

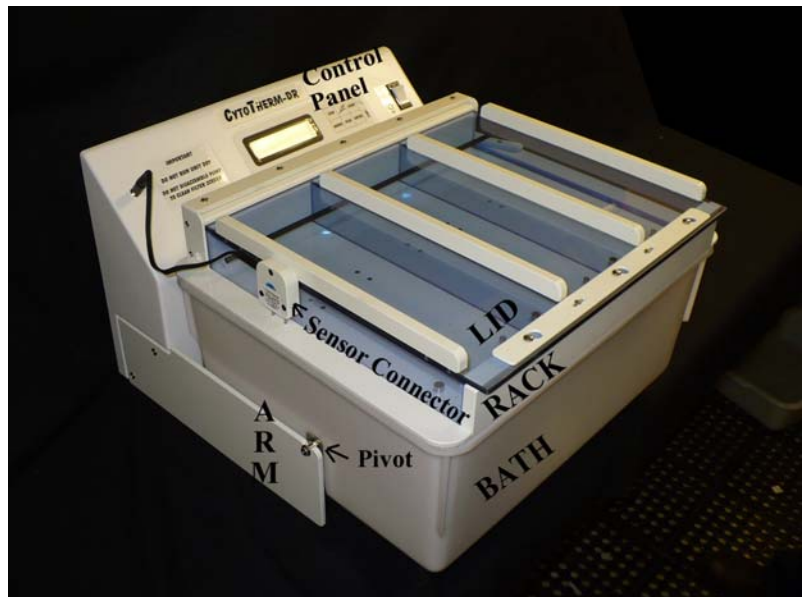
# CytoTherm

110 Sewell Ave. Trenton NJ 08610 USA  
Tel 800 747-9699 or 609 396-1456 Fax 609 396-9395  
Email serve@cytotherm.com Web www.cytotherm.com

## CytoTherm-DR

Dry  
Plasma Thawing  
with  
Rocking Action

Model **CT-DR**  
Rack with External Ribs  
Version 4.08 or higher



### Owner's Manual

#### WARRANTY

*Each CytoTherm product is manufactured under rigid quality control standards. This unit is fully warranted for a period of one year from the date of purchase. Call 609 396-1456 or 800 747-9699 for assistance. If necessary send unit to:*

**CytoTherm** 110 Sewell Ave. Trenton, NJ USA Tel 609 396-1456 Fax 609 396-9395

Do not forget to mail in your warranty card.

Please record the following: Serial No. \_\_\_\_\_ Date of Purchase \_\_\_\_\_

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\\DrawRec\Draw\Instructions\CtdrInsM.doc 22 Nov 08

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**SPECIFICATIONS:** Thawing temperature adjustable 25°C to 40° C. Preset to 37.0°C. Overtemp alarm 1.0°C over thawing temperature. 45°C safety thermostat. Accuracy 0.1°C. Easy to do, digital temperature calibration. Power 770 Watt, Available in 120 Volt or 230 Volts, 50 or 60 Hz. (must be grounded).

## DESCRIPTION

The CytoTherm DR (Model CT-DR) is a laboratory instrument for thawing plasma while keeping the plasma bag dry. Tempered water is recirculated through a bladder. The plasma bag to be thawed lays on one part of the bladder, while the rest of the bladder is folded over to cover the plasma bag. The plasma bag remains dry throughout. The rocking action speeds thawing. Plasma bag leakage is isolated to one of 3 separate sections. If a leak is detected, the thawing stops and an alarm sounds.

A digital timer displays the time to completion of the thawing. The plasma bag is also visible during thawing so you can check when it has been fully thawed.

Each of the 3 sections can thaw two 450ml. bags or one 1,000ml. Jumbo bag for a total of 6 x 450ml. or 3 Jumbo bags.

All the air that comes in contact with the internal water passes through 0.1 micron AIR FILTER.

