

GERMANICA

2.7kW

PORTABLE AIR CONDITIONER

GPA27KW



SERVICE MANUAL

Please read this manual carefully before using, and keep it for future reference.

R290-Specific Safety Advice

Important safety precautions concerning refrigerant R290



Caution, risk of fire

WARNING: Combustible & Dangerous

This symbol alerts you to take care as the appliance contains a flammable refrigerant: R290 (propane). Take extra care when installing the unit and when carrying out maintenance. R290 is a colourless and odourless hydrocarbon gas. It is an efficient refrigerant with a low Global Warming Potential (GWP) and no potential for ozone depletion.

While R290 is highly flammable, there will be no risk of burning and explosion if the appliance is properly installed and maintained following all instructions and safety advice in the supplied manuals.

WARNING!

- The appliance shall be stored in a well-ventilated area without continuously operating sources, such as open flames, an operating ignition gas appliance or an operating electric heater. Do not expose the appliance to high heat, sparks and open flames.
- Do not pierce or burn the appliance.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- Be aware that refrigerants may not contain an odour.
- The ratings of the fuse installed in the built-in control unit are T 3.15AL 250V~..
- This air conditioner has been fully charged with refrigerant at the factory. Should a recharge become necessary, it may only be recharged by a professional installer.
- Maintenance must only be carried out by properly qualified, authorised personnel. If the appliance requires maintenance or service, contact our after sales support centre.
- The service technician must strictly comply with:
 - all safety instructions in the manual provided with the appliance
 - all relevant provisions of gas-related local laws and regulations.
- After servicing the appliance, the service technician must:
 - check that air cannot enter the refrigerant system
 - check for refrigerant leaks when moving the air conditioner
 - carry out a test cycle under controlled conditions after installing the unit and record the operating data.

Service Instructions

- Special training additional to usual refrigerating equipment repair procedures is required. For maintenance, service and repair operations, the working personnel needs to be certified.
- Examples for such working procedures are:
 - breaking into the refrigerating circuit
 - opening of sealed components
 - opening of ventilated enclosures.

Specific information for service personnel

- The installation of pipe work shall be kept to a minimum.
- Pipe work shall be protected from physical damage and shall not be installed in an unventilated space.
- Compliance with national gas regulations shall be observed.
- Mechanical connections made by brazing or welding shall be accessible for maintenance purposes.
- Servicing shall be performed only by AYONZ PTY LTD.
- Ducts connected to an appliance shall not contain potential ignition source.

Table: Minimum room area (m²): R290

LFL (kg/m³)	h_o (m)	Charge amount (M) (kg) Minimum room area (m²)						
		0.152kg	0.228kg	0.304kg	0.456kg	0.608kg	0.76kg	0.988kg
0.038	0.6		82	146	328	584	912	1541
	1.0		30	53	118	210	328	555
	1.8		9	16	36	65	101	171
	2.2		6	11	24	43	68	115

h_o is the room height.

The maximum refrigerant charge amount is 160g.

WARNING: Keep any required ventilation openings clear of obstruction.

Service Instructions (Cont.)

1. Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, points 1.2 to 1.6 below shall be completed prior to conducting work on the system.

1.1 Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

1.2 General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

1.3 Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

1.4 Presence of fire extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO₂ fire extinguisher adjacent to the charging area.

1.5 No ignition sources

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

Service Instructions (Cont.)

1.6 Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

2. Checks to the refrigeration equipment

- 2.1 Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.
- 2.2 The following checks shall be applied to installations using flammable refrigerants:
 - the charge size is in accordance with the room size within which the refrigerant containing parts are installed
 - the ventilation machinery and outlets are operating adequately and are not obstructed
 - if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant
 - marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected
 - refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

3. Checks to electrical devices

- 3.1 Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.
- 3.2 Initial safety checks shall include:
 - that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking
 - that no live electrical components and wiring are exposed while charging, recovering or purging the system
 - that there is continuity of earth bonding.

Service Instructions (Cont.)

4. Repairs to sealed components

- 4.1 During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
- 4.2 Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc. Ensure that the apparatus is mounted securely.
- 4.3 Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

NOTE The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment.

Intrinsically safe components do not have to be isolated prior to working on them.

5. Repair to intrinsically safe components

- 5.1 Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.
- 5.2 Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.
- 5.3 Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

6. Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

7. Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

Service Instructions (Cont.)

8. Leak detection methods

The following leak detection methods are deemed acceptable for all refrigerant systems.

