

HydraTherm™

OPERATION MANUAL



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INTENDED USE:

The HydraTherm Unit is intended for use in treatment facilities and rehabilitation clinics to heat hot packs for the purpose of moist heat therapeutic treatment.



WARRANTY

Congratulations on your purchase of your Richmar HydraTherm™.

Richmar warrants that our HydraTherm units are free of defects in material and workmanship. This warranty shall remain in effect for One (1) year from the date of the original end user purchase. If this Product fails to function during the One (1) year warranty period due to a defect in materials or workmanship, Richmar or the selling dealer will repair or replace the respective Product without charge within a period of Thirty (30) days from the date on which the Product is returned.

All repairs to the Product must be performed by Richmar or a Richmar Authorized Service Center.

Any modifications or repairs performed by unauthorized centers or groups will void this warranty.

To participate in warranty coverage, the Product's warranty registration card (included with the product) must be filled out and returned to Richmar by the original owner within ten (10) business days from the date of purchase; or the Product can be registered online at: richmarweb.com/warranty-registration.

RICHMAR SHALL RESERVE THE RIGHT TO REQUEST PROOF OF PURCHASE FROM THE END-USER TO VALIDATE THE WARRANTY PERIOD

This warranty does not cover:

1. Replacement parts or labor furnished by anyone other than Richmar, the selling dealer or a certified service technician.
2. Defects or damage caused by labor furnished by someone other than Richmar, the selling dealer or a certified service technician.
3. Any malfunction in the Product caused by product misuse, including, but not limited to, the failure to provide reasonable and required maintenance or any use that is inconsistent with the Product's Manual.

RICHMAR SHALL NOT BE LIABLE IN ANY EVENT FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES

Some locations do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

To obtain Service from Richmar or the selling dealer under this warranty:

1. A claim must be made within the warranty period to Richmar or the selling dealer.
2. Written claims made to Richmar should be sent to:

Richmar
4120 South Creek Road
Chattanooga, TN 37406 USA

Telephone: +1 423.648.7730

Fax: +1 423.648.7735

Email: technicalsupport@richmarweb.com

3. The Product must be returned to Richmar or End User's Distributor by the End User.

This warranty give you specific legal rights and you may also have other rights which vary from location to location. Richmar does not authorize any person or representative to create for it any other obligation or liability in connection with the sale of the Product.

Any representative or agreement not contained in the warranty shall be void and of no effect.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OR MERCHANT ABILITY OR FINES FOR A PARTICULAR PURPOSE.

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This manual is written to insure the proper and safe operation of the HydraTherm Heating Unit. It contains general information regarding replacement parts, operation, safety precautions and maintenance. In order to maximize safety, efficiency and the life of your heating unit, please read this manual thoroughly and follow all instructions prior to operating the unit.

Specifications and instructions put forth in this manual are in effect at the time of publication; however, due to Richmar's policy of continued product improvement, changes may be made to these specifications and instructions at any time without obligation on the part of Richmar.

SYMBOLS GLOSSARY

CAUTIONS

Text with a "CAUTION" indicator explains possible safety infractions that could have the potential to cause minor to moderate injury or damage to equipment.

WARNINGS

Text with a "WARNING" indicator explains possible safety infractions that could potentially cause serious injury and equipment damage.

DANGER

Text with a "DANGER" indicator explains possible safety infractions that are imminently hazardous situations that could result in death or serious injury.

DANGEROUS VOLTAGE

Text with a "DANGEROUS VOLTAGE" indicator serves to inform the user of possible hazards resulting in an electrical charge.

NOTE: Throughout this manual, "NOTE" may be found. These notes are helpful information to add in the particular area or function being described.



ATTENTION: Refer to the Instruction Manual/ Booklet



Type B equipment



Indicates a requirement not to dispose of WEEE as municipal waste.



"I" indicates ON. "O" indicates OFF.

