Tuttnauer
Innovation · Legacy · Partnership

Operation and Maintenance Manual

Electronic Tabletop Autoclaves

Models 1730, 2340, 2540, 3140, 3850, 3870 E, EK, EA & EKA

Cat. No. MAN205-0112000EN Rev. V(22)

Tuttnauer. Ltd., Har Tuv B Industrial Zone, P.O. Box 170, Beit Shemesh, 9910101, Israel.
Tel: 972 2 9904611, Fax: 972 2 9904730

Tuttnauer U.S.A. Co, Ltd., 345 Oser Avenue Hauppauge, NY, 11788, U.S.A.
Tel: (631) 737-4850, (800) 624-5836, Fax: (631) 737-0720

Tuttnauer
Innovation · Legacy · Partnership

Operation and Maintenance Manual

Models 2340, 2540, 3140, 3850, 3870 E, EK, EA & EKA

Cat. No. MAN205-0112000EN Rev. V(22) December 2025

Tuttnauer. Ltd., Har Tuv B Industrial Zone, P.O. Box 170, Beit Shemesh, 9910101, Israel.
Tel: 972 2 9904611, Fax: 972 2 9904730

Tuttnauer U.S.A. Co, Ltd., 345 Oser Avenue Hauppauge, NY, 11788, U.S.A.
Tel: (631) 737-4850, (800) 624-5836, Fax: (631) 737-0720

Table of Contents

Paragraph **Page No.**

1. General Information

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

1.1 Manufacturer and US Official Correspondence Information

The Autoclave is manufactured by Tuttnauer. Ltd.Har Tuv B Industrial Zone, P.O. Box 170, Beit Shemesh, 9910101, Israel. Tel:972 2 9904611 Fax:972 2 9904730

The US Official Correspondence is:

Tuttnauer U.S.A. Co, Ltd., 345 Oser Avenue Hauppauge, NY, 11788, U.S.A. Tel: (631) 737-4850, (800) 624-5836, Fax: (631) 737-0720

1.2 Directives and Standards

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

Regulation (EU) 2017/745 (MDR)	
Medical Device Single Audit Program – (MDSAP)	
ISO 9001	Quality Management System
EN ISO 13485	Quality Management System – Medical Devices
ISO 14001	Environmental management system
ISO 17025	General requirements for the competence of testing and calibration laboratories
EN ISO 14971	Medical devices – Application of risk management for medical devices
ASME Code	Section I and Section VIII. Div. I
PED	2014/68/EU
Chinese Regulations	Special Equipment Licensing Office
EN 13060	Small Steam Sterilizer
ANSI/AAMI/ST55	Table Top Steam Sterilizer
ISO 17665	Sterilization of health care products – Moist heat
ANSI / AAMI / ST79	Comprehensive guide to steam sterilization and sterility assurance in health care facilities
IEC 61010-1 / UL 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
IEC 61010-2-040	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-040: Requirements for sterilizers and washer-disinfectors used to treat medical materials
EN 61326-1	EMC Requirements for Electrical Equipment
IEC 62304	Medical Device Software – Software life cycle processes

1.3 Symbols Description

	Manufacturer
	Year of Manufacturing
	Country of Manufacture
	Medical Device
	Model Number
	Serial Number
	Consult the Operation and Maintenance Manual (User Manual) before use.
	Keep away from sunlight and protect from heat.
	For Indoor Use Only.
	Keep dry.
	Disposal according to electronic scrap ordinance.

	This side up (during transport and shipment).
	Fragile (during transport and shipment).
 OR 	A warning or precaution as detailed in the Operation and Maintenance Manual (User Manual).
 OR 	Caution! Hot Surface
	Caution! Hot steam
	Protective earth (Ground)

1.4 General Description

This autoclave is an electrically - heated sterilizer using steam as the sterilizing agent. A computerized control unit ensuring a fully automatic sterilization cycle, control and monitoring of physical parameters and a clear documentation of the sterilization cycle controls the autoclave.

The autoclave has three automatic programs, according to the material to be sterilized, and one auxiliary drying program. Models EA and EKA are equipped with an air compressor that during the drying stage, draws air through a HEPA filter (0.2µm.) and pushes that air through the heated chamber to remove moisture and facilitate the drying operation. Drying is performed with the door closed.

On all models (except 1730), a water pump is installed between the water reservoir and the chamber. This pump guarantees fast and accurate filling of the chamber every time. Entry of water may be accompanied by a noise for approximately 30 seconds. This is normal noise generated by regular operation of the pump.

The control system provides adequate protection, to ensure the safety of personnel and reliable operation with a minimum shutdown time.

On all models (except 1730), a printer is an optional addition to the autoclave. The printer prints the preset and actual parameters of the cycle (temperature, time, and pressure).

This manual is intended for the user and gives the user a general understanding of the instrument and the best ways to operate and take care of it, to obtain optimum effective results.

After reading this manual, operating the autoclave will be easy. However, since this instrument is built with high technology sensitive components, no attempt should be made by the user or any other unauthorized person to repair or recalibrate it.

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

1.5 Stand – by heating mode

The autoclave provides an option of heating the chamber in stand-by mode between cycles, with a very low power to reduce total cycle time (1.6% of the total power only). The autoclave turns off automatically if the interval between the sterilization cycles is more than 2 hours. This feature is standard on all EK, EKA models and optional on all E, EA models.

1.6 Indications for Use

1.7 Intended Users

All autoclave users must receive training in proper usage from an experienced employee. Every new employee must undergo a training period under an experienced employee.

1.8 Warranty Description

This warranty does not include routine cleaning or preventive maintenance, which must be performed as described in section 8.1 – Preventive and Scheduled Maintenance.

This product is sold with a **limited two (2) year parts-only warranty**. Tuttnauer's obligation under this warranty is strictly limited to the **replacement of defective parts**. Labor, travel, and any other associated service costs are **not covered** under this warranty.

This warranty is void if the unit is not purchased from an **authorized Tuttnauer dealer**, or if the product is damaged due to misuse, neglect, improper handling or installation, unauthorized repair, alteration, accident, fire, natural disasters, or static discharge.

No other warranties or obligations, whether express or implied, are provided.

The autoclave must be used strictly in accordance with the instructions in this manual!

1.9 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 Technical Service Department can be reached at:

Tuttnauer U.S.A. Co, Ltd. 345 Oser Avenue Hauppauge, NY, 11788, USA.
Tel (631) 737 4850, (800) 624 5836, Fax: (631) 737 0720

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.

If the autoclave is equipped with a printer, 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.

If replacement parts are needed, stipulate the model and serial number of the machine.

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

This warranty will be void if the unit is not purchased from an authorized full service Tuttnauer dealer.

1.10 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 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.

Caution!

Lifting and carrying should always be done by two people.

1.11 Water Quality

 **Warnings!**

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

In the case of a generator:

1. Use only water having the characteristics stated in the table below. Using tap water will clog the system and invalidate the manufacturer's warranty.
2. Use only deionized water, having a maximum conductivity of 15 µs/cm. Conductivity greater than 15 µs/cm may cause failures.
3. 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!

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

Suggested maximum limits of contaminants in water for steam sterilization per EN13060

Substance	Feed Water	Condensate
Evaporate residue	≤ 10 mg/l	≤ 1.0 mg/l
Silicate (SiO2)	≤ 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	≤ 0.5 mg/l	≤ 0.1 mg/l
Conductivity (at 20°C)	15 µs/cm	≤ 3 µs/cm
pH value	5 to 7.5	5 to 7
Hardness	≤ 0.02 mmol/l	≤ 0.02 mmol/l
Appearance	Colorless, clean, without sediments	
Note: The condensate is produced from steam taken from the empty sterilizer chamber.		

1.12 Environmental Emission Information

1. The peak sound level generated by the autoclave is 70dBawith background noise of 60dBa .
2. The total heat per hour transmitted by the autoclave is < 100 Wh for all models.

2. Safety

2.1 Principle Safety Warnings and Precautions

The autoclave has unique characteristics. Please read and understand the operation instructions before the first operation of the autoclave. The following issues may require instructions guidance provided by the manufacturer: how to operate the autoclave, the door safety mechanism, the dangers involved in circumventing safety means, how to ensure that the door is closed, and how to select a correct sterilization program.

Never use the autoclave to sterilize corrosive products, such as: acids, bases and phenols, volatile compounds, or solutions such ethanol, methanol or chloroform nor radioactive substances.

- NEVER operate a new autoclave or steam generator before the safety, licensing, and authorization department has approved it for use.
- Always operate the autoclave strictly as instructed in this user manual.
- The device is designed to carry safeguards against cybersecurity threats. If you fear the device has been compromised, immediately contact the authorized representative.
- The instructed Steam Sterilization Program should be verified against the programs available in this autoclave. Verify that you have chosen the appropriate sterilization program. When sterilizing materials, make sure that the item can withstand the sterilization temperature.
- A written procedure should be established to ensure safe autoclave operation, including: Daily safety tests; seal inspection and door hinge inspection; smooth action of the closing mechanism; chamber cleaning; prevention of clogging; preservation from corrosion; and finally, what is permitted and what is prohibited for sterilization and choosing a sterilization program.
- If there is a steam generator – drain it daily.
- If there is an air compressor – drain it daily.
- Before use, check the autoclave chamber to ensure that no items have been left from a previous cycle.
- Before loading the autoclave, clean the strainer on the chamber floor.
- Load trays in a manner that enables steam to move freely among all items.
- Be careful: the surfaces may be hot! Before withdrawing trays, wear heat resistant gloves and avoid touching hot loads and surfaces.
- During loading and unloading, use safety gloves and glasses in accordance with local safety regulations and good practice.
- If applicable: Do not remove the top cover during a running cycle. Hot water / steam may exit!
- Only technical personnel having proper qualifications and holding technical documentation (including a Technician Manual), and adequate information are authorized to install and serve the apparatus.
- Mind the power socket. Keep it and its vicinity dry. Danger of electrocution.
- If applicable: Before moving the autoclave, make sure that the electrical cord is disconnected from the power and there is no pressure in the chamber.
- For devices that weigh less than 75Kg – The device is not designed for use on any standard slide out shelf. If necessary, it must be tested and/or rated for 75Kg or more.
- Once a month, ensure that the safety valves are operating.

- Once a year, or more frequently, effective tests must be performed by a certified technician, i.e., calibration and validation.
- Make sure there are no leaks, breaks, blockages, whistles or strange noises.
- Notify the person in charge immediately of any deviation or risk of proper function of the device or with the shipping carrier, and also notify the Tuttnauer representative.
- Insufficient space for ventilation may result in malfunction or damage due to overheating.
- In order to assure proper operation of the autoclave, it should not be placed in the vicinity of electrical equipment which is not certified for Electromagnetic Compatibility according to IEC/EN 61326-1.
- The user shall report any serious incident that occurred in relation to the sterilizer, to the manufacturer and the authority having jurisdiction in their locale.
- Disposal of the device should be done in accordance with local laws.

3. Depiction of System Parts

3.1 Construction

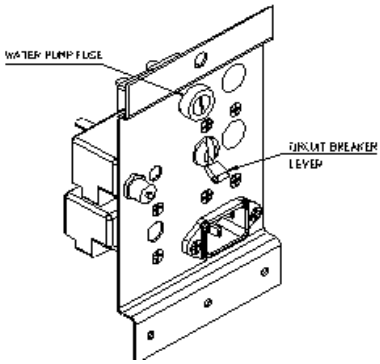
The main parts of the autoclave are made of materials as indicated below:

- Chamber is electro-polish and built of stainless steel 316 L.
- Door is made of stainless steel CF8.
- Trays are made of stainless steel 304.
- Water reservoir is made of hard plastic material.
- Door handle is made of hard plastic material, which is safe to touch and thermo-insulated.
- Covers are made of aluminum sheet, coated with Epoxy paint.

