



OWNER'S MANUAL

Including Installation Instructions And Warranty Information

TO SUIT HEAT PUMP STORAGE WATER HEATER

MODELS

Compact: **150-08ACW-134**
270-11AC3-134
340-11AC3-134
340-17ACW-134

Titan Split: **340TIH-134**

FOR ADVICE, REPAIRS AND SERVICE

1800 644 705

Document Number: QDC0030PD-11

Date Of Revision: 01 Mar. 2008

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Section 1: APPLIANCE DETAILS

For future convenience, please fill in the following details and retain with your original invoice.

1a: Owner's Details

Surname: Given Name(s):

Address:

Town/Suburb:

State/Territory:..... Postcode:

Date of Purchase:

Purchased From:

Model: Serial Number:

Date of Manufacture:

(Details on Data Plate on water heater)

1b: Installer's Details

Date of Installation: Installer's Name:

Address:.....

Installer's Signature:

1c: Service History

Date of Service: Serviced By:

Work Carried Out:

Signature of Service Agent:

Date of Service: Serviced By:

Work Carried Out:

Signature of Service Agent:

Section 2: INTRODUCTION**Quantum Energy Technologies****2a: One Of The Worlds Most Energy Efficient Methods Of Water Heating Production**

We thank you for your decision to purchase a Quantum Energy Technologies Heat Pump Water Heater, which will reward you with many years of low energy hot water production.

QUANTUM ENERGY TECHNOLOGIES Pty Ltd designs and manufactures energy efficient Heat Pump water heaters. The simple way to explain the advantage of this heater is that it saves energy in any weather, even at night.

The Compact models use 1kW of electrical energy, however, they are able to put up to 3.6kW of heat energy into the water @ 20°C ambient. The system can save up to 75% of conventional hot water energy utilization; greatly assisting in the worldwide greenhouse gas reduction campaign.

As the name indicates, a Heat Pump is a machine that pumps heat from a low temperature source to a high temperature reservoir. It has a cold side to absorb heat at low temperatures and a hot side to deliver heat at high temperatures.

The Quantum compact model has an air conditioning coil as the cold side of the refrigeration circuit. This coil absorbs the heat from air that is forced through it by means of the fan. The Compact design is installed like a conventional electric water heater i.e. the electrical and plumbing is completed in the same manner.

There is also a Split Air Sourced design, which can be used to recover heat from the roof space or a warm area like a kitchen. The remote fan coil (energy collector) operates like a passive solar collector, for instance, absorbing the heat energy from the warm air in the roof space (which has been heated by the sun). Alternatively, the waste heat from the building can be used as the heat source.

QUANTUM water heaters are designed and manufactured in Australia and can save energy in countries all around the world. They are used in all weather conditions for domestic, commercial and industrial applications, and are regarded as one of the most energy efficient water heaters available.

This is your assurance that you have purchased one of the highest quality water heaters on the market, one that will provide continuous hot water for all your needs – safely, economically, and for many years to come.

2b: Time Delay On Start

NOTE: The system has a 10-minute time delay on start or restart. When the power is first connected or after a disconnection then re connection, the time delay on start will commence. The compressor and fan will not operate until the completion of this delay period.

2c: Features Of Your Quantum Water Heater

1. Fully welded steel tank with class X vitreous enamel lining for superior corrosion resistance and longer life.
2. Indirect heat transfer eliminates tank hot spots.
3. One of the most energy efficient Heat Pump systems in the world.
4. Able to save more money, especially in cold weather, than any other solar system on the market.

Warranty Return Card

Enclosed you will find a warranty card – please fill in the details and return immediately. This will ensure prompt service under warranty, if required (see Section 8 for terms of warranty).

Section 3: INSTALLATION DETAILS

3a: General Installation Requirements

This water heater must be installed by a licensed tradesperson, and in accordance with

1. AS 3500.4, National Plumbing And Drainage Code, Part 4: Hot Water Supply Systems.
2. AS 3500.4.2, National Plumbing And Drainage Code, Part 4.2: Hot Water Supply Systems – Acceptable Solutions.
3. Other relevant Australian Standard, Industry or Local Water Supply regulations or codes for mains pressure storage tanks.

Note: This water heater is not suitable for pool heating or building heating.

3a.1: Location

The water heater should be located as close as possible to the most frequently used hot water outlets. Adequate access must be made for service to the evaporator, water temperature thermostat, relief valve and anode. Ensure that the specification label is clearly visible. The front service cover of the heat pump section (on top of tank) must be accessible from the front of the heater; this must **NOT** face the wall. The fan **MUST NOT** be up against a wall (minimum clearance 500mm).

The Compact model has a noise level similar to an air conditioner (52dBA @ 1.5 metre); therefore locating the unit away from bedrooms or living areas is recommended (both the owners & any neighbours). Obviously installing near a bedroom window may be annoying to the occupants.

Note: All models are equipped with a sacrificial anode, accessible through the top cover. We recommend allowing 400mm above the top of the water heater (if possible) for clearance to replace the anode.

The water heater should be placed on a 650mm x 650mm plinth if installed on a floor subject to wet conditions or outdoors. A properly drained overflow tray should be used where property damage could occur from water spillage. (See AS3500.4 for further details.)

Note: The warranty does not cover damage due to leakage of the water heater

3a.2: Corrosion Protection

Fittings and the Shell Surface in contact with the water are to be galvanically compatible. Sealants and / or Teflon plumbing tape should be used on potentially galvanically incompatible fittings. This is to protect against possible electrolytic corrosion between the metals (where moisture penetration could occur due to incorrectly or poorly sealed fittings).

3b: Air Flow

The Compact and Split Air models extract the required heat from air being drawn through their Fin Coil Evaporator. This produces cold exhaust air as a by-product. In order for the heaters to operate efficiently, good ventilation of the proposed location for the Compact model or the Titan models separate evaporator is required. This is to provide warm air as a heat source and to remove the cold air being produced. The Compact therefore is best located externally, however a large double garage (minimum of 120 cubic meters) may also be suitable. The Titans separate evaporator could be located externally or in a large well-ventilated ceiling space or garage, however being a more powerful system, more ventilation is required.

3c: Evaporator Drain

During operation considerable amounts of condensate water will flow from the evaporator drain. If allowed to simply flow out of the outlet, this water may pool below the unit and can cause problems to both the water heater and area around it. The evaporator drain on both the Compact and Split Air units should be drained to a suitable location. This can be accomplished with a length of hose or pipe but must not be connected directly to the PTR valve or expansion valve drain.

3d: Pressure & Temperature Relief Valve (PTR)

The Pressure and Temperature relief valve (see tank data plate for rating), which is supplied with the unit, must be fitted and made accessible so that the release mechanism can be operated and, if required, the valve replaced. The outlet of the PTR valve must be suitably drained to remove the water discharged during the normal heating cycle. The valve thread is RP ½" / 15mm and must be installed into the top front socket.

Warning: A separate drain line must be run for this relief valve. It is not permitted to couple the drain lines from the relief valve and evaporator into a single common line. The use of a tundish under the evaporator drain with this then connected to the drain of the PTR valve is acceptable.

3e: Expansion Control Valve (ECV)

Where an Expansion Control Valve is fitted to the cold water supply, the ECV should be rated at 150kPa lower than the Pressure & Temperature Relief valve (PTR). It is a State requirement for SA & QLD that an ECV be fitted on the cold water supply line between the non-return valve and the water heater.

3f: Cold Water Connection

An approved isolating valve, approved non-return valve, line strainer (optional but recommended), and union must be fitted between the supply main and the RP $\frac{3}{4}$ / 20mm socket in the water heater. All fittings must be approved by the relevant Authority (refer to Figures 1 & 2).

3g: Pressure Reducing Valve

This water heater is designed for direct connection to a maximum water supply pressure of 500 kPa. Where the mains pressure can exceed or fluctuate beyond this pressure, a pressure-limiting device (complying with AS1357) must be fitted in the cold-water supply line. This device must be installed after the isolating valve and set at or below 500 kPa (350 kPa if ECV fitted). With a water supply pressure of 700 kPa, as the tank temperature reaches 55°C, the internal pressure climbs to 1100 kPa (well above the PTR valve rating). Given this 400 kPa rise, even with a 500 kPa supply, the internal pressure could still reach 900 kPa.

3h: Caution Regarding Glass Lining Of Tank

When making the hot and cold water connections to the tank care should be taken not to apply excessive strain as damage to the tank spigots or glass lining may occur.

3i: Suitability For Installation In Frost Areas

The R134a refrigerant used has a boiling point of -26°C so there is no risk of damage to the heat pump from frost. Performance may be reduced in very low temperatures but the system will not be damaged by such climatic conditions.

3j: Draining Of Tank

Consideration should be given to the possible necessity of draining the tank at some point. Draining of the tank can be accomplished by the connection of a hose to the cold water inlet and running to a suitable drain. It will be necessary to disconnect the hot water outlet or PTR valve to relieve any partial vacuum created as the water flows out.

3k: Hot Water Connection

The hot water pipe should be connected to the RP $\frac{3}{4}$ / 20mm socket as shown in the Installation Diagram (Figures 1 & 2). If desired a thermo siphon trap can be installed at the hot water outlet to further reduce heat loss (a "U" shaped loop will form such a trap– see Figures 1 & 2). For the most economical operation of the water heater, it is recommended that all hot water lines be insulated. NOTE: Plugs are supplied with the water heater to plug off the inlet / outlet entries that are not required. Ensure that adequate sealing tape is applied to the plugs for a tight, leak proof seal.