## SETTING-UP

Make sure you have received the following:

..... Control Panel	..... Bath
..... Rack	..... 2 Arms
..... Lid	..... Sensor Connector
..... 6 Bladders, 3 mounted inside RACK	..... 4 x Air Filters
..... Extension Tubing	..... Inlet and Outlet Port Plugs (3 of each)
..... Power Cord	..... Instruction Book
.....Video or DVD	..... Algicide (contiguous USA only)

Screw the ARMS to the side of the CONTROL SECTION. The notched side of the ARMS face up.

Place the BATH in front of the CONTROL SECTION so that the chassis on the BATH is next to the indented portion of the CONTROL SECTION.

Connect the umbilical cord of the CONTROL SECTION to the plug receptacle on the back of the BATH section.

**\*\* THE POWER SWITCH MUST BE OFF  
WHEN CONNECTING OR DISCONNECTING THIS CONNECTION \*\***

Lift the BATH and position it so that the pivots on the side of the BATH slip into the notches on the ARMS.

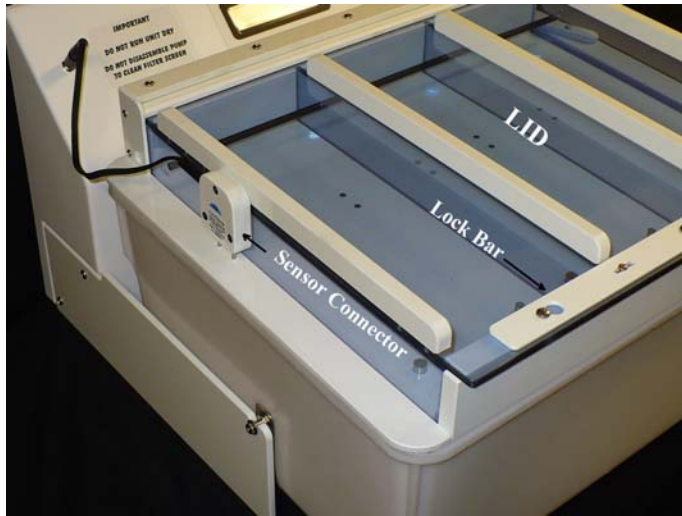
Make sure the power switch is OFF. Connect the power cord to a properly grounded electrical outlet.

Make sure that the DRAIN Valve is closed (horizontal) and fill with tap water to 2.5Cm. (1 inch) above the pivot screw inside the BATH. If you use deionized water, add a pinch (0.01 gr) of salt to make the water conductive. Do NOT use saline solution. Add 5 ml. of Algicide Part #ALG240 (1.0 ml. per 4 liter of water available in contiguous USA only) to the water. Any other bath clearing agent can also be used to keep the water clear.

Connect the pump output tubing to the input fitting on the bottom of the RACK. Place the RACK onto the top the BATH. The RACK has 3 bladders mounted inside.

Connect one side of the SENSOR CONNECTOR to the CONTROL PANEL and the other end to the 2 rods on the left side of the RACK. The SENSOR CONNECTOR senses if the LID is closed and if there is a leak.

Open the RACK by pushing the LOCK BAR to the left. Lift the LID by rotating it back, and when it is vertical, slowly lower it straight down into the slot.



Turn the power switch ON. The heater will heat to maintain 37°C. The pump will pulse to recirculate the water and the display will indicate the temperature.