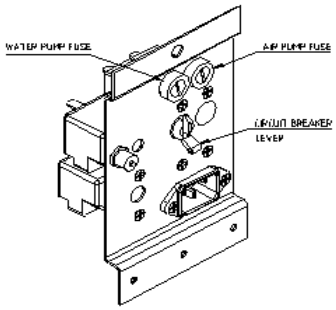
3.2 Electrical Data

	1730		2340		2540		3140	3850	3870
	E	EK	E, EA	EK, EKA	E, EA	EK, EKA	E, EA	E, EA	E, EA
Ampere (A) at 230/240V	4.6	5.9	6	9.6	6	9.6	10.4	10.4	13
Ampere (A) at 120V	8.8	11.2	11.7	-	11.7	-	20.0	-	-
Heaters (W)	1050	1350	1400	2200	1400	2200	2400	2400	3000
Frequency	50 / 60 Hz								
Protection against electrical shock	IEC 61010-1								

Description	Autoclave Type							
	E		EA		EK		EKA	
	120V	230V	120V	230V	120V	230V	120V	230V
1730								
Circuit breaker (A)	15	10	___	___	15	10	___	___
Air pump fuse (A)	___	___	___	___	___	___	___	___
Water pump fuse (A)	___	___	___	___	___	___	___	___
	2340 / 2540							
Circuit breaker (A)	15	10	15	10	___	15	___	15
Air pump fuse (A)	___	___	2.0	1.25	___	___	___	1.25
Water pump fuse (A)	1.25	1.25	1.25	1.25	___	1.25	___	1.25
	3140 / 3850 / 3870							
Circuit breaker (A)	___	15	___	15	___	___	___	___
Air pump fuse (A)	___	___	___	1.25	___	___	___	___
Water pump fuse (A)	___	1.25	___	1.25	___	___	___	___

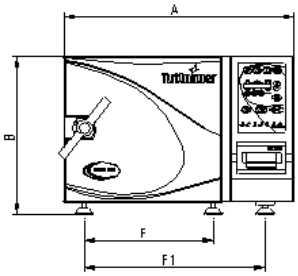


Models E, EK (without an air pump)

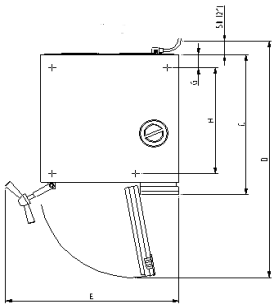


Models EA, EKA (with an air pump)

3.3 Overall Dimensions



Front View



Top View

Dimensions	Model	1730		2340		2540		3140		3850		3870	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Overall Dimensions	A	440	17.4	510	20.0	510	20.0	590	23.2	660	26.0	660	26.0
	B	305	12.0	365	14.4	365	14.4	450	17.7	525	20.7	525	20.7
	C	455	17.9	540	21.5	545	21.5	566	21.9	695	27.5	875	34.5
Maximum dimensions (door open)	D	750	29.5	910	35.8	910	35.8	990	39.0	1155	45.5	1335	53.0
	E	560	22.0	630	24.8	655	25.8	755	29.7	815	32.0	815	32.0
Distance between supporting legs	F	234	9.2	415	16.4	415	16.4	488	19.2	450	17.7	450	17.7
	F1	339	13.4	422	16.6	422	16.6	371	14.6	564	22.2	564	22.2
	G	50	2.0	50	2.0	50	2.0	50	2.0	50	2.0	50	2.0
	H	315	12.4	400	15.8	400	15.8	400	15.2	555	21.9	725	28.5
Reservoir volume		3 lit.	0.8 gal	3 lit.	0.8 gal	3 lit.	0.8 gal	3.0 lit.	0.8 gal	7.3 lit.	1.93 gal	7.3 lit.	1.93 gal
Min. water vol. in Reservoir		0.8 lit.	0.21 gal	0.8 lit.	0.21 gal	0.8 lit.	0.21 gal	0.8 lit.	0.21 gal	2.0 lit.	0.53 gal	2.0 lit.	0.53 gal
Max. Allowable Working Pressure (MAWP)		2.76 bar (40 psi)											
Load No. counter		Counting from 0 to 250 and nullifies.											

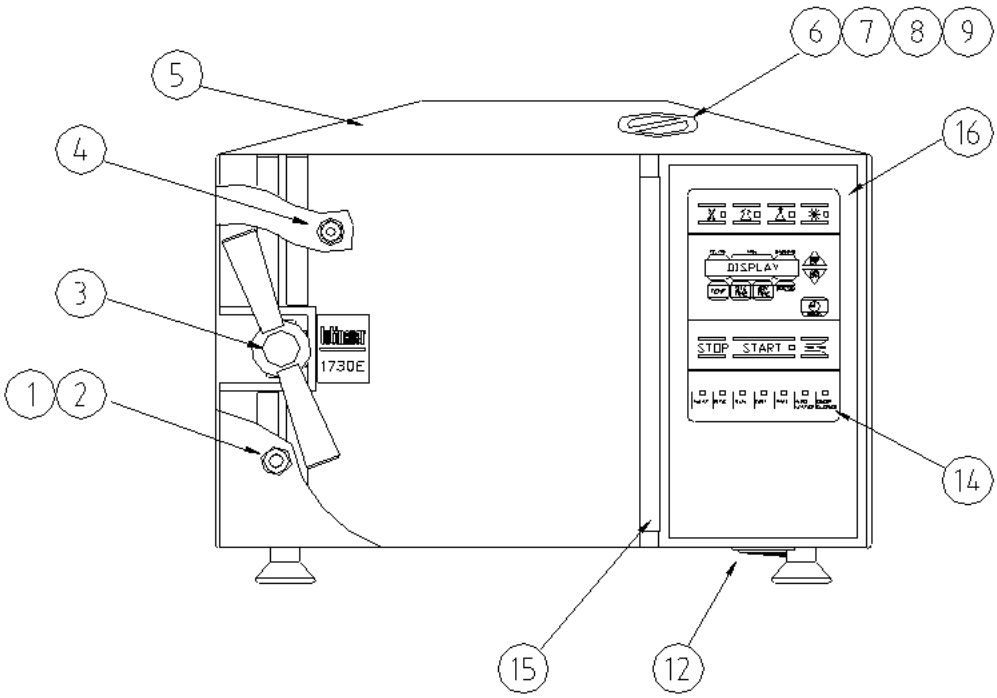
3.4 Technical Specifications

Models	Chamber dimensions DIA x D	Volume of chamber	Volume of mineral free water reservoir	Tray dimensions W X D X H	No. of trays	No. of IMS Cassettes (Optional)	
						Full	Half
1730	17 x 34 cm (7" x 13")	7.5 liters. (2 gal.)	3.0 liters. (0.66 US gal.)	12 x 29.5 x 2 cm (4.7" x 11.6" x 0.8")	3	-	2
2340	23 x 47 cm (9" x 18")	19 l (5 gal)	3.0 liters (0.66 gal)	17 x 41.5 x 2cm (6.7" x 16.3" x 0.8")	3	2	2
2540	25.4 x 47.5cm (10" x 19")	23 l (6 gal)	3.0 liters (0.66 gal)	17 x 41.5 x 2 cm (6.7" x 16.3" x0.8")	4	3	3
3140	31.3 x 39.1 (12" x 15")	34.4 l (7.8 gal)	3.0 liters (0.66 gal)	25.6 x 40.8 x 2.5 (10.1 x 16.1 x 1) 19.8 x 40.8 x 2.2 (7.8 x 16.1 x 1)	2	4	4
3850	38 x 58 cm. (15" x 23")	64 liters (16.9 gal)	7.3 liters (1.9 gal)	28 x 50 x 2.5 cm (11" x 20 " x 1") 35 x 50 x 2.5cm (14" x 20 " x 1")	2	10	—
3870	38 x 76 cm (15" x 30")	85 liters (22.5 gal)	7.3 liters (1.9 gal)	28 x 67 x 2.5cm (11" x 26" x 1") 35 x 67 x 2.5 (14" x 26" x 1")	2	15	—

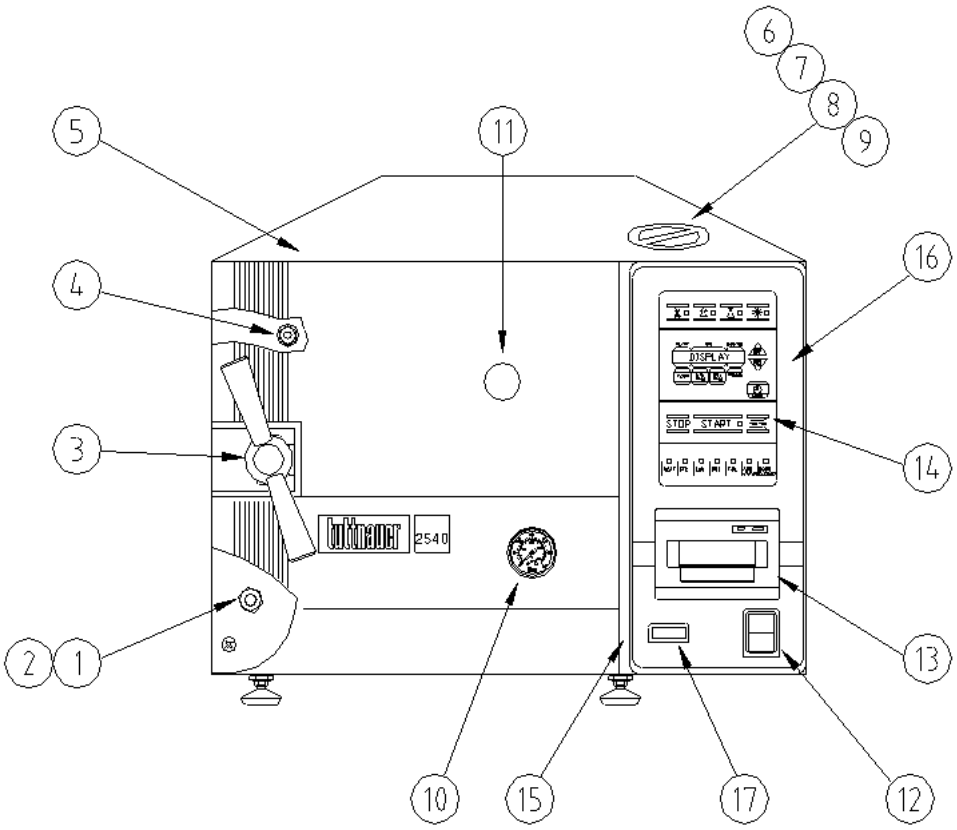
Models	Printer	Max. Solid Load	Shipping Weight	Shipping Volume
1730	No	2.7 kg	25 kgs. (55 lbs.)	0.18 m3 (6.35 cu.f.)
2340 (EZ9)	Yes	3.2 kg	36 kg (79 lbs)	0.27m3 (9.4 cu.ft.)
2540 (EZ10)	Yes	4.0 kg	48 kg (106 lbs)	0.27m3 (9.4 cu. ft.)
3140	Yes	5.0 kg	60 kg (132 lbs)	0.35 m3 (12.4cu.ft.)