- 8.1 Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL (lower flammable limit, 0.038 kg/m^3) of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.
- 8.2 Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe work.
- 8.3 If a leak is suspected, all naked flames shall be removed/extinguished.
- 8.4 If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen-free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

9. Removal and evacuation

- 9.1 When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:
 - remove refrigerant
 - purge the circuit with inert gas
 - evacuate
 - purge again with inert gas
 - open the circuit by cutting or brazing.
- 9.2 The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be “flushed” with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.
- 9.3 Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe work are to take place.

Service Instructions (Cont.)

9.4 Ensure that the outlet for the vacuum pump is not close to any ignition sources and that ventilation is available.

10 Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

10.1 Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.

- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system.

10.2 Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas.

10.3 The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

11. Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

11.1 Become familiar with the equipment and its operation.

11.2 Isolate system electrically.

11.3 Before attempting the procedure, ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders
- all personal protective equipment is available and being used correctly
- the recovery process is supervised at all times by a competent person
- recovery equipment and cylinders conform to the appropriate standards.

11.4 Pump down refrigerant system, if possible.

11.5 If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

11.6 Ensure that the cylinder is situated on the scales before recovery takes place.

Service Instructions (Cont.)

- 11.7 Start the recovery machine and operate in accordance with manufacturer's instructions.
- 11.8 Do not overfill cylinders. (No more than 80% volume liquid charge.)
- 11.9 Do not exceed the maximum working pressure of the cylinder, even temporarily.
- 11.10 When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- 11.11 Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

12. Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

13. Recovery

- 13.1 When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.
- 13.2 When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
- 13.3 The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
- 13.4 The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

Service Instructions (Cont.)

13.5 If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

14. Information about the correct working procedures:

Every working procedure that affects safety means shall only be carried out by competent persons according to the below points:

14.1 Commissioning

- Ensure that the floor area is sufficient for the refrigerant charge or that the ventilation duct is assembled in a correct manner.
- Connect the pipes and carry out a leak test before charging with refrigerant.
- Check safety equipment before putting into service.

14.2 Maintenance

- Portable equipment shall be repaired outside or in a workshop specially equipped for servicing units with flammable refrigerants.
- Ensure sufficient ventilation at the repair place.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark. The standard procedure to short-circuit the capacitor terminals usually creates sparks.
- Reassemble sealed enclosures accurately. If seals are worn, replace them.
- Check safety equipment before putting into service.

14.3 Repair

- Portable equipment shall be repaired outside or in a workshop specially equipped for servicing units with flammable refrigerants.
- Ensure sufficient ventilation at the repair place.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark.
- When brazing is required, the following procedures shall be carried out in the right order:
 - Remove the refrigerant. If the recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.

Service Instructions (Cont.)

- Evacuate the refrigerant circuit.
- Purge the refrigerant circuit with nitrogen for 5 min.
- Evacuate again.
- Remove parts to be replaced by cutting, not by flame.
- Purge the braze point with nitrogen during the brazing procedure.
- Carry out a leak test before charging with refrigerant.
- Reassemble sealed enclosures accurately. If seals are worn, replace them.
- Check safety equipment before putting into service.

14.4 Decommissioning

- If the safety is affected when the equipment is put out of service, the refrigerant charge shall be removed before decommissioning.
- Ensure sufficient ventilation at the equipment location.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark.
- Remove the refrigerant. If the recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
- Evacuate the refrigerant circuit.
- Purge the refrigerant circuit with nitrogen for 5 min.
- Evacuate again.
- Fill with nitrogen up to atmospheric pressure.
- Put a label on the equipment that the refrigerant is removed.

14.5 Disposal

- Ensure sufficient ventilation at the working place.
- Remove the refrigerant. If the recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. If in doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
- Evacuate the refrigerant circuit.
- Purge the refrigerant circuit with nitrogen for 5 min.
- Evacuate again.
- Cut out the compressor and drain the oil.

SPECIFICATIONS

Power Supply	220-240V ~ 50Hz	
Rated Power	POWER	1000 W
	CURRENT	4.9 A
Capacity	COOLING	2700W (2.7kW)
Weight	NET	25 kg
	GROSS	27.5 kg
Indoor Dishcharge Air-Flow	DISCHARGE	≥ 320m3/h
Refrigerant Type	TYPE	R290
	QUANTITY	160 g
Noise Level	≤ 67dB(A)	
Dimensions	UNIT	330 (w) x 280 (d) x 690 (h) mm

This appliance has been fully tested and meets all requirements as set out by standards AS/NZS 60335.1 and AS/NZS 60335.2.40.



CUSTOMER HELPLINE:

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