3l: Tempering Valves

Where a tempering valve is fitted on the hot water outlet of a Quantum (to reduce water temperature to 50°C as per the plumbing code) **ONLY** high performance valves suitable for "Solar" type water heaters are recommended to be used. Standard tempering valves may not function correctly.

3m: Electrical Connection

Quantum water heaters are designed for single-phase 220/240V A.C supply only. A certified electrician must carry out all electrical work according to the local supply authority regulations and AS3000. A 15-amp circuit breaker must be installed at the power supply for the hot water unit.

A separate circuit breaker is recommended for each unit in the case of multiple installations. The power connection rating for all Quantum water heaters up to 1.7kW is 220-240VAC 50Hz 15A.

It is not recommended to wire the system to an earth leakage circuit breaker. There is lot of moisture present while in operation and this can lead to nuisance tripping.

The connection will require an approved, standard 240V 15A On / Off switch or Junction Box in close proximity to the heater. The unit should be connected to Standard Domestic tariff. Off Peak connection is **NOT** recommended for Quantum heat pump units. If the unit is connected to an "Off Peak" connection, the minimum power availability must be at least 18 hours per day.

The fitted power cord is not to be removed; this cord should be connected with the building wiring in an On / Off switch enclosure or Junction Box. Faulty wiring may void the warranty if damage has been sustained to the compressor or heat pump from such faulty or sub-standard wiring.

3m.1: Safety Notes

Note.1: This water heater is fitted with a thermostat and over-temperature energy cut-out (both incorporated into the digital controller). Under no circumstances should the water heater be operated without both of these devices being in the circuit. Only a qualified electrician or the manufacturer should carry out replacement.

Note.2: If the supply cord is damaged, the manufacturer or its service agent or other similarly qualified person must replace it in order to avoid hazard.

Caution: The water heater must be filled with water before turning on the electricity

3n: Refrigeration Connections (Split Models Only)

Refrigeration pipe work is very specialized and should only be completed by a licensed tradesperson.

Maximum refrigeration pipe length from the tank connections to the evaporator is 10m.

If the evaporator is mounted below the tank connection point, then a suitable oil trap needs to be installed on the suction line between the evaporator and the heat pump.

3n.1: Refrigeration Tube Sizes

Quantum Model	Copper Tube Size - Inlet	Copper Tube Size - Outlet
340 TIH-134	$\frac{3}{8}$ Inch (9.5mm)	$\frac{5}{8}$ Inch (15.9mm)

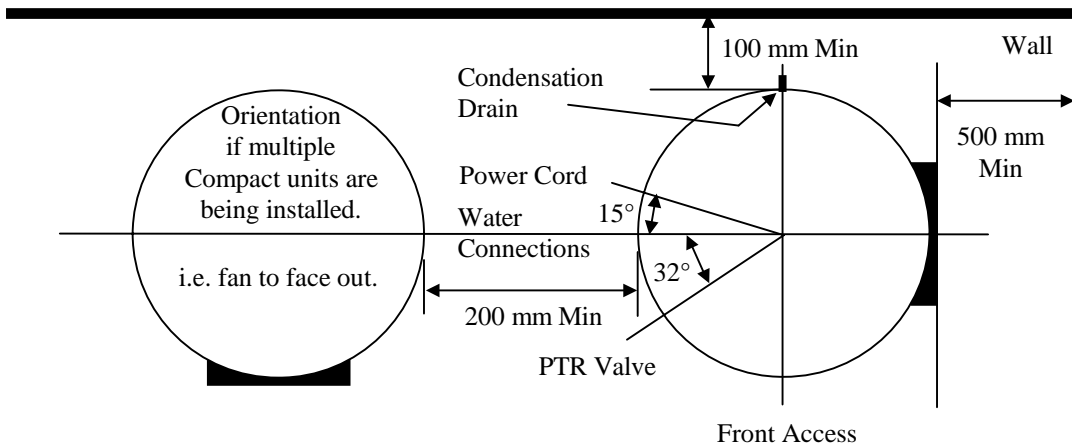
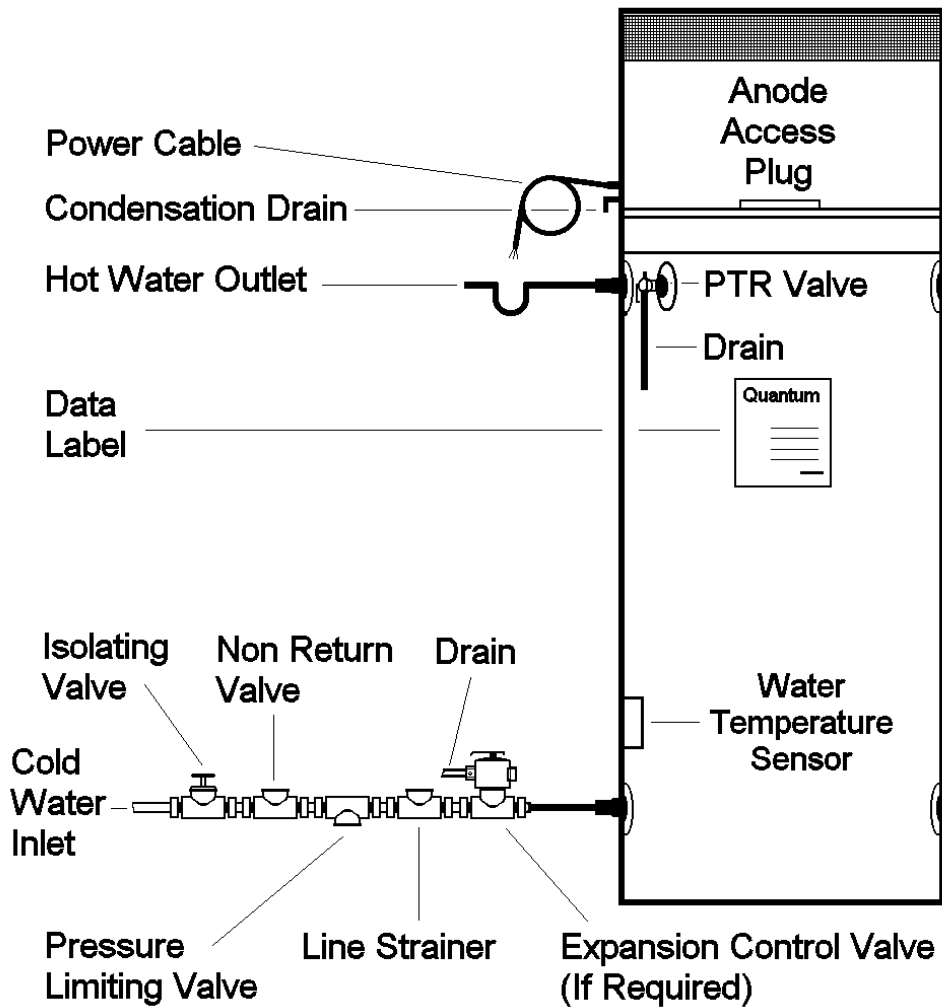
* When the evaporator is below the tank level on the Titan model use 12.7mm(1/2") outlet tube.

3o: Caution Regarding Drilling Metal Jacket

This is extremely important and *MUST* be adhered to without exception!

**DO NOT DRILL ANY HOLES IN OUTER METAL JACKET
DAMAGE TO REFRIGERATION LINES MAY RESULT**

Figure 1: Installation Diagram (Compact Systems)