Models	Printer	Max. Solid Load	Shipping Weight	Shipping Volume
3850	Yes	6.0 kg	89 kg (96 lbs)	0.63 m3 (22.2cu.ft.)
3870	Yes	6.4 kg	102 kg (225 lbs)	0.76m3 (26.8cu.ft)

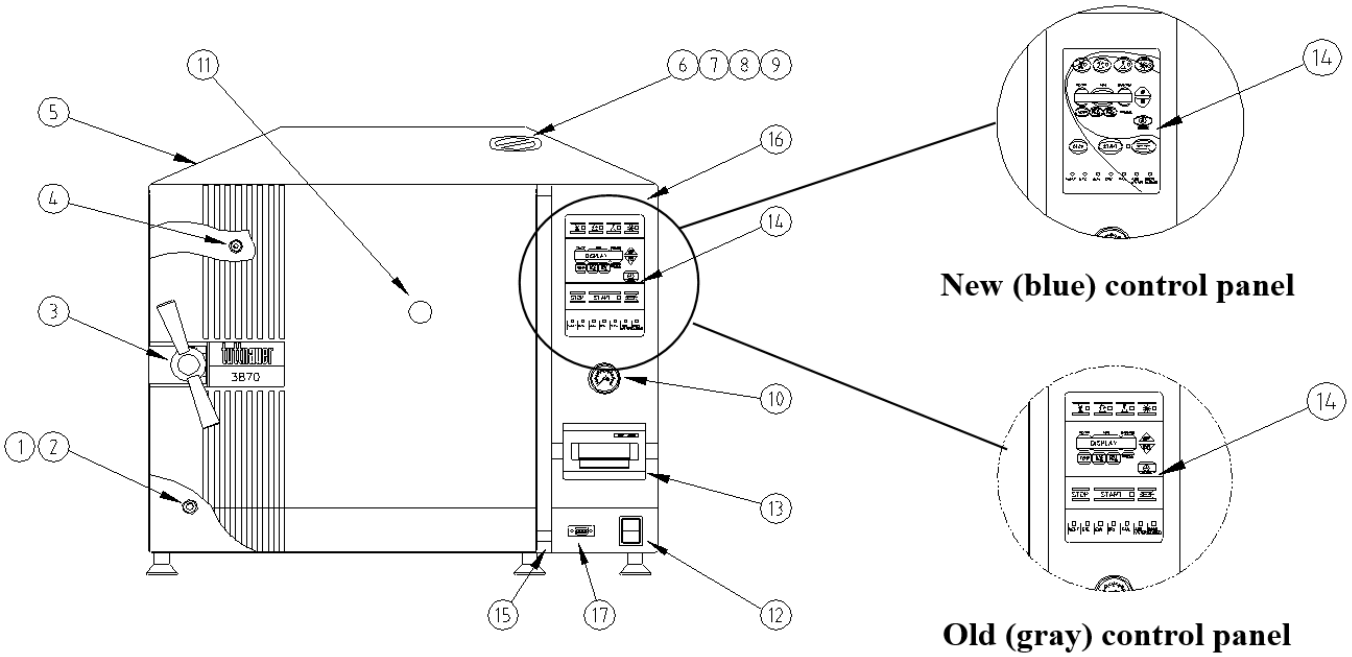
3.5 Front View - Model 1730



3.6 Front View - Models 2340 / 2540

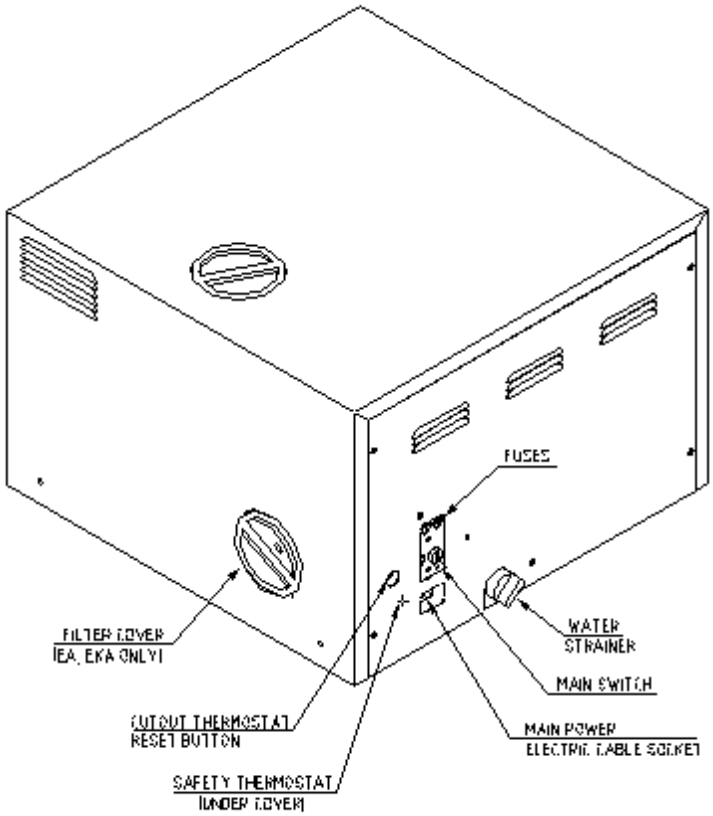


3.7 Front View - Models 3140 / 3850 / 3870



No.	Description	No.	Description
1	Reservoir water drain valve	10	Pressure gauge
2	Ring for drain valve	11	Validation port cover
3	Door closing device	12	Main switch
4	Door switch	13	Printer
5	Autoclave cover	14	Front panel keyboard
6	Water reservoir cover	15	Completion to panel
7	Water reservoir – assembly	16	Panel base
8	Safety valve	17	RS232 port cover
9	Air relief valve		

3.8 Rear View



4. Installation Instructions

Warnings!

- Only technical personnel having proper qualifications and holding technical documentation (including a Technical Manual), and adequate information are authorized to install and serve the apparatus.
- Before moving the autoclave, make sure that the electric cord is disconnected from the power, and there is no pressure in the chamber.
- Mind the power socket. Keep it and its vicinity dry. Danger of electrocution.
- If applicable: Before moving the autoclave, make sure that the electric cord is disconnected from the power, and there is no pressure in the chamber.
- Drain the water from the reservoir.
- Do not drop the device!
- 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.
- For devices that weigh less than 75 Kg: The device 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 75 Kg or more.
- Insufficient space for ventilation may result in malfunction or damage due to overheating.

4.1 Operating Conditions

The equipment is intended to work withing NORMAL environment conditions as follows:

Pollution:	Pollution Degree 2
Altitude:	Maximum altitude 2000 meters (6561.68 ft) above sea level
Ambient Pressure:	80 – 105 kPa (11.6 – 15.2 psi)
Room Temperature:	5 – 40 ºC (41 – 104 ºF).
Humidity:	Up to 80%.
Mains supply fluctuations:	Up to +/-10% of the nominal voltage.
Installation Category II.	

- This device is to be used for indoor use.
- Insufficient space for ventilation may result in malfunction or damage due to overheating.

4.2 Storage

The packed or unpacked autoclave shall be stored in “indoor conditions” (protected from rain and water).

4.3 Utilities

Utilities	Unit	Value
Power supply (as appropriate)	V-A	1ph, 120V – 16A,50/60 Hz
	V-A	1ph, 230V – 16A,50/60 Hz

Warnings!

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 and 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 ± 10%. Check and verify that the electrical net is protected by a current leakage safety relay.

4.4 Electrical

The electrical connection should comply with the devices power requirement. It must also comply with local installation and safety rules and regulations. The voltage supplied to the device must comply with the label ±5%.

To avoid any injury by electrical hazard, it is mandatory for the customer to have installed an earth leakage relay (GFI outlet or circuit breaker) in the electrical circuit to which the autoclave is connected. This relay disconnects all the poles of the electrical power line in case of accidental contact with the autoclave’s metal enclosure, by the operator or another person, leading to a dangerous leakage current.

Connect the power cord to the socket on the rear side of the autoclave; plug it into the supply outlet. The autoclave must be connected to a properly grounded outlet.

4.5 Setup for models 2340, 2540, 3140, 3850 & 3870

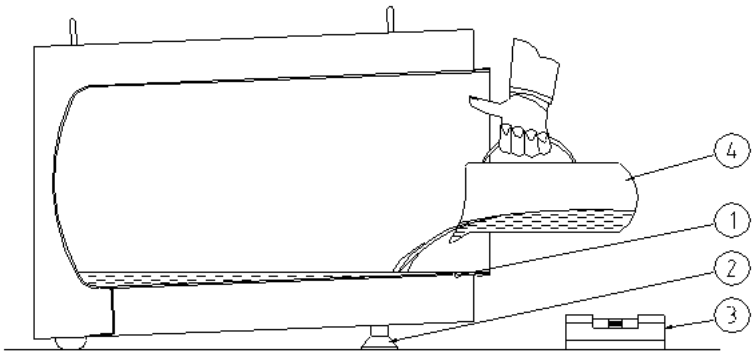
Your new Tuttnauer Autoclave was set at the factory and requires a minimal of setup.

- Make sure the counter is level and sturdy.
- Make sure all the feet are on the autoclave and none have been lost.
- Position the autoclave on the counter.
- Fill the reservoir with distilled water.
- The unit is ready to operate.
- Measure the proper amount of distilled water for the appropriate model unit as listed below (the tolerances on these amounts are +2 oz. and –0 oz).

4.6 Setup for model 1730

Proper adjustment of the chamber pitch is one of the most important things you can do for the sterilizer. Proper chamber pitch insures that among other things the sterilizer will have the proper amount of water in the chamber at the beginning of each cycle. Insufficient water in the chamber at the beginning of the cycle

will generate a LOW WATER message at some point during the cycle when the water level becomes too low. If, on the other hand, there is too much water in the chamber this will extend the heating portion of the cycle. In cases where the heating portion of the cycle is extended for more than 50 minutes (80 minutes for a 3850/3870) the sterilizer will abort the cycle and display a LOW HEAT message. Please follow these setup steps:



- Make sure the counter is level and sturdy (3).
- Make sure all the feet are on the autoclave and none have been lost.
- Make sure the feet are free to move in and out (2).
- Position the autoclave on the counter.
- Fill the reservoir with distilled water.
- The chamber should be empty of any instruments, trays, or leftover water.
- The autoclave should be turned off.
- The chamber pitch now needs to be adjusted.
- Measure the proper amount of distilled water for the appropriate model unit as listed below (the tolerances on these amounts are +2 oz. and –0 oz).

1730		2340/2540		3140		3850		3870	
300 ml	10 oz	350 ml	12 oz	400 ml	14 oz	600 ml	20 oz	750 ml	24 oz

- Pour the proper amount of water into the chamber through the front door of the unit (4).
- This water should cover the bottom of the chamber to within +/- ½ inch of the groove in the front. (1).
- If necessary, adjust the front leveling feet so that the water lays in the chamber correctly. (2).
- Once the chamber pitch adjustment is completed, empty the water from the chamber and check if the automatic filling is set correctly.

4.7 Preparation Before Sterilization

Warnings!

- The instructed Steam Sterilization Program should be verified against the programs available in this autoclave. Verify that you have chosen the appropriate sterilization program.

- When sterilizing materials, make sure that the item can withstand the sterilization temperature.
- Only use the autoclave for products approved for sterilization in an autoclave. Never use the autoclave to sterilize corrosive products or chemicals, such as: acids, bases and phenols, volatile compounds or solutions, such as ethanol, methanol, or chloroform nor radioactive substances.
- Consult the Medical Device manufacturer relating adequate and most effective cleaning methods, cleaning agents and disinfection methods.

4.8 Disinfection

There are various methods and means for disinfection like soaking in liquid chemical disinfectants or hot water disinfection.

