



Rheem

THERMAL SYSTEMS GROUP

Rheem Thermal Hot Water RTHW Series Installation, Maintenance and Service Manual



This booklet is to be carefully read and instructions followed for efficient and trouble free operation of the Rheem Thermal Hot Water Heat Pump

43 Marigold Street
Revesby NSW 2212
www.rheemthermal.com.au
Tel: (02) 9684 3684
Fax: (02) 9684 3698

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INTRODUCTION

Rheem Thermal Hot Water Heat Pumps are available in sizes from 10KW to 540KW nominal output and are suitable for domestic & commercial Mechanical, Hot Water and Hydronic heating applications. The units are most commonly manufactured as air-to-water design, in which it extracts heat from ambient air and transfers this to water, providing a highly energy efficient method of water heating. The units can also be manufactured as water-to-water and ground-coupled design.

Each is a fully packaged unit, requiring only electrical and water connections to be made on installation. A water circulation pump is not supplied with the unit and must be fitted and sized accordingly to suit the required water flow rates.

Each is factory charged, with refrigerant R407c being ideally suited for domestic, commercial or industrial situations requiring hot water up to 61°C. Refrigerant R134a may also be used for special hot water applications where hot water is needed up to 65°C.

As the performance of the Rheem Thermal Heat Pump varies with ambient operating conditions, water flow, water temperature and also due to the wide diversity of domestic, commercial and industrial applications, selection of the unit should be done in conjunction with an experienced heat pump dealer or the manufacturer.

In hot water application, vessels and reticulation containing the heated water should all be suitably insulated to obtain the optimum performance from the system.

Each Rheem Thermal unit is custom-manufactured to meet specific task/site requirements. Warm coastal climates may never accumulate ice on the coil. In cooler and/or more volatile climates removal of any ice buildup is essential and various de-ice mechanism options are provided.

This manual includes important information in regard to installation, operation, maintenance and servicing and should be retained for the life of the heater. Correct installation and familiarity with the operational guidelines given will ensure that the heater gives optimal efficiency and trouble-free operation over many years.

Rheem Thermal hot water units are suitable for domestic and commercial Mechanical, Process and Hydronic applications.



Caution should be taken if soldering to avoid damage to the thermostat sensor. The sensor should be removed prior to soldering and refitted once the pipe has cooled. The sensor is located in a well on the return water pipe.

SECTION 1. INSTALLATION

For validity of warranty, installation must be carried out by registered trade person.

Site Location, Preparation & Unit Positioning

- Heating efficiency and output increases with the rise in entering air temperature, as such full advantage should be taken for direct sunlight, typically with evaporator coil facing north-west or facing a heat source like boiler room, etc.
- Locating the unit close to other system equipment like the pump, tank, etc. will minimise friction and heat losses.
- Free circulation of air across the coil, requires no obstructions on the intake or fan discharge of Heat Pumps. Do not position the unit with any intake side closer than 1,000mm to adjacent wall, fences, hedges, etc. Ensure that walls, eaves, etc. do not obstruct the release of discharge air such that this may recirculate in the incoming air stream of the unit.
- Service access is required at both ends of the heater. Allow a minimum 850 mm service access at the compressor end if possible for units up to 80 kW. For units 100 kW and above 1000 mm access at the compressor end is required.
- Where multiple heat pumps are to be installed, allow 2,000mm minimum clearance between units.
- The Heat Pump requires a concrete slab. Rubber mounts shall be installed between the unit and slab.
- Local building authorities should be consulted for regulations concerning minimum installation distance from pool or other amenities.
- Units to be used in areas having highly corrosive atmosphere, must be specified at time of ordering.
- Consideration should be given to the operating noise, wherever possible the exhaust should be directed away from the occupied areas.
- To ensure proper drainage of the Heat Pump, make sure that the unit is located at a slightly tilted angle with the drain on the downhill side of the unit. This can be done by making the concrete slab slightly higher at one end or lifting one end of the unit by rubber mounts.
- For the plant-room installation, make sure that sufficient fresh air is available via provision of inlet grills in building design, etc. Exhaust air from the unit must be discharged by a duct away from the fresh air supply. Proposed ductwork should be submitted to the manufacturer for approval. The unit should never be installed in a fully enclosed area.