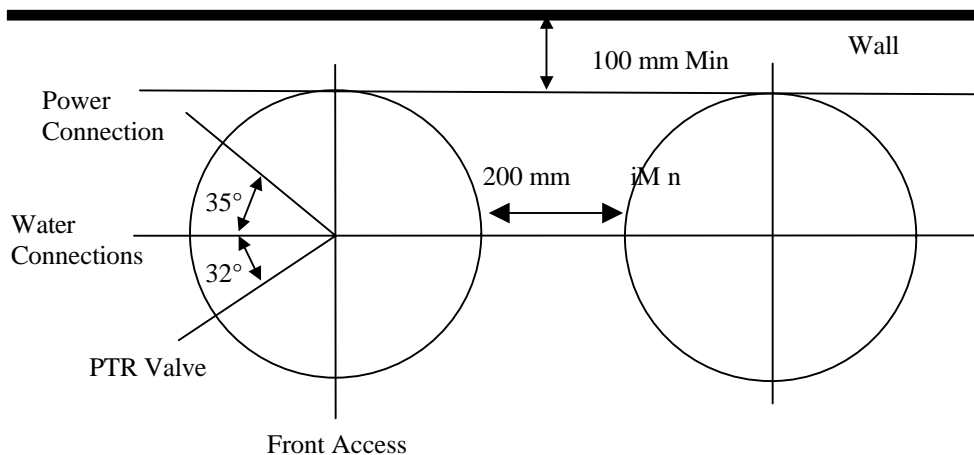
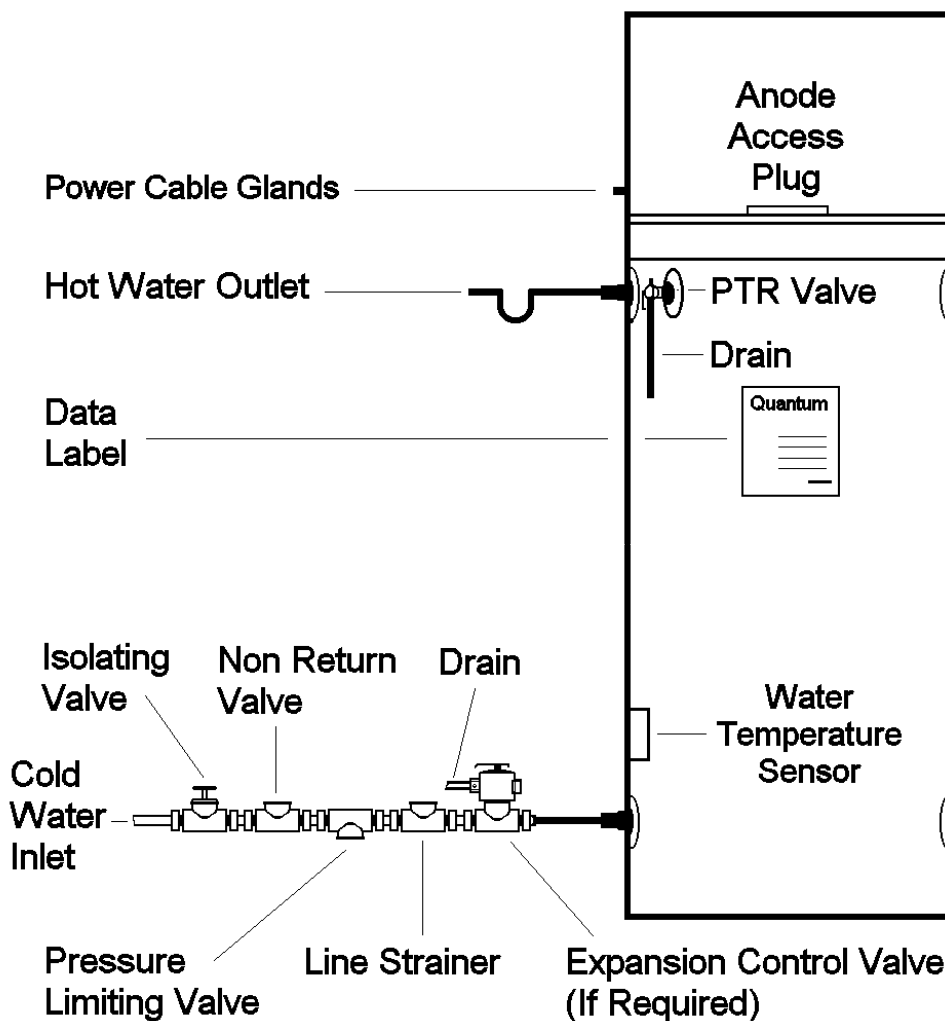


NOTE

If installing multiple Compact units, the orientation of the tank will need to be at 90° to the normal arrangement so that the fan points out from the wall rather than along it. This is so that cold air being discharged from one unit is not drawn in by the one next to it. The space between multiple units should be a minimum of 200mm.

Tank Orientation Diagram for Compact Units

Figure 2: Installation Diagram (Split Systems)



Tank Orientation Diagram For Split Units

Section 4: OPERATING INSTRUCTIONS

4a: Filling The Water Heater

Open all hot water taps. Open isolating valve at the cold-water inlet and allow the water heater to fill until water flows through the system. Close each hot water tap after the air is expelled from its line.

4b: Water Quality

Your Quantum water heater has been manufactured to suit the water conditions of most Australian metropolitan supplies. Please note that harsh water supplies can have a detrimental effect on the water heater and its life expectancy. If you are unsure about your water quality you can obtain information from your local water supply authority.

By using the correct anode this water heater can be used in areas where the Total Dissolved Solids (TDS) content of the water supply is up to 2500 mg/L. In areas where the TDS exceeds 750mg/L it is possible that the magnesium alloy anode (supplied in the heater) may become over reactive. To alleviate this, the magnesium alloy anode should be replaced with an aluminum alloy anode (Note: Quantum does not supply this).

4c: Caution When Left Operating But Unused

If the water heater is left in an operating condition but unused for two weeks or more, a quantity of hydrogen gas (which is highly flammable) may accumulate in the top of the water cylinder. To dissipate this gas safely it is recommended that a hot tap be turned on for several minutes at a sink, basin or bath, but not a dishwasher, clothes washer or other appliance. During this procedure there must be no smoking, open flame or any other electrical appliance operating nearby. If hydrogen gas is discharged through the tap it will probably make an unusual sound similar to air escaping.

Section 5: SAFETY INFORMATION

DO NOT TURN ON POWER UNLESS THE TANK IS FULL OF WATER

5a: Safety Devices

WARNING: For safe performance this water heater is fitted with:

1. Digital Controller.
2. A thermostat (connected to the digital controller) to manage water temperature.
3. A thermostat (connected to the digital controller) to manage compressor temperature.
4. A non self-setting thermal cut out (incorporated into the digital controller).
5. Combination Pressure & Temperature relief valve.

These devices **must not** be tampered with or removed.

The water heater **must not** be operated unless each of these devices is fitted and in working order.

This appliance is not intended for use by young children or the infirm without supervision – young children should be supervised to ensure that they do not play with the appliance.

5b: Important Note Regarding PTR Valve

The Pressure & Temperature relief valve should be checked for adequate performance or replaced at intervals not exceeding 5 years, or less in areas where there is a high incidence of water deposits. Providing there is some discharge from the relief valve during each heating cycle there is no requirement to manually activate the release mechanism on the relief valve. There is a possibility that manually opening the relief valve may allow contamination / grit etc to settle in the valve seat causing continuous leakage. If the relief valve is operated manually it should be done with care.

The Pressure & Temperature relief valve and the drain outlet pipe must not be sealed or blocked. It is normal for small amounts of water to leak from the valve during each heating cycle.

Section 6: MAINTAINANCE & SERVICE INFORMATION

Your Quantum water heater is a completely sealed refrigeration system, similar to a household refrigerator. The maintenance program to be employed on your Quantum is not much different to that required for the maintenance of a standard electric water heater. However, **Quantum warranty may be void if any of the following conditions are not met** or if the refrigeration lines or components are damaged or altered in any unauthorized way.

6a: The Water Tank

The water tank must not be drilled or punctured. Drilled holes or punctures may damage the refrigeration pipes located on the skin of the water tank. The Quantum tank is a patented design and in fact forms the condenser of the unit; i.e. it is the hot side of the refrigeration circuit. The coils wound around the outside wall of the tank heat the tank more efficiently than any other water heater design. The coils are not in contact with the water so they never corrode or suffer from scaling, meaning the efficiency of the tank will not diminish.

6b: Air Evaporator Coils

Quantum water heaters use evaporator coils to extract heat from the air. The coil is extremely efficient in warm humid weather; however, as temperatures drop to ten degrees or less the coil will begin to collect ice. The coil has been designed with "heat injection" to defrost the coil under such conditions. The heat injection cycle is automatic and is managed by the digital controller. **It is important that the air inlet vents are kept clean. Restriction of air-inlet or outlet vents may void warranty if the system has been damaged because of insufficient airflow.**

6c: Sacrificial Anode

A sacrificial anode is fitted inside the vitreous enamel lined cylinder. Its purpose is to help protect the cylinder from the corrosive effects of water. Normally, the sacrificial anode should be inspected every fifth year and replaced if necessary. In areas where "hard water" or poor quality water conditions exist, the sacrificial anode must be inspected every second year. **Replacement anodes must meet Quantum quality specifications and must be appropriate for local water conditions.** The anode socket in the top of the tank is an RP $\frac{3}{4}$ / 20 thread, an 1 $\frac{1}{16}$ " socket wrench is required to unscrew it.

6d: Service Caution – Before Any Work Is Carried Out

Before any electrical components are inspected **the System MUST be turned off** at the power switch / hot water circuit breaker. Do not touch wiring or any electrical components without supervision or training to Australian (or equivalent) standards.

6e: Thermal Overload (Incorporated in Digital Controller)

All models are fitted with a digital controller for heat pump management. One function of the digital controller is to initiate a shut down and lockout if the compressor reaches a temperature of 105°C. The system will not automatically restart from this. To reset the system the “**SET**” button on the digital controller must be pressed (hold for 6 seconds). Turning the power off then back on will also perform a reset.

6f: Routine Service

Serving requirements and timing for Quantum heat pump hot water systems.

MAINTENANCE REQUIRED	YEAR AND MONTH FOR SERVICE																			
	1		2		3		4		5		6		7		8		9		10	
	6	12	6	12	6	12	6	12	6	12	6	12	6	12	6	12	6	12	6	12
Check PTR Valve	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Replace PTR Valve										X										X
Replace Anode										X										X
Flush Water Tank										X										X
Check Of Electrical										X										X
Check Of Refrigeration										X										X
Check Of Thermostats										X										X
Check For Any Corrosion										X										X
Check of Plumbing										X										X

6f.1: Six Month Service (By Owner)

To be carried out every six months. Operate the Pressure & Temperature relief valve for approximately 10 seconds by activating the release mechanism on the valve to ensure water is released to waste through the relief drainpipe.

It is very important that the mechanism is operated gently. Check to ensure the valve closes correctly.

Note: providing some hot water discharge has been observed from the relief valve during normal heating cycles, manually activating the valve is not necessary and could cause contamination / grit to lodge in the relief valve seat causing constant leakage.

An inspection for any obvious signs of corrosion of the outer case or air intake grills should also be conducted.

6f.2: Five Year Service (By Authorized Personnel Only)

The five-year service should be carried out by a licensed tradesperson every five years. It is recommended that your local Quantum distributor carry out this service. The service should include the following: -

1. Replace the Pressure & Temperature Relief valve.
2. Replace the anode.
3. Flush the water heater.
4. Checking of the refrigeration system.
5. Checking of thermostats, digital controller and electrical components.