- Check the instructions of the item manufacturer as to the proper procedure for cleaning, disinfecting, and sterilizing each item.
- It is recommended that instruments be ultrasonically cleaned using Tuttnauer's Clean & Simple enzymatic cleaning tablets or other suitable solutions.
- Follow the instrument manufacturer's instructions on the use of products for cleaning and lubricating instrument that have been ultrasonically cleaned.

4.9 Packaging

The target in packing medical items is to assure that the contained goods are sterile and maintain them sterile till opening the package.

There are various methods and techniques used in preparation and packaging of surgical instruments.

- Be sure that instruments of dissimilar metal (stainless steel, carbon steel, etc.) are separated. Carbon steel instruments should be bagged or placed on autoclavable towels and not directly on stainless steel trays (mixing will result in damage to the instruments or trays from the oxidation of these materials).
- Load items within the boundaries of the tray so that they do not touch the chamber walls or fall off when the tray is moved. Items should not be allowed to touch the walls of the Chamber as the hot metal can damage the item.
- Don't overload the Sterilizer trays (see section). Overloading will cause inadequate sterilization & drying.
- Make sure that all instruments remain apart during the sterilization cycle. Surfaces that are hidden because items are covering other items will not be exposed to the steam and will not be sterilized.
- Disassemble or sufficiently loosen multiple-part instruments prior to packaging to permit the sterilizing agent to come into contact with all parts of the instrument.
- Wrapped instruments should be placed in material which will allow steam penetration and promote drying, such as autoclave bag, autoclave paper, or muslin towels.
- Tilt on edge items prone to entrap air and moisture, e.g., hollow-ware, so that only minimal resistance to removal of air, the passage of steam and condensate will be met.
- When loading pouches on the tray, put them paper side up, nylon side towards the tray.
- Tubing should be rinsed after cleaning. When placed in the tray, make sure that both ends of the tubing are open and there are no sharp bends or twists.

- Cassettes should be placed on the tray rack in place of the trays. They should not be touching each other or the Chamber walls. There should be about 2.5cm between cassettes or packs for proper steam circulation.

- If spotting is detected on the instruments, it is necessary to determine if the spot is dirt or rust. The first step would be to use an ordinary eraser to remove the spot. If there is no pitting under the spot, then the spot is only dirt. Dirt spots on an instrument may be an indication that the autoclave needs to be cleaned or that the instruments were not adequately cleaned or dried prior to sterilization. If removal of the spot reveals pitting, then the spot is most likely rust. Rust spots on an instrument are not uncommon on inexpensive instruments. It may also be an indication that the instruments were rinsed in tap water with a high mineral content. These minerals, when exposed to high temperature and steam will accelerate the oxidation of the metal. One suggestion would be to final rinse the instruments in a distilled water bath and pat dry to absorb residual water and minerals.

- If the instruments exhibit a discoloration this can be due to the mixing of carbon steel and stainless steel. When these two metals come into contact with each other electrolysis occurs that breaks down the metal. The best solution is to separately wrap the carbon steel instrument to insulate it from other instruments on the tray and the tray itself.

5. Operating Instructions

Warnings!

- The autoclave is intended for indoor use only.
- Do not operate the autoclave in the presence of dangerous gases and vapors.
- The Emergency Stop Push-Button in cooperative with key lock mounted on the front panel switches OFF the autoclave operation.
- When the emergency switch is activated, the key must be used to allow the switch to return to the operating position.
- If applicable: It is strictly forbidden for any person to enter the autoclave's chamber. If, for any reason (cleaning, maintenance, or if something falls down), it is necessary to enter the chamber, the person must shut the system by actuating the emergency switch and withdrawing the key from the system, keeping the key on him, and shut OFF all utilities (steam, water, compressed air, and electricity), to prevent accidents and injuries. It is also necessary to turn off the air supply.
- Waste water should be brought into the public net in accordance with the local rules or requirements i.e. ONLY NON-HAZARDOUS LIQUIDS SHALL BE DISPOSED IN PUBLIC SEWAGE!
- Never reuse waste water.
- Water droplets and visible signs of moisture on sterile packaging or the tape used to secure it, may compromise the sterility of processed loads, or be indicative of a sterilization process failure. Visually check the outside wrapper for dryness. If there are water droplets or visible moisture on the exterior package or on the tape used to secure it, the pack or instrument tray is considered unacceptable.
- The sterility of the instruments processed in unwrapped cycles cannot be maintained if exposed to non-sterile environment.
- Reset the Atmospheric Pressure prior to operating the autoclave for the first time.
- If applicable: In the beginning of each day, check the water level in the reservoir.
- If applicable: Before filling the reservoir, verify that the autoclave is idle and there is no pressure in the chamber.
- Custom programs require validation by the user!
- After the cycle, open the door slowly to allow steam to escape and wait 20 seconds before removing the load.
- For manual operating doors: Before opening the door, verify that there is no pressure in the chamber. Open the door slowly to allow steam to escape, and wait 5 minutes before removing the load.
- To avoid severe injuries from hot steam and condensed hot water that may drip out when opening the door, it is strictly forbidden to lean on the autoclave, and to place your hand or any part of your body over or under the door.
- During loading and unloading, use safety gloves and glasses in accordance with local safety regulations and good practice. If applicable: Do not remove the top cover during a running cycle. Hot water / steam may exit!

- If carts are applicable: It is strictly forbidden to load or unload the loading cart if the transfer carriage is not connected by the hooks to the autoclave and the brakes are not applied.
- On closing the autoclave door, make sure that it is properly locked before starting a cycle.
- Don't place your hand or head, etc. above/beside/below or close to the door while opening it as hot steam is escaping the chamber.
- Do not stand near the back panel of the autoclave while the device is operating as the pressure safety valve may release steam.
- Do not touch hot surfaces, such as the top enclosure and area adjacent to the chamber opening! Hot surfaces are indicated with a label.

It is important to clean the hole of the air jet, as described in section 8.7 Cleaning the Air Jet before starting operation of the autoclave, for the first time.

5.1 Filling Water

For models 2340, 2540, 3140, 3850 & 3870:

The proper amount of water for automatic filling in your new Tuttnauer autoclave has been preset at the factory. However, if in routine operation, there is inadequate water in the chamber, the operator can adjust the level with the automatic built-in system by doing the following.

1. Press STOP key repeatedly until the message "code xxx" appears on the display.
2. Use the UP or DN arrow keys to change the code to 105, then press the STOP key.
3. A message will be displayed saying "Water in = xx sec".
4. Using the UP/DN arrow keys change the seconds according to the following table:

Model	Seconds
2340	30 sec
2540	30 sec
3140	40 sec
3870	60 sec

5. Press the STOP key to enter the new water inlet time into memory.
6. If necessary, press the STOP key again to bring up the program display.

   Note:

   DO NOT attempt to automatically fill the chamber with the DOOR open. Water will overflow out of the chamber.

   Warning:

   If it becomes necessary to RESET the software program it will be essential to repeat all steps listed above. This will ensure that the correct amount of water enters the chamber for operation.

For model 1730:

If it becomes necessary to adjust the automatic fill, follow these steps:

1. Make sure the power is off.
2. The door should be open and the chamber empty of any water.
3. Make sure the Water Electrode is clean.
4. Press and hold the Water Inlet key (this is the button on the keypad with the two arrows).
5. Turn the power on. When the program display screen appears, release the Water Inlet key – wait one second and press it in again.
6. Water will begin flowing into the chamber.
7. Monitor the water flow.
8. Hold the Water Inlet key until the water reaches the groove at the front of the chamber.
9. Release the button – wait ten seconds – the unit is now reprogrammed.

5.2 Checking the automatic fill

To check the automatic fill, follow these steps:

1. Remove any water that is in the chamber.
2. Make sure the unit is turned on.
3. Place a collecting vessel under the autoclave's door.
4. With the door open, press and hold the door switch, then press the START key.
5. When water starts flowing into the chamber release the door switch.
6. Water should come beyond the groove at the front of the chamber, and a small amount will pour into the collecting vessel.
7. After the automatic filling is completed, tilt the autoclave and pour all the water in the chamber into the collecting vessel.
8. Measure and verify that the amount of water pumped into the chamber is 500-600 ml.
9. If the water is not filling correctly then follow the adjustment procedure above.

Warning!

If it becomes necessary to RESET the software program it will be essential to repeat all steps listed above. This will ensure that the correct amount of water enters the chamber for operation.

Due to the fact that the water lines are empty when the unit is shipped, air may become trapped in the lines. It is recommended that for the first operation these steps are followed to make sure water is flowing freely . Open the door, press the Water Inlet key. When water enters the chamber releases the key and removes the water.

5.3 Filling the Water Reservoir

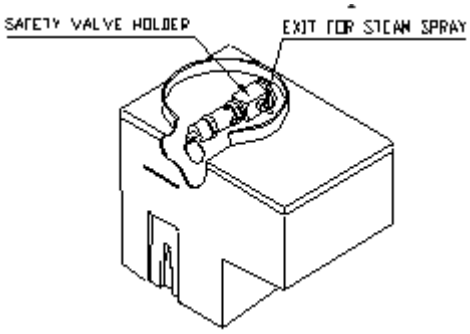
Remove the water reservoir cover. Pour distilled water into the reservoir through the opening on top of the autoclave until it reaches the base of the safety valve holder, approximately 3 liters (0.7 gallons).

Use water-having characteristics as per table in section .

Caution:

Under no circumstance should water be filled above the safety valve holder.

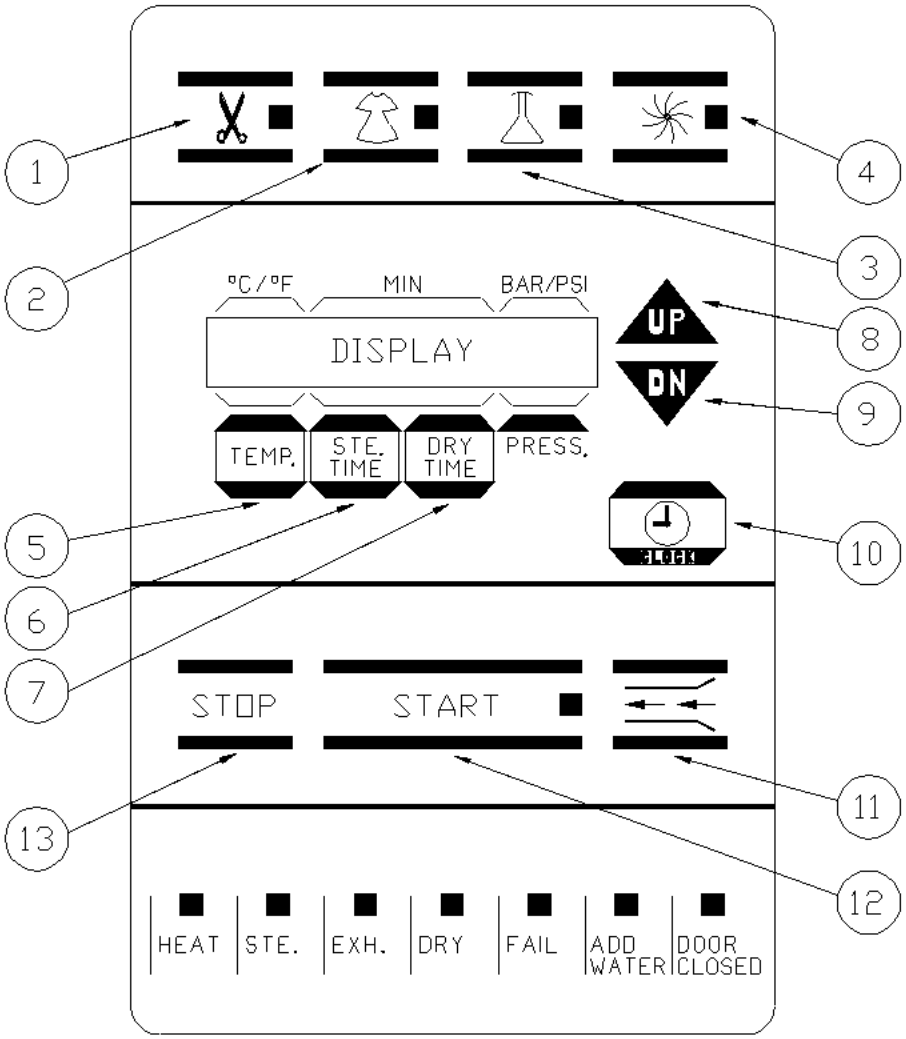
USE DISTILLED WATER ONLY. The impurities in tap water will create the need for more frequent cleaning and maintenance, in addition they will accumulate and block the hole of the **Air Jet**. This will prevent the temperature in the chamber from rising properly. **This will cause the unit to abort its cycle, spore tests to fail and indicator strips not to change color.** It is essential from time to time during heating and sterilization phases that a spray of steam should escape, from the Air Jet, causing a hissing sound. If no escaping steam is evident or no hissing sound heard, then follow the instructions in sec 8.7 Cleaning Air Jet for cleaning the **Air Jet.**



