

Technician Manual

**Pre-vacuum B-class Steam Sterilizer
Models ELARA9-D, ELARA11-D, ELARA9-i,
ELARA11-i**



Cat. No. MAN205-0498000EN Rev. H

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1 General Information



Caution!

Read the Operating Instructions carefully, before beginning any operation on the autoclave!

1.1 Introduction

This autoclave model is an electrically heated sterilizer using steam as a sterilizing agent.

The autoclave is designed as Type B in accordance with EN13060.

ELARA-D is equipped with the steam generator. ELARA-i uses water heaters to create steam inside the chamber.

This model is a pre-vacuum sterilizer having the following features;

- An air removal stage (pre-vacuum), before starting the sterilizing stage.
 - A post-sterilization drying phase, based on the combined operation of heat and vacuum with air inlet pulses.
- There are the following safety devices installed in the autoclave to optimize its safe operation:
- Two safety cut-off thermostats to prevent over-heating of upper (jacket) and the lower heating elements.
 - One safety pressure valve to prevent over pressurizing the chamber and one for the generator.
 - Two door switches that indicate that the door is closed and locked. Without this indication, the cycle does not start.
 - A digital display is used for monitoring and control purposes. This device displays the pressure in kPa, psia or psig, according to the operator's needs.
 - Temperature can be displayed in either °F or °C according to the operator's needs.

The advantages of the pre-vacuum sterilizer are as follows:

- Removal of residual air from packs and porous load and most kinds of tubes (rubber, plastic etc.) by vacuum at the first stage of the cycle.
- More efficient steam penetration into the load; assuring effective sterilization.
- Improved temperature uniformity throughout the chamber.
- Better drying of materials due to the vacuum achieved in the chamber during the drying cycle.

The printer (optional) prints the preset and actual parameters of the cycle (temperature, time and pressure/vacuum).



Warning

Only technical personnel having proper qualifications and holding technical documentation (including a Technician Manual) and adequate information are authorized to install and service the apparatus.

1.2 Intended Use

This table-top autoclave is designed for sterilization of medical and surgical goods such as unwrapped and wrapped, solid, hollow, porous products and tubes in ophthalmic, dental and medical clinics, first aid rooms, small laboratories etc.

1.3 Incoming Inspection

Upon receiving your Tuttnauer Autoclave, carefully inspect the outside of the shipping carton for signs of damage. If any damage to the carton is found, note the location with respect to the autoclave and check that area of the autoclave carefully once it is fully unpacked. Observe packing method and retain packing materials until the unit has been inspected. Mechanical inspection involves checking for signs of physical damage such as: scratched panel surfaces, broken knobs, etc.

If any damage is found, contact your dealer as soon as possible so that they can file a claim with the shipping carrier and also notify Tuttnauer.

All Tuttnauer products are carefully inspected prior to shipment, and all reasonable precautions are taken in preparing them for shipment, to assure safe arrival at their destination.

Note: Lifting and carrying should always be done by two people.

1.4 Warranty

We certify that this autoclave is guaranteed to be free from defects in material and workmanship for one year against faulty components and assembly.

This warranty does not include routine cleaning and preventive maintenance to be performed according to instructions in sec. 12.1 (Preventive and Scheduled Maintenance).

Tuttnauer warrants all new autoclaves for a period of one full year, covering both parts and labor. This one year warranty covers defects in materials and workmanship on every part in the autoclave except the HEPA filter and the door gasket.

This warranty does not apply to any autoclave that has been subjected to misuse, neglect, accident or improper installation or application, nor shall it extend to autoclaves that have been repaired or altered outside the factory without prior authorization from Tuttnauer.

Tuttnauer's obligation is limited to the repair or replacement of parts for the autoclave. This warranty will be void if the unit is not purchased from an authorized Tuttnauer dealer. No other warranties or obligations are expressed or implied.

The Autoclave should not be used in a manner not described in this manual!

1.5 Warranty Statement

The warranty registration must be completed and returned to our service departments; within fourteen (14) days of purchase or the warranty will be void. Our European Representative's Technical Service Department can be reached at:

✉ Tuttnauer Europe B.V., Hoeksteen 11 4815 PR P.O. Box 7191 4800 GD Breda, The Netherlands

☎ Tel: 31 (0) 765423510, ☎ Fax: 31 (0) 765423540, Email: info@tuttnauer.nl

Note: If there is any difficulty with this autoclave, and the solution is not covered in this manual, contact our representative or us first. Do not attempt to service this autoclave yourself. Describe the difficulty as clearly as possible so we may be able to diagnose the problem and provide a prompt solution.

Send along a copy of the last printout for our inspection. If replacement parts are needed, stipulate the model and serial number of the machine.

No autoclaves will be accepted for repair without proper authorization from us. All transportation charges must be paid both ways by the owner.

2 Technical Data

2.1 Specifications

Property		ELARA9-D/ ELARA9-i	ELARA11-D/ ELARA9-i
Chamber Diameter		230 mm	280 mm
Chamber Depth		430 mm	504 mm
Chamber volume		19.8 lit	28.5 lit.
Max. Allowable Working Pressure (MAWP)		2.8 bar	2.8 bar
Maximum load per item		0.2kg	0.2kg
Maximum load per tray		1.5kg for unwrapped instruments, 0.8kg for wrapped instruments	1.5kg for unwrapped instruments, 0.8kg for wrapped instruments
Maximum solid load		5.0kg for unwrapped instruments, 2.5kg for wrapped instruments	7.0kg (ELARA-i models) or 8.0kg (ELARA-D models) for unwrapped instruments, 4.5kg for wrapped instruments
Maximum textile load		1kg	1.5kg
Tray dimensions		44.2 x 17.3 x 1.9	44.2 x 17.3 x 1.9
No. of trays		4	6
Net weight (ELARA-D models)		62.15	71.7kg
Net weight (ELARA-i models)		55kg.	65kg
Mineral-free water reservoir	Max. water volume	6.6lit	
	Min. water volume	2.6lit.	
Used (waste) water reservoir	Max. water volume	5.2lit.	
Safety relief valve		28 PSI	

2.2 Generator Steam Data (ELARA-D models)

Property	Value
Max. working pressure	3 BarG
Safety relief valve	5 Bar

2.3 Autoclave Electrical Data

Property	ELARA-D	ELARA-i
Total Power	2200W	1800W
Voltage	1Ph / 230 VAC	1 Ph / 230 VAC
Amperage	10A	9A
Protection against electrical shock	Class I (IEC 60601-1)	Class I (IEC 60601-1)
Mains supply fluctuation	+/- 10%	+/- 10%
Frequency (Hz)	50Hz	50Hz

2.4 Utilities

Property	Value
Mineral free water	See table in 2.11
Power supply	* 1 phase, /230VAC $\pm$ 10%, 50Hz
Recommended circuit breaker	15A

* According to the local network.



Cautions!

In order to avoid any injury by electrical hazard, it is recommended that a ground fault protection device (GFCI) be installed in the electrical panel feeding the autoclave (local codes may make this mandatory).

The electrical network must comply with local rules or regulations.

Verify that there is an easy access to the main power switch and to the current leakage safety relay (GFCI). The voltage supplied to the device must comply with the label $\pm$ 5%.

A switch or circuit-breaker must be included in the building installation. This switch or circuit-breaker shall be in close proximity to the equipment, within easy reach of the operator; and marked as the disconnecting device for the equipment.

2.5 Environment Emission Information

1. The peak sound level generated by the autoclave is 65dBa with background noise of 48 dBa.
2. The total heat per hour transmitted by the autoclave is <200Wh.

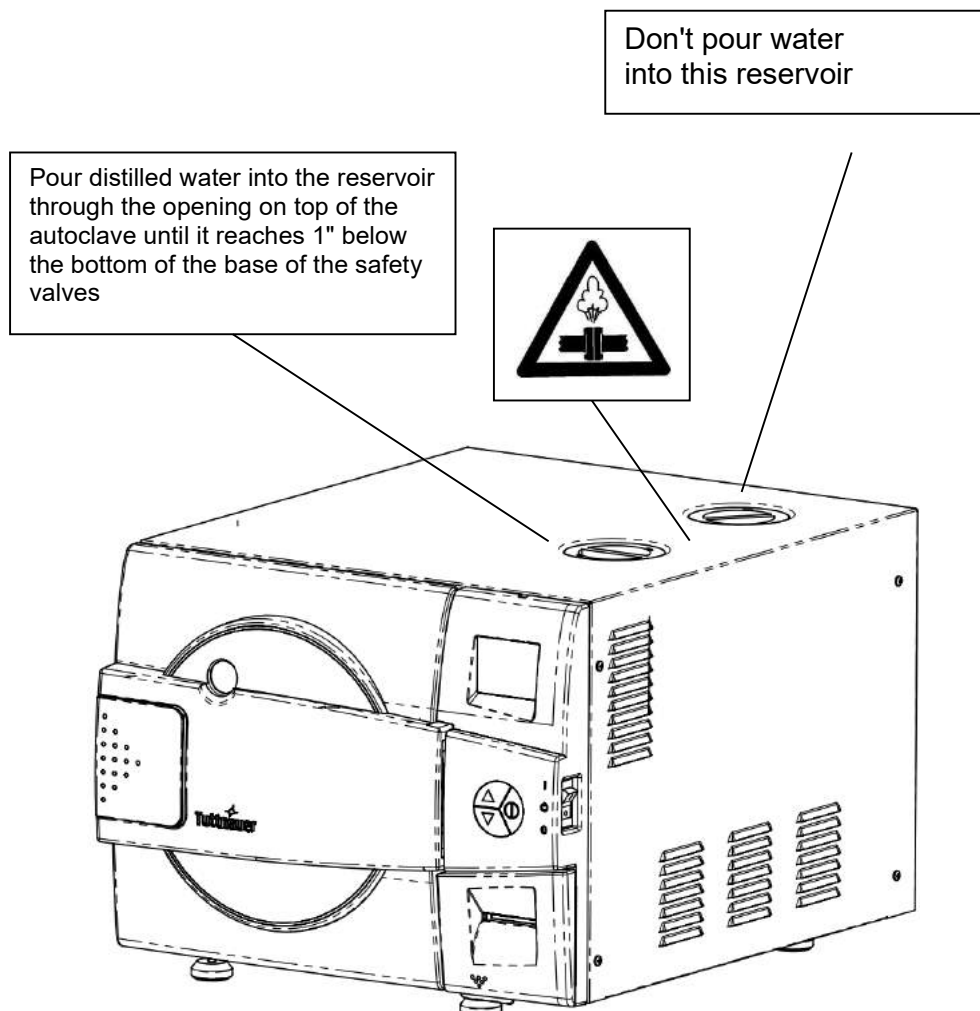
2.6 Construction

- The main parts of the autoclave are made of materials as indicated below:
- Chamber is built of stainless steel 316 L.
- Door is made of stainless steel 316.
- Trays are made of stainless steel 304.
- Water reservoir is made of polyethylene.
- Door handle and door cover are made of hard plastic material, which is safe to touch and thermo-insulated.

2.7 Stickers Description

Symbol	Meaning	Part Number	Location
	Pour distilled water into the reservoir through the opening on top of the autoclave until it reaches 1" below the bottom of the base of the safety valves*	LAB048-0355	Near the mineral-free water reservoir cover
	Caution! Hot steam.	LAB048-0058	Near the safety valve
Don't pour water into this reservoir.		LAB048-0039	Near the waste water reservoir cover*.
	Caution! Consult accompanying documents	LAB048-0024	2 Stickers: one near the Power switch and one on the front door upper-left corner
	To avoid damages during installation remove all the packaging material from the chamber immediately after turning the machine on.	LAB048-0446	In the middle of the door
* D models only			

2.8 Stickers map



2.9 Operating Conditions

This device is for indoor use only!

The sterilizer should be loaded only with autoclavable material!

Minimum room ventilation shall be 10 cycles per hour

The environment shall not exceed an ambient temperature range of 41°F-104°F (5°C-40°C) and a relative humidity of 85% respectively.

The operation altitude shall not be over 6500 feet (2000 meters) (ambient pressure shall not be lower than 80 kPa (11.6 psia)).

Operate the autoclave only in the manner specified in the manual. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



Caution!

Waste water should be brought into the public net in accordance with the local rules or requirements

2.10 Directives and Standards

Every autoclave meets the provisions of the following Directives and is in compliance with the following Standards:

Tuttnauer. Ltd. company meets the provisions of the following standards:

ISO 13485:2003 (Quality Systems for Medical Devices)

ISO 9001:2008 (Quality Systems)

MDD 93/42/EEC (Medical Device Directive)

Tuttnauer. Ltd. company also works in conjunction with and refers to:

ANSI/AAMI ST55 American Society of Mechanical Engineers

Section VIII, Division 1, for unfired pressure vessels.

EN 13060 Small Steam Sterilizers.

UL UL 61010-1

PED 97/23EEC

IEC IEC 61010-2-040 Safety

ISO 17665-1:2006 (Validation and Routine Control)

2.11 Water Quality

The distilled or mineral-free water supply shall be according to the table below:

Physical Characteristics and Maximum acceptable contaminants levels in water or steam, for steam generator and sterilizers

	Contaminants in water supplied to generator/chamber	Contaminants in condensate at steam inlet to sterilizer
Evaporate residue	≤ 10 mg/l	N/A
Silicate (SiO ₂)	≤ 1 mg/l	≤ 0.1 mg/l
Iron	≤ 0.2mg/l	≤ 0.1mg/l
Cadmium	≤ 0.005 mg/l	≤ 0.005 mg/l
Lead	≤ 0.05 mg/l	≤ 0.05 mg/l
Rest of heavy metals except iron, cadmium, lead	≤ 0.1 mg/l	≤ 0.1 mg/l
Chloride (Cl)	≤ 2 mg/l	≤ 0.1 mg/l
Phosphate (P ₂ O ₅)	≤ 0.5 mg/l	≤ 0.1 mg/l
Conductivity (at 25°C)	3 to 15 µs/cm	≤ 3 µs/cm
pH value (degree of acidity)	5 to 7.5	5 to 7
Hardness (Σ ions of alkaline earth)	≤ 0.02 mmol/l	≤ 0.02 mmol/l
Appearance	Colorless, clean, without sediments	

Compliance with the above data should be tested in accordance with acknowledged analytical methods, by an authorized laboratory.

Attention:

The use of water for autoclaves that do not comply with the table above may have severe impact on the working life of the sterilizer and can invalidate the manufacturer's guarantee.

Use only deionized water, having a maximum conductivity of 15 µs/cm. Conductivity greater than 15 µs/cm may cause failures.

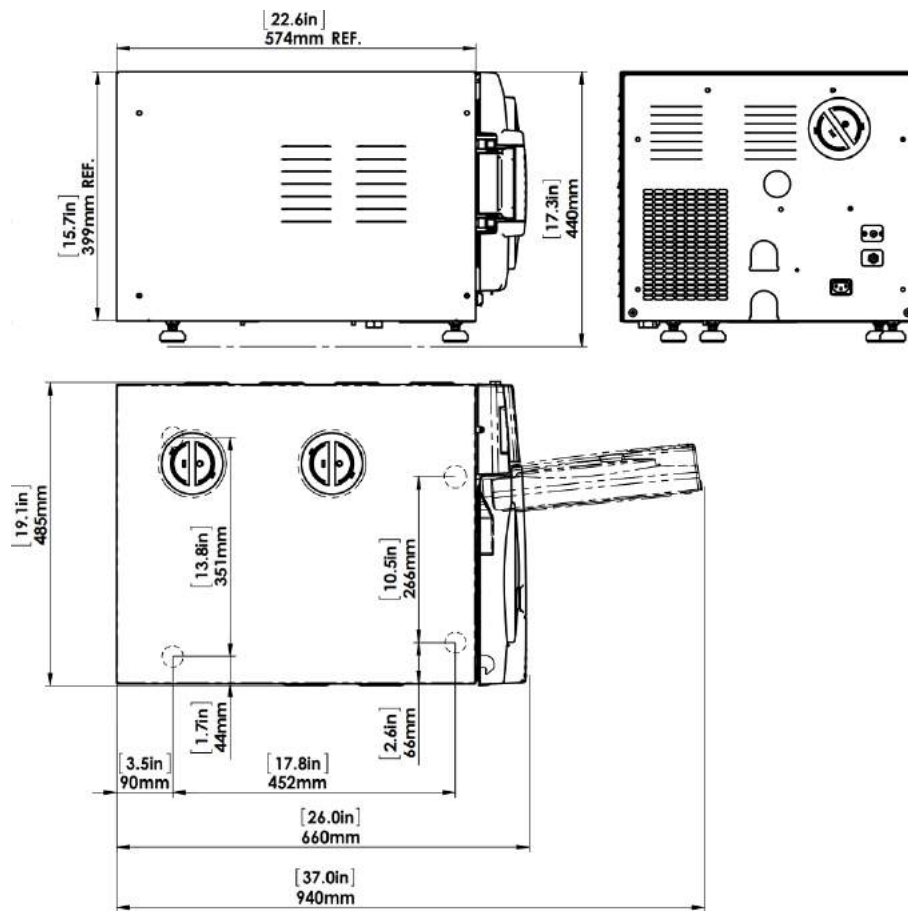
Tap water supply

The range of hardness value 0.7-2.0 mmol/l (70- 200 mg/l CaCO₃)

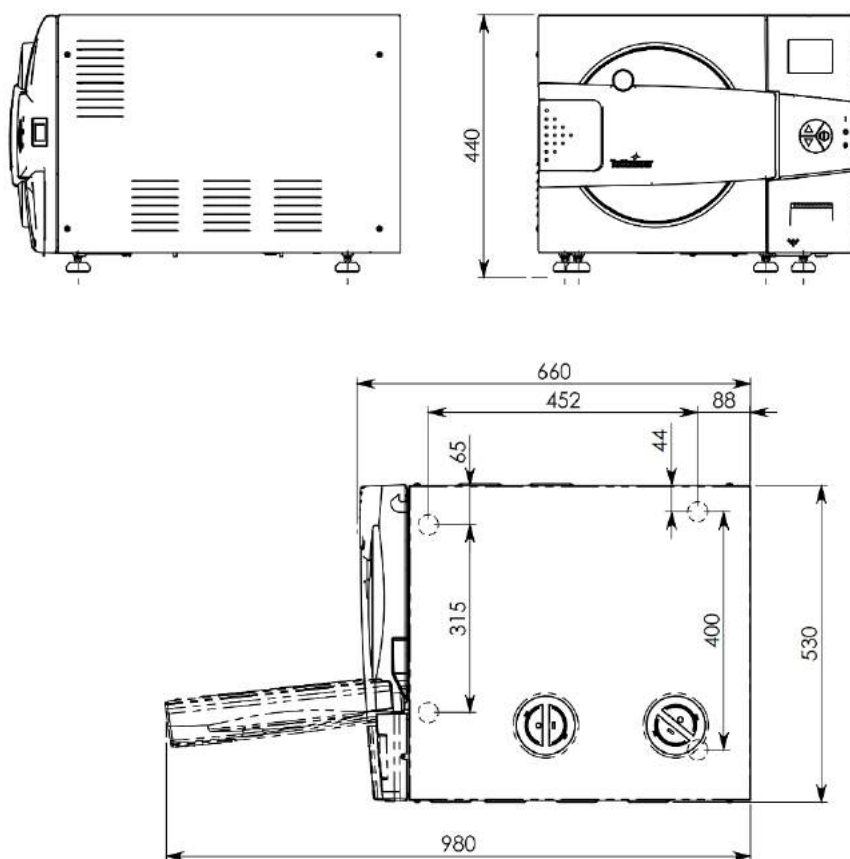
The use of soft water is strictly forbidden!

Please consult a water specialist!

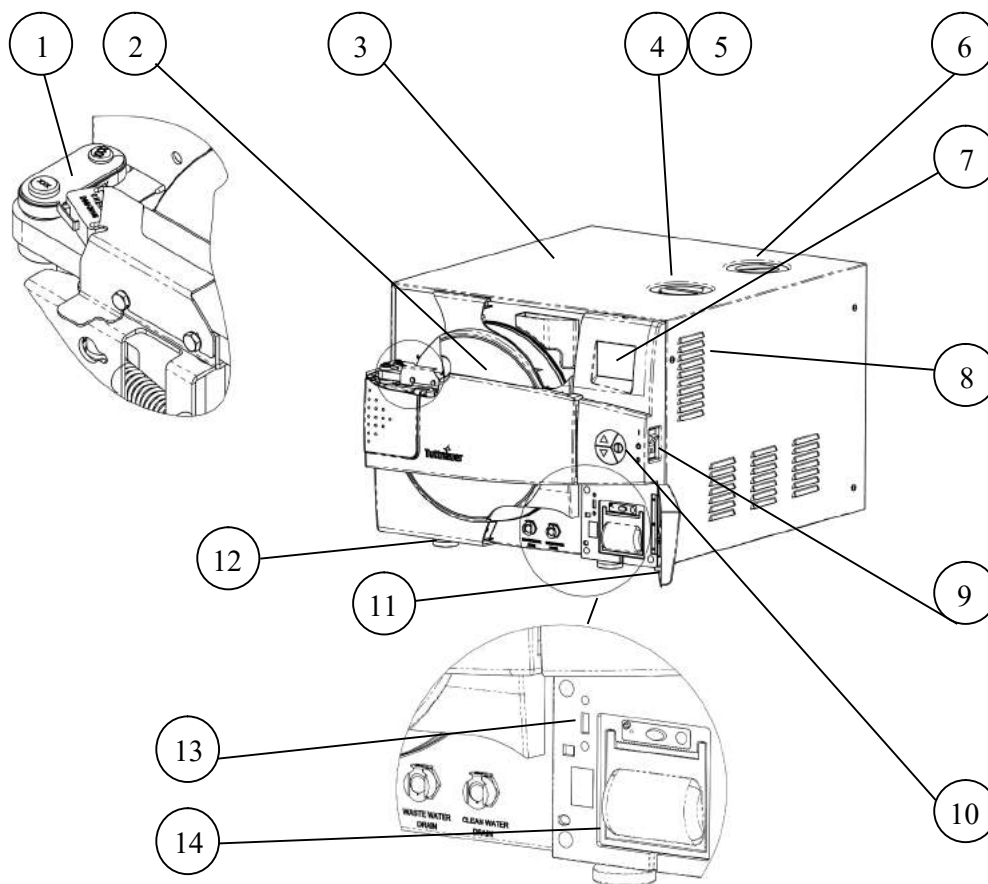
2.12 Overall Dimensions: ELARA9-D/ELARA9-i



2.13 Overall Dimensions: ELARA11-D/ELARA11-i

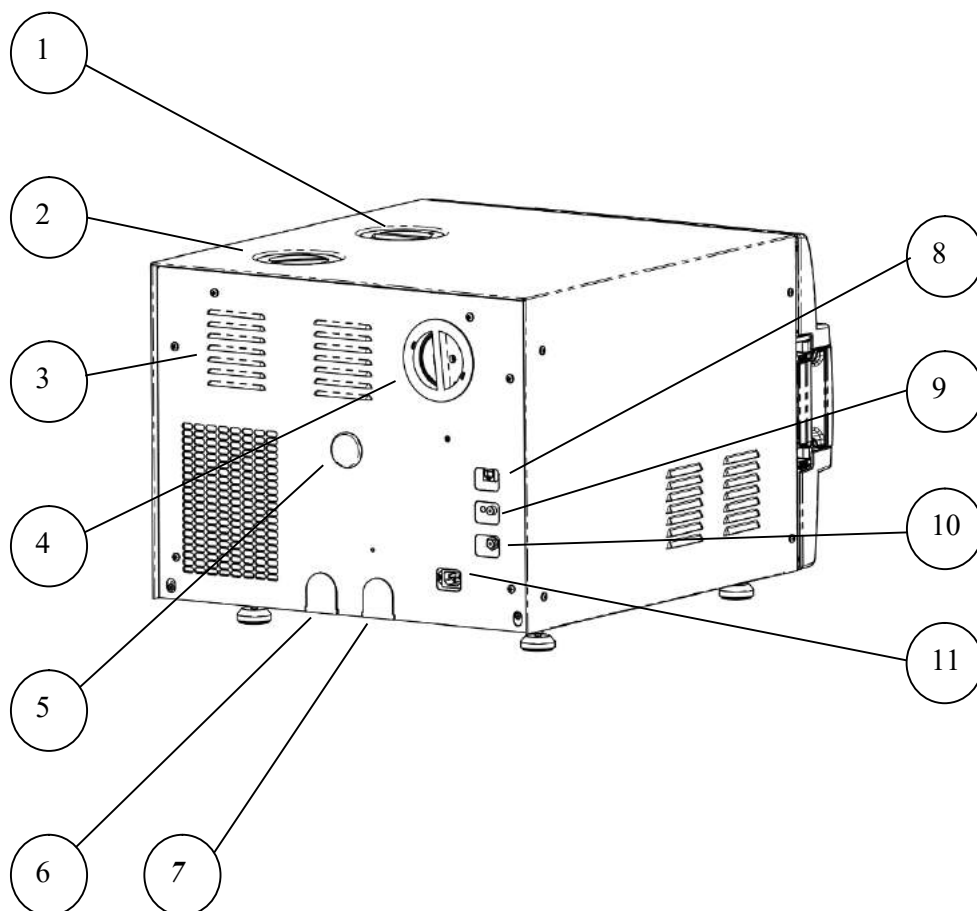


2.14 Front view



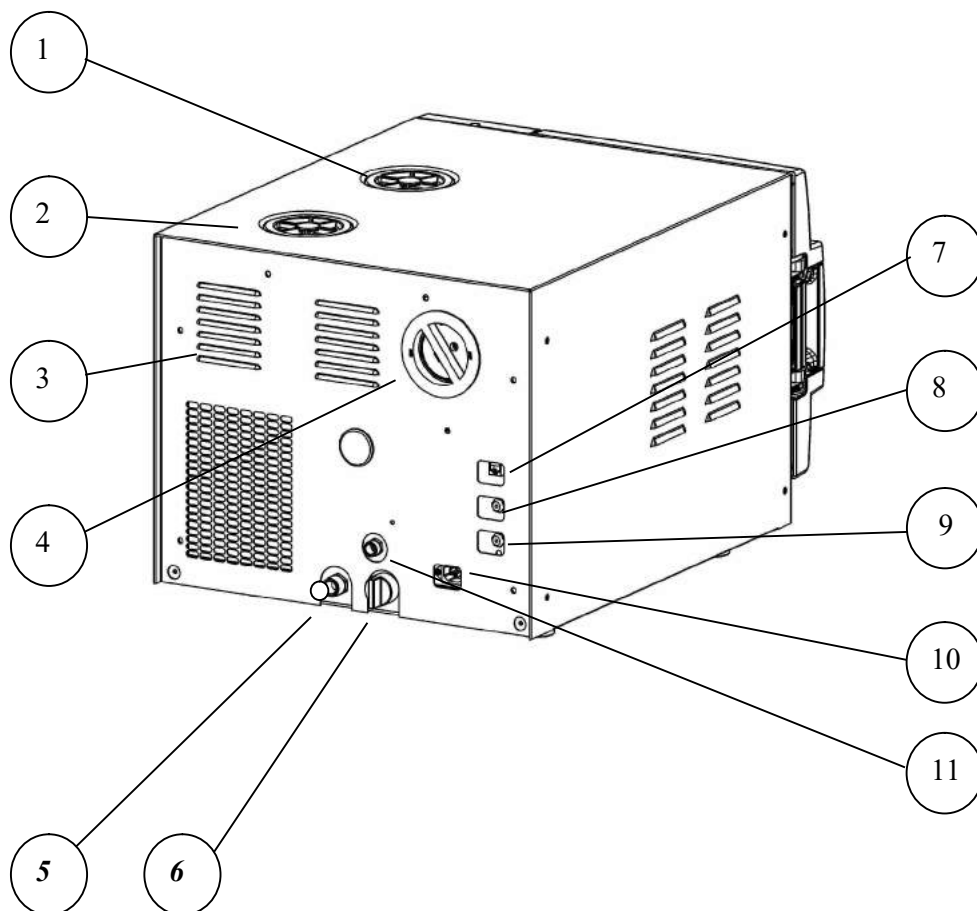
No.	Description	No.	Description
1	Door switches	8	Ventilation grill
2	Autoclave door	9	On/ off switch / circuit breaker
3	Autoclave cover	10	Keypad
4	Mineral-free water reservoir cover	11	Printer cover
5	Steam generator (ELARA-D models only) and cChamber (ELARA-D and ELARA-i) and steam generator (ELARA-D models only) safety valves	12	Autoclave Leg
6	Waste water reservoir cover	13	USB connection
7	Display	14	Printer (optional)

2.15 Rear View (ELARA-D models)



No.	Description	No.	Description
1	Mineral-free water reservoir cover	7	Automatic water filling inlet (optional)
2	Waste water reservoir cover	8	RJ45 network connector
3	Ventilation grills	9	Jacket cut-off
4	Air filter service cover	10	Generator cut-off (ELARA-D models only)
5	Opening for calibration/ validation.	11	Main power electric cable socket
6	Overflow outlet to drain		

2.16 Rear View (ELARA-i models)



No.	Description	No.	Description
1	Mineral-free water reservoir cover	7	RJ45 network connector
2	Waste water reservoir cover	8	Jacket cut-off
3	Ventilation grills	9	Chamber cut-off
4	Air filter service cover	10	Main power electric cable socket
5	Overflow outlet to drain	11	Water inlet (optional)
6	Steam Outlet Strainer		

3 Safety

Never use the autoclave to sterilize corrosive products (acids, bases, or phenols) volatile compounds or solutions (ethanol, methanol or chloroform), or radioactive substances.

3.1 Safety features

The pressure vessel chamber door has the following features protecting personnel from hazards:

- Two door switches that indicate that the door is closed and locked. Without this indication, the cycle does not start.
- An electrical door locking pin that blocks door opening during operation.

Note: The door cannot be opened if the chamber is too hot.

There are the following safety devices installed in the autoclave to optimize its safe operation:

- Safety thermostats/thermostats, to prevent over-heating of the steam generator (D models) and the chamber.
- Safety pressure valves/valves to prevent over-pressurizing the steam generator (D models) or the chamber.

3.2 Safety Instructions

- All new autoclave users must undergo a period of training in proper usage under an experienced employee.
- Before use, check inside the autoclave chamber to ensure that no items have been left from the previous cycle.
- Load trays in such a way as to allow steam to move freely among all items.
- When sterilizing plastic materials, make sure that the item can withstand sterilization temperature. Plastic that melts in the chamber is liable to cause a great deal of damage.
- On closing the device door, make sure it is properly locked before activating. Verify that DOOR OPEN  symbol is replaced by the message "System Ready".
- Verify once again that you have chosen the appropriate sterilization program.
- Open the door slowly to allow steam to escape and wait 1 minute before you remove the load.

- When removing the trays it is recommended to use the tray handle or wear heat resistant gloves.
- Once a month, ensure that the safety valve is operating.
- A certified inspector must perform a periodic pressure chamber safety test according to the local regulations.
- Once a year, or more frequently, effectiveness tests must be performed, i.e., calibration and validation.
- Make sure there are no leaks, breaks, blockages, whistles or strange noises.
- Perform maintenance operations as instructed. The owner of the autoclave is responsible to perform the maintenance operations.
- Notify the person in charge immediately of any deviation from the normal functioning of the device.
- Protective equipment and clothes and other safety instructions should be implemented in accordance with local and national regulations and/or rules!

4 Installation



Caution!

The installation and all operations described in this chapter must be done only by an authorized technician.

The sterilizer must be placed on a rigid and leveled surface. The stand must be able to withstand the load of the device and loaded material.

Property	ELARA9-D/ELARA9-i	ELARA11-D/ELARA11-i
Counter top able to support a minimum of	70 kg (155 lb)	85 kg (188 lb)
Minimum Counter dimensions (W x D)	51cm x 63cm (20" x 25")	56cm x 63cm (22" x 25")

4.1 Lifting and carrying



Caution!

Before moving the autoclave, Make sure that the electric cord is disconnected from the power, and there is no pressure in the chamber or in the generator.

Attention! The pressure of the generator (ELARA-D models) does not decrease immediately when the equipment is turned off. Wait approx. ½ an hour to verify that the pressure decreased to atmospheric pressure.

1. Disconnect the power supply cord.
2. Drain the water from both reservoirs.

To avoid injuries, lifting and carrying should be done with at least two persons or by using a fork-lift or any other mechanical aid.

Do not drop the device!

4.2 Unpacking the autoclave

Unpack the autoclave and inspect for mechanical damage upon receipt. Observe packing method and retain packing materials until the unit has been inspected. Mechanical inspection involves checking for signs of physical damage such as: scratched panel surfaces, broken knobs, etc.

To avoid injuries, lifting and carrying of the autoclave should be done with at least two persons or by using a fork-lift or any other mechanical aid.

4.3 Installation preparations

1. Check and verify that the counter carrying the autoclave is a rigid and leveled surface and can carry a load of 225 lb (102kg).



Attention: The ELARA11D/ELARA11-i is not designed for use on any standard slide out shelf. If it is necessary to use a slide out shelf, it must be tested and/or rated for 225 Lbs or more.

2. Check and verify that the counter dimensions are, at least, 22" wide x 24" deep (55cm x 63.5cm).
3. Keep the back and the sides of the autoclave approximately 4" (10 cm) away from the wall to allow ventilation and facilitate the device disconnection.
4. If placed in a cabinet, verify that the rear of the cabinet is open to allow ventilation.

Note: Insufficient space for ventilation may result in an increase of the autoclave's temperature that may cause a malfunction or damage the instrument.

5. It is recommended that enough space be left around the autoclave to give a technician access for servicing the machine.
6. Check and verify that the room ventilation is 10 cycles per hour minimum.
7. Check and verify that the ambient temperature range is 41°F - 104°F (5°C-40°C), it is preferable not to exceed 86°F (30°C).
8. Check and verify that the ambient relative humidity does not exceed 85%
9. To update the atmospheric pressure in the autoclave, keep the chamber's door open for approx. 5 minutes. The system will be updated automatically.

4.4 Placing the Autoclave

Keep all the sides of the autoclave approximately 3" (75.2 mm) away from the wall to allow ventilation.

If placed in a cabinet, verify that the rear of the cabinet is open to allow ventilation.

Insufficient space for ventilation may result in an increase of the autoclave's temperature that may damage the instrument.

It is recommended that enough space be left around the autoclave to give a technician access for servicing the machine.

4.5 Connections to Utility Supplies

1. Check and verify that the power supply is a 1 phase, 230Vac $\pm 10\%$, 50/60Hz (as appropriate), 15A supply.
2. Check and verify grounding of the autoclave.
3. Check and verify that the electrical net is protected with a current leakage safety relay.

4.6 Operating the autoclave

1. Plug the power cord into the power socket.
2. Turn on the Main Switch / Circuit Breaker (see front view).
3. Select "Vacuum Test" cycle to keep the steam generator and heating elements from heating up.
4. Setng time and date (See instruction in the user manual).
5. Adjust the atmospheric pressure according to the altitude of the autoclave (See 9.24 reset atmospheric pressure)
6. Fill the Mineral Free Water Reservoir with water meeting the quality specs in sec. 2.11 with water (see "Filling the Mineral-Free Water Reservoir" in the Operation and maintenance manual) as follows: Fill with 6 liters of mineral free water by pouring it into the front reservoir fill opening at the top of the machine or through the front funnel (see front view).

Note: one filling is enough for 3-4 cycles

7. Open the door of the autoclave and remove the trays and the packaging material.
8. Insert a paper roll in the printer (if available), if you have one in your configuration (see printer handling chapter of the user manual).
9. Close the door and perform a Vacuum Test. If the test fails perform another test since the fail may be a result of moisture in the air. If the second test fails it may be necessary to run Program 2 with the long drying cycle to remove any excess moisture that is causing the test to fail.

10. If the Vacuum Test is successful then select the B&D Test cycle.
11. At this stage the chamber and steam generator will be heating up. It will take approximately 15 minutes (from selecting the B&D Test).
12. While waiting for the unit to heat up explain and instruct the operator as follows (use the operation manual as reference):
 - Operation principles of the autoclave.
 - Preparation for sterilizing instruction including loading instructions.
 - Intended use of each cycle.
 - Selecting a cycle.
 - Water filling method.
 - Displayed error and operational messages.
 - Monitoring and changing parameters.
 - Printer handling.
 - Maintenance instructions
13. Perform a B&D test with a chemical indicator.
14. The operator shall perform a cycle under supervision of the technician.

5 Tests

5.1 Installation Tests

The service technician shall perform the following preliminary checks before operating the autoclave:

- a. Integrity Check**
Perform a visual check to verify that there are no dents, scratches, broken parts, etc.
- b. Leveling Check**
Check (visual check) that the surface carrying the autoclave is leveled.
- c. Leakage current test**
Check the precise operation of the earth leakage relay.
- d. Continuity Check**
Check the continuity of the grounding connection.

At this stage operate the autoclave and continue with the tests:

- e. Safety Check**
Check the safety elements; safety valve and the door locking mechanisms.
- f. Programs Check**
Run basic programs of the autoclave to verify that the cycle operates and there are is no leakage.
- g. Validation**
Validate the sterilization cycles, taking in consideration the interface of packaging/goods/autoclave.

After the above steps are performed, the autoclave is ready for operation.

5.2 Periodical Tests

Period	Test
1 month	Test the safety valve by operating it.
6 months	Remove the autoclave's cover, tighten the heaters' screws and electrical connections, valves and connectors in the control box.
Year	Check the continuity of the grounding connections.
	Check the temperature and pressure calibration.

	Perform validation of the autoclave.
	Check the precise operation of the earth leakage relay.
	Check that the autoclave is leveled.
	Check the safety elements; safety valve, safety and cut-off thermostats door locking mechanisms.
	Run basic programs of the autoclave and check the operation sequences, the sterilization parameters etc.
	Check the water reservoir, piping, plastic parts and electric wires.
	Check and tighten the piping joints to avoid leakage.
	Check and tighten all screw connections in the control box, heaters and valves and instrumentation.
	Calibrate the temperature and pressure once a year or in reference to local rules or regulations (refer to the section on Calibration).
5 years	Observe the closing device for excessive wear
	Check the door gasket
Safety tests (pressure vessel, efficiency, electrical) shall be performed in accordance with local rules or regulations, by an authorized inspector.	

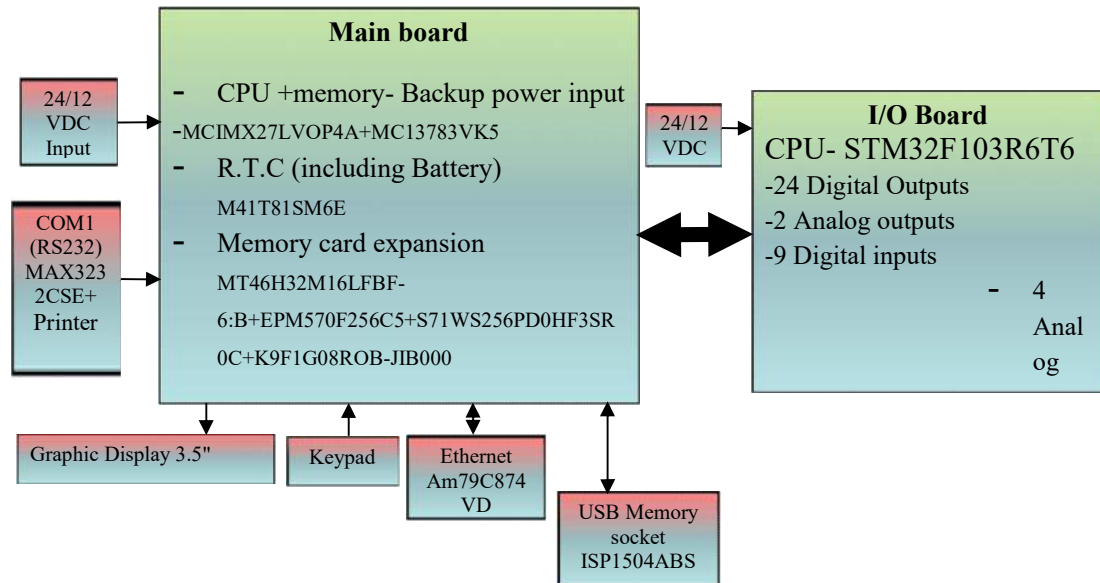
Only an authorized technician shall perform the 6-months and yearly tests!

5.3 First Operation

1. Plug the power cord into the power socket.
2. Turn on the On/ off Switch / Circuit Breaker (see front view).
3. For ELARA-D models only: select "Vacuum Test" cycle to keep the steam generator and heating elements from heating up.
4. Fill the Mineral-Free Water Reservoir with water meeting the quality specified in 2.11 (see Filling the Mineral-Free Water Reservoir in the Operation and maintenance manual) as follows: Fill with 4 liters of mineral free water by pouring it into the front reservoir fill opening at the top of the machine or through the front funnel (see front view).
5. Set the atmospheric pressure (See 9.24) parameter
6. Set date and time (see 9.8).
7. Insert a paper roll into the printer (if available, see printer chapter of the Operation and maintenance manual).
8. Wait until  symbol (low jacket temperature) disappears. It may take up to 10-15 minutes.

6 Description of the Control System

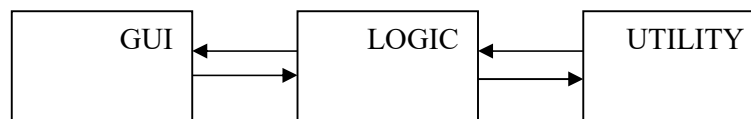
6.1 Block Diagram of Hardware Components



6.2 Application System Architecture

The system is divided into three main sections (dll)

1. GUI – holds all the Human Machine interface including the main application screen and all the configuration screens which enable the user to handle the machine.
2. Logic – holds all the application logic for running the machine.
3. Utilities – Holds general functionality which is used by the logic section and the GUI section e. g: converting function for displaying different pressure or temperature units type, languages etc.



Mapping of the software to the hardware – see 6.1. The Hardware architecture is based on Freescale i.MX27 PDK Evaluation Board.

6.3 Description of the programmable component:

User Interface

— **Keypad:** The keypad has three push buttons:

- Down key
- Up key
- Start/stop key



Display: The control system has 3.2 " color graphical display.

USB socket: The USB socket is intended to load cycles' history from flash a memory (disk on key). The received file is in txt format that can be loaded onto a PC.

