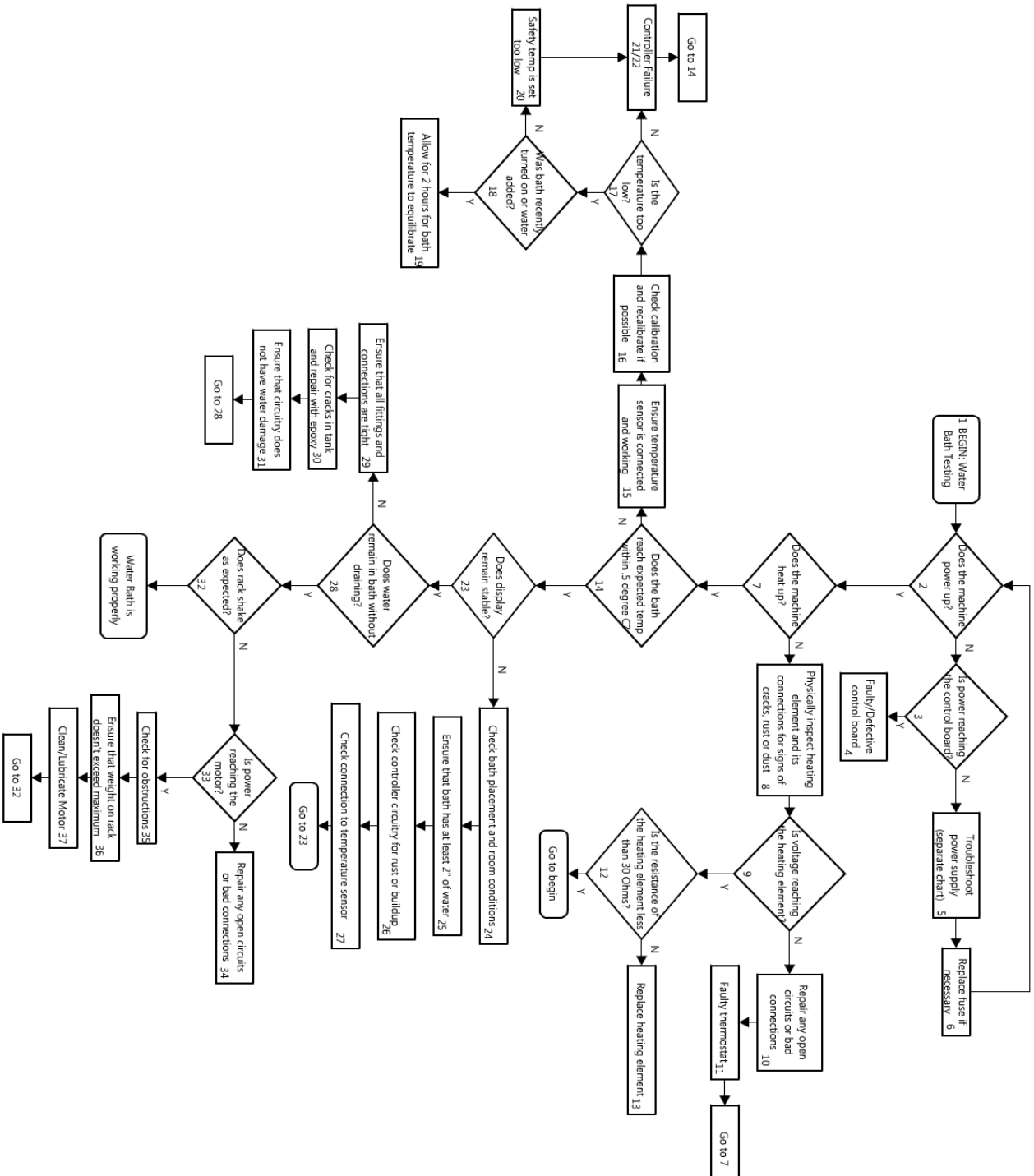


# Waterbath Repair and Troubleshooting



## Description

#	Text Box	Explanation
1	Begin Water Bath Testing	Start the diagnostic process for a work order on a Water bath
2	<i>Does the machine power up?</i>	With unit plugged in, and power switch turned on, the display should light up
3	<i>Is power reaching the control board?</i>	Use a multimeter at the leads of the control board to ensure that sufficient voltage is reaching the controller. If insufficient, there may be a problem with the wiring.
4	Faulty/Defective control board.	Replace control board if available.
5	Troubleshoot the power supply (separate chart)	
6	Replace fuse if necessary	See BTA skill under <i>Power Supply</i> on <u>Identifying a Blown Fuse</u>
7	<i>Does the machine heat up?</i>	Expose the heating element by opening up the machine. Turn the unit on and place hand over coils. You should be able to feel heat being produced by coils if machine is functioning correctly
8	Physically inspect heating element and its connections for signs of cracks, rust or dust	If the coils do not produce heat, turn unit off and visually inspect coils for signs of damage. Reference BTA skill under <i>Mechanical</i> on <u>Cleaning Rust</u> , and <u>Compressed Air</u> . If cracks are present the heating unit will need to be replaced.
9	<i>Is voltage reaching the heating element?</i>	Using a voltmeter, measure the voltage entering the heating unit. To inspect if the circuit is open or closed, see BTA skill under <i>Electrical Simple</i> for <u>Building and Using a Continuity Tester</u>
10	Repair any open circuits or bad connections	Bad connections can occur due to buildup of rust, corrosion, or broken components. See BTA skills under <i>Electrical Simple</i> for <u>Soldering</u> , <u>Cleaning of Connectors</u> , <u>Loose Connectors</u> .
11	Faulty thermostat.	If no voltage is reaching the heating coil, the problem could also lie in the machine's thermostat. Refer to BTA skill under <i>Electrical Simple</i> on <u>Replacing Temperature Sensing Device</u> to repair.

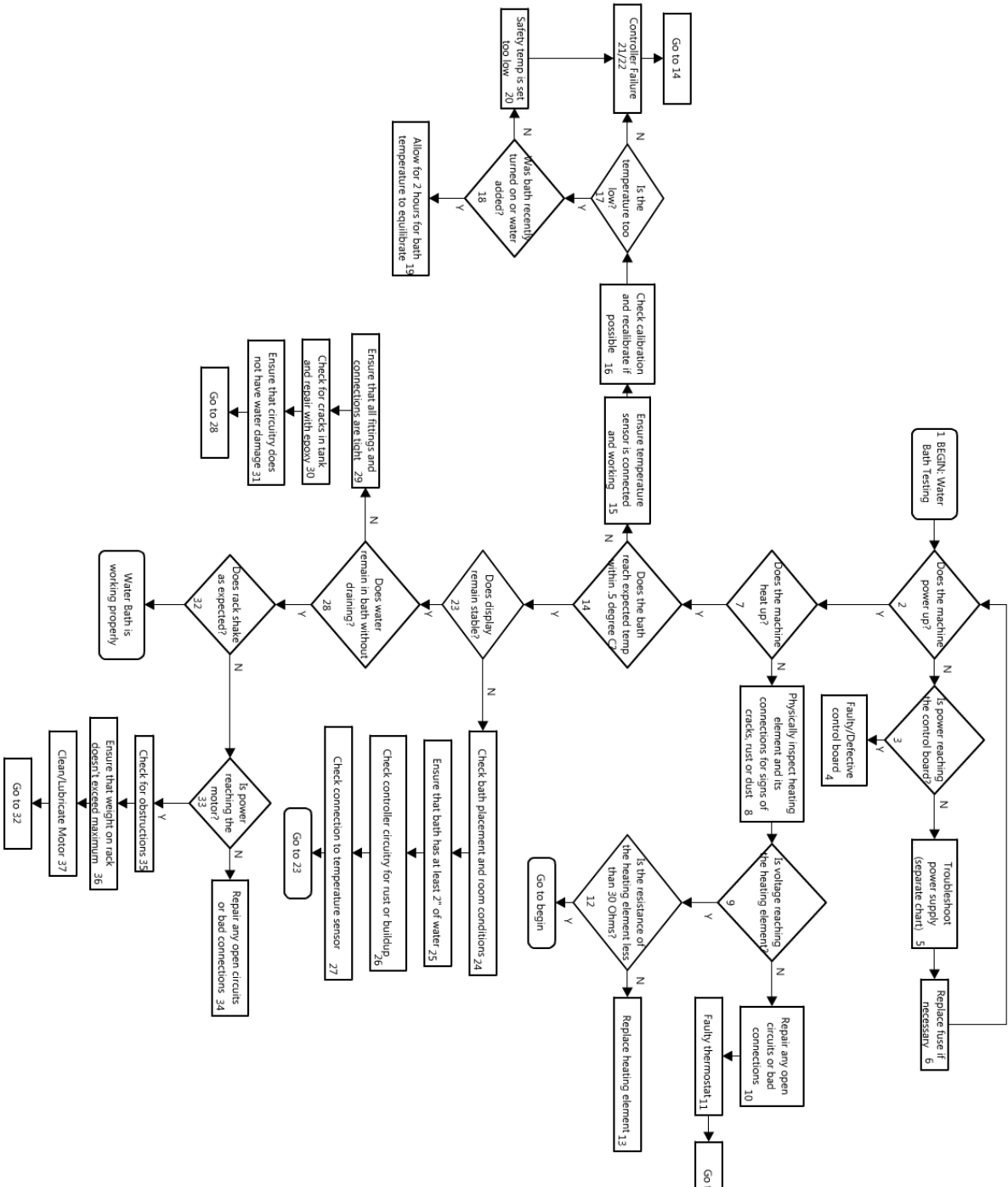