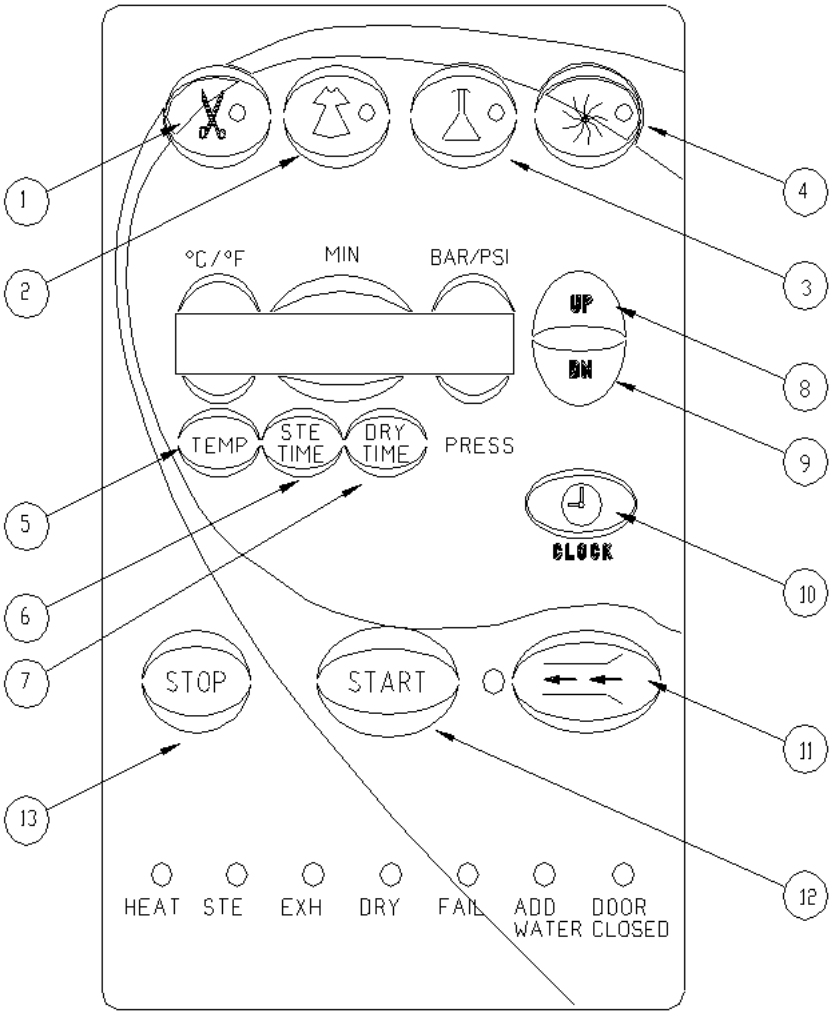
6. Control Panel

6.1 Keyboard (keys and display)

Front Panel Keyboard - Old Type (Gray)

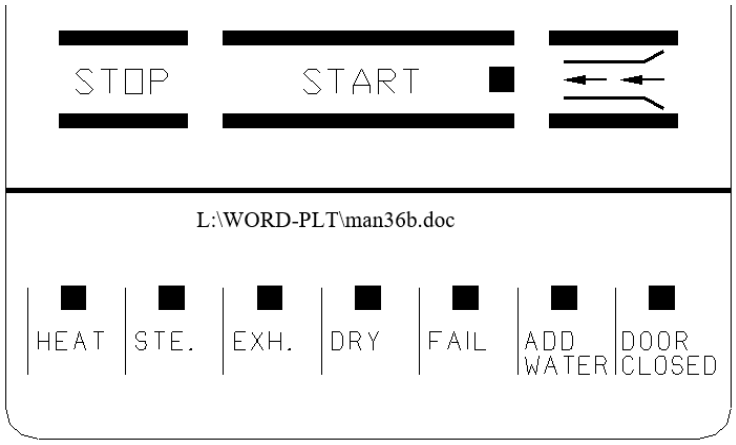


Front Panel Keyboard - New Type (Blue)

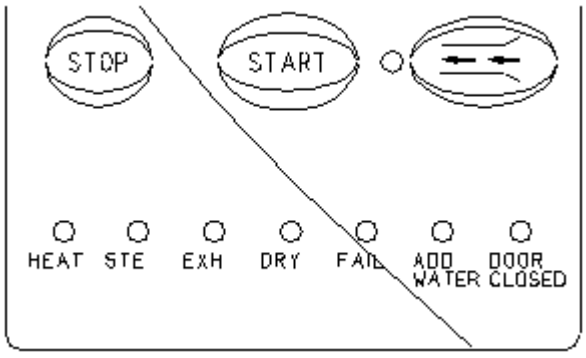


Note: See section for a description of the Keyboard buttons.

Old Type - Gray



New Type - Blue



6.2 Indicator Light Description

Programs Indicators	Shows the selected program
Start	Shows the system is running a program
Heat	The system is currently in the Heating stage
STE	The system is currently in the Sterilization stage.
EXH	The system is in the Exhaust stage.
Dry	The system is in the Dry stage.
Fail	Shows the system has failed as a result of either a malfunction, or the STOP key was pressed. A message is displayed on the screen, the reason for failure.
Add water	This indicator lights if there is a lack of water in the reservoir.
Door closed	This indicator lights shows the door is in the closed position.

6.3 Home Screen Description and Functions

No.	Icon	Name	Description
1		Unwrapped Instruments	
2		Wrapped Instruments	
3		Glasswares (slow exhaust, no drying)	Pressing one of the above program keys determines the chosen program. The program parameters are displayed, and the program indicator lights.
4		Dry Only	Pressing this key allows inclusion of the Additional Drying procedure for a period of time determined by the operator. Time range is 0-99 minutes.
5		TEMP.	Pressing this key place, the marker under the temperature displayed on the display. To raise or lower the program sterilizationtemperature, press UP or DN keys. To store the new value in the memory, as the nominal setting, complete the changing of the parameter by pressing TEMP. key again. The permitted temperature range for proper sterilization is

No.	Icon	Name	Description
			250ºF-274ºF (121ºC-134ºC). **Note:**In no case should the temperature be set higher than 274ºF (134ºC).
6		STE. TIME	Pressing this key place, the marker under the sterilization time displayed on the display. To raise or lower the program sterilization time, press the UP or DN keys. To store the new value in the memory, as the nominal setting, complete the changing of the parameter by pressing STE. TIME key again. Time range is 3-99 minutes. **Note:**It is important to properly coordinate the STE. TIME with the sterilization temperature.
7		Dry Time	Pressing this key place, the marker under the drying time displayed on the display. To raise or lower the program drying time, press the UP or DN keys. To store the new value in the memory, as the nominal setting, complete the changing of the parameter by pressing DRY TIME key again. The time range is 0-99 minutes. This key does not allow any change of the dry time for the Glassware program, for which it is permanently set to 00 minutes.
8		UP	Pressing this key in combination with TEMP. (5), STE TIME (6), DRY Time (7) and CLOCK (9) increases these values.
9		DN	Pressing these keys in combination with TEMP. (5), STE TIME (6), DRY Time (7) and CLOCK (9) lowers these values.
10		Clock	Pressing the CLOCK programming key displays the date, with the cursor under the day. Pressing the UP or DN keys changes the date. Pressing the CLOCK key again moves the cursor to the month, then year and then time (hour, minute, second). At this point the display shows the currently set date and time. If no key is pressed during a 10-second interval, the system exits the clock-programming mode and returns to the current program display.
11		Water Inlet	Pressing this key continuously allows for manual filling of the chamber with water. Once the key is released the water pump stops, the fill valve closes, and water stops entering the chamber.

No.	Icon	Name	Description
12		Start	Pressing this key starts the sterilization (or DRY ONLY) process according to the selected program. Water flows automatically into the chamber, HEAT and STE. stages commence and the respective LED indicator lights up. On completion of the sterilization program the Exhaust stage will automatically begin, at the end of which a Drying stage (if previously programmed) will initiate. The respective LED indicators light up indicating which stage is operating. Once all stages have been completed the final indicator extinguishes and the screen displays the “Cycle Finished” message. The process will not start if: • The door is not closed, and the DOOR CLOSED indicator is off. • The "DOOR UNLOCK" message is displayed **Note:** Due to inherent elasticity of the door gasket, the CLOSE DOOR indicator may be illuminated green before a complete seal is made between the door and the chamber. Therefore, to ensure the door is fully sealed, tighten the door bolt until ‘hand tight’. Do not overtighten the bolt as this may result in damage to the gasket. Should the autoclave fail to reach sterilizing temperature/pressure, always check first that the door is fully sealed. If not, tighten the door further, as described above, until completely sealed. • There is not enough water in the reservoir, (the red ADD WATER indicator lights and the “ADD WATER” message is displayed).
13		STOP	This key issues the only command accepted by the system during the running of a program. Pressing this key for over 1 second causes the program to immediately cease running and enters the EXHAUST stage, at the end of which the “MAN. STOP” message will be displayed. This key has no function when the system is not in operation and its only use is to manually stop a cycle. In normal working conditions on completion, the system automatically terminates the cycle, without use of this key. The STOP key does not function in EXH stage.

6.4 Description of Displayed Messages and Safety Measures

Message	Message Description	Possible Causes
Low Heat	Message is displayed, and sterilization does not start if the autoclave has not reached sterilization temperature after heating for 50 minutes while in the Wrapped or Unwrapped programs (80 minutes in the Glassware program).	• A clogged Air Jet (see section) • No power to the heating elements. • Low line voltage delaying heat up.
Low Pres	Message is displayed, fail indicator lights, and the program is aborted if the pressure drops 4 PSI (0.27Bar) below the required sterilization pressure.	Insufficient water in the chamber (see message). A damaged heating element. A damaged pressure transducer.
Low Temp	Message is displayed, fail indicator lights and cycle is aborted, if the temperature drops 2.5°C (4.5°F) below the required sterilization temperature.	Insufficient water in the chamber. (see message) Sterilization time has been set for too long a period. A bad temperature sensor.
High Temp	Message is displayed, fail indicator lights and program is aborted if one of the following occurs: • The temperature rises to 3°C (5°F) above the required sterilization temperature during the sterilization stage. • This message appears during the HEAT stage, if the temperature sensor is damaged.	• A damaged solid state relay. • A damaged heating element. • A damaged temperature sensor.
Low Water	Message is displayed if during the Water Inlet stage insufficient water enters the chamber. In units with water pumps, the pump will try three times to fill the chamber with water, if unsuccessful the cycle is aborted and the message LOW WATER is displayed. Message is displayed, if during a normal heat up stage the system determines that there is insufficient water in the chamber to complete the cycle. This determination is	• A dirty or shorted Water Electrode. • A clogged water pump or water pump filter. • A clogged water line. • Unit is improperly leveled. • The Air Outlet Valve is stuck closed. • A leaky door gasket, door bellows, solenoid valve, safety valve, or the air jet is allowing steam to escape at a higher than normal rate.