Inputs and Outputs

Analog inputs

Analog inputs	Description	JP
PT100-1	PT-100 Chamber Temperature	J2
Pressure 1	4-20mA main chamber pressure control	J7/1
Electrode 1	Water level chamber control 1	J11/1

Digital inputs

Digital Inputs	Description	JP
Door 1 closed	Indicate door 1 closed	J12/1
Door1 open switch	Indicate to command to close / open Door1	J12/6
Distilled water supply	Indicate distilled water supply	J12/3

Digital outputs

Digital Outputs	Description	JP
Chamber heat	SSR that operates the chamber heaters	J13/6
Water pump valve (ELARA-D only)	Option , relay that operates the water pump valve	J13/10
slow exhaust	slow exhaust valve	J14/6
Fast exhaust	Fast exhaust valve	J14/8

Actuators

The control system operates electrical valves (solenoids), pumps, etc...

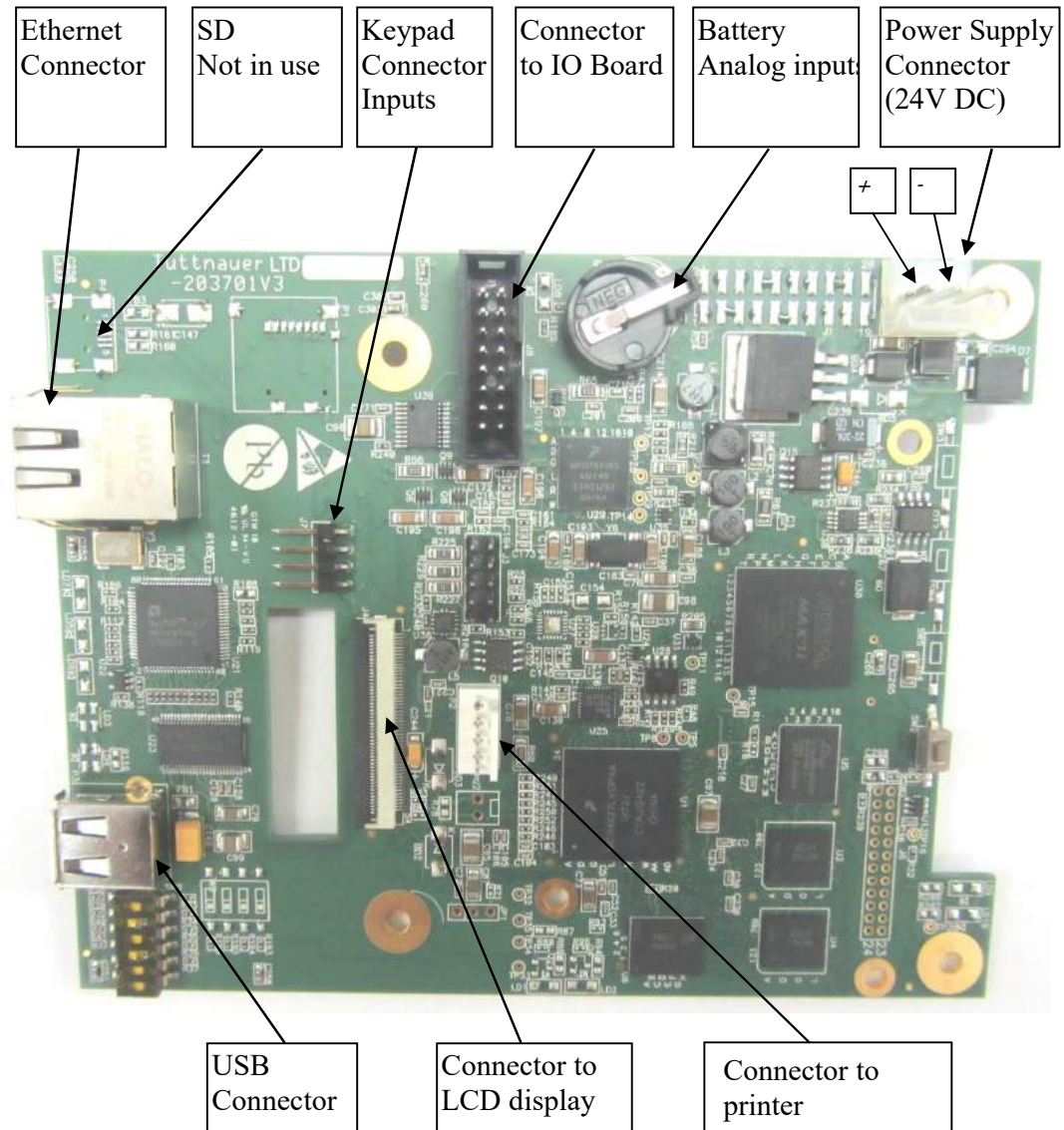
On / off switch

A Rocker Switch 250V AC, 16A

6.4 Control system hardware components

The hardware is consisted of cards: MAIN and IO

Main card



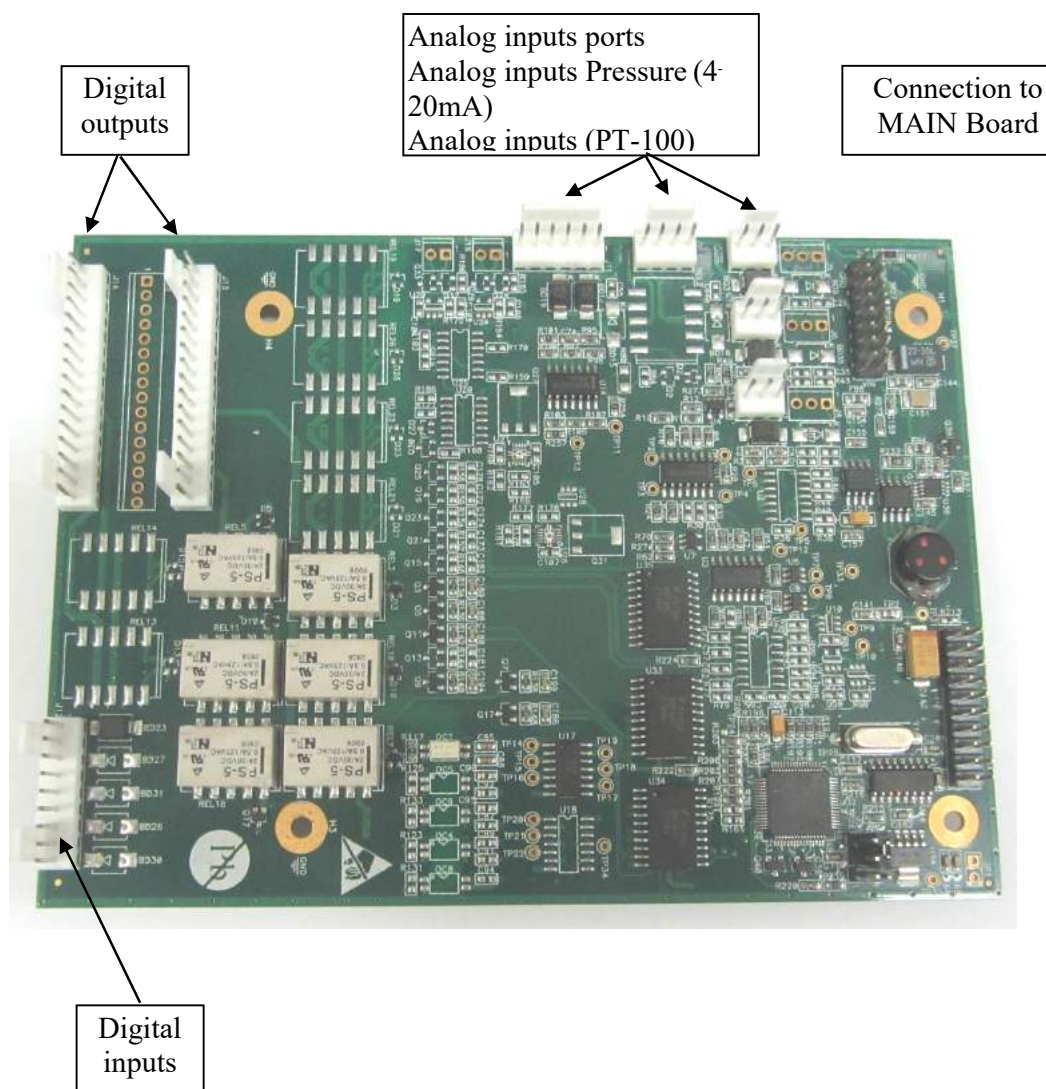
Operating system (MAIN card)

The Operating system is Microsoft Windows CE version 6. The code to the Operating system is supplied by Microsoft. The connection code between the Operating system and the hardware components (BST – Board Support Package) is supplied by FreeScale. Minimum suitability for this "Tuttnauer" project is performed in this code.

Development tools (MAIN card)

The software develop environment is on Microsoft Visual Studio 2005 that includes the Microsoft Platform Builder for Windows CE 6.0. The specific Tuttnauer system application is written in C Sharp.net on Microsoft Compact Framework.net

IO Card



IO card is an independent card. It checks the card by a method of a continuous scan of all the ports, saving the data in the memory and transporting this data according to the request in the communication channel RS-232 to the personally adapted protocol.

At the end of the check process of the digital and analog ports, the communication channel is checked, in case of receiving a request, the request is checked and if the request is legitimate it will be taken care of.

The IO card is controlled by the MAIN card. Only when requests are received from the MAIN, the requests will be checked and performed.

The IO card will perform an electrical restart of the systems (IO card) if it does not receive requests within 5 seconds. In the next request received from the MAIN, the IO card will indicate to the requester of IO card systems restart.

The "brain" in the IO card runs on microcontroller type: STM32F103R6T6.

The Microcontroller is an electrical Integrated circuit with an actualized complete system (SoC) including a processing unit, external interfaces, memory, etc.

The Microcontroller is constructed of a number of main components:

1. Central processing unit – the main component in the microcontroller is a central processing unit (CPU) This unit is in charge of receiving the request (command) code from the memory, deciphering, receiving variable data from the memories and performing the command.
2. Memory – divided into 2 sections.
 - 2.1 software memory – in this memory the software that samples the IO card and request (command) from the user are saved. As this memory is a flash memory it is possible to burn the code many times (efficient to the development stage).
 - 2.2 information memory – in this memory the data and other variables values are saved. This memory is not flash memory, but is RAM memory.
- Digital / Analog ports (in/out) – through them the microcontroller can receive data of digital/analog signs from the system, save them and pass them on respectively to the user request.
- Ports (in / out) to the communication – in the IO card there is a UART component. This component enables communication with the MAIN card through the RS-232 in suitable protocol.

MAIN and IO cards :communication protocol between IO board to Main Board

Communication protocol between IO to Main boards is described below.

The communication managed by the Main board (master), the IO functions as slave

1. There are six communication functions.

The communication functions (to read or write) identified by number.

The communication functions listed below:

01 - Read – command to IO send all the information of digital analog inputs.

02 - Write – Command to IO to activate analog and digital outputs.

03 - Read version – IO software version to verify the version.

04 – N.A.

05 - Read number that identifies the ID of IO board and the software version.

06 - Write (only at the first time) to IO his ID and software number.

2. First Byte (Byte 1).

The first byte identifies ID functionality request. It can be one of the numbers in a paragraph.

3. The second byte will present the data size if the main board asks to write information to the IO. If the request is to read this byte will be 00.

4. The number of the request. This number is increased from 00-ff.

5. Check sum of the package – to prevent mail functionality of the board if there is interference in communication.

6. The information package transfer. The information contains number of the input or output and data for/from each I/O.

Bytes identify number of input or output followed by two bytes containing the data of the input or outputs.

7. Last byte contains a check sum of the entire package that is transferred. This is to verify that the information is not corrupted.

Example

The main board sends:

01;00;0003;0004;

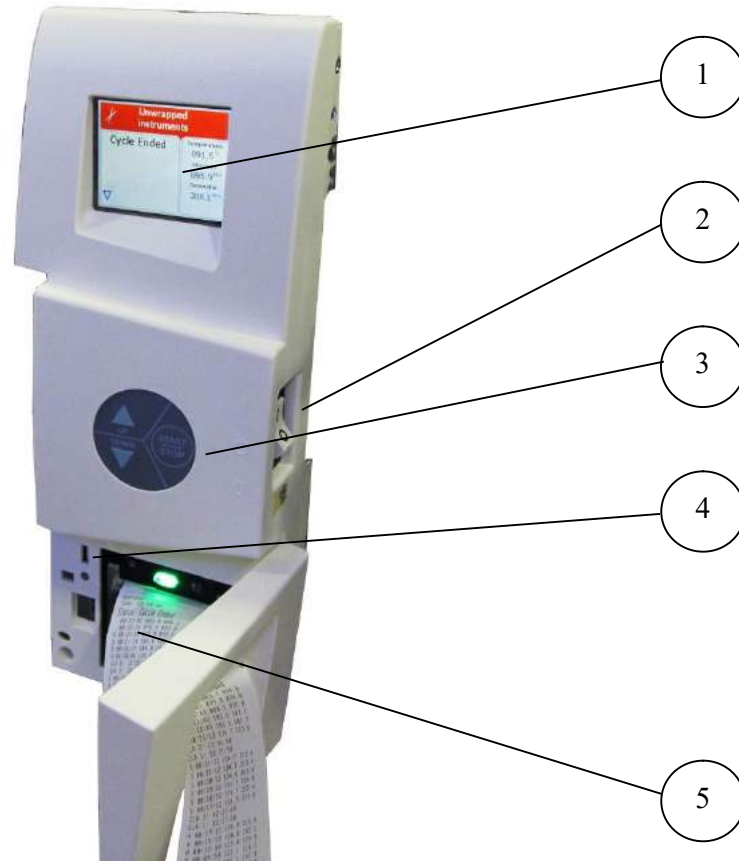
01 Ask to Read inputs.

00 not transfer information.

0003 Request number 3

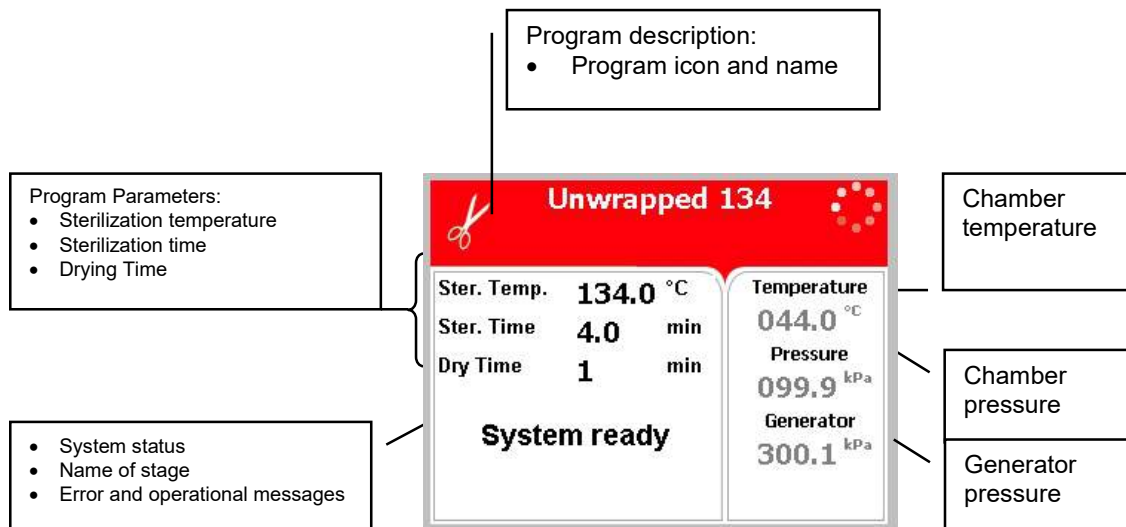
0004 Checksum to verify the request

7 Control Panel



No.	Description
1	Display
2	On/off switch and circuit breaker
3	Keypad
4	USB Port
5	Printer (optional)

The display which is an LCD panel used to display the current status of the autoclave and any Operational Messages or Error Messages.



7.1 Keypad

The keypad consists of 3 keys as described below:

UP key This key has the following functions: - In the main screen: - This key enables the operator to browse through the cycles. - In the menu directories: - When the cursor is blinking on a number, the UP ▲ key increases its value. - When the cursor is blinking on a menu selection, the UP ▲ key allows browsing backward through the menu. - When adjusting a parameter and the cursor is blinking on "SET" or "EXIT" the UP ▲ key activates that procedure.	
DOWN key This key has the following functions: - In the main screen: - This key enables the operator to browse through the cycles. - In the menu directories: - When the cursor is blinking on a number, the DOWN ▼ key decreases its value. - When the cursor is blinking on a menu selection, the DOWN ▼ key allows browsing forward through the menu. - When adjusting a parameter and the cursor is blinking on "SET" or "EXIT" the DOWN ▼ key activates that procedure.	

START/STOP key

This key has the following functions:

- In the main screen:
 - Starts the process when the required program was chosen.
 - Stops the current process.
 - Cancels the ERROR message displayed on the screen and opens the electric door lock.
- In the menu directories:
 - When the cursor is blinking on a number, the START/STOP ⓘ key enables moving to the next position.
 - When the cursor is blinking on a menu selection, the START/STOP ⓘ key activates that selection.



7.2 Data Center

The Data Center contains a USB port, a network port and an printer (if available).

- The USB port can be used to upload or download software and settings and download cycle history for transferring to a PC for storage or printing.
- The network port (located on the rear of the unit) can be used to connect to a local network and download information to Tuttnauer's R.PC.R software.

The RPCR software has been developed especially for the Tuttnauer autoclaves and is an excellent report generating tool.

This software will allow you to:

- Monitor up to 8 autoclaves
- Monitor the real time activity of any autoclave connected via the network port.
- Manage the history files of the cycles run on your autoclave. The history files can be downloaded either directly through a physical connection to the network port or transferred manually using a USB device.
- Store all the history of the processes that have been run on your autoclave
- Track the parameter settings that have been used in each of the cycles and stages run.
- Choose the style of the report to view; either graph, table, or a print out
- All reports can be saved as a PDF.

- The graph style report offers the user an option to customize the inputs and outputs used in the presentation.

For more information on the R.PC.R refer to the R.PC.R user guide.

- The printer is an optional device. It prints the detailed history of each cycle performed by the autoclave. The printing is on thermal paper with 24 characters per line and records the sterilization cycle information for subsequent consideration.

7.3 Displayed Error Messages / Symbols

An error message is displayed when a failure occurs. The failures are divided into two categories.

1. Failures that occur before completing the sterilization stage, which in this case will leave the load unsterilized
2. Failures that occur after completing the sterilization stage, which in this case will leave the load sterilized

7.4 Displayed operational messages / Symbols

Operational messages tell you the status of the machine before or after a cycle.

Message / Symbol Name	Message / Symbol Description	Required Action
	This symbol is displayed when the door is open.	Close the door.
"Door is open" (during stand by)	This message is displayed when the door is opened: In stand by-if START/STOP is preset.	Close the door to perform a new cycle.
	This message is displayed if the electrode in the chamber senses water.	The door will be locked. Run a new cycle to drain the chamber.
"Cycle Ended"	This message is displayed when the cycle ended successfully.	Press START/STOP , then open the door. The autoclave is ready for a new cycle.

"Test Ended"	This message is displayed when the test ended.	Press START/STOP , then open the door. The autoclave is ready for a new cycle/test
	This symbol is displayed when Cycle by Clock mode is performed.	Enter the customer menu as described in this manual to change the time or to cancel this option.
"Cycle by clock is active"	This message is displayed if the user presses START/STOP key while the "start cycle by clock" mode is active.	Enter the customer menu as described in this manual to change the time or to cancel this option.
"Atmospheric pressure not set"	This message is displayed in order to set the atmosphere pressure by opening the door for 2 minutes.	Turn the autoclave on and off, and then open the door for 2 minutes in order to set the Atmospheric pressure. The temperature must be less than 45°.
	This symbol is displayed if the temperature in the jacket has not reached the preset value	Wait until the temperature in the jacket reaches the preset value
	This symbol is displayed when mineral free water level is low.	Add mineral free water to the mineral free water reservoir (see chapter 6.1).
	This symbol is displayed when the waste water level is high.	Drain the waste water reservoir (open the water drain valve (see chapter 8.4, Draining the reservoir) and pour the water to a bucket).
	This symbol is displayed if the steam pressure in the generator has not reached the required pressure.	Wait until the pressure in the generator reaches the required pressure.
* D models only		
** i models only		

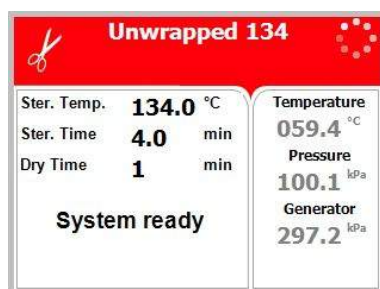
8 Screens

During the cycle the screen will change to let you know how the cycle is progressing. The following screens are a representation of what will be seen in all cycles.

8.1 Screens showing a successfully completed cycle

Note: Generator reading is for ELARA-D only

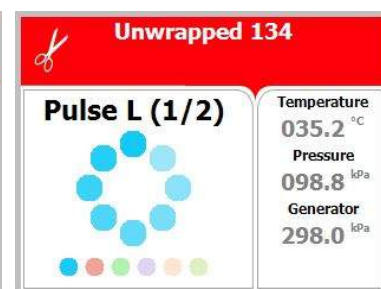
1. System Ready



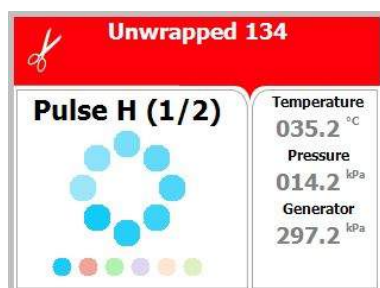
2. Starting



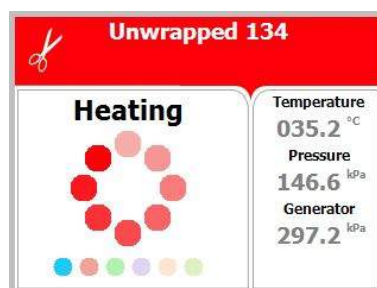
3. Pulse L



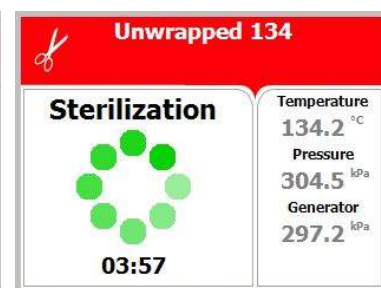
4. Pulse H



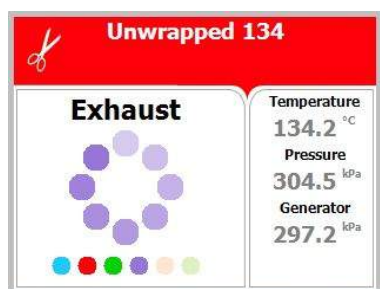
5. Heating



6. Sterilization



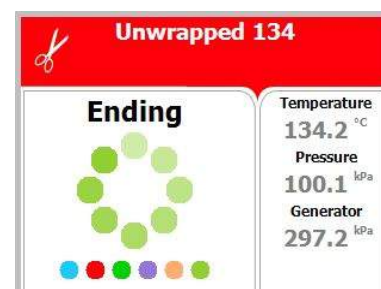
7. Exhaust



8. Drying



9. Ending



10. Cycle Ended (successful cycle)



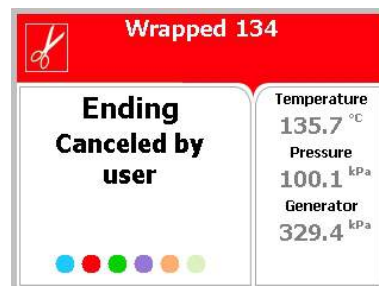
8.2 Screens showing aborted cycles after a completed sterilization stage

The sterilization phase ended successfully – the cycle was aborted and the reason for the failure is displayed. When the sterilization portion of the cycle is successful the display remains white even though the cycle was aborted.

The next three scenarios show examples of possible error messages:

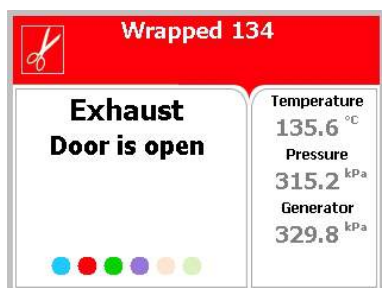
Canceled by user after complete sterilization stage

The sterilization stage ended successfully, however the operator manually aborted the remainder of the cycle, by pressing the Start/Stop key, which resulted in the following sequence of screens with the last screen showing the reason for the aborted cycle.



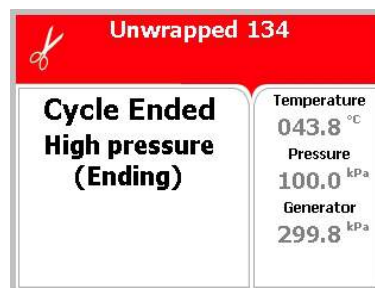
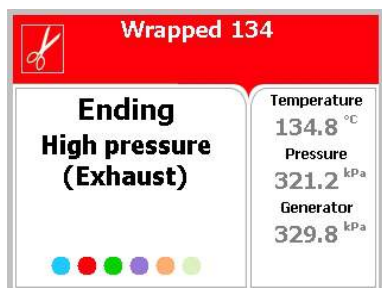
Door is open after sterilization stage has finished

The sterilization stage ended successfully, however the door switch indicated that the door was opened which resulted in the following sequence of screens with the last screen showing the reason for the aborted cycle



8.3 Screens showing a Failure occurrence after a completed sterilization stage

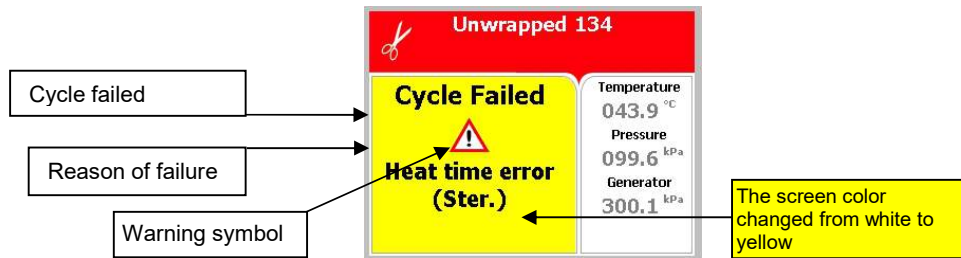
The sterilization stage ended successfully, however the chamber indicated that there was high pressure during the exhaust phase which resulted in the following sequence of screens with the last screen showing the reason for the aborted cycle.



8.4 Screens showing a failed cycle:

When the machine fails before the sterilization is completed the display becomes yellow, a warning sign  and the reason for the failure will appear.

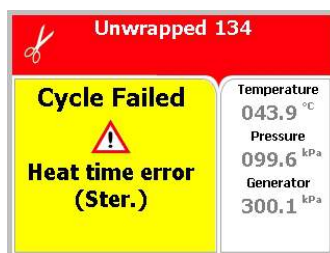
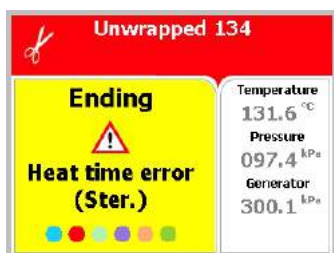
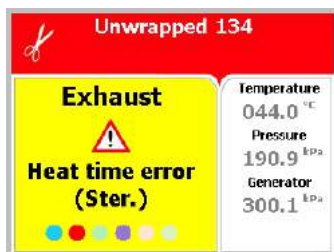
An explanation of how the display screen will look when a cycle has failed:



The next three scenarios show examples of possible error messages:

8.5 Screens showing a failure because of a Heat Time Error

The machine was not able reach the proper temperature which resulted in the following sequence of screens with the last screen showing the reason for the aborted cycle.

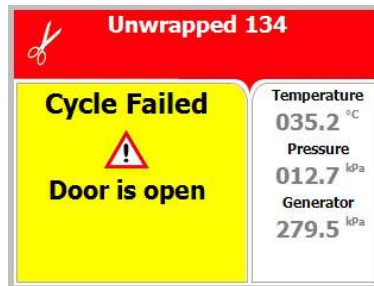


Failure due to Cancellation by user before completing the sterilization stage



Door is open during the cycle before completing the sterilization stage

In this case the door switch indicated that the door was opened which resulted in the following screen showing the reason for the aborted cycle



When "Cycle Failed" appears on the screen, the user should press the START/STOP key in order to clear the "Cycle Failed" message. The user can then start a new cycle.

9 Checking and Changing Parameters And Other Data

Bacsoft control panel allows changing parameters of the cycle and of the system, exporting various data to, and importing from, a USB device or to the printer (if available), and some other options.

Cycle parameters are changeable for Custom programs only (see 9.33), with the exception of the Temperature sensors, Displayed inputs, and Dry Time.

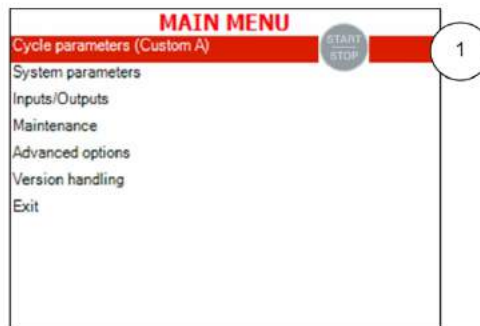
9.1 Browsing through the Menus

Now you will learn how to browse through the folders. When you read the Directories and subdirectories chapter with links to specific menus, you will need to know how to browse through the folders using the autoclave control panel. Below is the instruction.

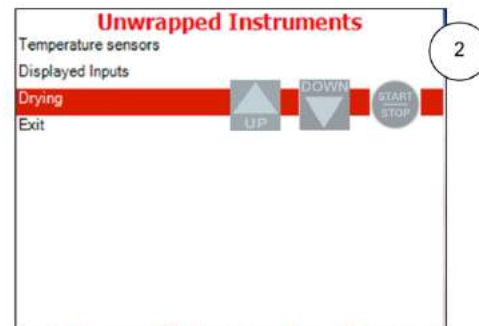
Log in as Technician (see 9.9). The Main menu screen appears. To browse through the menus:

1. Press the Up and Down keys to scroll through the menus.
2. Press the Start/Stop key to enter the next screen (i.e. to get one level down).
3. Repeat steps 1 and 2 to enter the next screen until you get to required screen.

Below are the example screens for the following menu: Cycle Parameters\ Drying\ Dry Time:



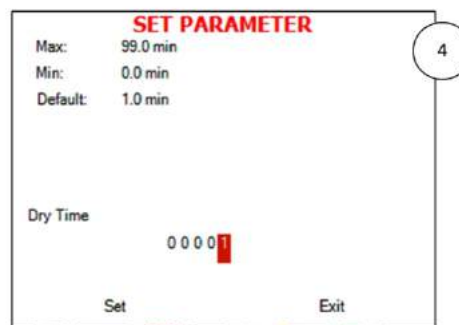
Login as Technician (see 1.4). The Main menu screen appears.
Press the Start/Stop key to enter the Cycle parameters menu.



Press the Up and Down keys to scroll through the menus until you get to Drying, then press the Start/Stop key to enter the Drying menu.



Press the Start/Stop key again to enter the Dry Time menu.



Now you have reached the required screen: Changing the dry time parameter. The path is: **Cycle parameters\Dry\Dry Time.**

Note: To exit every screen and to return to the previous screen (to get one level up):

- move the cursor to Exit by pressing the UP or DOWN keys and then press the Start/Stop key.
- or -
- press the UP and DOWN keys simultaneously.

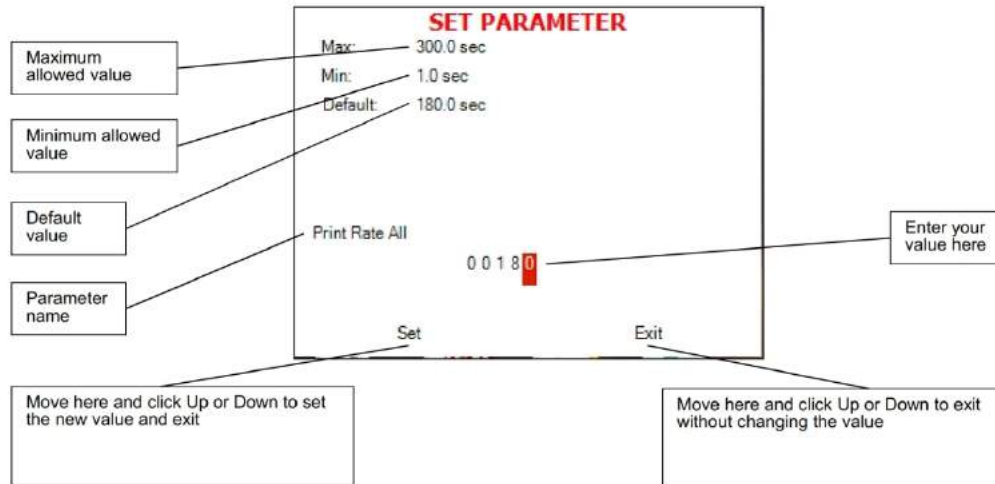
In the next chapter you will see how to change the required parameter as desired.

9.2 Changing a Parameter

You have browsed through the menus and reached the parameter changing screen as explained above. Now you can change the required parameter as desired. To do so:

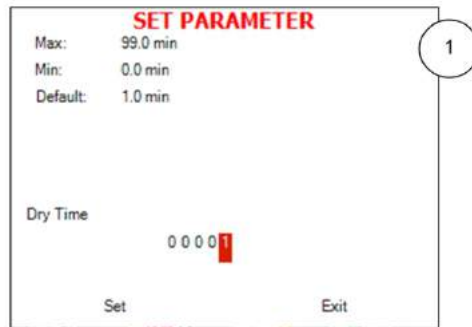
1. Enter the required value as follows:
 - Press the Up and Down keys to change the value of the digit.
 - Press the Start/Stop key to move the cursor to the next digit to the left.
2. When finished, press the Start/Stop key repeatedly until you move the cursor to Set.
3. Press the Up or Down key to confirm the new value and to exit the parameter changing screen.

Below is the typical parameter changing screen:

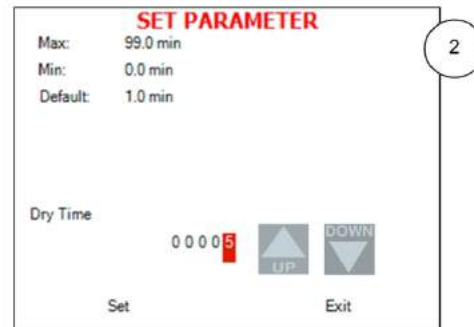


Note: Please note the maximum and minimum values for this parameter shown on the screen. Your value must be within these boundaries.

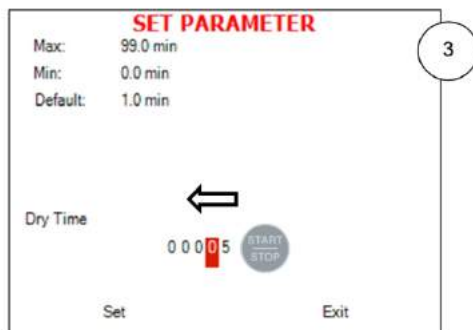
Below is the example of changing the Dry time parameter on the screen used in the previous section:



Browse to Changing dry time screen as explained in the previous chapter



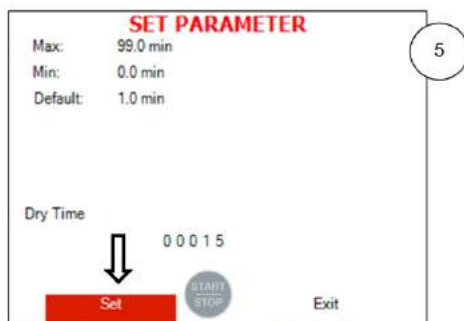
Use Up and Down keys to change the value of the digit



Press the Start/Stop key to move the cursor to the next digit to the left.



Press the Up and Down keys to change the value of the digit



When finished, press the Start/Stop key repeatedly until you move the cursor to Set.



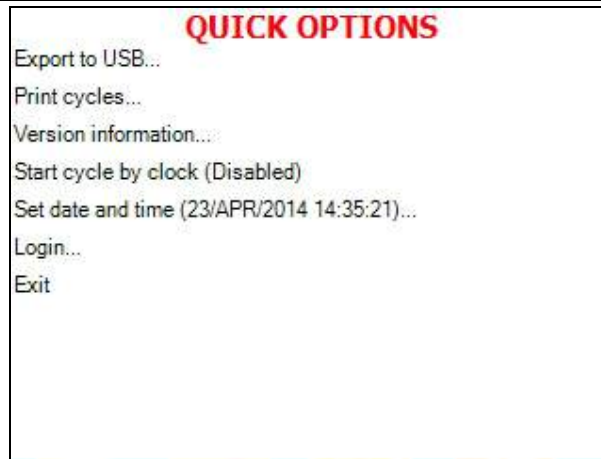
Press the Up or Down key to confirm the new value and to exit the parameter changing screen.

Note: To exit every screen and to return to the previous screen:

- move the cursor to Exit by pressing the UP or DOWN keys and then press the Start/Stop key
- or -
- press the UP and DOWN keys simultaneously

9.3 Quick Options Screen

When the system is ready not running a cycle,, press Up and Down keys simultaneously to enter the Quick options screen. Most of the options require login, and their availability depends on user authority (user, or technician). Login command is the last line on this screen. Quick options are options available without login.



Below you can find instructions how to log in and enter the Main menu. Section 7.1 above explains how to browse through the menus; section 7.2 explains how to change a parameter.

Below is the explanation of the Quick Options.

9.4 **Export to USB**

This subdirectory allows you to export settings and cycles history to the USB device.

1. Insert the USB device into the USB socket.
2. Enter the Export to USB screen.



To export the current version:

- a. Choose Export current version to USB.
- b. Press the Start/Stop key. The following screen will appear:



When finished, the following screen will appear:



To export settings:

- a. Choose Export all settings to USB device.
- b. Press the Start/Stop key. The following screen will appear:



- c. Press the START/STOP key again to exit.

To export cycles history:

- a. Choose All cycles history, 10 Cycles, or 50 Cycles.
- b. Press the Start/Stop key. The following screen will appear:

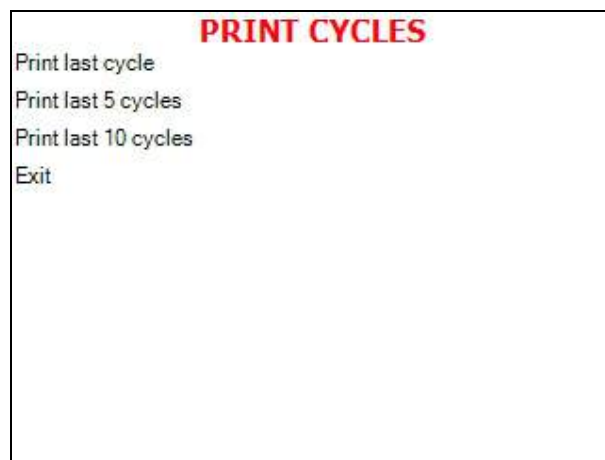


- c. Press the START/STOP key again to exit.
3. Remove the USB device from the USB Socket.

9.5 **Print Cycles (Printer is Optional)**

This subdirectory allows printing out cycle reports for a number of previous cycles (See the Printer handling section of the Operation and maintenance manual).

1. Enter the Print Cycles screen.

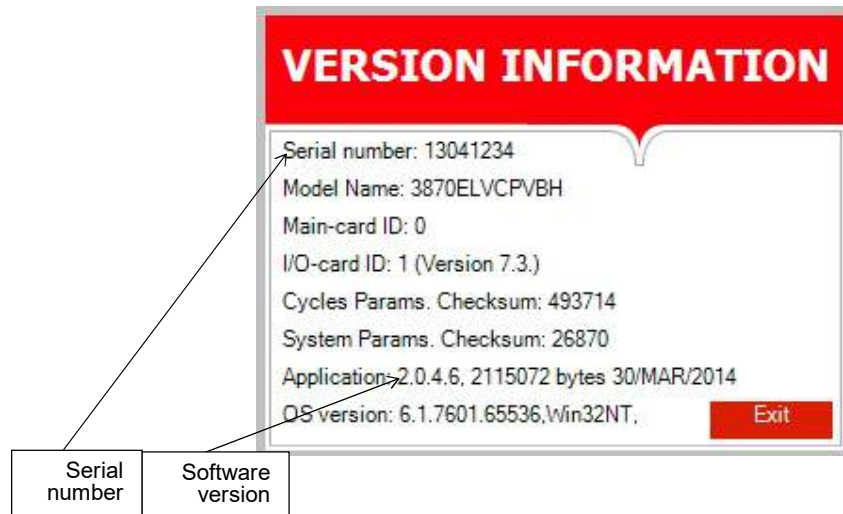


2. Make sure there is enough paper in the printer.
3. Choose Print last cycle, Print last 5 cycles, or Print last 10 cycles.
4. Press the Start/Stop key. The cycle reports will be printed.

9.6 Version Information

This directory allows viewing information of the current, factory default, and previous software versions.

1. Enter the Version information screen.



9.7 Start Cycle By Clock

This subdirectory enables the operator to start the cycle at the time set by this paramter.

1. Enter the Start cycle by clock screen. The following screen will appear:



On the Start cycle by clock screen, the time is displayed in the form "HH:MM". The hour range is 24 hours (i.e. from "0" to "23").

Setting the Time to Start the Cycle

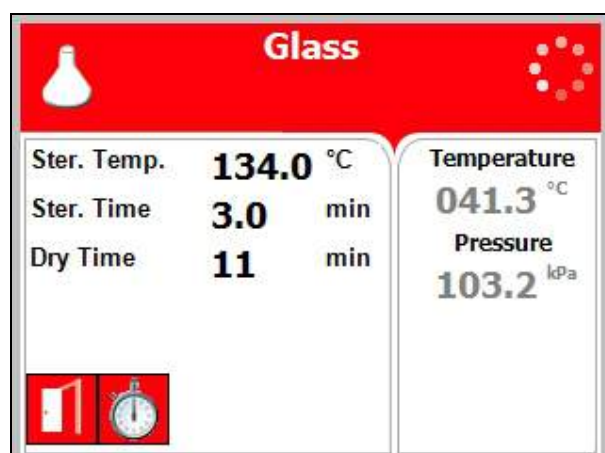
1. Move the cursor to the Time field.
2. Set the required time.

Enabling the Start Cycle by Clock

1. Set the starting time.
2. Move the cursor to Enabled. Press Up or Down key to enable starting cycle by clock.



3. Exit the Enabling the Start Cycle by Clock. The start cycle by clock icon appears on the display:
4. Make sure the door is closed and locked. The cycles will not start with the door open.