Plumbing

- It is essential that the water recirculating pump and pipe sizes be engineered to suit the particular application, giving correct water flow through the heat pump. Inadequate or excessive water flow detracts from heating efficiency and can lead to damage to the unit. Selection of the recirculating pump must be made in accordance with the design flow rate and pressure drop as per the manufacturer's specification.
- Consult Rheem Thermal for recommendations for optimum flow rates. Assistance will be provided in relation to optimum plumbing design and pump selection.

- Water connections on the unit are clearly marked as water inlet and water outlet. The water lines should be as short as conditions will permit. The size of these lines is not necessarily the same as unit connections.
- Breakable unions should be installed on both inlet and outlet pipes to facilitate maintenance and water drainage of the system. If the unit is situated below the level an open holding tank I, shut off valves should be fitted on the water side of both unions so that removal of the machine is possible without draining the system.
- Caution should be taken when soldering to avoid damage to the thermostat sensor. The sensor should be removed prior to soldering and refitted once the pipe has cooled. The sensor is located in a well on the return water pipe
- A one-way check valve should be installed on the outlet of the heat pump.
- Diagram 1 shows a typical plumbing schematic.
- Where multiple units are installed, the heaters must be installed in parallel to equalise pressure drops and balance flow through the heaters. Systems of three or more heat pumps require a plumbing loop.
- All Plumbing should be carried out by qualified trade's people.

Water Quality

The heat pump must be installed in accordance with this advice to be covered by the Rheem Thermal Warranty.

This heat pump is manufactured to suit the water conditions of most public reticulated water supplies. However there are some known water chemistries which can have a detrimental effects on the heat pump and its operation and / of life expectancy. If you are unsure of your water chemistry, you may be able to obtain information from your local water supply authority. This heat pump should only be connected to a water supply which complies with these guidelines for the Rheem Thermal warranty to apply.

Change of water supply

The changing or alternating from one water supply to another, e.g. a rain water supply, bore water supply, desalinated water supply, public reticulated water supply or water bought in from another supply, then water chemistry should be tested to ensure the water supply meets the requirements given in these guidelines for the Rheem Thermal warranty to apply.

Saturation Index.

The saturation index (SI) is used as a measure of the waters corrosive or scaling properties.

Where the saturation index is less than -1.0, the water is very corrosive and the Rheem Thermal warranty does not apply to the heat pump. In a corrosive water supply, the water can attack copper parts and cause them to fail.

Water which is scaling may be treated with a water softening device to reduce the saturation index of the water.

Chloride and PH

Where the chloride level exceeds 250 mg / l the Rheem Thermal warranty does not apply to the heat pump. In a high chloride water supply, the water can corrode stainless steel parts and cause them to fail.

Where the PH is less than 6.0 the Rheem Thermal warranty does not apply to the heat pump. PH is a measure of whether the water is alkaline or acid. In an acidic water supply, the water can attack stainless parts and cause them to fail.

Water with a PH less than 6.0 may be treated to raise the PH. The water supply from a rainwater tank in a metropolitan area is likely to be corrosive due to the dissolution of atmospheric contaminants.

Electrical

- All electrical work must be carried out by licensed electricians and all the wiring should be carried out to AS3000 latest edition wiring standards.
- Refer to the internal electrical wiring diagram supplied with the units before proceeding with electrical work. Cable and fuse sizing must be correct relative to unit specified Volts/Hz/Phase.
- An isolating switch must be fitted adjacent to the unit up to 87 kW, units above 100 kW have a factory installed isolation switch.
- To install the unit, remove the electrical service panel. No conduit entry points are provided, the installer has to drill an appropriate hole in the desired location. Earth and Neutral wires need to be connected to the appropriate terminal. Line voltage to terminals L1 and L2 and L3 if unit is three phase.
- Water must be running through the unit before the unit is switched on.

Control Design

All Rheem Thermal heat pumps intended for individual installation are manufactured with in-built thermostat control and refrigeration pressure safety switches.

- Typically, the thermostat is mounted on the outside panel and displays entering water temperature, with the sensor being located in a well to the inlet water pipe inside the unit.

For systems comprised of multiple Heat pump units, the thermostat sensor and well may be provided as follows depending on client requirement:

- Provided loose to allow installation of thermostat controller display in heat pump control panel (located separately to the heat pumps) with probe installed in the hot water storage tank.
- Provided in the nominated lead-unit (i.e. the control heat pump) with relays fitted to the slave units to allow control wiring to be run to these units.