If in doubt, contact Quantum Energy Technologies for your nearest distributor or service contractor. Our website www.quantumenergy.com.au also provides an up to date list of Quantum distributors.

6f.3: Access & Removal Of Sacrificial Anode

The anode can be accessed via the heat pump section, to remove.

1. Turn off power to the unit.
2. Remove the screws around the top cover of the heat pump & remove the heat pump top cover.
3. For easier access the front inspection panel on the heat pump section should also be removed.
4. Locate and remove the plastic plug through the centre of the heat pump chassis.
5. The anode head is now accessible and can be unscrewed with a suitable 1¹/₁₆" socket wrench.
6. Once unscrewed the anode can be drawn out through the top of the tank / heat pump section.
7. The new anode can then be fitted and the heater reassembled.

6f.4: Flushing Of Water Tank

As with other hot water heater tanks, dissolved solids in the water or scale may accumulate in the bottom of the water tank forming sludge. This is generally less of a problem with Quantum units as no internal elements or burners are used.

If such sludge build-up does occur the following procedure can be followed to clean out the tank.

1. Turn Off power to the unit.
2. Turn Off water supply to the unit.
3. Remove the blanking plug (brass fitting) from the unused inlet (normally on the right hand side for left hand connected tanks) – the inlets are at the bottom of the tank about 70mm up from the base.
4. Remove the blanking plug from the unused hot water outlet (normally on the right hand side for left hand connected tanks) – the outlets are at the top of the tank.
5. Allow the water to drain from tank, while the water is draining a non-metallic rod may be inserted through the open cold-water inlet and used to break up any sludge and assist in its removal.
6. Care should be exercised during this procedure so as not to damage the glass lining of the tank. The use of metal rods should be avoided and plastic or wooden rods used instead.
7. Turning the cold water supply back on while the tank is emptying or after the tank has drained and continuing with the mechanical agitation will further assist with the removal of the sludge.
8. Once tank has been cleaned, as much as possible, the cold water should be turned off again and the blanking plugs refitted. Care should be taken to ensure good a hydraulic seal is maintained – the use of plumbing tape will be required.
9. When unit is fully reassembled the cold water supply and power supply can be turned on and the unit allowed to reheat.

6f.5: Refrigeration & Thermostat Servicing

Qualified refrigeration technicians only should service the heat pump. The information provided in **Appendix A: Trouble Shooting Guide** will provide the necessary information for qualified personnel to service this part of the unit.

Section 7: RECOGNITION OF ABNORMAL OPERATION**7a: Pressure & Temperature Relief Valve Running**

It is not unusual for the Pressure & Temperature Relief valve to allow a small quantity of water to escape during the heating cycle. The amount of discharge will depend on hot water usage. As a guide, if it discharges more than 20 litres of water in 24 hours then there may be a problem.

7a.1: Continuous Trickle

Likely build up of foreign matter. Try gently operating the release mechanism on the Pressure & Temperature Relief valve for a few seconds. This may dislodge any small particles of foreign matter and rectify the fault.

7a.2: Steady Flow

Likely causes are excessive water supply pressure (500kPa Pressure Limiting valve should be fitted), a faulty Pressure & Temperature Relief valve, a faulty or non existent pressure limiting valve or a faulty Thermostat / Digital Controller. Turn off the electricity supply and contact your Quantum distributor or service agent.

7b: No Hot Water

1. Is the Electricity switched on? Check that the isolating switch, to which the Quantum is connected, is on. Check that the switch marked "Water Heater" in the switchboard is on. Are all circuit breakers on? If on Off Peak, is the meter switching on when it should? Note if the system is connected to any form of Off Peak, running out of hot water can be quite common – Off Peak tariffs are not recommended for Quantum water heaters.
2. Check that the thermal overload (on the digital controller) has not been tripped. If so press the "Set" button (hold for 6 seconds) to reset it.
3. Is the Pressure & Temperature Relief valve discharging too much water? See "*Pressure & Temperature Relief Valve Running*".
4. Do you have the correct size water heater for your requirements? Sizing details are available from your Quantum supplier.
5. Is one outlet (such as the shower) using more hot water than you think? Carefully review the family's hot water usage and if necessary check the shower flow rates with a bucket and a watch. If it is not possible to adjust water usage patterns, an inexpensive flow control valve can easily be fitted to the shower outlet.

7c: High Electricity Bills

1. Is the Pressure & Temperature Relief valve discharging too much water? See "*Pressure & Temperature Relief Valve Running*".
2. Is one outlet (such as the shower) using more hot water than you think? See "*No Hot Water*".
3. Is there a leaking hot water pipe or dripping hot water tap? A small leak can waste a large quantity of hot water.

4. Replace faulty tap washers and have your plumber rectify any leaking pipe work.
5. Have any new appliances been installed that might be using the extra power?
6. If there are no water leakages around the building and no excessive usage of hot water, yet electricity bills are higher than normal (without any other appliance being responsible) then it may indicate a problem with the water heater. Contact your nearest Quantum distributor or service agent.

Section 8: WARRANTY CERTIFICATE

**QUANTUM HOT WATER UNIT
MANUFACTURED BY QUANTUM ENERGY TECHNOLOGIES PTY LTD**

Terms Of Warranty

QUANTUM ENERGY TECHNOLOGIES PTY LTD (the Company) WARRANTS "THIS QUANTUM ENERGY SYSTEM" (the unit) against faulty workmanship, materials and defects in manufacturing as here in after provided: -

1. Storage tank integral with condenser coil: - Warranted for a period of five (5) years from the date of installation
2. Refrigeration pipe work, refrigeration valves, compressor, fan coil and motor, electrical components including thermostats, digital controller, solenoids, wiring and controls: - warranted for a period of two (2) years from date of installation. Plumbing valves supplied with the unit are covered by their respective manufacturers warranties.
3. Labour, delivery and / or transportation: - Where the Company considers it necessary to repair or replace any component part covered by the warranty, the consequential labour, delivery and / or transportation services will be provided free of charge to the owner within a fifty-kilometre radius from where the unit was purchased. Customers outside this area will be subject to freight and traveling charges incurred by the service agent carrying out the work. The date and time of the commencement of such warranty work will be at the discretion of the Company. Quantum does not warrant that such repair work will take place within any particular period. A call out fee applies to any warranty calls made outside normal QUANTUM business hours.

The Company's liability under this warranty shall be limited to the free replacement or repair of any defective component parts of the unit and shall not cover any consequential loss or damage arising out of any such defect.

THE WARRANTY SHALL NOT APPLY IN ANY OF THE FOLLOWING EVENTS:

1. The unit is installed by a non registered Plumber with inadequate technical skills or training to perform the task;
2. The installer does not issue a Plumber's Certificate of Compliance in the State of Victoria.
(State Rebate's in Victoria will not be paid unless a Certificate of Compliance number is provided).
3. Where alterations, addition or repairs to the unit are carried out by persons unauthorized by the Company;
4. Accident or in the opinion of the Company, misuse and / or abuse of the unit;
5. Where the anode has not been periodically replaced in accordance with the directions in this Owner's Manual or where in the opinion of the Company, it has been incorrectly replaced;
6. Where the loss or damage is, in the opinion of the Company, due to the failure to install, operate and / or maintain the unit in accordance with any of the directions contained in this Owner's Manual.

THIS WARRANTY DOES NOT COVER LOSS OR DAMAGE TO THE UNIT OCCASIONED BY ANY OF THE FOLLOWING PERILS: -

1. RIOT, CIVIL COMMOTION OR ANY CONSEQUENCE OF WAR OR INVASION;
2. ACTS OF GOD;
3. THEFT OR LARCENY.

IMPORTANT

This warranty is in addition to all other rights and remedies available to the consumer under the Trade Practices Act 1974 as amended and other relevant State and Territory laws and shall not be taken as applying to exclude, restrict or modify such rights or remedies in any manner whatsoever.

Where the unit is of a kind not ordinarily acquired for personal, domestic or household use, then the liability of the Company for breach of any condition or warranty implied by the aforementioned statutes (other than a condition or warranty implied by Section 69 of the Trade Practices Act or any corresponding Section on any other enactment in any State or Territory for the time being enforced) is limited to any one or more of the following as the Company decides: -

1. The replacement of the unit or the supply of an equivalent unit;
2. The repair of the unit;
3. The payment of the cost of replacing the unit or of acquiring an equivalent unit;
4. The payment of the cost of having the unit replaced

8a: Items Not Covered By Warranty

- Service calls due to:
 - Dirty Filters.
 - Blown Fuses
 - Incorrect Operation.
 - Tripped Circuit Breakers.
 - Main Isolator Switched Off.
 - Blocked Drains (Evaporator or PTR Valve).
- Failure to start due to voltage conditions or other damage due to inadequacy or interruption of electrical service.
- Damage caused by accident, misapplication and abuse or tampering.
- Damage caused by use in a corrosive atmosphere (e.g. such as coastal regions).
- Filter cleaning and / or replacement, unless defective.
- Cleaning / maintenance of the water heater unit.
- Calls made to check the operation of a unit, which is found to be working satisfactorily.
- Remounting or relocating equipment due to ground subsidence.
- Modifications to system after installation due to changes in requirements.
- Relocation of equipment due to complaints of noise level or inappropriate location.

No responsibility shall be accepted for damage to the system or property, if it is found that continued use of a faulty system has occurred.

No responsibility shall be accepted for delays due to: -

- Unavailability of parts from suppliers.
- Extreme delays due to unusually high demand for service.