Disabling the Start Cycle By Clock

5. On the Start Cycle by Clock screen, move the cursor to Disabled. Press Up or Down key to disable Starting cycle by clock.
6. Exit the Enabling the Start Cycle by Clock.

9.8 Set Date and Time

This subdirectory enables the operator to set date and time.

SET DATE AND TIME

Time: 15 : 42 : 28

Date: 24 / JAN / 2011

Set Exit

On the Set date and time screen, the time is displayed in the upper row in the form "HH:MM:SS". The hour range is 24 hour (i.e. from "0" to "24"). The date is displayed in the lower row in the form "DD: MMM: YYYY".

1. Set time and date
2. Exit the Set date and time screen. The following screen will appear:

Message...

New date and time has been set

Exit



Caution!

After setting time and date, the autoclave will restart.

9.9 Logging in and Entering the Main Menu

Note: For all the standard sterilization cycles, and for Bowie and Dick test, the only changeable cycle parameter is dry time (you will not see other parameters on your screen). For the custom cycles created by

duplication (see 9.33 Duplicate Cycles), and for the Warm Up cycle, all the options listed in table below are changeable. Operator is not allowed to create custom cycles; only authorized technician can do this.

Below you can find instructions how to login and enter the Main menu. Section 7.1 above explains how to browse through the menus, section 7.2 explains how to change a parameter.

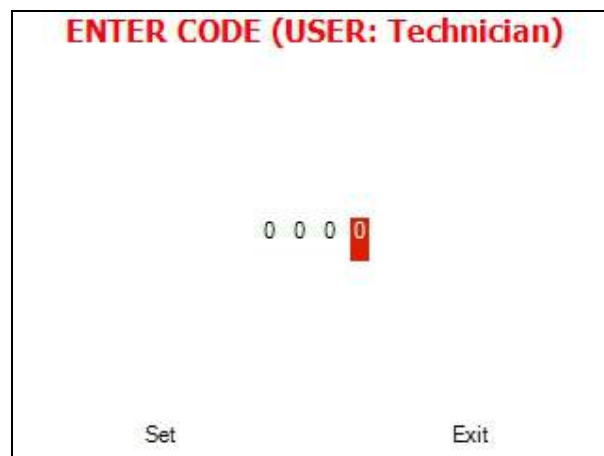
When the autoclave is on and no cycle is running, press the up and down keys simultaneously to enter the Quick Options screen (see 9.3). On this screen you can either proceed to login (see below) or choose one of the quick options available without login. To login as technician:

1. On the Quick Options screen, choose login.

Select user screen appears.

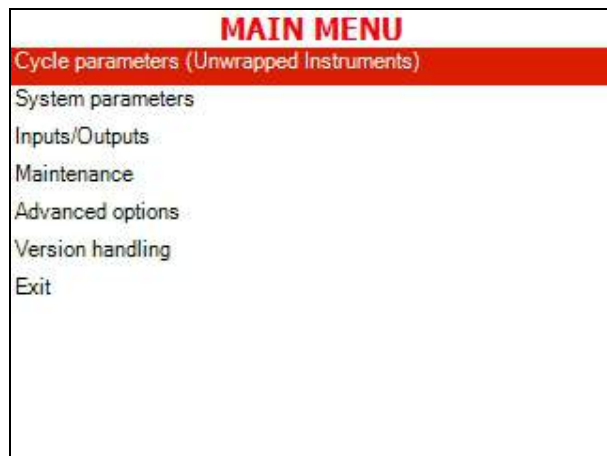


2. Choose Technician, then press the Start/Stop key to enter. The following screen will appear:



0000 is displayed on the screen with the cursor flashing on the right digit.

- Set the code to 0321. You will get to the Main menu.



Below is the list and the explanation of the options available on the Main Menu.

9.10 Directories and Subdirectories

Bacsoft control panel provides an interface that consists of control screens available through an easy scrollable menu tree.

Note: For all the standard sterilization cycles, and for Bowie and Dick test, the only changeable cycle parameter is dry time (you will not see other parameters on your screen). For the custom cycles created by duplication (see 9.33 Duplicate Cycles), and for the Warm Up cycle, all the options listed in table below are changeable. Operator is not allowed to create custom cycles; only authorized technician can do this.

To learn how to scroll through the menus, change the parameters, and perform some other functions using our three-button keypad, see 8.1 and 8.2.

The following table lists the options that the technician may perform.

Directory	Subdirectory
Cycle Parameters ¹	Temperature sensors
	Displayed inputs
	Drying
	Create Pulse
	Stabilize 1
	Heating
	Sterilization
	Stabilize 2
	Exhaust
	Drying
	Ending
	Global
System Parameters	Print Rate All
	Print Rate Sterilization
	Screen Saver
	Water Quality Level
	Cycle Print Gap
	Safe Water Temperature
	Auto Wake Up
Inputs/Outputs	View digital inputs state
	View digital outputs state
	Test digital outputs
	View analog inputs state
	Analog inputs calibration
Maintenance	Export gain offset to USB
	Reset atmospheric pressure
	Test RTC

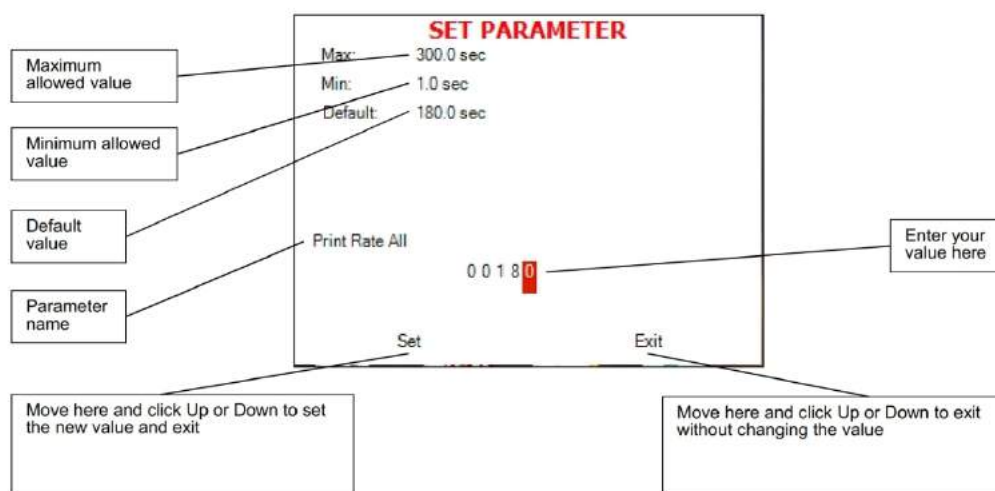
For custom programs only

¹ See cycle parameters in more detail in Cycle Parameters.

Directory	Subdirectory
	Printer test
	Print all Gain and Offset
	Export CFR part 11 log
Advanced Options	Enable/Disable cycles
	Set Language
	Set temperature units
	Set pressure units
	Duplicate cycles
	Delete custom cycles
	Set external IP address
Version Handling	Import application from USB
	Import all settings from USB device
	Import application and setting from USB
	Return to factory default settings
	Set Current Settings as Factory Default

The following chapter explains meaning and usage of the control screens.

Below is the typical parameter changing screen:



9.11 System Parameters

This menu is listing the system parameters that are the same for all cycles. Browse to the following folder:

Main menu\System parameters

You will see the following screen:

SYSTEM PARAMETERS	
Print Rate All	180.0 sec
Print Rate Sterilization	60.0 sec
Screen Saver	90.0 min
Pressure Calibration High	300.0 kPa
Pressure Calibration Low	25.0 kPa
Temperature Calibration High	130.0 °C
Temperature Calibration Low	60.0 °C
Cycle Print Gap	2.0
Exit	

Below is the instruction for changing the system parameters.

9.12 Print Rate All (Printer is Optional)

In this menu you can define the time interval for printing out the cycle status, for all the stages except sterilization: The default is 3 minutes. See the Printer handling section of the Operation and maintenance manual.

Browse to the following folder:

System parameters\Print Rate All

Change the parameter as desired

9.13 Print Rate Sterilization (Printer is Optional)

In this menu you can define the time interval for printing out the cycle status during the sterilization stage: The default is 1 minutes.

Browse to the following folder:

System parameters\Print Rate Sterilization

Change the parameter as desired

9.14 Screen Saver

Screen saver is active when the autoclave is in power-saving stand-by mode. All the autoclave elements are off. Press any key to get out of standby; the generator will start generating steam (a few minutes delay is possible before “System Ready” appears on the screen).

In this menu you can define the screensaver delay time, i. e. how long the keyboard will be untouched before the screensaver activates.

Browse to the following folder:

System parameters\Screen Saver

Change the parameter as desired.

9.15 Cycle Print Gap (Printer is Optional)

This parameter defines the time interval between printing the current values of the cycle (See the printer output section in the Operation and Maintenance manual).

Browse to the following folder:

System parameters\Cycle Print Gap

Change the parameter as desired

9.16 Inputs/Outputs

It is important for the technician to control the system down to the level of specific inputs and outputs. Viewing the outputs state at specific stages of the cycle helps you diagnose the malfunctions. You can also test and calibrate inputs and outputs.

Below is the typical screen for viewing/testing the inputs/outputs. “V” means the output is on.

VIEW DIGITAL OUTPUTS STATE	
☒	Unlock Door (J13:4)
☐	Steam To Jacket (J13:8)
☐	Vacuum Pump (J13:12)
☐	Exhaust To Bio (J13:14)
☐	Main Exhaust (J13:16)
☒	Atmospheric Air Valve (J14:2)
☐	Compressed Air To Chamber (J14:4)
☐	Slow Exhaust (J14:6)
☐	Fast Exhaust (J14:8)
☐	Vacuum Valve (J14:10)
☐	Cool Drain (J14:12)

Below is the instruction for working with inputs/ outputs.

9.17 View Digital Inputs State

In this menu you can view, at any stage, which digital inputs are being controlled at the moment. "V" means the output is on.

Browse to the following folder:

Inputs/Outputs\View digital inputs state

9.18 View digital outputs state

In this menu you can view, at any stage, which digital outputs are being controlled at the moment. "V" means the output is on.

Browse) to the following folder:

Inputs/Outputs\View digital outputs state

9.19 Test Digital Outputs

In this menu you can view and operate the normal function of all the autoclave elements: valves, heating elements, pumps, etc. "√" means the output is on. Press Start/Stop to turn an element on/off.

Browse to the following folder:

Inputs/Outputs\Test digital outputs

Note: On the screen that appears, scroll down for more outputs.

Check the checkboxes of the outputs you want to test.

9.20 View Analog Inputs State

In this menu you can view, at any stage, the values of the analog inputs at the moment. "V" means the output is on.

Browse to the following folder:

Inputs/Outputs\View analog inputs state

9.21 Analog Inputs Calibration

In this menu you can calibrate water level, mineral water level, pressure, and temperature sensors of the autoclave chamber.

1. Browse to the following folder:

Inputs/Outputs\Analog inputs calibration

The following screen will appear:

CALIBRATE ANALOG INPUTS	
Drain Temperature (J5)	043.2°C (1201)
Chamber Temperature (J2)	041.4°C (1201)
Bio Hazard Filter Temperature (J6)	152.0°C (3899)
Ref Temperature 1 (J3)	043.0°C (1199)
Jacket Temperature (J4)	122.3°C (2997)
Chamber Pressure (J7:1)	103.4 kPa (1601)
Exit	

2. Press Up or down key to choose the input to calibrate and press Start/Stop.

The following screen will appear:

CALIBRATION OPTIONS	
Auto calibrate analog input	
Calibrate analog input	
Set gain and offset	
Restore last calibration	
Restore default calibration	
Exit	
Drain Temperature (J5)	043.1°C (1200)

See below description of each option.

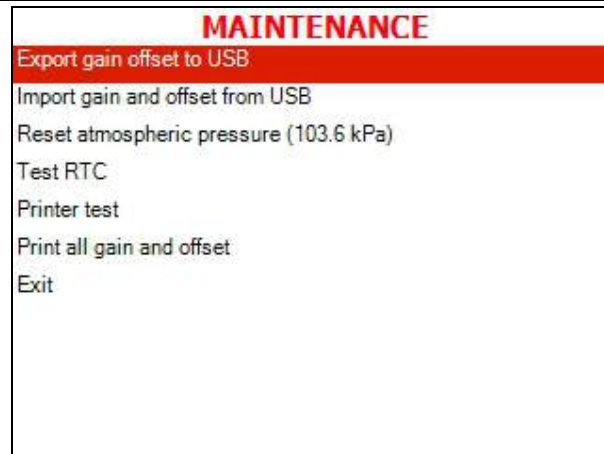
9.22 Maintenance

Maintenance procedures provided by Bacsoft software allow you additional tests and USB input/output options.

Browse to the following folder:

Main menu\Maintenance

You will see the following screen listing the maintenance options:



Below is the instruction for autoclave's maintenance menu.

9.23 **Export Gain Offset to USB**

In this menu you can export to USB the gain and offset you have got as a result of calibration.

Browse to the following folder:

Maintenance\ Export gain offset to USB



9.24 **Reset Atmospheric Pressure**

In this menu you can reset the atmospheric pressure value. To do so:

1. Browse to the following folder:

Maintenance\Reset atmospheric pressure

The following screen will appear:



2. Leave the door open for 2 minutes at least. Ambient temperature should be less than 45°C.

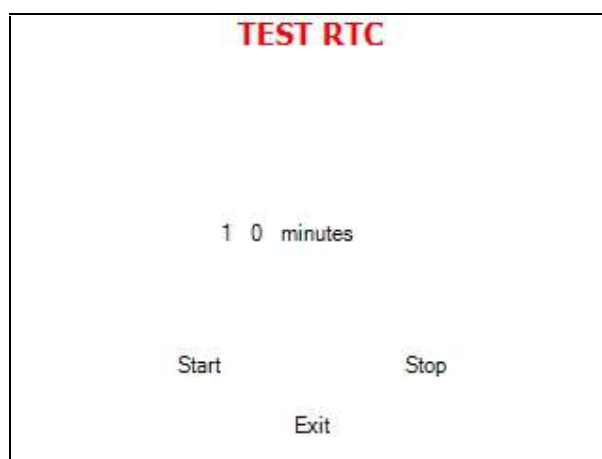
Note: Please reset the atmospheric pressure when you install the autoclave for the first time, and each time you relocate or calibrate the autoclave.

9.25 Test RTC

In this menu you can check the two clocks. The two clocks work during the interval set by the Test RTC parameter, and the results are displayed. If the results are different for more than 2 seconds, one of the clocks is faulty.

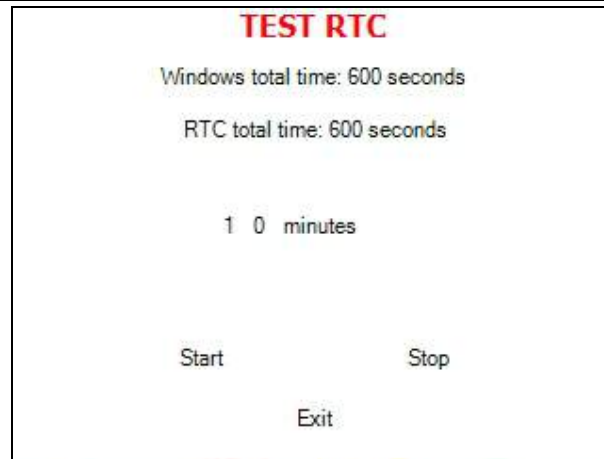
1. Browse to the following folder:
Maintenance\Test RTC

The following screen will appear:



2. Set the time interval as desired. Then move the cursor to start and press Start/Stop.

At the end of the test, the following screen will appear:



3. Using the Up and Down keys, move the cursor to Exit.

9.26 **Printer Test (Printer is Optional)**

In this menu you can check the normal function of the printer. The printer will print the list of errors.

Browse to the following folder:

Maintenance\Printer test

The following screen will appear to confirm that the test has been done.



See the printout shown in the Printer handling chapter of the user manual.

9.27 **Print all Gain and Offset (Printer is Optional)**

In this menu you can print all the gain and offset for all the pressures and temperatures in the autoclave (Chamber Temperature, Chamber Pressure, Chamber Water Level, Mineral Free Water Level).

Browse to the following folder:

Maintenance\Print all gain and offset



See below the example of a printout:

```
Chamber Temperature
G:000.0385;O:-008.0976
Chamber Pressure
G:000.1238;O:-098.5985
Chamber Water Level
G:001.0000;O:000.0000
Mineral Free Water Level
G:001.0000;O:000.0000
```

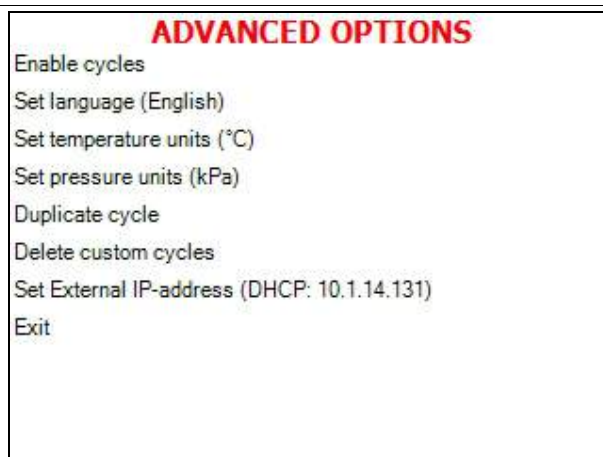
9.28 **Advanced Options**

Advanced options menu gives you even more possibilities, including interface customization, changing the settings, enabling, adding and deleting cycles, etc.

Browse to the following folder:

Main menu\Advanced options

You will see the following screen listing the Advanced options:



Below is the instruction for the Advanced options menu.

9.29 **Enable/Disable Cycles**

In this menu you can enable only the cycles you want to use. The cycles you do not want to use will not appear on the screen.

Browse to the following folder:

Advanced Options\Enable cycles



Move cursor to the cycles you want to enable/disable and check/uncheck them as desired.

9.30 **Set Language**

In this menu you can choose the language for all the interface screens: menus, cycle information, system messages.

1. Browse to the following folder:

Advanced Options\Set Language



Note: There are more languages than you see on the screen above. Just scroll down to see more.

2. Move the cursor to the desired language and check it. The following screen will appear:



The machine will be restarted and the main screen (current cycle) will appear in the chosen language.

9.31 Set Temperature Units

In this menu you can set the temperature units (Celsius or Fahrenheit) for screens and printouts.

Browse to the following folder:

Advanced Options\Set temperature units

Change the parameter as desired

9.32 Set Pressure Units

In this menu you can you can set the pressure units (kPa, Psia, Psig, BarA, BarG) for screens and printouts.

Browse to the following folder:

Advanced Options\Set pressure units

Change the parameter as desired

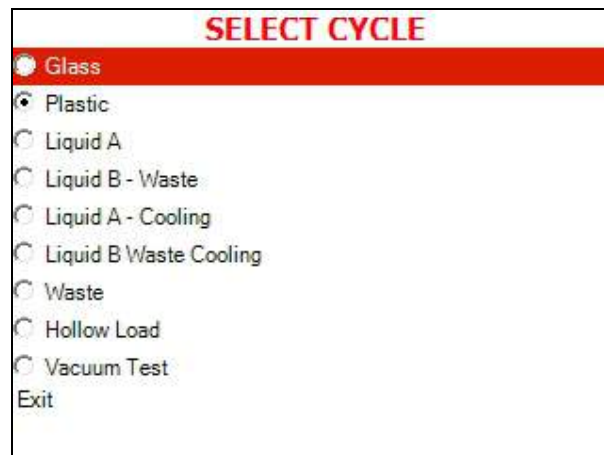
9.33 Duplicate Cycles

Note: For all the standard sterilization cycles, and for Bowie and Dick test, the only changeable cycle parameter is dry time (you will not see other parameters and settings on your screen). For the custom cycles created by duplication and for the Warm Up cycle, all the options listed in table below are changeable. Operator is not allowed to create custom cycles; only authorized technician can do this.

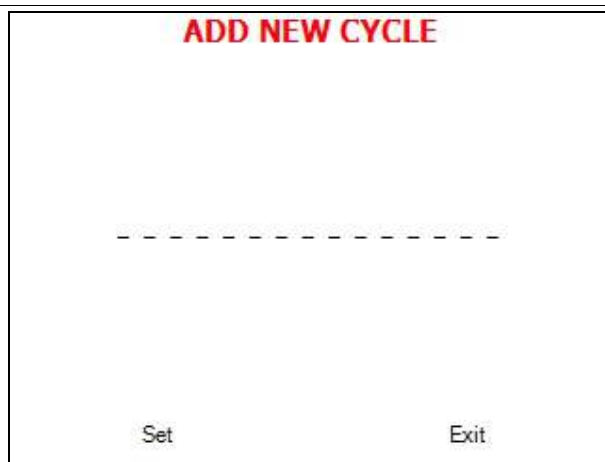
In this menu you can create a copy of one of the cycles with all its parameters and settings, and then customize these parameters and settings. You can give a custom name to the new cycle.

Browse to the following folder:

Advanced Options\Duplicate cycles

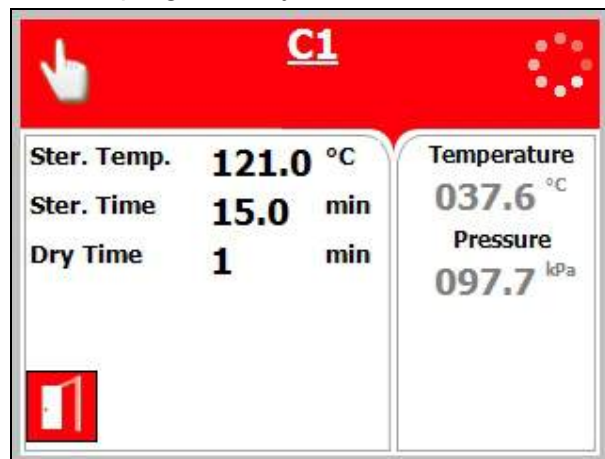


1. Using the Up and Down keys, move the cursor to the cycle you want to duplicate, then press Start/Stop to select the cycle. A custom program has been created with the same settings. You will be able to change the settings later. The following screen will appear:

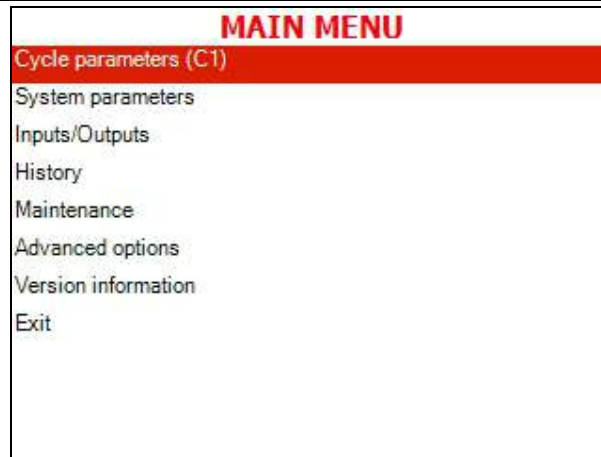


1. Give the name to your cycle.
2. Exit the menus until you get to the main screen.
3. Select your newly created program.

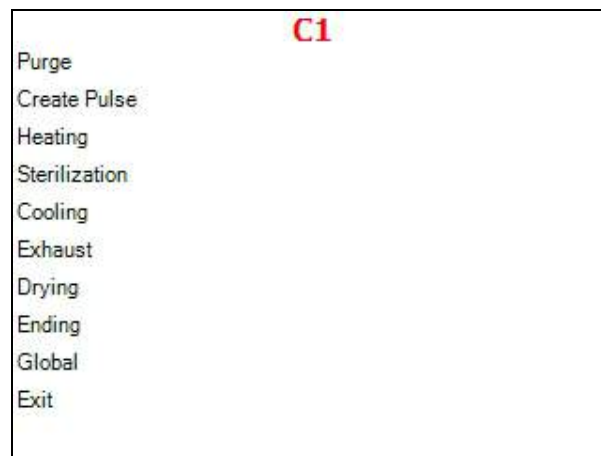
Note: you can select the program only when the autoclave door is open.



4. Login again as Technician (see 9.9).
5. In the main menu, select Cycle parameters and enter the Cycle Parameters screen.



The following screen will appear:



Now you can alter the cycle parameters as desired.

9.34 Delete Custom Cycles

In this menu you can delete the custom cycles that were created.

Browse to the following folder:

Advanced Options\Delete custom cycles

1. Move the cursor to the cycle you wish to delete. Press Start/Stop key to select/deselect the cycles.
2. Move the cursor to Delete selected cycles and press Start/Stop key to delete.

The following screen will appear:



The selected custom cycle is now deleted.

9.35 **Set External IP address**

This option allows to set specific external IP address to be used for remote RCPR connection.

Browse to the following folder:

Advanced Options\Set external IP address

Set the External IP Address as desired.

9.36 **Version Handling**

The version handling menu provides tools to import, export, and restore the autoclave software.

Browse to the following folder:

Main menu\Version Handling

You will see the following screen listing the version handling options:



Below is the instruction for version handling.

9.37 Import Application from USB

In this menu you can replace the autoclave software with the application software from the USB device to the autoclave.

1. Browse to the following folder:

Version handling\Import application from USB

The system will prompt you to confirm import

2. Move the cursor to Confirm and press Start/Stop.
The application will be imported from the USB device.

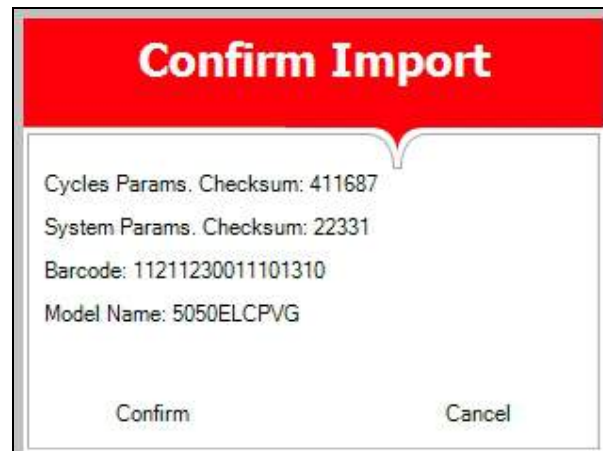
9.38 Import all Settings from USB Device

In this menu you can import the autoclave's individual settings from the USB device. The settings include all the changeable parameters of the cycle and the system.

1. Browse to the following folder:

Version handling\Import all settings from USB device

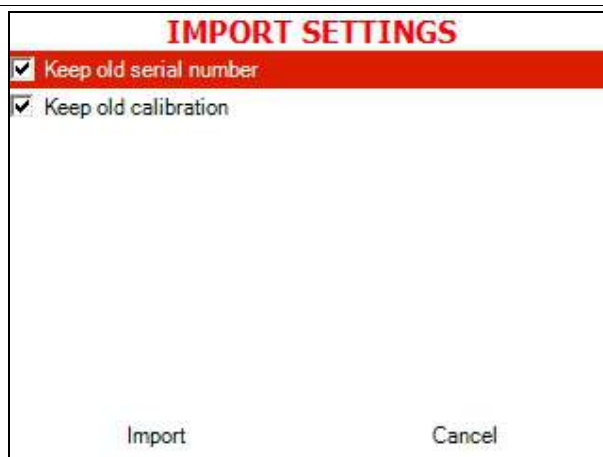
The following screen will appear:



On this screen, you will see the model name and parameters checksum of the settings saved on the USB device.

2. Move the cursor to Confirm and press Start/Stop.

The following screen will appear:



3. There is an option to keep the old serial number and/or calibration data while exporting all the rest from USB. Check/ uncheck respective checkboxes as desired.

All the autoclave settings will be imported from the USB device with the exception of the screen above.

9.39 Import Application and Setting from USB

In this menu you can replace both the application software and the parameters and settings of the autoclave with the software and parameters and settings from the USB device.

1. Browse to the following folder:
Version handling\Import application and setting from USB
2. Move the cursor to Confirm and press Start/Stop.

9.40 Return to Factory Default Settings

In this menu you can restore the default values of all the changeable parameters and settings of the cycle and the system. Default settings are those your autoclave had when it left the factory.

1. Browse to the following folder:
Version handling\Return to factory default settings



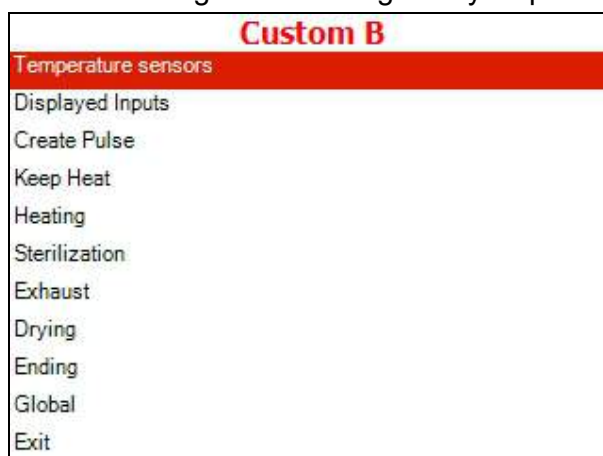
2. Move the cursor to Confirm and press Start/Stop. The default factory settings will be restored.

9.41 Cycle Parameters

The Cycle parameters menu includes parameters of a specific sterilization program (cycle). Browse to the following folder:

Main menu\Cycle parameters

You will see the following screen listing the cycle parameters:



Note: For all the standard sterilization cycles, and for Bowie and Dick test, the only changeable cycle parameter is dry time (you will not see other parameters on your screen). For the custom cycles created by duplication (see 9.33 Duplicate Cycles), and for the Warm Up cycle, all the options listed in table below are changeable. Operator is not allowed to create custom cycles; only authorized technician can do this.

Subdirectory	Property
Temperature sensors	Chamber Temperature
Displayed inputs	First

		Second
		Third
For custom programs only	Create Pulse	Pulse A Count
		Pulse A Stay Time
		Pulse A Low Pressure
		Pulse A High Pressure
		Pulse B Count
		Pulse B Stay Time
		Pulse B Low Pressure
		Pulse B High Pressure
	Stabilize 1	Temperature 1 stay
		Temperature 1 stay time
	Stabilize 2	Temperature 2 stay
		Temperature 2 stay time
	Heating	Sterilization Temperature
	Sterilization	Sterilization Temperature
		Sterilization Time
For custom programs only	Exhaust	Exhaust Mode
	Drying	Dry Time
		Dry Heat On 1
		Dry Heat Off 1
		Dry First Stage Time
		Dry Heat On 2
		Dry Heat Off 2
		Add Dry Time
	Ending	End Temperature
	Global	FO Mode
		Check RTC
		Multiple Cycles
		Multiple Cycles Gap
		Jacket Temperature

The following chapters explain meaning and usage of the control screens for the cycle parameters.

9.42 Temperature Sensors

Temperature sensors \Chamber Temperature

In case a machine has a number of temperature sensors, there is an option to assign every chamber temperature sensor to be one of the following: main, reference, not in use,.

1. Browse to the following folder:

Cycle parameters\Temperature sensors\Chamber Temperature

The following screen will appear:

G1		
CYCLE TEMPERATURE SENSORS		
Chamber Temperature		
☒ Main	☐ Reference	☐ Not In Use
Bio Hazard Filter Temperature		
☐ Main	☐ Reference	☒ Not In Use
Ref Temperature 1		
☐ Main	☐ Reference	☒ Not In Use
Save Exit		

2. Using Up and Down keys, move the cursor around the screen and check the desired radio buttons by pressing Start/Stop.
3. Using Up and Down keys, move the cursor to Save and press Start/Stop.

9.43 Displayed Inputs

This menu defines 2 (or 3, according to the cycle type) input values to be shown on the display.

You can choose, for each of them: chamber temperature, chamber pressure, chamber water level, and mineral free water level. Below is the example of setting the first input.

1. Browse to the following folder:

Cycle parameters\Displayed inputs\First

The following screen will appear:

CYCLE DISPLAYED INPUTS

First	Chamber Temperature
Second	Chamber Pressure
Third	None
Exit	

Using the Up and Down keys, choose first, second, or third.

2. The following screen will appear:

SET DISPLAY SEQUENCE

- ☐ None
- ☒ Chamber Temperature
- ☐ Chamber Pressure
- ☐ Chamber Water Level
- ☐ Mineral Free Water Level
- Exit

3. Using Up and Down keys, move the cursor to the desired radio button and choose it by pressing Start/Stop.

9.44 **Create Pulse**

This menu allows to set parameters and settings for each pulse of the program (see below).

G1	
Pulse A Count	1.0
Pulse A Stay Time	60.0 sec
Pulse A Low Pressure	25.0 kPa
Pulse A High Pressure	110.0 kPa
Pulse B Count	0.0
Pulse B Stay Time	2.0 sec
Pulse B Low Pressure	160.0 kPa
Pulse B High Pressure	180.0 kPa
Pulse C Count	0.0
Pulse C Stay Time	2.0 sec
Pulse C Low Pressure	160.0 kPa

Pulse A Count

This parameter defines how many times the pulse of each type (A, B) is repeated. For example, if the Pulse count for pulse A (low) is 4, and the Pulse count for pulse B (high) is also 4, the cycle will have the following pulses: low-high-low-high-low-high-low-high.

1. Browse (to the following folder:

Cycle parameters\Create Pulse\Pulse A Count

Change the parameter as desired.

Note: Pulse A and B counts for standard programs equal one, with the exception of Wrapped cycles and Bowie and Dick test (pre-vacuum models only), whose pulse count equals four.

Pulse A Stay Time

This parameter defines the value of delay after the required pressure for the pulse is reached.

1. Browse to the following folder:

Cycle parameters\Create Pulse\Pulse A Stay Time

Change the parameter as desired.

Note: Same parameters are available for other pulses. The following cycles have four pulses pre-vacuum models only): Wrapped cycles and Bowie and Dick test. Other cycles have only one pulse.

Pulse A Low Pressure

This parameter defines the lower pressure value for the A pulse.

1. Browse to the following folder:

Cycle parameters\Create Pulse\Pulse A Low Pressure

2. Change the parameter as desired.

Note: Same parameters are available for other pulses. The following cycles have four pulses pre-vacuum models only): Wrapped cycles and Bowie and Dick test. Other cycles have only one pulse.

Pulse A High Pressure

This parameter defines the higher pressure value for the A pulse

Browse to the following folder:

Cycle parameters\Create Pulse\Pulse A High Pressure

Change the parameter as desired.

Note: Same parameters are available for other pulses. The following cycles have four pulses pre-vacuum models only): Wrapped cycles and Bowie and Dick test. Other cycles have only one pulse.

9.45 Stabilize

There are two optional stages, within the sterilization cycle, when constant temperature (Temperature 1 or 2 stay) is maintained for certain time period (Temperature 1 or 2 stay time). Stabilize 1 starts before sterilization and Stabilize 2, immediately after the sterilization stage.

Below is the example of changing the Temperature 1 stay/stay time.

Temperature 1 or 2 stay

This parameter allows you to set two temperatures at which the process will be paused (Stabilize). It is possible to set the 2 values (Temp 1 stay and Temp 2 stay).



Temperature 1 Stay 110 °C
Temp 1 Stay Time 0 min
Exit

Browse to the following folder:

Cycle parameters\Stabilize 1 (or 2, respectively) \Temperature 1 (or 2, respectively) stay

Change the parameter as desired.

Temperature 1 or 2 stay time

This parameter allows you to set two temperatures at which the process will be paused (Keep Heat). Pause duration is set by Temperature 1 (or 2, respectively) Stay Time parameter.

1. Browse to the following folder:
Cycle parameters\Stabilize 1 (or 2, respectively) \Temperature 1 (or 2, respectively) stay time

Note: same parameters are available for temperature 2.

2. Change the parameter as desired.

9.46 Heating

Sterilization Temperature

This parameter defines the sterilization temperature for the cycle. At reaching this temperature, sterilization stage starts. This parameter is equal to the sterilization temperature of the sterilization section (see below).

1. Browse to the following folder:
Cycle parameters\Heating\Sterilization Temperature
2. Change the parameter as desired.

9.47 Sterilization

Sterilization Temperature

This parameter defines the sterilization temperature for the cycle.

1. Browse to the following folder:

Cycle parameters\ Sterilization\Sterilization Temperature

2. Change the parameter as desired.

Sterilization Time

This parameter defines duration of the sterilization stage for the cycle.

5. Browse to the following folder:
Cycle parameters\ Sterilization\Sterilization Time
6. Change the parameter as desired.

9.48 Exhaust

This menu defines parameters for the exhaust stage.

Exhaust Mode

The Exhaust mode parameter equals:

- 1 for fast exhaust in the end,
- 2 for slow exhaust in the end plus opening the fast exhaust when the pressure equals 30 kPa above the ambient pressure,
- 3 for slow exhaust opened during the entire cycle,
- 4 for BH exhaust mode (see BH cycles explanation).

You can set this parameter and thereby change the exhaust mode.

Browse to the following folder:

Cycle parameters\Exhaust\Exhaust Mode

Change the parameter as desired.

9.49 Drying

This menu defines parameters for the drying stage.

G1	
Dry Time	1.0 min
Dry Air On Pressure	20.0 kPa
Dry Air Off Pressure	30.0 kPa
Add Dry Time	0.0 min
Exit	

Dry Time

This parameter defines duration of the drying stage for the cycle.

1. Browse to the following folder:

Cycle parameters\Drying\Dry Time

2. Change the parameter as desired.

Drying stage is divided into two stages. For each stage you can set the total drying time, on time and off time. So during the Dry First Stage, the

heating elements are on for the time set in Dry Heat On 1, then they go off for the time set in Dry Heat Off 1, and then this sequence is repeated during the entire Dry First Stage Time. The same is true for the Second Stage Drying.



Important: The default drying time may be increased but not reduced.

Dry Heat On 1

This parameter defines how long will the heating elements be on for the Dry First Stage.

Browse to the following folder:

Cycle parameters\Drying\Dry Heat On 1

Change the parameter as desired.

Note: There are Dry heat On 2 and Dry heat Off 2 parameters for the Dry Second Stage of the drying.

Dry Heat Off 1

This parameter defines how long will the heating elements be off for the Dry First Stage.

1. Browse to the following folder:

Cycle parameters\Drying\Dry Heat Off 1

2. Change the parameter as desired.

Note: There are Dry heat On 2 and Dry heat Off 2 parameters for the Dry Second Stage of the drying.

Dry First Stage Time

This parameter defines duration of the Dry First Stage. The Dry Second Stage time is calculated as total Dry Time minus the Dry First Stage Time, that is why there is no Dry Second Stage Time menu.

1. Browse to the following folder:

Cycle parameters\Drying\Dry First Stage Time

2. Change the parameter as desired.

Add Dry Time

This subdirectory allows you to change the Dry Time parameter for the current cycle.

Browse to the following folder:

Cycle parameters\Drying\Add Dry Time

Change the parameter as desired.

9.50 Ending

This menu defines the End temperature parameter for the Ending stage.

End Temperature

This parameter defines the temperature when the cycle ends. The cycle will not end and the door will not open unless the autoclave chamber is cooled down to this temperature.

1. Browse to the following folder:

Cycle parameters\Ending\End Temperature

2. Change the parameter as desired

9.51 Global

This menu defines the global cycle parameters.

G1	
F0 Mode	0.0
Bio Hazard	0.0
Check RTC	1.0
Multiple Cycles	1.0
Multiple Cycles Gap	2.0 min
Jacket Temperature	85.0 °C
Exit	

F0 Mode	0
Multiple Cycles	1
Multiple Cycles Gap	2 min
Jacket Temperature	105 °C
Exit	

Check RTC

In this menu you can set the time interval for checking the two clocks. The two clocks work during this interval, and the results are displayed. If the results are different for more than 2 seconds, one of the clocks is faulty. For the procedure of the check itself, see 9.25.

1. Browse to the following folder:
Cycle parameters\Global\Check RTC
2. Change the parameter as desired).

Multiple Cycles

This parameter allows you to repeat, for testing purposes, the same cycle several times without reloading the autoclave. The number or repetitions is defined by this parameter.

1. Browse to the following folder:
Cycle parameters\Global\Multiple Cycles
2. Set the parameter as desired.

Multiple Cycles Gap

This parameter allows you set the time interval between the multiple cycles (see above).

1. Browse to the following folder:
Cycle parameters\Global\Multiple Cycles Gap
2. Change the parameter as desired.

Jacket Temperature

This parameter defines the temperature of the jacket (for the relevant models only). The system is not ready unless the jacket reaches this temperature.

1. Browse to the following folder:

Cycle parameters\Global\Jacket Temperature

2. Change the parameter as desired

10 Preliminary Operations for Each Technician Call

1. **In order to maintain efficient service, the technician must perform the following:**
 - a. Cleaning the following, if requires cleaning:
 - ◆ Chamber, trays and trays holder.
 - ◆ Filters.
 - ◆ Bottom parts and
 - ◆ Plungers of the solenoid valves.
 - ◆ Water reservoir.
 - b. Visual inspection for leaks or corrosion in the piping elements
 - c. Fastening loose screws and piping joints.
 - d. Visual inspection of the wiring.
 - e. In case some electronic parts were replaced, calibration and logging the calibration of the temperature and pressure.
2. **After completing the work, the technician must perform an unwrapped cycle:**

Every 6 months

Tighten the bolts of the heater bands and the electrical connections of the heaters, valves and connectors in the control box.

Drain the generator and refill with mineral free water (ELARA-D model only).

Perform the Chamber Pressure Test (specially trained experts only!) a frequent as required by your country regulations.

Once a year

Check the grounding continuity.

Calibrate the temperature and pressure.

Perform validation of the autoclave.

Check the precise operation of the earth leakage relay.

Check the safety elements; safety valve, cut-off thermostat, door locking mechanisms.

Check the operation sequences, the sterilization parameters etc.

Check the water reservoir, piping, plastic parts and electric wires.

Check and tightening the piping joints to avoid leakage.

Check and tighten all screw connections in the control box, heaters and valves and instrumentation.

5 years

Check the door closing system for excessive wear.

Performing safety tests: pressure vessel, efficiency, electrical, according to local rules or regulations.

Safety tests shall be performed only, by an authorized inspector.

11 Replacing and Maintenance Procedures

11.1 Draining the Reservoirs



Caution!