The thermostat sensor is the controlling device in the heating system. This determines whether the heat pump unit should run and is activated in response to the parameters set for temperature control. That is, the heat pump will run when the entering water temperature (EWT) or tank temperature is less than the desired set point (normally with a 2°C split) and stop running when the EWT is a set point. The heat pump will likewise not run without water flow so there is a very direct link between the heat pump, hot water recirculating pump and thermostat controller.

The thermostat sensor can be located in the hot water tank with control wiring back to the water recirculating pump. The operation of the recirculating pump will be controlled by tank temperature, with water flow to the heat pump activating its operation. This approach reduces recirculating pump and heat pump run-hours and duty. Contact manufacturer at time of order to discuss wiring requirements.

SECTION 2. COMMISSIONING

The Rheem Thermal heat pump is fully charged with refrigerant. The following checks should be carried out:

1. Installation and operation instructions should be read prior to commissioning.
 2. The unit should have unrestricted supply of fresh air to the coil and exhaust air removed from closed in areas.
 3. The unit should stand on a firm base with fall to take condensate or rain water away from the compressor compartment and to the unit's drainage at the plumbing end.
 4. Noise should be directed away from living areas.
 5. Water connected correctly as indicated.
 6. Condensate drain runs to waste.
 7. Unit is wired correctly and has full amperage,
 8. Unit is not to be started without flow of water.
 9. The thermostat and reset button are set.
-

SECTION 3. OPERATION

1. The Heat Pump has an internal thermostat located in the return water pipe which maintains storage tank water temperature at the nominated set point. The normal operating range for entering water is between 55°C and 57°C.
2. As water usage occurs, mains water will enter the storage tank, lowering the overall stored water temperature, which in turn, activates the Heat Pump. The Heat Pump will run until the water temperature (at the sensing point) reaches set point.

Thermostat Operation

Carel PJEZ control:

To check set point, push and hold the "Set" button for 1 second, current set point will be displayed, push the "up" or "down" arrows to adjust the value. Press "set" to confirm the value.

Adjusting the differential or Hysteresis "All parameters" screen must be accessed.

Press and hold "Set" for approx 5 seconds, PS will be displayed.

Press "Set" then "Arrow up" till the password value "22" is displayed "PS" will be displayed

Press "Arrow up" unit parameter "rd" is displayed. Press "Set" Value will be displayed.

Press "Arrow up" or "Down" to set the desired value. Press "Set"

Press and hold "Set" for approx 5 seconds, until temperature is displayed to save values.

The manufacturer's detailed full instructions on the operation of the controller will be supplied with the unit and reference may also be made to these instructions.

De-Icing

All units include hot gas bypass de-ice. This will occur when the evaporator temperature reaches - 4°C, after a period of 30 minutes the unit will go into de-ice mode and will terminate when the coil temperature reaches 10°C or when 10 minutes has passed.

SECTION 4. MAINTENANCE

1. In locations where ambient temperature can be very low, if unit is not used for a long period, it is essential to drain all water from unit to prevent ice build-up in water pipe-work.
2. Leak test refrigerant system once every 6 months.
3. Check pressure switches, de-ice control and solenoid valves.
4. Check thermostat.
5. Check fan motor support and fan blades.
6. Check condensate drain for blockages.
7. Check water inlet and outlet connections for any leaks.
8. Check current draw with and without load.
9. Check operating voltage at compressor terminal with load, without load and at start-up.
10. A minimum program of servicing every four months is recommended and should be undertaken by a specialist refrigeration mechanic.
11. The unit casing is designed for outdoors installation and no specific maintenance should be necessary. If the case is cleaned, ensure that power to the unit is switched off.
12. Clean evaporator coils. If coils are becoming clogged with leaves or debris, remove any surrounding source of leaf or other litter.

SECTION 5. TROUBLESHOOTING

Machine Will Not Start

As a safety feature, the Heat Pump has a programmed time delay between provision of power and unit start, usually a few minutes. Wait for this time delay before making the following checks:

- Check electrical supply to the unit is ON.
- Check water flow
- Check electrical for loose connections and wiring.
- Check supply fuse.
- Check thermostat is correctly set.