8b: Before Phoning For Service

Please check the following: -

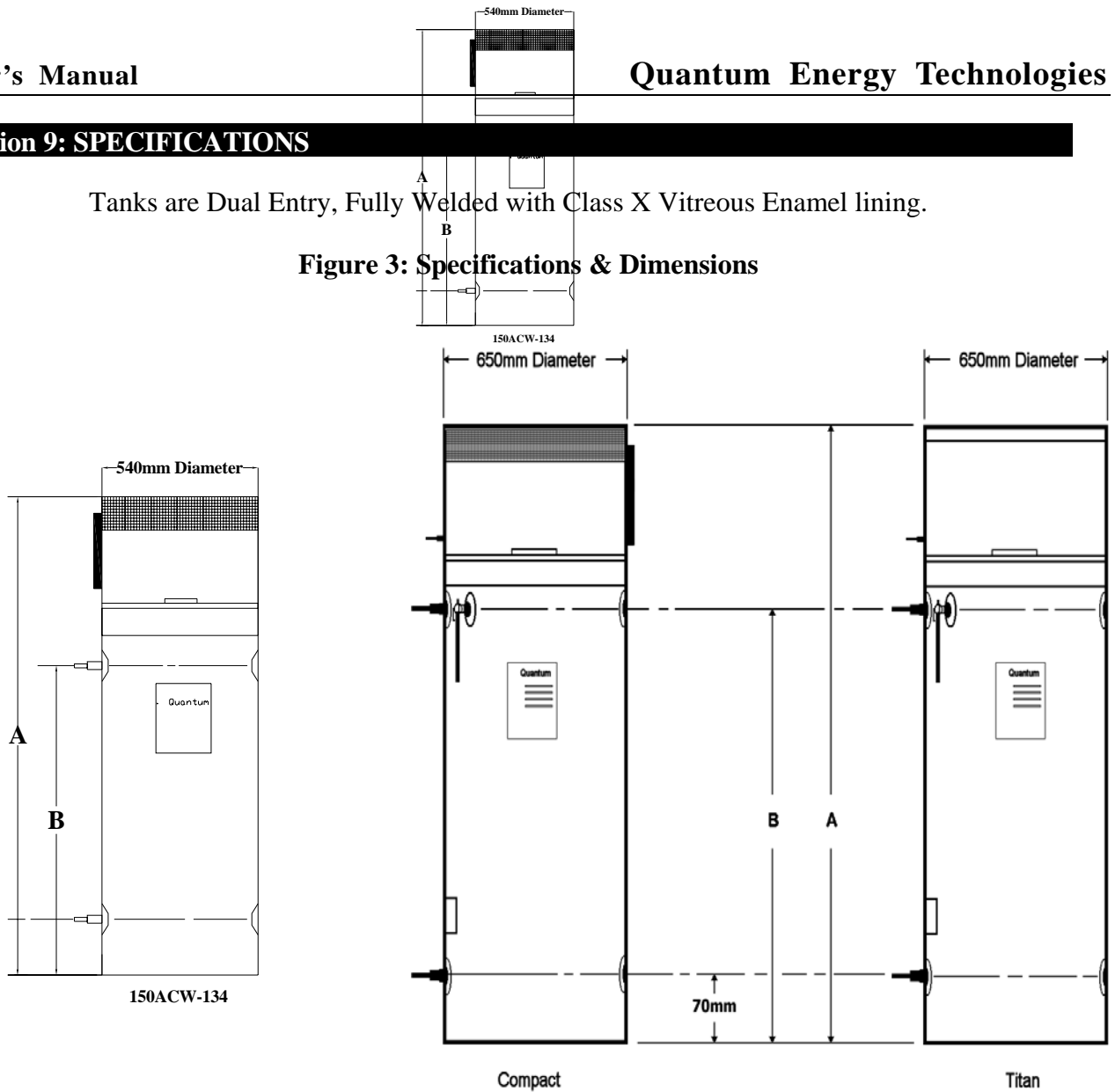
- Have all the above mentioned items been checked and adhered to?
- Have you checked through all items in Sections 6 & 7 of this manual?
- Has the main isolation switch / circuit breaker / hot water switch been turned on?
- Have any fuses in the switchboard blown?
- Is the filter clean?

Warranty shall be carried out during normal business hours 08:00 hours (08:00 AM) to 16:30 hours (04:30 PM) Monday to Friday. Warranty covers travel within a 50-klm distance from the place of purchase, distributor or service agent's premises. Any additional travel costs are at the expense of the customer.

Section 9: SPECIFICATIONS

Tanks are Dual Entry, Fully Welded with Class X Vitreous Enamel lining.

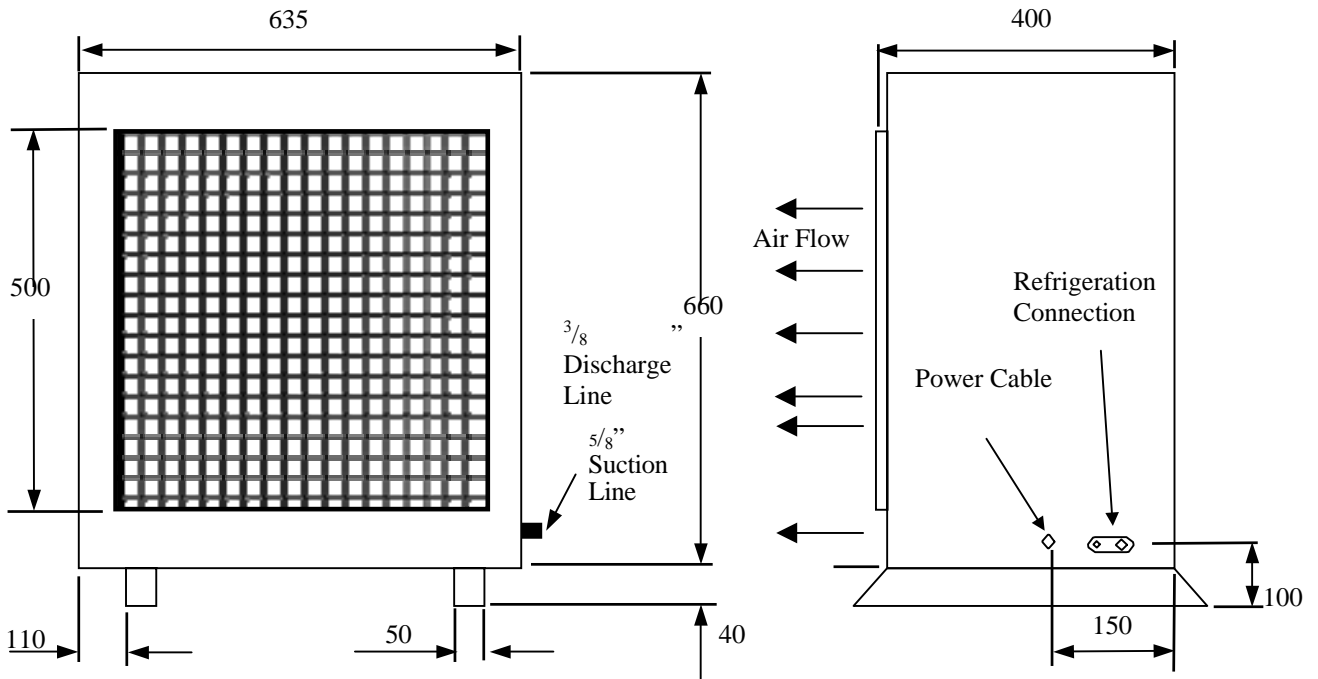
Figure 3: Specifications & Dimensions



Model Number	Mass (Empty) (Kg)	Mass (Full) (Kg)	R134a Charge (gm)	Dimensions(mm)		Number Of Panels	Power Input (Watts)	Nominal Capacity (Lt)
				A	B			
150-08ACW-134	100	250	1650	1620	975	N/A	680	125
270-11AC3-134	135	405	1850	1900	1190	N/A	1006	250
340-11AC3-134	170	510	1850	2200	1490	N/A	1006	315
340TIH-134	165	505	2650	2110	1490	N/A	1730	315
340-17ACW-134	190	535	2650	2240	1490	N/A	1730	315

Model	Evaporator Dimensions (mm)	Evaporator Weight	Evaporator Fan Noise @1.5 mtr	Air Flow Litres/Second
Compact-150	Internal	N/A	50 dBa	415
Compact-270/340	Internal	N/A	52dBa	550
Compact-TITAN	Internal	N/A	58dBa	850
Titan Split	655 × 580 × 380	35kg	61 dBa	880

Figure 4: Split Fin Coil Evaporator – 340 TIH-134



A qualified refrigeration technician must install the Split Air model. While the plumbing and electrical work is the same as the Compact, this unit also requires on site refrigeration work.

Section 10: OPERATION & ADJUSTMENT OF THE DIGITAL CONTROLLER

Caution: Alteration of the Digital Controllers programming & settings without authorisation from Quantum Energy Technologies will void your warranty. This section is provided ONLY for qualified refrigeration technicians to assist in servicing, repairs or trouble shooting.

10a: The Buttons

Use In Conjunction With The Layout Diagram Fig: 5 And Wiring Diagrams Fig: 6&7.

10a.1: SET BUTTON

- a) To enter the settings node, press the **SET** button **3 times**; the display will show H55, this is the water temperature cut out set point. Pressing the **UP** or **DOWN** button will adjust the set point from 10°C to a maximum setting of 62°C (factory setting 55°C).
- b) Press & hold for **6 seconds** to enter the de-icing mode. If display shows "**OFF**" press & hold for another **6 seconds** to exit this mode. (Note this may cause system malfunction so avoid using).
- c) Pressing the **SET** button (hold for 6 seconds) will perform a manual reset of the system if required i.e. after a 105°C Thermal Trip. Turning power off to the system, then back on will also reset it.