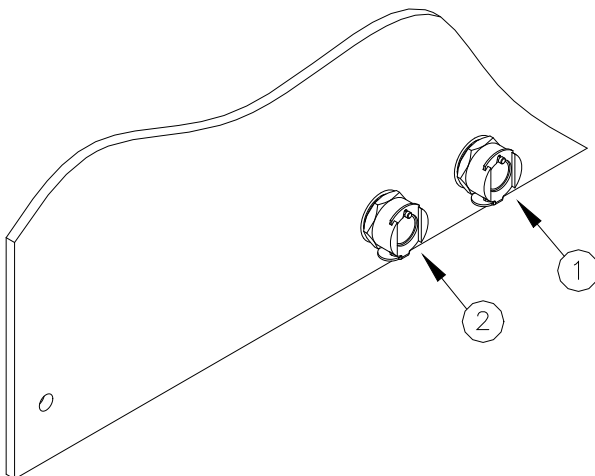
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or in the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

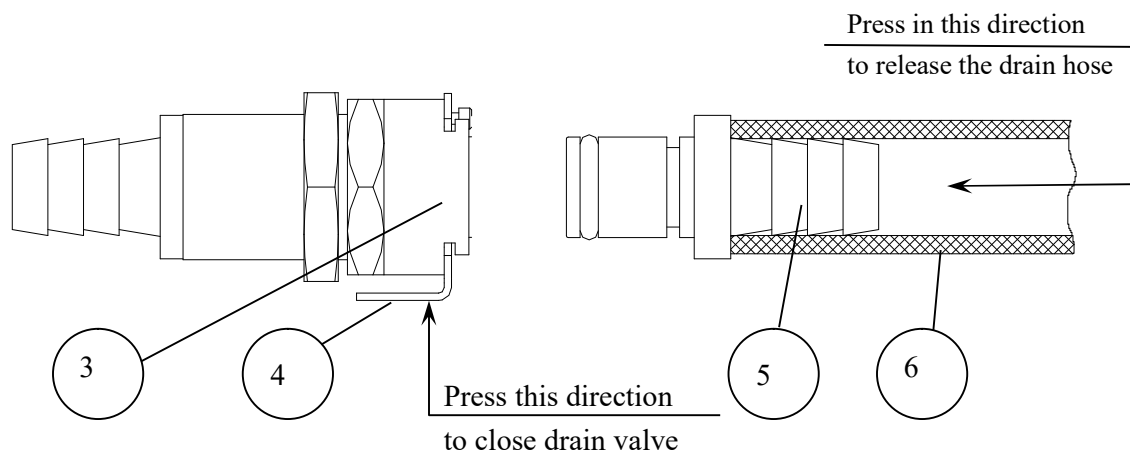
(Applies to the clean-water reservoir and to the waste-water reservoir)

1. To drain the reservoir, use item (5) with the plastic hose (6) attached to it (supplied with the autoclave).
2. Insert part (5) into valve (3) and press it until you hear a “click”. The drain valve is open.
3. When the water reservoir is empty, press part (4). Item (5) will pop out approx. 3mm and the drain valve will be closed. Remove item (5) with the plastic tube.
4. If the drained reservoir is the clean-water reservoir, fill reservoir with distilled water until it reaches the full level. (approximately 6.5 liters (1.72 gallons)).

The autoclave is now ready for use.



No.	description
1	Clean water drain
2	Waste water drain



11.2 Safety tests after repair



ATTENTION!

After every repair or dismantling the enclosure, the autoclave should pass two safety electrical tests by the Service Engineer. The following shall be performed:

1. Enclosure Leakage Current Test.

Every autoclave should pass this test as follows:

1. Connect the electrical cord to the autoclave.
 2. Turn on the main switch on the right side of the autoclave.
 3. Short-circuit the L and N pins on the cord's plug.
 4. Connect the Short-circuit pins to the L pole on the electrical tester.
 5. Connect the earth pins to the earth pole on the electrical tester.
 6. Impose an electrical potential of 500-1000V on the tested autoclave. The insulation resistance should be at least 2 MΩ.
- The test is successful if there was no leakage.

2. Protective Earth Impedance Test

1. Connect the grounding pin of the power cord plug to one pole of an Ohmmeter.
2. Connect any other metallic part (preferable – the metallic part of the locking screw) to the second pole of the Ohmmeter.
3. The resistance should not exceed 0.3 Ω.

After performing these tests, the Service Engineer should complete and sign the Work Order.

11.3 Dismantling the Outer Cover of the Autoclave

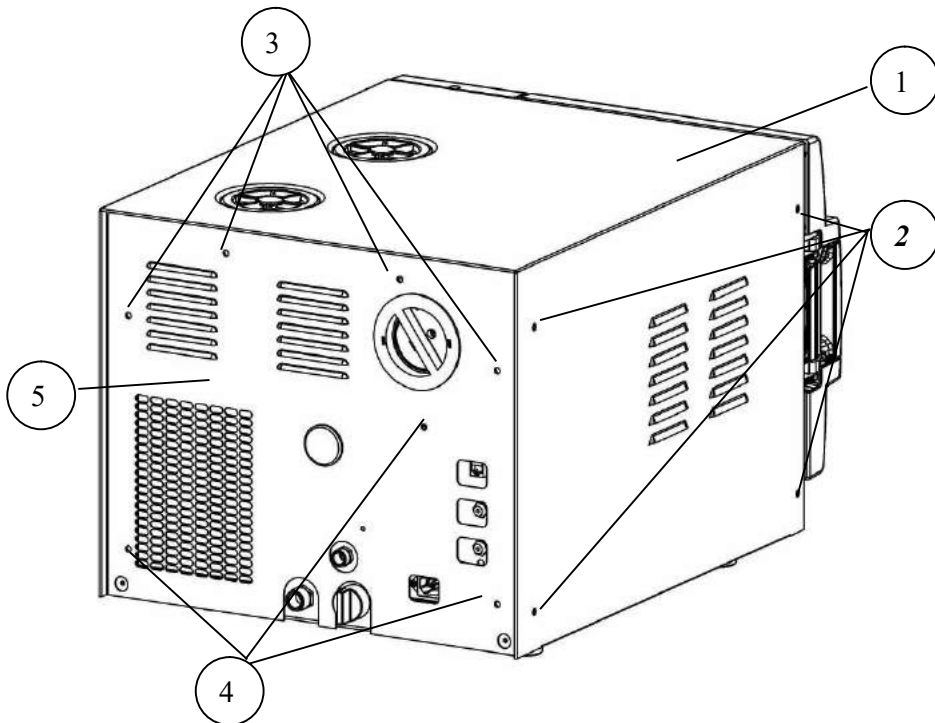


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Unscrew the screws (2) holding the outer cover (1).
2. Remove the outer cover (1).
3. Unscrew the screws (3, 4) holding the back cover (5).
4. Remove the back outer cover (5).
5. Remove the grounding wires from the outer cover.



11.4 Emergency Door Opening



Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or in the generator.

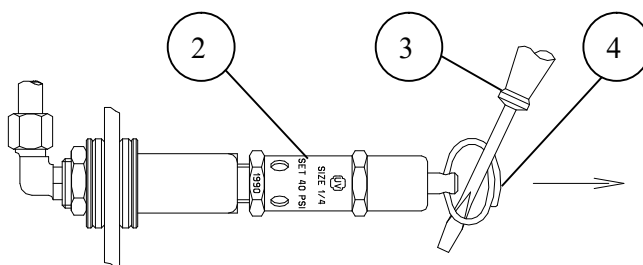
Normalizing the pressure

Sometimes it is required to open the door in emergency cases. Chamber pressure may be too high or too low, even vacuum may form. Since the autoclave is not equipped with an analogue pressure gauge, and the display is off (no electrical power), it is recommended to wait approximately for one hour to verify that the pressure and temperature have normalized.

If it is required to open the door urgently, normalize the pressure by opening the chamber's safety valve as follows (it will be helpful for both extra pressure and vacuum). The safety valve is located in the mineral-free water reservoir.

A. ASME-approved type safety valve

1. Remove water reservoir cover (See Front View (4)).
2. Pull the ring (4) of the safety valve using a tool, i.e. screwdriver, hook etc. (3). Pull the safety valve ring until steam ceases to escape (or air stops to get in) from the safety valve. Be careful not to burn your hands.



No.	Description
1	water reservoir cover
2	Safety valve
3	Pulling device
4	Pressure relief ring

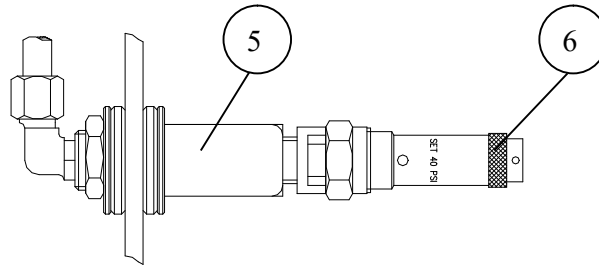
B. PED-approved type safety valve

3. Remove the water reservoir cover.
4. Turn the pressure relief nut clockwise until steam ceases to escape (or air stops to get in) from the safety valve.



Caution!

Use protective gloves in order not to burn your hands with the hot steam.



No.	Description
1	Water reservoir cover
5	Safety valve
6	Pressure relief nut

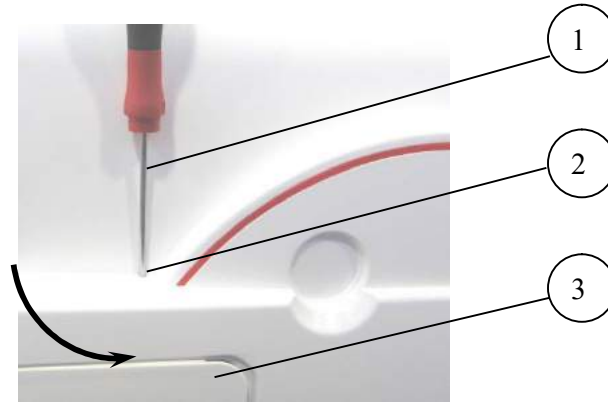
Opening the door



Caution!

This option is for emergency cases only! Before opening the door, always make sure that there is no pressure in the chamber or in the generator.

1. Insert a 2 mm (0.08") pin (1) into the hole (2) located above the door opening handle (3).
2. Press the pin downwards and, simultaneously open the door by pulling the door handle (3) in the arrow (4) direction.



11.5 Replacing the jacket heating elements (ELARA-D models only)

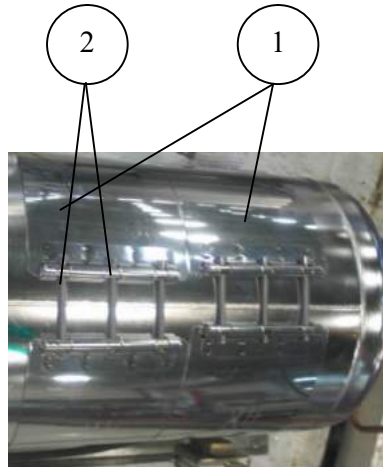


Caution!

Before starting, be sure that the electric cord is disconnected from the power source and that there is no pressure in the autoclave generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Remove the outer covers of the autoclave (see 11.3).
2. Remove the insulation blanket.
3. Remove the heating element tightening bolts (2).
4. Disconnect the heating element wires from the porcelain connector.
5. Carefully take out the PT100 and the cut-off.
6. Replace the heating elements (1)
7. Re-assemble the autoclave insulation and the covers.
8. Perform any cycle to verify that heating operates as required.
9. Remember to re-connect PT100 and the cut-off sensor as shown below.



11.6 Replacing the PT100 Temperature Sensor and cut –off thermostat of the jacket heater (ELARA-D models only)

The autoclave is equipped with a temperature thermostat, which protects the heaters and the autoclave against overheating.

This device reconnects automatically when the chamber cools down.



Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

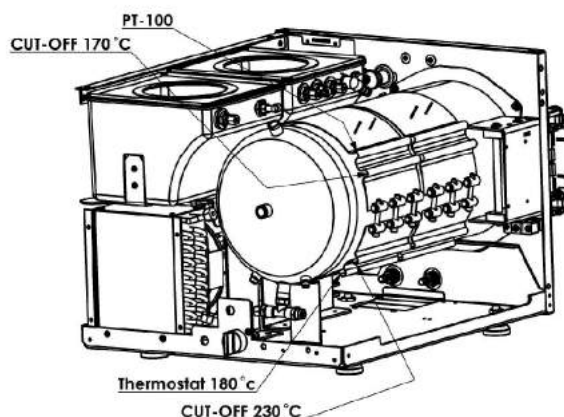
1. Remove the outer covers of the autoclave (see 11.3).
2. Open the insulation cover.
3. Loosen the jacket heating band screws
4. Unscrew the chamber heaters.
5. Take out the Jacket cut-off thermostat (1)/ PT100 temperature Sensor (2) of its seat and replace it with new one.
6. Disconnect the cut-off thermostat connector from the chassis / PT100 temperature Sensor connector to the control panel.
7. Reconnect the cut-off thermostat connector to the chassis / PT100 temperature Sensor connector to the control panel.

Note: Make sure that the sensor protrudes for the same length as the replaced one (2).

8. Perform any cycle to verify that the autoclave operates normally.



Connection scheme



11.7 Replacing the Water Reservoir Water Level Electrodes



Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

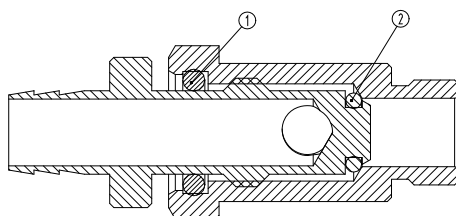
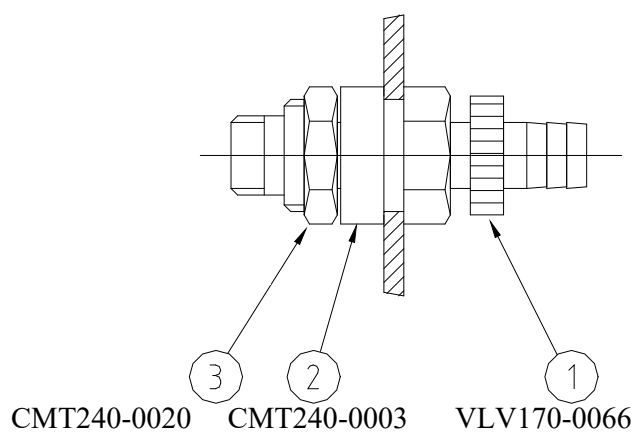
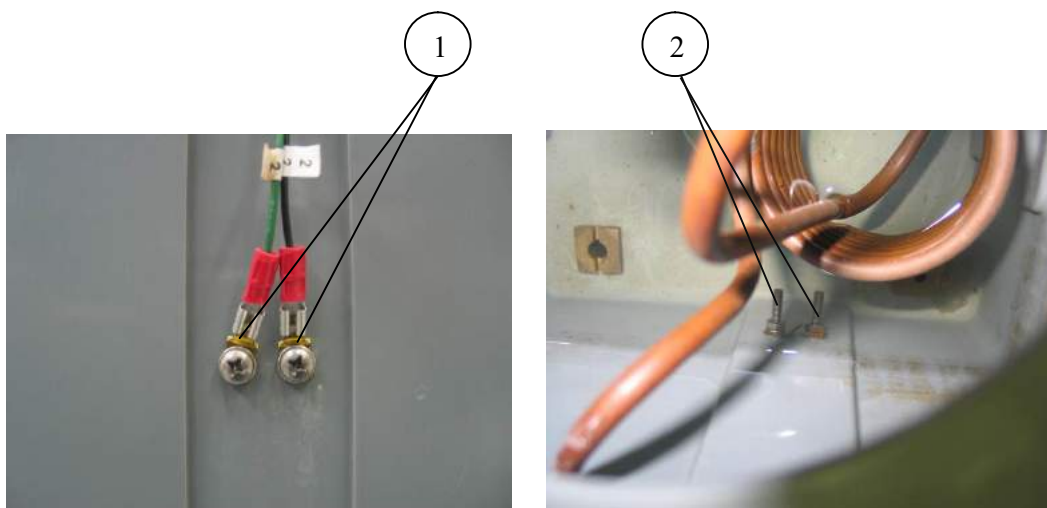
1. Open the outer covers of the autoclave.
2. Disconnect the wires of the electrode (1).
3. Unscrew the nut (2)
4. Apply some leakage prevention glue inside the nut and tighten it.



Caution!

Do not tighten too much so not to break the plastic.

5. Reconnect the wires and close the cover.



Item	Cat No.
1	GAS082-0020
2	GAS082-0021

6. Verify that there is no leakage.

11.8 Replacing the water filling pipe (ELARA-D models).

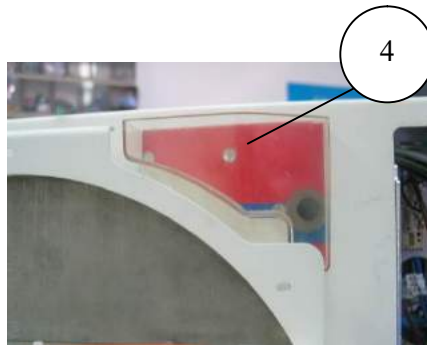
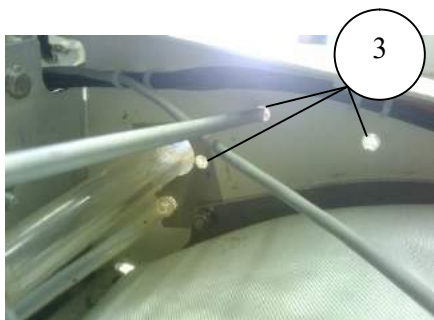
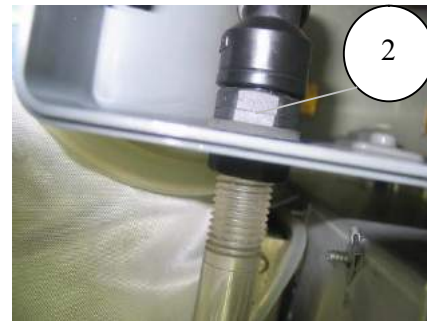
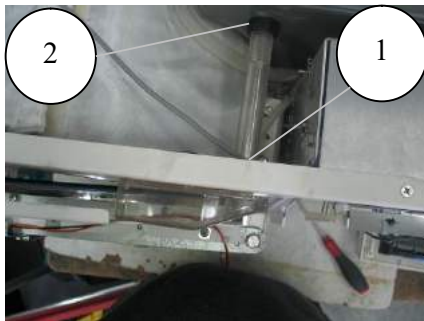


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Remove the autoclave outer covers.
2. To replace the water pipe (1):
 - 2.1 Unscrew the two nuts connecting the pipe to the water tank (2).
 - 2.2 Press the three pins in the inner side of the front panel that releases the pipe and the water filling tank (3, 4).
 - 2.3 Replace the pipe with the new one.

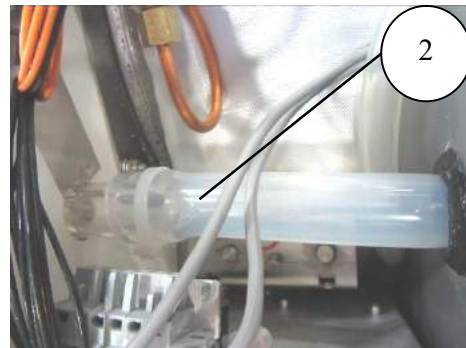
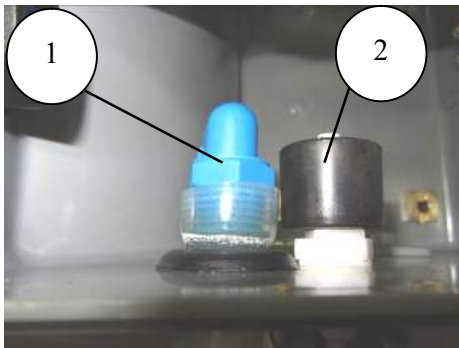


11.9 Replacing the water filling pipe.

To replace the water pipe:

3. Open the autoclave cover (see 11.3).
4. Unscrew the nut (1) connecting the pipe to the water tank (2).

5. Remove the black washer (2).
6. Pull the pipe (2) out of its nest in the water tank.
7. Replace the pipe with the new one.



11.10 Replacing the Door Cover



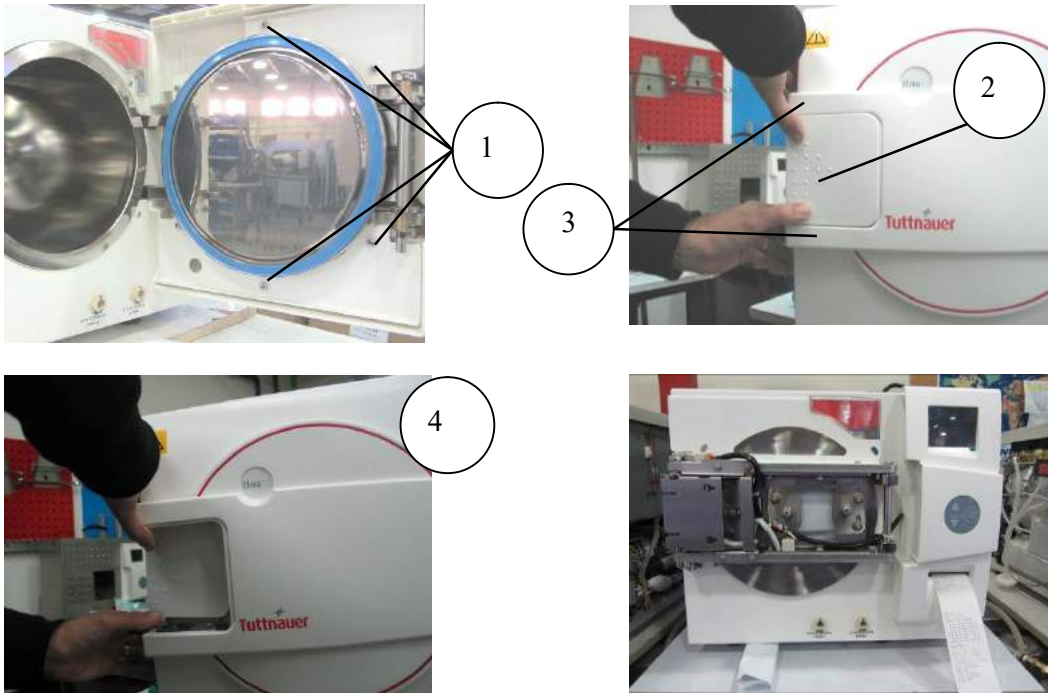
Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

Disassembling the door cover

1. Unscrew the screws (1) that connect the door plastic cover to the door.
2. While holding the door handle (2) with your thumbs, gently press the cover (3) outwards to click it open. (4).



11.11 Replacing the door closing safety microswitch

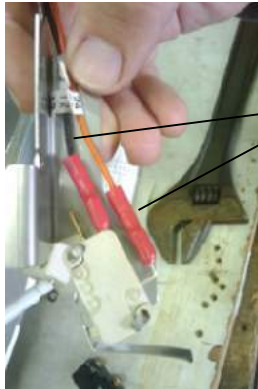


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Unscrew the 2 screws (1).
2. Release the microswitch together with its metal cover (2) so to release the red wires.
3. Disconnect the red wires (3).
4. Assemble the new microswitch using the two screws (1).
5. Reconnect the red wires to the new microswitch.



11.12 Replacing the main switch/ circuit breaker

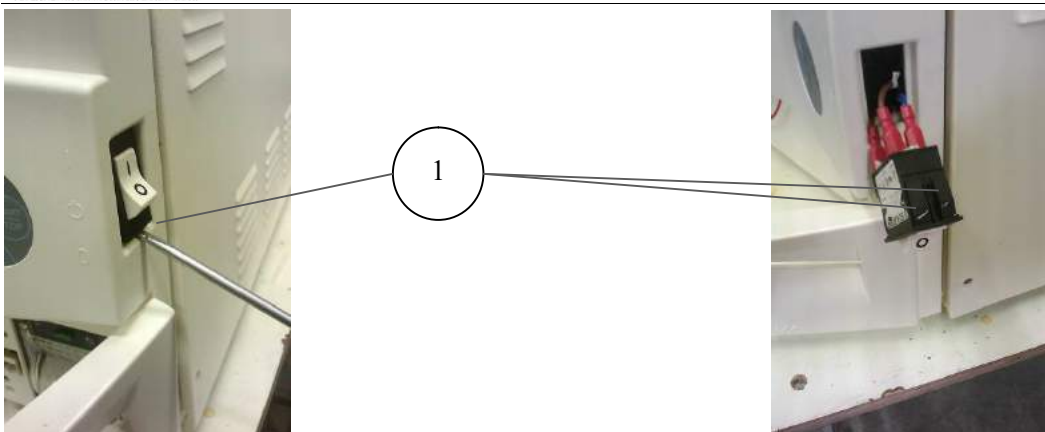


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or in the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Remove the control system electronic boards.
2. Disconnect all the four wires.
3. The main switch is fastened to its seat with two fasteners. To release the fasteners, using a flat screwdriver, press slightly on the part marked (1) and pull the fastener inward. Repeat this with the second fastener.
4. Pull the main switch out of its seat (the hole in the panel).
5. Replace the main switch with a new switch.
6. Pull the switch into its seat until it clicks. Verify that they are inserted firmly.
7. Connect the wires.



11.13 Replacing the Air Filter

Cautions!

Before proceeding, make sure that the electric cord is disconnected and there is no pressure in the chamber or in the generator.

Use scissors to open the filter bag and not sharp blades or pointed instrument.



Check that the new filter has not exceeded the maximum shelf life.

Carefully un-pack the new filter, and examine it for any signs of damage.

Remove any protective packaging before inserting the filter into place.

Carefully Insert the new filter into the housing. Do not force.

The AIR filter is located on the rear of the autoclave (see Rear View, position 7).

1. Pull the filter assembly out. The filter cover is screwed to the filter.
2. Unscrew the filter cover.
3. Pull the cover off.
4. Pull the filter out.
5. Insert the new filter by pressing it into the filter seat.
6. Ensure the new filter is all the way in and seated properly.
7. Insert the filter cover.
8. Insert the filter assembly to the autoclave.

Note: make sure that the arrow on the filter body points inwards, toward the chamber. Make sure that you don't bend the filter pipe when reattaching the cover.



Note: It is recommended to replace the air filter, every 6 months or after 1000 cycles (whichever is the shorter period).

11.14 Replacing the Solid State Relay (SSR)

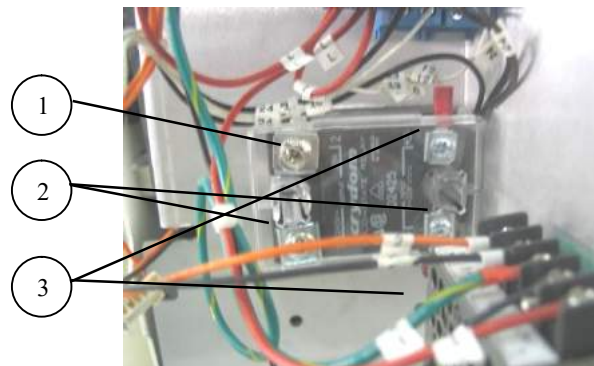


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Remove the Control System (see 11.23).
2. Disconnect the AC (1) and DC (3) connectors.
3. Unscrew the screws connecting the SSR to the control system base (2).
4. Disassemble the SSR from the base.
5. Replace the SSR with the new one.
6. Restore the connections (1,2, 3).
7. Assemble the new SSR with two screws (2).



11.15 Replacing the Transformer.

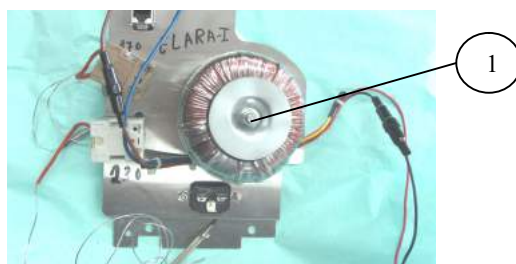


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Open the outer cover of the autoclave.
2. Unscrew the nuts (1) of the transformer axis.
3. Disconnect wires and fuses (see Replacing the Fuse of the Transformer below).
4. Replace the transformer, reconnect the wires.
5. Close the outer cover.



11.16 Replacing the fuse of the transformer



Caution!

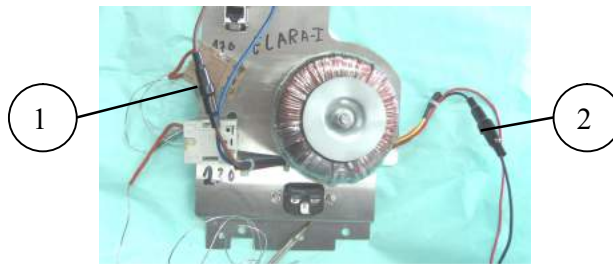
Before starting, disconnect the instrument from the power source.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Remove the outer cover (see 11.3).
2. Unscrew the two halves of the fuse capsule apart.
3. Take out the burnt fuse and replace it with a new fuse.
- 4.

Note: The left fuse (1) is 5A, the right one (2) is 800 mA.

5. Reassemble the fuse holder.
6. Replace the cut cable holder.
7. Re-assemble the covers.



11.17 Replacing the Safety Valve



Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or in the generator.

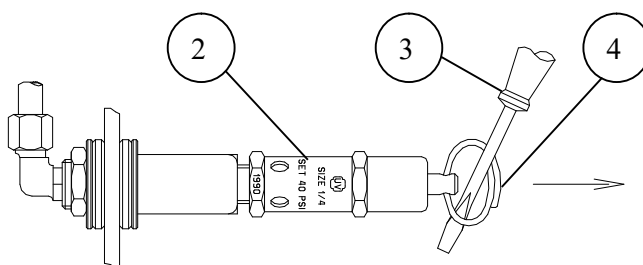
Allow the autoclave to cool for about an hour before removing outer covers.

The safety valve is installed to protect the system from over pressurizing should all the electrical controls fail.

1. Drain the water reservoir (see 11.1)
2. Remove the autoclave outer cover.
3. Remove the water reservoir cover.
4. Unscrew the safety valve (2) and remove it from the safety valve base (1).
5. Replace the valve with a new safety valve (install only an original equipment replacement!). Use liquid thread seal on the threads to seal it. Tighten the safety valve to prevent leaking.
6. To check the new safety valve, perform the following:
 - 5.1. Operate the sterilization cycle according to the manual but with no instruments.
7. Allow a pressure of approximately 300 kPa (29-psig) to build up in the generator and the chamber.

A. ASME-approved type safety valve

5. Remove water reservoir cover (See Front View (4)).
6. Pull the ring (4) of the safety valve using a tool, i.e. screwdriver, hook etc. (3). Pull the safety valve ring until steam ceases to escape from the safety valve. Be careful not to burn your hands.



No.	Description
1	water reservoir cover
2	Safety valve
3	Pulling device
4	Pressure relief ring

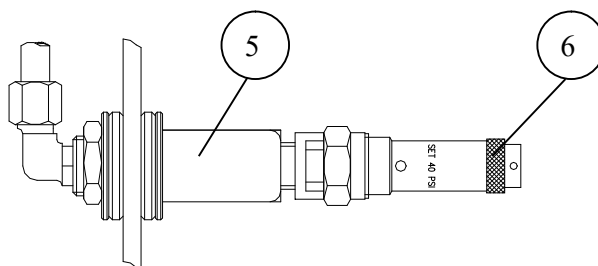
B. PED-approved type safety valve

7. Remove the water reservoir cover.
8. Turn the pressure relief nut clockwise until steam ceases to escape from the safety valve.



Caution!

Use protective gloves in order not to burn your hands with the hot steam.



No.	Description
1	Water reservoir cover
5	Safety valve
6	Pressure relief nut

11.18 Replacing the steam generator heating elements

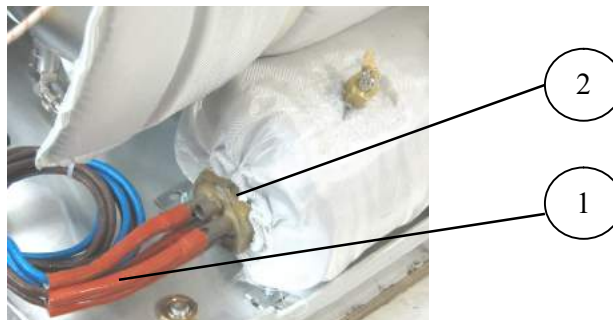


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or in the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Remove the outer covers of the autoclave (see 11.3).
2. Empty the generator.
3. Pull the thermostat (1) out of its sleeve.
4. Disconnect the wires of the heating elements from the porcelain connector.
5. Unscrew the big nut (2) bearing the heating elements to the generator.
6. Take out the nut with the heating elements.
7. Replace the heating elements with new ones. Tighten the big nut and connect the wires to the porcelain connector.
8. Return the thermostat to its sleeve.
9. Perform any cycle to verify that the heating elements operate as required.



11.19 Replacing the steam generator cut-off thermostat

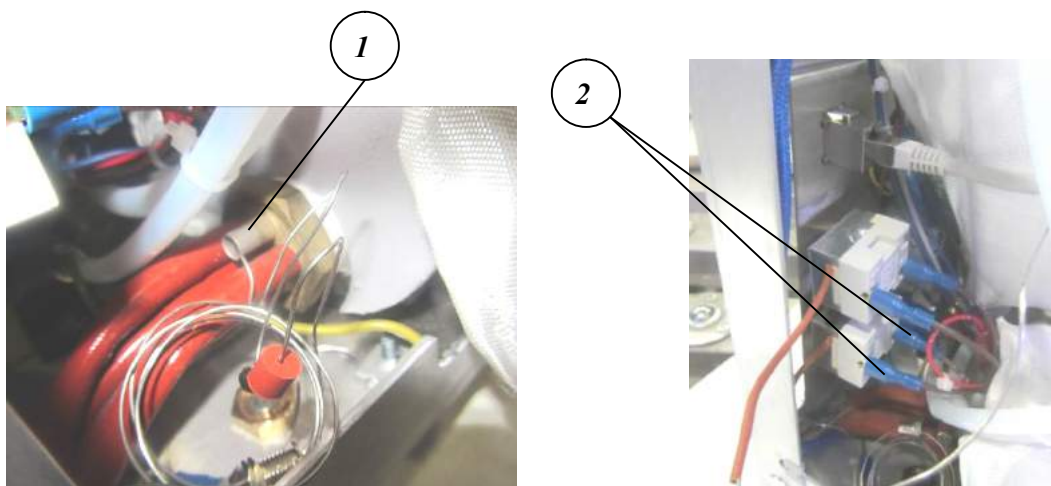


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or in the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Remove the outer covers of the autoclave (see 11.3).
2. Empty the generator.
3. Pull the thermostat out of its sleeve (1).
4. Unscrew the lower connector from the chassis.
5. Disconnect the wires (2).
6. Place the new thermostat into the sleeve.
7. Reconnect the wires.
8. Perform any cycle to verify that the cut-off operates as required.



11.20 Replacing and cleaning the generator's water level electrode



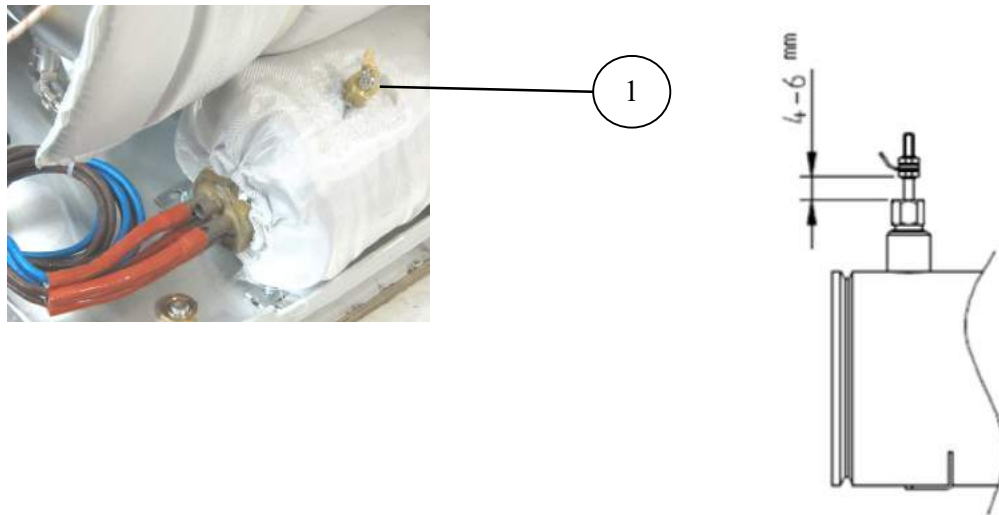
Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or in the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Remove the outer covers of the autoclave (see 11.3).
2. Open the generator insulation.
3. Unscrew the water level electrode (1).and take it out.
4. Disconnect the wire from the terminal block.
5. Insert the new electrode and screw it tight. Make sure that the new electrode protrudes into the generator for 3-4 mm (see the drawing below).
6. Connect the electrode's wire to its terminal block.
7. Close the generator insulation.

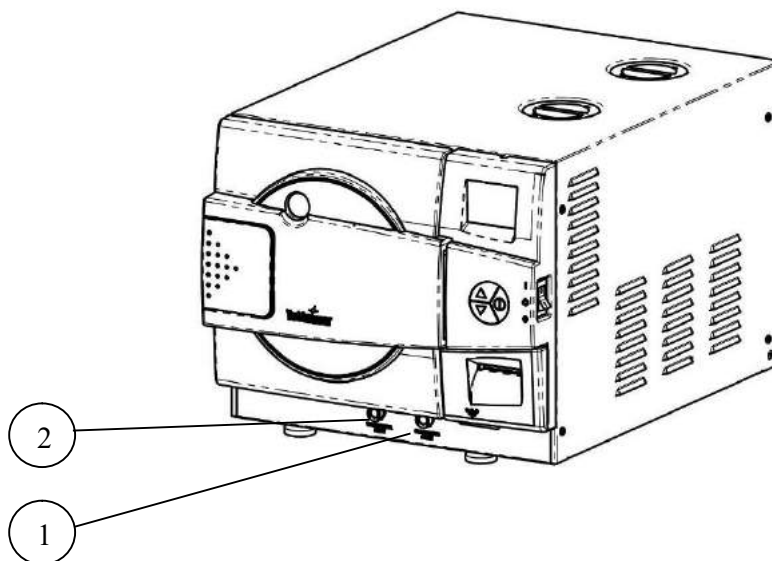
8. Perform any cycle to verify that water level electrode operates as required.



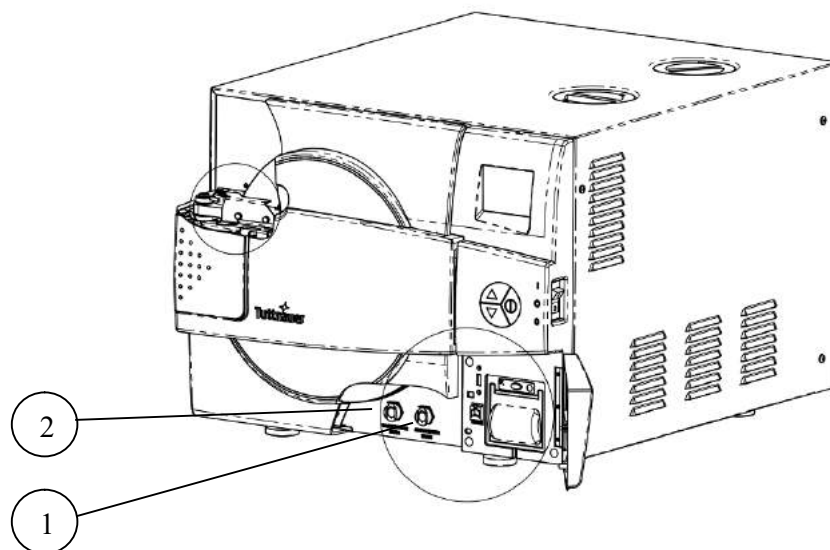
11.21 Replacing the Drain Valve

There are two drain valves on the front of the autoclave. One drains the mineral free water from the clean water reservoir (right, 1) and the other drains the water from the waste water reservoir (left, 2).

ELARA9-D/ELARA9-i



ELARA11-D/ELARA11-i

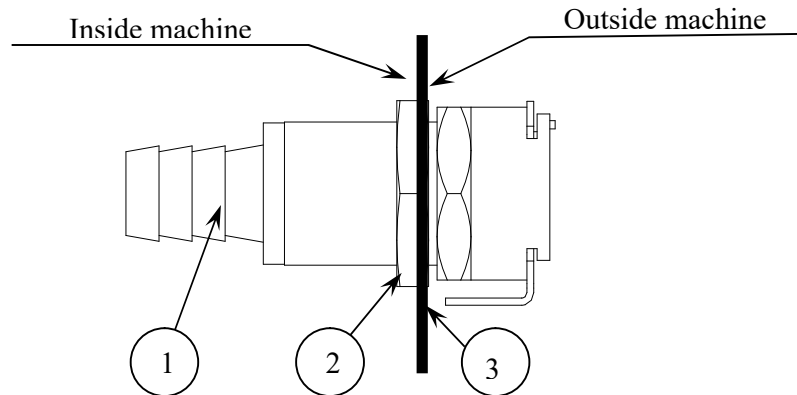


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Drain the reservoir (See 11.1). If the drain is not operational it will be necessary to suction the water out of the reservoir from the top.
2. Remove the autoclave outer cover.
3. Remove the right top frame support over the reservoirs.
4. Remove the metal shroud shielding the electronic components.
5. Remove the drain hose from the inside portion of the drain valve (1).
6. Unscrew the inside nut (2) using a 21mm socket wrench.
7. Remove the drain valve (1) from the panel (3).
8. Install the new valve and reattach the drain tube. Use a tie wrap to secure the drain tube to the valve.
9. Verify that there is no leakage.
10. Replace the metal shroud and right frame support.



11.22 Replacing the door gasket



Caution!

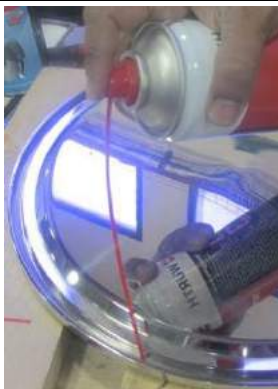
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave.

Allow the autoclave and the door to cool for about an hour before removing outer covers.

1. Pull off the gasket from the door groove and install the new gasket referring to the directions below.
2. Remove the door gasket and clean the groove of the old gasket's remainder (plain water is okay).



