

Section 5 – Troubleshooting

Alarm Classification

Alarms and concerns are classified in sections related to potential sources, and are organized by alarm code similarly to integrated diagnostic functions displayed on the sterilizer touchscreen.

Alarm/Concern

Code	Functional area/Problems
01	Power supply
02	Aesthetic concerns
03	Printer
04	Sterilization concerns
05	Drying concerns
06	Condenser subset
07	Water tanks
08	Touchscreen
09	CPU board
10	Sterilization chamber
20	Steam generator
30	Vacuum pump
40	Water pump
50	Door locking system
60	Electro-valves
70	Distilled/de-mineralized water concerns

Troubleshooting tables are organized as follows:

1 st Column	The alarm code displayed on the touchscreen; the concern.
2 nd Column	Description of alarm/anomaly.
3 rd Column	Possible causes of the alarm/anomaly.
4 th Column	Related action to solve the problem.
5 th Column	Related procedures and layouts (where applicable).

	CODE	DESCRIPTION	SEL	PV1..	PP1..	PV6	PPh	PR	DV	VEN	LEV	End
230	A01	Power failure		✓	✓	✓	✓	✓	✓	✓	✓	
CHAMBER	A10	If duration of PPh phase > 20 minutes					✓					
	A11	T° chamber heater > Set + 72°F (40°C)		✓	✓	✓	✓	✓	✓	✓	✓	✓
	A12	T° chamber heater < Set - 72°F (40°C)		✓	✓	✓	✓	✓	✓	✓	✓	✓
	A13	T° theoretical > 278.6°F (33.4 psi)/255.2°F (18.0 psi) T° theoretical > 137°C (2.3 bar)/124°C (1.24 bar)						✓				
	A14	T° theoretical < 273.2°F (29.4 psi)/249.8°F (15.1 psi) T° theoretical > 134°C (2.03 bar)/121°C (1.04 bar)						✓				
	A15	T° sen < 273.2°F/249.8°F (Steam temperature) T° sen < 101°C/121°C (Steam temperature)						✓				
	A16	T° sen > 278.6°F/255.2°F (Steam temperature) T° sen > 137°C/124°C (Steam temperature)						✓				
	A17	External chamber sensor open (Jacket heater)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	A18	Internal chamber sensor broken	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	STEAM GENERATOR	A21	Steam generator temperature > Set + 126°F (70°C)		✓	✓	✓	✓	✓			
A22		Steam generator temperature below 194°F (90°C)		✓	✓	✓	✓	✓				
A23		Steam generator sensor broken	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VACUUM	A31	3 minutes after beginning of the phase: Pressure > -2.9 psi (-0.2 bar)		✓		✓			✓			
	A32	4 minutes after beginning of the phase: Pressure > -7.2 psi (-0.5 bar)		✓		✓						
	A33	The value of the 6 th vacuum pulse to be run < -11.6 psi (-0.8 bar)		✓ PV5								
	A34	The 10 last cycles required the 6 th additional vacuum pulse										✓
DOOR	A52	Door locking problem/ DOOR LOCKED switch open		✓	✓	✓	✓	✓	✓	✓	✓	✓
VALVES	A63	2 minutes 50 seconds after beginning of the phase: Pressure < -10.1 psi (-0.7 bar)			✓		✓					

01 Power Supply

Alarm or concern	Description	Cause	Action	Procedures Layouts
A01	Mains failure or significant fall in voltage		The cycle must be repeated	
	Touchscreen OFF and main switch LED illuminated	CPU board fuses	Check and replace the broken fuses	
		Touchscreen broken	Replace the touchscreen	Proc. 5
	Mains voltage OK + Main switch LED not illuminated when activated + Touchscreen OFF	Mains filter pack fuses broken	Replace the main filter pack	Proc. 12

The load cannot be considered sterile; the cycle must be repeated.