### INSTALLATION CHECK LIST.

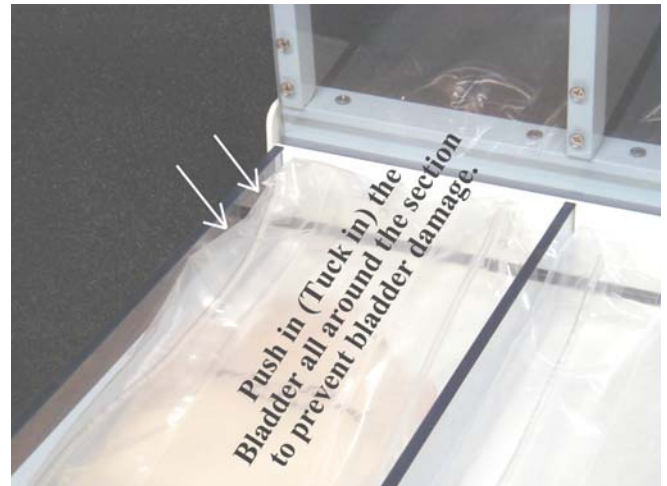
1. Make sure that the electrical outlet is properly wired. It must be grounded and the polarity must be correct.
2. Make sure that you use water from the tap or if you use de-ionized water, add a pinch of salt.
3. Make sure that the rocking motion is balanced. Start a thawing cycle (see OPERATION) watch the air bubble above the water flowing back and forth inside the BLADDERS. The air bubbles should flow forward and backward evenly as the BATH rocks. If not place a shim under the front or back of the ARMS so that the flow is balanced.

### OPERATION

Wait for the water to heat up to 37.0°C

Open the LID. Lift up the top layer of the bladder with one hand and lay the plasma bag(s) to be thawed on the bottom part of the BLADDER. Cover the plasma bag(s) with the top layer of the BLADDER. Tuck the bladder in.

Close the LID by lifting straight up until it stops and then rotating it down (forward). Lock it into place by pushing the LOCK BAR to the right.



Push START to begin thawing for the programmed time. The Rocking Motor will turn on and the BATH will rock front to back, the tempered water will be pumped through the bladder and the thawing time will be displayed. Use PLUS or MINUS to increase or decrease the thawing time. When the timer counts down, the buzzer will call the operator back.

Timing down to zero or pushing STOP ends the thawing and rocking.

If more thawing time is needed, hold PLUS while pushing START and the unit will thaw for another 3 minutes. STOP ends the thawing and drains the bladders.

If more thawing time is needed, hold PLUS while pushing START and the unit will thaw for another 3 minutes.

Thawing time is mainly a factor of thickness of the plasma in the bag. Flat-frozen plasma thaws quicker than folded-frozen plasma, which is thicker.

## **LEAKS**

In case of a leak, the alarm will sound and the thawing will stop. Open the LID to see which bag leaked. The leak will be confined to only one of the 3 sections. The other sections are not contaminated.

Determine what leaked:

**1. Plasma bag leaked.** Open the LID. Push down on the front of the RACK. Any leaked solution will flow to the front of the RACK. This will let you identify which section leaked. Pick up the plasma bag and observe for leaks. If there is a leak, discard the bag(s). Check if the Bladder also leaked. See # 3 below. If the BLADDER did not leak, use a paper towel to soak up the visible leaked solution. Remove the BLADDER by first lifting the top of the BLADDER up to drain out as much of its internal water as possible. Remove the INLET and OUTLET FITTINGS by holding the FITTINGS and twisting them as you pull up.

If you need to rush thawing the plasma bags in the non-contaminated section, you can do the full clean up later. Use the plastic plugs to close off the stainless steel ports, turn the unit on and start thawing. You will have to watch the plasma bags to see when they are thawed, because the count down timer will restart from the full thaw time.

Rinse the BLADDER under flowing water and wipe with a bleach towelette or a 10% bleach solution.

Wipe out the inside of the RACK and then wipe it with a bleach towelette or a 10% bleach solution. Remount the cleaned BLADDER in the RACK.

**2. BLADDER leaked.** If the plasma bag did not leak, the leak must be in the bladder. Wipe off and place the plasma bag(s) aside. Remove and discard the BLADDER by first lifting the top of the BLADDER up to drain out as much of its internal water as possible. Remove the INLET and OUTLET FITTINGS by holding the FITTINGS and twisting them as you pull up. Wipe up all the leaked solution inside the RACK. Wipe the inside of the RACK with a bleach towelette or a 10% bleach solution. Remount a new BLADDER. You are ready to start thawing again. Rinse off the bleach with water.

