

SECTION 4—TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	SOLUTION
Normal Operation: Internal Status Indicators: RED: Off GREEN: Off Unit plugged in, power switch on. Single beep on start up.	No Problems.	System Okay.
Power loss: Internal Status Indicators: RED: Off GREEN: Off Unit unplugged, power switch on, alarm off.	No Problems.	Battery Free Circuit drained. Plug in cord and turn power switch ON (I) to recharge.
Power loss: Internal Status Indicators: RED: Off GREEN: Off Unit plugged in, power switch , alarm off, battery Free circuit drained.	No power at outlet.	Check electrical outlet with a table lamp or voltmeter set on VAC scale. If outlet isn't working, check protective device in home's electrical panel or consult an electrician. Also ensure that unit is properly plugged in. DO NOT use extension cords. Move to another outlet or circuit.
	Power cord: a. Frayed. b. Broken or damaged spade. c. Spade connector from power cord loose or disconnected (inside back of unit).	a. Reattach cord. b. Replace power cord connectors on plug. c. Reattach connector.
	On/Off (I/O) switch. a. Disconnected wire. b. Faulty switch.	Check all electrical connections to the ON/OFF (I/O) switch for any disconnected wires. If the concentrator does not come on at all and wiring is intact, color code and remove wires one at a time. Remove and replace with new one. Transfer wires from old switch to new switch one at a time to the matching contact.
	Circuit breaker tripped.	Reset breaker. NOTE: Breaker may trip to safeguard concentrator during a power surge. If breaker trips IMMEDIATELY, there is a probable short in the unit. Check for pinched or charred wires. If the breaker does not trip, run unit for approximately two hours. The circuit breaker should be less than 10 ohms. If breaker trips again, there is an internal problem. Contact Invacare Technical Service.

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Power Loss: (Continued) Internal Status Indicators: RED: Off GREEN: Off Unit plugged in, power switch, alarm off. Battery Free circuit drained.	P.C. board. a. P.C. board damaged. b. Loose or damaged connector.	a. Replace P.C. Board. Refer to <u>Replacing P.C. Board</u> on page 58. b. Repair or replace connector.
Internal Power Loss Senso ₂ : Internal Status Indicators: RED: Off GREEN: Off Alarm may or may not be on. Control Panel Indicators: RED: Off YELLOW: Off GREEN: Off Fan operates, Compressor not operating.	Transformer assembly. a. Faulty. b. Connector loose or disconnected. c. Faulty wiring.	a. Replace. Refer to <u>Replacing the Transformer</u> on page 61. b. Reattach connector. c. Replace transformer assembly. Refer to <u>Replacing the Transformer</u> on page 61.
	P.C. board faulty.	Replace P.C. board. Unit requires retiming after P.C. board replacement. Refer to <u>Replacing P.C. Board</u> on page 58.
High Pressure: Internal Status Indicators: RED: One Flash GREEN: Two Flashes Unit plugged in, power switch on, continuous alarm. Compressor shut down.	P.C. board: a. Malfunction b. Disconnected wire. c. Shifting valve at pressures greater than 25 p.s.i. for Perfecto ₂ .	a. Set flow to max L/min. for concentrator. Check voltage across Pilot Valve 1 on volt DC scale. If meter reads 0 volts when unit is turned on, replace P.C. board b. Check spade connectors on pilot valves 1 or 2 and connectors on P.C. board. c. Replace P.C. board. Unit requires retiming after P.C. board replacement. Refer to <u>Replacing P.C. Board</u> on page 58.
	4-way Valve: a. Not shifting. b. Bad coil. c. Coil resistance.	a. Check voltage. If voltage rises to approximately 24 volts D.C. when unit shuts down, P.C. board is functioning properly. Replace the valve if shorted or open. Refer to <u>Replacing 4-Way Valve and/or Manifold Assembly</u> on page 65. b. Replace 4-way valve. Refer to <u>Replacing 4-Way Valve and/or Manifold Assembly</u> on page 65. c. Coil should read 175 ohms ± 20.