02 Aesthetic Concerns

Concern description	Cause	Action	Procedures Layouts
Composite fascia/door cover/technical door broken	Use of aggressive cleaning solutions	Replace the part(s) and check attached product list indicating products not to be used	Proc. 2, 4, and 30
After replacement door cover touches the fascia	Door cover has to be adjusted to fit the cast aluminum door	File down the left hand lower part of the cover until door cover/fascia contact is avoided	

03 Printer *

Concern Description		Cause	Action	Procedures Layouts
No printout		Printer flat cable	Replace printer flat cable	Proc. 18
		EMC filter	Test without filter, if OK replace it	
		CPU	Replace CPU board	Proc. 17
		Printer itself	Test another type of printer	
Strange printing characters		Wrong printer selection	Select the correct printer Custom or Seiko in the printer submenu	Owner's Manual
		Printer flat cable	Replace printer flat cable	
		EMC filter	Test without filter, if OK replace filter	
Custom DP40	Printout inverted Big characters Wrong width etc.	Wrong printer settings	Set the right parameters using the printer setting mode	Custom setting procedure
	Empty line between each printed one (extended printout)	Wrong driver selected	Select Custom printer instead of Seiko in the PRINTER submenu	Owner's Manual
Seiko	Only one line printed	Wrong driver selected	Select Seiko printer instead of Custom in the PRINTER submenu	Owner's Manual

Printer Types

ATTENTION: Only 3 printer types can be used with the Lisa sterilizer:

- Custom DP40
- Seiko DPU-414
- CITI70 DP 3110

These printers have been tested and the corresponding drivers are included in the software. The correct printer driver must be selected in the **PRINTER** submenu.

Configuring the Printer

If both keys are held down when the printer is switched ON, the printer enters the configuration mode and prints the first modifiable parameter. Each time **PRINT** is pressed, the variation of the parameter is shown and its current value is printed. After entering the desired parameter, press **FEED** to go to the next parameter. Once all parameters have been entered, the printer prints a message to indicate the setting procedure has been completed.

Recommended printer parameters:

PRINT = REVERSE
LITTLE
FONT 1
CR-LF HONOR CR
PARALLEL MODE
8 BITS PER CHAR.
TEXT = DISABLE

04 Sterilization Concerns

Alarm or concern	Description	Cause	Action	Procedures Layouts

05 Drying Problems

Concern description	Cause	Action	Procedures Layouts
Concern due to load preparation and/or loading mistakes	Incorrect loading	Place the paper side upward.	Preparation of the load
	Over loaded chamber	Do not exceed maximum load masses of 4.5 and 1.5Kg (9.9 and 3.3lbs) respectively for solid and porous loads.	
	Instruments not dried prior to sterilization	The load must be rinsed and dried.	
	Trays/cassettes not perforated	Use only perforated accessories.	
	Miscellaneous: check preparation, loading, wrapping, bags, material , etc.		
Mechanical concerns	Vacuum pump	Assure the vacuum pump operates during the drying phase. If the pump operates, check the filter.	Owner's Manual
	Filter	Try a cycle without a filter. If OK, replace the filter.	
	Condenser fan	Determine if the fan is working at the maximum speed, if not replace it.	Diagnostic menu
	Excessive water consumption > 0.42 quart/cycle >0.4 liters/cycle	Check steam generator PT100 positioning/condition.	Proc. 39
		Determine if the 2CS condensation re-vaporization (EV2/EV4) system is working properly. Clean chamber filter (filter 5).	See Section 1
		Assure the worksurface under the sterilizer is level.	
		Check EV1 tightness especially during PR phase, replace if needed.	Proc. 26

EN 13060 : Dryness Test Procedure

Weigh the test load and record its mass (m1).

Place the test load in the sterilization chamber in a position which allows the load to acquire the maximum moisture.

Immediately start the sterilization cycle.

At the completion of the sterilization cycle, remove the test load from the sterilizer chamber.

Visually check the test load. No moisture spots should be visible on the test load or the wrapping material.

Weigh the test load within 2 minutes of the cycle completion. Record the mass (m2).

Calculate the change in moisture content CMC using the following formula: $CMC = \frac{m2-m1}{m1} \times 100\%$

EN 13060 "Small Steam Sterilizer Standard" Drying Tolerance Definitions

For wrapped loads, any remaining moisture shall not lead to wet packages and shall not result in detrimental effects on the sterilization load. Any remaining water droplets on the inner side of the film of laminate pouch shall evaporate within 5 minutes.

For a solid load the moisture content (CMC) shall not exceed 0.2 % when tested.

For a porous load the moisture content (CMC) shall not exceed 1.0 % when tested.

Load Preparation (from Owner's Manual - Annex 2)**Cleaning of the instrument**

- ▶ The instruments to be sterilized must be clean and free from all types of residue such as fragments, dentine, and blood, etc. These substances can damage the objects on the trays and the sterilizer.
- ▶ Clean the instruments immediately after use. Follow the manufacturer's instructions when using an ultrasonic cleaner.
- ▶ Remove all traces of disinfectant from the product as this may cause corrosion on heating. Rinse thoroughly, and then dry.
- ▶ Lubricate in accordance with the manufacturer's instructions.