Storage Tank Will Not Heat

- Check that the ejected air temperature is colder than incoming air. If so, this means the unit is extracting heat from the air and transferring this to water.
- Check that the evaporator and internal pipes sweating. This is evidence of heat removal from the air, suggesting that the heater is working.
- Check inlet louvres, outlet grill and condenser coil has satisfactory airflow and is not clogged.
- Check that thermostat is correctly set
- Check that water pump is running
- Check that inlet valves are not closed
- Check ambient air temperature suits design standards

The temperature rise for a heat pump heating may seem slow but the unit is probably working. Typically, heat pumps have a much lower kW per hour heat output capacity than gas and will need to operate for more time to deliver the same heat transfer.

Compressor Will Not Run

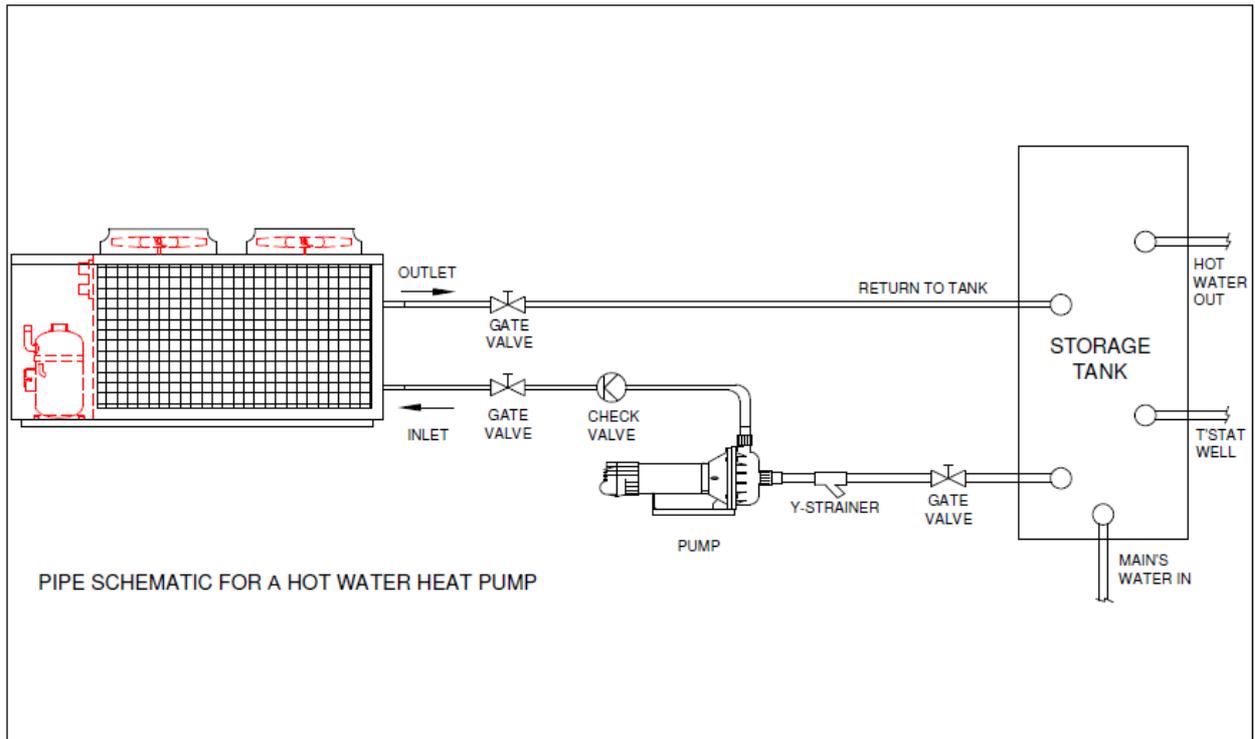
<i>Possible Cause</i>	<i>Possible Solution</i>
Overload switch cut-out (if fitted)	Find cause of overload and reset overload switch.
System stopped on safety lockout	A disturbance in water flow may have triggered the safety lockout. Reset unit by switching OFF, then back to ON. If unit does not respond, fit gauges and check refrigerant charge and HP/LP operation. Possible condenser water flow failure. Check condenser pump water entering temperature and flow rate.
Motor windings faulty	Contact manufacturer for replacement.