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<p>LOW PRESSURE: Internal Status Indicators: RED: One Flash GREEN: One Flash Or RED: One Flash GREEN: Three Flashes</p> <p>Control Panel Indicators: RED: On YELLOW: Off GREEN: Off</p> <p>Unit plugged in, power switch on, continuous audible alarm. Compressor shut down (Failure to cycle due to low pressure).</p>	Compressor inlet filter dirty or plugged.	Replace compressor inlet filter. Refer to Replacing the Compressor Inlet HEPA Filter on page 26.
	Compressor: a. Leaks at fittings or tubing b. Leaking or defective relief valve. c. Insufficient voltage at outlet. d. Worn cup seals or gaskets.	a. Replace or repair. b. Repair leak or replace. c. DO NOT use extension cords. Use another outlet. d. Rebuild top end of compressor. Refer to Rebuilding the Thomas Model 2660 Compressor on page 34.
	Heat exchanger: a. Leak at tubing or body chamber. b. Inspect tubing and heat exchanger.	a. Replace or retighten. b. Replace or retighten tubing. Replace heat exchanger. Refer to Replacing Heat Exchanger Assembly on page 51.
	Regulator cracked or leaking.	Replace regulator. Refer to Replacing Regulator on page 48.
	P.E. valve leaking.	Replace P.E. Valve. Check voltage at P.E. valve connector on 24 volt D.C. scale. The P.E. Valve activates or energizes approximately one second prior to the activation of the 4 way valve with approximately 24 volts. If voltage is in excess of 24 volts consistently, replace the P.C. board. Refer to Replacing P.C. Board on page 58. If the P.C. board voltage acts normally, replace the P.E. valve. Refer to Replacing P.E. Valve on page 42. Note: Check for leaks starting at the compressor output through all the pneumatic connections. Major leaks will cause system pressures to remain below adequate shift (exhaust) pressures and will cause compressor shutdown.
<p>Defective Parts: Internal Status Indicators: RED: One Flash GREEN: Five Flashes Or RED: Two Flashes GREEN: Three Flashes Control Panel Indicators: RED: On YELLOW: Off GREEN: Off</p> <p>Unit plugged in, power switch on, continuous audible alarm. Compressor shut down.</p>	Defective main valve coil.	a. Replace main valve. b. Replace main valve coil.
	Connector loose.	Reattach connector.
	Defective P.E. valve coil. (Resistance 80 ohms \pm 10.)	Replace P.E. coil if shorted or open on resistance check. Refer to Replacing P.E. Valve on page 42.
	Defective P.E. valve.	Replace P.E. valve. Refer to Replacing P.E. Valve on page 42.
	Connector loose.	Reattach connector.
Defective P.C. board.	Replace P.C. board. Refer to Replacing P.C. Board on page 58.	

SYMPTOM	PROBABLE CAUSE	SOLUTION
Unit not operating: Alarm: On or Off Internal Status Indicators: RED: Two Flashes GREEN: Four Flashes Or RED: Two Flashes GREEN: Five Flashes	P.C. board Failure.	Replace P.C. board. Refer to Replacing P.C. Board on page 58.
Low Concentration: NOTE: Check for O ₂ purity using a calibrated Oxygen Analyzer at Test Point 1 (oxygen outlet) of the concentrator. Internal Status Indicators: RED: Two Flashes GREEN: One Flash 73% Shutdown Control Panel Indicators: SensO ₂ ONLY: RED: On YELLOW: Off GREEN: Off For SensO ₂ units, the RED indicator will signal extremely low purity and will be accompanied by a continuous audible alarm and a system shutdown. Repairs are required.	Cabinet filters dirty.	Clean or replace. Refer to Cleaning the Cabinet Filter on page 24, Replacing the Outlet HEPA Filter on page 25, and Replacing the Compressor Inlet HEPA Filter on page 26.
	Compressor inlet filter dirty.	Replace inlet filter. Refer to Replacing the Compressor Inlet HEPA Filter on page 26.
	Compressor: a. Defective. b. Faulty capacitor. c. Bad motor windings. d. Worn seals. e. Bad bearings. f. Leak at fittings or tubing. g. Leaky or defective relief valve. h. Insufficient voltage (outlet).	a. Replace compressor. Refer to Replacing Compressor Assembly on page 31. b. Replace capacitor. Refer to Replacing Capacitor on page 33. c. Replace compressor. d. Rebuild top end of compressor. Refer to Rebuilding the Thomas Model 2660 Compressor on page 34. e. Replace compressor. f. Replace fittings or tubing. g. Replace relief valve. h. DO NOT use extension cords.
	Heat exchanger: a. Leak at tubing or body chamber. b. Inspect tubing and heat exchanger.	a. Replace or retighten. b. Replace or retighten tubing. Replace heat exchanger. Refer to Replacing Heat Exchanger Assembly on page 51.
	Regulator cracked or leaking.	Replace. Refer to Replacing Regulator on page 48.
	Exhaust muffler dirty or plugged.	Replace. Refer to Replacing the Muffler Assembly on page 26.
	Fan: a. Not operating. Unit overheating. b. Faulty fan.	a. Leads to fan disconnected. Reconnect. b. Replace. Refer to Replacing Cooling Fan on page 55.
	Sieve beds defective.	Replace. Refer to Checking Sieve Bed Pressure on page 85.
	Tubing kinked or blocked.	Repair or replace.
	P.C. board: a. Shifts at wrong pressures.	Check pressure at product tank. Pressure should rise to 144.79 kPa (21 p.s.i.) at shift point. If not, replace P.C. Board. Refer to Replacing P.C. Board on page 58.