10a.2: UP BUTTON

- a) This key becomes operational after entering the settings mode above.
- b) Press **3 times** to display **Axx** (the compressor temperature). Push again to display **bx** (evaporator temperature) or again for **Cxx** (ambient temperature).
- c) During the time delay start period, press & hold for **3 seconds** to force a compressor start. When the compressor is running, press & hold for **3 seconds** to force a compressor shutdown.

10a.3: DOWN BUTTON

- a) This key becomes operational after entering the settings mode above.
- b) Press & hold for **3 seconds** to simultaneously open the de-ice valve and liquid injection valve; the valves will close 10 seconds later.
- c) When compressor is running, press **3 times** to display the Amperage being drawn **Cxx**.

10b: Programming Menu

To restore the digital controllers factory settings, press the **SET** button and hold while turning the power onto the system.

To exit any level press the **SET** button to cycle through all menu items until the controller returns to the water temperature display once again.

10b.1: First Level: Press SET + UP for 6 Seconds

- t10** Compressor start time delay; 1 to 30 min adjustable. Factory setting 10 min.
- p10** Interval for compressor start after stop; 3 to 30 min adjustable. Factory setting 10 min.
- d10** Interval for over heat auto-reset; 3 to 30 min adjustable. Factory setting 10 min.
- E10** The max de-icing time; 5 to 30 min adjustable. Factory setting 10 min.
- F45** The interval for de-icing; 10 to 99 min adjustable. Factory setting 45 min.

10b.2: Second Level: Press SET+DOWN for 6 Seconds

- A65** Highest water temperature setting; 30 to 65°C adjustable. Factory setting 65°C.
- d05** Temperature difference for heat pump reactivation (H55 - d05=50°C) 5 to 30°C adjustable. Factory setting 5°C.
- H95** Overheat trip-out temperature; 60 to 98°C adjustable. Factory setting 95°C.
- L70** Overheat reset temperature; 60 to 98 adjustable. Factory setting 70°C.
- P85** Liquid Injection activation temperature; 55 to 98°C adjustable. Factory setting 85°C.
- b75** Liquid Injection de activation temperature; 55 to 98°C adjustable. Factory setting 75°C.
- F08** De-ice de activation temperature; 1 to 15°C adjustable. Factory setting 8°C.
- C-5** De-icing temperature setting; -9°C to -1°C; Factory setting -5°C.

10b.3: Third Level: Press UP+DOWN for 6 Seconds

- FXX** Start Up model; F00 to F03 adjustable. Factory setting F02.
- F00** Following compressor start the Liquid Injection & De Icing valves remain closed.
- F01** Following compressor start the Liquid Injection valve opens, 3 seconds later it closes.
- F02** Following compressor start the De-Icing valve opens, 3 seconds later it closes.
- F03** Following compressor start the Liquid Injection & De Icing valves open, 3 seconds later they close.
- A25** Compressor amperage overload adjustment; 0 to 30 Amps adjustable. Factory setting 25A.

10c: Error Codes

- E01** Water temperature sensor open or short circuit. Auto reset.
- E02** Compressor temperature sensor open or short circuit. Auto reset.
- E03** Evaporator temperature sensor open or short circuit. Auto reset.
- E04** Compressor overload protection. Auto reset the first time, manual reset the second time.
- E05** Compressor overheat protection (exceeding H95 setting). Auto reset.
- E06** Compressor overheat protection (exceeding 105°C). Manual reset.
- E08** Ambient temperature sensor open or short circuit (Optional). Auto reset.

10d: De-Icing

Only if the temperature, measured by the evaporator sensor, is below 0°C will the de-icing function operate.

When the compressor has been operating for 45 min (1st Level F45) and the evaporator temperature is below -5°C (2nd Level C-5), de-icing is activated and the indicator will be on. When the evaporator temperature rises to 8°C (2nd Level F08) or the de-icing time has been more than 10 min (1st Level E10), de-icing is de activated.

10e: Operating Principle

At power on the compressor will start after the 10 min time delay (1st Level t10). When the water temperature reaches 55°C the compressor will be de activated. As the water temperature drops below 50°C (H55-d05) and the compressor has not been in operation for at least 10 min (1st Level P10), the compressor will be activated.

During compressor operation, when the compressor temperature goes above 85°C (2nd Level P85), the liquid injection will be activated. When the compressor temperature (Axx) drops below 75°C (2nd Level b75), the liquid injection will be activated.

If the compressor temperature (Axx) goes above 95°C (2nd Level H95), the compressor will be de activated and the error code E05 will be displayed. When the compressor temperature drops below 70°C (2nd Level L70), and the compressor has not been in operation for at least 10 min (1st Level d10), the compressor will be reactivated.

As the compressor temperature goes above 105°C, the compressor will be de activate and the error code E06 will be displayed. A manual reset is required.

When the current draw is greater than the present value and lasts for 6 seconds, the compressor is de activated and the error code E04 will be displayed, 10 minutes later the compressor will be re activated. If the overload occurs again the system is de activated and the error cod E06 will be displayed. A manual reset will be required or the power to the unit can be switched off and then on again to reset the system.

10f: Adjusting

To enter any menu, press the **SET** button to select the item to be adjusted. Press Up and Down to do the adjustment. After finishing the adjustment, press the **SET** button again to confirm. The screen flashes once to indicate the adjustment has been updated successfully. Press the **SET** button again to enter the next menu or return.