The following labels are located on the electrical enclosure in the rear of the unit.



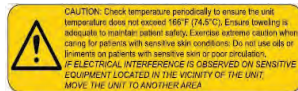
Hazardous Voltage

High Voltage is present in the electrical enclosure located in the rear of the unit. Service should only be accomplished by trained personnel.



Explosion Hazard

Due to the high temperatures in which the unit operates, do not use this unit in the presence of flammable anesthetics.



Water Temperature

Check water temperature periodically to ensure temperature does not exceed 170°F (77°C). For personal safety and patient safety, please observe the cautions as outlined in the label below.



Hot Surface

Hot surface. Do not touch.



Classification

Classified by SGS North America Inc.
Consumer Testing Services (USA Only)

CAUTION

- The HydraTherm Heating Unit is intended for clinical/professional use ONLY.
- Read, understand and practice the precautionary and operating instructions. Know the limitations associated with the HydraTherm Heating Unit. Observe the cautionary and operational decals installed on the Product.
- On the initial startup of the heating unit or when new heat packs are added, check the water level every 2 hours for a period of 8 hours. This will prevent running the heater with low water levels as some new heat packs absorb water.

Note: Richmar recommends using the HydraHeat Packs, which do not absorb water, provide better performance, and lower maintenance.

- The thermostat is preset to 135°F (57°C) at the factory. The operating temperature range is 120°F (49°C) - 160°F (71°C). Always allow sufficient time for the water temperature to stabilize.
- ALWAYS keep the water level at or over the top of the heat packs.
- Check water level daily, due to evaporation from the unit.
- Check the temperature periodically to ensure the unit temperature does not exceed 170°F (77°C).
- Clean the tank periodically as described in the cleaning and maintenance sections of this manual.
- Always replace heat packs as soon as they show signs of wear.
- If the unit is to be left unattended for longer than one week:
 - a. Turn the unit off.
 - b. Disconnect the power cord from the power source/electrical outlet.
 - c. Remove the packs.
- **DO NOT** move the HydraTherm Heating Unit when filled with heated water. Contact with hot water could result in scalding and/or burns to users or others.

- **ALWAYS** use factory authorized replacement parts.
- **ALWAYS** use a towel, pillowcase, or washable terry cover against a patient's skin when using hot packs to prevent injury to patient and contamination.
- **ALWAYS** unplug the unit from its electrical service when cleaning the unit.
- If electrical interference is observed on sensitive equipment in the locale of the heating unit, first turn the unit off to determine the source of interference. If necessary, unplug the heating unit and move it to another area. It is recommended to allow water to cool and/or drain the unit prior to moving.

NOTE: Refer to “**Electrical Interference**” on page 16 of this manual.

- **DO NOT** store the unit in a confined space.
- When heated, the surface of the glass lid may become hot. Use the handle to lift the lid. **DO NOT** touch the glass top.
- Exercise extreme caution when caring for patients with insensitive skin or in areas of poor circulation.
- The HydraTherm Shelf load limit is 7.5 lb (3.4 kg).
- **DO NOT** sit on the HydraTherm or the HydraTherm Shelf.
- Consult healthcare professionals before using heat packs on individuals who cannot communicate.

Warning

If the water reaches or exceeds 175°F (79°C) turn the unit OFF, remove the Power Cord and quarantine the unit. Contact Richmar's Service Department for technical support and further instructions.

PRECAUTIONARY INSTRUCTIONS



Warnings

- The water temperature in the HydraTherm Heating Unit is adjustable from 120°F (49°C) to 160°F (71°C).
- **NOTE:** The scalding temperature of water is 120°F (49°C). Never place hands into the Heating Unit. When filled with heated water, retrieve heat packs using the divider handles to lift heat packs out of the water enough to safely grasp; or use plastic or coated tongs to retrieve hot packs.
- It is recommended that the water temperature be checked on a daily basis prior to use.
- Individuals with circulatory problems should consult with a physician before using this product.
- **DO NOT** add chlorine additive to water.