Message	Message Description	Possible Causes
	made by the combined input of two sensors, the Water Electrode and the Safety Thermostat. Also, if a power failure occurs during the heat or sterilization stage after the power returns, the system will check the Water Electrode to see if there is sufficient water in the chamber in order to resume the cycle. If not, the cycle will be aborted, the message LOW WATER will be displayed, and the Cycle Fail indicator will light.	• A power down has occurred and on power up the water electrode tip is dry.
High Pres.	Message is displayed, fail indicator lights up, and the program is aborted if the pressure rises 10 psi (0.6Bar) above the required sterilization pressure.	• A damaged solid state relay • A damaged heating element

Message	Message Description
Door Unlock	Message is displayed and the DOOR CLOSED LED indicator remains unlit, if the door is improperly closed when the START button is pressed. If the door accidentally opens during any stage of the cycle, the same message appears, the DOOR CLOSED LED indicator will turn off, and the system reacts as if the STOP key was pressed.
Man. Stop	Message will be displayed and the FAIL indicator will light after the STOP key is pressed for longer than 1 second.
Add Water	Message is displayed and the respective red LED indicates insufficient water in the water RESERVOIR. After water is added to the reservoir, the START button must be pressed again in order to start the required sterilization cycle.
Water Inlet	During the automatic water fill, the message WATER INLET is displayed, as information to the operator.
Power Dn.	If a power failure occurred during the running of a cycle, when power resumes a POWER DN message is displayed for several seconds, if a printer is installed it will print POWER DN. In addition the system automatically attempts to complete the STERILIZATION stage if the following parameters are met: • If the temperature drop is less than 4.5°F (2.5°C), sterilization resumes automatically. • If the temperature drop is more than 4.5°F (2.5°C), the cycle fails, POWER DN

Message	Message Description
	message is displayed and printed and LOW TEMP message is displayed. • If the pressure drop is more than 4 psi (0.27Bar), the cycle fails, POWER DN message is displayed and printed and LOW PRES message is displayed. If a power failure occurred during the HEAT stage, heating resumes, provided enough water remains in the chamber. If not, the cycle is aborted, the message “LOW WATER” is displayed. If a power failure occurs during the dry and exhaust stages, the unit will automatically resume operation once the power is back on. If a power failure occurs during the GLASSWARE PROGRAM, the system does not allow fast exhaust (as the exhaust valve is normally closed) during a power failure or when power resumes.
CYC Finish	When the cycle has been completed successfully the message CYC FINISH is displayed.

6.5 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.

1. Disconnect the power supply cord.
2. Drain the water from the reservoir and vessel.

Do not drop this device!

6.6 Loading and unloading the device

Safety:

Protective equipment and clothes and other safety instructions should be implemented in accordance with local and national regulations and/or rules!

For proper sterilization - Do not overload the chamber. Only autoclavable products shall be used; please refer to the materials or instruments manufacturer’s instructions for sterilization of unknown materials or instruments.

Loading:

Correct loading of the autoclave is essential to successful sterilizing for several reasons. Efficient air removal from the chamber and the load will permit steam penetration and saturation and allow proper drainage of condensate. Additionally, correct loading will reduce damage to packs and their contents and maximize efficient use of the sterilizer.

For detailed loading instructions, see section .

Unloading:

On completion of the cycle, the load shall be immediately removed from the sterilizer and a visual inspection made to ascertain that the load is dry, and that sterilizing indicators have made the required color change.

6.7 Printer

 **Cautions!**

Hazardous moving parts, keep fingers and body parts away.

For an external printer:

The print head may be hot and could cause severe burns. Allow the print head to cool.

Due to the high temperature exuding from the autoclave's upper water tank, please refrain from locating the printer or other equipment on the top cover of the device.

The printer is an optional device. If the autoclave is not equipped with a printer this section is not applicable.

Printer Operation:

The autoclave is equipped with a character printer, which prints a detailed history of each cycle performed by the instrument (for the record or for subsequent consideration).

The printing is made on thermal paper with 24 characters per line and contains the following information:

- Software version.
- Date and time of cycle start.
- Selected program and parameters.
- Sterilization pressure.
- Sterilization temperature.
- Sterilization time.
- Cycle identification.

When the sterilization cycle begins the printer starts printing the above data.

After the preliminary printing, the autoclave starts performing the sequence of operations of the cycle. The measured values of temperature and pressure are printed at fixed time intervals, according to the phase of the process, as shown in the table below.

The data is printed from the bottom up, beginning with the program name and ending with "O.K." for a complete cycle or "FAIL" for an aborted cycle.

For an example of a typical printout, see below.

PRINTER OUTPUT			DESCRIPTION
Autoclave No: 01			Number of the autoclave with respect to other units in the same location
Load number: 0005			Load number. Useful to determine when to clean the chamber. (Upon reaching 255 this number is reset to 0).
Operator: _____			To be filled in manually by operator.
O.K.			Cycle completed successfully
D20	220°F	00P	The time, temperature, and pressure during drying.
E20	251°F	02P	The time, temperature, and pressure during exhaust.
S20	273°F	31P	The time, temperature, and pressure during sterilization.
			Prints sterilization data every 1 minute.
S13	273°F	31P	The time, temperature, and pressure during sterilization.
S12	273°F	31P	The time, temperature, and pressure during sterilization.
H08	231°F	10P	The time, temperature, and pressure during heating.
H04	137°F	00P	The time, temperature, and pressure during heating.
			Prints heat up data every 4 minute.
H00	72°F	00P	The time, temperature, and pressure during heating.
MN	TEMP	PRES	
DRY: 30min			Drying time for selected program.
TIME: 08min			Sterilization time for selected program.
TEMP: 273°F			Sterilization temperature for selected program.
PROG: PKG			Selected program: Unwrapped instruments.
TIME: 15:12:06			Time sterilization cycle begun.
DATE: 07:31:00			Date sterilization cycle begun.
Version: T01EAWP			Number and version of the program.

Legend

MN	*Time elapsed in minutes*	*E*	*Exhaust stage*
H	*Heating stage*	*D*	*Drying stage*
S	*Sterilization stage*	*P*	*psi*

DPU-20 Printer Handling:

If the autoclave is equipped with a DPU-20 printer refer to this paragraph.

The printer is driven and controlled automatically by the control unit, while the autoclave performs a sterilization program.

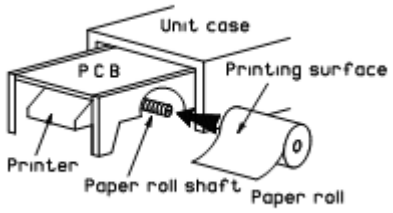


Figure 1

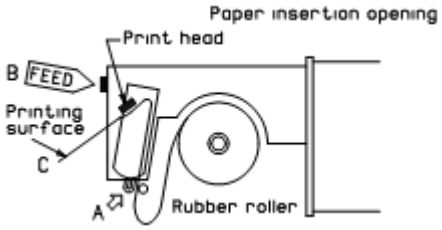


Figure 2

To set the paper roll in the printer perform the following steps:

1. Gently push the clips to remove the front panel, remove the panel and pull out the printer gently.
2. Set the paper roll on the shaft (See Figure 1). Since the outer and inner surfaces of the paper are different, set the roll so that the printing surface is the outer.
3. Gently push the paper face down into insertion opening (A) in Figure 2. Keep pressing the feed switch (B) until the paper comes out from the print head (C).
4. When the paper emerges from the print head, insert it in the paper cutter (the slot in the front panel) and reassemble the front panel on the unit.

   The paper roll is set inside the unit and the printer is ready for use.

   Note: If the paper is not pulled in by the rollers even when you press the feed switch (B) push the paper in.
5. To ensure a reliable operation of the printer perform the following:
   a. Turn the main switch to the OFF position.
   b. Turn the main switch to the ON position; press the feed switch at the same time. Verify that the printer performs an operation test by printing all the built-in characters.

The following precautions must be taken ensuring the proper operation of the printer:

- Avoid contact between the paper and the hot parts of the autoclave, as the paper will be blackened.
- Do not pull out the paper roll from the paper insertion opening.
- Use only the 58mm. wide thermal paper rolls, supplied by your dealer.

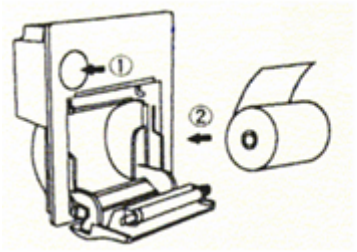
DPU 30 Printer Handling:

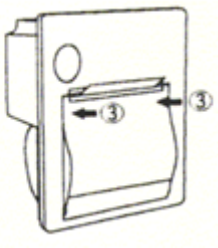
Setting Paper

If the autoclave is equipped with a DPU 30 printer, follow the instructions in this paragraph:

1. Press the paper cover open button and open the paper cover.

   Handle the paper cutter carefully not to cut your hand.
2. Set a paper roll as shown in the figure.
3. Close the paper cover by pressing both ends of the cover with the tip end of the paper emerging from the cutter.





Maintenance

1. Wipe off the soiling on the printer surface with a dry soft cloth with a weak neutral detergent. After that, wipe the printer with a dry cloth.
2. **Caution:** Never disassemble the printer. Failure to follow this instruction may cause overheating or burning of the printer or the AC adapter. Or an electric shock, which may lead to fires or accidents.
3. Never use the printer in a place of extreme humidity or any place where it can possibly be splashed by any liquids. If any liquids get into the printer, it could lead to fire, electric shock, or other serious accidents.
4. Never touch the thermal head immediately after printing because it becomes very hot. Make sure that the thermal head is cool before setting papers or cleaning the thermal head.
5. Power OFF the printer in any of the following cases:
    a. The printer does not recover from an error.
    b. Smoke, strange noise or smells erupt from the printer.
    c. A piece of metal or any liquid touches the internal parts or slot of the printer.
6. Notes on treatment of thermal papers:
    a. Store the papers in a dry, cool and dark place.
    b. Do not rub the papers with hard substance.
    c. Keep the papers away from organic solvent.

7. Sterilization Programs

The autoclave offers 3 sterilization programs, at temperatures of up to 134°C (274°F), with or without a drying stage and 1 accessory (dry only) program.

Three sterilization programs:

1. Unwrapped instruments
2. Wrapped instruments and porous loads
3. Glassware

Accessory program:

1. Dry only

Note: The nominal data of the program (default settings) can be changed to fit the needs of a particular office. This is done by means of the TEMP, STE.TIME, DRY TIME, keys in combination with the UP or DN keys, as described in section .

7.1 Unwrapped Instruments

For unwrapped instruments and materials, when the manufacturer recommends autoclaving at temperatures between 121°C and 134°C (250°F and 274°F) no preset drying stage required.