Figure 5: Layout Of Digital Controller Programming Buttons

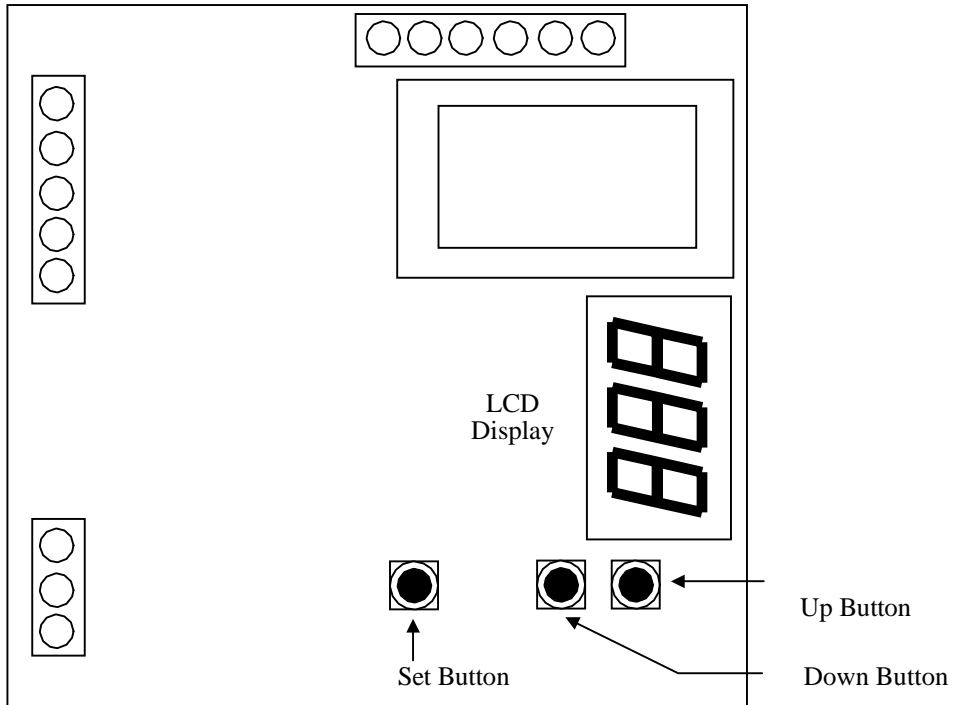


Fig 6: Wiring Diagram-150-08ACW-134&270/340-11AC3-134&340-17ACW-134

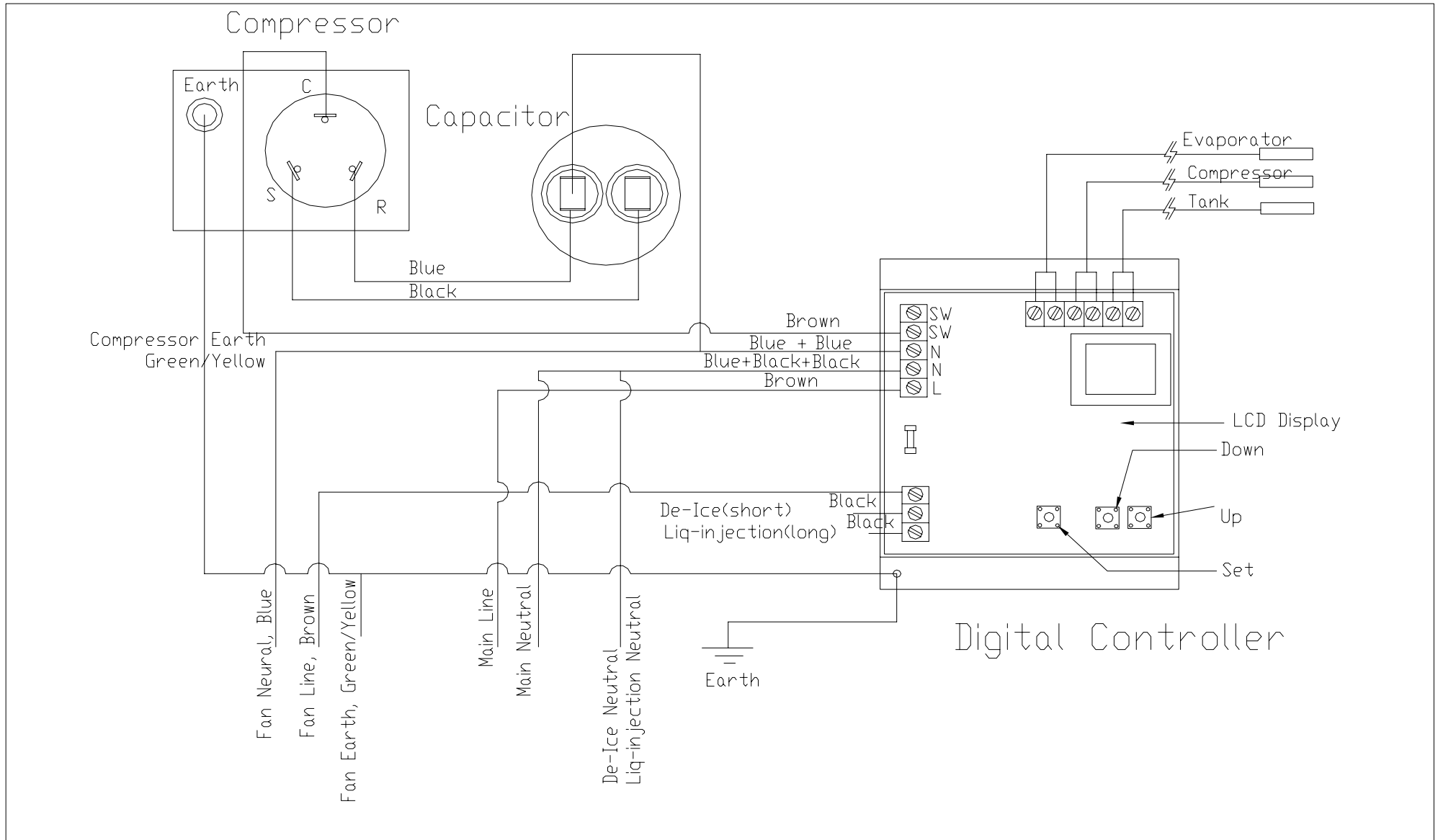
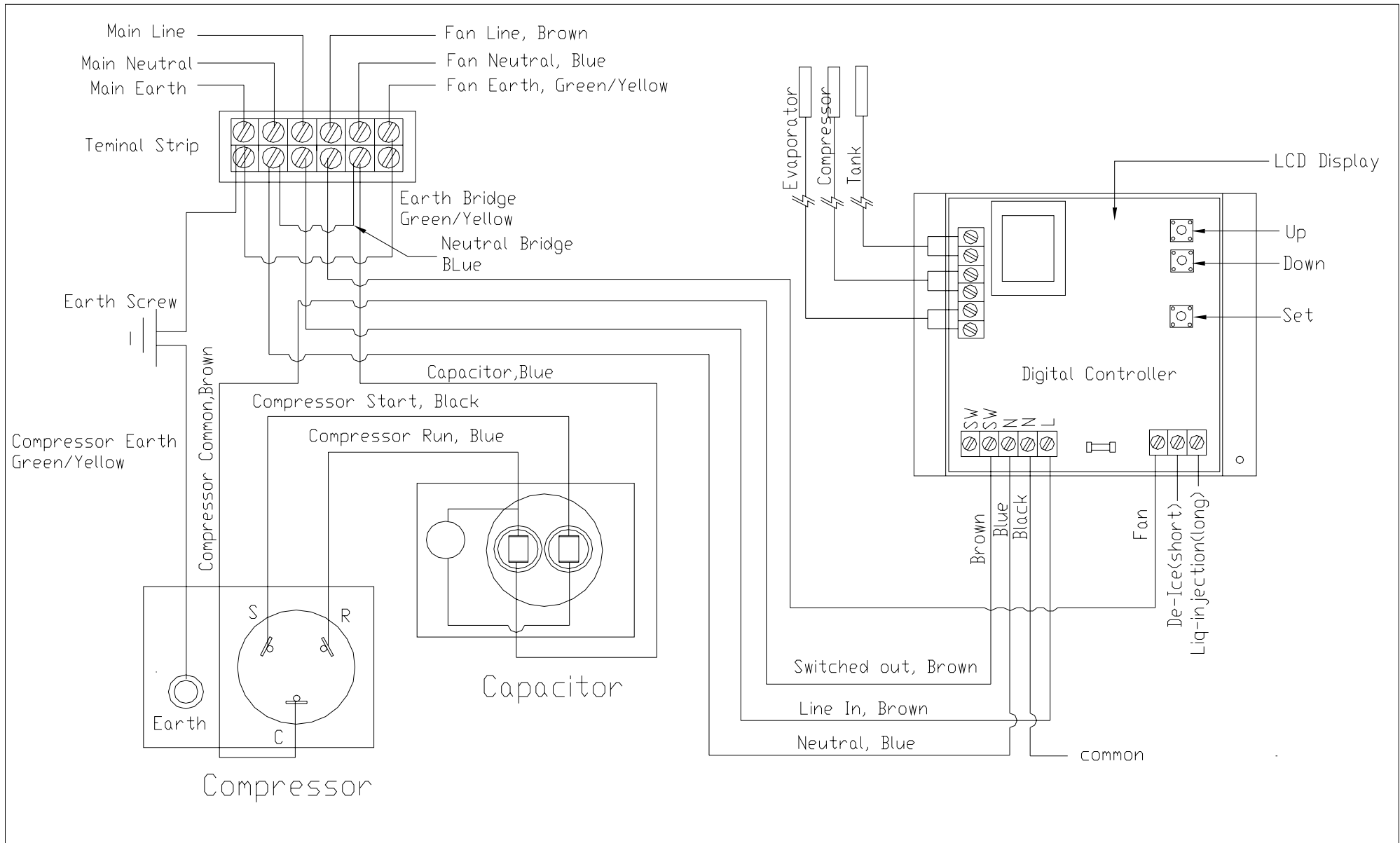


Fig 7: Wiring Diagram-340TIH-134



Appendix A: TROUBLE SHOOTING GUIDE ON QUANTUM WATER HEATERS

Models covered in this guide:

800 Watt.	Compact Air Sourced Domestic Hot Water Heater (0.8kW compressor models)
1100 Watt.	Compact Air Sourced Domestic Hot Water Heater (1.1kW compressor models)
1700 Watt.	Titan Split Air Sourced Domestic Hot Water Heater (1.7kW compressor model)

A.1: No Hot Water; Compressor Not Running

Probable Cause	Test / Observation	Action
1. Power Failure	Check power supply, cable & connections.	If CB off refer to 2.
2. Circuit breaker (CB) tripped off.	Check for short circuit (SC) in line or wiring. If circuit breaker trips off when compressor re-starts, check compressor grounding and winding resistance.	Remove line or wiring SC. Replace compressor if found SC.
3. Faulty / incorrect capacitor.	Check capacitor operation if compressor will not start.	Replace faulty or wrong capacitor.
4. Compressor Seized.	Compressor will not start, draws high current, or mechanically noisy when trying to start.	Replace compressor.
5. Thermal cut-out (TCO) on digital controller tripped off.	No power to compressor after thermal cut out (TCO). If TCO trips off repeatedly, see table "A2".	Reset the TCO by pressing the "SET" button on the digital controller.
6. Faulty water thermostat.	Thermostat did not cut in even though water temperature is below the restart point. Electrical disconnection at the thermostat.	Check / replace water thermostat or digital controller. Reconnect or replace if faulty.
7. Compressor cuts out on current overload protector.	Test for faulty capacitor. Test for compressor short circuit / compressor seized.	Replace faulty capacitor. Replace compressor if faulty.

A.2: Thermal Cut Out Trips Off Repeatedly

Probable Cause	Test / Observation	Action
1. Low refrigerant charge.	Check refrigerant charge. Test for possible leak in the refrigeration circuit.	Top up refrigerant or re-charge. Repair leak, or if not repairable, contact QUANTUM service.
2. High refrigerant charge.	Check refrigerant charge. Over charge causes high current draw and excessive head pressure resulting in a hot compressor.	Correct the refrigerant charge.
3. Incorrect voltage and frequency.	Check power supply quality while unit is running.	Rectify improper power supply or shut off system and report to the client.
4. Compressor runs hot: Internal leakage. High suction superheat. High current draw. High head pressure. Thermal Cut Out faulty. De-ice solenoid remains open.	Observe compressor operation: pressure delivery, noise. Check liquid cooling system for faulty parts or blocked capillary etc. Check super heat setting on TX valve and TX valve operation. Check for refrigerant over charge, compressor winding resistance or mechanical fault in the compressor rotors or valves. Check for high condensing temperature due to: I) faulty water thermostat / digital controller, which does not cut off or II) restriction, blockage in condenser or III) poor heat transfer to tank - possibly bonding of condenser coil to tank has failed. Check for correct operation of Digital Controller. Check for faulty de-ice solenoid parts or thermostat. Check for incorrect wiring.	If faulty, replace compressor and filter. Replace liquid injection parts if faulty. Adjust superheat or if TX valve faulty replace TX valve. Adjust gas charge if needed or replace compressor if it is faulty. I) Replace faulty water thermostat / digital controller. II) If restriction is not removable replace blocked part. III) Replace tank. Replace Digital Controller if faulty. Replace faulty de-ice parts. Correct wiring.
5. Poor oil return to compressor.	Check for oil traps in the tubes between evaporator and tank.	Rectify installation defects

A. 3: No Hot Water; Compressor Running

Probable Cause	Test / Observation	Action
1. Tank water drawn off - unit only recently started.	Wait until water is heated.	If water is not heated in the expected time, check for other reasons.
2. Low or no refrigerant.	Check for shortage of refrigerant or leakage in the system.	Refer to Table A.2: Item 1
3. Compressor is not pumping.	<ul style="list-style-type: none"> a. Check for internal valve leak. When shut off, gas will go back through the compressor making noise and vibration. b. Minimum pressure difference across compressor due to TX valve malfunction. Test TX valve. 	<ul style="list-style-type: none"> a. Replace compressor if faulty. b. Adjust or Replace TX valve.
4. Frozen evaporator.	<ul style="list-style-type: none"> a. Malfunction of de-ice system or persistent cold weather resulting in poor performance of the fin coil evaporator. b. Blocked evaporator. c. Restricted airflow. 	<ul style="list-style-type: none"> a. Repair or replace de-ice system or avoid running in constant cold weather. b. Repair blockage or replace parts. c. Clean or replace air filter (if fitted), or provide ventilation.