Preparation of the trays

- ▶ Do not exceed the maximum load which has been set, tested and validated by the manufacturer.
- ▶ Always use the rack to allow adequate steam circulation between the trays.
- ▶ Do not overload the trays.
- ▶ Place the cassettes in the vertical position (if possible) to ensure thorough drying.
- ▶ Place the items in such a way so as to allow the steam to circulate properly.

- ▶ Empty containers or non-perforated trays must be placed upside down to prevent accumulation of water.
- ▶ Items made from different materials (stainless steel, carbon, etc.) must be placed on separate trays.
- ▶ Instruments manufactured from carbon steel, should have paper placed between them and the sterilizer tray.
- ▶ Sterilize instruments in the open position, e.g. forceps.
- ▶ In the case of wrapped items, use porous packaging to facilitate good steam penetration and drying (e.g. nylon/paper sachet for autoclave).

Tubes

- ▶ Rinse, drain and dry after washing.
- ▶ Place the tubes on a tray allowing the ends to remain open. Do not bend.

Packets

- ▶ Place the packets in the vertical position, leaving a space between each one. Do not allow them to come into contact with the walls of the sterilization chamber.

Wrapped material

- ▶ Bags should be placed on trays, leaving a space between each one. Position with paper side upwards.

06 Condenser Subassembly

Alarm or concern	Description	Cause	Action	Procedures Layouts
Fan	Fan noisy at low speed	The fan is out of balance	Replace the fan	Proc. 23

07 Water Tanks

Alarm or concern	Description	Cause	Action	Procedures Layouts
Pure water tank overflows during filling (no acoustic signal)		Maximum pure water level sensor	Make sure the sensor moves freely	Proc. 9
			Remove, check, replace the sensor	
			Check connections and wiring loom	
Used water tank overflows (no warning message)		Maximum used water level sensor	Make sure the sensor moves freely	Proc. 9
			Remove, check, replace the sensor	
			Check connections and wiring loom	
Used water tank cannot be drained		Tubing blocked	Make sure the steam generator heating element is coated. If not : replace it	Proc. 15
			Clean the tubing and try to find out where the debris came from (load not cleaned, water quality, etc.) <u>Reminder</u> : If the sterilizer is not used for more than 1 week, both water tanks must be completely drained in order to avoid algae growth or any other deposits.	
Water droplets come out of the used water tank venting holes	In case of intensive use, this phenomena is normal especially when the tank is nearly full	Maximum used water level sensor	Make sure the sensor moves freely	Proc. 9
			Remove, check, replace the sensor	
			Check connections and wiring loom	

08 Touchscreen

Alarm or concern	Description	Cause	Action	Procedures Layouts
Touchscreen not working		EMC protection film	Replace the EMC film	Proc. 5
		Touchscreen itself	Replace the touchscreen	
		Touchscreen flat cable	Replace the touchscreen	
		CPU board	Check fuses Replace the CPU board	Sec. 3, Tab 15 Proc. 17
Continuous scrolling of the screen		EMC protection film	Replace the EMC film	Proc. 5
		Touchscreen itself	Replace the touchscreen	
		Touchscreen flat cable connector	Replace the touchscreen	
LCD Display	A few dots or lines are missing	Touchscreen itself	Replace the touchscreen	Proc. 5
	Screen completely dark	LCD contrast	Adjustment of the contrast in Touchscreen submenu	
		Touchscreen itself	Replace the touchscreen	Proc. 5
	Screen completely light or blank	LCD contrast	Adjustment of the contrast in Touchscreen submenu	
		CPU board	Check jumper X7 position	Layout 22
			Check fuses/replace CPU	Proc. 17
		Touchscreen itself	Replace the touchscreen	Proc. 5
Touchscreen connections	Check TS/CPU connections			
	Check the flat cable condition			

