ELECTRIC WATER HEATER OWNER'S MANUAL (AUSTRALIA)

Marine Water Heater Operation Manual (Australia)

Approval Mark. RCM & SAA—192405-EA

Certified to: AS/NZS 60335.2.21 2013 Inc A1, to AS/NZS 60335.1.2011

IMPORTANT SAFEGUARDS

Read all instructions and warnings before operating.

If this product is dealer installed, leave these instructions for the end user for future reference.

IMPORTANT INSTALLATION NOTE:

The water heater must be mounted upright on its base. The mounting feet must be securely fastened to a stable horizontal base.

The water heater **CANNOT** be mounted vertically or in any other orientation other than as described in this installation note.

Mounting tabs for fastening water heater to installation surface. Depending on model the mounting tabs will be located on other edges. Ensure that you use sufficient sized fasteners as the weight of a water heater when filled with water is significant and using adequate fasteners is an installer supply, they not supplied with the appliance. Poor or inadequate installation is not warranty.

This product is warranted against manufacturing defects only
Incorrect installation including testing element without water, failure to check anode periodically, raw water running through the heat exchange, incorrect coolant running through the heat exchange, poor earthing, poor mounting, poor water directly into the heating chamber, etc. are not manufacturing defects and will not be considered warranty. Any corrosion is the result of poor or incorrect installation or poor maintenance.

Use of stainless steel T-Bolt hose clamps is strongly recommended for ALL hose fittings

Installation and testing of all electrical connections to be completed by a qualified electrician

Installation and testing of all plumbing connections to be completed by a qualified plumber

Check anode after first 3 months of installation

INTRODUCTION

Thank you for selecting a Kuuma Products Marine Water Heater. Your unit was carefully inspected and tested at our factory. We take pride in producing one of the finest water heaters for marine use. Please take the time to read this manual carefully; many of its instructions are essential to the safe operation of your unit.

Because of the continuing refinement of our product designs, your water heater may possess features not discussed in the manual. We have tried to supply all the information you might need, so please take time to read this manual before using your Water Heater.

Unauthorized modification of this product is strongly discouraged and will void the warranty. However, we do encourage you to perform the maintenance outlined in this manual. Proper maintenance is essential to the continuing safety and performance of this product.

Please make note of the model and serial number of your Water Heater for future reference.

Model # _____ Serial # _____

Any recommendation or advice by Kuuma Products/Camco Manufacturing Inc. its employees or its authorised agents is given with the understanding that it is solely as an accommodation to the customer, and should not be relied upon by the customer without independent verification of its applicability in the customers particular situation.

IMPORTANT SAFETY INSTRUCTIONS

WARNING – When using electrical appliances, basic safety precautions to reduce the risk of fire, electric shock, or injury to persons should be followed, including:

1. READ ALL INSTRUCTIONS BEFORE USING THIS WATER HEATER
2. This water heater must be grounded. Connect only to a properly grounded outlet. See 'GROUNDING INSTRUCTIONS' found on page 5,item 4.
3. Install or locate this water heater on in accordance with the provided installation instructions.
4. Use this water heater only for its intended purpose as described in this manual.
5. **DO NOT** use an extension cord set with this water heater.
6. This appliance is to be installed by a qualified electrician with the appropriate license to work with 240vac power supply. Warranty is VOID if the appliance is not installed by a qualified electrician.
7. As with any appliance, close supervision is necessary when used by children.
8. **DO NOT** operate this water heater if it has a damaged power supply line, if it is not working properly or has been damaged or dropped.
9. This water heater should be serviced only be qualified service personnel.

(SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE)

THOROUGHLY READ AND UNDERSTAND ALL INFORMATION PRESENTED IN THIS MANUAL PRIOR TO USING THIS APPLIANCE. Safety precautions are essential when any electrical equipment is involved. These precautions are necessary when using, storing, and servicing. Using this equipment with the respect and caution demanded will reduce the possibilities of personal injury or property damage.

CAUTION

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

CAUTION

- **DO NOT** operate this water heater if it has a damaged power line, if is not working properly, or if it has been damaged or dropped.
- The water heater should only be serviced (electrical) by qualified service personnel with the appropriate license to work with 240vac power supply. In regards to plumbing, service personnel with experience in marine plumbing and relevant types of systems should be used.
- Warranty is VOID if the appliance is not serviced by a qualified electrician.

WARNING

This is an electrical appliance that requires a specific energy source. Each unit is manufactured to run on either 120 or 240 volt circuitry. Be sure you have purchased the correct unit based on your available power source.

PLEASE NOTE: IN AUSTRALIA ONLY THE 240VAC MODELS HAVE ELECTRICAL CERTIFICATION

This heater is equipped with a heat exchanger so that the water may be heated by the coolant from your engine. This may cause the water temperature to get excessively hot unless your unit is equipped with, which holds the temperature at approximately 140 degrees Fahrenheit (60 degrees Celsius)

CAUTION PRODUCT DAMAGE

The tank and heat exchanger are aluminium. Do not use any chemicals in the heat exchanger that may cause damage to it. Use only the engine manufacturer's recommended coolant. **DO NOT** use raw water (salt water) in the heat exchanger circuit. Damage caused by a damaging chemical or a reaction due to salt water use is not covered under warranty.

IMPORTANT SAFEGUARDS

This manual contains important information about the installation, operation and maintenance of this product. General safety information is presented in these first few pages and is also located throughout the manual. Particular attention should be paid to information accompanied by the safety alert symbols:

 **DANGER,**  **WARNING, and**  **CAUTION.**

Keep this manual for future reference and to educate new users of this product. This manual should be read in conjunction with the labelling on the product.

Safety precautions are essential when any electrical equipment is involved. These precautions are necessary when using, stor-ing and servicing. Using this equipment with the respect and caution demanded will reduce the possibilities of personal injury or property damage.

The symbols shown above are used extensively throughout his manual. Always heed these precautions , as they are essential when using any electrical equipment.

WARNING: Fire Hazard

DO NOT smoke or have any flame near an open faucet.

If you have not used this water heater for more than two weeks, hydrogen gas may have been produced within the

hot water system. To reduce the risk of injury, open the hot water faucet that is highest in the system (generally the galley faucet) for several minutes before you use any electrical appliance connected to hot water system. If hydrogen is present, you will probably hear sounds like air escaping through the pipe as water begins to flow. Allow the water to flow until the sounds stop.

CAUTION: Product Damage

Small electric currents move between boats and shore through the safety ground wire in the shore cord, causing galvanic damage to your water heater. To prevent galvanic damage, this product should be used in conjunction with a galvanic isolator. These devices are inexpensive and easily installed. **Galvanic corrosion is not covered by warranty.**

To reduce the risk of excessive pressure and temperatures in this water heater, install temperature and pressure protective equipment required by local codes and no less than a combination temperature and pressure relief valve certified by a na-tionally recognized testing laboratory that maintains periodic inspections of production of listed equipment or materials, as meeting the requirements for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22. This valve must be marked with a maximum set pressure not to exceed the marked maximum working pressure of the water heater, this maximum pressure is 150psi (1034 kPa). Install the valve into an opening provided and marked for this purpose in the water heater, and orient it or provide tubing so that any discharge from the valve exits only within 6 inches (150mm) above, or at any distance below, the structural floor, and does not contact any live electrical part. The discharge opening must not be blocked or reduced in size under any circumstances.

MAINTENANCE IS IMPORTANT

SEE MAINTENANCE AND RECOMMENDATION SECTION ON PAGE 17 & 18

LACK OF REQUIRED MAINTENANCE WILL LEAD TO A BUILD-UP OF CALCIUM, AND OTHER MINERALS WITHIN THE HOT WATER SYSTEM THIS WILL LEAD TO PREMATURE FAILURE.

ELECTROLYSIS AND CALCIFICATION ARE NOT COVERED UNDER WARRANTY

INSTALLATION CAUTION AND WARNING

This product is warranted against manufacturing defects only
Incorrect installation including testing element without water, failure to check anode periodically, raw water running through the heat exchange, incorrect coolant running through the heat exchange, poor earthing, poor mounting, poor water directly into the heating chamber, etc. are not manufacturing defects and will not be considered warranty. Any corrosion is the result of poor or incorrect installation or poor maintenance.

Use of stainless steel T-Bolt hose clamps is strongly recommended for ALL hose fittings

Installation and testing of all electrical connections to be completed by a qualified electrician

Installation and testing of all plumbing connections to be completed by a qualified plumber

Check anode after first 3 months of installation

INSTALLATION

If you are using the heat exchanger feature, locate the water heater as close to the engine as possible. The heat exchanger port (or TCV inlet, if equipped) must be lower than the coolant output port of the engine.

Your unit is equipped with mounting brackets located either on the sides of the tank or the front and back of the tank. Use adequately sized stainless steel screws to securely fasten the heater.

Always use pipe lubricant on threads when connecting hot and cold water couplings. It is recommended that a suitable plastic fitting be used. If using the heat exchanger connect 5/8" diameter SAE 20R3 or equivalent coolant hose to heat exchange tubes at rear or front of water heater. (model dependant—all models may not be available in your country). Use SAE J536a type E hose clamp or equivalent.

Plumbing

1. **Connect cold water supply and hot water outlet to the heater as indicated on the front of the tank. (the tank is supplied with 1/2" NPT Female fitting). Kuuma recommend the installation of a check valve on the cold water inlet. Seal all pipe fittings with Teflon tape or a Loctite thread sealant.**
   Note: the maximum inlet water pressure is 500kPa. If the water supply pressure exceeds the rated pressure, a pressure reducing valve is to be fitted into the installation.
   Thermal Expansion: When a Water Heater is installed in a closed water supply system, such as one having a backflow prevention device in the cold water supply, means shall be provided to control thermal expansion.
2. **The heat exchanger inlet or TCV inlet (if equipped) and the outlet is a 5/8" hose barb fitting. Connect hoses to the hose barb fittings using stainless steel hose clamps.**
   To reduce the risk of excessive pressures and temperatures in this water heater, a pressure relief valve (Reliance model HT-575, 30 KW capacity, maximum temperature 99 degrees Celsius, pressure setting 1000 kPa) is fitted to this appliance.