3. Line the inside of both sides/walls of the gasket groove with grease (red arrows).



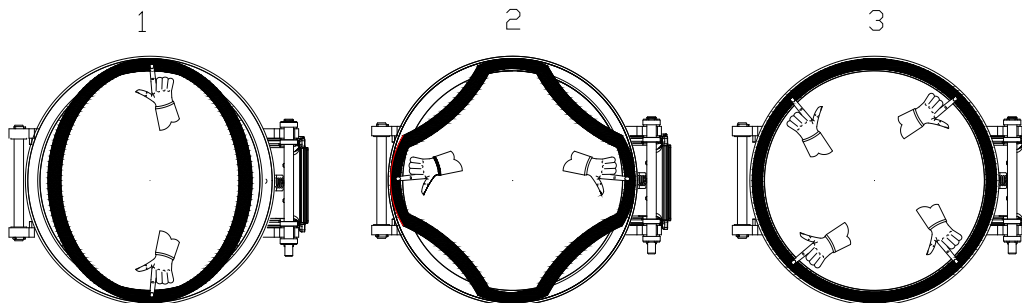
Note: It is recommended to use a silicone based lubricant such as Würth Silicone Emulsia (Tuttnauer part number SEA 095-0117). If you had purchased a replacement door gasket it will have come with a small packet of lubricant.



Caution!

If insufficient lubricant is applied, replacing the gasket will be difficult. If excess lubricant is applied, the gasket will 'spring' out of the groove.

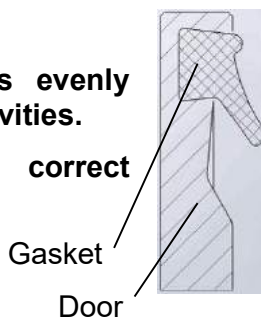
1. Install the new gasket referring to the drawings as below points 1, 2 and 3.



Caution!

Make sure the gasket sits evenly without waves, humps, or cavities.

This drawing shows the correct direction of the gasket.



11.23 Replacing the Control System Front Panel

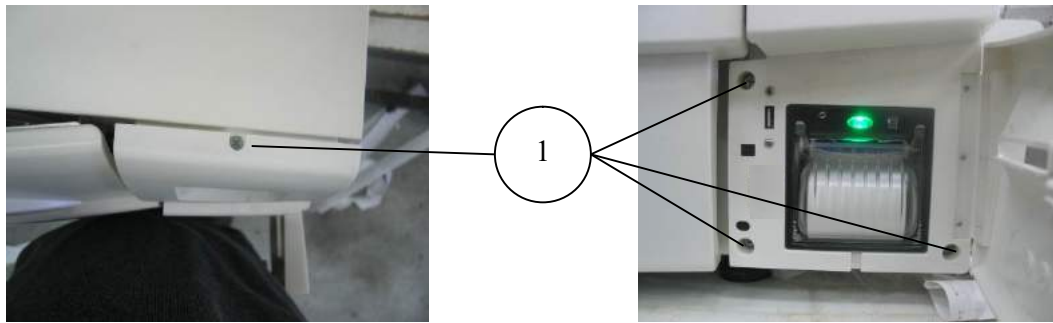


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or in the generator.

Allow the autoclave to cool for about an hour before replacing the Panel.

1. Open the printer's door.
2. Unscrew the 3 fastening screws on the panel's front and one on the top (1).



3. Pull the panel approx. 30 centimeters.
4. Disconnect all the wires,



5. Remove the I/O card, the main card, optional printer, display etc. located on the rear side of the panel).

Note: Verify that you know where each plug is connected.

6. Remove the optional printer (if exists, see 11.27).
7. Assemble the digital card on the new panel.
8. Assemble the optional printer (if exists) on the new panel.
9. Assemble the panel and fasten it to the autoclave with the 4 fastening screws.

11.24 Replacing the Printer Door (If Available)

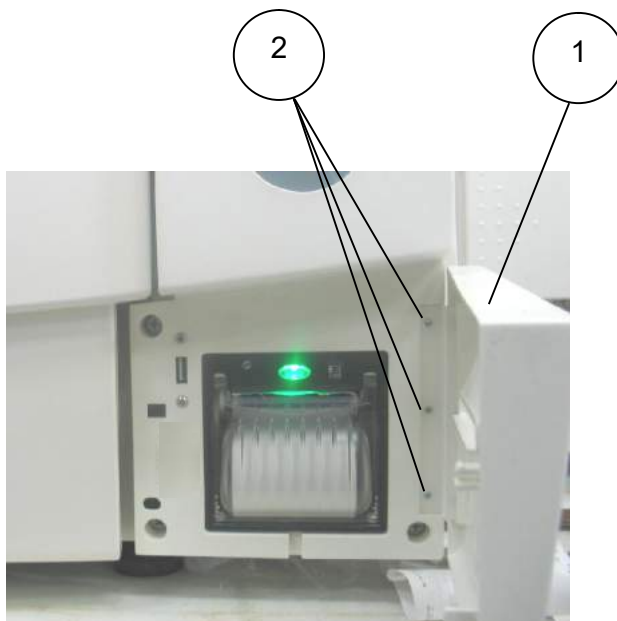


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave.

Allow the autoclave to cool for about an hour before replacing the Printer Door.

1. Open the printer's door (3).
2. Unscrew and remove the 3 screws (2) holding the Printer Door to the Integral Hinge (1).
3. Remove the Printer Door.
4. Assemble the new Printer Door to the Integral Hinge with the 3 screws (2).



11.25 Replacing the Door Handle



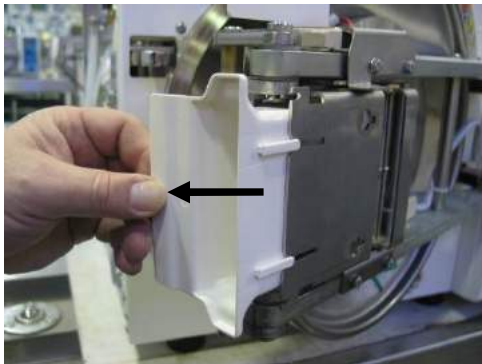
Caution!

Before starting, ensure that there is no pressure in the chamber or in the generator.

Allow the autoclave to cool for about an hour before replacing the Door Handle.

Do not disconnect the electric power, since disconnecting the power will lock the handle and prevent replacement of the handle.

1. Open the autoclave's door.
2. Remove the two screws holding the Door Handle Cover and slide it out from the door. It might be tight, but it will slide.
3. Remove the Door Handle by pulling it in the direction of the arrow. It might be tight, but it will slide out of its holder.
4. Slide the new handle into position.
5. Reinstall the Door Handle Cover (see step 2).



11.26 Replacing the Plastic Handle Cover



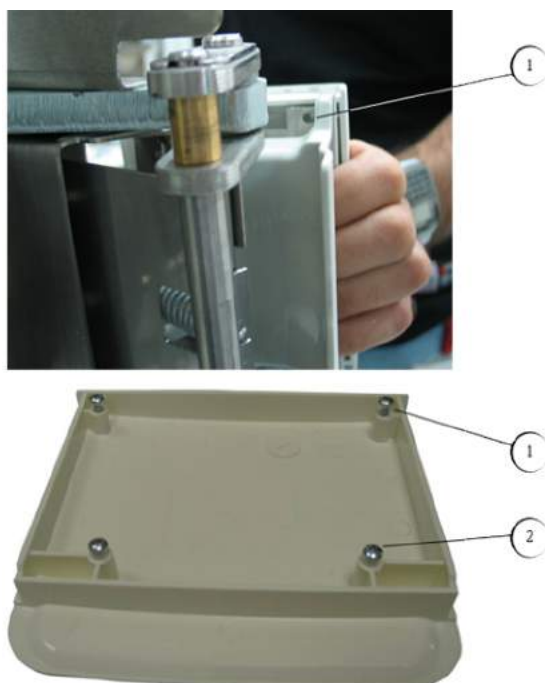
Caution!

Before starting, ensure that there is no pressure in the autoclave.

Allow the autoclave to cool for about an hour before replacing the Door Handle Cover.

Do not disconnect the electric power, since disconnecting the power will lock the handle and prevent replacement of the handle cover.

1. Open the autoclave's door.
2. Open the handle and release the two screws (1).
3. Slide the handle cover out from the door. It might be tight, but it will slide.
4. Transfer the two screws (2) from the rear of the old cover to the new cover and tighten so as to provide a snug fit when the cover is slid back into the slots on the metal bracket.
5. Inserted screws (1) in the cover until two threads are above the cover's surface.
6. Now insert the cover into the handle bracket.
7. Now with the cover in position tighten the two front screws (1).



11.27 Replacing the Printer (If Available)



Caution!

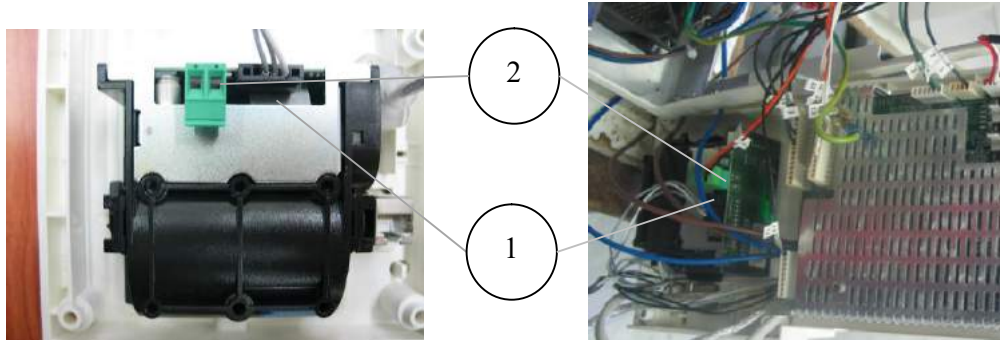
Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Remove the control system front panel (see 11.23) to reveal the internal part and the electrical connectors.

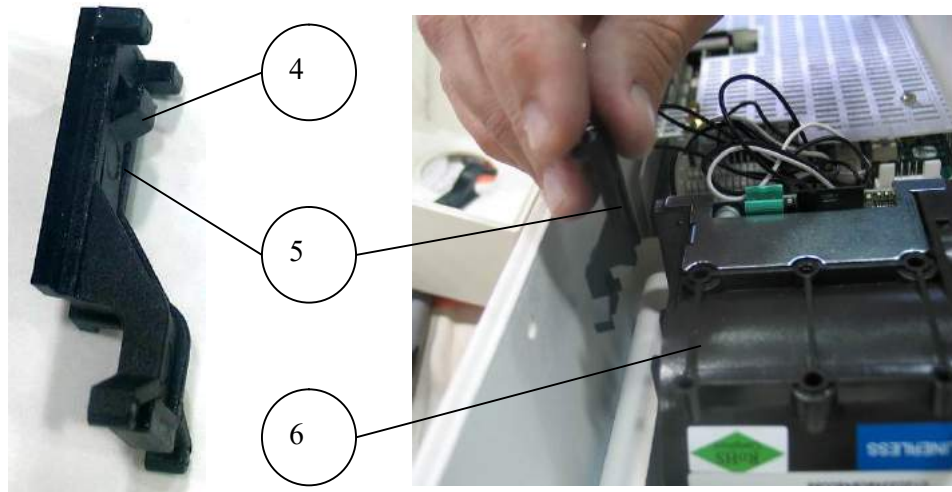
2. Unplug the board connectors (1) and the printer connectors (2).

Note: Verify that you know where each plug is connected.



3. The printer (6) is fastened to its seat with two fasteners (5). To release the fasteners, using a flat screwdriver, press slightly on the part marked (4) and pull the fastener upward. Repeat this with the second fastener.
4. Pull the printer out of its seat (the hole in the panel).
5. Replace the printer with a new printer.
6. Inset the fasteners. Verify that they are inserted firmly.
7. Connect the printer's connectors
8. Connect all the connectors of the board.
9. Lay the control panel on its place.
10. Assemble the panel (see 11.23).

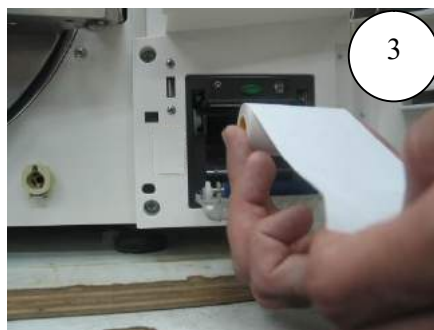




11.28 Replacing the paper roll (If Available)

When the printer's green LED flashes, it means that the printer is out of paper, or the paper is mishandled. In the first case, proceed as follows:

1. Press the green printer button (1) to open the paper compartment (2).
2. Replace the paper roll with the new one (3) as shown on the picture below.
3. Feed the end of paper through the paper slot (4), then close the door.



11.29 Replacing the Door Locking safety Microswitch

1. Open the door

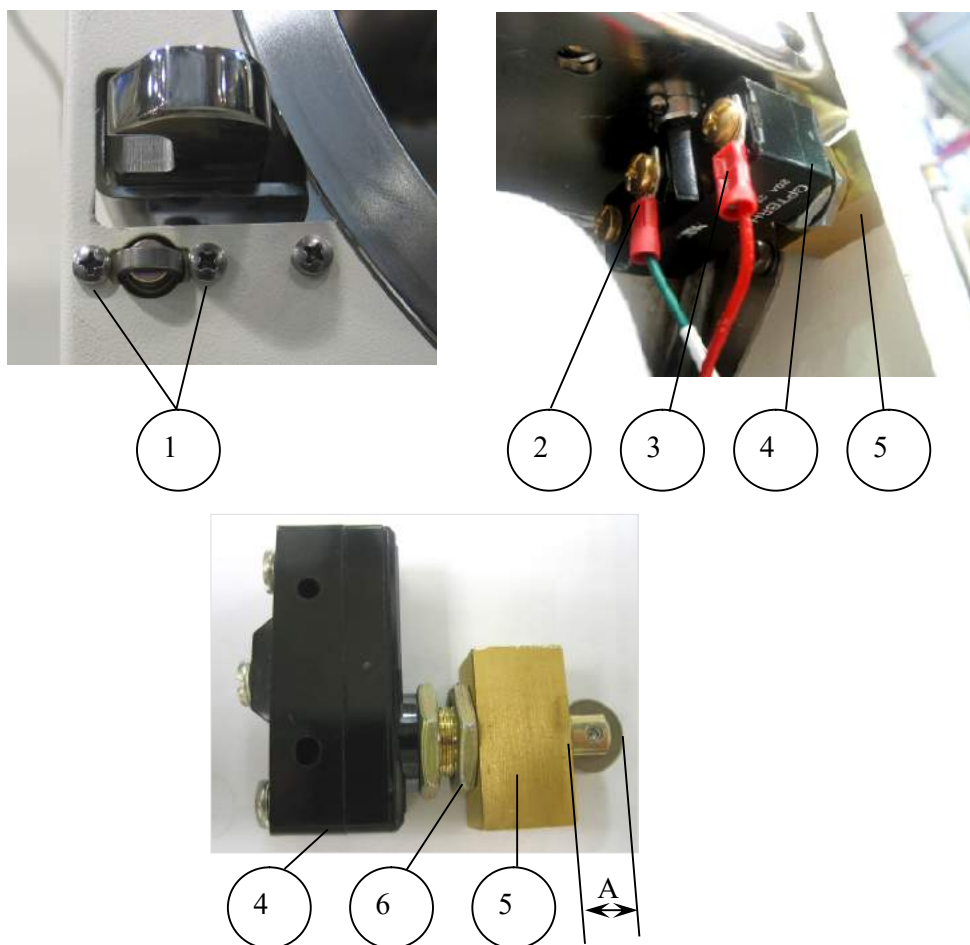


Caution!

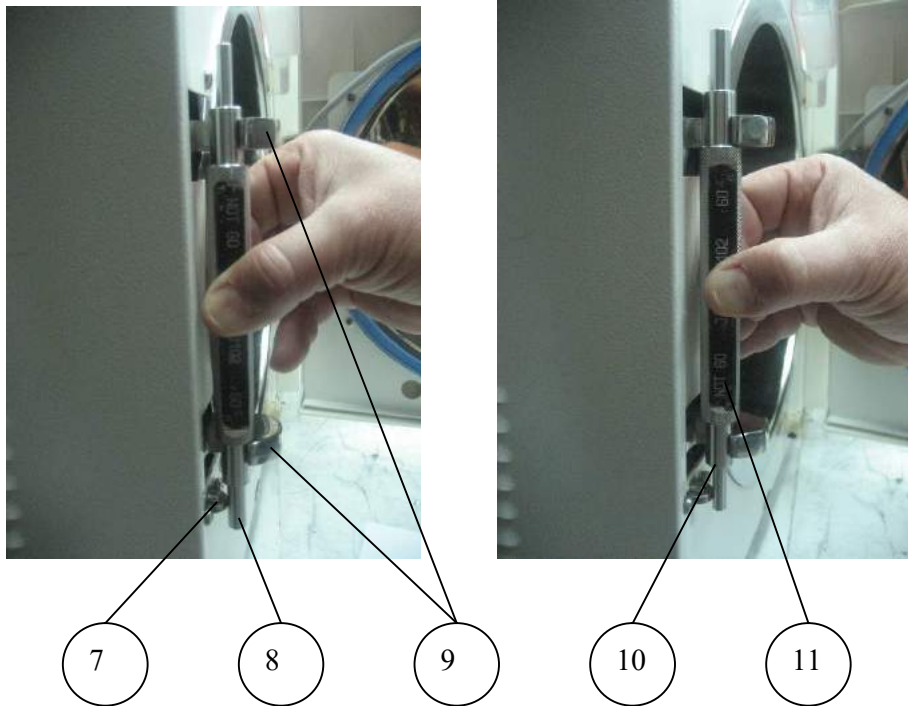
Before starting, disconnect the instrument from the power source and verify that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

2. Remove the autoclave top and left covers.
3. Unscrew the 2 screws (1) holding the door switch adapter (5) on the front panel of the autoclave.
4. Disconnect the 2 wires (2, 3) from the door switch (4).



5. Remove the door switch from the autoclave.
6. Release nut (6) and unscrew the door switch (4) from the door switch adapter (5).
7. Assemble the new door switch to the adapter. Verify that the wheel protrudes (A) approx. 0.37"-0.38" (9.5-10mm) from the adapter (5) and tighten nut (6).
8. Assemble the door switch with its adapter to the front panel. Do not tighten the two screws (1).
9. Perform final adjustment of the microswitch using a GO-NO GO gauge (P/N JIG411-0102) as follows:
 - 9.1. Insert the GO side (8) of the gauge (11) between the wheel (7) of the microswitch and the door locking hooks (9) while pressing the gauge to the hooks. Verify that you hear a "click" indicating the closing of the switch.
 - 9.2. Insert the NO GO side (10) of the gauge (11) between the wheel (7) of the microswitch and the door locking hooks (9) while pressing the gauge to the hooks. Verify that you DO NOT hear the "click" indicating the closing of the switch.



- 9.3. If these two conditions are fulfilled, dimension "A" is correct, tighten screws (1).
- 9.4. If dimension "A" is not correct, remove the microswitch from the panel, turn the adapter 1/2 a turn clockwise or counterclockwise as required and reassemble it to the panel.
- 9.5. Repeat steps 9.1-9.4.
- 9.6. Reconnect the 2 wires (2, 3) to the door switch. Verify that one wire is connected to screw no. 1 ("COM" - marked on the switch) and the other wire is connected to screw no. 3 ("NO" marked on the switch).



Caution!

Make sure that the door switch is installed correctly (the wheel of the microswitch is parallel to the floor)!

Check that the operational message "Door is Open"  is displayed when the door is opened and that the message disappears when the door is closed.

11.30 Replacing the water pump

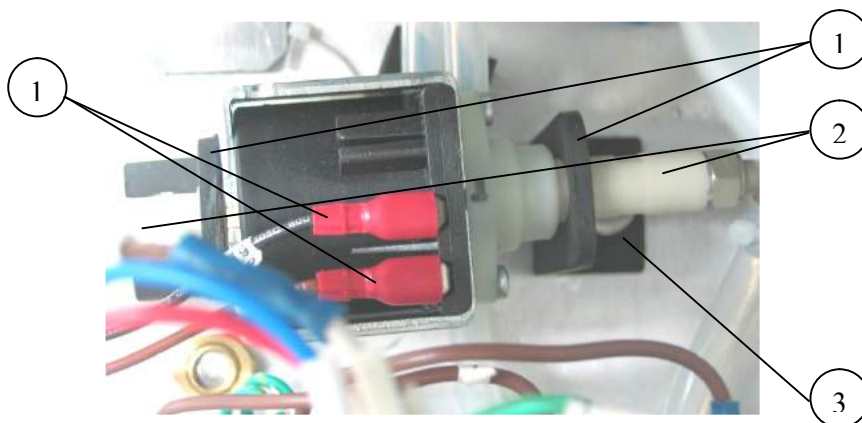


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or in the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Empty the water reservoir.
2. Remove the autoclave outer covers.
3. Disconnect the wires from the pump (1).
4. Disconnect the piping from the pump (2).
5. Remove the pump from the rubber shock absorbers (3). If the rubber shock absorbers are damaged, replace them.
6. Replace the damaged pump with a new pump.
7. Reconnect wiring and piping.



8. Reassemble the outer cover.
9. Turn on the autoclave and verify it operates correctly.

No.	Description	Cat. No.
1	Rubber shock absorber	SKR203-0006
2	Fitting 5/16"x1/8" (straight)	—
3	Screw	BOL191-0140

11.31 Replacing Plunger or Coil of the Solenoid Valve

The solenoid valves may be out of order due to faulty, dirty (with chipset or dirt) plunger or coil. To repair the solenoid valve – replace the faulty plunger or solenoid

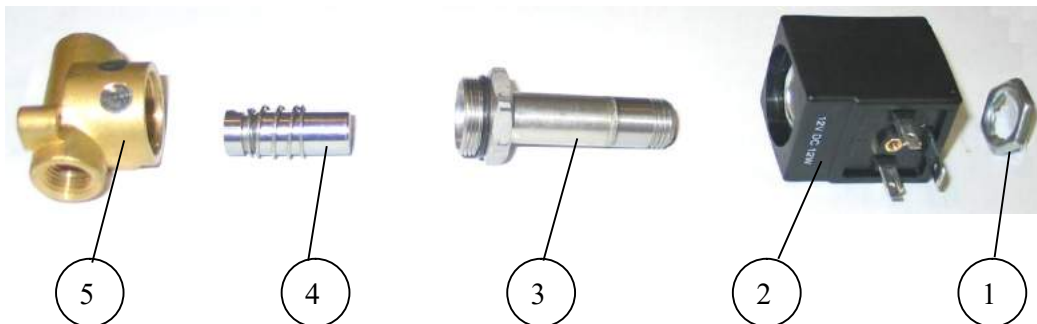


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or in the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Open the outer housing to reveal the faulty solenoid valve.
2. Unscrew and remove nut (1).
3. Remove the coil (2).
4. Unscrew the plunger + spring (4) with the plunger housing (3) and replace it with a new one. The plunger the spring and the housing are replaced as a kit.
5. Reassemble the coil (2) and the nut (1).
6. Reinstall and close the solenoid.
7. Reinstall the autoclave cover.



11.32 Replacing the internal PT100 (ELARA-I models only)

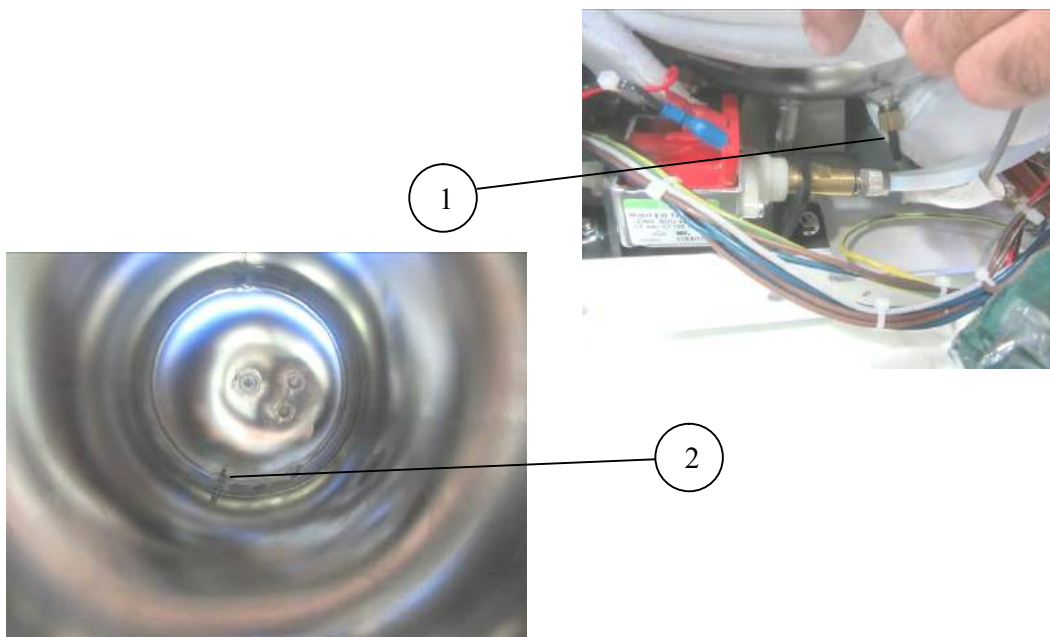


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Remove the outer covers of the autoclave (see 11.3).
 2. Disconnect the jacket PT100 from its connector on the control panel.
 3. Unscrew the ½ nut (1) from the chamber and take it out
- Note:** Please note which length the PT100 protrudes. The new PT100 must protrude into the chamber to the same length.
4. Install the new PT100 in place of the old one.
- Note:** Make sure that the sensor protrudes for the same length as the replaced one.
5. Perform any cycle to verify that the PT100 operates as required.



11.33 Replacing the Chamber and Generator Pressure Transducers



Cautions!

Before proceeding, make sure that the electric cord is disconnected and there is no pressure in the autoclave.

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave.

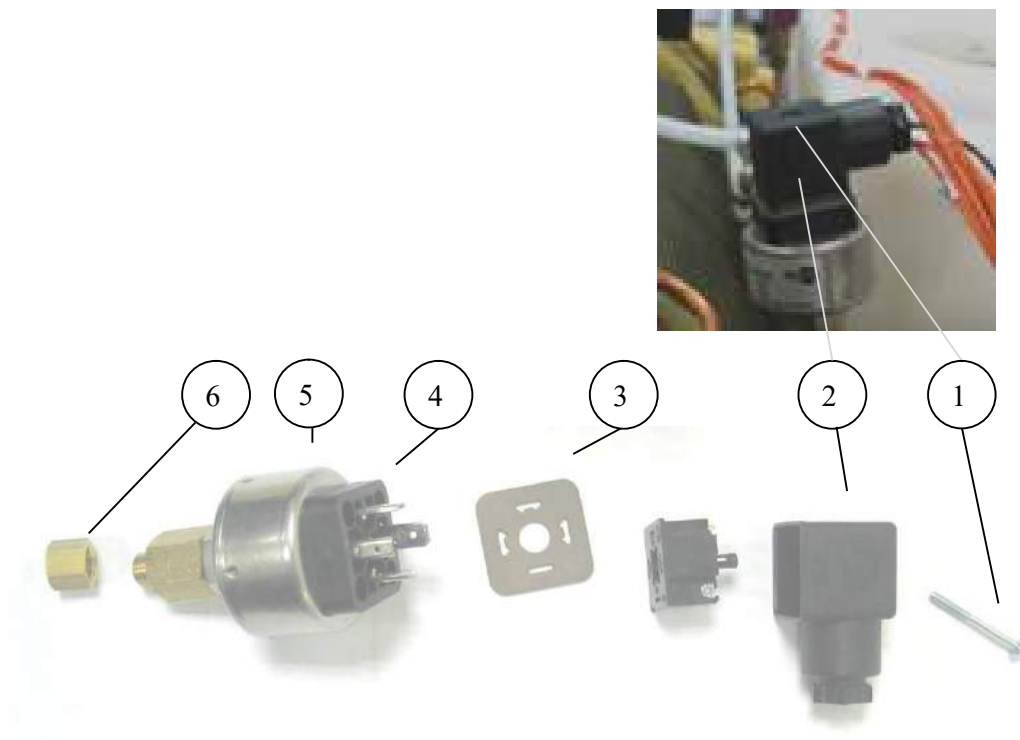
Allow the autoclave to cool for about an hour before removing outer covers.

Generator

Chamber



1. Remove the outer cover of the autoclave (see 11.3).
2. Unscrew the screw (1).
3. Unscrew the pipe nut (6).
4. Lift and remove the transducer's cap (2) from the transducer (4).
5. Disconnect the wires. Mind the wiring scheme to restore the wires to their correct places.
6. If the square gasket (3) remains on the transducer, remove it and install it on the new transducer.
7. Unscrew the faulty transducer from its seat (5).
8. Install a new transducer.
9. Assemble the cap to the new transducer and tighten it with screw (1).
10. Reconnect the wires.
11. Replace the transducer's cap.
12. Reassemble the outer cover.
13. Run basic programs of the autoclave to verify that the cycle operates. There may be need for calibration.



11.34 Replacing the Pressostat



Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave.

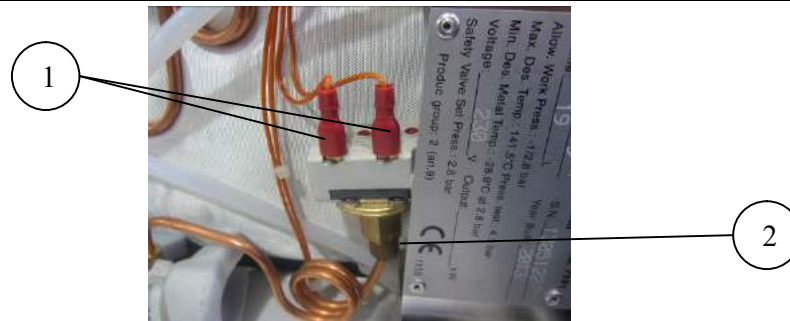
Allow the autoclave to cool before removing outer covers.

The pressostat's function is to turn off power when the pressure is too high.

1. Remove the outer covers of the autoclave (see 11.3).
2. Disconnect the wires (1).
3. Unscrew the nut (2).

Note: Follow the steps in this section in the reverse order to install the new pressostat.

4. Perform any cycle to verify that the pressostat operates as required.



11.35 Replacing the door locking solenoid

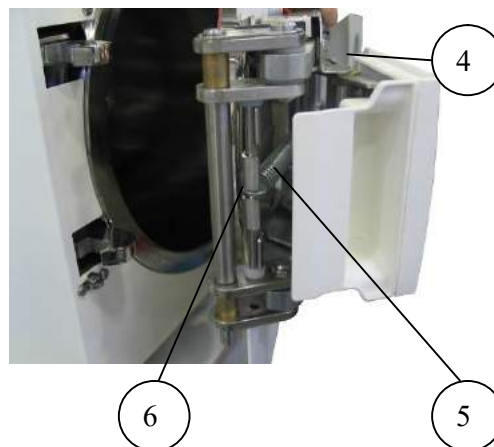


Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the chamber or the generator.

Allow the autoclave to cool for about an hour before removing outer covers.

1. Open the door.
2. Remove the door cover.
3. Release the locking mechanism spring (5) from the front spring holder (6) or brace the locking mechanism so it will not move while you are working on it.
4. Remove the solenoid pin stop bracket (4).



5. Disconnect the door solenoid wires (7) at the terminal block (8).

- 
- 9
- 10
- Door handle
- Upper door bridge

-

- Page 128

Item	Cat. No.	Description
11	LOK411-0019	Solenoid extension adaptor T4x12
12	LOK411-0018	Solenoid pin -ELARA
13	LOK254-0001	Washer, locking solenoid pin
14	SPR177-0004	Spring, door locking solenoid
15	SOL027-0003	Solenoid, door lock

11.36 Replacing the internal PT100



Caution!

Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave.

Allow the autoclave to cool before removing outer covers.

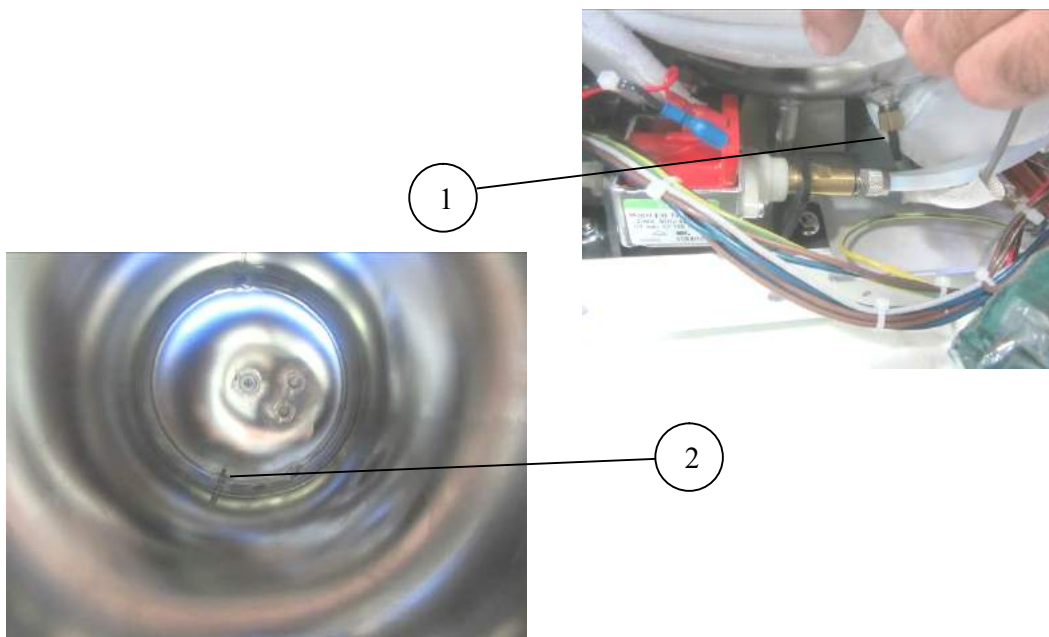
1. Open the outer covers of the autoclave.
2. Disconnect the jacket PT100 from its connector on the control panel.
3. Unscrew the ½ nut (1) from the connector (2) and take it out

Note: Please note which length the electrode protrudes. The new electrode must protrude into the generator to the same length.

4. Install the new PT100 in place of the old one.

Note: Make sure that the sensor protrudes for the same length as the replaced one.

5. Perform any cycle to verify that the PT100 operates as required.



11.37 Replacing the Water Filter



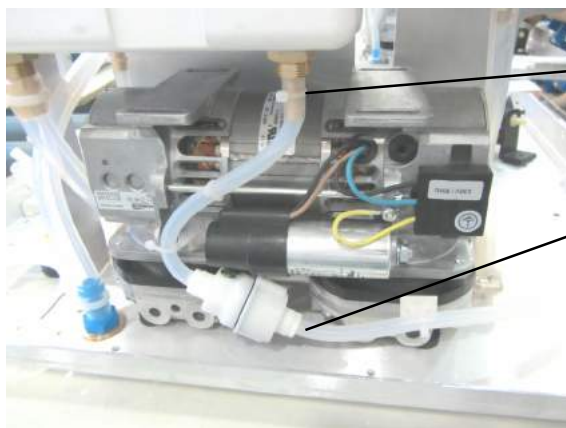
Caution:

Before starting:

Make sure that the electric cord is disconnected and that there is no pressure in the autoclave.

Make sure there is no pressure in the generator. If there is, open the left service door and reduce the generator pressure by opening the drain valve.

5. Drain the water reservoir (see 11.1).
6. Remove the ty-rap, disconnect the inlet pipe of the filter from the reservoir (1).
7. Disconnect the outlet pipe (2) of the filter from the ULKA water pump.
8. Replace the filter with the new one. Make sure to connect the filter in the right direction (see the arrow on the filter cover).



1

2



11.38 Replacing the Vacuum Pump



Caution:

Before starting:

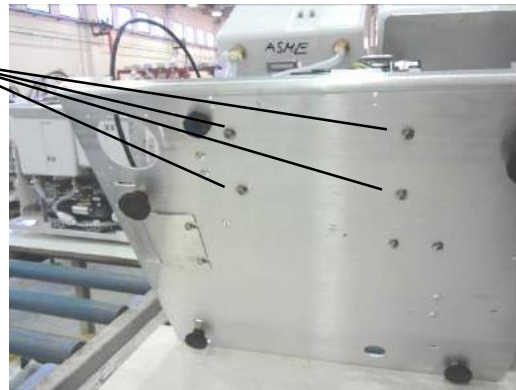
Make sure that the electric cord is disconnected and that there is no pressure in the autoclave.

Make sure there is no pressure in the generator. If there is, open the left service door and reduce the generator pressure by opening the drain valve.

1. Disconnect the water filter (see above)
2. Disconnect the vacuum pump electrical wires.
3. Unscrew the four screws from the bottom of the autoclave (1)



1



4. Disconnect the inlet (2) and the outlet (3) pipes of the pump.



5. Replace the pump with a new one.
6. Fasten the pump to the autoclave's base with screws (1).
7. Connect all the tubes (2, 3).
8. Connect the electrical wires.

12 Troubleshooting



Warning!

Do not touch door micro-switches in case of malfunction! Call Tuttnauer service.

Only technical personnel having proper qualifications and holding technical documentation (including a technician manual) and adequate information are authorized to service the apparatus.

Symptoms	Possible causes Check-ups and tests	Corrective Action
The screen doesn't turn on.	1 The main switch is in 'OFF' position. 2 The power cord is disconnected from the machine or the mains. 3 The circuit breaker has tripped. 4. Power supply faulty	1 Turn the main switch to the 'On' position. (see front view). 2 Make sure the power cord is connected properly to the machine and the mains. (see rear view) 3 Lift the circuit breaker lever. 4. Replace the power supply.
After Pressing Key no response	1. The software has a bug and it is stuck 2. The key pad not connecting to the main board.	1 turn off the autoclave and restart the power 1.1 USB import 2. Replace control system/
Printer doesn't print	1 If printer's LED is on, the printer is OK. 2 If printer's LED is off, – faulty printer or no power to the printer. 3 If printer's LED is blinking, no paper is inserted in the printer. (see Printer Handling in Operator's manual)	1 Make sure the paper roll is inserted in the printer. (see Printer Handling in operator's manual) 2 Switch off the machine and switch it back on for restart 3 Replace the printer.

Symptoms	Possible causes Check-ups and tests	Corrective Action
	2 No obvious reason. Disconnect and connect again. 3 Check 24V input to the printer. If none: — Discontinuity between power supply and printer. — Faulty power supply.	Fix discontinuity. Replace power supply.
leaking at the door	1 The door gasket is dirty. (see Daily Maintenance in Operator's manual) 2 The door gasket is damaged.	1 Clean the door gasket. (see Daily Maintenance in Operator's manual). 2 Replace the door gasket.
Steam leaks through the door, despite the fact that door is tightly closed.	Check if the gasket is smooth, making sure the door closes properly. Please check that both door switches are in order.	Replace the faulty gasket.
The safety valve does not release pressure when blow-off test is performed.	1 Check the path of safety valve ensuring circulation is free. 2 Safety relief valve is faulty	1 If circulation is not free, remove the block. 2 Replace the faulty valve.
Fast exhaust operation is too slow.	Exhaust valve is faulty or pipe is clogged.	Replace exhaust valve or clean pipe.

Symptoms	Possible causes Check-ups and tests	Corrective Action
High temp. (ending)	During the 'Ending' stage the chamber temperature does not go below the temperature defined in parameter 'End Temperature' for X minutes (as defined in parameter 'Normal Temperature Timeout') Possible causes: 1. Heating elements go on working beyond the required time. 2. Faulty SSR or Analog board. 3. Faulty calibration of temp., pressure or faulty sensors of temp and/or pressure.	If the problem persists, perform the following with SSR, Analog board, and temp/pressure sensors: a. Test b. If this doesn't help, recalibrate. c. If this doesn't help, replace.
High pressure (ending or exhaust)	During the 'Ending' stage the chamber pressure does not go below the atmospheric pressure + 5 kpa after the time defined in parameter 'Normal Pressure Timeout'. Possible causes: 1. Heating element is working continuously. 1 Pressure System is not calibrated. 2 Exhaust valve does not open due to mechanical or electrical malfunction (aulty I.O. board, faulty I.O. board connection).	First, perform a new cycle. If the problem persists: 2 Calibrate System. 3 Fix connection. If this doesn't help, replace faulty I.O. board. Other possible solutions are: Replace faulty valve. Replace the faulty solid state relay.
Time error	At the end of the 'Sterilization' stage, the gap between the 2 Main Board system clocks is more than 4 seconds.	Repeat the cycle. If the problem persists, replace the Main Board.

Symptoms	Possible causes Check-ups and tests	Corrective Action
High temp	During 'Sterilization' stage, the chamber temperature goes above the value defined in parameter 'Sterilization Temperature' + value of parameter 'Sterilization temperature Range'. Possible causes: 1. Heating elements go on working beyond the required time. 2. Faulty SSR or Analog board. 3. Faulty calibration of temp., pressure or faulty sensors of temp and/or pressure.	If the problem persists, perform the following with SSR, Analog board, and temp/pressure sensors: a. Test b. If this doesn't help, recalibrate. c. If this doesn't help, replace.
Low Temp	During 'Sterilization' stage, the temperature drops for more than 1 second below the sterilization temperature. Possible causes: 1. Door gasket is leaking. 2. Heating elements (even one of them) do not work. 3. Faulty SSR or Analog board. 4. Faulty calibration of temperature and pressure sensors. 5. Faulty temperature or pressure sensors. 6. Overloaded chamber	First, perform a new cycle (make sure not to overload the chamber). If the problem persists: 1. Replace the door gasket. 2. Recalibrate the temperature and pressure sensors. 2. Fix connection. If this doesn't help, replace faulty temperature sensors, pressure sensors, SSR or Analog board.
High pressure	During 'Sterilization' stage, the chamber pressure goes above the value of 'Sterilization Pressure' plus the value of parameter 'Sterilization pressure Range'. The 'Sterilization Pressure' value is calculated according to parameter	If the problem persists, perform the following with SSR, Analog board, and temp/pressure sensors: a. Test b. If this doesn't help, recalibrate.