09 CPU Board

Alarm or concern	Description	Cause	Action	Procedures Layouts
Press. + T° calibration cancelled	Condensation/ moisture from the used water tank negatively affects the electronic components	Determine if the new tank/cover with grommets' seals are fitted, if not, replace both	Replace both water tank and cover	Proc. 9
		Check the grommet's condition and positioning (sealing)	Fix the grommets properly Replace the grommets if damaged	Proc. 1
	Droplets from the pressure sensor connection negatively affects the electronic components (EPROM)	Remove the tubing, cut 5mm (1/4 in.) and re-fix tightly		
	Water penetration during the tank filling	Mount the additional gasket under the front fascia		Proc. 36
Stored data (Date, Name, LCD adjust., etc.) cancelled	Condensation/ moisture from the used water tank negatively affects the electronic components	Determine if the new tank/cover with grommets' seals are fitted, if not, replace both	Replace both water tank and cover	Proc. 1 and 9
		Check the grommet's condition and positioning (sealing)	Fix the grommets properly Replace the grommets if damaged	
	Droplets from the pressure sensor connection negatively affects the electronic components (EPROM)	Remove the tubing, cut 5mm (1/4 in.) and re-fix tightly		
	Water penetration during the tank filling	Mount the additional gasket under the front fascia		Proc. 36

10 Sterilization Chamber

Alarm or concern	Description	Cause	Action	Procedures Layouts
A10	<p>PPh phase duration greater than 20 minutes</p> <p>The nominal sterilization holding time pressure:</p> <p>16.5 psi (1.14 bar) at 250°F (121°C) or 31.3 psi (2.16 bar) at 273°F (134°C)</p> <p>could not be reached within 20 minutes during PPh phase</p>	Main water tank empty	Check minimum water level sensor	
		Excessive water consumption >14 oz./cycle >0.4 liter/cycle	Check steam generator PT100 positioning/condition	Layout 45
			Determine if the 2CS condensation re-vaporization (EV2/EV4) system is working properly Clean chamber filter (FILTER 5)	See Section 1
			Check sterilizer leveling	
			Check EV1 tightness especially during PR phase, replace if needed	Proc. 26
		Insufficient water injected into the steam generator	Check water pump (WP)	Layout 21
			Check water pump one way valve condition	
			Check water filter condition (FILTER 3) Check braided black tubing positioning/fixing (twisted/clamped)	
		Significant leakage	Check door seal / door adjustments	Layout 7, 12 and 13
			Check over pressure safety valves	Layout 25
Check pneumatic connections				

Alarm or concern	Description	Cause	Action	Procedures Layouts
<p>A11</p>	<p>Chamber heater temperature > Set + 72°F (40°C) The temperature of the chamber heater element is above the set value</p>	<p>External T° sensor PT100</p>	<p>Check condition, position, fastening of the external PT100 T° sensor</p>	<p>Layout 27</p>
		<p>CPU board calibration cancelled</p>	<p>CPU calibration</p>	<p>Layouts 22 and 23</p>
		<p>CPU board broken</p>	<p>CPU replacement + calibration</p>	<p>Calibration board + service EPROM 1</p>
<p>A12</p>	<p>Chamber heater temperature > Set - 72°F (40°C) The temperature of the chamber heater is below the nominal value</p>	<p>Chamber thermal-overload open</p>	<p>Reset/replace thermal-overload</p>	<p>Proc. 32</p>
		<p>External T° sensor PT100 broken</p>	<p>Sensor replacement</p>	<p>Proc. 24</p>
		<p>CPU board calibration cancelled</p>	<p>CPU calibration</p>	<p>Layouts 22 and 23</p>
		<p>CPU board</p>	<p>Check the chamber heating element power voltage output on the CPU board, if not, replace the CPU board</p>	<p>Calibration board + service EPROM 1</p>
<p>A13</p>	<p>Theoretical temperature > 278.6°F/255.2°F > 137°C/124°C Pressure > 33.4 psi/18.0 psi > 2.30 bar/ 1.24 bar During PR phase, theoretical T° deducted from read pressure, (according saturated steam T°/ P correlation table), is above the maximum threshold</p>	<p>CPU board broken</p>	<p>CPU replacement + calibration</p>	<p>Layouts 22 and 23 Calibration board + service EPROM 1</p>