CAUTION

A discharge pipe is to be connected to the P & T valve in a continuously downward direction and in a frost free environment; piping should be terminated so that any discharge from the valve exits only within 15cm's above, or at any distance below the structural floor, and does not contain any live electrical components/parts.

DANGER

The discharge opening MUST NOT be blocked or reduced in size under any circumstances.

INSTALLATION

Mounting & Plumbing

1. Position the water heater on structural floor such that Temperature and Pressure Relief Valve will not discharge on to live electrical components or wiring. If heat exchanger is to be used, locate at or below engine level.
2. **DO NOT** install water heater on an incline, a vertical wall or upside down.
3. Secure to flooring through the front and rear hold-down bracket, or left and right side hold down brackets.
4. Using the appropriate 1/2″ NPT fittings, connect both the Hot Water Out and Cold Water In ports.

Note: Always use a PTFE based pipe sealant on threads when connecting hot and cold water fittings.

It is recommended that suitable plastic fittings be used.

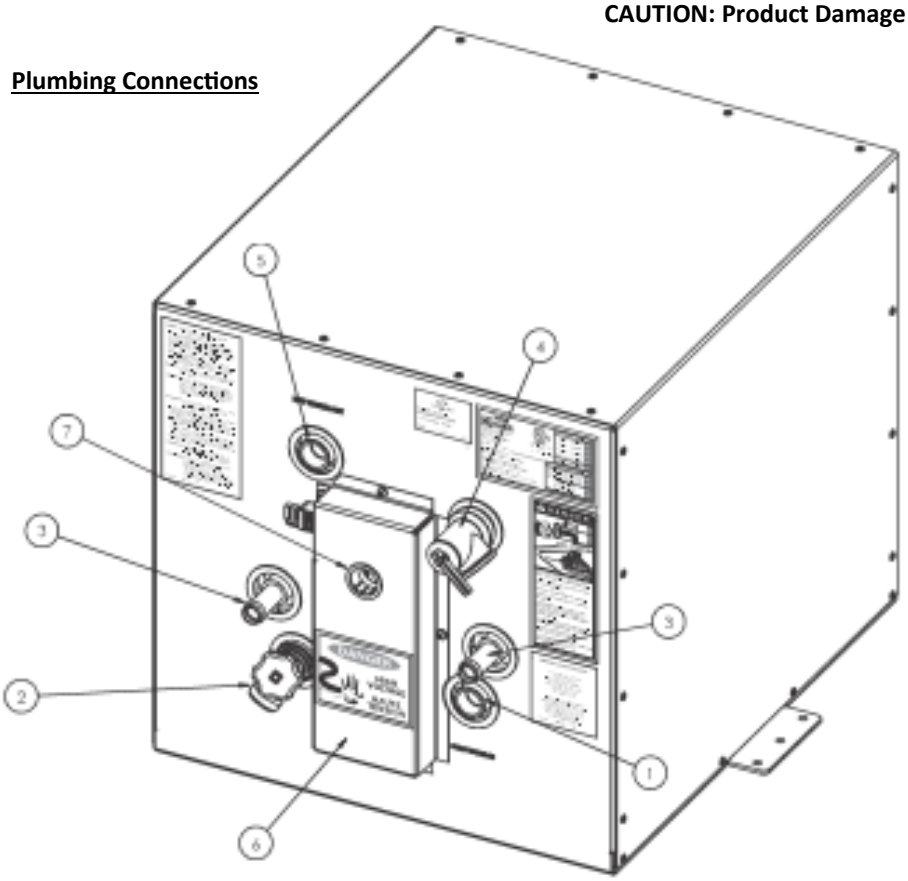
5. Turn on the water supply. Completely fill the hot water system by opening each of the hot water faucets to allow the trapped air to escape.
6. If using engine heat exchanger, connect 5/8″ diameter SAE 20R3 or equivalent coolant hose to heat exchange tubes per the diagram below. Use a SAE J536a type E hose clamp or equivalent.
7. Refill the engine coolant system with the manufacturer's recommended coolant. For proper operations of both the engine and water heater all air must be bled from the coolant system. Failure to properly bleed air from engine coolant system could result in engine damage.
8. Check the system for leaks.

CAUTION: Product Damage

Do not use raw water or any chemical that is not PH neutral in the heat exchanger circuit.

Damage caused by a chemical or salt reaction is not covered under warranty.

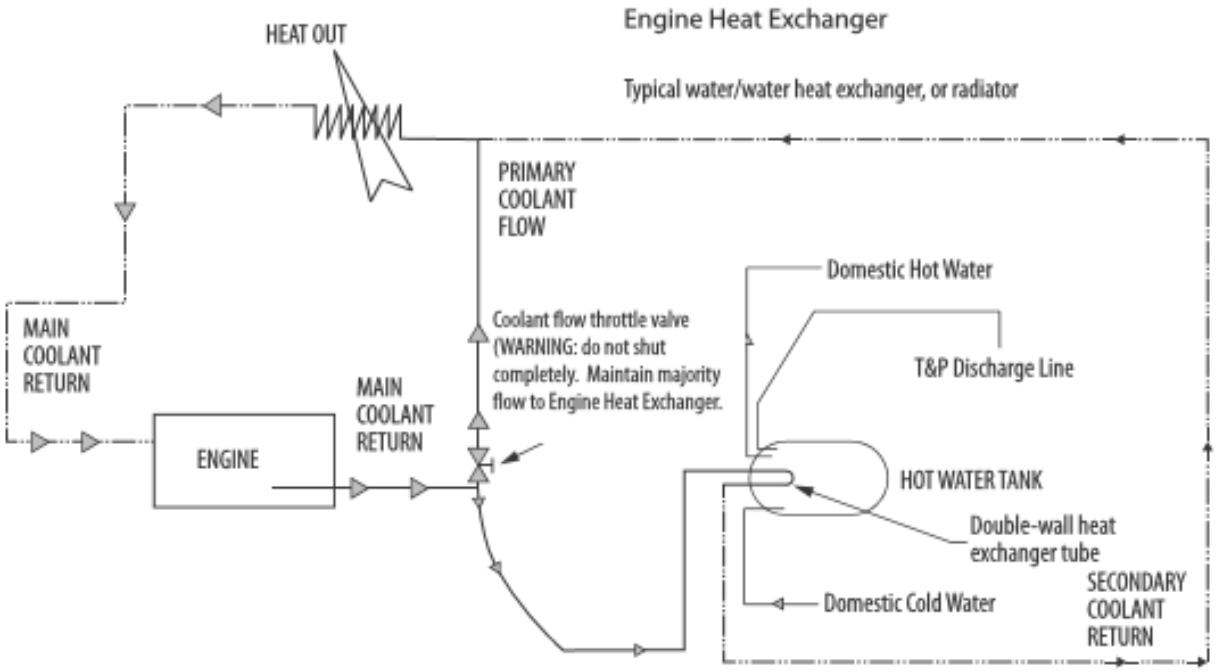
Plumbing Connections



1. **Cold Water In**
2. **Drain Valve (or anode)**
3. **Heat Exchanger Inlet / Return**
4. **Temperature & Pressure (T&P) Relief Valve**
5. **Hot Water Out**
6. **Control Access Cover**
7. **Manual Reset Access**

CAUTION Product Damage

The tank and heat exchanger are aluminium. Do not use any chemicals in the heat exchanger that may cause damage to it. Use only the engine manufacturer's recommended coolant. DO NOT use raw water (salt water) in the heat exchanger circuit. Damage caused by a damaging chemical or a reaction due to salt water use is not covered under warranty.



WARNING

Bleed air from the entire coolant system for proper operation of both engine and water heater.

ELECTRICAL

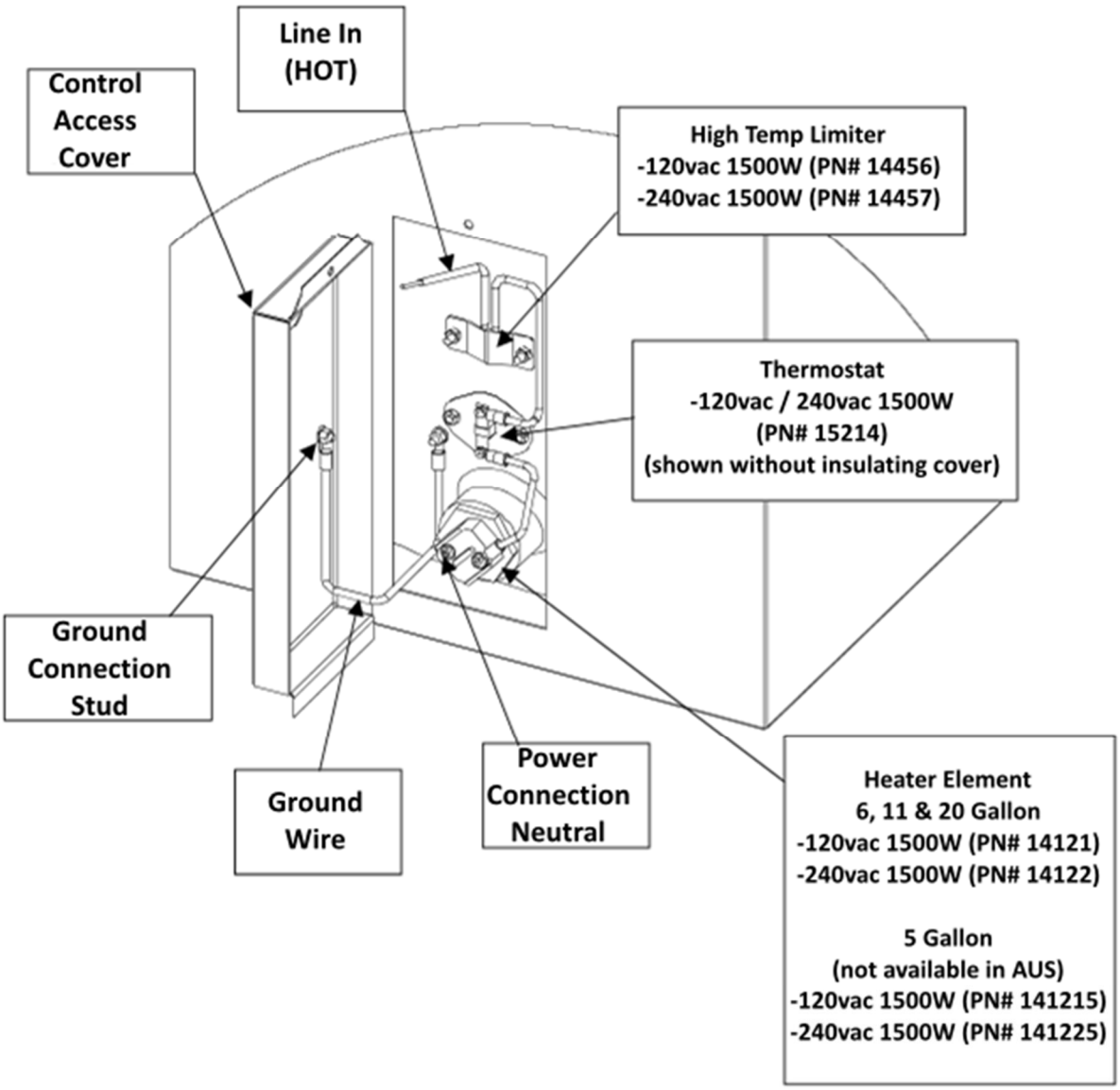
1. **Remove the AC Wiring access cover.**
2. **Connect the electrical supply using a qualified and appropriately certified electrician. The electrical supply shall be armoured cable or conduit per NEC code ANSI/NFPA 70-1993. Wiring diagram is located on the inside of the removable access panel.**
3. **Connect Line (Hot) (Refer #2 above relating to qualified personnel) to the pigtail wire coming from the High Temperature Limiter. Connect the Neutral to the unused screw terminal on the heating element marked 'N'.**
4. **A strain relief should be installed in the hole on the front access panel/cover to secure the AC wire.**
5. **Ground the water heater using the ground connection screw on the inside access cover. Do not use a switch in the grounding circuit. For Marine installation, use conductors as specified by sub chapter S, part 183.425, table 5 of chapter 1—Coast Guard Department of Transportation Code of Federal Regulations , Title 33.**