**3. Plasma bag and BLADDER both leaked.** It is a very unlikely case. After you determine that the plasma bag leaked, discard the plasma bag(s), push down on the front of the RACK and squeeze down lightly on the BLADDER. If the bladder is also leaking, the volume of the leaked solution in the front of the RACK will increase. Remove the BLADDER (see #2 above) and discard it. Wipe the section of the RACK with bleach towelettes or a 10% bleach solution. Rinse off the bleach with water.

If you need to rush thawing the plasma bags in the sterile section, you can do the full clean up later. Use plugs to close off the stainless steel ports, turn the unit on and start thawing. You will have to watch the plasma bags to see when they are thawed, because the count down timer starts at the full thawing time.

Do a full clean up. Remove the SENSOR CONNECTOR. Lift the front of the RACK, disconnect the RACK TUBE and place the RACK aside. Drain as much water as possible through the drain valve. Lift the BATH and place it on the table with the PIVOTS in front of the ARMS. Disconnect the umbilical cord connecting the CONTROL PANEL to the chassis on the back of the BATH, by squeezing the 2 tabs on the connector. Carry the bath to the sink and pour out the remaining water in the BATH. Wipe the inside of the BATH and the RACK with a bleach towelette or a 10% bleach solution. Do not use concentrated bleach. Mount a new BLADDER to replace the leaked BLADDER in the RACK. Reassemble (See SETTING-UP). Plug in and turn on the unit and push START and let it run for a few minutes so that the water passes through and rinses the pumps and the BLADDERS on the inside. Turn the unit off, drain out all the water a second time. Reassemble (see SETTING-UP).

## **BLADDER REPLACEMENT**

Hold the BLADDER so that the holes in the FITTINGS (water connectors) face down. Push the top of the BLADDER underneath the black rod that passes across the RACK near the back of the RACK. Gently pull the BLADDER up. Push down of the FITTING as you twist back and forth until the FITTING stops against the bottom of the RACK.

Mount the other FITTING the same way.

## BLADDER STORAGE

When storing, fold the bladders up loosely. If the bladder is dry it can be stored in a zip lock bag. If the bladder is wet then allow air flow around the rolled bladder.

## MODES

**STANDBY MODE.** Just turn the unit ON. The unit heats up and maintains 37.0°C in the BATH.

**THAWING MODE.** The unit recirculates tempered water through the bladders, rocks the BATH and RACK, times the thawing and monitors for leaks. Pushing START initiates thawing. Pushing STOP stops thawing.

**DIAGNOSTIC MODE.** Is for technician access. Hold MINUS as you turn the unit ON.

1. To restore the unit to initial factory settings, press ENTER while still holding MINUS. The unit displays “UNIT RESET”. Turn the unit off. You have to re-calibrate the temperature after resetting the unit.
2. “PUMP TEST” is a diagnostic tool to check if each pump turns on. It is checked only when a pump does not operate. Release MINUS then push ENTER to verify that you are a technician. The display shows “PUMP TEST”. MINUS turns on Pump 1, ENTER turns the rocking motor. Push PLUS to go to next function.
3. ALARM TEST (OVERTEMP). Push ENTER, the heater will heat continuously and the pumps will turn on. When the temperature reaches 1.0C above the target temperature the alarm will sound. Turn Off the unit. If alarm does not sound, contact CytoTherm. Alarm test should be performed every 3 months as part of unit maintenance.

**PROGRAM MODE.** Allows you to:

1. Program the thawing time.
2. Select whether to continue thawing when timed out.
3. Calibrate the temperature.
4. Set the target thawing temperature. The Alarm temperature is 1.0C above the target temperature.
5. Select the signal when thawing is done (continuous or pulsed).

Enter PROGRAM MODE by holding ENTER while turning the unit ON. Follow the displayed instructions to program. Pushing PLUS advances the menu to the next parameter.

**Programming the Thawing Time.** When the thawing time is displayed, press MINUS because you want to change the time. Use PLUS or MINUS to set the desired new thawing time, press ENTER to program in the new time. Turn the unit off.