DETAILED DEVICE DESCRIPTION



Front View



Rear View



Side View with Shelf

NOTE: One Shelf is a Standard Accessory on the Deluxe Model Only.



Enclosure Panel (115/120VAC Deluxe shown)

1. Power Entry Module
2. Mains Fuses 12 Amp
@ 250 VAC 5mm x20mm
3. Power Switch
4. Power Indicator Lamp
5. Heat/Drain Select Switch (Deluxe Model Only)

HydraTherm Heating Units come standard with the Divider System as shown below in **Figure 1**. The Divider System functions as a vertical drawer, enabling the raising of heat packs for easy removal.

The Divider System can be substituted for the Traditional Rack System shown in **Figure 2**. Made from the same composite material, the Rack System sits lower inside the tank and functions like traditional stainless steel racks.

Shelf Clips are included with both systems, and can be used at any of four (4) available height positions. See page 6 for recommended shelf clip positions.



Rear Cavity

6. Low Voltage Control Fuse
(500mA @ 205V)
7. Voltage Requirement
(120 VAC or 240 VAC)
8. Drain Hose with Shut-Off Valve

NOTE: The front rail of the first divider is thin compared to the other dividers, as seen in **Figure 3**.



Figure 2. Traditional Rack System



Figure 1. Divider System



Figure 3. Divider Rail Comparison

RECOMMENDED PACK SETUP

When purchasing HydraTherm heating units, customers have the option of including 12 HydraHeat Packs with their purchase. This includes three of each size: universal, cervical, standard and oversize.

Recommended setup uses 2 of the 3 included clip-on shelves, one at the bottom position on the back of the rear-most divider. The second is placed at the top position of the front divider (Fig. 1). The third can be stored for later use, or used if a different configuration is desired.

The recommendation for setup of clip-on shelves and pack placement is illustrated below (Fig. 2).

When retrieving a HydraHeat Pack, it is important to only lift the divider 2" to 3" (5-8 cm), just enough to lift the edge of the pack out of the water. When returning packs to the tank, flatten first to ensure smooth operation of the dividers.

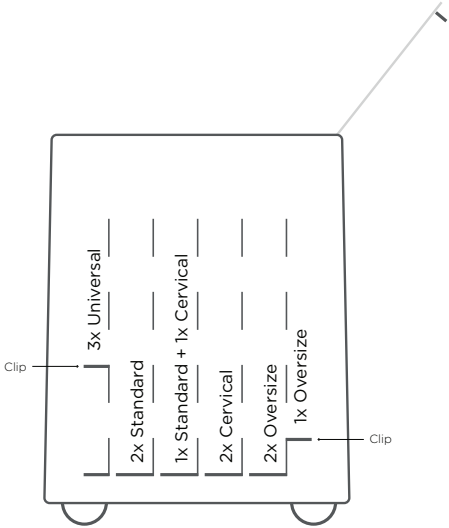


Figure 1.

Figure 2. Side View of Tank

The HydraTherm Heating Unit is designed to be simple and easy to use.

Remove all of the contents inside the HydraTherm Heating Unit and then place the racks into the unit.

- Allow a minimum of 16" (41 cm) clearance above the lid so that the packs can be removed without external interference and 6" (15 cm) or more in the back to be able to access the electrical enclosure power switch.

NOTE: As with all electrical equipment and components, the unit should be kept clear of any hazardous or explosive gases.

- Insert the heat pack(s).
- Verify drain hose valve is in the closed position.
- Fill tank with water until the packs are covered.

NOTE: Richmar recommends using distilled water. If the low water light is illuminated after tank is filled, slowly add tap water until the light extinguishes.

NOTE: Adding additional packs after the unit is filled will cause the water to displace and may cause an overflow condition.