CAUTION

In order to avoid a hazard due to inadvertent resetting of the thermal cut-out this appliance must not be supplied through an external switching device, such as a timer or connected to a circuit that is regularly switch on and off by the utility.

ELECTRICAL, cont'd

Part numbers—Maintenance items/replaceable parts



WARNING! Explosion Hazard Marine Installations Only

Locate circuit breaker switch in an area where ignition protection is not required

CAUTION Product Damage

Small electric currents move between boats and shore through the safety ground wire in the shore cord, causing galvanic damage to your water heater. To prevent galvanic damage, this product should be used in conjunction with a galvanic isolator. These devices are inexpensive and easily installed. Galvanic corrosion is not covered by warranty.

Electrical Connections

CAUTION: Electric Shock Hazard

Connecting the electrical supply must be performed by a qualified electrician.

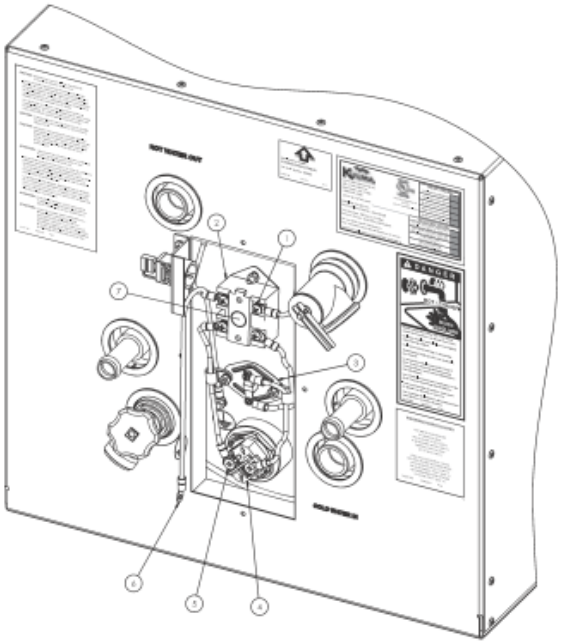
The electrical supply shall be permanent wiring, armoured cable or conduit per NEC code ANSI/NFPA 70-2011. All wiring and connectors must comply with the applicable electrical codes and should be copper with a minimum capacity to support 1500 watts and 120volts/15amps or 240volts/10amps depending on the heater used.

For marine installation, use conductors specified by sub chapter S, part 183.425, table 5 of chapter 1 - Coast Guard Department of Transportation Code of Federal Regulations Title 33.

WARNING: Explosion Hazard (marine installation only)

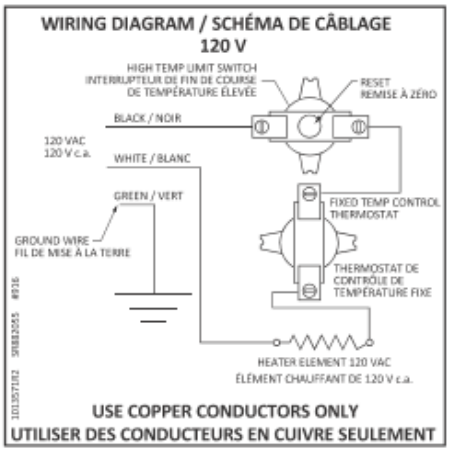
Locate circuit breaker(s) and/or remote switches in an area where ignition protection is not required.

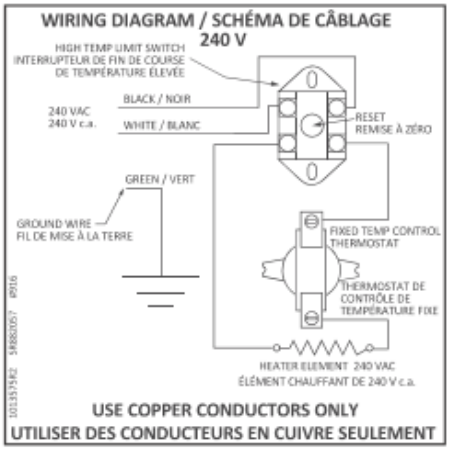
1. Remove the Control Access Cover. Wiring diagram is located on the inside of access cover.
2. Install an appropriate strain relief in Control Access Cover (if one is not installed) and pass voltage supply wires through the strain relief. The type of strain relief is dependent on the type of cable or conduit used.
3. Connect the electrical supply:
   a. 120V Models: Connect the hot wire to the Line-In of the High Temp Limiter (Black wire). Connect the neutral wire to the unused screw terminal on the Heating Element. See diagram below.
   b. 220/240V (L1&L2 or L1&N) Models: Connect each voltage leg (L1 & L2, Red & Black wires) to the Line-In terminals (2) of the High Temp Limiters. See diagram below.
4. Grounding Instructions: Connect the ground wire to the Ground Connection Screw on the inside of the access cover. **DO NOT** use a switch in the grounding circuit.
5. Verify all connections are tight and that they provide good continuity.
6. Reinstall the Control Access Cover and secure the strain relief.



1. Line-in pigtail (HOT)
2. High Temperature Limiter
3. Thermostat
4. Heating Element (1500w)
5. Neutral Connection Terminal
6. Ground Wire
7. Manual Reset

Access cover, Fishpaper & insulation not shown (for clarity)



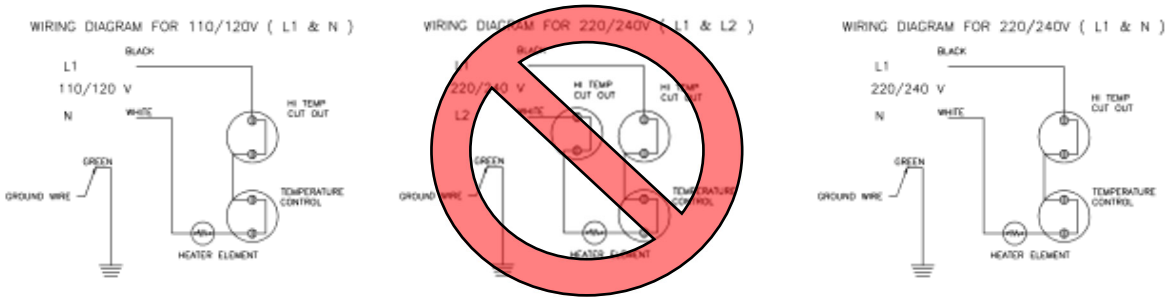


Wiring Diagrams

USE COPPER CONDUCTORS ONLY

120V models use UL listed ON/OFF switch rated for 15amps/125vac

240V models use UL listed ON/OFF switch rated for 10amps/220-240vac



This diagram N/A for Australian models

DO NOT CONNECT LINE (HOT) DIRECTLY TO THE ELEMENT

PRIOR TO START UP

Completely fill the heater with water. (Failure to do so will result in a element failure—this is NOT warranty)

Open the hot water faucet closest to the water heater to allow the air in the system to bleed out. When the water is running steadily you can close the hot water faucet. Check all connects for leaks.

DANGER!

Failure to operate the pressure relief valve at least once every six (6) months may result in the water heater exploding. Continuous leaking from the valve may indicate a problem with the water heater. Following installation, the pressure relief valve lever MUST be operated AT LEAST ONCE EVERY SIX (6) MONTHS by the hot water tank owner to ensure that the 'water-ways' are clear. Certain naturally occurring mineral deposits may adhere to the valve, rendering it inoperative. When manually operating the lever, water will discharge and precautions must be taken to avoid contact with hot water and to avoid water damage. The lever should be operated smoothly and carefully as a sudden influx of water may cause the blow-out cage to activate.

BEFORE operating the lever, check to see that a discharge line is connected to this valve directing the flow of hot water from the valve to a proper and safe place of disposal. Failure to do this may result in personal injury. If no water flows then the valve is inoperative.

TURN OFF THE WATER HEATER AND CALL A PLUMBER IMMEDIATELY

The thermostat is factory set and is not adjustable.

CAUTION Product Damage

DO NOT operate water heater without water in the tank!

Turn remote switch to ON. Your water heater is now operating. The water should be at maximum temperature in two (2) hours.

Allow for complete drainage of both valve and discharge line.

