source side will be mixed to make the product unusable.



Head loss of strainer on water pipe



Base on ARWN100



Base on ARWN200

Upper graph is a theoretical value for selection and it may be different according to specification of strainer.

Maintenance

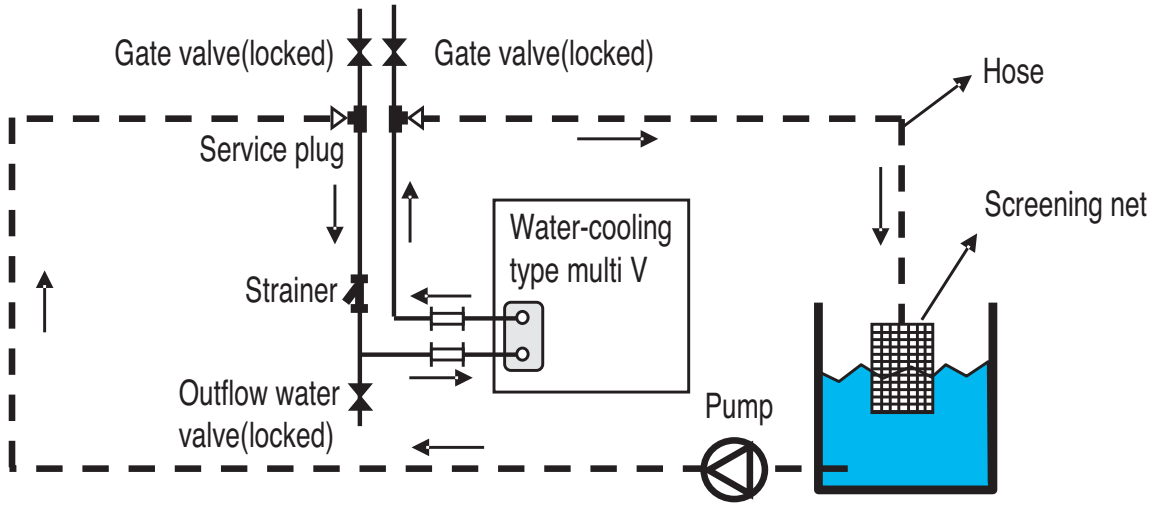
Plate type heat exchanger

As the scales are created in the panel heat exchanger, its efficiency may decrease or damage may occur due to winter-sowing due to the decrease in its flow. Due to this reason, regular maintenance is necessary so that the scales shouldn't be created.

1. Before the season of use, check below points.(Once a year)
   1) inspection on water quality to check if this is within the standard condition.
   2) Clean the strainer.
   3) Check if the flow is appropriate.
   4) Check if the operation environment is appropriate.(Pressure, flow, output temperature)

2. Below procedure should be abided by in order to clean the panel heat exchanger. (Once every 5 years)
   1) Check if the service port is equipped with the water pipe in order to clean the chemical solution.
      5% diluted formic acid, citric acid, oxalic acid, acetate acid, phosphoric acid and etc. are appropriate for the chemical solution for wiping out the scales.(Hydrochloric acid, sulphuric acid, nitric acid and etc. shouldn't be used due to its corrosion.)
   2) Be sure to check if the gate valve of inflow/outflow pipe and the valve for outflow pipe are properly closed when cleaning.
   3) Connect the water pipe for cleaning with the chemical solvent through the service plug of the pipe and fill up the panel heat exchanger with 50°C~60°C of cleaning solvent and circulate it with the pump for 2~5 hours. The circulation time may depend on the temperature of the cleaning solvent or the creation of the scales. Therefore, observe change in the color of the chemical solvent to set the circulation time for removing the scales.
   4) After the circulation of the solvent, extract the solvent inside of the panel heat exchanger and fill up 1~2% of NaOH or $NaHCO_3$ and then, circulate it for 15~20 minutes to neutralize the heat exchanger.
   5) Once the neutralization is completed, clean the inside of the panel heat exchanger with clean water.
      Measure the water Ph to check if the chemical solvent is properly removed or not.
   6) When using a different kind of chemical solvent in the market, be sure to check if there is any corrosive action to stainless or copper in advance or not.
   7) For details on the cleaning chemical solvent, be sure to consult the specialists of the related corporation.