**Calibrating Temperature.** Turn the unit on and let it heat up to 37.0°C. Check the displayed temperature with your accurate thermometer. There is a covered THERMOMETER WELL on the right side of the RACK. It is covered with a cover bar. Rotate the cover bar to expose the thermometer well. Place your thermometer into the THERMOMETER WELL. The thermometer stem should be at least 13 cm. (5”) long. If the displayed temperature needs to be changed, turn the unit off. Enter PROGRAMMING MODE by holding ENTER as you turn the unit on. When the thawing time is displayed push PLUS until the display shows “CALIBRATE TEMPERATURE”. Push MINUS because you want to change the displayed temperature. Use PLUS or MINUS to make the displayed temperature agree with your thermometer. Push ENTER to record the calibration. Turn the unit off. If the unit can not be calibrated, or if the calibrated temperature is not stable, have a technician check the unit. See TECHNICIAN FUNCTIONS.

## SWITCH FUNCTIONS There are 6 switches on the front panel:

START. Starts function.

STOP. Stops function.

ENTER. Records parameter changes.

PLUS. Steps through parameters and increases value of parameter.

MINUS. Allows change in parameter and decreases value of parameter.

Sketch of FIN logo. Not currently used. Future expansion

# **TROUBLESHOOTING**

English: *Unit should be opened by qualified technicians only.*

French: *Ne puet être ouvert que un techicien autorize.*

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Unit is "dead"	Verify that you are plugged into a live, grounded outlet.  Have qualified technician check if fuse is blown or connectors are loose. There are three fuses (see wiring diagram) in the unit. Fuse-1 & Fuse-2 are located on the circuit board: 8Amp for 120Vac models and 5A for 240 Vac models. Fuse-3 is a ¼ Amp slow blow inline fuse on the transformer 12 Vac line.
Computer does not boot when turned on. Does not display readable messages.	Unit is not responding, but the display is backlit. Backlit display indicates that the unit has power. Turn unit off for at least 10 seconds and turn unit back on. If this does not solve problem, replace the computer (program module part# CDR-PM).
Display says "low water" but there is water.	The unit is not sensing that water is present. a. Make sure you are using tap water or adding salt to deionized water to make it conductive. b. The level sensor (screw inside the BATH on the right side) is dirty. Scrape it and then clean with alcohol.
Unit does not heat but "heating" is displayed	Was the unit filled with water over 40C.? If yes then cool the water to 20C to reset the safety thermostat.  Check the Safety thermostat (#C-TH) and the heaters (#14-77) for continuity.
Bag leaked, but does not trigger alarm and "LEAK" message..	Unplug and Plug in the SENSOR CONNECTOR. If there is still a problem, contact CytoTherm.
Temperature calibration does not "hold", it changes .	Replace temperature sensor (#CT4-TS).
Temperature calibration is out of range.	Have technician check the voltage at TP1 (see wiring diagram) , it should be 0.395 +/- .001 Vdc. If TP1 was correct, replace the temperature sensor (#CT4-TS).  If TP1 was not correct, restore the unit to initial factory settings (see DIAGNOSTICS) do full calibration. See Technician Functions > Full Calibration.
Pump does not circulate. No hum.	No power to pump or pump winding open. Check the umbilical connector. Check the pump (#14-PM). <b>DO NOT DISASSEMBLE PUMP.</b>
Pump does not circulate. Makes humming noise.	Blow air through pump outlet tubing to clear small obstruction. Check pump (#14-PM). <b>DO NOT DISASSEMBLE.</b> Any evidence of leaking on motor side means pump must be replaced.
Waterbath not rocking.	Check if cam is loose on motor. Check the rocking motor (#C-RM).

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## **MESSAGES, Troubleshooting**

**COLD** indicates that the water temperature is less than 20.0C. As soon as the temperature rises above 20C, it will display the true temperature.

**TOO HOT** is an audible and displayed alarm condition that indicates that the bath temperature is 1.0C higher than the set temperature. If the operator pours hot water into the bath he/she will trigger this alarm. This should never happen in normal operation. If it does, contact CytoTherm.