WARNING! Scalding

Pressure & temperature relief valve is not serviceable, if not functioning it MUST be replaced.

Tampering with the valve will result in a scalding injury.

Tampering with the valve WILL void warranty.

WARNING! EXPLOSION

DO NOT place a valve, plug or reducing coupling on the outlet port of the pressure & temperature relief valve or block the discharge opening.

If you use a discharge line, do not use a reducing coupling or create any restriction that is smaller than the outlet of the relief valve.

Install temperature and pressure equipment if required by local codes to protect against excessive pressures and temperatures.

The combination pressure & temperature relief valve must be installed into the water heater coupling provided and marked.

Orientate the valve or provide tubing so that any discharge from the valve will only exit within six (6) inches (150mm) above , or at any distance below the structural floor and cannot contact any live electrical part.

A temperature & pressure relief valve, dripping whilst the water heater is running does not mean that the valve is defective.

During normal expansion of water, as it is heated in a closed water system the temperature & pressure relief valve will occasionally drip.

The water heater tank is designed to allow for an internal air gap at the top of the tank to reduce the possibility of dripping. Over time, the expanding water will absorb this air and the air gap must be restored.

WARNING! Scalding

Turn off water heater before opening temperature-pressure relief valve to re-establish air gap. Storage water MUST be cool.

TO RESTORE THE AIR GAP FOLLOW THESE STEPS

Turn off the main water supply. (the pump or water hook up source)

Let water cool or let it run until cool.

Open the hot water faucet closest to the water heater.

Lift the handle/lever of the temperature & pressure valve until straight out and allow the water to flow until it stops.

Allow temperature & pressure relief valve to snap shut; close faucet and turn on water supply.

Turn on water heater and test.

At least twice a year (every six months) manually operate the temperature & pressure relief valve. When pressure and relief valve discharges again, repeat the above procedure.

For a permanent solution, we recommend the following:

Install a pressure relief valve in the cold water inlet line to water heater and attach a drain valve to thru-hull fitting. Set to relieve at 100-125psi OR Install a diaphragm type expansion tank in the cold water inlet line. The tank should be sized to allow for expansion of approximately 15oz (445ml) and pre-charged to a pressure equal to the water supply pressure. These devices can be obtained from a plumbing contractor or plumbing supply/service centre.

OPERATION

CAUTION: Product Damage

DO NOT operate water heater without water in the tank.

When the heater is operating on AC power, the water temperature is regulated by a thermostat to 140°F (60 °C).

The thermostat is not adjustable or field serviceable.

In the event of a thermostat or element failure, the water heater is equipped with a high temp limiter that interrupts the circuit if the tank exceeds 185°F (85 °C). This high temp limiter is equipped with a manual reset.

1. Check/verify water heater is filled with water and there are no leaks.
2. Locate the remote water heater operation switch (see vehicle/boat owners manual for location of switch).
3. Turn “ON” the remote switch. Your water heater is now operating.
4. The water heater is equipped with a high temp limiter in the event of a thermostat or element failure, the high temp limiter will interrupt the circuit if the tank exceeds 185°F (85 °C). If it should need to be reset:
    a. Turn “OFF” the remote power switch to the water heater.
    b. Allow the water to cool below 185°F (85 °C).
    c. Depress the reset button on the high temp limiter.
    d. Turn “ON” the remote power switch to the water heater.
    e. If the water heater malfunctions again, contact an authorized Marine Electrician to troubleshoot and repair.

WARNING: High Temperature

When the water heater is operating from the engine heat exchanger, the water temperature in the tank will approach the temperature of the engine coolant. This can be in excess of 170°F (77 °C).

If desired, an external thermostatic mixing valve can be installed to limit the water temperature at the taps.

In addition to the high temp limiter, the water heater is also equipped with a temperature and pressure (T&P) relief valve that complies with ANSI Z21.22, Relief Valves for Hot Water Supply Systems. This valve is designed to open if the water inside of the tank exceeds its rated temperature and/or pressure rating (listed on the ID plate under the handle).

WARNING: Scalding Hazard

Discharging water above 120°F (49 °C) can result in severe burns or death.

WARNING: Explosion Hazard

The T&P valve is not serviceable. Tampering with the valve will void the warranty and could create an explosion hazard. Do not place a valve, plug or reducing coupling in the outlet port of the T&P valve. If you use a discharge line, do not use a reducing coupling or any other restriction that is smaller than the outlet of the relief valve. Restricting the outlet of this valve could result in dangerously high pressure within the hot water system. The discharge line must terminate within 6 inches of the floor or any distance beneath the structural floor.

During normal operation the water within the tank will expand when heated. This expansion results in an increased pressure within the closed hot water system. The T&P valve may occasionally weep to relieve the excess pressure. This is normal and does not represent a faulty valve.

The water heater tank is designed with an internal air pocket at the top of the tank to reduce the possibility of dripping. In time, the expanding water will absorb this air and it must be restored. To restore the air pocket take the following steps.

1. Disconnect the power supply to the water heater.
2. Let water cool or let run until cool.
3. Turn of the main water supply.
4. Open the hot water faucet closest to the water heater.
5. Pull the discharge handle of the T&P valve and allow water to flow until it stops.
6. Allow the T&P valve to close.
7. Close the faucet.
8. Turn water supply back on.
9. Restore the power to the water heater.
10. Turn on water heater and test.
11. Perform this procedure at least once a year or whenever the T&P valve begins to weep.

For a permanent solution, we recommend one of the following:
Install a pressure relief valve in cold water inlet line to water heater and attach a drain line from valve to thru-hull fitting. Set to relieve at 100-125 PSI. (690—860 kPa)
Install a diaphragm-type expansion tank in cold water inlet line. Tank should be sized to allow for expansion of approximately 15 oz. (0.5 Ltr) of water and pre-charged to a pressure equal to water supply pressure. These devices can be obtained from a plumbing supply centre.

MAINTENANCE

Regularly check the system for leaks and inspect all lines to and from the heat exchanger.
At least once a year disconnect the power to the water heater, allow water to cool, and manually operate the T&P valve discharge handle. Verify that the discharge port is clear of obstruction and that it flows freely.

ELECTROLYSIS PREVENTION

After installation, ideal is to remove and visually check the anode every 3 months, at least every 4 months for the first year to understand anode depletion rates. When moving around in new waterways depletion rates can alter, example if you take your vessel from Sydney Harbour and move it to Airlie Beach for 6 months your anode will most likely deplete much more rapidly as Airlie Beach waters are known to have different "potentials" of electrical conductivity.
Proper installation and maintenance of your Kuuma Hot Water system will provide you with many years of faithful service.

Replacement parts may be ordered from Ocean Solutions Int.. Contact Ocean Solutions Int. customer service at +61 7 3806 6033 or sales@oceansolutions.com.au to obtain replacement parts. When contacting Ocean Solutions Int. to order replacement parts, please provide:

1. Item or Model Number of water heater.
2. Serial Number of water heater.
3. Part description of item required for replacement.

The model number and serial number of the water heater can be found on the front panel of the water heater. There is also a place on the second sheet of this manual to record these two items for future use.

Ocean Solutions International

Contact: **sales@oceansolutions.com.au**

For information in regards to the correct part/part number to order please write to the above email address for details.

Winterizing & Flushing Instructions

To ensure the best performance of your water heater and add to the life of the tank, periodically drain and flush the tank.

It is also recommended that a drain and flush be performed before long term storage or freezing weather.

1. Disconnect the power supply to the water heater.
2. Turn of the main water supply.
3. Drain water heater tank by opening the drain valve. If desired, a garden hose can be connected to the drain outlet to run the water outside the boat.
4. Open the faucet that is highest in the system to allow air to displace the water. It may also help to open the T&P valve once the system has drained down to water heater level.
5. Due to the placement of the drain valve, approximately two quarts of water will remain in the tank. Sediment collects in this remaining water. To remove it, flush the tank with either air or water. Whether using air or water pressure, it may be applied through the water inlet or outlet. The pressure will force out the remaining water and sediment.
6. Close the drain valve, faucet, and T&P valve.

The approximately two quarts (2 Ltr) of water remaining in the tank after draining will not cause damage to the tank should freezing occur. However, you can add non-toxic, propylene-glycol based anti-freeze that is designs for use in potable water systems. Always follow the manufacturer's instructions.

LIMITED WARRANTY

Camco Manufacturing warrants this product to be free from defects in material and workmanship under normal use and service conditions for 12 months from the date of first purchase. Camco's liability is limited solely to the replacement of any defective product returned to us. To the extent allowable by law, Camco makes no other warranty; either expressed or implied, nor assumes any liability for incidental or consequential damages resulting from the use of this product or for breach of warranty of merchantability or fitness for a particular purpose.

Submit warranty claims to Camco Manufacturing, 121 Landmark Drive, Greensboro, NC 27409. (In other countries any warranty claims must originate through your original place of purchase. They will make contact with the relevant country's importer and distributor.)

Retain this manual for future reference.

Camco Manufacturing, Inc.