3. After cleaning, operate the device to see if it works properly once again.



[Cleaning the panel heat exchanger]

Daily check/management

1. Water quality control

The plate type heat exchanger is not structured to be disassembled, cleaned or replaced with parts.
To prevent corrosion or scaling on the plate type heat exchanger, special care must be taken to control the water quality.
Water quality must satisfy the minimum criteria of the reference water quality items.
When anti-corrosion agent or corrosion inhibitor is added, the substance must not have any corrosive effect on stainless steel and copper.
Even if the circulating water is not contaminated by the external air, it is recommended to empty the water flowing in the pipe and to resupply the water.

2. Flow rate control

If the flow rate is insufficient, it can cause freezing on the plate type heat exchanger.
Check whether the strainer is clogged or whether the pipe is filled with air and then check the temperature and pressure difference of the inlet and outlet pipe to check whether the flow rate is insufficient.
If the temperature and pressure difference is above the appropriate level, it means that the flow rate is reduced. In this case, the operation must immediately be stopped and re-operated when the root cause is resolved. (*If air is trapped in the pipe, the air must be purged. Air inside the water pipe interferes with the circulation of the heat water supply and can cause insufficient flow rate or freezing.)

3. Brine density management

When using the brine (Anti-freeze) in the heat water supply, designated type and density must be used. Calcium chloride brine can cause corrosion on the plate type heat exchanger and must not be used.
If the anti-freeze liquid is left as is, it absorbs the moisture from the air to cause a drop in the density, leading to freezing of plate type heat exchanger. Therefore minimize the contact surface with the atmosphere and periodically measure the density of the brine to supplement the brine as needed to maintain the density.

Maintenance/Repair checklist

Period (Year) / Checkpoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Product operating condition	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Heat exchanger cleaning (Wash)					●					●					●
Strainer cleaning	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Water quality check	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Refrigerant leakage check	●														●
Indoor unit filter cleaning	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

(● : Check mark)

⚠CAUTION

- The above checklist is set based on the minimum period and more frequent checking can be required depending on the operating condition/water quality condition.
- When cleaning the heat exchanger, make sure to take parts out or lock the value so that chemical detergent does not penetrate into the pressure gauge etc.
- When cleaning the heat exchanger, check the connecting part of the water pipes prior to cleaning so that the chemical detergent does not leak.
- After sufficiently mixing the chemical detergent with water, start cleaning.
- Cleaning the heat exchanger is easier at the initial stage and becomes difficult after the scaling has accumulated.
- In areas where the water quality is poor, cleaning is required periodically.
  Because chemical detergent has strong acidity, it must be washed off thoroughly with water.
- To check whether it is cleaned well inside, remove the hose and check the inside.
- Purge the air to remove any air inside the water pipe.
- After checking, always check whether the heat water supply is flowing normally flowing before operating the product.

Water control

Water control

- Keep the water temperature between 10~45°C. Other it may cause the breakdown.
  - Standard water supply temperature is 30°C for Cooling and 20°C for heating.
- Properly control the water velocity. Otherwise it may cause the noise, pipe vibration or pipe contraction, expansion according to the temperature. Use the same water pipe size connected with the product or more.
- Refer to the water source pipe diameter and water velocity table below. As the water velocity is fast, air bubble will increase.