A. 4: Shortage Of Hot Water

Probable Cause	Test / Observation	Action
1. System under sized.	Check actual load with design load.	Re-size.
2. Unexpected load or weather condition.	<ul style="list-style-type: none"> a. Check for excessive hot water draw. b. Check for hot water leakage. c. Check heat loss if the heater is on reticulation circuit. 	<ul style="list-style-type: none"> a. Re-size if extra hot water draw is to be included in the design. b. Repair leakage if found. c. Re-size with heat loss included in the design or install booster.
3. System not producing enough heat.	Check according to Table A.3: item 2, 3 & 4.	See Table A.3: items 2, 3 & 4.

A.5: Testing Undercharge Or Overcharge Of Refrigerant

Unlike normal refrigerating or air conditioning systems, the QUANTUM heat pump operates under a very wide range of evaporating and condensing temperatures. To identify undercharge or overcharge of refrigerant gas in the system, three parameters need to be checked.

1. Current Draw
2. System Pressures
3. Bubbles through sight glass on the receiver / filter-dryer

A.6: Water Temperature, Condensing Pressure & Amperage – R134a Units

Water Temperature In Tank °C	Approx. Discharge Gauge Pressure		Nominal Current Draw (varies with evaporating temperature)		
	kPa	PSI	800 Watt Compressor Code RE165VHAMC	1100 Watt Compressor Code RE231VHAMC	1700 Watt Compressor Code PE39VPEMT
30	900-1050	130-150	2.3-2.6A	3.2-3.5A	6.0-6.3A
40	1200-1380	175-200	2.8-3.0A	3.8-4.1A	6.7-7.0A
50	1580-1800	230-260	3.4-3.7A	4.7-5.0A	8.0-8.2A
55	1850-2000	270-290	3.8-4.0A	5.2-5.5A	8.6-9.0A
60	2100-2300	305-335	4.1-4.4 A	5.6-6.0A	9.2-9.5A

A.7: Suction Pressure – R134a Units

Typical Suction Pressure (Back Pressure – Low Side)			
Ambient Temperature °C	Evaporator Temperature °C	kPa	PSI
15	5	210	30
20	10	300	45
25	15	390	60
30	20	470	70

A.8: Signs Of Correct Charge

During normal operation with the correct amount of refrigerant gas, the sight glass should show clear liquid. A very few small bubbles may be present when the system is started or when the TX valve opens quickly. But it should return to clear liquid shortly after. Current draw and delivery pressure will be within the nominal range and temperatures should be consistent with gas properties. Correct amount of charge is listed in the Table A10.

A.9: Signs Of Undercharge

When bubbles through the sight glass persist for a significant time or repeat frequently then it is a sign of refrigerant undercharge. This can be confirmed by a low current draw together with low pressures. Note that unusual current draw could also be a sign of other defects in the system. If the sight glass shows clear gas (not liquid), current draw is too low and discharge gas is not hot or suction pressure too low then the system is nearly or totally empty.

Note that low suction pressure could also indicate a blockage in low-pressure side or a closed TX valve.

A.10: Signs Of Overcharge

Continuous liquid through sight glass: Assuming TX valve is functioning normally, evaporator tends to flood, head pressure tends to be high, current draw is high and compressor is noisy.

A.11: Technical Data For Service Personnel – SIAM Compressors – R134a

Parameters	150-08ACW-134	270 & 340-11AC3-134	340TIH-134 340-17ACW-134
Superheat setting	1.5Turn(F.Close)	3.5 Turns(7 Turns) F..Open	3.5Turns(7Turns) F.Open
TX valve + orifice size	TI-E 2#	TEN2 # 3(AAE 2MC)	TEN2 # 4
Winding Resistance @20°C		C-R: 2.13Ω, C-S: 3.91Ω	C-R: 0.96Ω, C-S: 1.77Ω
Run Capacitor	30μF (+10, -5%) 370 VAC	30μF (+10, -5%) 370 VAC	60μF (+0, -15%) 400 VAC
Rated power supply	220-240VAC, 50Hz	220-240VAC, 50Hz	220-240VAC, 50Hz
Rated circuit breaker	1Φ, 15A	1Φ, 15A	1Φ, 15A
De-ice control setting	On-5°C, Off + 8°C (Timed De Icing)	On - 5°C, Off + 8°C (Timed De Icing)	On-5°C, Off + 8°C (Timed De Icing)
Liquid injection capillary	Eyre: ID 1.1mm x 1.5m	Eyre: ID 1.1mm x 2.9m	ID 1.1mm x 2m
Liquid injection thermostat	On at 85°C, Off at 75°C	On at 85°C, Off at 75°C	On at 85°C, Off at 75°C
Water temperature setting	55°C/5°C (Del. ≥60°C)	55°C/5°C (Del. ≥60°C)	55°C/5°C (Del. ≥60°C)
Refrigerant charge	1650g	1850g	2650g
Thermal cut-out setting	105°C, manual reset	105°C, manual reset	105°C, manual reset

WARRANTY CARD

Warranty Registered (Office Use Only)

Product Model: Serial Number:

Date Manufactured:

End User Details			
First Name	<input type="text"/>		Last Name <input type="text"/>
Installed Address	<input type="text"/>		
City	<input type="text"/>		
State	<input type="text"/>	P. C.	<input type="text"/>
Country	<input type="text"/>		Phone <input type="text"/>
			Work Phone <input type="text"/>
			Mobile <input type="text"/>

Installation Details	
Install Type	<input type="checkbox"/> New <input type="checkbox"/> Replace
Date Installed	<input type="text"/>
Old System (Type)	<input type="text"/>
Tank Position	<input type="checkbox"/> External <input type="checkbox"/> Internal
Access To Tank	<input type="checkbox"/> Good <input type="checkbox"/> Poor
Customer Address (if different to site address)	<input type="text"/>

Panel Mounting	
Location (i.e. Roof / Wall)	<input type="text"/>
Orientation (i.e. Nth / Sth)	<input type="text"/>
Incline To Horizontal	<input type="text"/> °
Shading On Panels (%)	<input type="text"/> %
Oil Trap Created	<input type="checkbox"/> Yes <input type="checkbox"/> No

Plumbing	
Mains Water Pressure	<input type="text"/> kPa
Pressure Limit Valve	<input type="checkbox"/> Yes <input type="checkbox"/> No
If Yes kPa Rating	<input type="text"/> kPa
Drip Tray Installed	<input type="checkbox"/> Yes <input type="checkbox"/> No

Electrical	
Power Supply Rating	<input type="text"/> A
C.B. Rating	<input type="text"/> A
Connection Tariff	<input type="checkbox"/> Std <input type="checkbox"/> OP1 <input type="checkbox"/> OP2

Fan Coil Evaporator	
Location (i.e. Roof / Wall)	<input type="text"/>
Evaporator Ventilation	<input type="checkbox"/> Good <input type="checkbox"/> Poor
Total Duct Length	<input type="text"/> m
Source Of Heat	<input type="text"/>
Access For Service	<input type="checkbox"/> Good <input type="checkbox"/> Poor
Oil Trap Created	<input type="checkbox"/> Yes <input type="checkbox"/> No
Condensation Drain	<input type="checkbox"/> Yes <input type="checkbox"/> No

Refrigeration	
Refrig. Tube Length	<input type="text"/> m
Delivery Tube Size	<input type="text"/>
Return Tube Size	<input type="text"/>
Insulation Type	<input type="text"/>
Insulation Length	<input type="text"/> m
Vacuum (millibar)	<input type="text"/> mb
Refrigerant Added	<input type="text"/> g
Pressure Test (kPa)	<input type="text"/> kPa

Seller / Installer	
Sold By	<input type="text"/>
Address	<input type="text"/>
Telephone / Fax	<input type="text"/>
Installers Company	<input type="text"/>
Installers Name	<input type="text"/>
Installers Signature	<input type="text"/>
Address	<input type="text"/>
Telephone / Fax	<input type="text"/>

56-60 Bourke Road, Alexandria NSW 2015 Australia

****Failure to complete and return this record sheet to Quantum Energy (at the above address) may jeopardize warranty****

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NOTES (Owner's Use)



MANUFACTURED BY QUANTUM ENERGY TECHNOLOGIES PTY LTD
56-60 Bourke Road Alexandria NSW 2015 Phone: (02) 4953 9888 Fax (02) 4953 9887 A.B.N: 88 095 959 327

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