**CLOSE LID** indicates that the LID is not closed. If the LID is closed, unplug and replugin the SENSOR CONNECTOR. Check if there is a magnet imbedded along the left side of the LID. If the magnet is there, replace the SENSOR CONNECTOR (Part #CDR-SCN).

**LOW WATER** First make sure that a pinch ( 0.01 gr) of salt was added if deionized water was used. Then remove RACK to add water. Lift up the top layer of the bladders to let the water in the BLADDER drain down into the BATH. Lift the front of the RACK and disconnect the RACK TUBING. Lift the RACK and put it aside. Pour water into the BATH to the water label.

**LEAK** is an audible and displayed alarm that indicates that a plasma bag or BLADDER leaked.

## **MAINTENANCE**

Daily: Wipe off the unit.

Every 3 months:

### **Replace the bladders and clean the bath.**

1. Unplug the unit.
2. Remove and discard the BLADDERS by first lifting the top of the BLADDERS up to drain out as much of its internal water as possible. Remove the INLET and OUTLET FITTINGS by holding the FITTINGS and twisting them as you pull up.
3. Lift the front of the RACK and disconnect the RACK TUBING from the RACK, lift up the Rack and place aside.
4. Drain the bath by attaching the provided tubing to the DRAIN valve and turning the valve handle clockwise to vertical. Drain as much water as possible through the drain valve. Lift the BATH and place it on the table with the PIVOTS in front of the ARMS. Disconnect the umbilical connector. Carry the bath to the sink and pour out the remaining water in the BATH.
5. Wipe the BATH and RACK with bleach towelettes or a 10% bleach solution. Use only water and bleach towelettes or a 10% bleach solutions for cleaning. Do not use concentrated bleach. Use alcohol for removing oil or grease. DO NOT IMMERSE THE WHOLE BATH. WIPE THE PUMP SCREEN FROM THE OUTSIDE ONLY. DO NOT REMOVE THE SCREWS. Rinse off the bleach with water.
6. Close the DRAIN valve. Fill the bath with water to the water label.
7. Place the RACK on the BATH. Do not connect the RACK TUBING. Plug the unit in, turn it on and start a thawing cycle. Let the unit run for a few minutes so that the water passes through and rinses the pumps.
8. Remove the RACK, and drain out the water. Close the DRAIN valve. Fill the bath with water. If you use deionized or distilled water add a little pinch ( about 0.01 gr.) of table salt. Do NOT use saline solution. Add 5 ml. of Algicide Part #ALG240 (1.0 ml. per 4 liter of water available in contiguous USA only) to the water. Any other bath clearing agent can also be used.
9. Connect the RACK TUBING and position the RACK in place.
10. Mount new BLADDERS in the RACK .

**Replace the air filter.** Unscrew the filter cover, discard the old filter and mount the new filter. Screw on the filter cover.

**Leak Test** Turn the unit ON. Take a slightly moist piece of a paper towel and touch it to both of the stainless steel studs near the center of each RACK section under the BLADDER.. The alarm should sound and the display should say LEAK. If it does not, contact CytoTherm.

**Temperature Calibration.** Run temperature calibration at least every 3 months or more often if your institution procedures or regulations require. See PROGRAM MODE > TEMPERATURE CALIBRATION.

**Overtemperature Alarm Test.** Have a technician run the ALARM TEST. See DIAGNOSTIC MODE > ALARM TEST

**BLADDER Maintenance.** The bladder does not require maintenance. In case of a plasma bag leak, remove the BLADDER, rinse the BLADDER under running water and wipe with bleach towelettes or a 10% bleach solution.