- To turn the unit on, simply plug the supplied power cord into the back of the unit and then into the appropriate 115-120VAC or 220-240VAC, 50/60 Hz outlet and set the Power Switch to the "I" position. To turn the unit off, simply move the switch to the "O" position and unplug from the mains power outlet.

NOTE: If unit is a Deluxe Model, ensure the HEAT/DRAIN Switch is set to HEAT before setting the Power Switch to "I".

NOTE: DO NOT attempt to use the unit if it is not properly grounded.

NOTE: A Ground Fault Interruption circuit or receptacle (GFI outlet) is recommended for additional protection.

- The Digital Thermostat, located on the front of the unit, controls and maintains the temperature of the water as well as senses Low Water Condition,
- **For Deluxe Models:** Ensure that the HEAT/DRAIN switch is selected to the HEAT position.

PUMP SYSTEM (DELUXE MODELS ONLY):

- **Heat Mode**
When the HydraTherm HEAT/DRAIN Switch is in the "HEAT" position, the unit will operate in a normal mode.
- **Drain Mode**
The HydraTherm Deluxe pump can be used to drain the water from the tank. When the HEAT/DRAIN Switch is set to the "DRAIN" position, the pump will turn on.

NOTE: Make sure that the shut-off valve on the Drain Hose is in the OPEN position when draining, and turned to the CLOSED position again before filling.

- Once the tank is empty, place the HEAT/DRAIN Switch back to the "HEAT" mode position. Refer to page 5 for the location of switch and drain hose.

DEVICE USER INTERFACE

The HydraTherm Heating Unit is equipped with a digital temperature controller and will display the current water temperature. This control also has a Low Water Sensing circuit that will warn the user, via a LED light on the lower left front of the control display, that a Low Water Condition exists. This feature will also disable the heating element until a safe water level is sensed.

NOTE: Refer to page 7 for more information.

Changing the Temperature Set Point

The Temperature Set Point is adjustable between 120°F (49°C) and 160°F (71°C).

The Factory Default setting is 135°F (57°C). To change the set point to the desired water temperature, follow the instructions below:

- Upon completion of filling the tank with water, power the unit up using the I = "ON" / O = "OFF" switch located on the lower back side of the unit.
- The control on the front should now be on and displaying the current water temperature sensed. Refer to **Figure 1**.



Figure 1.

- Press the SET key on the control. HSP will now be displayed as shown in **Figure 2**.



Figure 2. Heat Set Point Menu Displayed

- Again, press the SET key. The Current Set Point Temperature will now be displayed. Factory default setting is 135°F (57°C) as shown in **Figure 3**.



Figure 3. Current Set Point Setting

- Using either the UP or DOWN keys, adjust the set point to the desired value. The controller will allow set points between 120°F (49°C) and 160°F (71°C). Refer to **Figures 4A and 4B**.



Figure 4A. Minimum Setting



Figure 4B. Maximum Setting

- Once the desired Set Point value is reached, press the SET key. The control will now display HSP again as shown in **Figure 5**.



Figure 5.

- To exit the Set Point menu, press the SET and DOWN keys at the same time for 2 seconds, or wait 60 seconds. The control will then save the value of the set point and the current water temperature will be displayed.

Low Water Condition

The control provides the feature of Low Water Sensor. If the water level drops to a certain point the controller will sense the Low Water Condition and will disable the heating element from energizing. The Low Water LED will illuminate to indicate that a Low Water Level exists. Refer to #1 in Figure 6.

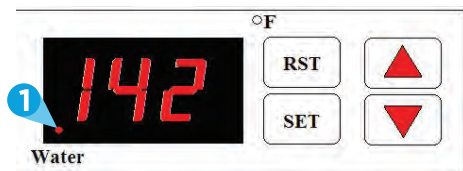


Figure 6. Low Water Level LED Illuminated

NOTE: When the Low Water LED is illuminated, the controller has sensed little to no water present, and has disabled the heating element.