12	<i>Is the resistance of the heating element less than 30 Ohms?</i>	Heating elements work by having low resistance between 15-30 ohms. Attaching a multimeter to the heating element should conduct electricity and produce a resistance in this range. If the resistance reads "open" the heating coil should be replaced.
13	Replace heating element	Refer to BTA skill under <i>Electrical Simple</i> on <u>Replacement of Heating Element</u> , and ensure that new coil matches resistance and power rating.
14	<i>Does the bath reach expected temp within 0.5 degrees?</i>	Using a thermometer, test the bath temperature and determine if it matches display/expected temp within 0.5 degrees. Any difference greater than this is not appropriate.
15	Ensure temperature sensor is connected and working	Use methods described in BTA skill under <i>Electrical Simple</i> on <u>Replacement of Temperature Sensing Device</u> , to determine if temp sensor is working properly. Replace if necessary.
16	Check calibration and recalibrate if possible	Most digital water baths have the capability to reset their calibration. After ensuring the temp sensor is working properly, recalibrate the system. Determine water bath temperature with external thermometer and make sure the machine is calibrated correctly to this value.
17	<i>Is the temperature too low?</i>	The bath temperature is not reaching the set temp.
18	<i>Was bath recently turned on or water added?</i>	If the machine just turned on, or room temp/colder water recently added to the bath, it might not have equilibrated yet.
19	Allow for 2 hours for bath temperature to equilibrate	Leave at least 2 hours after start or addition of water for the bath temperature to rise to set temp before continuing with flow chart.
20	Safety temperature is set too low	Ensure that the safety temp (or maximum allowable temperature) temperature setting is not lower than the desired, set temperature. The machine will never exceed the safety temp, even if it is lower than desired temperature.
21/22	Controller Failure	The PID controller is not providing correct or sufficient feedback to the system. Troubleshoot controller circuit (include rust check).
23	<i>Does display remain stable?</i>	After the equilibration time (2 hours) the bath temp should remain stable (within 0.5 degrees of