## **PARTS LIST CT-DR**

CDR-MP	Pump, Magnetic	\$198.-	DP-SW	Switch, 2-pole	\$ 20
14-77	Heater (2 needed)	72.-	C-TH	Safety Thermostat	39.-
CT4-PC	Printed Circuit Board	400.-	C4-DISP	Display	80.-
CDR-BTH	Bath Section	700.-	C4-UMB	Wiring Harness	120.-
C-RM	Rocking Motor	160.-	CDR-PM	Program Module	100.-
C4-TS	Temperature Sensor	80.-	CDR-SCN	Sensor Connector	150.-
CDR-RK	Rack for Dry Thaw	1,200.-	CDR-LID	Lid for Rack	200.-
CDR-BL	Bladder (3 needed)	49.-	C4-TR	Transformer 120 Volt	60.-
CDR-VLV	Valve	54.-	C4-TR2	Transformer 240 Volt	85.
ALG240	Algicide	66.-	C4-FILT	Air Filters, pack of 4	45.
14-77J	Heater 100V (use 2) Japan	72.-	C4-TRJ	Dual Transformer. Japan only	126.-

Always specify model and serial number when ordering. Prices subject to change.

Oct 07

## **SOURCES for SUPPLIES**

BAGS overwrap 15 cm. wide by 30 cm. (6" x 12") long are available from US Plastics 1390 Neubrecht Rd. Lima OH 45801 Tel. 800 537-9724. Part #47352.

## **TECHNICIAN FUNCTIONS**

### **FULL CALIBRATION**

Adjust the 10-turn potentiometer so that the voltage between TP1 and Ground (Earth) is .395 V (see wiring diagram for locations). Actual temperature calibration is then set in Programming Mode (see PROGRAMMING MODE).

The trimmer near the BODY connector adjusts the display contrast.

## **SAFETY FEATURES**

### **WATER LEVEL SENSOR**

The unit will display **LOW WATER** and beep if there is not enough water to cover the level sensor inside the bath, a screw located 3/4" above the temperature sensor. The heat will also turn off. The water must be conductive in order for the level sensor to work. Use tap water or add a pinch (0.01 gr.) of salt if you are using de-ionized or distilled water.

### **OVER TEMPERATURE**

The unit will display **TOO HOT** and emit double-beeps if the temperature reaches 1.0°C above the thawing temperature. It will turn the heaters off and stop thawing by draining the water from the bladders into the bath.

### **SAFETY THERMOSTAT**

An independent safety thermostat will turn heaters off if the temperature goes above 45 °C. It has to be cooled to 20 C to reset.

### **FUSING**

The main fuses (Fuse-1 & Fuse-2) are located on the Printed Circuit Board and are 8Amp for 120Vac and 5Amp for 240Vac. Correct the cause of the blown fuse.

The transformer has a 3/4 Amp slow blow fuse (Fuse-3) on the wires of the 12 Vac winding used to generate the 5 Vdc supply.

### **ISOLATION**

The circuitry is isolated from the power lines by a transformer and from the heaters by an opto-coupled solid state relay.