Alarm or concern	Description	Cause	Action	Procedures Layouts
A14	<p>Theoretical temperature < 273.2°F/249.8°F < 134°C/ 121°C Pressure < 29.4 psi/15.1 psi < 2.03 bar/1.04 bar</p> <p>During holding time, the theoretical T° deducted from read pressure, according saturated steam T°/ P correlation table, is below the minimum threshold</p>	Main water tank empty	Check minimum water level sensor	Layout 9
		Excessive water consumption > 14 oz./ cycle > 0.4 liters/cycle	Check steam generator PT100 positioning/condition	Layout 45
			Determine if the 2CS condensation re-vaporization (EV2/EV4) system is working properly	See Sec. 1
			Clean chamber filter (FILTER 5)	Proc. 37
			Check sterilizer work surface for level	
		Insufficient water injected into the steam generator	Check EV1 tightness especially during PR phase, replace if needed	Proc. 26
			Check water pump (WP)	Layout 21
		Check water pump one way valve		
		Significant leakage	Check water filter condition (FILTER 3)	
			Check door seal/door adjustments	Layouts 7, 12 and 13
Check over pressure safety valves				
Check pneumatic connections				
A15	<p>T° sen < 273.2°F/ 249.8°F < 134°C/ 121°C (Steam temperature)</p> <p>During holding time, the steam temperature read is below the minimum threshold</p>	Internal PT100 T° sensor	Check internal PT100 T° sensor condition and positioning	Layout 37
		Main water tank empty	Check minimum water level sensor	Layout 9
			Proc. 9	
		Excessive water consumption > 14 oz./cycle > 0.4 liters/cycle	Check steam generator PT100 positioning/condition	Layout 45
			Determine if the 2CS re-vaporization (EV2/EV4) system works properly	See Sec. 1
			Clean chamber filter (FILTER 5)	Proc. 37
Check sterilizer work surface for level				

Alarm or concern	Description	Cause	Action	Procedures Layouts
<p>A15 continued</p>	<p>T° sen < 273.2°F/249.8°F < 134°C/ 121°C (Steam temperature)</p> <p>During holding time, the steam temperature read is below the minimum threshold</p>		<p>Check EV1 tightness especially during PR phase, replace if needed</p>	<p>Layout 32</p>
		<p>Insufficient water injected into the steam generator</p>	<p>Check water pump (WP) Check water pump one way valve Check water filter condition (FILTER 3)</p>	<p>Layout 21</p>
		<p>Significant leakage</p>	<p>Check door seal/door adjustments Check over pressure safety valves Check pneumatic connections</p>	<p>Layouts 7, 12 and 13 Layout 25</p>
		<p>CPU board calibration cancelled</p>	<p>CPU calibration</p>	<p>Layouts 22 and 23 Calibration board + service EPROM 1</p>
		<p>Significant leakage</p>	<p>Check door seal/door adjustments Check over pressure safety valves Check pneumatic connections</p>	<p>Layouts 7, 12 and 13 Layout 25</p>
		<p>Internal PT100 T° sensor</p>	<p>Check internal T° sensor condition and positioning</p>	<p>Layout 37</p>
<p>A16</p>	<p>T° sen > 278.6°F/ 255.2°F > 137°C/ 124°C (Steam temperature)</p> <p>During holding time, the steam temperature read is above the maximum threshold</p>	<p>External PT100 T° sensor</p>	<p>Check external T° sensor condition and positioning</p>	<p>Layout 27</p>
		<p>CPU board calibration cancelled</p>	<p>CPU calibration</p>	<p>Layout 22 Calibration board + service EPROM 1</p>

Alarm or concern	Description	Cause	Action	Procedures Layouts
A17	Chamber heater temperature sensor broken The chamber external PT100 T° sensor is broken or disconnected	External PT100 T° sensor	Check PT100 T° sensor connections	Proc. 24
			Replace PT100 T° sensor	
A18	Internal chamber temperature sensor broken The chamber internal PT100 T° sensor is broken or disconnected	Internal PT100 T° sensor	Check PT100 T° sensor connections	Proc. 31
			Replace PT100 T° sensor	

20 Steam Generator

Alarm or concern	Description	Cause	Action	Procedures layouts
<p>A21</p>	<p>Steam generator temperature > Set + 126°F (70°C)</p> <p>The temperature of the steam generator is above the maximum threshold</p>	<p>Main water tank empty</p>	<p>Check minimum water level sensor</p>	<p>Proc. 9</p>
		<p>Excessive water consumption >14 oz./cycle (>0.4 liters/cycle)</p>	<p>Check steam generator PT100 positioning/condition</p>	<p>Layout 45</p>
			<p>Determine if the 2CS condensation re-vaporization (EV2/EV4) system is working properly</p>	<p>See Section 1</p>
			<p>Clean chamber filter (FILTER 5)</p>	<p>Proc. 37</p>
			<p>Check sterilizer leveling</p> <p>Check EV1 tightness especially during PR phase, replace if needed</p>	<p>Proc. 26</p>
		<p>Insufficient water injected into the steam generator</p>	<p>Check water pump (WP)</p>	<p>Layout 21</p>
			<p>Check water pump one way valve condition</p> <p>Check water filter (FILTER 3)</p>	