121 Landmark Drive, Greensboro, NC 27409

www.camco.net / info@camco.net

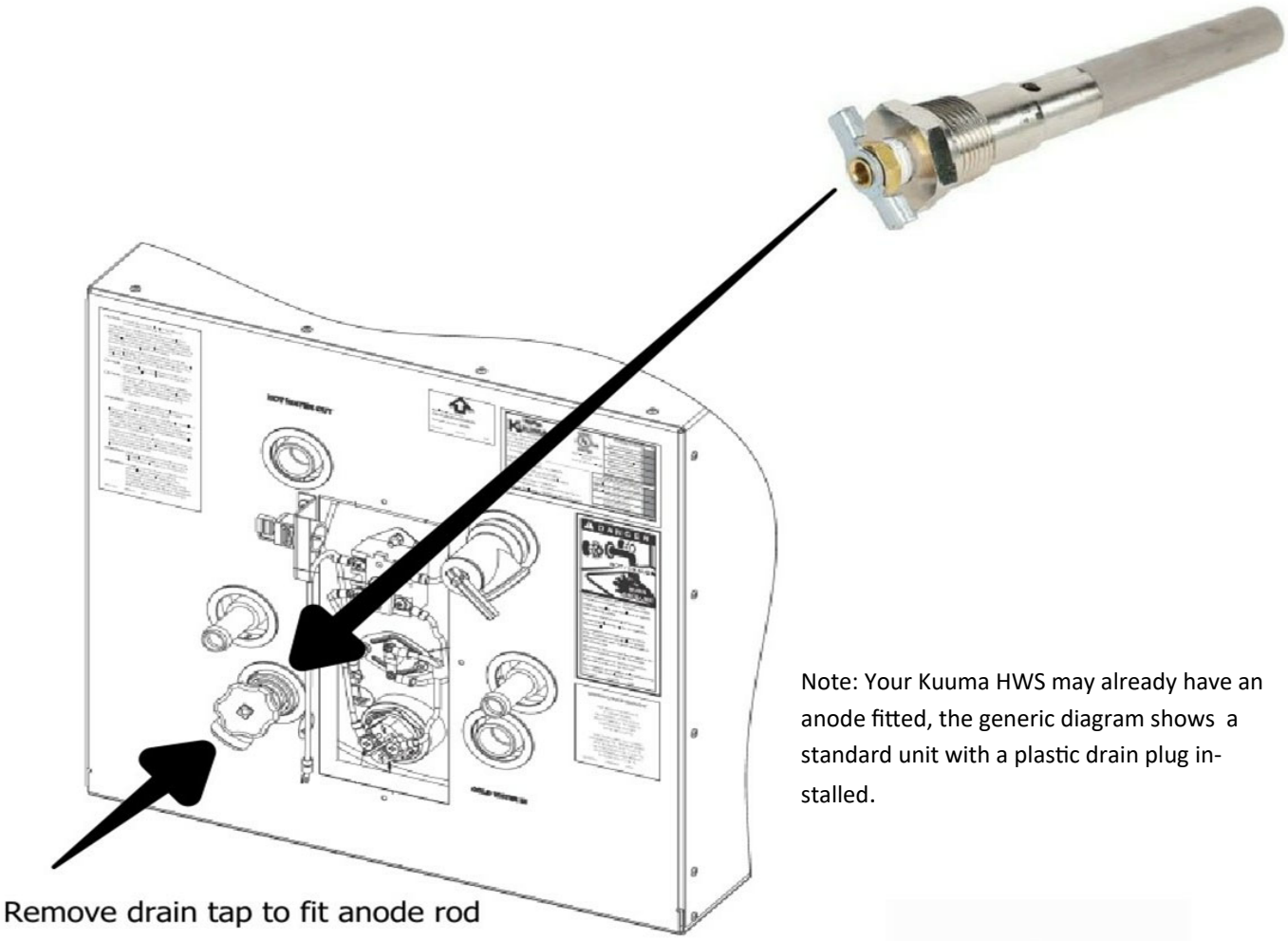
Troubleshooting Guide

PROBLEM	CAUSE	SOLUTION
No output from tank	Air lock in system	Bleed air from all the water lines
Water does not get hot when plugged into AC power.	High temperature limiter has tripped	Cycle AC power
	Failed thermostat	Replace thermostat
	Element has burnt out	Replace element
Water dripping from PRV	Thermal expansion	Install expansion tank
	Valve poppet not seated properly	Lift lever to flush valve to reseat

Specifications

Model		406XX	411XX	418XX	420XX
Capacity		6 Gallon	11 Gallon	20 Gallon	20 Gallon
Tank Material		Aluminium	Aluminium	Aluminium	Aluminium
Case Material		Aluminium	Aluminium	Aluminium	Aluminium
Weight (dry)		25lb (11.5kg)	30lb (13.6kg)	47lb (21.4kg)	47lb (21.4kg)
Heat Exchanger Location		Front	Front	Front	Front
Electrical Rating	120v	1500W/12.5A	1500W/12.5A	1500W/12.5A	1500W/12.5A
	240v	1500W/6.25A	1500W/6.25A	1500W/6.25A	1500W/6.25A
Ignition Protection		Yes	Yes	Yes	Yes
	120v	UL 174 (Including Marine Supplement) CSA C22.2 No. 110.94	UL 174 (Including Marine Supplement) CSA C22.2 No. 110.94	UL 174 (Including Marine Supplement) CSA C22.2 No. 110.94	UL 174 (Including Marine Supplement) CSA C22.2 No. 110.94
	240v	CE AS/NZS 60335.2.21 2013 Inc A1, to AS/NZS 60335.1.2011 inc. A1-5	CE AS/NZS 60335.2.21 2013 Inc A1, to AS/NZS 60335.1.2011 inc. A1-5	CE AS/NZS 60335.2.21 2013 Inc A1, to AS/NZS 60335.1.2011 inc. A1-	CE AS/NZS 60335.2.21 2013 Inc A1, to AS/NZS 60335.1.2011 inc. A1-5
	Water Inlet	1/2” NPT (F)	1/2” NPT (F)	1/2” NPT (F)	1/2” NPT (F)
	Water Outlet	1/2” NPT (F)	1/2” NPT (F)	1/2” NPT (F)	1/2” NPT (F)
	Heat Exchanger	5/8” Hose Barb	5/8” Hose Barb	5/8” Hose Barb	5/8” Hose Barb
	PRV	3/4” NPT (F)	3/4” NPT (F)	3/4” NPT (F)	3/4” NPT (F)
Warranty		1 Year	1 Year	1 Year	1 Year

Marine Water Heater Anode



Remove drain tap to fit anode rod

Note: Your Kuuma HWS may already have an anode fitted, the generic diagram shows a standard unit with a plastic drain plug installed.

Drain water heater by turning drain valve handle **counterclockwise.**

IMPORTANT INFORMATION:

MAINTENANCE OF THE INTEGRITY OF THE MATERIAL OF YOUR TANK.

There are two important maintenance tasks that are critical to assist in extending the life of your tank in a marine environment. a) Fitting of a replacement anode supplied with, or fitted to your tank. and b) Flushing your tank with a cleaning solution on a regular basis.

Failure to maintain a regular maintenance schedule can result in a premature degradation of your tank and a resultant failure of the integrity of your tank's material.

Recommended schedule for anode inspection or anode replacement, and system flushing is every 3 months.

How quickly your system decays the anode and/or builds up calcium and mineral deposits in the tank will vary based on water quality, water hardness, and how well your system is earthed. Where vessel is moored or where the vessel is in water bound transit will also have an effect on the electrolysis occurring

Electrolysis and calcification of your tank is not covered under warranty.

Please note: In poor conditions tanks can corrode or decay as quickly as 6 months or less without proper maintenance. We strongly recommend that in poor environmental conditions (seek local knowledge) check anode and flush the system every month.

The fitting of a fine sediment filter and the use of a water softener MAY assist with removal of sediments in the water but will not prevent the build up of sediments over time.

We strongly recommend the use of fine sediment filters on the inlet side of your hot water system. The finer the filter the more sediments will be removed.

When inspecting a returned water system, we will cut them apart and look for build up of sediments, and pitting from electrolysis.

Fitting Guide

This Kuuma Water Heater Anode Rod will help extend the life of you Kuuma water heater.

The magnesium anode rod preserves the life of your water heater tank by corroding itself in place of your water tank's material. Simply replace your drain valve with the Kuuma Water Heater Anode Rod to protect your tank.

Installation Instructions

1. SHUT OFF and ISOLATE the electric power to the water heater.

2. SHUT OFF the cold water supply to the water heater, open a hot water faucet, open the water heater drain valve, and drain the tank completely.

3. Remove the water heater drain valve by rotating it counterclockwise with the appropriate wrench.

4. Apply Teflon™ thread tape to the threads of the Kuuma Anode Rod. Wrap 5 turns, in the same direction that you tighten the rod.

5. By rotating clockwise, thread the anode rod into the drain valve port and tighten until snug. Use Caution! DO NOT OVERTIGHTEN. Use only 7 - 8 ft-lbs torque / (9.5 - 11 kN).

6. Restore the cold water supply to the water heater.

7. While filling the hot water heater, open all hot water faucets. Allow water to run until air is forced from water lines, and then close the faucets. The water heater should now be full.

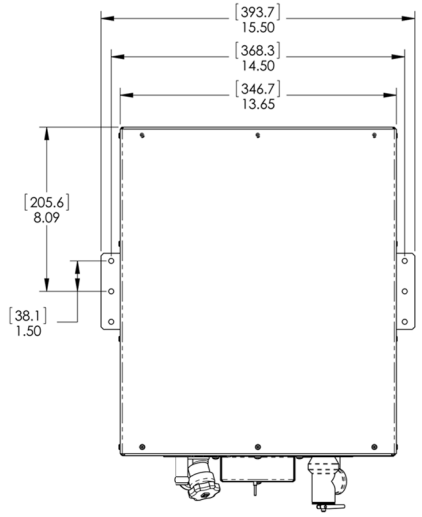
8. Examine the anode rod for leaks and tighten if necessary.

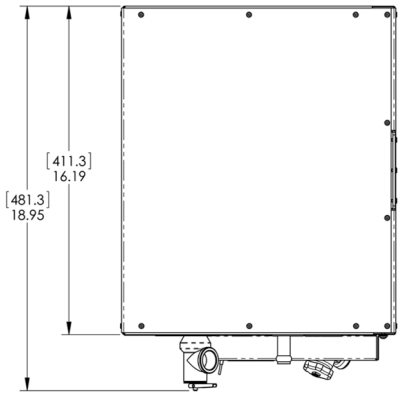
9. If no leaks are present, switch on the electric power to the water heater.

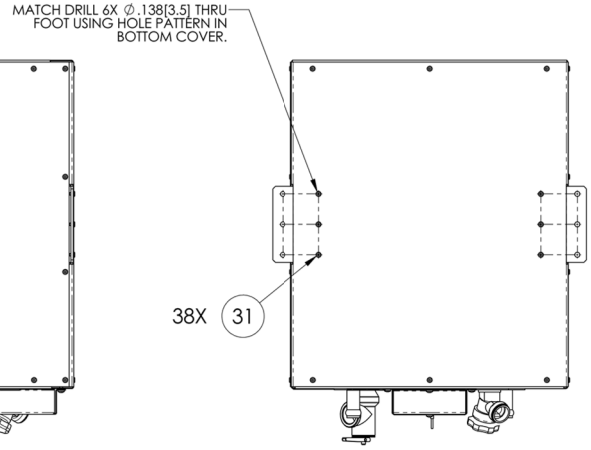
IMPORTANT

Inspect your anode rod at least twice annually. The best time to do this is while servicing your hot water system at the beginning of each boating season. Over time, minerals can build up around the anode making removal difficult. Frequent inspection will help prevent this.