Compressor Motor Hums, But Will Not Start

<i>Possible Cause</i>	<i>Possible Solution</i>
Low voltage	Provide adequate voltage.
Wrong motor connections	Check with name plate or wiring diagram.
Tight or seized compressor	Replace.
No power on one phase	Check circuit breakers, main switch and wiring for fault.

SECTION 6. INSTALLATION SCHEMATIC DRAWING

Typical Schematic for Single Hot Water Heat Pump



SECTION 7. RHEEM THERMAL WARRANTY TERMS & CONDITIONS

1. THE RHEEM THERMAL WARRANTY – GENERAL

- 1.1 This warranty is given by Rheem Thermal ABN 28 062 383 224 of 43 Marigold Street, Revesby New South Wales.
- 1.2 For the purposes of this document, the Rheem Thermal heat pump water heater is referred to as the “unit”.
- 1.3 Rheem Thermal offer a trained and qualified national service network who will repair or replace components at the address of the heat pump subject to the terms of the Rheem Thermal warranty. Rheem Thermal Service, in addition can provide preventative maintenance and advice on the operation of the unit. The Rheem Thermal Service contact number is 02 9684 3684 with service personnel available to take your call from 8am to 4pm Monday to Friday, (hours subject to change).
- 1.4 For details about this warranty, you can contact us on 02 9684 3684
- 1.5 The terms of this warranty are set out in Section 2 and apply to units manufactured after 1st January 2012.
- 1.6 If a subsequent version of this warranty is published, the terms of that warranty will apply to units manufactured after the date specified in the subsequent version.
- 1.7 The application of the Warranty is dependent on payment for the unit being made in accordance with the Company's Standard Terms and Conditions.

2. TERMS OF THE RHEEM THERMAL WARRANTY AND EXCLUSIONS TO IT

- 2.1 The warranty period will commence from the end user's date of purchase.
- 2.2 The decision of whether to repair or replace a faulty component is at Rheem Thermal sole discretion.
- 2.3 If you require a call out and we find that the fault is not covered by the Rheem Thermal warranty, you are responsible for our standard call out charge. If you wish to have the relevant component repaired or replaced by Rheem Thermal that service will be at your cost
- 2.4 Where a failed component is replaced under this warranty, the balance of the original warranty period will remain effective. The replacement does not carry a new Rheem Thermal warranty.
- 2.5 Where the unit is installed outside the boundaries of a metropolitan area as defined by Rheem Thermal or further than 25 km from either a regional Rheem Thermal branch office or an Accredited Rheem Thermal Service Agent's office, the cost of transport, insurance and travelling between the nearest branch office or Rheem Thermal Accredited Service Agent's office and the installed site shall be the owner's responsibility.
- 2.6 Where the unit is installed in a position that does not allow safe or ready access, the cost of that access, including the cost of additional materials handling and/or safety equipment, shall be the owner's responsibility. In other words, the cost of dismantling or removing cupboards, doors or walls and the cost of any special equipment to bring the pool heater to floor or ground level or to a serviceable position is not covered by this warranty.
- 2.7 This warranty only applies to the original and genuine Rheem Thermal unit in its original installed location and any genuine Rheem Thermal replacement parts.
- 2.8 The Rheem Thermal warranty does not cover faults that are a result of:
 - a) Accidental damage to the unit or any component (for example: (i) Acts of God such as floods, storms, fires, lightning strikes and the like; and (ii) third party acts or omissions).
 - b) Misuse or abnormal use of the unit.
 - c) Installation not in accordance with the Owner's Guide and Installation Instructions or with relevant statutory and local requirements in the State or Territory in which the unit is installed.
 - d) Connection at any time of the unit in anyway which does not comply with the guidelines as outlined in the Owner's Guide and Installation Instructions.
 - e) Repairs, attempts to repair or modifications to the unit by a person other than Rheem Thermal Service or a Rheem Thermal Accredited Service Agent.
 - f) Faulty plumbing or faulty power supply.
 - g) Failure to maintain the unit in accordance with the Owner's Guide and Installation Instructions.
 - h) Transport damage where freight is arranged by others.
 - i) Fair wear and tear from adverse conditions (for example, corrosion).
 - j) Cosmetic defects.
- 2.9 Subject to any statutory provisions to the contrary, this warranty excludes any and all claims for damage to furniture, carpet, walls, foundations or any other consequential loss either directly or indirectly due to leakage from the unit, or due to leakage from fittings and/ or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure.
- 2.10 This warranty is not applicable if the installation of the unit is carried out by an installer not approved by Rheem Thermal or persons who are not qualified to do so in the opinion of Rheem Thermal.