Symptoms	Possible causes Check-ups and tests	Corrective Action
	'Sterilization Temperature' using a predefined lookup table. Possible causes: 1. Heating elements go on working beyond the required time. 2. Faulty SSR or Analog board. 3. Faulty calibration of temperature or pressure sensors. 4. Faulty temperature or pressure sensors.	c. If this doesn't help, replace.
Low pressure	During 'Sterilization' stage, the chamber pressure goes below the value of 'Sterilization Pressure'. The 'Sterilization Pressure' value is calculated according to parameter 'Sterilization Temperature' using a predefined lookup table. Possible causes: 1. Door gasket is leaking. 2. Heating elements (even one of them) do not work. 3. Faulty SSR or Analog board. 4. Faulty calibration of temperature and pressure sensors. 5. Faulty temperature or pressure sensors. 6. Leakage in the pipes	Perform a new cycle. 1. Replace the door gasket. Recalibrate the temperature and pressure sensors. 2-5. Fix connection. If this doesn't help, replace faulty temperature sensors, pressure sensors, SSR or Analog board 6. Find and replace the leaking pipes.
Heat time error/ Heat time error (keep)	During 'Heat' stage, chamber temperature has not reached the requested temperature (defined by cycle parameter 'Sterilization Temperature') after X minutes as defined in parameter 'Heat Time Error'	If the problem persists, perform the following with SSR, Analog board, and temp/pressure sensors: a. Test b. If this doesn't help,

Symptoms	Possible causes Check-ups and tests	Corrective Action
	Possible causes: 1. Door gasket is leaking. 2. Heating elements (even one of them) do not work. 3. Faulty SSR or Analog board. 4. Faulty calibration of temperature and pressure sensors. 5. Faulty temperature or pressure sensors.	recalibrate. c. If this doesn't help, replace.
Pressure time error	Chamber pressure has not reached the requested high pressure after the time defined by cycle parameter 'Pressure Time Error' Possible causes: 1. Door gasket is leaking. 2. Heating elements (even one of them) do not work. 3. Faulty SSR or Analog board. 4. Faulty calibration of temperature and pressure sensors. 5. Faulty temperature or pressure sensors.	If the problem persists, replace the door gasket.
No water	The 'No Water' parameter defines the maximum time to wait for water to be detected in the chamber. If no water detected in the chamber (during insert water stage) after the time defined by the parameter, a 'No Water' error will be displayed and the cycle will fail. Possible causes: 1. No mineral water supply.	1. Check and fix the mineral free water supply. 2. check and clean the water inlet

Symptoms	Possible causes Check-ups and tests	Corrective Action
	2. Water inlet filter clogged. 3. Water level electrode is dirty. 4. The wire of the water level electrode is disconnected. 5. Faulty water pump. 6. One of the heating elements does not work 7. Faulty thermostat 8. Faulty cut-off	filter. 3. Clean the water level electrode. 4. fix wire of the water level electrode. 5. Replace the water pump fuse.
Power down	Power down has occurred during the cycle.	If it happened before or during the sterilization stage, repeat the cycle. If power down happened after the sterilization stage, repeating the cycle is not necessary, it's up to the operator.
i/o card failed	The I/O card (connected to the main through RS232 connector) is not responding. Possible causes: 1. Disconnection between I/O board and Main board. 2. I/O card is faulty (both while cycle is running or not).	1. Check the connections. 2. Replace the control system.
Analog input error	Pressure or temperature sensor reports an out-of-range digital value.	Locate the cause of the problem as displayed in 9.7 under "View Analog Inputs State" and check the sensor that shows the value "--". Check the connections. If this does not help, replace the faulty sensor.
Door is open	During the cycle the door switch indicates that the door is open. Possible causes: Faulty or not adjusted door	Check the door switch and its connections.

Symptoms	Possible causes Check-ups and tests	Corrective Action
	switch or faulty door switch itself.	
Vacuum Time Error	Vacuum Time Error message on the yellow screens after a failed cycle means that, during a time set in the parameter "Pulse A (or B) Stay Time", chamber vacuum has not reached the pressure value set in "Pulse A (or B) low pressure".	Perform a new cycle. If the problem persists, perform vacuum test to find leakage the autoclave door or pipes.
Vacuum Pressure Error	Vacuum Pressure Error message on the yellow screens after a failed cycle means that, during a time set in the parameter "Pulse A (or B) Stay Time", chamber pressure has not reached the value set in "Pulse A (or B) high pressure".	Perform a new cycle. If the problem persists, perform vacuum test to find leakage the autoclave door or pipes.

13 List of Spare Parts

ELARA11P230-W-D

Part No.	Description
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2, DIN7985
BOL194-0340	Pan Head Tapping Screw, Philips, 4.8x13, Flat Point, DIN7981 FH
BOL194-0341	Pan Head Tapping Screw, Philips, 4.8x19, Flat Point, DIN7981 FH
CMT240-0097	Handle, Tray, TTA 1730, 2340, 2540
VLV170-0014	Cock, Drain
FIL175-0060	Strainer, 40 mesh, St.St., w/Grip
GAS080-0007	Gasket, Silicone, ø119mm, Water Reservoir
GAS083-0004	Tube, Silicone, Clear, Translucent, 7x13mm, 58 Shore A
GAS084-0007	Drain PVC Tube 10x13
HLD411-0009	Bottom support for door cover - Elara 11
HLD411-0020	Upper support for door cover - EZ11K
NUT192-0217	Hex Nut, 8-32UNC, Brass, Plain
NUT192-0230	Nut, Clip-On, U-Style, 4.8x20x13, 0.7 thick., Spring steel, Cadmium plated
NUT193-0263	Plain Washer Without Chamfer, M6, Steel, Zinc Plated, DIN125-1A
NUT193-0271	Plain Washer Without Chamfer, M5 (3/16), Stainless Steel A2, DIN125
NUT193-0291	Serrated Lock Washer External Teeth, M4(5/32), Steel, Zinc Pl., DIN6798A
POL065-0006	Cover, Validation Port, 2340
POL067-0004	Cover, Reservoir, Fill water
POL067-0005	Dipstick, Water level, Tables
POL067-0011	Shield, Opening Handle, 9" & 11" E/M
POL067-0012	Cover, Opening Handle, 9" & 11" E/M
COV411-0011	Cover, Outer, ELARA

Part No.	Description
COV411-0014	Cover,Rear,ELARA11-D & 2840ELPV
POL065-0091	Cover, Door, 11" , with company logo.
SEA095-0117	Silicon Bag 5 mml
CMT258-0002	Disc, Cover door
BOL194-0341	Pan Head Tapping Screw, Philips, 4.8x19, Flat Point, DIN7981 FH
CMT240-0018	Nut, Front Leg For TTA
CMT240-0021	Bushing, Front Leg, TTA
WHE070-0034	Leg, Adjustable, Front, 124020D/10, Haman.
WHE070-0035	Leg, Adjustable, Rear, 124020D, Haman
FIT100-0902	Connector, Male, Straight, 1/2BSP Tube10mm,Plastic,12446850180,Tefen
NUT193-0275	Plain Washer, 1X5.3X13, Stainless Steel A2
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2,DIN127B
CMT411-0097	Cover, Service, Bottom, Elara 11
BOL191-0142	Pan Head Machine Screw, Phillips, 1/4UNCx3/4, St.St. A2
BOL191-0155	Pan Head Machine Screw, Phillips, M5x20, St. St. A2, DIN7985
SKR203-0009	Shock Absorber, Ø20.5x6.5x5.5mm, EP 70 DURO
FIT100-0805	Male Adapter, Elbow, 90°, 1/4"BSP For 6mm Hose
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
NUT193-0275	Plain Washer, 1X5.3X13, Stainless Steel A2
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2,DIN127B
PUM057-0055	Vacuum Pump, Diaphragm, 230V, UL, ASF Thomas
ARM100-0152	Heat Exchanger, 15/04x10x0127/16, Lordan
CTP201-0159	Fan, 230VAC, 150x172x38
FIL175-0069	Fan guard, 170 mm, NiCr plated, FGW-162A-5, Cooltron
FIT100-0805	Male Adapter, Elbow, 90°, 1/4"BSP For 6mm Hose
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2,DIN127B
BOL191-0142	Pan Head Machine Screw, Phillips, 1/4UNCx3/4, St.St. A2
SKR203-0006	Shock Absorber, SRB, 85/90 SHORE fot ULKA Pump.
NUT192-0155	Flange Hex Nut, 1/4UNC,Grade 2, Steel, Zinc Plated
NUT193-0269	Plain Washer Without Chamfer, M6, Stainless Steel A2,

Part No.	Description
	DIN125
PUM055-0021	Water Pump, 230V, 50Hz, Ulka
ARM172-0026	Check Valve, Spring Disk, 1/4"BSP, St.St., MONDEO
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2, DIN7985
SOL026-0039	Valve, Solenoid, 2/2 way, 1/4"BSPx4.5, NC, 24VAC, 8W
FIT100-0802	1/4" T section O-RING - M/F/M
FIT100-0803	1/4" Elbow Connection O-RING - F/M
FIT100-0805	Male Adapter, Elbow, 90°, 1/4"BSP For 6mm Hose
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
FIT100-0812	Adaptor, Elbow, Orienting, Male 1/4"" , Tube 1/4
NUT192-0229	Nut,Clip-On,U-Style,4.8x20x13,0.7 thick.,Spring steel,Cadmium plated
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2,DIN127B
PNE195-0040	Silencer 1/4"
ARM172-0026	Check Valve, Spring Disk, 1/4"BSP, St.St., MONDEO
CMT100-0004	Nipple, Hex, 1/4"x1/4", NPTxNPT For TTA
CMT411-0074	Connector 1/4" Hexagon- Elara 11"
FIT100-0807	Straight Male O-RING - 1/4 M / Tube(8*6)
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
FIT100-0813	Straight Male O-RING - 1/4 M / Tube 3/16
NUT192-0230	Nut,Clip-On,U-Style,4.8x20x13,0.7 thick.,Spring steel,Cadmium plated
CMT411-0073	Reservoir, waste water, assembly, ELARA
BOL191-0082	Pan Head Machine Screw, Phillips, M4x16, St. St. A2, DIN7985
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2, DIN7985
CMT240-0020	Nut, 3/8"BSP, Water Reservoir
CMT240-0022	Washer, 30mm, Brass, Water Reservoir
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
FIT100-0216	Sleeve, Tube 1/4, Brass, 60C-4, Parker
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
FIT100-0806	Male Adapter, Elbow, 90°, 1/8"BSP For 6mm Hose

Part No.	Description
GAS080-0022	O-Ring, ID 2.84, W=2.62, 2-104 EPDM
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. A2,DIN127B
NUT193-0340	Teflon Ring for water tank
PIP411-0002	Coil, Cooling, ELARA
CMT411-0113	WATER LEVEL ELECTRODE
CMT411-0168	Reservoir, waste water, ELARA11/9 ,Drilling
RES411-0005	Reservoir, Overflow water Tank, Injection,Polycarbonate,
COV411-0001	Isolation for body Elara 11"
COV411-0008	Isolation for rear body Elara 11"
THE005-0016	Thermostat, Cut-Off, TY95-H, 155C, Campini
THE005-0019	Thermostat, Cut-Off, TY95-H, 170C, Campini
ELE039-0084	Cable Tie, Releasable, Nylon, 1042mm
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
BOL194-0341	Pan Head Tapping Screw, Philips, 4.8x19, Flat Point, DIN7981 FH
CMT196-0001	Bushing, water level electrode
CMT196-0004	Electrode, Water Level, Assembly, For Electronic TTA Length: 58mm
GAS086-0001	Tube, Teflon, Water Level Electrode
CMV196-0002	Electrode, Water Level, 58mm, TTA
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
NUT192-0191	Hex Nut, M4X3.2, Stainless Steel A2, DIN934
NUT193-0292	Serrated Lock Washers External Teeth, M6, Steel,Zinc Plated,DIN6798A
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
FIT100-0807	Straight Male O-RING - 1/4 M / Tube(8*6)
FIT100-0813	Straight Male O-RING - 1/4 M / Tube 3/16
PNE195-0161	Hex Socket Plug with O-Ring Viton,1/4",BSPxBSP,Brass,Nickel-Plated,
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
HEA016-0031	Heating Element, Immersion, Threaded, 230V, 1"x300, 2x1100W, St. St.

Part No.	Description
NUT192-0230	Nut, Clip-On, U-Style, 4.8x20x13, 0.7 thick., Spring steel, Cadmium plated
NUT193-0271	Plain Washer Without Chamfer, M5 (3/16), Stainless Steel A2, DIN125
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2, DIN127B
PNE195-0161	Hex Socket Plug with O-Ring Viton, 1/4", BSPx BSP, Brass, Nickel-Plated,
HEA010-0017	Heating Element, Band, 230V, 11-1/4"x12", 500W, Aluminum, ELARA 11
ELE036-0026	Limit Switch, Snap-Action, SPDT, 20A, 250VAC, 2HP, Screw terminal
NUT192-0192	Hex Nut, M5X4, Stainless Steel A2, DIN934
NUT192-0235	Nut, for bulkhead, Brass, 7/16-24
NUT193-0271	Plain Washer Without Chamfer, M5 (3/16), Stainless Steel A2, DIN125
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2, DIN127B
THE006-0006	Transducer, Pressure, 0-4 Bar abs
FIL175-0042	Filter, Air, 0.2 Micron, Model 50mm D
FIL175-0066	Filter, 0.2 micron, 92WM
FIL175-0087	Filter, Water, PVC Assy.
FIT100-0216	Sleeve, Tube 1/4, Brass, 60C-4, Parker
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
FIT100-0824	Coupling, Stud, Female, 1/4" BSP, Parallel, 5mm Tube, 01140513 Legris
GAS083-0002	Tube, Silicone, Clear, Translucent, 5x10mm, 58 Shore A
GAS083-0004	Tube, Silicone, Clear, Translucent, 7x13mm, 58 Shore A
GAS083-0015	Tube, Silicone, Clear, Translucent, 16*22 mm, 58 Shore A
GAS086-0017	Tube, Teflon, 6x8mm
THE005-0047	Switch, Pressure, TY85/B, Campini
PNE195-0161	Hex Socket Plug with O-Ring Viton, 1/4", BSPx BSP, Brass, Nickel-Plated,
BOL191-0052	Hex Cap Screw, 1/4UNCx5/8, St. St. A2
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2, DIN7985
BOL191-0226	Hex Cap Screw, M5x12, St. St. A2, DIN933

Part No.	Description
CMT411-0012	Pin Side, door Axis 9/11"
CMT411-0013	Pin Side, door locking 9/11"
SPR177-0024	Central clicking Spring- Elara 11
THE039-0036	Connector, Ceramic, No.3, Double
BOL191-0240	Hex Socket Flat Cap Screw, M5x25, St. St. A2, DIN7991
LOK692-0039	Pin, Cotter, 2.0x16 mm
NUT193-0269	Plain Washer Without Chamfer, M6, Stainless Steel A2, DIN125
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0271	Plain Washer Without Chamfer, M5 (3/16), Stainless Steel A2, DIN125
NUT193-0275	Plain Washer, 1X5.3X13, Stainless Steel A2
NUT193-0283	Plain Washer, 1.2X7.45X16.1, Stainless Steel A2
NUT193-0317	Spring Lock Washers With Square Ends, 1/4, St. St. A2, DIN127B
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2, DIN127B
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2, DIN127B
GAS080-0310	Gasket for Flate Door-11",Silicone
CMT411-0108	Spacer,Door 11" Adjustment 0.8mm
CMT098-0002	Nipple, Water level electrode
BOL191-0052	Hex Cap Screw, 1/4UNCx5/8, St. St. A2
BOL191-0238	Hex Cap Screw, M4x10, St. St. A2, DIN933
CMT411-0017	Hinge Plate Axle for ELARA 11", ELARA FLAT DOOR,EZ11,EZ9,2840ELXX
CMT411-0020	Stopper, door pin 9/11"
DOR411-0005	Hinge unit , Assembly 9/11"
BOL191-0240	Hex Socket Flat Cap Screw, M5x25, St. St. A2, DIN7991
CMT411-0011	Spacer for Hinge Unit For ELARA 11"
LOK411-0006	Door Axis 9/11"
SOL027-0003	Solenoid, Door Lock, TPGx12-C-24VDC, Guardian
SPR177-0004	Spring, Solenoid, Door Locking, 1730, 2340, 2540
LOK254-0001	Washer, locking solenoid pin, 1730, 2340, 2540
LOK411-0018	Solenoid pin -Elara

Part No.	Description
BOL191-0070	Flat Head Machine Screw, Phillips, M4x10, St. St. A2, DIN965
SPR177-0023	Spring, Tension, M3386 for 9"&11"
LOK411-0010	Sliding Sleeve for Elara 11".
LOK692-0039	Pin, Cotter, 2.0x16 mm
NUT193-0269	Plain Washer Without Chamfer, M6, Stainless Steel A2, DIN125
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0317	Spring Lock Washers With Square Ends, 1/4, St. St. A2, DIN127B
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2, DIN127B
CMT411-0101	Bushing for locker, Door 9/11"
CMT411-0102	Bushing for door axis 9/11"
NUT192-0253	Hex Nut, M6X5, Brass, DIN934
CMT411-0115	Arm Door-11" for flat door - Machining
NUT192-0253	Hex Nut, M6X5, Brass, DIN934
LOK411-0047	Safety Switch Holder-Assy. for ELARA EZ11 EZ9
ELE036-0036	Limit Switch, Snap-Action, Formed Lever, Light, SPDT, 10A/250VAC
LOK411-0044	Safety Switch Holder for Elara door
VLV170-0013	Housing, Cock, Drain
VLV170-0015	Nut, Cock, Drain
NUT192-0230	Nut, Clip-On, U-Style, 4.8x20x13, 0.7 thick., Spring steel, Cadmium plated
BOL191-0091	Pan Head Machine Screw, Phillips, M4X20, St. St. A2, DIN7985
BOL191-0140	Pan Head Machine Screw, Phillips, M4x12, St. St. A2, DIN7985
CMT240-0020	Nut, 3/8"BSP, Water Reservoir
CMT240-0022	Washer, 30mm, Brass, Water Reservoir
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
GAS080-0022	O-Ring, ID 2.84, W=2.62, 2-104 EPDM
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125

Part No.	Description
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2,DIN127B
NUT193-0340	Teflon Ring for water tank
CMT411-0113	WATER LEVEL ELECTRODE
CMT411-0167	Reservoir, Main Water Tank,Drilling,ELARA11/9
CMT411-0137	Holder, Safety Valve, ASME, 1/4" NPT
SVL029-0119	Safety Valve, PED,1/4"NPT MPTxDisch. H.,Brass Body,Brass Seat,2.8Bar
ELC258-0030	Sensor, Temperature, PT100, 5x45, Assy.(For EZ9/11)
THE003-0013	Sensor, Temperature, PT100, 5X70, TUT-001, MAMAB
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
GAS082-0022	Grommet, 22-35, Rubber 3144
GAS083-0015	Tube, Silicone, Clear, Translucent, 16*22 mm, 58 Shore A
POL067-0061	Funnel, Water, 9"/11"- Cut
POL067-0051	Funnel, Water, 9"/11"
WIR040-0003	ELECTRIC CABLE PLUG+SOCKET 10A, 250V, EUR
BOL190-0012	Pan Head Machine Screw, Slotted, 5-40UNCx5/8, Brass, Nickel Plated
BOL190-0023	Pan Head Machine Screw, Slotted, 8-32UNCx5/8, Brass, Nickel Plated
BOL194-0340	Pan Head Tapping Screw, Philips, 4.8x13, Flat Point, DIN7981 FH
THE039-0036	Connector, Ceramic, No.3, Double
WIR040-0179	Modular coupler, MH3101S-8821 Shielded Cat 5e, MH connectors
ELE039-0049	Connector, Ceramic, No.1, single
NUT192-0206	Hex Nut, 5-40UNC, Brass, Nickel Plated
NUT192-0217	Hex Nut, 8-32UNC, Brass, Plain
NUT193-0291	Serrated Lock Washer External Teeth,M4(5/32),Steel,Zinc Pl.,DIN6798A
ELC258-0015	Sensor, Temperature, 5x100, 54400, Sontec, Assy. (For D line)
THE003-0002	Sensor, Temperature, PT100, 5x100, Sontec
GAS080-0022	O-Ring, ID 2.84, W=2.62, 2-104 EPDM
BOL190-0012	Pan Head Machine Screw, Slotted, 5-40UNCx5/8, Brass, Nickel Plated
WIR040-0015	Electric Socket 16A

Part No.	Description
NUT192-0206	Hex Nut, 5-40UNC, Brass, Nickel Plated
NUT192-0230	Nut,Clip-On,U-Style,4.8x20x13,0.7 thick.,Spring steel,Cadmium plated
ELE035-0092	Transformer, 2x115 / 2x12, 50/60 hz, TDB-100, Jishisheng
ELE035-0170	Fuse, 5x20mm, Glass tube, 250V, 5A, SB
CPN064-0031	Keyboard, EZ 9"&11", EZ/3870-D & Hor.-D
CTP200-0138	Board, I/O Extension, Bacsoft
CTP200-0140	Board, Main Control, Bacsoft
THE002-0052	Panel printer, Thermal, 24 Columns
THE002-0066	Thermal paper for CUSTOM PLUSII printer roll 57mm d=50mm
WIR040-0170	Cable kit for PLUSII-S-0004 Printer
ELC258-0012	Shield, Control Unit Boards, Bacsoft
ELE035-0102	Circuit Breaker,2Pole,15A,250VAC,White
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
POL064-0027	Control Panel,First Assembly, EZ11
POL067-0013	Hinge, Printer Opening Door, 9"&11" E/M
POL067-0010	Door, Printer Opening, 11" E
POL067-0048	Window, Clear for Control Sys. Screen - Bacsoft
THE002-0061	Full Color graphical display 3.5"
BOL191-0020	Pan Head Machine Screw, Phillips, M3x10, St. St. A2, DIN7985
BOL194-0330	Blind Rivets 4x10, Head 7.5 mm, Aluminium, DIN7337 A
CTP201-0065	Relay, SSR,24-280VAC,25A,Contr. 3-32VDC, SPST-NO,Screw terminals
CTP201-0271	Relay Socket
CTP201-0272	Miniature PCB relay, coil 24VDC, contact 250VAC, 8A, 2 pole
THE039-0037	Connector, Ceramic, Double, No.2
ELE035-0009	Fuse, 5x20mm, Glass tube, 250V, 2A,F
ELE035-0144	Power Supply, 24VDC, 1A
ELE035-0144	Power Supply, 24VDC, 1A
NUT192-0217	Hex Nut, 8-32UNC, Brass, Plain
NUT192-0230	Nut,Clip-On,U-Style,4.8x20x13,0.7 thick.,Spring

Part No.	Description
	steel,Cadmium plated
NUT193-0291	Serrated Lock Washer External Teeth,M4(5/32),Steel,Zinc Pl.,DIN6798A
CTP201-0318	Fan, 24VDC, Dia. 80mmx20mm, 34.6CFM
ELE035-0192	BUZZER, PIEZO, CONTINUOUS, 85dB@30cm/3-28VDC
ELE039-1055	Female Connector, 6 Pole,5mm Pin Spacing with Coding Fingers Closed
ELE039-1056	Female Connector,8 Pole,5mm Pin Spacing with Coding Fingers Closed
SOL026-0077	Connector, 2 Contacts, 24V, Black, DIN43650, KA132L34B9, CNE

ELARA9P-230-W-D

Part No.	Description
WIR040-0003	ELECTRIC CABLE PLUG+SOCKET 10A, 250V, EUR
BOL191-0142	Pan Head Machine Screw, Phillips, 1/4UNCx3/4, St.St. A2
BOL191-0155	Pan Head Machine Screw, Phillips, M5x20, St. St. A2, DIN7985
SKR203-0009	Shock Absorber, Ø20.5x6.5x5.5mm, EP 70 DURO
FIT100-0805	Male Adapter, Elbow, 90°, 1/4"BSP For 6mm Hose
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
NUT193-0275	Plain Washer, 1X5.3X13, Stainless Steel A2
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2,DIN127B
PUM057-0055	Vacuum Pump, Diaphragm, 230V, UL, ASF Thomas
ARM100-0152	Heat Exchanger, 15/04x10x0127/16, Lordan
CTP201-0159	Fan, 230VAC, 150x172x38
FIL175-0069	Fan guard, 170 mm, NiCr plated, FGW-162A-5, Cooltron
FIT100-0805	Male Adapter, Elbow, 90°, 1/4"BSP For 6mm Hose
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2,DIN127B
BOL191-0142	Pan Head Machine Screw, Phillips, 1/4UNCx3/4, St.St. A2
SKR203-0006	Shock Absorber, SRB, 85/90 SHORE fot ULKA Pump.
NUT192-0155	Flange Hex Nut, 1/4UNC,Grade 2, Steel, Zinc Plated

Part No.	Description
NUT193-0269	Plain Washer Without Chamfer, M6, Stainless Steel A2, DIN125
PUM055-0021	Water Pump, 230V, 50Hz, Ulka
CMT411-0073	Reservoir, waste water, assembly, ELARA
BOL191-0082	Pan Head Machine Screw, Phillips, M4x16, St. St. A2, DIN7985
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2, DIN7985
CMT240-0020	Nut, 3/8"BSP, Water Reservoir
CMT240-0022	Washer, 30mm, Brass, Water Reservoir
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
FIT100-0216	Sleeve, Tube 1/4, Brass, 60C-4, Parker
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
FIT100-0806	Male Adapter, Elbow, 90°, 1/8"BSP For 6mm Hose
GAS080-0022	O-Ring, ID 2.84, W=2.62, 2-104 EPDM
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2, DIN127B
NUT193-0340	Teflon Ring for water tank
PIP411-0002	Coil, Cooling, ELARA
CMT411-0113	WATER LEVEL ELECTRODE
CMT411-0168	Reservoir, waste water, ELARA11/9 ,Drilling
RES411-0005	Reservoir, Overflow water Tank, Injection, Polycarbonate,
THE005-0016	Thermostat, Cut-Off, TY95-H, 155C, Campini
THE005-0019	Thermostat, Cut-Off, TY95-H, 170C, Campini
WHE070-0034	Leg, Adjustable, Front, 124020D/10, Haman.
WHE070-0035	Leg, Adjustable, Rear, 124020D, Haman
ELE039-0084	Cable Tie, Releasable, Nylon, 1042mm
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
GAS083-0015	Tube, Silicone, Clear, Translucent, 16*22 mm, 58 Shore A
BOL194-0341	Pan Head Tapping Screw, Philips, 4.8x19, Flat Point, DIN7981 FH

Part No.	Description
CMT196-0001	Bushing, water level electrode
CMT196-0004	Electrode, Water Level, Assembly, For Electronic TTA Length: 58mm
GAS086-0001	Tube, Teflon, Water Level Electrode
CMV196-0002	Electrode, Water Level, 58mm, TTA
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
NUT192-0191	Hex Nut, M4X3.2, Stainless Steel A2, DIN934
NUT193-0292	Serrated Lock Washers External Teeth, M6, Steel,Zinc Plated,DIN6798A
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
FIT100-0807	Straight Male O-RING - 1/4 M / Tube(8*6)
FIT100-0813	Straight Male O-RING - 1/4 M / Tube 3/16
PNE195-0161	Hex Socket Plug with O-Ring Viton,1/4",BSPxBSP,Brass,Nickel-Plated,
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
HEA016-0031	Heating Element, Immersion, Threaded, 230V, 1"x300, 2x1100W, St. St.
NUT192-0230	Nut,Clip-On,U-Style,4.8x20x13,0.7 thick.,Spring steel,Cadmium plated
NUT193-0271	Plain Washer Without Chamfer, M5 (3/16), Stainless Steel A2, DIN125
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2,DIN127B
PNE195-0161	Hex Socket Plug with O-Ring Viton,1/4",BSPxBSP,Brass,Nickel-Plated,
ELE036-0026	Limit Switch, Snap-Action,SPDT,20A, 250VAC, 2HP,Screw terminal
NUT192-0192	Hex Nut, M5X4, Stainless Steel A2, DIN934
NUT192-0235	Nut, for bulkhead, Brass, 7/16-24
NUT193-0275	Plain Washer, 1X5.3X13, Stainless Steel A2
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2,DIN127B
THE006-0006	Transducer, Pressure, 0-4 Bar abs
FIL175-0042	Filter, Air, 0.2 Micron, Model 50mm D
FIL175-0066	Filter, 0.2 micron, 92WM
FIL175-0087	Filter, Water, PVC Assy.

Part No.	Description
FIT100-0216	Sleeve, Tube 1/4, Brass, 60C-4, Parker
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
FIT100-0824	Coupling, Stud, Female, 1/4"BSP, Parallel, 5mm Tube, 01140513 Legris
GAS083-0002	Tube, Silicone, Clear, Translucent, 5x10mm, 58 Shore A
GAS083-0004	Tube, Silicone, Clear, Translucent, 7x13mm, 58 Shore A
GAS083-0015	Tube, Silicone, Clear, Translucent, 16*22 mm, 58 Shore A
GAS086-0017	Tube, Teflon, 6x8mm
THE005-0047	Switch, Pressure, TY85/B, Campini
PNE195-0161	Hex Socket Plug with O-Ring Viton, 1/4", BSPxBSP, Brass, Nickel-Plated,
CMT411-0097	Cover, Service, Bottom, Elara 11
BOL191-0091	Pan Head Machine Screw, Phillips, M4X20, St. St. A2, DIN7985
BOL191-0140	Pan Head Machine Screw, Phillips, M4x12, St. St. A2, DIN7985
CMT240-0020	Nut, 3/8"BSP, Water Reservoir
CMT240-0022	Washer, 30mm, Brass, Water Reservoir
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
GAS080-0022	O-Ring, ID 2.84, W=2.62, 2-104 EPDM
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2, DIN127B
NUT193-0340	Teflon Ring for water tank
CMT411-0113	WATER LEVEL ELECTRODE
CMT411-0167	Reservoir, Main Water Tank, Drilling, ELARA11/9
CMT411-0137	Holder, Safety Valve, ASME, 1/4" NPT
BOL191-0052	Hex Cap Screw, 1/4UNCx5/8, St. St. A2
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2, DIN7985
CMT411-0012	Pin Side, door Axis 9/11"
CMT411-0013	Pin Side, door locking 9/11"
SPR177-0024	Central clicking Spring- Elara 11
THE039-0036	Connector, Ceramic, No.3, Double

Part No.	Description
BOL191-0052	Hex Cap Screw, 1/4UNCx5/8, St. St. A2
BOL191-0238	Hex Cap Screw, M4x10, St. St. A2, DIN933
CMT411-0017	Hinge Plate Axle for ELARA 11", ELARA FLAT DOOR,EZ11,EZ9,2840ELXX
CMT411-0020	Stopper, door pin 9/11"
DOR411-0005	Hinge unit , Assembly 9/11"
BOL191-0240	Hex Socket Flat Cap Screw, M5x25, St. St. A2, DIN7991
CMT411-0011	Spacer for Hinge Unit For ELARA 11"
LOK411-0006	Door Axis 9/11"
SOL027-0003	Solenoid, Door Lock, TPGx12-C-24VDC, Guardian
SPR177-0004	Spring, Solenoid, Door Locking, 1730, 2340, 2540
LOK254-0001	Washer, locking solenoid pin, 1730, 2340, 2540
LOK411-0018	Solenoid pin -Elara
BOL191-0070	Flat Head Machine Screw, Phillips, M4x10, St. St. A2, DIN965
SPR177-0023	Spring, Tension, M3386 for 9"&11"
LOK411-0010	Sliding Sleeve for Elara 11".
LOK692-0039	Pin, Cotter, 2.0x16 mm
NUT193-0269	Plain Washer Without Chamfer, M6, Stainless Steel A2, DIN125
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0317	Spring Lock Washers With Square Ends, 1/4, St. St. A2, DIN127B
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2,DIN127B
CMT411-0101	Bushing for locker, Door 9/11"
CMT411-0102	Bushing for door axis 9/11"
BOL191-0240	Hex Socket Flat Cap Screw, M5x25, St. St. A2, DIN7991
LOK692-0039	Pin, Cotter, 2.0x16 mm
NUT193-0269	Plain Washer Without Chamfer, M6, Stainless Steel A2, DIN125
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0271	Plain Washer Without Chamfer, M5 (3/16), Stainless Steel A2, DIN125

Part No.	Description
NUT193-0283	Plain Washer, 1.2X7.45X16.1, Stainless Steel A2
NUT193-0317	Spring Lock Washers With Square Ends, 1/4, St. St. A2, DIN127B
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2, DIN127B
CMT411-0108	Spacer, Door 11" Adjustment 0.8mm
GAS080-0310	Gasket, Silicone, for Ele. Autoclave Flat Door 9"
NUT192-0253	Hex Nut, M6X5, Brass, DIN934
CMT098-0002	Nipple, Water level electrode
VLV170-0013	Housing, Cock, Drain
HEA010-0022	Heating Element, Band, 230V, 9-1/4"x12", 500W, Aluminum, ELARA9
SVL029-0119	Safety Valve, PED, 1/4"NPT MPTxDisch. H., Brass Body, Brass Seat, 2.8Bar
ELC258-0030	Sensor, Temperature, PT100, 5x45, Assy. (For EZ9/11)
THE003-0013	Sensor, Temperature, PT100, 5X70, TUT-001, MAMAB
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
GAS082-0022	Grommet, 22-35, Rubber 3144
GAS083-0015	Tube, Silicone, Clear, Translucent, 16*22 mm, 58 Shore A
POL067-0061	Funnel, Water, 9"/11"- Cut
POL067-0051	Funnel, Water, 9"/11"
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2, DIN7985
BOL194-0340	Pan Head Tapping Screw, Philips, 4.8x13, Flat Point, DIN7981 FH
BOL194-0341	Pan Head Tapping Screw, Philips, 4.8x19, Flat Point, DIN7981 FH
CMT240-0097	Handle, Tray, TTA 1730, 2340, 2540
VLV170-0014	Cock, Drain
FIL175-0060	Strainer, 40 mesh, St.St., w/Grip
GAS080-0007	Gasket, Silicone, ø119mm, Water Reservoir
GAS083-0004	Tube, Silicone, Clear, Translucent, 7x13mm, 58 Shore A
GAS084-0007	Drain PVC Tube 10x13
HLD409-0000	Support, Bottom, for door cover "9
HLD409-0001	Support, Upper, for door cover "9
NUT192-0217	Hex Nut, 8-32UNC, Brass, Plain

Part No.	Description
NUT192-0230	Nut, Clip-On, U-Style, 4.8x20x13, 0.7 thick., Spring steel, Cadmium plated
NUT193-0263	Plain Washer Without Chamfer, M6, Steel, Zinc Plated, DIN125-1A
NUT193-0271	Plain Washer Without Chamfer, M5 (3/16), Stainless Steel A2, DIN125
NUT193-0291	Serrated Lock Washer External Teeth, M4(5/32), Steel, Zinc Pl., DIN6798A
POL065-0006	Cover, Validation Port, 2340
POL067-0005	Dipstick, Water level, Tables
POL067-0011	Shield, Opening Handle, 9" & 11" E/M
POL067-0012	Cover, Opening Handle, 9" & 11" E/M
POL067-0054	Cover, Reservoir, Fill water, Elara
POL065-0092	Cover, Door, 9" , with company logo
SEA095-0117	Silicon Bag 5 mml
CMT258-0002	Disc, Cover door
BOL190-0012	Pan Head Machine Screw, Slotted, 5-40UNCx5/8, Brass, Nickel Plated
BOL190-0023	Pan Head Machine Screw, Slotted, 8-32UNCx5/8, Brass, Nickel Plated
THE002-0052	Panel printer, Thermal, 24 Columns
THE002-0066	Thermal paper for CUSTOM PLUSII printer roll 57mm d=50mm
THE039-0036	Connector, Ceramic, No.3, Double
WIR040-0179	Modular coupler, MH3101S-8821 Shielded Cat 5e, MH connectors
ELE039-0049	Connector, Ceramic, No.1, single
NUT192-0206	Hex Nut, 5-40UNC, Brass, Nickel Plated
NUT192-0217	Hex Nut, 8-32UNC, Brass, Plain
NUT193-0291	Serrated Lock Washer External Teeth, M4(5/32), Steel, Zinc Pl., DIN6798A
ELC258-0015	Sensor, Temperature, 5x100, 54400, Sontec, Assy. (For D line)
THE003-0002	Sensor, Temperature, PT100, 5x100, Sontec
GAS080-0022	O-Ring, ID 2.84, W=2.62, 2-104 EPDM
BOL190-0012	Pan Head Machine Screw, Slotted, 5-40UNCx5/8, Brass, Nickel Plated

Part No.	Description
WIR040-0015	Electric Socket 16A
NUT192-0206	Hex Nut, 5-40UNC, Brass, Nickel Plated
NUT192-0230	Nut,Clip-On,U-Style,4.8x20x13,0.7 thick.,Spring steel,Cadmium plated
ELE035-0092	Transformer, 2x115 / 2x12, 50/60 hz, TDB-100, Jishisheng
ELE035-0170	Fuse, 5x20mm, Glass tube, 250V, 5A, SB
CPN064-0031	Keyboard, EZ 9"&11", EZ/3870-D & Hor.-D
CTP200-0138	Board, I/O Extension, Bacsoft
CTP200-0140	Board, Main Control, Bacsoft
WIR040-0170	Cable kit for PLUSII-S-0004 Printer
WIR040-0179	Modular coupler, MH3101S-8821 Shielded Cat 5e, MH connectors
WIR040-0180	Cord, extension, USB 2.0 type A - panel F to M, 35 cm
ELC258-0012	Shield, Control Unit Boards, Bacsoft
ELE035-0102	Circuit Breaker,2Pole,15A,250VAC,White
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
POL064-0029	Control Panel, First Assembly, EZ9
POL067-0013	Hinge, Printer Opening Door, 9"&11" E/M
POL067-0048	Window, Clear for Control Sys. Screen - Bacsoft
THE002-0061	Full Color graphical display 3.5"
BOL191-0020	Pan Head Machine Screw, Phillips, M3x10, St. St. A2, DIN7985
BOL194-0330	Blind Rivets 4x10, Head 7.5 mm, Aluminium, DIN7337 A
CTP201-0065	Relay, SSR,24-280VAC,25A,Contr. 3-32VDC, SPST-NO,Screw terminals
CTP201-0271	Relay Socket
CTP201-0272	Miniature PCB relay, coil 24VDC, contact 250VAC, 8A, 2 pole
THE039-0037	Connector, Ceramic, Double, No.2
ELE035-0009	Fuse, 5x20mm, Glass tube, 250V, 2A,F
ELE035-0144	Power Supply, 24VDC, 1A
ELE035-0144	Power Supply, 24VDC, 1A
NUT192-0217	Hex Nut, 8-32UNC, Brass, Plain
NUT192-0230	Nut,Clip-On,U-Style,4.8x20x13,0.7 thick.,Spring

Part No.	Description
	steel,Cadmium plated
NUT193-0291	Serrated Lock Washer External Teeth,M4(5/32),Steel,Zinc Pl.,DIN6798A
CTP201-0318	Fan, 24VDC, Dia. 80mmx20mm, 34.6CFM
ELE035-0192	BUZZER, PIEZO, CONTINUOUS, 85dB@30cm/3-28VDC
ELE039-1055	Female Connector, 6 Pole,5mm Pin Spacing with Coding Fingers Closed
ELE039-1056	Female Connector,8 Pole,5mm Pin Spacing with Coding Fingers Closed
SOL026-0077	Connector, 2 Contacts, 24V, Black, DIN43650, KA132L34B9, CNE
BOL194-0340	Pan Head Tapping Screw, Philips, 4.8x13, Flat Point, DIN7981 FH

ELARA-i

Part Number	Description
BOL191-0052	Hex Cap Screw, 1/4UNCx5/8, St. St. A2
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2, DIN7985
CMT098-0002	Nipple, Water level electrode
CMT411-0012	Pin Side, door Axis 9/11"
CMT411-0013	Pin Side, door locking 9/11"
CMT411-0108	Spacer,Door Adjustment 0.8mm
GAS080-0310	Gasket, Silicone, for Ele. Autoclave Flat Door 9"
BOL191-0052	Hex Cap Screw, 1/4UNCx5/8, St. St. A2
BOL191-0238	Hex Cap Screw, M4x10, St. St. A2, DIN933
CMT411-0017	Hinge Plate Axle for ELARA 11", ELARA FLAT DOOR,EZ11,EZ9,2840ELXX
CMT411-0020	Stopper, door pin 9/11"
CMT411-0101	Bushing for locker, Door 9/11"
CMT411-0102	Bushing for door axis 9/11"
DOR411-0005	Hinge unit , Assembly 9/11"
BOL191-0240	Hex Socket Flat Cap Screw, M5x25, St. St. A2, DIN7991
CMT411-0011	Spacer for Hinge Unit For ELARA 11"
LOK411-0006	Door Axis 9/11"

Part Number	Description
LOK254-0001	Washer, locking solenoid pin, 1730, 2340, 2540
LOK411-0018	Solenoid pin -Elara
SOL027-0003	Solenoid, Door Lock, TPGx12-C-24VDC, Guardian
SPR177-0004	Spring, Solenoid, Door Locking, 1730, 2340, 2540
BOL191-0070	Flat Head Machine Screw, Phillips, M4x10, St. St. A2, DIN965
LOK411-0010	Sliding Sleeve for Elara 11".
SPR177-0023	Spring, Tension, M3386 for 9"&11"
LOK692-0039	Pin, Cotter, 2.0x16 mm
NUT193-0269	Plain Washer Without Chamfer, M6, Stainless Steel A2, DIN125
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0317	Spring Lock Washers With Square Ends, 1/4, St. St. A2, DIN127B
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2, DIN127B
BOL191-0240	Hex Socket Flat Cap Screw, M5x25, St. St. A2, DIN7991
LOK692-0039	Pin, Cotter, 2.0x16 mm
NUT192-0253	Hex Nut, M6X5, Brass, DIN934
NUT193-0269	Plain Washer Without Chamfer, M6, Stainless Steel A2, DIN125
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0271	Plain Washer Without Chamfer, M5 (3/16), Stainless Steel A2, DIN125
NUT193-0283	Plain Washer, 1.2X7.45X16.1, Stainless Steel A2
NUT193-0317	Spring Lock Washers With Square Ends, 1/4, St. St. A2, DIN127B
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2, DIN127B
SPR177-0024	Central clicking Spring- Elara 11
THE039-0036	Connector, Ceramic, No.3, Double
BOL191-0142	Pan Head Machine Screw, Phillips, 1/4UNCx3/4, St.St. A2
BOL191-0140	Pan Head Machine Screw, Phillips, M4x12, St. St. A2, DIN7985
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2,