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Low Concentration (Continued)	Flowmeter: a. Flowmeter opened beyond maximum flow rate. b. Cracked or broken fitting. c. Input tubing leaking or loose.	a. Return flow to maximum setting. b. Replace fitting. c. Repair or replace. Refer to <u>Replacing Flowmeter</u> on page 63.
	Timing.	To accommodate for varying tolerances when replacing components, an adjustable timer is used to control the shifting of the Pressure Equalization (P.E.) valve. Refer to <u>Timing</u> on page 73.
	P.E. valve: a. Bad coil. b. Restrictor blockage.	a. Replace P.E. valve. b. Replace P.E. valve. Refer to <u>Replacing P.E. Valve</u> on page 42.
	Inspect P.C. board restrictor tubing for kinks or tears.	Replace P.C. board. Unit may need retiming after board replacement. Refer to <u>Replacing P.C. Board</u> on page 58.
Fluctuating Flow:	Regulator/Flowmeter: a. Incorrectly set regulator. b. Flowmeter malfunction.	a. Check pressure at oxygen outlet. Adjust regulator. b. If flow is still unstable, check for leaks starting at the compressor outlet fitting through all pneumatic connections. If no leaks are found and flow is still fluctuating, replace the regulator. If pressure at test point is within spec (5 p.s.i. \pm 0.5 max. [34.4 kPa \pm 6.89]), replace flowmeter. Refer to <u>Replacing Flowmeter</u> on page 63.
	Outlet HEPA filter: a. Dirty or plugged	a. If low flow conditions persist, replace outlet HEPA filter. Refer to <u>Replacing the Outlet HEPA Filter</u> on page 25.
Unit Excessively Loud:	Pneumatic exhaust: a. Muffler cracked, damaged or missing. b. Muffler tubing disconnected or damaged.	a. Replace. Refer to <u>Replacing the Muffler Assembly</u> on page 26. b. Reconnect or replace tubing.
	Compressor inlet filter missing and/or orange sticker removed.	a. Replace compressor inlet filter. Refer to <u>Replacing the Compressor Inlet HEPA Filter</u> on page 26.
	Compressor removed.	a. Replace Compressor. Refer to <u>Replacing Compressor Assembly</u> on page 31.
	Incorrect style of inlet filter (aftermarket).	a. Replace with factory OEM sound reduced style inlet HEPA filter.

SYMPTOM	PROBABLE CAUSE	SOLUTION
Unit Overheats:	Base exhaust vent plugged or restricted.	Place unit at least 7.62 cm (3-inches) from any wall. DO NOT place unit on pile or shag carpeting that may restrict air flow.
	Cabinet filters dirty or blocked.	Clean or replace. Refer to <u>Cleaning the Cabinet Filter</u> on page 24.
	Fan: a. Leads to fan disconnected. b. Defective fan. c. Fan installed upside down.	a. Reconnect leads. b. Replace fan. Refer to <u>Rebuilding the Thomas Model 2660 Compressor</u> on page 34. c. Install fan with air flow arrow pointing down.
	Heat exchanger: a. Dirty or plugged. b. Damaged.	a. Clean heat exchanger. b. Replace heat exchanger. Refer to <u>Replacing Heat Exchanger Assembly</u> on page 51.
	Compressor: a. Defective. b. Faulty capacitor. c. Bad motor windings. d. Worn seals. e. Bad bearings.	a. Replace compressor. Refer to <u>Replacing Compressor Assembly</u> on page 31. b. Replace capacitor. Refer to <u>Replacing Capacitor</u> on page 33. c. Replace compressor. d. Replace compressor. e. Replace compressor.
	Line voltage excessive (surge).	Have line voltage inspected by certified electrician. A voltage regulator may be required and is obtainable from your local electric company.
Oxygen Purity: Good Internal Status Indicators: Control Panel Indicators: RED: Off YELLOW: On GREEN: On After 30 minutes of run time, unit operates normally, oxygen purity within normal range. GREEN or YELLOW panel indicator should illuminate.	P.C. board defective.	Replace P.C. board. Refer to <u>Replacing P.C. Board</u> on page 58. Unit may need retiming after P.C. board replacement. Refer to <u>Timing</u> on page 73.

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SYMPTOM	PROBABLE CAUSE	SOLUTION
Unit Not Operating, Internal Status Indicators: RED: Off GREEN: Off Control Panel Indicators: RED: Off YELLOW: Off GREEN: Off Power Switch ON. Continuous audible alarm.	Transformer assembly: a. Assembly connector disconnected. b. Faulty transformer assembly.	a. Reattach connector. b. Replace transformer assembly. Refer to <u>Replacing the Transformer</u> on page 61.
Unit Operating, Internal Status Indicators: RED: Three Flashes GREEN: One Flash Control Panel Indicators: RED: Off YELLOW: Flashing GREEN: On	Internal repairs required.	Replace SensO ₂ circuit board. Refer to <u>Replacing P.C. Board</u> on page 58.
Low-Flow Alarm does not activate on flows less than 0.5 L/min.	System leak.	Repair leak in product tank, regulator, tubing, fittings, or flow meter.
	Defective check valves.	Replace check valves. Refer to <u>Replacing Check Valves</u> on page 46.