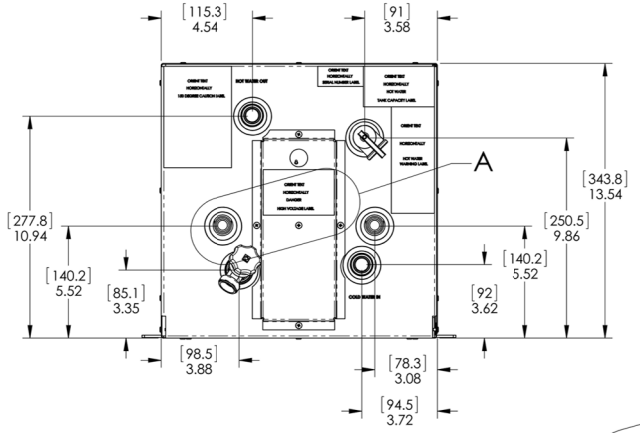
For maximum performance, replace your anode rod when less than one half of the rod remains.

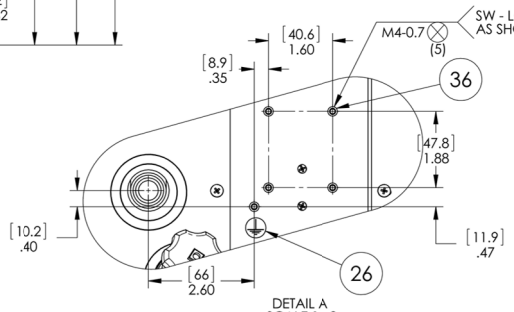




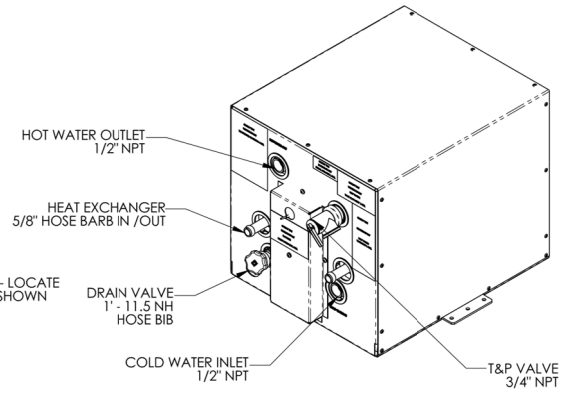


BOTTOM VIEW





DETAIL A
SCALE 1 : 2



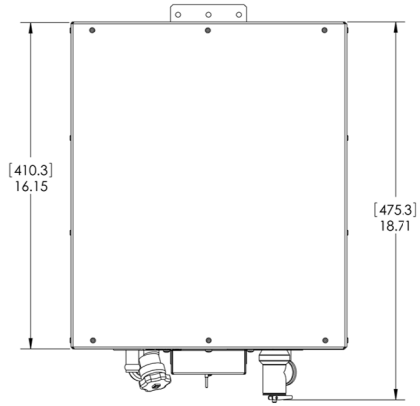
NOTES :
1. ALL DIMS IN [ ] ARE IN MILLIMETERS.
2. REMOVE ALL SHARP EDGES.
3. WEIGHT : 19.926 lbs [9.0383 kg].

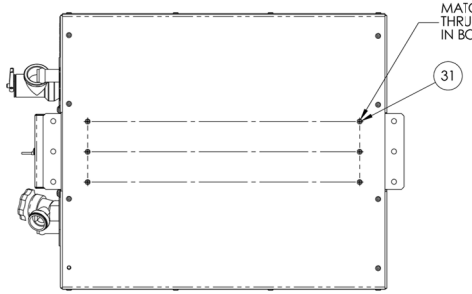
TOLERANCES (UNLESS SHOWN)
.XXX ± .005 (.13 mm)
.XX ± .020 (.51 mm)
X/X ± 1/32 (.8 mm)
ANGLE ± 0°30'
FINISH 125 √(3.2)
THIRD ANGLE PROJECTION

CAMCO MFG. INC.
GREENSBORO, NC USA

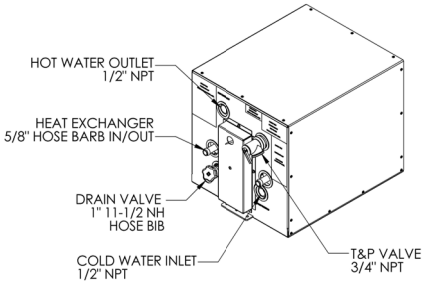
TITLE: ASSEMBLY, WATER HEATER, 240V, FHX, S-S, 6 GALLON - #40610

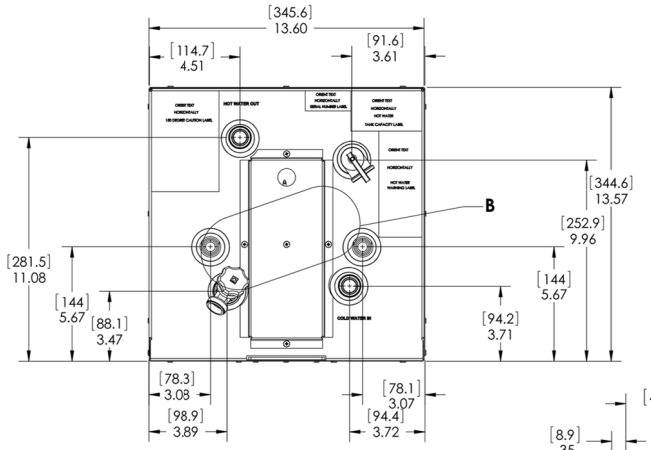
DATE: 1/18/2013	SCALE: 1:4	SIZE	DRAWING NO.	REV.
DES	DRN: JRB / CHK	C	1008000	1

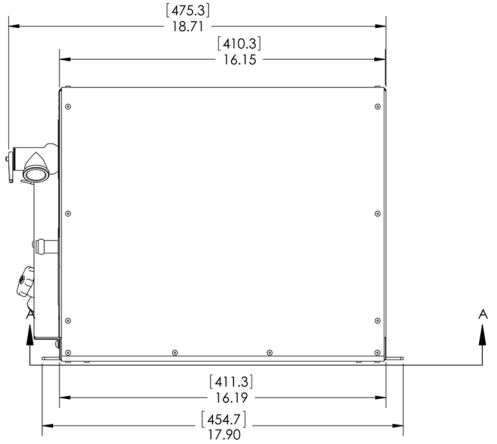


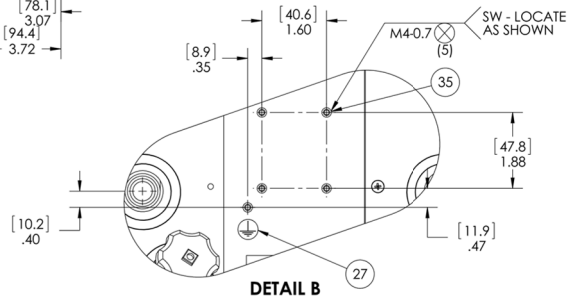


VIEW A-A









DETAIL B
SCALE 1 : 2

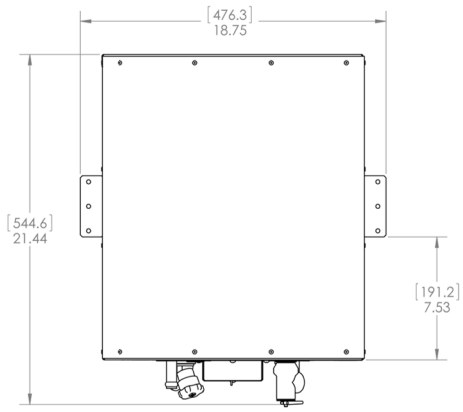
NOTES :
1. ALL DIMS IN [ ] ARE IN MILLIMETERS.
2. REMOVE ALL SHARP EDGES.
3. WEIGHT : 20.288 lbs (9.2025 kg).
4. EXCEPT FOR DETAIL B DIMENSIONS
ALL DIMENSIONS ARE FOR REFERENCE ONLY

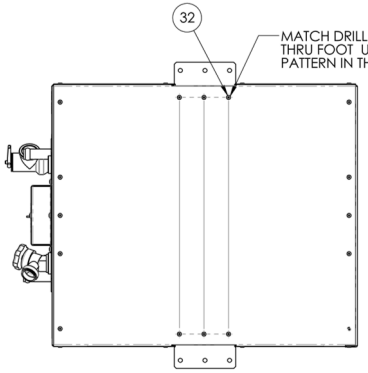
TOLERANCES
(UNLESS SHOWN)
.XXX ± .005 (.13 mm)
.XX ± .020 (.51 mm)
X/X ± 1/32 (.8 mm)
ANGLE ± 0°30'
FINISH 125 √(3.2)
THIRD ANGLE PROJECTION

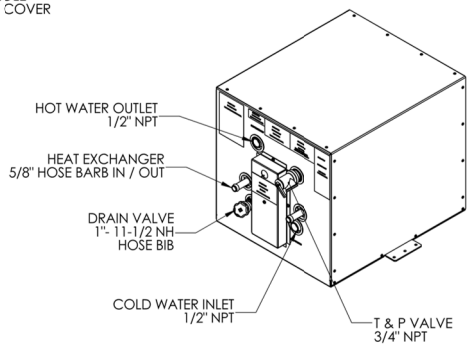
CAMCO MFG. INC.
GREENSBORO, NC USA

TITLE: WATER HEATER ASSEMBLY, FHX, 240V, 6 GAL, F-B, (AUS)