Part Number	Description
	DIN7985
CMT240-0020	Nut, 3/8"BSP, Water Reservoir
CMT240-0022	Washer, 30mm, Brass, Water Reservoir
CMT411-0113	WATER LEVEL ELECTRODE
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
FIT100-0806	Male Adapter, Elbow, 90°, 1/8"BSP For 6mm Hose
GAS080-0022	O-Ring, ID 2.84, W=2.62, 2-104 EPDM
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2,DIN127B
NUT193-0340	Teflon Ring for water tank
PIP411-0002	Coil, Cooling, ELARA
RES411-0005	Reservoir, Overflow water Tank, Injection,Polycarbonate,
BOL191-0140	Pan Head Machine Screw, Phillips, M4x12, St. St. A2, DIN7985
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2, DIN7985
CMT240-0020	Nut, 3/8"BSP, Water Reservoir
CMT240-0022	Washer, 30mm, Brass, Water Reservoir
CMT411-0113	WATER LEVEL ELECTRODE
CMT411-0137	Holder, Safety Valve, ASME, 1/4" NPT
ELC258-0020	Switch, Float, Mini, PT14-2A, Riko Assy.
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
FIT100-0806	Male Adapter, Elbow, 90°, 1/8"BSP For 6mm Hose
GAS080-0022	O-Ring, ID 2.84, W=2.62, 2-104 EPDM
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2,DIN127B
NUT193-0340	Teflon Ring for water tank
SVL029-0119	Safety Valve, PED, 1/4"NPT MPTxDisch. H.,Brass Body,Brass Seat,2.8Bar

Part Number	Description
ARM100-0152	Heat Exchanger, 15/04x10x0127/16, Lordan
CTP201-0159	Fan, 230VAC, 150x172x38
FIL175-0069	Fan guard, 170 mm, NiCr plated, FGW-162A-5, Cooltron
FIT100-0805	Male Adapter, Elbow, 90°, 1/4"BSP For 6mm Hose
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2,DIN127B
CMT411-0097	Cover, Service, Bottom, Elara 11
GAS082-0022	Grommet, 22-35, Rubber 3144
GAS083-0015	Tube, Silicone, Clear, Translucent, 16*22 mm, 58 Shore A
POL067-0061	Funnel, Water, 9"/11"- Cut
POL067-0051	Funnel, Water, 9"/11"
ELC258-0030	Sensor, Temperature, PT100, 5x45, Assy.(For EZ9/11)
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
ELE039-0084	Cable Tie, Releasable, Nylon, 1042mm
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
GAS083-0015	Tube, Silicone, Clear, Translucent, 16*22 mm, 58 Shore A
HEA010-0026	HeatingElementBand,230V,9-1/4"x140mm,Bot 200W,Top900WCopp.ELARA9-i
ELE036-0026	Limit Switch, Snap-Action,SPDT,20A, 250VAC, 2HP,Screw terminal
NUT192-0192	Hex Nut, M5X4, Stainless Steel A2, DIN934
NUT192-0235	Nut, for bulkhead, Brass, 7/16-24
NUT193-0275	Plain Washer, 1X5.3X13, Stainless Steel A2
NUT193-0325	Spring Lock Washers With Square Ends, M5 (3/16), St. St. A2,DIN127B
VLV170-0013	Housing, Cock, Drain
CMT067-0014	Strainer 1/4BSP, Complete
FIL175-0046	Screen, 400 Micron, For Strainer 1/4"
GAS082-0008	Gasket, Silicon, 4mm, OD=28mm, ID=20mm for 1/4" strainer
FIL175-0042	Filter, Air, 0.2 Micron, Model 50mm D
FIT100-0226	Nut for Sleeve, Tube 1/4, Thread 7/16-24, Brass
FIT100-0803	1/4" Elbow Connection O-RING - F/M
FIT100-0805	Male Adapter, Elbow, 90°, 1/4"BSP For 6mm Hose

Part Number	Description
FIT100-0807	Straight Male O-RING - 1/4 M / Tube(8*6)
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
FIT100-0818	1/4"BSP T section O-RING - F/F/M
FIT100-0824	Coupling, Stud, Female, 1/4"BSP, Parallel, 5mm Tube, 01140513 Legris
GAS083-0002	Tube, Silicone, Clear, Translucent, 5x10mm, 58 Shore A
GAS083-0004	Tube, Silicone, Clear, Translucent, 7x13mm, 58 Shore A
GAS083-0015	Tube, Silicone, Clear, Translucent, 16*22 mm, 58 Shore A
GAS086-0017	Tube, Teflon, 6x8mm
NUT192-0235	Nut, for bulkhead, Brass, 7/16-24
ARM172-0026	Check Valve, Spring Disk, 1/4"BSP, St.St., MONDEO
FIT100-0807	Straight Male O-RING - 1/4 M / Tube(8*6)
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
FIT100-0813	Straight Male O-RING - 1/4 M / Tube 3/16
FIT100-0824	Coupling, Stud, Female, 1/4"BSP, Parallel, 5mm Tube, 01140513 Legris
THE006-0006	Transducer, Pressure, 0-4 Bar abs
FIT100-0802	1/4" T section O-RING - M/F/M
FIT100-0805	Male Adapter, Elbow, 90°, 1/4"BSP For 6mm Hose
FIT100-0807	Straight Male O-RING - 1/4 M / Tube(8*6)
FIT100-0809	Elbow Connection O-RING -1/4" BSP M / Tube(8*6)
FIT100-0812	Adaptor, Elbow, Orienting, Male 1/4", Tube 1/4
PNE195-0040	Silencer 1/4"
SOL026-0039	Valve, Solenoid, 2/2 way, 1/4"BSPx4.5, NC, 24VAC, 8W
PNE195-0161	Hex Socket Plug with O-Ring Viton, 1/4", BSPxBSP, Brass, Nickel-Plated,
PUM057-0027	Vacuum Pump, Diaphragm, 230V, Thomas
SVL029-0119	Safety Valve, PED, 1/4"NPT MPTxDisch. H., Brass Body, Brass Seat, 2.8Bar
THE005-0014	Thermostat, Cut-Off, TY95-H, 230C, Campini
THE005-0016	Thermostat, Cut-Off, TY95-H, 155C, Campini
WHE070-0034	Leg, Adjustable, Front, 124020D/10, Haman.
WHE070-0035	Leg, Adjustable, Rear, 124020D, Haman
BOL190-0012	Pan Head Machine Screw, Slotted, 5-40UNCx5/8, Brass, Nickel Plated

Part Number	Description
BOL190-0023	Pan Head Machine Screw, Slotted, 8-32UNCx5/8, Brass, Nickel Plated
BOL194-0340	Pan Head Tapping Screw, Philips, 4.8x13, Flat Point, DIN7981 FH
CPN064-0031	Keyboard, EZ 9" & 11", EZ/3870-D & Hor.-D
CTP200-0139	Board, I/O Control
CTP200-0140	Board, Main Control, Bacsoft
ELC258-0012	Shield, Control Unit Boards, Bacsoft
ELE035-0102	Circuit Breaker, 2 Pole, 15A, 250VAC, White
POL067-0013	Hinge, Printer Opening Door, 9" & 11" E/M
POL067-0048	Window, Clear for Control Sys. Screen - Bacsoft
THE002-0061	Full Color graphical display 3.5"
WIR040-0170	Cable kit for PLUSII-S-0004 Printer
WIR040-0180	Cord, extension, USB 2.0 type A - panel F to M, 35 cm
BOL190-0023	Pan Head Machine Screw, Slotted, 8-32UNCx5/8, Brass, Nickel Plated
CTP201-0065	Relay, SSR, 24-280VAC, 25A, Contr. 3-32VDC, SPST-NO, Screw terminals
CTP201-0271	Relay Socket
CTP201-0272	Miniature PCB relay, coil 24VDC, contact 250VAC, 8A, 2 pole
CTP201-0318	Fan, 24VDC, Dia. 80mmx20mm, 34.6CFM
ELE035-0144	Power Supply, 24VDC, 1A
ELE035-0144	Power Supply, 24VDC, 1A
ELE035-0174	Fuse, 5x20mm, Glass tube, 250V, 2A, SB/Time Lag
ELE035-0192	BUZZER, PIEZO, CONTINUOUS, 85dB@30cm/3-28VDC
NUT192-0217	Hex Nut, 8-32UNC, Brass, Plain
NUT192-0230	Nut, Clip-On, U-Style, 4.8x20x13, 0.7 thick., Spring steel, Cadmium plated
NUT193-0291	Serrated Lock Washer External Teeth, M4(5/32), Steel, Zinc Pl., DIN6798A
THE039-0037	Connector, Ceramic, Double, No.2
ELE039-1055	Female Connector, 6 Pole, 5mm Pin Spacing with Coding Fingers Closed
ELE039-1056	Female Connector, 8 Pole, 5mm Pin Spacing with Coding Fingers Closed
ELC258-0015	Sensor, Temperature, 5x100, 54400, Sontec, Assy. (For

Part Number	Description
	D line)
GAS080-0022	O-Ring, ID 2.84, W=2.62, 2-104 EPDM
THE003-0002	Sensor, Temperature, PT100, 5x100, Sontec
BOL190-0012	Pan Head Machine Screw, Slotted, 5-40UNCx5/8, Brass, Nickel Plated
ELC411-0050	Electric base for 9/11"
ELE035-0092	Transformer, 2x115 / 2x12, 50/60 hz, TDB-100, Jishisheng
ELE035-0170	Fuse, 5x20mm, Glass tube, 250V, 5A, SB
NUT192-0206	Hex Nut, 5-40UNC, Brass, Nickel Plated
NUT192-0230	Nut, Clip-On, U-Style, 4.8x20x13, 0.7 thick., Spring steel, Cadmium plated
THE005-0003	Thermostat, Safety, 180C, TY95/AC, Campini
THE005-0014	Thermostat, Cut-Off, TY95-H, 230C, Campini
WIR040-0015	Electric Socket 16A
ELE039-0049	Connector, Ceramic, No.1, single
NUT192-0206	Hex Nut, 5-40UNC, Brass, Nickel Plated
NUT192-0217	Hex Nut, 8-32UNC, Brass, Plain
NUT193-0291	Serrated Lock Washer External Teeth, M4(5/32), Steel, Zinc Pl., DIN6798A
THE039-0036	Connector, Ceramic, No.3, Double
WIR040-0179	Modular coupler, MH3101S-8821 Shielded Cat 5e, MH connectors
BOL191-0140	Pan Head Machine Screw, Phillips, M4x12, St. St. A2, DIN7985
BOL191-0158	Pan Head Machine Screw, Phillips, M4x8, St. St. A2, DIN7985
BOL194-0340	Pan Head Tapping Screw, Philips, 4.8x13, Flat Point, DIN7981 FH
BOL194-0341	Pan Head Tapping Screw, Philips, 4.8x19, Flat Point, DIN7981 FH
CMT240-0097	Handle, Tray, TTA 1730, 2340, 2540
CMT258-0002	Disc, Cover door
ELE039-0048	Terminal, male, brass, w/o isolation, PC1L18704LR, K.S. Terminals
GAS080-0007	Gasket, Silicone, ø119mm, Water Reservoir
GAS083-0004	Tube, Silicone, Clear, Translucent, 7x13mm, 58 Shore A

Part Number	Description
GAS084-0007	Drain PVC Tube 10x13
HLD409-0000	Support, Bottom, for door cover "9
HLD409-0001	Support, Upper, for door cover "9
NUT192-0230	Nut, Clip-On, U-Style, 4.8x20x13, 0.7 thick., Spring steel, Cadmium plated
NUT193-0270	Plain Washer Without Chamfer, M4 (5/32), Stainless Steel A2, DIN125
NUT193-0291	Serrated Lock Washer External Teeth, M4(5/32), Steel, Zinc Pl., DIN6798A
NUT193-0323	Spring Lock Washers With Square Ends, M4 (5/32), St. St. A2, DIN127B
POL065-0006	Cover, Validation Port, 2340
POL065-0092	Cover, Door, 9" , with company logo
POL067-0005	Dipstick, Water level, Tables
POL067-0011	Shield, Opening Handle, 9"&11" E/M
POL067-0012	Cover, Opening Handle, 9"&11" E/M
POL067-0054	Cover, Reservoir, Fill water, Elara
SEA095-0117	Silicon Bag 5 mml
VLV170-0014	Cock, Drain
WIR040-0003	ELECTRIC CABLE PLUG+SOCKET 10A, 250V, EUR

14 Pressure vs Temperature for Saturated Steam

psia	InHg	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
1.5	2.95	114.5	0.10	10	45.8	17.1	2.4	219.7	1.18	117.9	104.3
2.2	4.44	129.3	0.15	15	54.1	17.2	2.5	219.9	1.18	118.6	104.4
2.9	5.90	140.2	0.20	20	60.1	17.2	2.5	220.1	1.19	118.6	104.5
3.6	7.39	149.1	0.25	25	65.0	17.3	2.6	220.3	1.19	119.3	104.6
4.4	8.86	156.4	0.30	30	68.9	17.4	2.7	220.5	1.20	120.0	104.7
5.1	10.34	162.9	0.35	35	72.7	17.4	2.7	220.6	1.20	120.0	104.8
5.8	11.81	168.6	0.40	40	75.9	17.5	2.8	220.8	1.20	120.4	104.9
6.5	13.30	173.8	0.45	45	78.8	17.5	2.8	221.0	1.21	120.7	105.0

psia	InHg	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
7.3	14.76	178.4	0.50	50	81.3	17.6	2.9	221.2	1.21	121.3	105.1
						17.7	3.0	221.4	1.22	122.0	105.2
psia	psig	°F	Bar	kPa	°C	17.7	3.0	221.5	1.22	122.0	105.3
14.7	0.0	212.0	1.01	101.3	100.0	17.8	3.1	221.7	1.23	122.7	105.4
14.8	0.1	212.2	1.02	101.7	100.1	17.8	3.1	221.9	1.23	122.7	105.5
14.8	0.1	212.4	1.02	102.1	100.2	17.9	3.2	222.1	1.23	123.4	105.6
14.9	0.2	212.5	1.02	102.4	100.3	18.0	3.3	222.3	1.24	124.1	105.7
14.9	0.2	212.7	1.03	102.8	100.4	18.0	3.3	222.4	1.24	124.1	105.8
15.0	0.3	212.9	1.03	103.2	100.5	18.1	3.4	222.6	1.24	124.7	105.9
15.0	0.3	213.1	1.04	103.6	100.6	18.2	3.5	222.8	1.25	125.1	106.0
15.1	0.4	213.3	1.04	104.0	100.7	18.2	3.5	223.0	1.26	125.5	106.1
15.1	0.4	213.4	1.04	104.3	100.8	18.3	3.6	223.2	1.26	126.0	106.2
15.2	0.5	213.6	1.05	104.7	100.9	18.3	3.6	223.3	1.26	126.2	106.3
15.2	0.5	213.8	1.05	105.1	101.0	18.4	3.7	223.5	1.27	126.8	106.4
15.3	0.6	214.0	1.05	105.4	101.1	18.5	3.8	223.7	1.27	127.2	106.5
15.4	0.7	214.2	1.06	105.8	101.2	18.5	3.8	223.9	1.28	127.7	106.6
15.4	0.7	214.3	1.06	106.2	101.3	18.6	3.9	224.1	1.28	128.1	106.7
15.5	0.8	214.5	1.07	106.6	101.4	18.6	3.9	224.2	1.29	128.5	106.8
15.5	0.8	214.7	1.07	106.9	101.5	18.7	4.0	224.4	1.29	129.0	106.9
15.6	0.9	214.9	1.07	107.3	101.6	18.8	4.1	224.6	1.29	129.6	107.0
15.6	0.9	215.1	1.08	107.7	101.7	18.9	4.2	224.8	1.30	129.9	107.1
15.7	1.0	215.2	1.08	108.1	101.8	18.9	4.2	225.0	1.30	130.4	107.2
15.7	1.0	215.4	1.08	108.4	101.9	19.0	4.3	225.1	1.31	130.8	107.3
15.8	1.1	215.6	1.09	108.8	102.0	19.0	4.3	225.3	1.31	131.3	107.4
15.8	1.1	215.8	1.09	109.2	102.1	19.1	4.4	225.5	1.32	131.7	107.5
15.9	1.2	216.0	1.10	109.6	102.2	19.2	4.5	225.7	1.32	132.2	107.6
16.0	1.3	216.3	1.10	110.0	102.4	19.3	4.6	225.9	1.33	132.6	107.7
16.1	1.4	216.5	1.11	110.7	102.5	19.3	4.6	226.0	1.33	133.1	107.8
16.1	1.4	216.7	1.11	111.1	102.6	19.4	4.7	226.2	1.34	133.5	107.9
16.2	1.5	216.9	1.12	111.5	102.7	19.4	4.7	226.4	1.34	134.0	108.0
16.2	1.5	217.0	1.12	111.9	102.8	19.5	4.8	226.6	1.34	134.4	108.1
16.3	1.6	217.2	1.12	112.3	102.9	19.6	4.9	226.8	1.35	134.9	108.2
16.4	1.7	217.4	1.13	112.7	103.0	19.6	4.9	226.9	1.35	135.3	108.3
16.4	1.7	217.6	1.13	113.1	103.1	19.7	5.0	227.1	1.36	135.8	108.4

psia	InHg	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
16.5	1.8	217.8	1.14	113.5	103.2	19.8	5.1	227.3	1.36	136.2	108.5
16.5	1.8	217.9	1.14	114.0	103.3	19.8	5.1	227.5	1.37	136.7	108.6
16.6	1.9	218.1	1.14	114.3	103.4	19.9	5.2	227.7	1.37	137.1	108.7
16.6	1.9	218.3	1.15	114.7	103.5	19.9	5.2	227.8	1.38	137.6	108.8
16.7	2.0	218.5	1.15	115.1	103.6	20.0	5.3	228.0	1.38	138.1	108.9
16.8	2.1	218.7	1.16	115.6	103.7	20.1	5.4	228.2	1.39	138.5	109.0
16.8	2.1	218.8	1.16	116.0	103.8	20.2	5.5	228.4	1.39	139.0	109.1
16.9	2.2	219.0	1.16	116.3	103.9	20.3	5.6	228.6	1.39	139.5	109.2
16.9	2.2	219.2	1.17	116.7	104.0	20.3	5.6	228.7	1.40	140.0	109.3
17.0	2.3	219.4	1.17	117.1	104.1	20.4	5.7	228.9	1.40	140.5	109.4
17.1	2.4	219.6	1.18	117.5	104.2	20.4	5.7	229.1	1.41	140.9	109.5
20.5	5.8	229.3	1.41	141.4	109.6	24.6	9.9	239.2	1.70	169.7	115.1
20.6	5.9	229.5	1.42	142.0	109.7	24.7	10.0	239.4	1.70	170.2	115.2
20.6	5.9	229.6	1.42	142.4	109.8	24.7	10.0	239.5	1.71	170.8	115.3
20.7	6.0	229.8	1.43	142.9	109.9	24.8	10.1	239.7	1.71	171.3	115.4
20.8	6.1	230.0	1.43	143.3	110.0	24.9	10.2	239.9	1.72	171.8	115.5
20.9	6.2	230.2	1.44	143.9	110.1	25.0	10.3	240.1	1.72	172.4	115.6
21.0	6.3	230.4	1.44	144.3	110.2	25.1	10.4	240.3	1.73	173.1	115.7
21.0	6.3	230.5	1.45	144.8	110.3	25.2	10.5	240.4	1.74	173.6	115.8
21.1	6.4	230.7	1.45	145.3	110.4	25.3	10.6	240.6	1.74	174.1	115.9
21.1	6.4	230.9	1.46	145.8	110.5	25.3	10.6	240.8	1.75	174.7	116.0
21.2	6.5	231.1	1.46	146.2	110.6	25.4	10.7	241.0	1.75	175.3	116.1
21.3	6.6	231.3	1.47	146.7	110.7	25.5	10.8	241.2	1.76	175.9	116.2
21.3	6.6	231.4	1.47	147.2	110.8	25.6	10.9	241.3	1.76	176.4	116.3
21.4	6.7	231.6	1.48	147.7	110.9	25.7	11.0	241.5	1.77	177.0	116.4
21.5	6.8	231.8	1.48	148.2	111.0	25.8	11.1	241.7	1.78	177.6	116.5
21.6	6.9	232.0	1.49	148.6	111.1	25.9	11.2	241.9	1.78	178.2	116.6
21.7	7.0	232.2	1.49	149.6	111.2	25.9	11.2	242.1	1.79	178.7	116.7
21.7	7.0	232.3	1.50	149.6	111.3	26.0	11.3	242.2	1.79	179.3	116.8
21.8	7.1	232.5	1.50	150.3	111.4	26.1	11.4	242.4	1.80	180.0	116.9
21.9	7.2	232.7	1.51	151.0	111.5	26.2	11.5	242.6	1.80	180.5	117.0
21.9	7.2	232.9	1.51	151.0	111.6	26.3	11.6	242.8	1.81	181.1	117.1
22.0	7.3	233.1	1.52	151.7	111.7	26.4	11.7	243.0	1.82	181.6	117.2
22.1	7.4	233.2	1.52	152.2	111.8	26.4	11.7	243.1	1.82	182.2	117.3

psia	InHg	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
22.1	7.4	233.4	1.53	152.7	111.9	26.5	11.8	243.3	1.83	182.8	117.4
22.2	7.5	233.6	1.53	153.2	112.0	26.6	11.9	243.5	1.83	183.4	117.5
22.3	7.6	233.8	1.54	153.8	112.1	26.7	12.0	243.7	1.84	184.0	117.6
22.4	7.7	234.0	1.54	154.3	112.2	26.8	12.1	243.9	1.85	184.5	117.7
22.4	7.7	234.1	1.55	154.8	112.3	26.8	12.1	244.0	1.85	185.1	117.8
22.5	7.8	234.3	1.55	155.3	112.4	26.9	12.2	244.2	1.86	185.7	117.9
22.6	7.9	234.5	1.56	155.8	112.5	27.0	12.3	244.4	1.86	186.3	118.0
22.7	8.0	234.7	1.56	156.3	112.6	27.1	12.4	244.6	1.87	186.9	118.1
22.8	8.1	234.9	1.57	156.8	112.7	27.2	12.5	244.8	1.88	187.5	118.2
22.8	8.1	235.0	1.57	157.3	112.8	27.3	12.6	244.9	1.88	188.2	118.3
22.9	8.2	235.2	1.58	157.9	112.9	27.4	12.7	245.1	1.89	188.8	118.4
23.0	8.3	235.4	1.58	158.4	113.0	27.5	12.8	245.3	1.89	189.4	118.5
23.1	8.4	235.6	1.59	158.9	113.1	27.6	12.9	245.5	1.90	190.0	118.6
23.1	8.4	235.8	1.59	159.4	113.2	27.7	13.0	245.7	1.91	190.6	118.7
23.2	8.5	235.9	1.60	159.9	113.3	27.7	13.0	245.8	1.91	191.2	118.8
23.3	8.6	236.1	1.60	160.4	113.4	27.8	13.1	246.0	1.92	191.8	118.9
23.4	8.7	236.3	1.61	160.0	113.5	27.9	13.2	246.2	1.92	192.4	119.0
23.4	8.7	236.5	1.62	161.5	113.6	28.0	13.3	246.4	1.93	193.0	119.1
23.5	8.8	236.7	1.62	162.1	113.7	28.1	13.4	246.6	1.94	193.7	119.2
23.6	8.9	236.8	1.63	162.6	113.8	28.2	13.5	246.7	1.94	194.3	119.3
23.7	9.0	237.0	1.63	163.1	113.9	28.3	13.6	246.9	1.95	194.9	119.4
23.7	9.0	237.2	1.64	163.7	114.0	28.4	13.7	247.1	1.95	195.5	119.5
23.8	9.1	237.4	1.64	164.2	114.1	28.5	13.8	247.3	1.96	196.1	119.6
23.9	9.2	237.6	1.65	164.8	114.2	28.6	13.9	247.5	1.97	196.7	119.7
24.0	9.3	237.7	1.65	165.3	114.3	28.6	13.9	247.6	1.97	197.3	119.8
24.1	9.4	237.9	1.66	165.9	114.4	28.7	14.0	247.8	1.98	197.9	119.9
24.1	9.4	238.1	1.66	166.4	114.5	28.8	14.1	248.0	1.99	198.5	120.0
24.2	9.5	238.3	1.67	167.0	114.6	28.9	14.2	248.2	1.99	199.2	120.1
24.3	9.6	238.5	1.67	167.5	114.7	29.0	14.3	248.4	2.00	199.8	120.2
24.4	9.7	238.6	1.68	168.0	114.8	29.1	14.4	248.5	2.00	200.5	120.3
24.4	9.7	238.8	1.69	168.6	114.9	29.2	14.5	248.7	2.01	201.1	120.4
24.5	9.8	239.0	1.69	169.1	115.0	29.3	14.6	248.9	2.02	201.8	120.5
29.4	14.7	249.1	2.02	202.4	120.6	34.6	19.9	258.6	2.39	238.7	125.9
29.5	14.8	249.3	2.03	203.1	120.7	34.7	20.0	258.8	2.39	239.4	126.0

psia	InHg	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
29.5	14.8	249.4	2.04	203.7	120.8	34.8	20.1	259.0	2.40	240.2	126.1
29.6	14.9	249.6	2.04	204.4	120.9	34.9	20.2	259.2	2.41	240.9	126.2
29.7	15.0	249.8	2.05	205.0	121.0	35.0	20.3	259.3	2.42	241.6	126.3
29.8	15.3	250.0	2.06	205.7	121.1	35.1	20.4	259.5	2.42	242.3	126.4
29.9	15.4	250.2	2.06	206.3	121.2	35.3	20.6	259.7	2.43	243.1	126.5
30.0	15.5	250.3	2.07	207.0	121.3	35.4	20.7	259.9	2.44	243.8	126.6
30.1	15.6	250.5	2.08	207.6	121.4	35.5	20.8	260.1	2.45	244.5	126.7
30.3	15.6	250.7	2.08	208.3	121.5	35.6	20.9	260.2	2.45	245.3	126.8
30.5	15.8	250.9	2.09	208.9	121.6	35.7	21.0	260.4	2.46	246.0	126.9
30.5	15.8	251.1	2.10	209.6	121.7	35.8	21.1	260.6	2.47	246.8	127.0
30.6	15.9	251.2	2.10	210.2	121.8	35.9	21.2	260.8	2.48	247.6	127.1
30.7	16.0	251.4	2.11	210.8	121.9	36.0	21.3	261.0	2.48	248.3	127.2
30.8	16.1	251.6	2.11	211.5	122.0	36.1	21.4	261.1	2.49	249.1	127.3
31.0	16.3	251.8	2.12	212.1	122.1	36.2	21.5	261.3	2.50	249.9	127.4
31.0	16.3	252.0	2.13	212.8	122.2	36.5	21.8	261.5	2.51	250.6	127.5
31.1	16.4	252.1	2.13	213.5	122.3	36.5	21.8	261.7	2.51	251.4	127.6
31.2	16.5	252.3	2.14	214.2	122.4	36.6	21.9	261.9	2.52	252.2	127.7
31.3	16.6	252.5	2.15	214.8	122.5	36.7	22.0	262.0	2.53	252.9	127.8
31.4	16.7	252.7	2.16	215.2	122.6	36.8	22.1	262.2	2.54	253.7	127.9
31.5	16.8	252.9	2.16	216.2	122.7	36.9	22.2	262.4	2.54	254.5	128.0
31.6	16.9	253.0	2.17	216.9	122.8	37.0	22.3	262.6	2.55	255.2	128.1
31.7	17.0	253.2	2.18	217.6	122.9	37.1	22.4	262.8	2.56	256.0	128.2
31.8	17.1	253.4	2.18	218.3	123.0	37.2	22.5	262.9	2.57	256.8	128.3
31.8	17.1	253.6	2.19	218.9	123.1	37.4	22.7	263.1	2.58	257.5	128.4
31.9	17.2	253.8	2.20	219.6	123.2	37.5	22.8	263.3	2.58	258.3	128.5
32.0	17.3	253.9	2.20	220.3	123.3	37.6	22.9	263.5	2.59	259.1	128.6
32.1	17.4	254.1	2.21	221.0	123.4	37.7	23.0	263.7	2.60	259.8	128.7
32.2	17.5	254.3	2.22	221.7	123.5	37.8	23.1	263.8	2.61	260.6	128.8
32.3	17.6	254.5	2.22	222.4	123.6	37.9	23.2	264.0	2.61	261.4	128.9
32.4	17.7	254.7	2.23	223.1	123.7	38.0	23.3	264.2	2.62	262.2	129.0
32.5	17.8	254.8	2.24	223.7	123.8	38.1	23.4	264.4	2.63	263.0	129.1
32.6	17.9	255.0	2.24	224.4	123.9	38.3	23.6	264.6	2.64	263.8	129.2
32.6	17.9	255.2	2.25	225.1	124.0	38.4	23.7	264.7	2.65	264.6	129.3
32.7	18.0	255.4	2.26	225.8	124.1	38.5	23.8	264.9	2.65	265.4	129.4

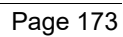
psia	InHg	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
32.8	18.1	255.6	2.26	226.5	124.2	38.6	23.9	265.1	2.66	266.2	129.5
32.9	18.2	255.7	2.27	227.2	124.3	38.7	24.0	265.3	2.67	267.0	129.6
33.0	18.3	255.9	2.28	227.9	124.4	38.8	24.1	265.5	2.68	267.8	129.7
33.1	18.4	256.1	2.29	228.6	124.5	39.0	24.3	265.6	2.69	268.6	129.8
33.3	18.6	256.3	2.29	229.3	124.6	39.1	24.4	265.8	2.69	269.4	129.9
33.4	18.7	256.5	2.30	230.0	124.7	39.2	24.5	266.0	2.70	270.3	130.0
33.5	18.8	256.6	2.31	230.7	124.8	39.3	24.6	266.2	2.71	271.1	130.1
33.6	18.9	256.8	2.31	231.5	124.9	39.4	24.7	266.4	2.72	271.9	130.2
33.7	19.0	257.0	2.32	232.2	125.0	39.5	24.8	266.5	2.73	272.7	130.3
33.8	19.1	257.2	2.33	232.9	125.1	39.7	25.0	266.7	2.73	273.5	130.4
33.9	19.2	257.4	2.34	233.6	125.2	39.8	25.1	266.9	2.74	274.3	130.5
34.0	19.3	257.5	2.34	234.4	125.3	39.9	25.2	267.1	2.75	275.1	130.6
34.1	19.4	257.7	2.35	235.1	125.4	40.0	25.3	267.3	2.76	275.9	130.7
34.2	19.5	257.9	2.36	235.8	125.5	40.1	25.4	267.4	2.77	276.7	130.8
34.3	19.6	258.1	2.37	236.5	125.6	40.3	25.6	267.6	2.78	277.5	130.9
34.4	19.7	258.3	2.37	237.3	125.7	40.4	25.7	267.8	2.78	278.3	131.0
34.5	19.8	258.4	2.38	238.0	125.8	40.5	25.8	268.0	2.79	279.1	131.1

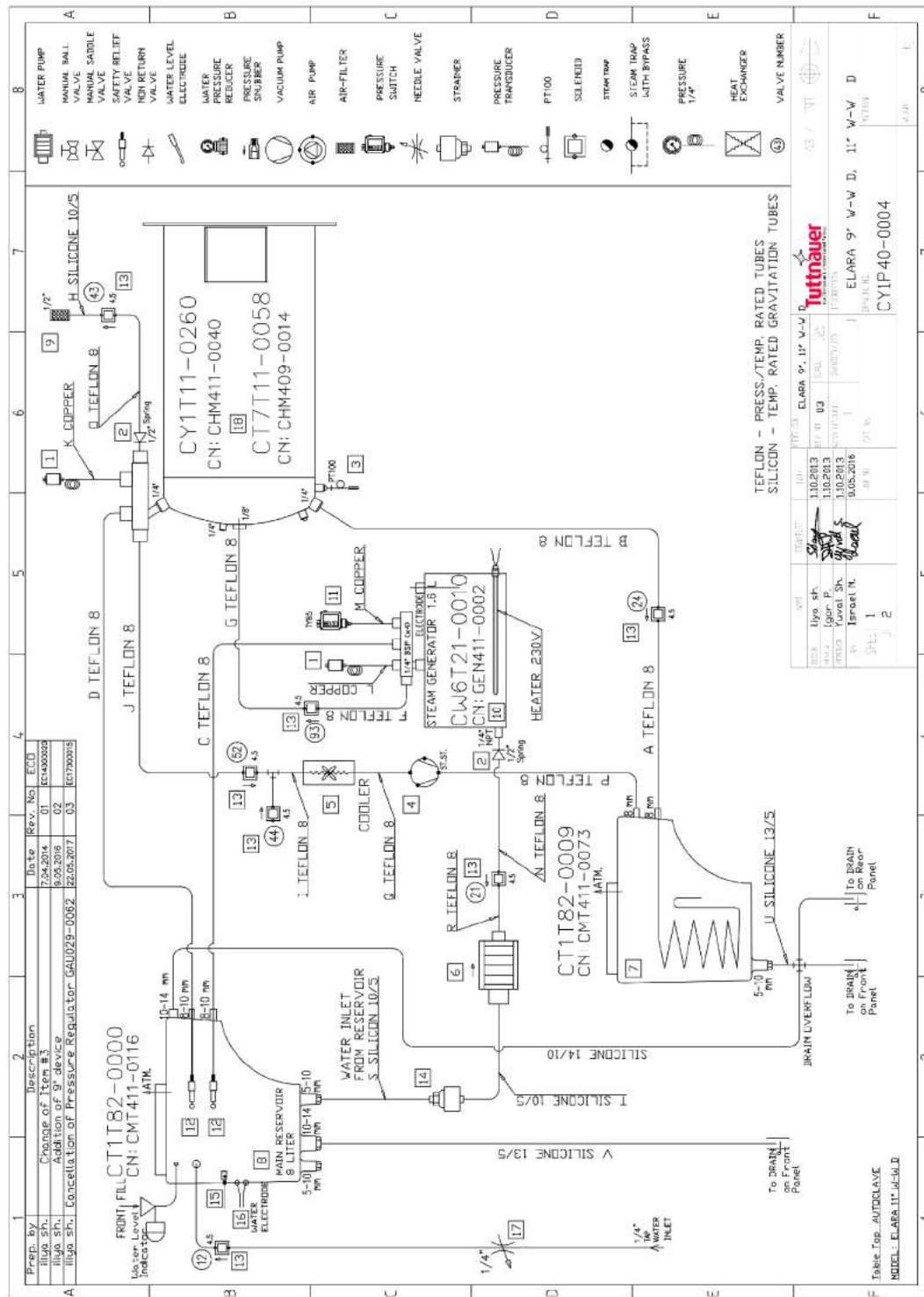
°C	kPa	Bar	°F	psig	psia	°C	kPa	Bar	°F	psig	psia
135.2	315.0	3.15	275.4	31.2	45.7	131.2	280.0	2.80	268.2	25.9	40.6
135.3	315.9	3.16	275.5	31.3	45.8	131.3	280.9	2.81	268.3	26.0	40.7
135.4	316.8	3.17	275.7	31.5	45.9	131.4	281.7	2.82	268.5	26.2	40.9
135.5	317.7	3.18	275.9	31.6	46.1	131.5	282.6	2.83	268.7	26.3	41.0
135.6	318.6	3.19	276.1	31.7	46.2	131.6	283.4	2.83	268.9	26.4	41.1
135.7	319.5	3.20	276.2	31.9	46.3	131.7	284.3	2.84	269.1	26.5	41.2
135.8	320.5	3.20	276.4	32.0	46.5	131.8	285.1	2.85	269.2	26.7	41.4
135.9	321.4	3.21	276.6	32.1	46.6	131.9	286.0	2.86	269.4	26.8	41.5
136.0	322.4	3.22	276.8	32.3	46.8	132.0	286.8	2.87	269.6	26.9	41.6
136.1	323.3	3.23	277.0	32.4	46.9	132.1	287.7	2.88	269.8	27.0	41.7
136.2	324.3	3.24	277.2	32.6	47.0	132.2	288.5	2.89	270.0	27.1	41.8
136.3	325.2	3.25	277.3	32.7	47.2	132.3	289.4	2.89	270.1	27.3	42.0
136.4	326.2	3.26	277.5	32.8	47.3	132.4	290.2	2.90	270.3	27.4	42.1
136.5	327.1	3.27	277.7	33.0	47.4	132.5	291.1	2.91	270.5	27.5	42.2
136.6	328.1	3.28	277.9	33.1	47.6	132.6	291.9	2.92	270.7	27.6	42.3

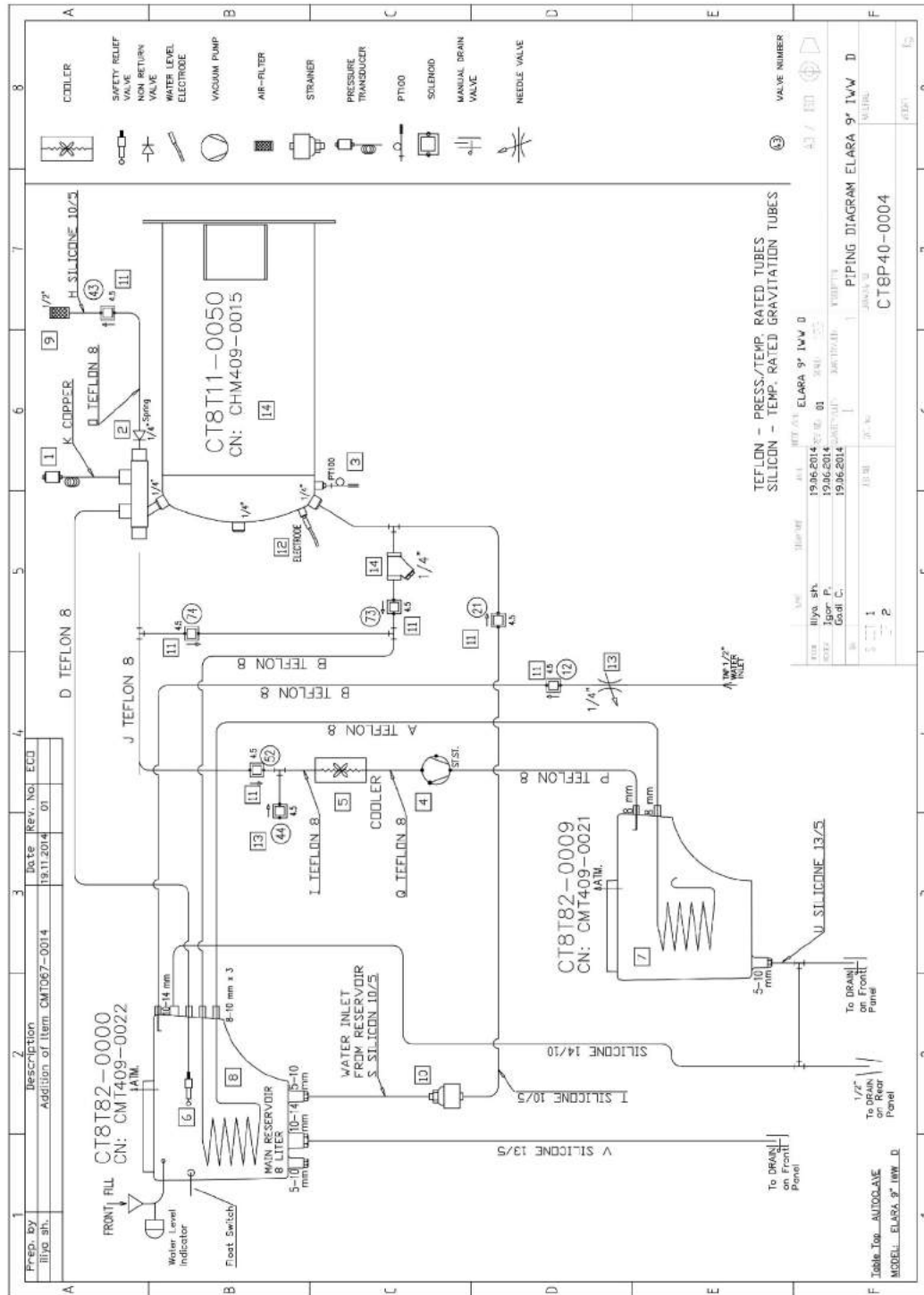
136.7	329.0	3.29	278.1	33.2	47.7	132.7	292.8	2.93	270.9	27.8	42.5
136.8	330.0	3.30	278.2	33.3	47.9	132.8	293.6	2.94	271.0	27.9	42.6
136.9	330.9	3.31	278.4	33.3	48.0	132.9	294.5	2.94	271.2	28.0	42.7
137.0	331.9	3.32	278.6	33.4	48.1	133.0	295.4	2.95	271.4	28.1	42.8
137.1	332.8	3.33	278.8	33.6	48.3	133.1	296.2	2.96	271.6	28.3	43.0
137.2	333.8	3.34	279.0	33.7	48.4	133.2	297.1	2.97	271.8	28.4	43.1
137.3	334.7	3.35	279.1	33.8	48.5	133.3	297.9	2.98	271.9	28.5	43.2
137.4	335.6	3.36	279.3	34.0	48.7	133.4	298.8	2.99	272.1	28.6	43.3
137.5	336.6	3.37	279.5	34.1	48.8	133.5	299.7	3.00	272.3	28.8	43.5
137.6	337.5	3.38	279.7	34.3	49.0	133.6	300.6	3.01	272.5	28.9	43.6
137.7	338.5	3.38	279.9	34.4	49.1	133.7	301.5	3.01	272.7	29.0	43.7
137.8	339.4	3.39	280.0	34.5	49.2	133.8	302.4	3.02	272.8	29.2	43.9
137.9	340.4	3.40	280.2	34.7	49.4	133.9	303.3	3.03	273.0	29.3	44.0
138.0	341.4	3.41	280.4	34.8	49.5	134.0	304.2	3.04	273.2	29.4	44.1
138.1	342.4	3.42	280.6	35.0	49.7	134.1	305.1	3.05	273.4	29.5	44.2
138.2	343.4	3.43	280.8	35.1	49.8	134.2	306.0	3.06	273.6	29.7	44.4
138.3	344.4	3.44	280.9	35.2	49.9	134.3	306.9	3.07	273.7	29.8	44.5
138.4	345.4	3.45	281.1	35.4	50.1	134.4	307.8	3.08	273.9	29.9	44.6
138.5	346.4	3.46	281.3	35.5	50.2	134.5	308.7	3.09	274.1	30.1	44.8
138.6	347.4	3.47	281.5	35.7	50.4	134.6	309.6	3.10	274.3	30.2	44.9
138.7	348.4	3.48	281.7	35.9	50.6	134.7	310.5	3.10	274.5	30.3	45.0
138.8	349.4	3.49	281.8	36.0	50.7	134.8	311.4	3.11	274.6	30.5	45.2
138.9	350.4	3.50	282.0	36.1	50.8	134.9	312.3	3.12	274.8	30.6	45.3
139.0	351.4	3.51	282.2	36.3	51.0	135.0	313.2	3.13	275.0	30.7	45.4
139.1	352.4	3.52	282.4	36.4	51.1	135.1	314.1	3.14	275.2	31.1	45.6