Diameter (mm)	Velocity range (m/s)
< 50	0.6 ~ 1.2
50 ~ 100	1.2 ~ 2.1
100 <	2.1 ~ 2.7

- Be careful of the water purity control. Otherwise it may cause the breakdown due to water pipe corrosion. (Refer to 'Standard Table for Water Purity Control')
- In case the water temperature is above 40°C, it is good to prevent the corrosion by adding the anticorrosive agent.
- Install the pipe, valve and gauge sensor in the space where it is easy to maintain. Install the water valve in the low position for drain, if required.
- Be careful not to let air in. If so, the water velocity will be unstable in the circulation, pump efficiency will also decrease and may cause the piping vibration. Therefore, install the air purge where it may generate the air.
- Choose the following anti freezing methods. Otherwise, it will be dangerous for the pipe to break in the winter.
  - Circulate the water with the pump before dropping the temperature.
  - Keep the normal temperature by boiler.
  - When the cooling tower is not operated for a long time, drain the water in the cooling tower.
  - Use an anti-freeze.
  - Refer to the additive amount about freezing temperature as in the table given below.

Anti freeze type	Minimum temperature for anti freezing (°C)					
	0	-5	-10	-15	-20	-25
Ethylene glycol (%)	0	12	20	30	-	-
Propylene glycol (%)	0	17	25	33	-	-
Methanol (%)	0	6	12	16	24	30

- In addition to anti freeze, it may cause the change of the pressure in the water system and the low performance of the product.
- Make sure to use the closed cooling type tower.
  When applying the open type cooling tower, use a 2nd heat exchanger to make the water supply system a closed type system.

Standard table for water purity control

The water may contain many foreign substances and hence may influence the performance and lifetime of the product due to the corrosion of the condenser and water pipe. (Use water source that complies with the below standard table for water purity control.)

If you use water supply other than the tap water to supply the water for the cooling tower, you must do a water quality inspection.

- If you use the closed cooling tower, the water quality must be controlled in accordance with the following standard table.
  If you do not control the water quality in accordance with the following standard water quality table, it can cause performance deterioration to the air conditioner and severe problem to the product

Items	Closed type		Effect	
	Circulating water	Supplemented water	Corrosion	Scale
Basic Item				
pH(25C)	7.0~8.0	7.0~8.0	O	O
Conductivity[25C](mS/m)	Below 30	Below 30	O	O
Chlorine ion(mg Cl^-/*l*)	Below 50	Below 50	O	-
Sulfuric acid ion(mg SO_4^{2-}/*l*)	Below 50	Below 50	O	O
Acid demand[pH 4.8] (mg SiO_2/*l*)	Below 50	Below 50	-	O
Total hardness(mg SiO_2/*l*)	Below 70	Below 70	-	O
Ca hardness(mg $CaCO_3$/*l*)	Below 50	Below 50	-	O
Ion silica(mg SiO_2/*l*)	Below 30	Below 30	-	O
Reference Item				
Fe(mg Fe/*l*)	Below 1.0	Below 0.3	O	O
Copper(mg Cu/*l*)	Below 1.0	Below 0.1	O	-
Sulfuric acid ion(mg S^2/*l*)	Must not be detected	Must not be detected	O	-
Ammonium ion(mg NH_4^+/*l*)	Below 0.3	Below 0.1	O	-
Residual chlorine(mg Cl/*l*)	Below 0.25	Below 0.3	O	-
Free carbon dioxide(mg CO_2/*l*)	Below 0.4	Below 4.0	O	-
Stability index	-	-	O	O

[Reference]

(1) The "O" mark for corrosion and scale means that there is possibility of occurrence.

(2) When the water temperature is 40°C or above or when uncoated iron is exposed to the water, it can result in corrosion. Therefore adding anti-corrosion agent or removing the air can be very effective.

(3) In case of using the closed type cooling tower, the cooling water and supplementing water must satisfy the water quality criteria of closed type system in the table.

(4) Supplementing water and supplied water must be supplied with tap water, industrial water and underground water excluding filtered water, neutral water, soft water etc.

(5) 15 items in the table are general causes of corrosion and scale.

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