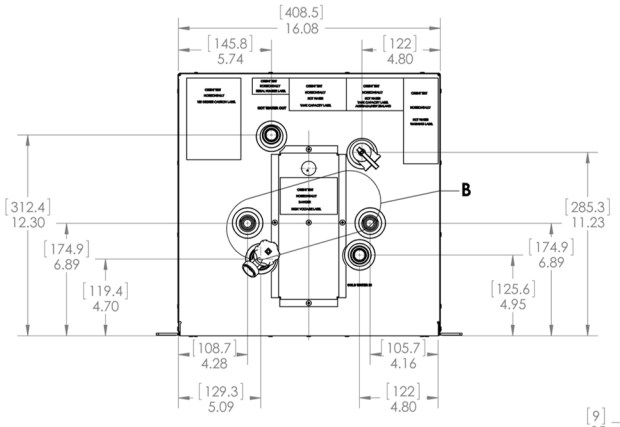
DATE: 1/28/2013	SCALE: 1:4	SIZE	DRAWING NO.	REV.
DES	DRN: JRB / CHK	C	1008205	1

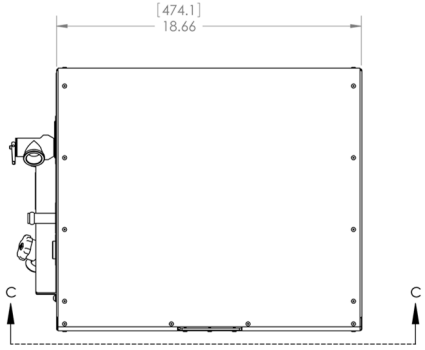


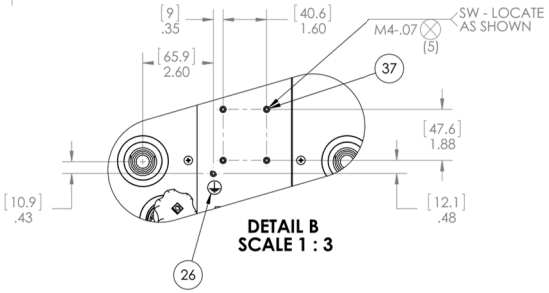




VIEW C-C







DETAIL B
SCALE 1 : 3

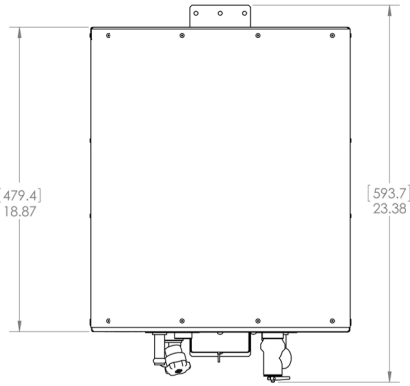
NOTES :
1. ALL DIMS IN [ ] ARE IN MILLIMETERS.
2. REMOVE ALL SHARP EDGES.
3. WEIGHT : 26.127 lbs [11.851 kg].
4. EXCEPT FOR DETAIL B DIMENSIONS ALL DIMENSIONS ARE FOR REFERENCE ONLY.

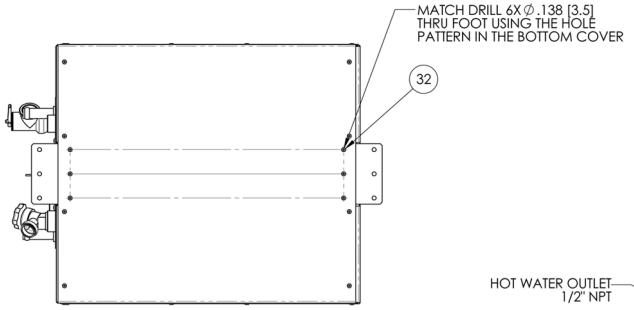
TOLERANCES (UNLESS SHOWN)
.XXX ± .005 [.13 mm]
.XX ± .020 [.51 mm]
X/X ± 1/32 [.8 mm]
ANGLE ± 0°30'
FINISH 125 ⎓ [3.2]
THIRD ANGLE PROJECTION

CAMCO MFG. INC.
GREENSBORO, NC USA

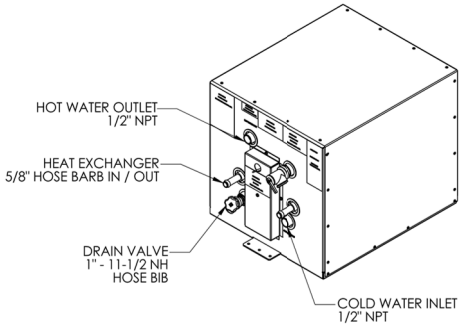
TITLE: ASSEMBLY, WATER HEATER, 240V, FHX, S-S, 11 GALLON (AUS)

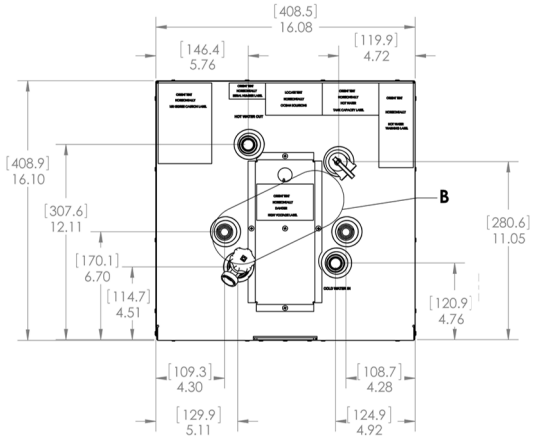
DATE: 9/4/2013	SCALE: 1:5	SIZE	DRAWING NO.	REV.
DES	DRN JRB / CHK	C	1008223	1

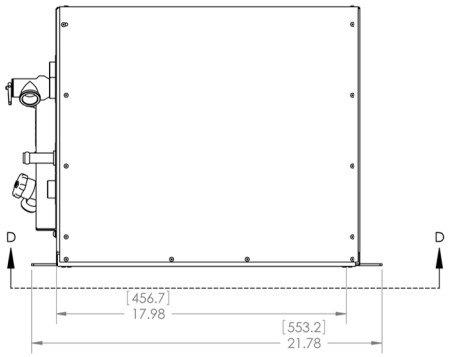


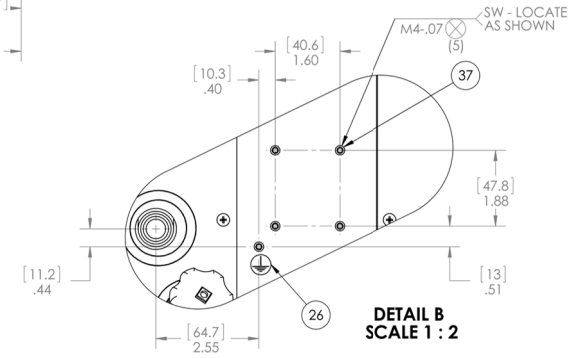


VIEW D-D
BOTTOM VIEW









DETAIL B
SCALE 1 : 2

NOTES :
1. ALL DIMS IN [ ] ARE IN MILLIMETERS.
2. REMOVE ALL SHARP EDGES.
3. WEIGHT : 26.048 lbs [11.8152 kg].
4. ALL DIMENSIONS EXCEPT FOR DETAIL B
   DIMENSIONS ARE FOR REFERENCE ONLY

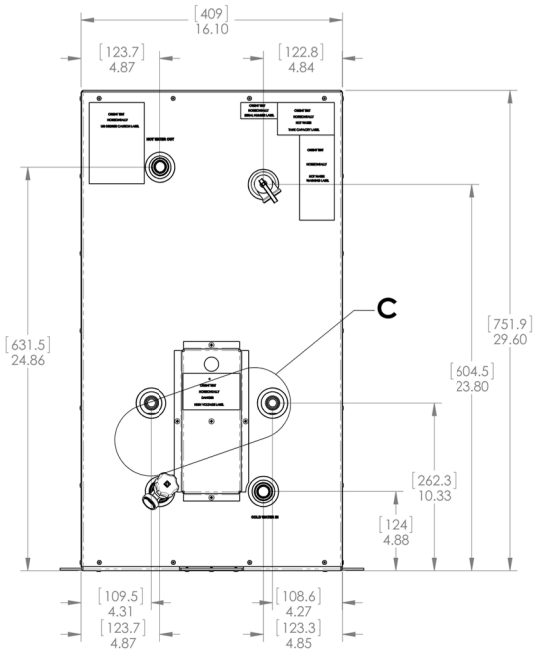
TOLERANCES (UNLESS SHOWN)
.XXX ± .005 (.13 mm)
.XX ± .020 (.51 mm)
X/X ± 1/32 (.8 mm)
ANGLE ± 0°30'
FINISH 125 √ (3.2)
THIRD ANGLE PROJECTION

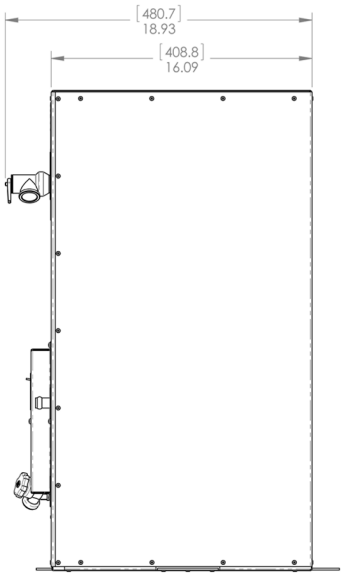
CAMCO MFG. INC.
GREENSBORO, NC USA

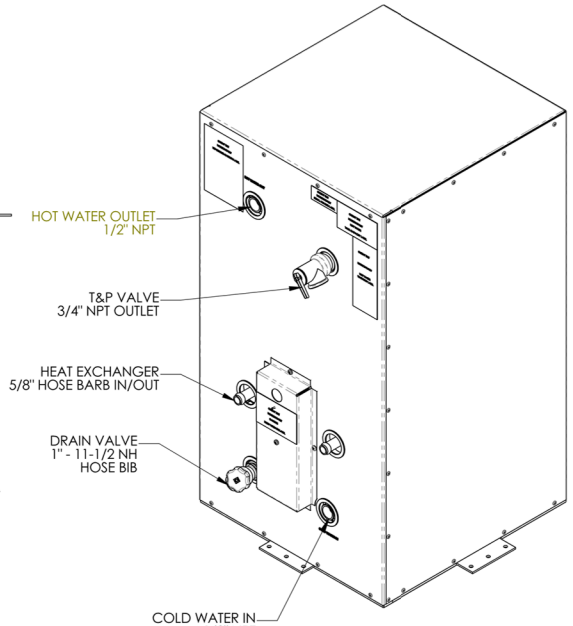
TITLE: ASSEMBLY, WATER HEATER, 240V L1&N, FHX, F-B, 11 GAL(AU)OS