Legend:

psia — absolute pressure in psi
 Psig — gauge pressure in psi
 kPa — absolute pressure in kilo-Pascal
 InHg — pressure (vacuum) in inch-Mercury





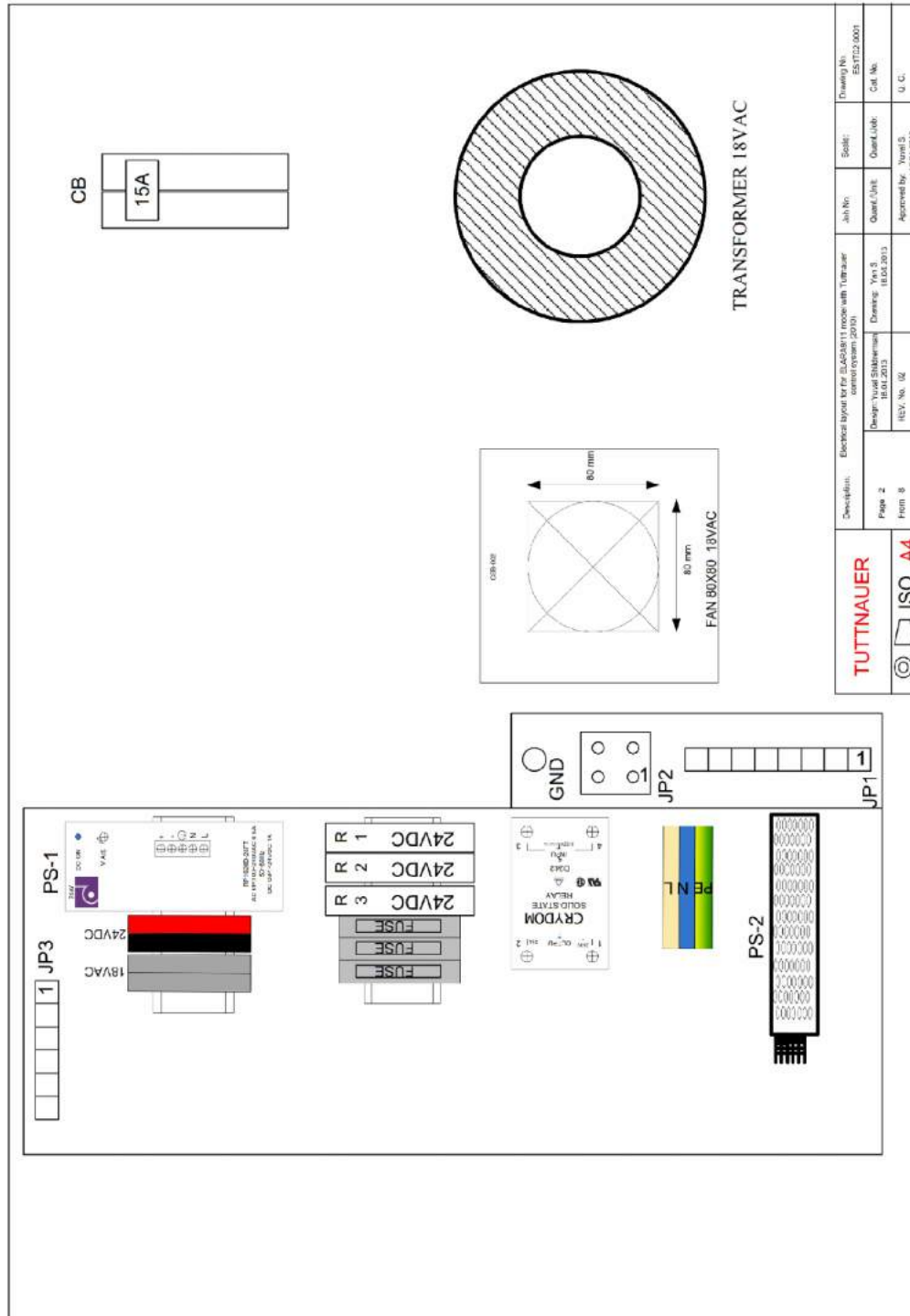


15.3 Electric Diagram (ELARA-D)

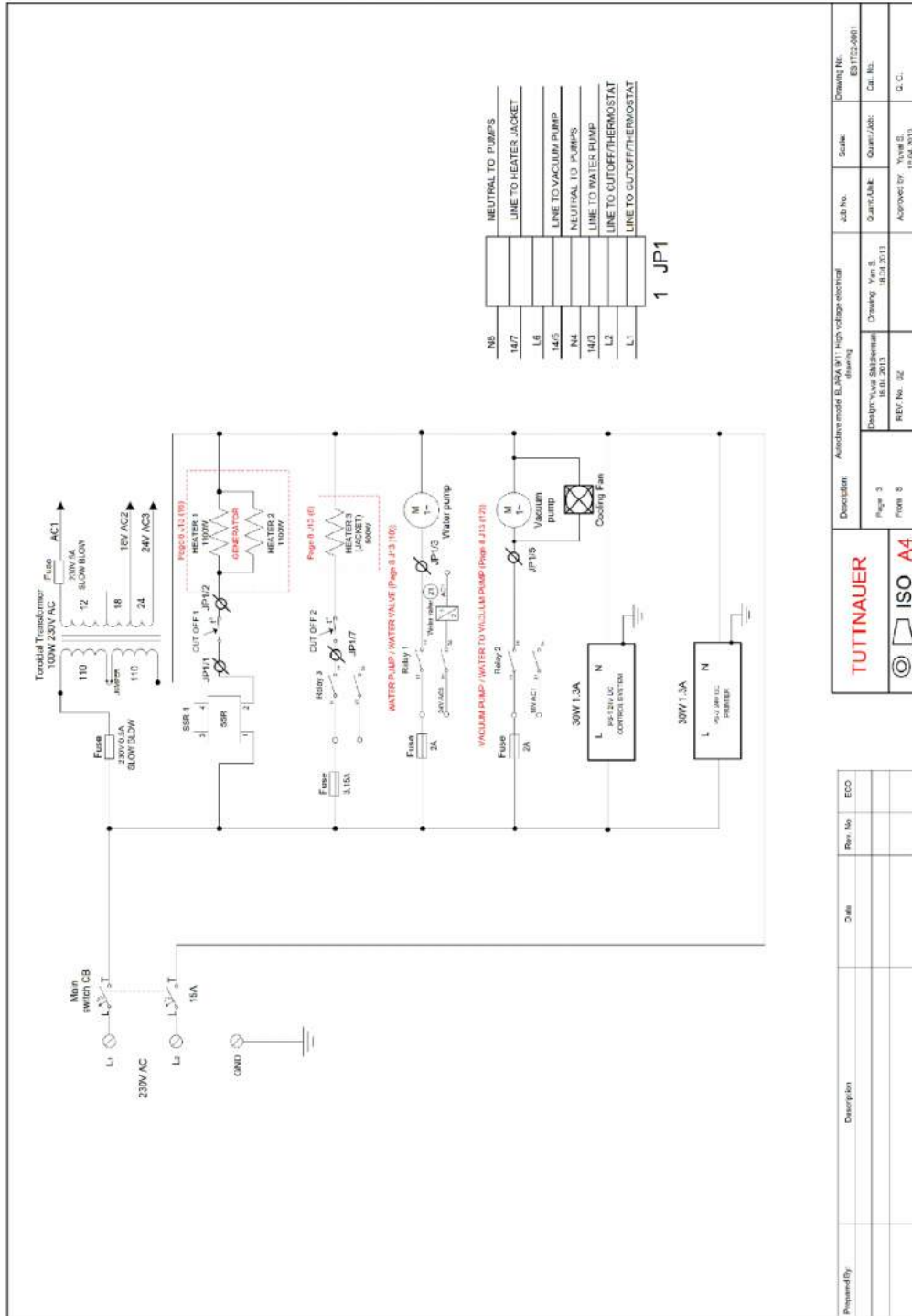
List of Drawings for autoclave model ELARA9/11
with Tuttnauer control system 2010

No.	Drawing No.	Description	Rev.	Quantity
1	ES1T02-0001	List of Drawings	02	1
2	ES1T02-0001	Electrical layout for ELARA 9/11 model with Tuttnauer control system	02	1
3	ES1T02-0001	High voltage electrical drawing ELARA 9/11	02	1
4	ES1T02-0001	Schematic I/O & MAIN Boards	02	1
5	ES1T02-0001	ELARA 9/11 ANALOG INPUTS TUTTNAUER CONTROL SYSTEM	02	1
6	ES1T02-0001	ELARA 9/11 ANALOG OUTPUTS TUTTNAUER CONTROL SYSTEM	02	1
7	ES1T02-0001	ELARA 9/11 DIGITAL INPUTS TUTTNAUER CONTROL SYSTEM	02	1
8	ES1T02-0001	ELARA 9/11 DIGITAL OUTPUTS TUTTNAUER CONTROL SYSTEM	02	1

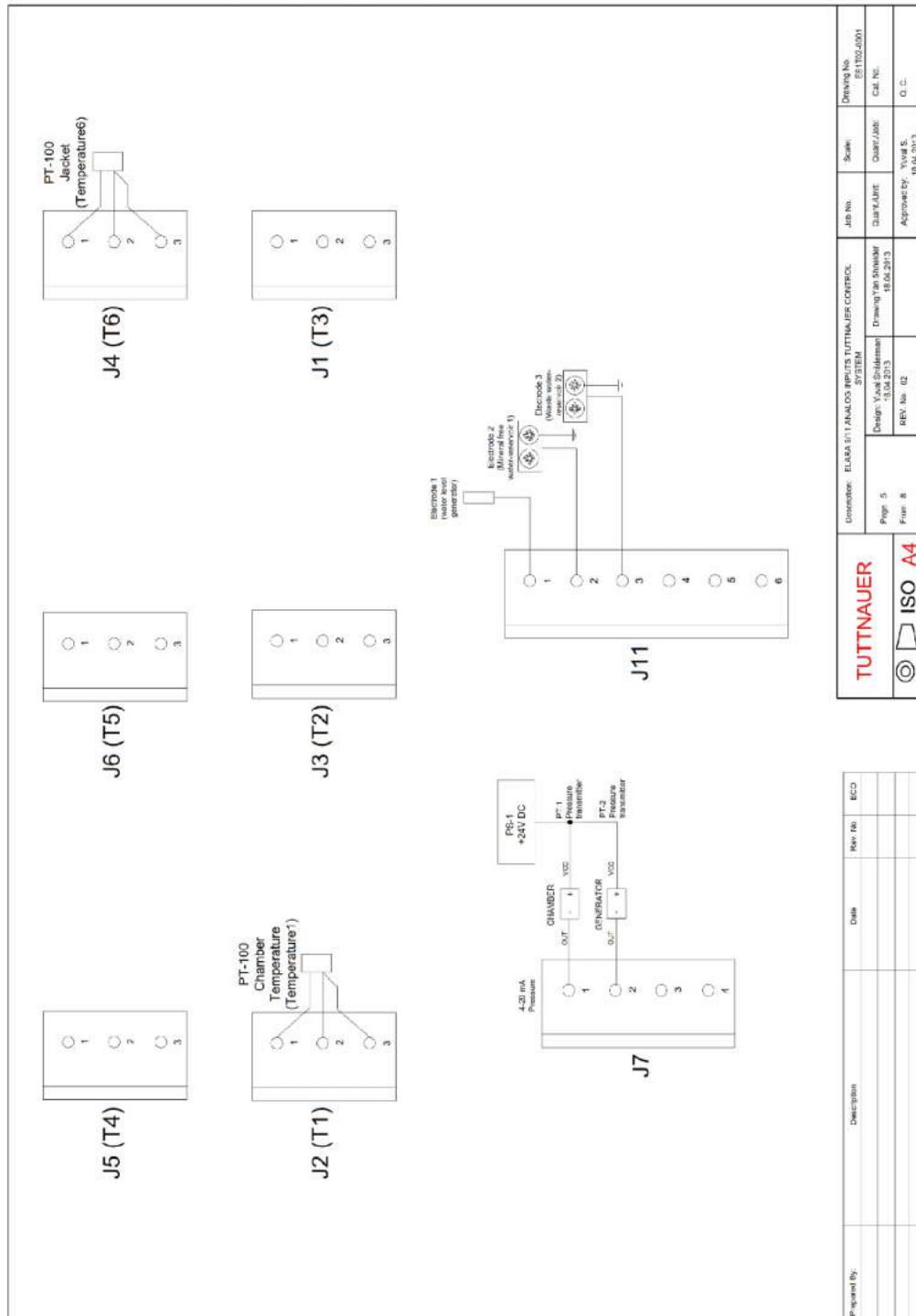
Prepared By:	Description	Unit:	Rev. No.	ECO	TUTTNAUER	Description: List of Drawings for autoclave model ELARA 9/11 with Tuttnauer control system 2010		Job No.	Scale:	Drawing No.
						Page: 1	Design/Drawn: 18.04.2013			
						From: 6	Rev. No. 02	Quantity:	Quantity:	ES1T02-0001
								Approved by:	Quantity:	Col. No.
								18.04.2013	Quantity:	C. C.



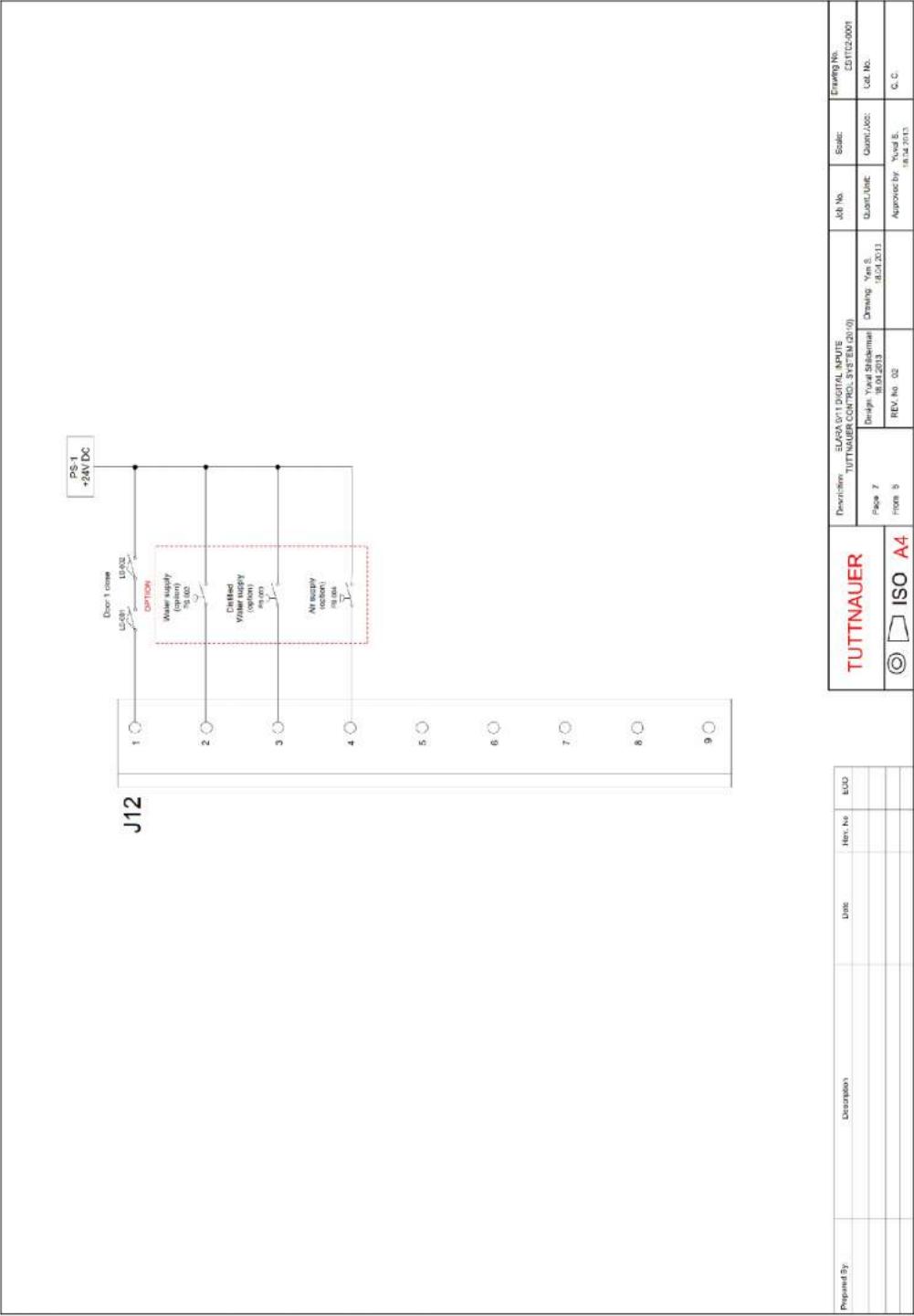
TUTTNAUER		Description:		John No:	Scale:	Drawing No:
Page 2		Electrical layout for the SLAS-1011 module with Tuttnauer control system (2010).		Quant./Unit:	Quant./Unit:	ES-1722-0001
From 8		Design: Yusuf Staldermann		Quant./Unit:	Quant./Unit:	Cal. No.
		REV. No. 02		REV. No. 02	REV. No. 02	U. C.
				Approved by:	Yusef S.	18.04.2013

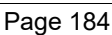






Prepared By:	Description:	Date:	Rev. No:	ECO:		UNIONVIEW ELARI ANALOG OUTPUTS TUTTNAUER CONTROL SYSTEM (25/15)				Job No.	Scale:	Drawing No. EST102.001	
						Page: 6	Design: Yon S. 18.04.2013	Drawing: Yon S. 18.04.2013	Quantity:				Call No.
						From: 8	REV. No.: 02	Approved By: Yon S. 18.04.2013	Q. C.				
J16 J17													



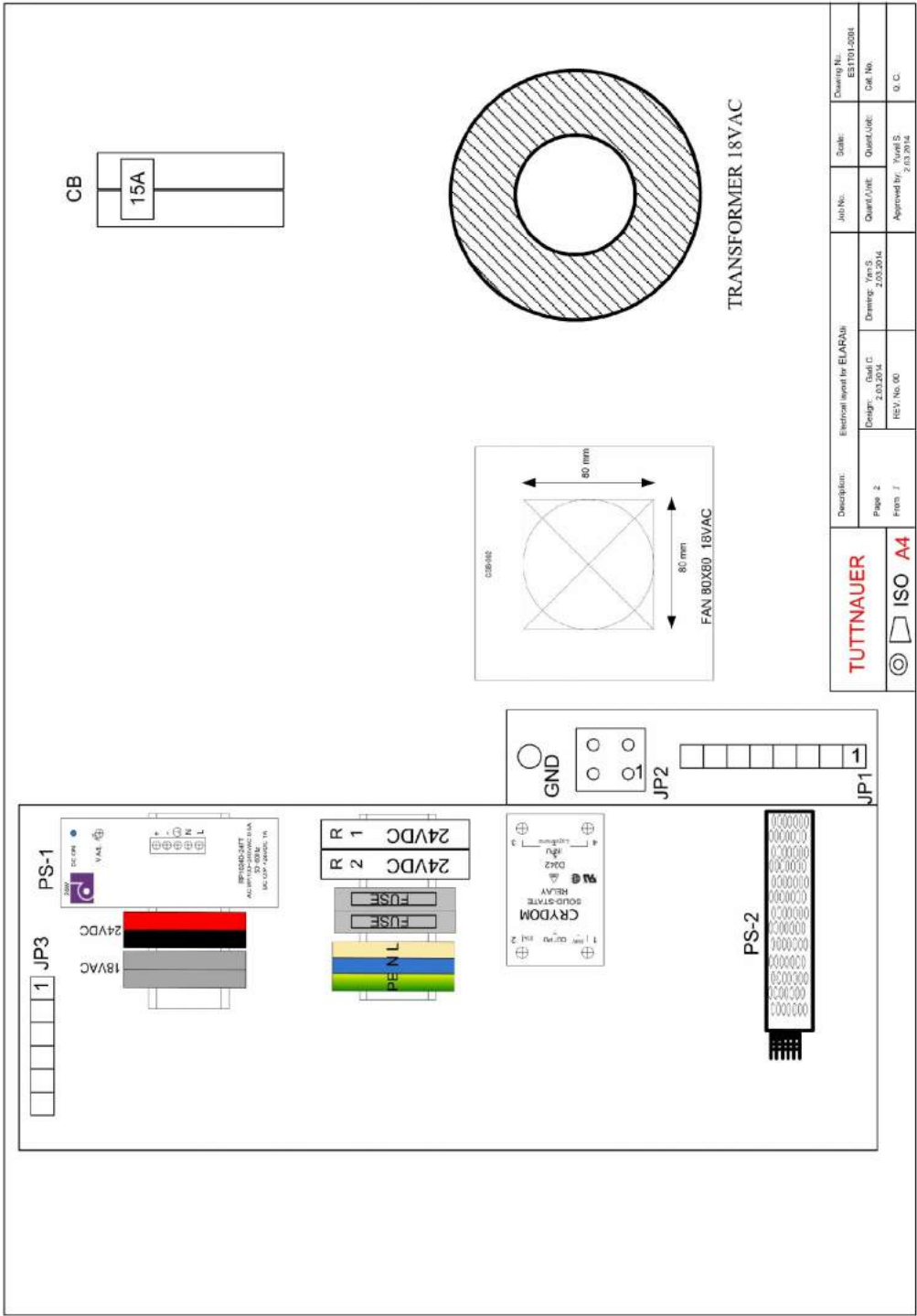


15.4 Electric Diagram (ELARA-i)

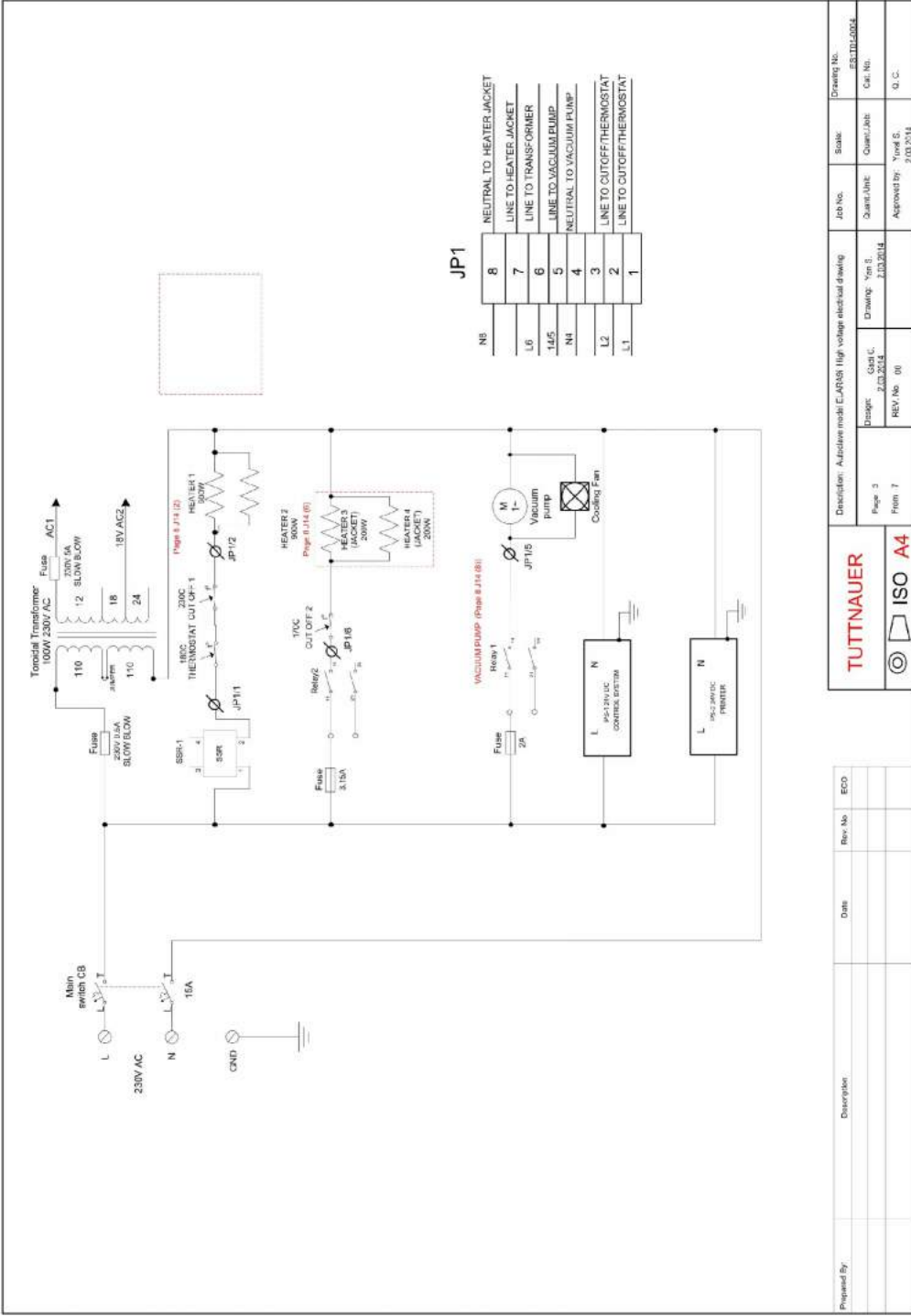
List of Drawings for autoclave model ELARA9i

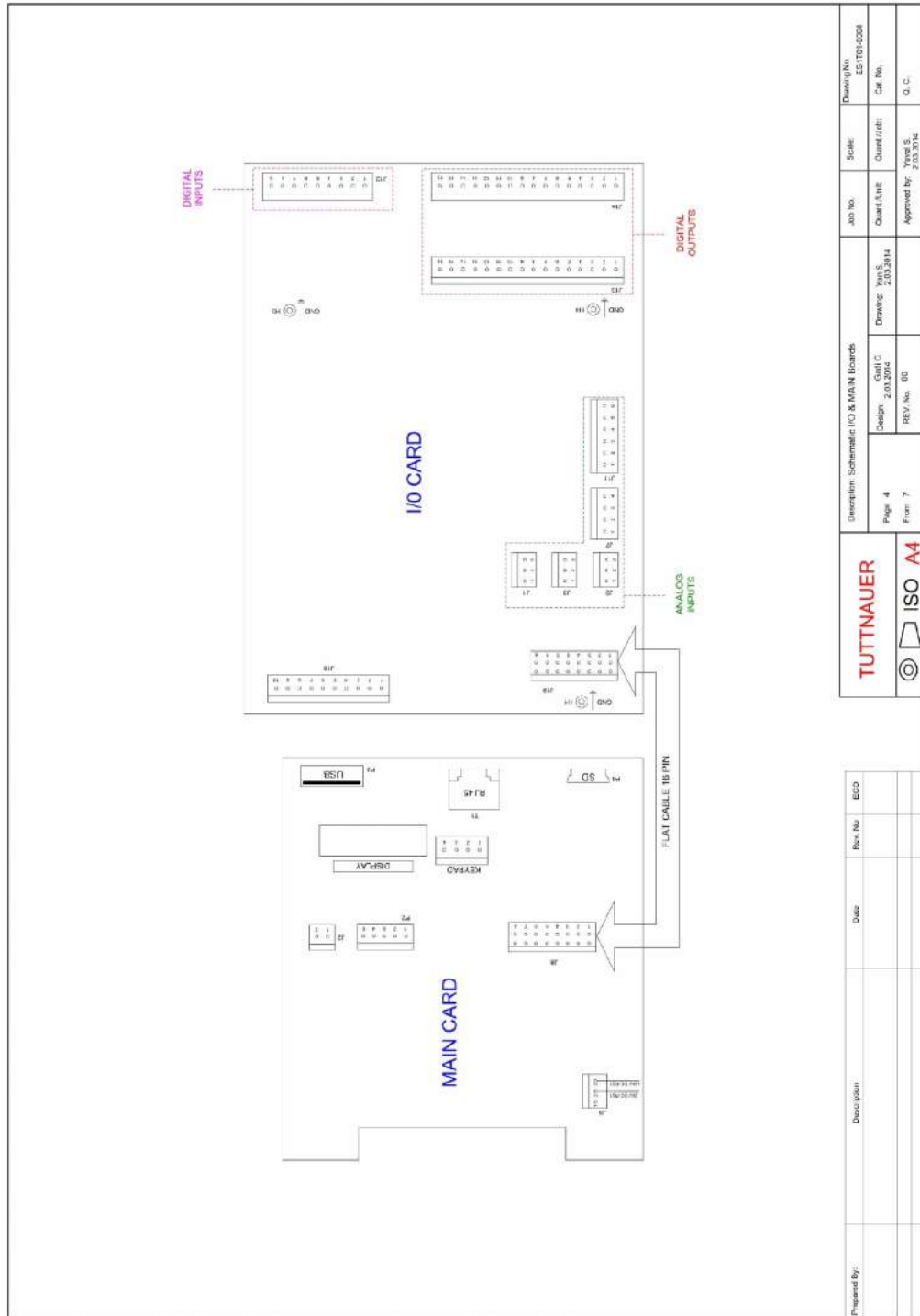
No.	Drawing No.	Description	Rev.	Quantity
1	ES1T01-0004	List of Drawings	00	1
2	ES1T01-0004	Electrical layout for for ELARA9i model with Tuttnauer control system	00	1
3	ES1T01-0004	High voltage electrical drawing ELARA9i	00	1
4	ES1T01-0004	Schematic I/O & MAIN Boards	00	1
5	ES1T01-0004	ELARA9i ANALOG INPUTS TUTTNAUER CONTROL SYSTEM	00	1
6	ES1T01-0004	ELARA9i DIGITAL INPUTS TUTTNAUER CONTROL SYSTEM	00	1
7	ES1T01-0004	ELARA9i DIGITAL OUTPUTS TUTTNAUER CONTROL SYSTEM	00	1

Prepared By:	Description	Date:	Rev. No	ECO	TUTTNAUER	Description: List of Drawings for autoclave model ELARA9i		Job No.	Scale:	Drawing No. ES1T01-0004	
						Page 1 From 7	Design: 2.03.2014 REV No. 00				Drawing Year S. 2.03.2014
					 ISO A4						

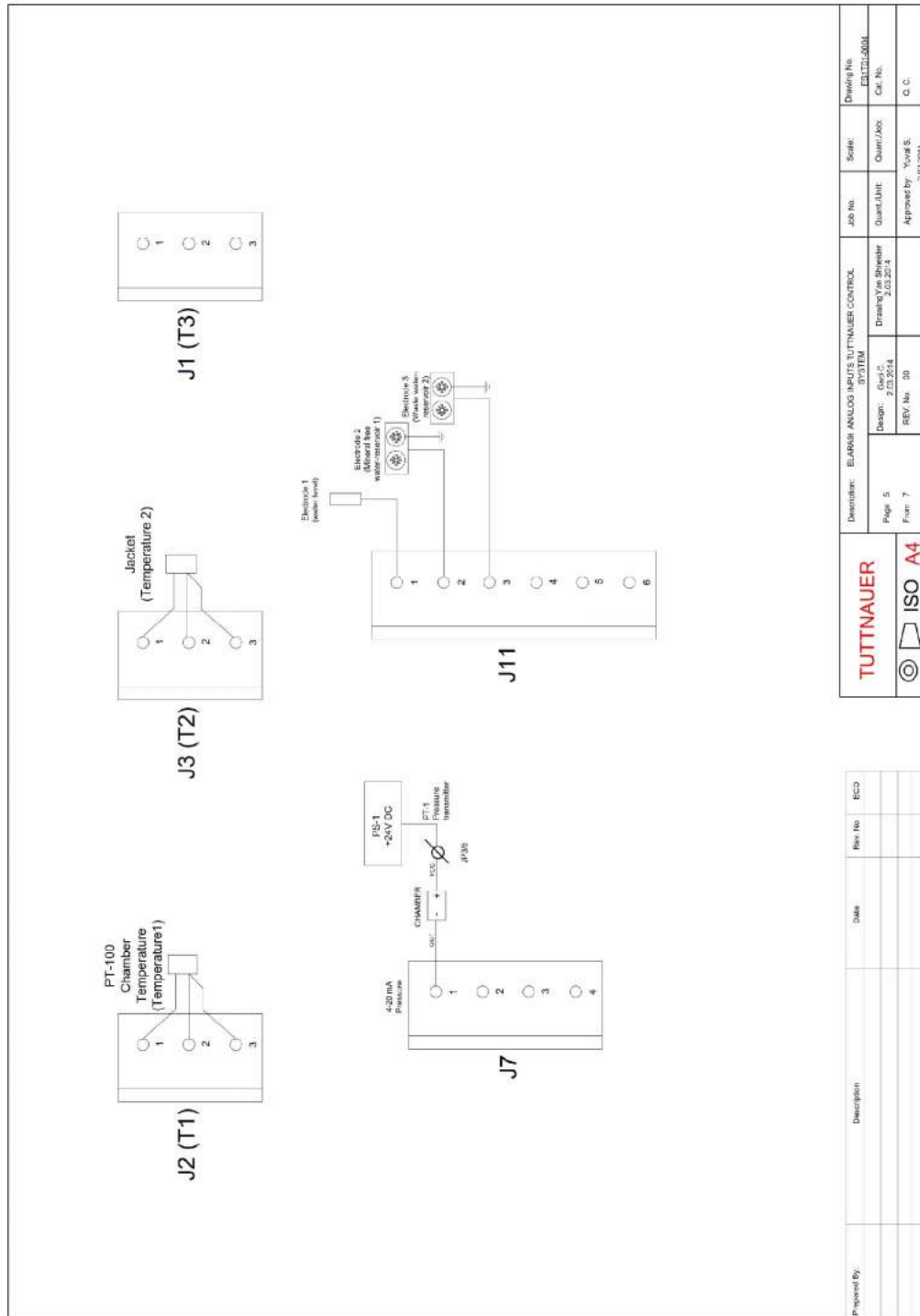


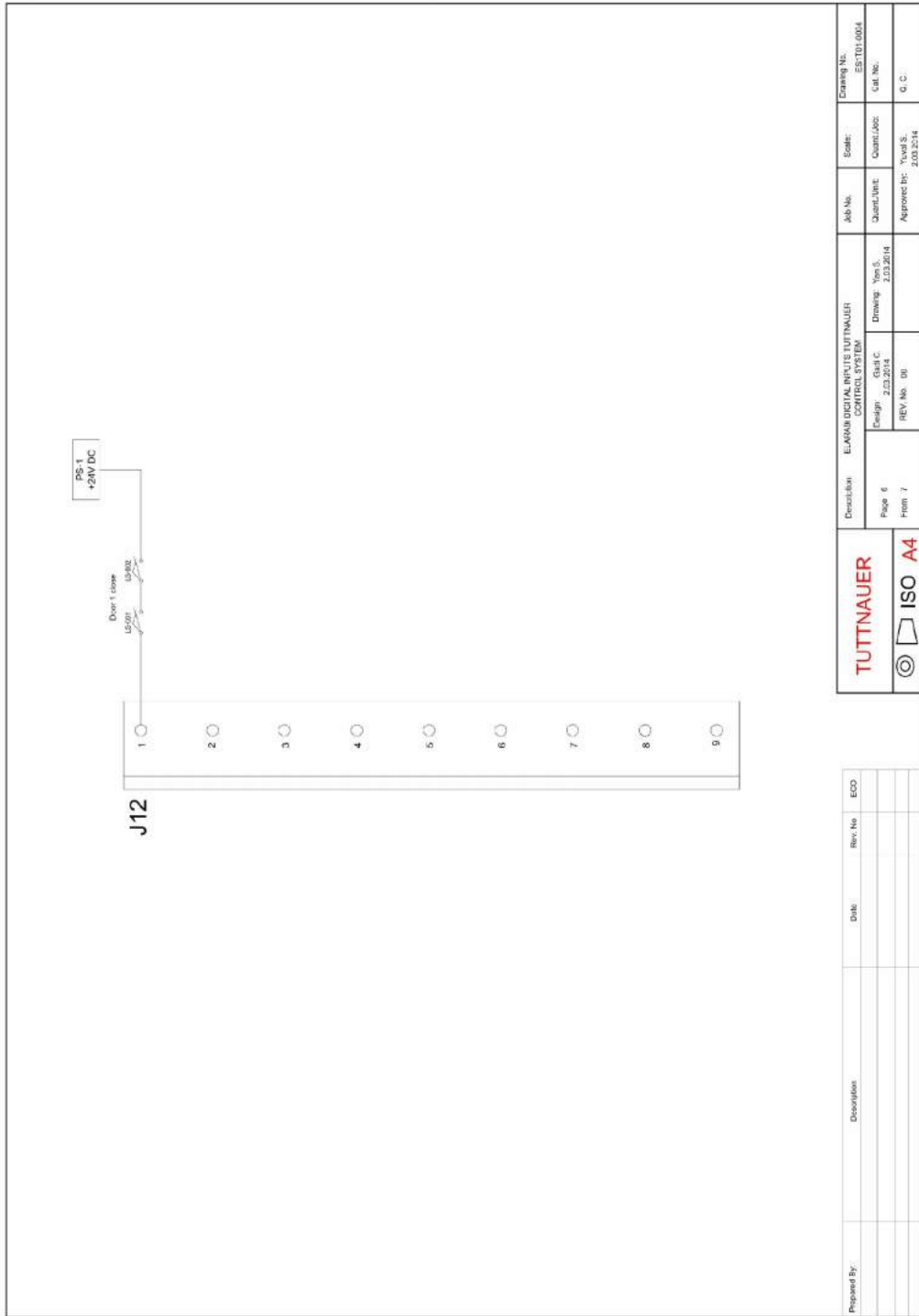
TUTTNAUER		Electrical layout for ELAP/SL		Job No.	Scale:	Drawing No.
Page 2		Design: 2.03.2014		Quart./Unit:	Quart./Unit:	ESTD-0004
From 1		REV. No. 00		Approved by: Yusef S.	Call. No.	
				2.03.2014	Q. C.	



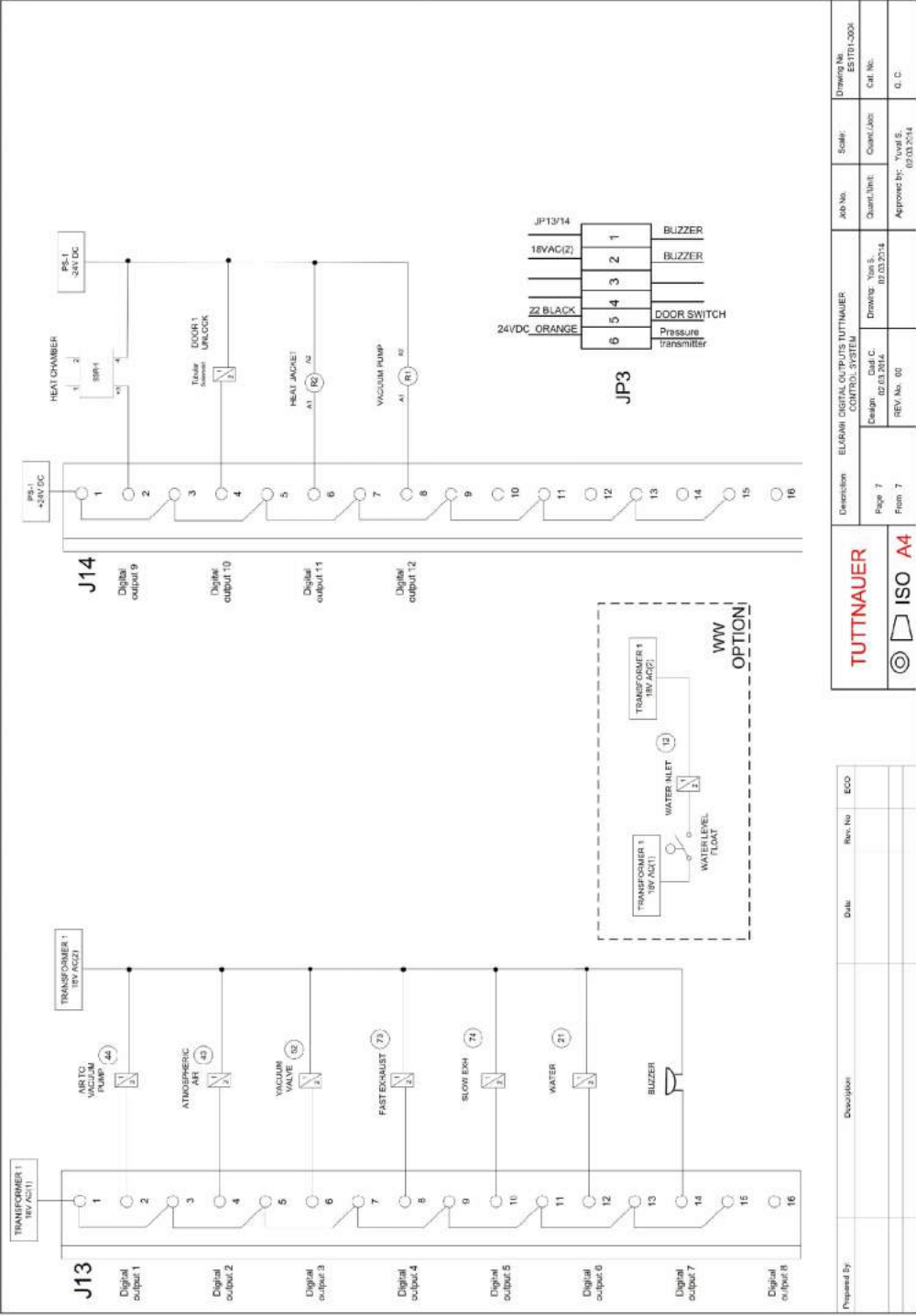


Prepared By:	Design (John)	Date:	Rev. No:	ECO:	TUTTNAUER	Description: Schematic: I/O & MAIN Boards Page: 4 From: 7	Job No.: Scale: Quant. Unit: Quant. (alt): Approved By:	Drawing No.: E3100-0004 Cal. No.: Total S.S.: 2/23/2014 Q. C.:
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Prepared By:	Description	Date	Rev. No	ECO		Description		Drawing	Year 3	Quant./Unit	Job No.	Scale:	Drawing No.	EST/DT/0004
						Page 6	Of 6							
						From 1	REV No. 00							



Prepared By:	Description		BLANKI DIGITAL OUTPUTS TUTTNAUER COMPTD. SYSTEM		Job No.	Scale:	Drawing No.
	Page 7	From 7	Design	Drawn	Quant./Unit	Quant./Unit	EST101-300
			REV No. 00	REV No. 00	Approved By: "Total S."		Q. C.