- 2.11 Where a titanium heat exchanger is fitted, the extended warranty protects against failure due to water imbalance. The warranty is not applicable if failure is caused due to hydraulic damage, such as excess pressure. The extended parts warranty covers the cost of a replacement heat exchanger but excludes labour or associated costs or the cost of any subsequent damage, of any type.
- 2.12 This warranty does not cover the replacement or replenish of refrigerant within the unit.
- 2.13 It is a condition of warranty that the customer has stipulated correctly and precisely the capacity and performance required of the System and the conditions under which the System shall operate. Any performance figures given by us in the Quotation or mentioned or referred to in or prior to the contract are such as we expect to obtain on test but are not guaranteed. All such performance figures whether analytical or financial are estimates only and the customer must independently satisfy itself as to their accuracy and completeness.

Failure to perform as duly specified shall be notified to us in writing and we shall be given every reasonable facility to investigate the cause of the failure and to recommend remedial action.

If it is clearly established that the fault is due to an error in calculation by us or failure by our employees to carry out instructions, the fault shall be rectified by us in as reasonable a period of time as possible and at no cost to the Customer. Should the remedial action fail to achieve the designed performance the limit of our liability either the negligence or for breach of statutory duty or otherwise shall be for us to remove the equipment at our expense or to refund to the buyer the purchase price in full.

3. WHAT IS COVERED BY THE RHEEM THERMAL WARRANTY FOR THE UNITS DETAILED IN THIS DOCUMENT

- 3.1 Rheem Thermal will repair or replace a faulty component of your unit if it fails to operate in accordance with its specifications as follows:

Series	What components are covered	The period in which the fault must appear in order to be covered	What coverage you receive
RTHW	Major Parts*	Years 1 to 2	1st Year repair and/or replacement of the faulty parts, free of charge, when installed for the purpose of heating hot water. 2nd Year parts only.
	Minor Parts*	Year 1	Repair and/or replacement of the faulty parts, free of charge, when installed for the purpose of heating hot water
	Protection of the heat exchanger due to chemical corrosion	Years 1 to 5	Repair and/or replacement of the faulty parts, free of charge, when installed for the purpose of heating hot water
All above models	Labour	Year 1	Repair and/or replacement of the faulty parts, free of

- For the purposes of this warranty, Major Parts are defined as compressors, heat exchangers and evaporators. Minor Parts are defined as the remainder of the unit including refrigeration piping, valves, fans, electrical components and refrigerant.

4. ENTITLEMENT TO MAKE A CLAIM UNDER THIS WARRANTY

- 4.1 To be entitled to make a claim under this warranty you need to:
 - a) Be the owner of the unit or have consent of the owner to act on their behalf
 - b) Contact Rheem Thermal Service without undue delay after detection of the defect and, in any event, within the applicable warranty period.
- 4.2 You are not entitled to make a claim under this warranty if your unit:
 - a) Does not have its original serial numbers or rating labels.
 - b) Is not installed in Australia.

5. HOW TO MAKE A CLAIM UNDER THIS WARRANTY

- 5.1 If you wish to make a claim under this warranty, you need to:
 - a) Contact Rheem Thermal on (02) 9684 3684 and provide owner's details, address of the unit, a contact number and date of installation of the heater or if that's unavailable, the date of manufacture, model and serial number (from the rating label on the heater)
 - b) Rheem Thermal will arrange for the heater to be tested and assessed on-site.
 - c) If Rheem Thermal determines that you have a valid warranty claim, Rheem Thermal will repair or replace the heater in accordance with this warranty
- 5.2 Any expenses incurred in the making of a claim under this warranty will be borne by you.

6. THE AUSTRALIAN CONSUMER LAW

- 6.1 Our goods come with guarantees that cannot be excluded under the *Australian Consumer Law*. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
- 6.2 **The Rheem Thermal warranty (set out above) is in addition to any rights and remedies that you may have under the *Australian Consumer Law*.**

7. INTERNATIONAL WARRANTY PROVISIONS

- 7.1 Contact Rheem Thermal for international warranty terms and conditions.