Open or Shorted Temperature Sensor

In the event the Temperature Sensor or sensor wiring encounters an OPEN or SHORTED state, the Control will display

"000" (OPEN) as shown in Figure 7, or "- - -" (SHORTED) as shown in Figure 8.

In the event of an OPEN or SHORTED condition perform the following steps before contacting Richmar's Service Department for technical support and further instructions:

1. Turn the unit OFF (O).
2. Remove the Power Cord.
3. Quarantine the Unit.
4. Contact Richmar Service Department.



Figure 7. Open Temperature Sensor

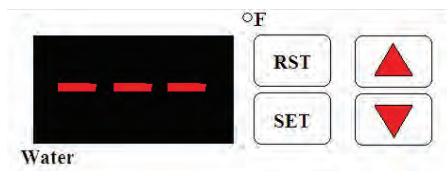


Figure 8. Shorted Temperature Sensor

MAINTENANCE

The HydraTherm Heating Unit is equipped with an immersion type heating element and a Digital Thermostat Controller to maintain the water temperature.

It is recommended to maintain the water level at or over the top of the heat packs.

Water is constantly lost during operation due to evaporation; therefore, it is essential to check the water level daily.



Council Directive 2002/96/EC concerning Waste Electrical and Electronic Equipment (WEEE). Indicates a requirement not to dispose of WEEE as municipal waste.

Contact your local distributor for information regarding disposal of the unit and accessories.

CLEANING INSTRUCTIONS

CAUTION

ALWAYS unplug the unit from the electrical outlet when cleaning the unit.

It is recommended to clean the heating unit a minimum of 2 times per year, or more frequently as needed.

NOTE: DO NOT USE BLEACH or any cleaner with HIGH CHLORINE content.

NOTE: Chlorine in regular tap water may be present in high enough concentrations (4ppm or more) to damage your unit. If you suspect high levels of chlorine in your HydraTherm Heating Unit, Richmar recommends the use of distilled water or the addition of a dechlorinator.

Also, certain additives such as herbal teas, essential oils, etc., may damage the components of the heating unit. The HydraTherm Heating Unit was designed for use with clean water and HydraHeat packs.

The interior of the unit should be cleaned using a non-abrasive cleaner. Check to make sure your cleaner has a low amount or no chlorine content in your cleaner and make sure that any residue is thoroughly rinsed away with water.

To aid in the removal of deposits on the heating element, pour a solution of vinegar and water in a 1:1 ratio into the heating element well, using no more than required to submerge the heating element. Thoroughly rinse the water tank with clean water to remove dissolved deposits.

NOTE: Failure to maintain your equipment may result in voiding the warranty.

OPERATION: HEATING MODE

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Unit / Device fails to power ON. The Power Indication Lamp does not illuminate.	Fuse(s) open	Check MAINS fuse(s) with OHM Meter for continuity
	Facility outlet not powered	Check facility outlet for proper operation
	Faulty Power Cord	Replace Power Cord
	Faulty Power Switch	Replace Power Switch
Unit / Device Power Indication Lamp illuminates, but the Digital Thermostat Controller display does not illuminate.	HEAT / DRAIN Switch in DRAIN MODE	Move switch to the HEAT position
	24VAC Low Voltage Fuse open	Check Low Voltage Fuse with OHM Meter for continuity. Replace if needed.
	Defective Digital Thermostat Control	Replace Digital Thermostat Control
Unit / Device Power Indication Lamp does not illuminate but the Digital Thermostat Controller display is illuminated.	Power Indication Lamp faulty	Check to see if unit / device is operating properly 1. If "YES", replace Power Indication Lamp 2. If "NO" contact Richmar Service Department
Both the Power Indication Lamp and Digital Thermostat Controller display illuminates, but Unit / Device does not heat.	If LOW WATER status is illuminated on the Digital Thermostat Controller Display: 1. Was HydraTherm filled with Distilled water? 2. Possible dirty and/ or contamination on temperature sensor housing.	Is LOW WATER indicated? 1. If YES, add 6 - 12 ounces of tap water. If NO or LOW WATER indication is still illuminated, proceed to Solution #2. 2. Clean the temperature sensor element located in bottom of tub on left hand side.
	Issue with Digital Thermostat	Replace Digital Thermostat Control
	Faulty Heating Element	Replace Heating Element
	Faulty Heating Element Power Contactor/Relay	Replace Heating Element Power Contactor/Relay
Both the Power Indication Lamp and Digital Thermostat Controller display are illuminated. Unit / Devices starts to heat up then stops heating. Unit never reaches desired temperature and/or set point.	Verify SETPOINT setting/value	Set to desired temperature (see manual)
	Digital Thermostat Controller	Replace Digital Thermostat Control
	Power Contactor intermittent	Replace Heating Element Power Contactor/Relay
	HIGH LIMIT Switch intermittent	Replace HIGH LIMIT Switch Assembly
	HEATING ELEMENT intermittent	Replace Heating Element