### **Revisions:**

22 Nov 08 Ver M. Pictures update

30 Oct 07 Ver L. Delete resistance test in Maintenance. Add prices

8 Aug 07 Ver K. No prices.

17 Apr 07. Ver J. offer Algicide

24 Jan 07. rev.G water level 1" above pivot.

1 Mar 07. Ver. H. Do not use bleach.

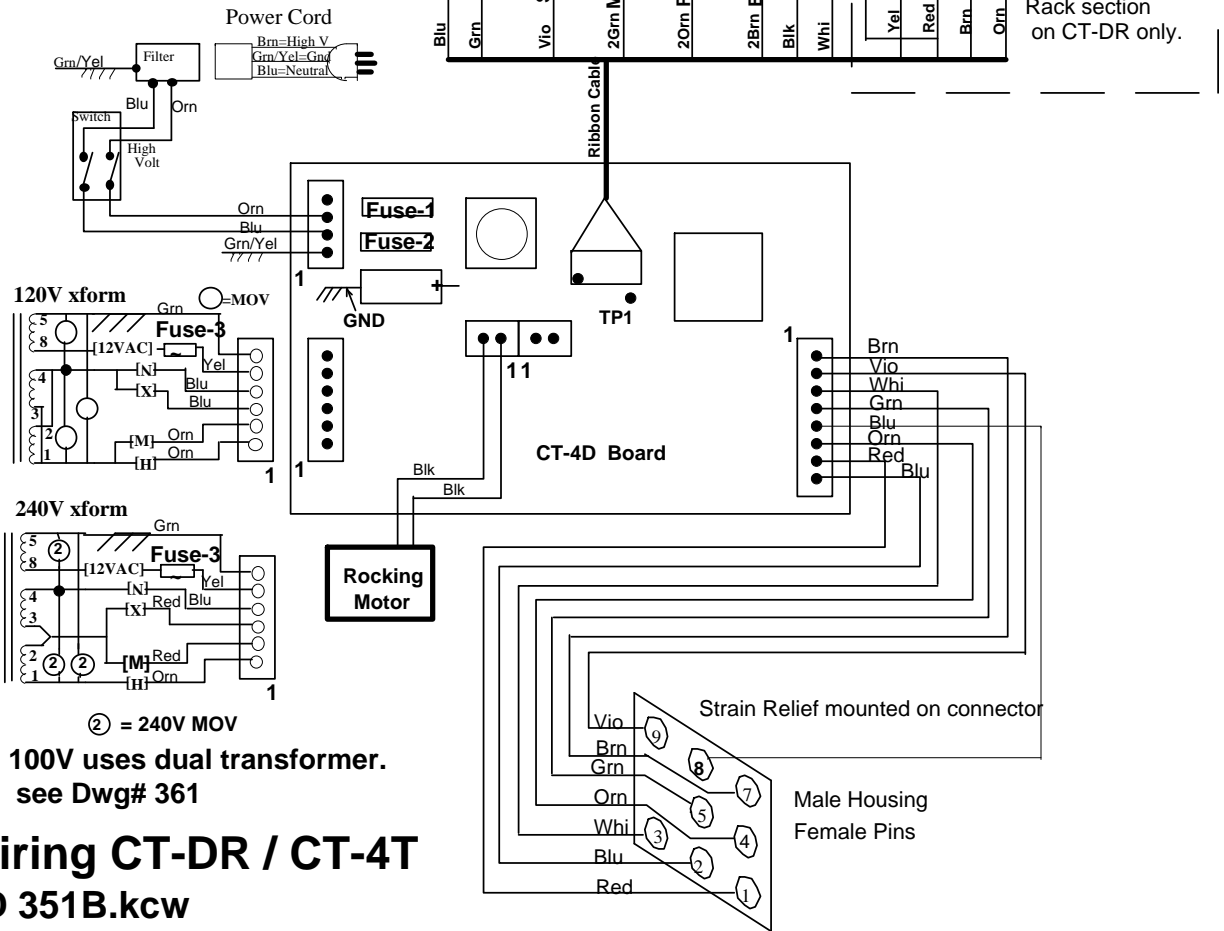
12 Dec 06. rev. G. Do not use concentrated bleach

20Aug 06 Add resistance test.

24 June 06. rev. G Clarify.

Rev 25 June 06 Fuse Table & TP1  
 Rev 5 June 04 add 3/4A slow blow fuse  
 to 12 Vac Xform lead. See D 467.

Fuse	Amps	Vac	Type
1 & 2	8	120	Fast
1 & 2	5	240	Fast
3	3/4	12	Slow Blow



② = 240V MOV  
 100V uses dual transformer.  
 see Dwg# 361

## Wiring CT-DR / CT-4T D 351B.kcw

File \Draw#\D#351.kcw Home  
 30 Nov 2000  
 1 Jul 02. 8A Fuses for 120/100

Rev B. 4 Jan 04

1. Add separate Neutral wire from Bath Conn# 5 to 9-pin conn# 8. Wire separate neutral wires to heaters & pump.
  2. Spade connectors on heaters.
  3. CT-DR & 4T on one drwg.
- 100V units**
4. Move heater wires to 1/4" spade connectors from BATH connector.
  5. Remove SWITCH conn. & solder wires directly to board.

Ground is Green with Yellow stripe



## Bath Section

120/100V wired as shown  
 240V the 2 heaters are in ser