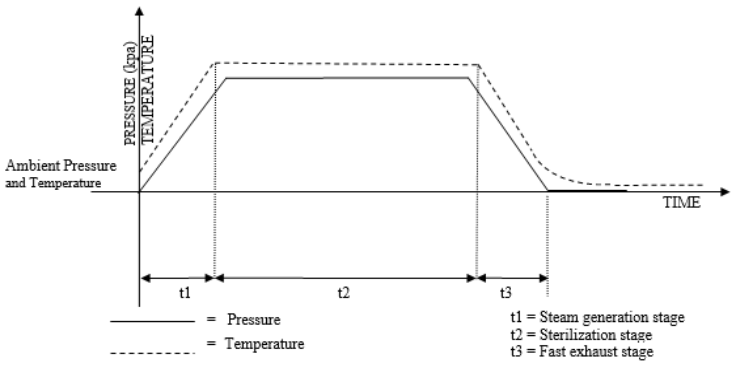
Nominal parameters default settings:

- Sterilization temperature: 134°C (273°F).
- Sterilization time: 3 minutes.
- Dry time: none.

Operations Sequence:

- Heating by actuation of electrical heaters until the sterilization temperature is reached.
- Sterilization temperature is maintained constant for the preset sterilization time.
- Fast exhaust, steam is exhausted out of the chamber at a fast rate until pressure drops to zero

Note: The sterility of instruments processed in unwrapped cycles cannot be maintained if exposed to non-sterile environment.



7.2 Wrapped Instruments and Porous Loads

For wrapped instruments and materials, when the manufacturer recommends autoclaving at temperatures between 121°C and 134°C (250°F and 274°F) with a drying stage.

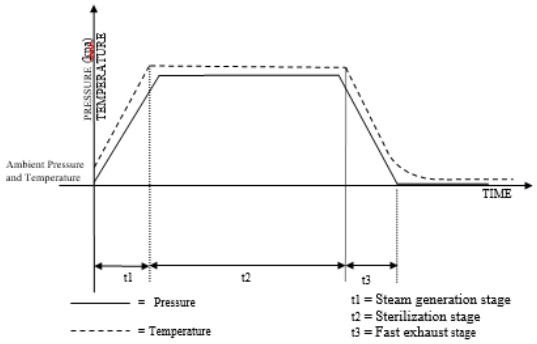
Nominal parameters default settings:

- Sterilization temperature: 134°C (273°F).
- Sterilization time: 7 minutes
- Dry time:

Models	Dry Time
EA/EKA	30 minutes
E/EK	60 minutes

Operations sequence:

1. Heating by actuation of electrical heaters until the sterilization temperature is reached.
2. Sterilization temperature is maintained constant for the preset sterilization time.
3. Fast exhaust, steam is exhausted out of the chamber at a fast rate until pressure drops to 4 psi abs. (124 kpa abs.).
4. Dry heating of chamber to remove leftover moisture from the instruments and wraps, 30 minutes for models EA/EKA and 60 minutes for models E/EK.



7.3 Glassware

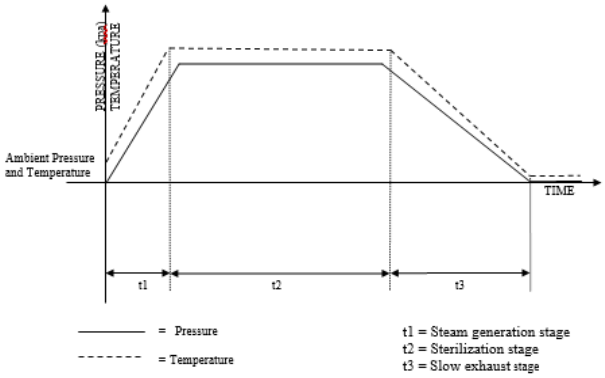
For all glassware intended for sterilization.

Nominal parameters default settings:

- Sterilization temperature: 121°C (250°F).
- Sterilization time: 30 minutes.
- Slow exhaust: 15 to 20 minutes.
- Drying time: drying time is not available in this program.

Operations sequence:

1. Heating by actuation of electrical heaters until the sterilization temperature is reached.
2. Sterilization temperature is maintained constant for the preset sterilization time.
3. Slow exhaust, heating is stopped, and steam is let out of the chamber at a slow rate until the temperature decreases to 85°C (185°F).
4. No drying is allowed.



7.4 Accessory (Dry Only)

The purpose of the accessory drying program is to offer an alternative in situations where the dry time in the wrapped or unwrapped cycle is insufficient. Rather than wait for the items to air dry or run another complete cycle with a longer dry time, just select the accessory drying program to continue the heat assisted drying process.

8. Maintenance Instructions

8.1 Preventive and Scheduled Maintenance

8.2 Daily Maintenance

Clean the door gasket with a mild detergent, water and a soft cloth or sponge. The gasket should be clean and smooth.

8.3 Weekly Maintenance

1. **ONCE PER WEEK**, clean the air jet. To ensure that the temperature inside the chamber rises properly it is necessary to keep the air jet clean. A dirty air jet will prevent indicator strips from changing color and cause spore tests to fail. See section .
2. Once per week clean and descale the chamber, copper tubes and the reservoir using **Chamber Brite** (see section).
3. Take out the tray holder and trays. Clean the tray holder and trays with detergent or a non-abrasive stainless-steel cleaner and water, using a cloth or sponge. Rinse the tray holder and trays immediately with water to avoid staining the metal.

   Caution: Do not use steel wool, steel brush or bleach as this can damage the chamber and trays!
4. Put a few drops of oil on the 2 door pins and door tightening bolt.
5. Clean the outer parts of the autoclave with a soft cloth.

8.4 Periodic Maintenance

1. Once every month clean and check the safety valve.
2. Replace the door gasket every 12 months, or as needed (see section).
3. Once a year inspect the locking device for excessive wear.

8.5 Replacing the Air Filter (models EA, EKA)

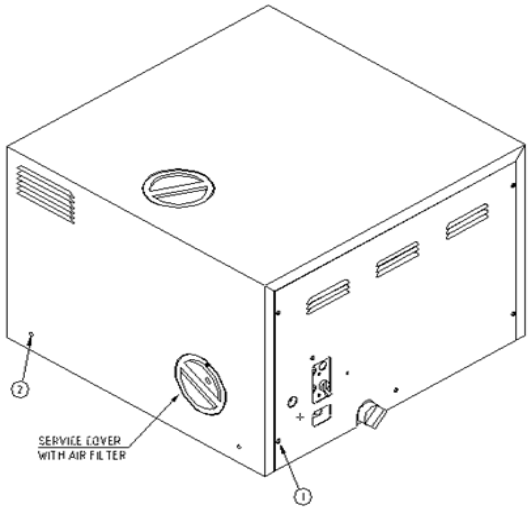
To facilitate drying the instruments with the door of the chamber closed, models EA and EKA are equipped with an air compressor and HEPA filter (0.2µm). During the drying stage the compressor draws air through the HEPA filter and forces the circulation of that air through the heated chamber to remove moisture from the wrapped instruments. The filtration of the air is performed by the bacteriological filter and depending on the usage of the autoclave and the surrounding environment that will determine the frequency of replacement.

The filter is mounted in an opening on the right sidewall of the autoclave enclosure, this is to allow easy access for replacing it (see picture below).

To replace the filter proceed as follows:

1. Remove the securing screws and then the filter cover by turning the cover counterclockwise until the handle is at a vertical position.
2. Pull out the cover with the filter attached.

3. Disconnect the flexible tube from the filter.
4. Replace the filter with a new one, connecting it to the flexible tubing.
5. Reassemble the cover and lock it into position by turning it a ¼ turn.
6. Fasten the securing screws.



8.6 Draining the Reservoir

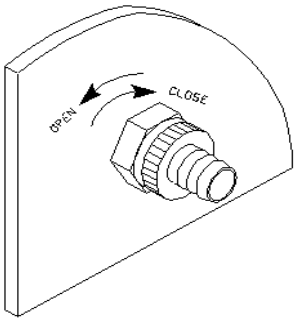
Warnings!

- Before starting, make sure that the electric cord is disconnected and there is no pressure in the autoclave.
- Never reuse waste water.
- Waste water should be brought into the public net in accordance with the local rules or requirements i.e. ONLY NON- HAZARDOUS LIQUIDS SHALL BE DISPOSED IN PUBLIC SEWAGE!

The drain valve is located on the front left side of the autoclave after the door is opened. The function of the drain valve is to drain the water reservoir.

1. Connect the silicone hose, supplied with the autoclave, to drain into a bucket.
2. Turn drain valve counterclockwise to the open position.
3. Fully drain the reservoir.
4. With a quart of tap water flush out the reservoir.
5. Turn drain valve clockwise to the close position.
6. Connect the electric cord to power source.
7. Fill the reservoir with distilled water to just below the safety valve (see section).

8. Turn on the main power switch.
9. The autoclave is now ready for use.



8.7 Cleaning Air Jet

(Located in the water reservoir.)

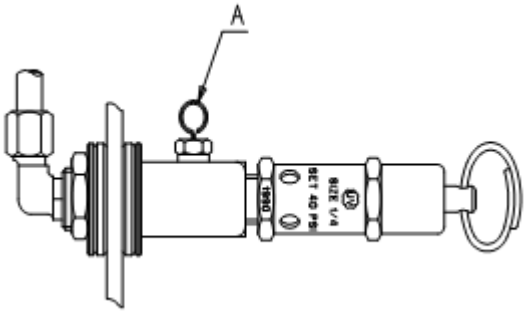
A dirty air jet is the number one cause of failed spore tests.

The elimination of air from the sterilization chamber during heat up is critical to the proper operation of the autoclave. Failure of the air removal system will be responsible for incomplete sterilization, indicator strips that do not turn, failed spore tests and aborted sterilization cycles. A clogged air jet will result in receiving the error message “Low Heat”.

The air jet consists of a small orifice with a clean out wire inserted in it (wire is permanently installed and will not come out). It is required that the air jet be cleaned once per week or more often, if necessary, to remove any accumulated dirt and debris.

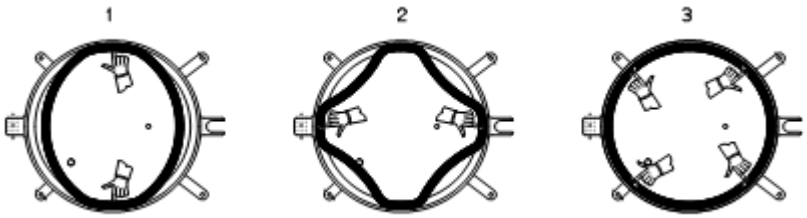
It is preferred to clean the air jet when the unit is running a cycle and under pressure. This is so that any loosened debris will be blown away, however, it can be done while the unit is idle.

1. Remove the water reservoir cover.
2. Clean the hole of the jet by manipulating the air trap wire back and forth 10 times.



Note: It is important to clean the hole of the air trap, as described at point 2 before starting operation of the autoclave, for the first time.

8.8 Replacing the Door Gasket



1. Pull off the gasket from the door groove.
2. Install the new gasket as described in drawings 1, 2 and 3 above.

Cuation!

This gasket is designed with a trapezoidal cross section. The gasket should be placed with the widest side towards the door.

8.9 Checking the Safety Valve

(Located in the water reservoir)

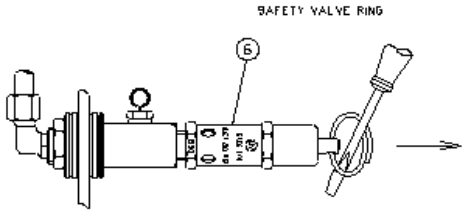
To prevent the safety valve from becoming blocked, it is necessary to allow the steam pressure to escape through the valve. This procedure should be done every month as follows:

1. Operate the sterilization cycle according to the manual.
2. Allow a pressure of approximately 30 psi (260 kpa)to build up in the chamber.
3. Turn the timer back to 0 minutes.
4. Remove the water reservoir cover.