TROUBLESHOOTING



OPERATION: HEATING MODE (CONTINUED)

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Both the Power Indication Lamp and Digital Thermostat Controller display are illuminated. Unit / Device heating to temperatures well beyond desired temperature.	Verify SETPOINT setting/value	Set to desired temperature (see manual)
	Temperature OFF-SET setting	Contact Richmar Service Department
	Digital Thermostat Controller faulty	Replace Digital Thermostat Control
	Power Contactor faulty	Replace Heating Element Power Contactor/Relay
Both the Power Indication Lamp and Digital Thermostat Controller display are illuminated but Controller displays: "---" or "ooo".	Thermistor wire(s) disconnected at controller terminal (purple wires)	Re-connect thermistor wire(s) in terminal position 1 and/or 2
	Faulty High Limit / Thermistor Assembly	Replace HIGH LIMIT Switch Assembly
	Faulty Digital Controller	Replace Digital Thermostat Control
	If none of the possible repair solutions listed above solve the issue: 1. TURN OFF UNIT 2. UNPLUG DEVICE 3. ISOLATE UNIT 4. CONTACT RICHMAR SERVICE DEPARTMENT	

OPERATION: HEATING MODE - DELUXE MODELS ONLY

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Unit / Device fails to power ON. The Power Indication Lamp or Digital Thermostat Controller display does not illuminate.	MAINS Fuse(s) open	Check MAINS fuse(s) with OHM Meter for continuity
	Facility outlet/receptacle not powered	Check facility outlet for proper operation
	Faulty Power Cord	Replace Power Cord
	Faulty Power Switch	Replace Power Switch
	Defective Power Indication Lamp	Replace Power Indication Lamp
Unit / Device Power Indication Lamp illuminates but the Digital Thermostat Controller display did not illuminate	If DELUXE Unit, this is normal operation. No fault exists.	No Fault Condition Exists

OPERATION: DRAIN MODE - DELUXE MODELS ONLY

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Pump does not come ON - Unit / Device Power Indication Lamp illuminated, and HEAT / DRAIN Switch in "DRAIN" position.	PUMP electrical connection to 3-position receptacle located on the left hand side loose or disconnected. Note: Receptacle is located on rear of enclosure.	Re-seat electrical connection
	Pump 2 Amp protection fuse open	Replace fuse: 2 Amp / 250V Glass Fuse (5 x 20mm)
	Pump faulty	Replace Pump
	12VDC Power Supply faulty	Replace 12VDC Power Supply (Medical Grade)
	HEAT / DRAIN Switch faulty	Contact Richmar Technical Support
Unit / Device Power Indication Lamp illuminated, and HEAT / DRAIN Switch in "DRAIN" position.	Shut Off Valve "CLOSED"	"OPEN" Shut Off Valve
	Drain Hose kinked	Inspect hose for kink and/or remove obstruction
Pump energizes "ON" but no water flowing through system.	Pump faulty	Replace Pump

If in any case the suggested Troubleshooting Solutions do not remedy the problem(s) you are experiencing, contact Richmar Technical Support for additional information.