Alarm or concern	Description	Cause	Action	Procedures layouts
<p>A22</p>	<p>Steam generator temperature < 194°F (90°C)</p> <p>The temperature of the steam generator is below the minimum threshold</p>	<p>Steam generator thermal overload open after overheating (A21)</p>	<p>Reset the thermal overload and check causes and actions as described in A21</p>	<p>Layout 29</p>
		<p>CPU board</p>	<p>Check the steam generator heating element power voltage output on the CPU board, if none, replace the CPU board</p>	<p>Proc. 17</p> <p>Diagnostic menu</p>
		<p>Steam generator heating element</p>	<p>Check the conductivity of the heating element with an ohmmeter, if open replace the heating element</p>	<p>Proc. 15</p>
		<p>CPU board steam generator T° channel calibration cancelled provoking overheating and the thermal overload opening</p>	<p>CPU calibration</p>	<p>Layout 22</p> <p>Calibration board + service EPROM 1</p>
<p>A23</p>	<p>Steam generator temperature sensor broken</p> <p>The steam generator PT100 T° sensor is broken or disconnected</p>	<p>Steam generator T° sensor</p>	<p>Check PT100 sensor connections</p> <hr style="border-top: 1px dashed black;"/> <p>Replace PT100 sensor</p>	<p>Proc. 39</p>
		<p>CPU board steam generator T° channel calibration cancelled</p>	<p>CPU calibration</p>	<p>Layout 22</p> <p>Calibration board + service EPROM 1</p>

30 Vacuum Pump

Alarm or concern	Description	Cause	Action	Procedures Layouts
A31	<p>3 minutes after phase start: Pressure > -2.9 psi (-0.20 bar)</p> <p>During a vacuum <i>phase</i> (PV1-6/DV), the lowest achieved pressure/vacuum is not below -2.9 psi (-0.20 bar)</p>	Vacuum pump	Check vacuum pump condition, pneumatic and electrical connections	Layout 33
			Check vacuum pump head membranes, valves and O-rings	
		Pressure sensor	Black braided tubing jammed	Layout 23
			Pressure sensor broken, replace CPU board	
		CPU board	Check the vacuum pump power voltage output on the CPU board. If none, replace the CPU board	Layout 23 Diagnostic menu
		Door seal	Check door seal condition (broken)	Layouts 14, 15, and 16
			Door seal not properly positioned against chamber collar: Check door locking system function Check door locking switches adjustment and condition	
			Check EV2-3-4 tightness and switching	
		Electro-valves	Replace Electro-valve(s)	Diagnostic menu Proc. 20 and 26
			Replace CPU board	Proc. 17

Alarm or concern	Description	Cause	Action	Procedures Layouts
A32	<p>4 minutes after phase start: Pressure > -7.2 psi (-0.50 bar)</p> <p>During a vacuum phase (PV1-6/DV), the lowest achieved pressure/vacuum is not below -7.2 psi (-0.50)</p>	Vacuum pump	<p>Check vacuum pump condition, pneumatic and electrical connections</p> <p>Check vacuum pump head membranes, valves and O-rings</p>	Layout 33
		Door seal	Check door seal condition	
		Condenser fan	<p>Fan stopped or blocked</p> <p>Check the voltage output from the board and on the fan pins:</p> <p>If yes: replace the fan</p> <p>If not: replace the CPU board</p>	<p>Diagnostic menu</p> <p>Proc. 17 and 23</p>
		Electro-valves	Check EV2-3-4 tightness and switching, replace electro-valve(s)	<p>Diagnostic menu</p> <p>Proc. 20 and 26</p>
		Pneumatics circuit leakage	Check all pneumatic connections	