   Caution!

   This next step will expose you to HOT STEAM.

   To avoid being burned by hot steam, do not place your face over the safety valve.
5. Pull the ring of the safety valve using a tool, i.e., screwdriver, hook, etc. and open the safety valve for 2 seconds, then release. Be careful not to burn your hands.
6. Wait until pressure decreases to zero, only then can the door be opened.



8.10 Replacing the Fuse

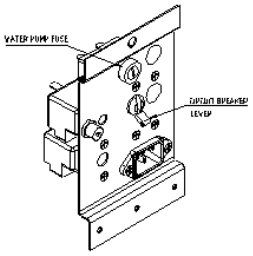
Caution!

Use a screwdriver to unlock the fuse holder cover by turning it counter clockwise ¼ turn, and pull it out.

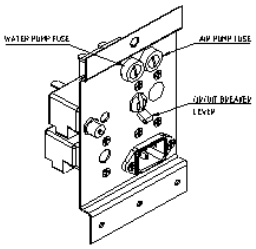
Insert a new fuse into the holder and turn the cover clockwise until locked.

Make sure that the correct fuse is installed.

Fuse	Amps.	V
Water Pump Fuse	1.25	___
Air Pump Fuse	2.0	120
Air Pump Fuse	1.25	230



For autoclaves
Models E, EK
(without an air pump)



For autoclaves
Models EA, EKA
(with an air pump)

8.11 Cleaning Water Outlet Strainer

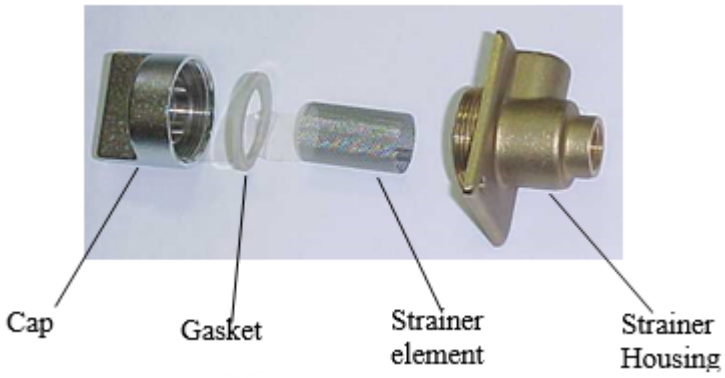
Caution!

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

The strainer's cover is HOT

- Do not touch the strainer's cap, mounted on the exhaust line, during and shortly after operation. Touching the hot strainer's cap may cause severe injuries.
- If maintenance operation is performed while strainer cap is hot, use heat resistant gloves to avoid injuries.

1. Open the strainer cap.
2. Remove the strainer element.
3. Rinse the strainer with water, using a brush if necessary.
4. Reinstall the strainer element.
5. Close the strainer cap



8.12 Cleaning Table Top Autoclaves with Chamber Brite ™

CHAMBER BRITE ™ is a cleaning and descaling agent designed specifically for the cleaning and removal of water deposits, oxides and other sediments that are found in steam sterilizers. The material is a combination of acidic salts and additional cleaning materials. Chamber Brite ™ autoclave cleaner has been formulated specifically to be a fast, powerful and easy to use cleaner for steam sterilizers.

If the autoclave is not cleaned regularly dirt and debris will build up and clog the tubing and solenoid valves. This dirt can also be transmitted to the instruments during sterilization. In addition, a layer of dirt on the stainless-steel chamber traps moisture against the metal and will lead to the chamber becoming porous and failing.

It is recommended that your autoclave be cleaned with CHAMBER BRITE ™ once per week.

Caution!

NEVER use bleach, steel wool, a steel brush or anything abrasive to scrub or clean the Chamber.

Cleaning Procedure:

1. **Important** – all steps in this procedure must be completed without interruption.
2. When the autoclave chamber is cold, remove instruments and trays from the autoclave.
3. Open the door and spread the contents of a packet in a straight even line along the bottom of the chamber, from back to front.

4. Select and start program No.1 (**without dry**). When the cycle is finished it will automatically exhaust.

5. At the end of the exhaust cycle drain the water from the reservoir.

6. Fill the water reservoir with distilled water.
7. Repeat a sterilization cycle without Chamber Brite ™ powder, to remove any excessive dirt in the pipes. Select and start program No. 1 (**without dry**). When the cycle is finished it will automatically exhaust.
8. At the end of the exhaust cycle drain the water from the reservoir.
9. Turn the autoclave off and allow chamber to cool.
10. Remove the tray holder; rinse and wipe the interior of the chamber with a damp cloth.

11. Fill the reservoir with distilled water or mineral free water only.

12. Press the manual water fill button and allow a small amount of water (2-4 ounces) to fill chamber and flush out the fill tube. Remove water from chamber.
13. The instrument is ready to use.

Important: DO NOT sterilize instruments during the cleaning process!!!

Caution!

Keep out of reach of children. Contains mildly acidic ingredients. Avoid contact with the skin, eyes, or clothing. Wash hands well after touching the powder, in the case of eye contact flush with continuous running water for at least 15 minutes. If irritation persists, get medical attention. If accidentally swallowed, do not induce vomiting, drink large amounts of water, and obtain medical attention. MSDS is available upon request.

For models 2340, 2540 use one packet of CHAMBER BRITE™.

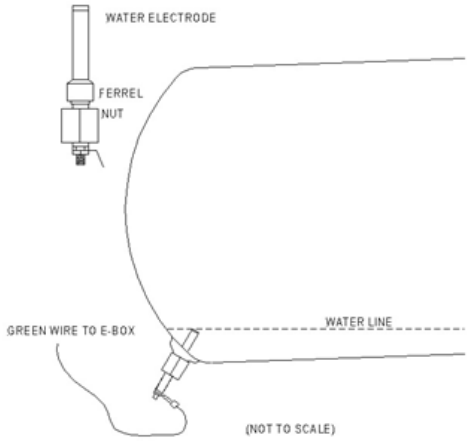
For models 3140, 3850, 3870 use two packets of CHAMBER BRITE™.

Clean every 20 cycles or as needed.

8.13 Water Sensor Cleaning

It is required that the water sensor be cleaned at least once per week.

The water sensor is located in the rear of the chamber. It is easily cleaned using a damp cloth or sponge, you may use a mild soapy solution if you like. It is important to wipe the sides of the sensor as well as the tip, to remove any dirt or debris that may have built up.



9. Troubleshooting

This troubleshooting chart enables the user to solve minor malfunctions, prior to requesting service.

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

Problem	Solution
The machine is not responding	• Make sure the main switch is in the 'On' position. (see Front View drawing) • Make sure the power cord is properly connected to the machine and the mains. (see Rear View drawing) • Check the reset button on the cut-out thermostat. (see Rear View drawing) • Make sure the circuit breaker has not tripped. Lift the circuit breaker lever.
Low Heat' is displayed	• Check the air trap (inside the water reservoir). (see section) • Make sure the machine has the proper amount of sterilization load.
Low Water' is displayed	• Check that the door is fully closed, the door gasket is seated and there is no steam leakage. replace the door gasket if necessary. (see section) • Check the leveling of the machine. (see section)
Low Pres' is displayed	• Clean the water level electrode inside the vessel. (see section) • Check that the door is fully closed, the door gasket is seated and there is no steam leakage. replace the door gasket if necessary. (see section) • Check the leveling of the machine. (see section)
Low Temp' is displayed	• See Low Water problem above • The sterilization time has been set for too long of a period, allowing the chamber to run dry

Problem		Solution
High Temp' is displayed		• If this message is displayed during heat up it indicates a bad temperature sensor. • Heating elements are remaining on instead of cycling on and off. • In both cases call for a technician.
High Pres' is displayed		• Air jet is clogged. Clean air jet according to section . • Heating elements are remaining on instead of cycling on and off. Call for a technician. • Temperature sensor (PT100) is faulty or dirty. Call a technician.
If equipped with a printer	The printer prints, but nothing is printed on the paper	• Make sure the paper is mounted in the right way. Only one side of the paper is printable. (see DPU-20 Printer Handling)
	The printer does not print	• Make sure the paper is inserted in the printer. (see DPU-20 Printer Handling) • Switch off the machine and switch it back on while pressing the feed button on the printer. If the printer prints a test printout, the printer is O.K. and there is a problem with the electronics. Contact your dealer to solve the problem. • If the printer does not print the test printout, there is a problem with the printer. Contact your dealer to solve the problem.
	When the machine is switched on, the printer gives paper feeds all the time	• Make sure the 'feed button' on the printer is not stuck.

Problem	Solution
The machine is leaking at the door	• Make sure the door is tightened enough and the door gasket is sealing the Chamber. Replace the door gasket. (see section)
When running a cycle, the exhaust stage takes a very long time	• If you are running a 'For all glassware intended for sterilization. program this is normal. The slow exhaust will take from between 15 and 20 minutes. (see section)
Water does not exit chamber due to clogged outlet strainer	• Clean strainer according to instructions. (see section)
The drain is clogged	• Open drain by turning counterclockwise. Place a heavy object over the reservoir cover. Blow compressed air into the drain, this should force any debris back into the reservoir. Clean out the reservoir. • Disassemble the drain valve by turning counterclockwise past the stop point. Remove the valve and clean, blow out the line as needed (see above). Reassemble the valve by turning clockwise, make sure to press the large "O" ring into the groove on the autoclave.
Spore test are failing or indicator strips are not turning	• Clean the air jet as per section . • Make sure the sterilization time and temperature are set correctly, if in doubt use the default settings. • Make sure the autoclave is not to heavily loaded. (see section)
Wrapped items come out wet	• Drying cycle may be too short. () • Autoclave may be overloaded. (see section) • The chamber strainer may be clogged. (see section) • The HEPA filter may be clogged. (see section)
Wraps come out burned	• Water sensor may be dirt. (see) • Wall outlet voltage may be to high. • Items may be touching the walls or bottom of the chamber. Load autoclave according to instructions in section .

Problem	Solution
Instruments are rustin	• First to determine true rust, use a pencil eraser to remove the brown spot. If there is no pitting then the instrument is just dirty (see section and section). If there is pitting beneath the brown spot then the rusting may be caused by minerals in the water used for rinsing (see section). • Use only distilled water for sterilizing. • Make sure dissimilar metals (carbon steel, stainless steel, etc.) have not come into.
Keyboard does not respond	• Press the STOP key for 2 seconds to abort any program that may still be running.
Autoclave takes too long to heat up	• Clean the air jet. (see section) • Check for proper voltage at the wall outlet
Loud noise coming from reservoir	Sterilization temperature set to high. Maximum setting 274ºF (134ºC)
Drying takes too long	• The autoclave may be overloaded (see section) • Replace the HEPA filter (see section)
Chamber not filling	• Check water level in reservoir. • Check for an obstruction at the bottom of the reservoir blocking the pick up tube. • Clean the water sensor. (see section) • Try filling the machine manually using the Manual Inlet key. (see section)
Chamber very dirty	• Use Chamber Brite ™ to clean the autoclave, very dirty machines may require two cleanings. (see section)
Trays and rack very dirty	• Remove the trays and rack and clean as per instructions in section .
If the problem persists, contact your dealer or Tuttnauer, for further assistance.	

Cat. No. MAN205-0112000EN Rev. V(22)