TECHNICAL SPECIFICATIONS

Supply Voltage	110/120VAC or 220/240VAC
Line Frequency	50/60 Hz
Power Consumption	
115-120VAC Models	1000 Watt
220-240VAC Models	2000 Watt
Adjustable Temperature Range	120°F (49°C) - 160°F (71°C) +/- 5°F (+/- 3°C)
Safety Thermal Control Accuracy	185°F +/- 5°F (79°C +/- 3°C)
Weight (Dry)	
Standard Model	70 lbs (31.75 Kg)
Deluxe Model	75 lbs (34.02 Kg)
All Models (Total Working Capacity)	350 lbs (158.76 Kg)
Dimensions	30" W x 20" D x 33" H
Safety Class	

**B**

Equipment providing a particular degree of protection against electric shock, particularly regarding allowable leakage currents and reliability of the protective earth connection (if present).

DEVICE DESCRIPTIONS



HYDRATHERM STANDARD MODELS

Part Number	Voltage Requirements	Divider/Rack System	Includes
HT-R12-S	115-120 VAC	Divider System	N/A
HT-R12-S220	220-240 VAC	Divider System	N/A
HT-R12-SW	115-120 VAC	Divider System	HydraHeat Packs 3 - Standard 3 - Cervical 3 - Oversized 3 - Universal
HT-R12-SW220	220-240 VAC	Divider System	HydraHeat Packs 3 - Standard 3 - Cervical 3 - Oversized 3 - Universal
HT-R12-SR	115-120 VAC	Rack System	N/A
HT-R12-SR220	220-240 VAC	Rack System	N/A
HT-R12-SRW	115-120 VAC	Rack System	HydraHeat Packs 3 - Standard 3 - Cervical 3 - Oversized 3 - Universal
HT-R12-SRW220	220-240 VAC	Rack System	HydraHeat Packs 3 - Standard 3 - Cervical 3 - Oversized 3 - Universal

HYDRATHERM DELUXE MODELS

Part Number	Voltage Requirements	Divider/Rack System	Includes
HT-R12-D	115-120 VAC	Divider System	N/A
HT-R12-D220	220-240 VAC	Divider System	N/A
HT-R12-DW	115-120 VAC	Divider System	HydraHeat Packs 3 - Standard 3 - Cervical 3 - Oversized 3 - Universal
HT-R12-DW220	220-240 VAC	Divider System	HydraHeat Packs 3 - Standard 3 - Cervical 3 - Oversized 3 - Universal
HT-R12-DR	115-120 VAC	Rack System	N/A
HT-R12-DR220	220-240 VAC	Rack System	N/A
HT-R12-DRW	115-120 VAC	Rack System	HydraHeat Packs 3 - Standard 3 - Cervical 3 - Oversized 3 - Universal
HT-R12-DRW220	220-240 VAC	Rack System	HydraHeat Packs 3 - Standard 3 - Cervical 3 - Oversized 3 - Universal

REPLACEMENT PARTS AND OPTIONAL EQUIPMENT

Description	Part Number	Qty. Per Unit
Power Cord - USA	410-599	1
Drain Valve	HW-DHV	1
Shelf Assembly (Optional)*	HT-R12-SHELF	1
Heat Pack Divider System	HT-R12-DIV	1 set of 5
Heat Pack Rack System (Optional)	HT-R12-RCK	1 set of 5
Shelf Clip	HT-R12-DIVS	1
Mains Fuses 12 Amp 250VAC Ceramic 5mm x 20mm Slow-blow	HT-ELC-F12	2
Low Voltage Fuse 500mA 250VAC 5mm x 20mm Glass Slow-blow	HT-ELC-FUS	1
HydraHeat Standard Heat Pack	HP-1711-ST	1
HydraHeat Cervical Heat Pack	HP-1711-CX	1
HydraHeat Oversize Heat Pack	HP-1713-OS	1
HydraHeat Universal Heat Pack	HP-1905-UN	1

* HydraTherm Heating Units can have up to two (2) shelves attached.