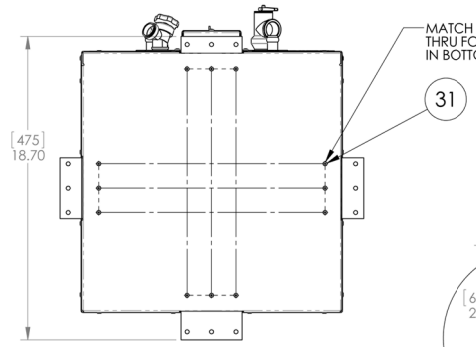
DATE: 1/29/2013 | SCALE: 1:5 | SIZE: C | DRAWING NO.: 1008224 | REV.: 1

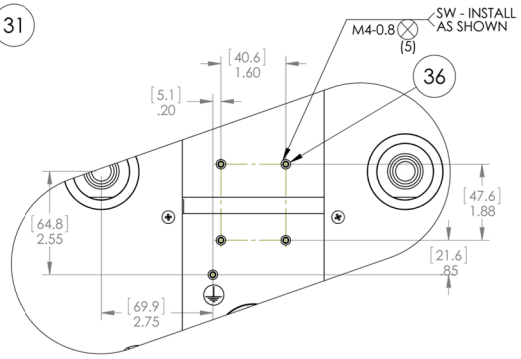
DES | DRN: JRB | CHK











NOTES :
1. ALL DIMS IN [ ] ARE IN MILLIMETERS.
2. REMOVE ALL SHARP EDGES.
3. WEIGHT : 37.867 lbs [17.1762 kg].
4. EXCEPT FOR DETAIL C DIMENSIONS
ALL DIMENSIONS ARE FOR REFERENCE ONLY.

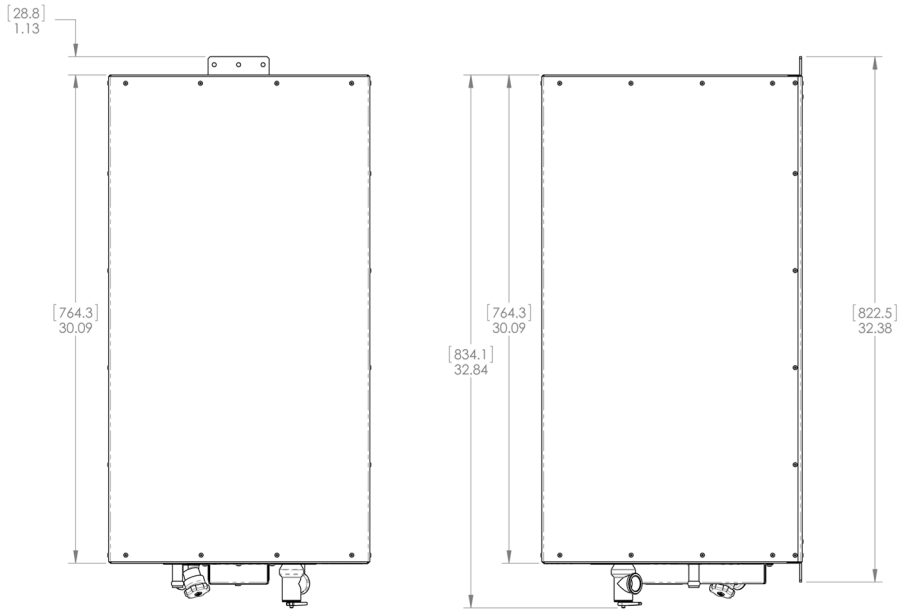
DETAIL C
SCALE 1 : 2

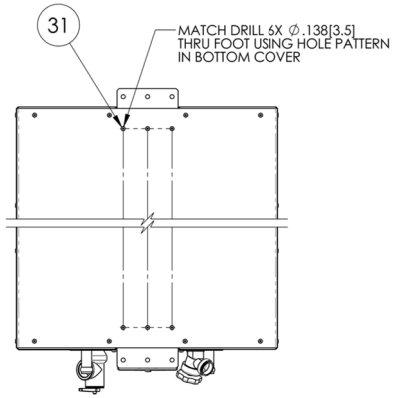
TOLERANCES (UNLESS SHOWN)
.XXX ± .005 (.13 mm)
.XX ± .020 (.51 mm)
X/X ± 1/32 (.8 mm)
ANGLE ± 0°30'
FINISH 125 √ (3.2)
THIRD ANGLE PROJECTION

CAMCO MFG. INC.
GREENSBORO, NC USA

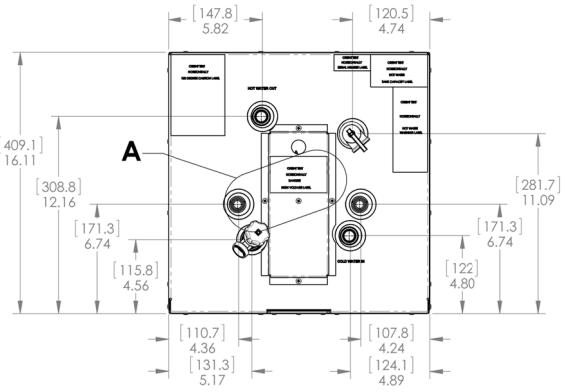
TITLE: ASSEMBLY, WATER HEATER, VERTICAL, 240V1500W 20 GALLON, OS

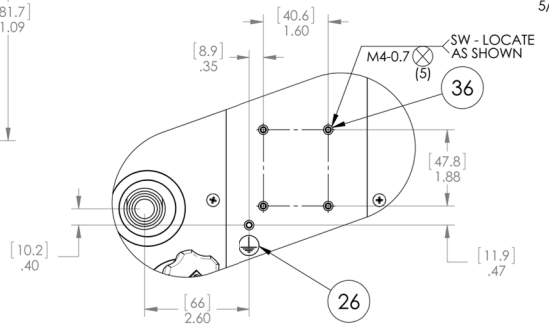
DATE: 12/6/2012	SCALE: 1:5	SIZE	DRAWING NO.	REV.
DES	DRN JRB	CHK	C	1007557	1



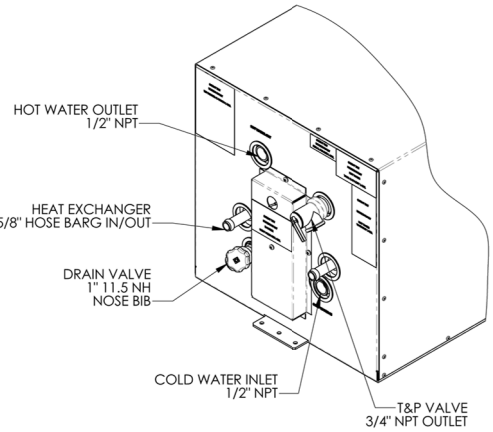


BOTTOM VIEW





DETAIL A
SCALE 1 : 2



NOTES :
1. ALL DIMS IN [ ] ARE IN MILLIMETERS.
2. REMOVE ALL SHARP EDGES.
3. WEIGHT : 35.901 lbs [16.2844 kg].
4. EXCEPT FOR DETAIL A DIMENSIONS
   ALL DIMENSIONS ARE FOR REFERENCE ONLY

TOLERANCES (UNLESS SHOWN)
.XXX ± .005 (.13 mm)
.XX ± .020 (.51 mm)
X/X ± 1/32 (.8 mm)
ANGLE ± 0°30'
FINISH 125 √ (3.2)
THIRD ANGLE PROJECTION

CAMCO MFG. INC.
GREENSBORO, NC USA

TITLE: ASSEMBLY, WATER HEATER, 240V, HORIZONTAL, 20 GAL, OS

DATE: 12/13/2012	SCALE: 1:5	SIZE	DRAWING NO.	REV.
DES	DRN: JRB	CHK	C	1007908	1

IMPORTANT NOTE

Different plumbing systems work differently. If you have a closed-loop system, which most boats do, your water heater has the potential to explode when the T&P valve fails to open. On the other hand, a system with an open system will be safe even when the T&P valve fails. A closed-loop system describes the condition where water in the system can only flow in one direction, due to the presence of a check valve or pressure reducing valve. The opposite is what describes an open system. With an open system, expanding water from a water heater can flow back through the cold-water supply pipe, thereby bringing down the pressure and/or temperature of the water in the water heater. If you have a close-loop system and unfortunately the T&P valve fails, the excess pressure and/or temperature will have nowhere to go and unless there is an immediate demand for hot water, you have the potential for an explosion.

If you have a close-loop system and want to have a backup for the T&P valve, you should consider installing a water heater expansion tank, which is sometimes also referred to as a thermal expansion tank. A water heater expansion tank is typical a small tank, about 2 gallons in size with an air bladder inside and is installed on the water heater's cold-water supply pipe between the shut off valve and the water heater. These tanks have 2 sections, the upper part is a balloon-like bladder, whose air pressure should be equal to that of the incoming cold water. Its lower compartment is filled with the incoming cold water and when water in the heater starts to heat up and expand, it flows back to the expansion tank. A move that compresses the air in the bladder instead of leaking out through the T&P valve.

One thing to note is that if you have a hot water recirculation pump/system, then you have a check valve which makes your plumbing system a closed-loop system. So, I guess to your question, if the water heater is installed in a closed-loop system and the T&P valve can't drain or release the pressure, then there is a chance that the water heater could potential explode because the excess pressure has nowhere to go to be released.

There are 3 main scenarios that can cause water to leak from the T&P valve and they are:

1. The water temperature and/or pressure in the water heater are too high and the valve is just doing its job.
2. The valve is faulty or isn't properly installed or the seat didn't fully reseat due to some reason.
3. If installed, the water heater expansion tank is waterlogged (this basically means the bladder/diaphragm inside the expansion tanks has raptured).