Alarm or concern	Description	Cause	Action	Procedures Layouts
<p>A33</p>	<p>The value of the 6th vacuum pulse to be run < -11.6 psi (-0.80 bar)</p> <p>The global vacuum level obtained after 5 vacuum pulses was not sufficient and the compensating additional 6th calculated pulse cannot be reached</p>	<p>Vacuum pump</p>	<p>Check vacuum pump condition, pneumatic and electrical connections</p> <p>Check vacuum pump head membranes, valves and O-rings</p>	<p>Layout 33</p>
		<p>Condenser fan</p>	<p>Fan stopped or blocked. Check the voltage output from the board and on the fan pins:</p> <p>If yes: replace the fan</p> <p>If not: replace the CPU board</p>	<p>Proc. 17 and 23</p>
		<p>Door seal</p>	<p>Check door seal condition</p>	
		<p>Electro-valves</p>	<p>Check EV2-3-4 tightness and switching, replace electro-valve(s)</p>	<p>Diagnostic menu</p> <p>Proc. 20 and 26</p>
		<p>Pneumatics circuit leakage</p>	<p>Check all pneumatic connections</p>	
		<p>CPU board calibration cancelled</p>	<p>CPU calibration</p>	<p>Layout 22</p> <p>Calibration board + service EPROM 1</p>
<p>A34</p>	<p>The 10 last cycles required the 6th additional vacuum pulse</p> <p>Sterilization is guaranteed. The additional 6th pulse ensures the required vacuum level. The user can go on sterilizing but will get a new alarm within 10 new cycles.</p>	<p>Overloaded cycle</p>	<p>Refer to the cycle table for the maximum solid and porous load mass</p>	
		<p>FOLLOW A33</p>		

40 Water Pump

Concern description	Cause	Action	Procedures Layouts
Water pump is noisy	One way valve spring	Check one way valve spring adjustment	Layout 41
	Pump itself	Check pump fixing/positioning	
		Check rubber support condition	
		Check braided black tubing positioning/fixing (twisted)	
	Replace the water pump		Diagnostic menu Proc. 16
Water pump doesn't work	Pump connections	Check pump/CPU electric connections (inverted wires)	Diagnostic menu
	Pump itself	Replace the water pump	Proc. 16
	CPU board	Check the water pump power voltage output on the board. If not: replace the CPU board	Diagnostic menu Proc. 17

50 Door Locking System

Alarm or concern	Description	Cause	Action	Procedures Layouts
<p>At cycle start, the locking motor is powered until the DOOR LOCKED switch is activated. If within 6" this switch is not reached, the motor is reversed until the UNLOCKED switch is detected.</p> <p>If the switch is reached or not, follow the listed possibilities ❶ or ❷</p>				
<p>Message "Door locking problem"</p>	<p>❶ The UNLOCKED switch could be detected (system not blocked or did not move)</p>	<p>Door seal</p>	<p>Check door seal condition ----- Door seal out of housing</p>	<p>Layouts 7</p>
		<p>Door locking system</p>	<p>Check/adjust door locking motor consumption</p>	<p>Layout 10 Door test device</p>
		<p>DOOR LOCKED switch</p>	<p>Check the presence and condition of the DOOR LOCKED switch actuator</p>	<p>Proc. 11 Door test device</p>
			<p>Check DOOR LOCKED switch adjustment ----- Replace and adjust the door locking switch board</p>	<p>Diagnostic menu</p>
			<p>CPU board</p>	<p>Check the motor power voltage output on the CPU board, if not, replace the CPU board</p>
		<p>Door locking motor</p>	<p>If the motor is powered and does not move, replace the entire door locking system</p>	<p>Proc. 10 Diagnostic menu Door test device</p>

Alarm or concern	Description	Cause	Action	Procedures Layouts
<p>A52</p>	<p>② The UNLOCKED switch could not be detected (system blocked)</p> <p>Note: the door test device can be connected in order to unlock the system (Layout 10)</p>	Door seal	Check door seal condition ----- Door seal out of housing	<p>Layouts 7</p>
		Door locking system	Check door locking motor electrical consumption	<p>Layout 10</p> <p>Door test device</p>
		CPU board	Check the reverse motor power voltage output on the CPU board (relays), if none, replace the CPU board	<p>Proc. 17</p> <p>Diagnostic menu</p> <p>Door test device</p>
	<p>The UNLOCKED switch is opened during the cycle</p>	<p>DOOR UNLOCKED switch</p>	Check the presence and condition of the switch actuator ----- Replace and adjust the door locking switch board	<p>Proc. 11</p> <p>Door test device</p>
		Door switch board/CPU	Check door switch board/CPU connections and wiring loom	<p>Door test device</p>