APPENDIX A - EMC TABLES

GUIDANCE AND MANUFACTURER'S DECLARATION - ELECTROMAGNETIC EMISSIONS

The HydraTherm Composite Heating Unit is intended for use in the electromagnetic environment specified below. The customer or the user of the HydraTherm Composite Heating Unit should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The HydraTherm Composite Heating Unit uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The HydraTherm Composite Heating Unit is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies	

GUIDANCE AND MANUFACTURER'S DECLARATION - ELECTROMAGNETIC IMMUNITY

The HydraTherm Composite Heating Unit is intended for use in the electromagnetic environment specified below. The customer or the user of the HydraTherm Composite Heating Unit should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD)	±6 kV contact ±8 kV air	±8 kV contact ±15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
IEC 61000-4-2			
Electrical fast transient/burst	±2 kV for power supply lines	±2 kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
IEC 61000-4-4			
Surge	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
IEC 61000-4-5			
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % UT (>95 % dip in UT) for 0,5 cycle	<5 % UT (>95 % dip in UT) for 0,5 cycle	Mains power quality should be that of a typical commercial or hospital environment. If the user of the HydraTherm Composite Heating Unit requires continued operation during power mains interruptions, it is recommended that the HydraTherm Composite Heating Unit be powered from an uninterruptible power supply or a battery.
	40 % UT (60 % dip in UT) for 5 cycles	40 % UT (60 % dip in UT) for 5 cycles	
	70 % UT (30 % dip in UT) for 25 cycles	70 % UT (30 % dip in UT) for 25 cycles	
	<5 % UT (>95 % dip in UT) for 5 sec	<5 % UT (>95 % dip in UT) for 5 sec	
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A / m	30 A / m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE UT is the AC mains voltage prior to application of the test level.

APPENDIX A - EMC TABLES

GUIDANCE AND MANUFACTURER'S DECLARATION - ELECTROMAGNETIC IMMUNITY

The HydraTherm Composite Heating Unit is intended for use in the electromagnetic environment specified below. The customer or the user of the HydraTherm Composite Heating Unit should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the [ME EQUIPMENT or ME SYSTEM], including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	6 Vrms	Recommended separation distance $d = 0.6\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,7 GHz(1)	3 V/m	$d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2,7 GHz
			Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).
			Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. b
			Interference may occur in the vicinity of equipment marked with the following symbol:
			

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

^aField strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the HydraTherm Composite Heating Unit is used exceeds the applicable RF compliance level above, the HydraTherm Composite Heating Unit should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the HydraTherm Composite Heating Unit.

^bOver the frequency range 150 kHz to 80 MHz, field strengths should be less than 1 V/m.

(1) Additionally the test frequencies and levels in Table 9 of IEC 60601-1-2: 2014 were applied to address higher levels of immunity to RF wireless communications equipment.

RECOMMENDED SEPARATION DISTANCES BETWEEN PORTABLE AND MOBILE RF COMMUNICATIONS EQUIPMENT AND THE HYDRATHERM COMPOSITE HEATING UNIT

The HydraTherm Composite Heating Unit is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the HydraTherm Composite Heating Unit can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the HydraTherm Composite Heating Unit as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2,7 GHz
	$d = 0.6\sqrt{P}$	$d = 1.2\sqrt{P}$	$d = 2.3\sqrt{P}$
0,01	0.06	0.12	0.23
0,1	0.19	0.38	0.73
1	0.6	1.20	2.30
10	1.90	3.79	7.27
100	6.00	12.00	23.00

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

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