		the set temp).
24	Check bath placement and room conditions	Ensure that the bath is not placed near a heat generator or distributor (i.e. fan, window, radiator, air conditioner). Ensure that room temperature is not fluctuating.
25	Ensure that bath has at least 2" of water	The water must completely cover the temperature sensor, which is generally about 2" on the base of the bath.
26	Check controller circuitry for rust or buildup.	Visually inspect all controller circuitry. If rust or buildup has formed on connections, clean using BTA skill under <i>Electrical Simple</i> for <u>Cleaning Rust</u> and <u>Cleaning of Connectors</u> .
27	Check connection to temperature sensor	Use methods described in BTA skill under <i>Electrical Simple</i> on <u>Replacement of Temperature Sensing Device</u> to determine if temperature sensor is working properly. Replace if necessary.
28	<i>Does the water remain in bath without draining?</i>	Other than because of evaporation, water height should remain relatively constant over time. Check to see if water level is changing drastically, due to cracks or leaks
29	Ensure that all fittings and connections are tight	Drain bath. Using BTA skills under <i>Plumbing</i> for <u>Connections</u> tighten all connections and fittings to ensure leak-proof seal.
30	Check for cracks in tank and repair with epoxy	Look for cracks in the bath tank. Using BTA skill under <i>Plumbing</i> on <u>Epoxy</u> , seal any cracks.
31	Ensure that circuitry does not have water damage	If leaks have occurred, disassemble bath and check electrical circuits to ensure no damage has occurred.
32	<i>Does the rack shake as expected?</i>	If bath has a shaking feature, this motion should occur without obstruction
33	<i>Is power reaching the motor?</i>	Using a multimeter, check the leads of the motor to ensure voltage is reaching the motor
34	Repair any open circuits or bad connections	Refer to steps 9 & 10 for BTA skills.
35	Check for obstructions	Visually inspect the bath and rack connections to find any objects that may be hindering its motion. This could include rust/calcium buildup, rack deterioration, or solid particles.

36	Ensure that weight on rack doesn't exceed maximum	The rack itself can only accommodate a limited amount of weight. This varies with bath size, but generally should not exceed
37	Clean/lubricate motor	See BTA skills under <i>Motors</i> on <u>Cleaning/Lubrication</u> .

# Water Bath

## Flowchart



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