Alarm or concern	Description	Cause	Action	Procedures Layouts
<p>END</p>	<p>Door remains locked at the end of the cycle</p> <p>Note: the door test device can be connected in order to unlock the system (Layout 10).</p>	<p>Door switch board/CPU</p>	<p>Moisture on the door switch board, DOOR UNLOCKED switch remains ON</p> <hr/> <p>Check door switch board/CPU connections and wiring loom</p>	<p>Door test device</p>
		<p>Door locking motor</p>	<p>Check/adjust door locking electrical motor consumption, if broken, replace the entire door locking system</p>	<p>Layout 10</p> <p>Door test device</p> <p>Diagnostic menu</p>
		<p>CPU board</p>	<p>Check the reverse motor power voltage output on the CPU board (relays), if none, replace the CPU board</p>	<p>Schedule 16</p> <p>Door test device</p> <p>Diagnostic menu</p>
	<p>Door can be opened but the END screen remains displayed</p>	<p>DOOR CLOSED switch remains activated</p>	<p>DOOR CLOSED switch actuating axle blocked. Clean, lubricate or replace it</p> <hr/> <p>Check DOOR CLOSED switch and actuator conditions/adjustments</p>	<p>Schedule 16</p> <p>Door test device</p>

60 Electro-Valves

Alarm or concern	Description	Cause	Action	Procedures Layouts
A63	<p>2 min. 50 sec. after the process switched from a vacuum to a pressure pulse (pp1-5/ pph), pressure is still negative and below -10.1 psi (-0.70 bar)</p> <p>Steam has not been injected in the chamber</p>	EV4	Determine if the valve switches when energized, if not, check connection or replace the valve	<p>Diagnostic menu</p> <p>Proc. 20</p>
		EV1	Determine if the valve switches when energized, if not, check connection or replace the valve	<p>Diagnostic menu</p> <p>Proc. 26</p>
		CPU board	Check the EV1-4 power voltage output on the CPU board, if none, replace the CPU board	<p>Diagnostic menu</p> <p>Proc. 17</p>
		Main water tank empty	Check minimum water level sensor	<p>Proc. 9</p>
		Insufficient water injected into the steam generator	Check water pump (WP)	<p>Layout 21</p>
Check water pump one way valve condition				
Check water filter (FILTER 3)				
Check braided black tubing positioning/fixing (twisted/clamped)				

70 Distilled/De-Mineralized Water

Concern description	Cause	Action	References
White dots on the load, chamber, trays and tray support	Poor water quality	Check water quality. Change to another water supplier	Attached E EN13060 Water quality
	Load not rinsed and dried prior to sterilization	Load must be rinsed and dried	Owner's Manual Attached 2 Preparation of the load
	Quality of the drying	Follow chapter 05 Drying problems	

Preparation of the Load (from Owner's Manual - Annex 2)

Cleaning of the instrument

The instruments to be sterilized must be clean and free from all types of residue (such as fragments, dentine, and blood, etc.) These substances can damage the objects placed in the trays and can also damage the sterilizer.

- ▶ Clean the instruments immediately after use. Follow the manufacturer's instructions when using an ultrasonic cleaner.
- ▶ Remove all traces of disinfectant from the product as this may cause corrosion on heating. Rinse thoroughly, and then dry.
- ▶ Lubricate in accordance with the manufacturer's instructions.

Water Quality (EN13060 Annex E)

Suggested maximum limits of contaminants as specified for water used for steam sterilization

Table B.1: Contaminants of condensate and feed water

	Feed water	Condensate
Evaporate residue	10 mg/liter	1.0 mg/kg
Silicon monoxide, SiO ₂	1 mg/liter	0.1 mg/kg
Iron	0.2 mg/liter	0.1 mg/kg
Cadmium	0.005 mg/liter	0.005 mg/kg
Lead	0.05 mg/liter	0.05 mg/kg
Rest of heavy metals, excluding iron, cadmium, lead	0.1 mg/liter	0.1 mg/kg
Chloride	2 mg/liter	0.1 mg/kg
Phosphate	0.5 mg/liter	0.1 mg/kg
Conductivity (at 68°F) (20°C)	15 µs/cm	3 µs/cm
pH value	5 to 7	5 to 7
Appearance	colorless, clean, without sediment	colorless, clean, without sediment
Hardness	0.02 mmol/liter	0.02 mmol/liter
<p>NOTE 1: Do not use water contaminated at levels exceeding those given in this table for steam generation. Contaminated water greatly reduces the working life of a sterilizer and can invalidate the manufacturer's warranty or guarantee.</p> <p>NOTE 2: Condensate is produced from steam evacuated from the sterilization chamber.</p>		

