

# TECHNICIAN MANUAL

**Electronic Table -Top Autoclaves**  
**models 1730, 2340, 2540, 3140, 3850, 3870**  
**E, EK, EA & EKA**

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## ***1 INTRODUCTION***

This manual, together with the operator's manual, forms the complete edition of the Operation and Maintenance instructions. This manual is intended for the use of the technician. It is forbidden for unqualified and unauthorized personnel to service the autoclave in accordance with the instructions in this manual. Any unauthorized service may result in the invalidation of the manufacturer's guarantee.

The qualified technician shall be an authorized electrician with the right qualifications in electronics and shall be familiar with the local technical/electrical regulations.

## ***2 SYMBOL DESCRIPTION***



**Caution! Consult accompanying documents**



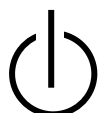
**Caution! Hot surface.**



**Caution! Hot steam.**



**Protective earth (Ground)**



**Stand by**

### 3 TESTS

#### 3.1 Installation Tests



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

- a. **Leveling Check**  
Check that the autoclave is leveled.
- b. **Leakage current test**  
Check the precise operation of the earth leakage relay.
- c. **Continuity Check**  
Check the continuity of the grounding connection.
- d. **Safety Check**  
Check the safety elements; safety valve and the door locking mechanisms.
- e. **Programs Check**  
Run basic programs of the autoclave and check the operation sequences, the sterilization parameters etc.
- f. **Integrity Check**  
Perform a visual check to verify that there are no dents, scratches, broken gauges, etc.
- 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.

#### 3.2 Periodical Tests

ERIOD	TEST
1 months	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
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!

## **4 WATER QUALITY**

### **4.1 Water for Generating Steam**

The distilled or mineral – free water supplied to the sterilizer shall be according to the table below:

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

**(In compliance with ISO 11134 and ISO 13683).**

Evaporate residue	< 15 mg/l
Silica	< 2 mg/l
Iron	< 0.2mg/l
Cadmium	< 0.005 mg/l
Lead	< 0.05 mg/l
Rest of heavy metals	< 0.1 mg/l
Chloride	< 3 mg/l
Phosphate	< 0.5 mg/l
Conductivity	< 50 µs/cm
pH	6.5 to 8
Appearance	Colourless, clean, without sediment
Hardness	< 0.1 mmol/l

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

***Attention:***

***We recommend testing the water quality once a month. The use of water that does not comply with the table above may have severe impact on the working life of the sterilizer and can invalidate the manufacturer's guarantee.***

### **4.2 Reverse Osmosis**

A Reverse Osmosis system may be used to improve the quality of the water used to generate steam in the autoclave chamber. The use of mineral free will contribute to better performance and longer life of the autoclave.

## 5 **IN-OUT TEST**

Before performing any trouble shooting on the autoclave, perform an “in-out test”. In this test the technician tests all the components of the system as follows:

1. Turn on the autoclave.  
**Note:** if, for any reason, one of the parameters is corrupted and out of range, the autoclave will perform an automatic reset to the parameters set by the manufacturer upon turning on the autoclave.
2. Press the Up button until the autoclave beeps. This beep indicates that the autoclave is in “IN-OUT TEST” mode.
3. Release the button.
4. To proceed, press the UP button. Each time the UP button is pressed the test advances one step, and the tested component is displayed on the display.
5. When a solenoid is tested, verify that it is activated by touching it with a screwdriver. If the solenoid is magnetized – it is activated.
6. To stop the IN-OUT TEST press the Up button.

DISPLAYED NOTICE	ITEM ACTIVATED	REMARKS
WATER V + WATER PUMP	Water valve + water pump	Verify water enters the chamber
EXH	Exhaust valve	—
HEATERS	Heating elements	Begins heating. Do not maintain for long time since it works without water.
AIR	Air valve	—
WATER P	Water pump	Verify you hear the pump is operating.
DOOR L	N/A	N/A
PUMP	Air pump	Verify you hear the pump is operating.
FLOAT 1	Water level switch indicates “no water”	Change position of the float switch and verify that the display reflects the change.
FLOAT 0	Water level switch indicates “enough water”	
DOOR 0	Door switch indicates “closed door”	Press and release the door switch and verify that the display reflects the change.
DOOR 1	Door switch indicates “open door”	
THERM 0	Safety thermostat grounded	—
THERM 1	Safety thermostat not grounded	—
PT100	Temperature sensor	Displays ambient temperature.
PRESSURE	Pressure transducer	Open door and verify ambient temperature is displayed.
ELECTRODE X	Water level electrode	X may vary between 100 and 255. 255 indicate “no water in chamber” 150 indicates “water in chamber” or “electrode short- circuited”



## **6 TROUBLESHOOTING**

- a) At the customer's location, avoid replacing any component, which is not connected to a socket or to a flat cable. If necessary, replace the complete board or box. If problem persists service the autoclave at the service lab.
- b) Whenever the AJUNC3 board of the complete electrical assembly (CB90030) is replaced without replacing the pressure transducer, or after replacing the pressure transducer, the pressure must be re-calibrated.
- c) When working with the autoclave, DISCONNECT the power cord from the socket or turn the circuit breaker OFF.

### **6.1 Turning on the system, no response**

- a) Check the voltage at the terminal (is the power cord damaged? change the power cord if necessary).
- b) Check the flat cable connecting the PREDG and the AJUNC3, replace it if necessary.
- c) Check the circuit breaker, if it is off, turn it on.
- d) Check the cut - off position pushes it in and turn it on.
- e) Check the power supply input fuse and replace the fuse if necessary.

If the network input is o.k., the problem must be with one of the elements along the line, the power supply, the PREDG or AJUNC boards and the elements they are connected to.

- f) Check the voltages by means of connecting the Test board to JP14 on the AJUNC 3 board as detailed in the voltage checking procedure.

#### **6.1.1 If there is no 12V nor 5V**

- a) Does the power supply receive the network voltage?
- b) Is the power supply output OK? Disconnect the connector to JP3 (AJUNC3 board) and check for voltage on the female connector no. 12V at the female connector indicates a faulty power supply that should be replaced. At the client's location replace the whole electrical box (C B 90030). 12V at that location indicates that the power supply is functioning and that the problem is somewhere else.
- c) Check the AJUNC3 board. Disconnect the fan (JP5), the valves (JP2) and the printer (if present). If disconnecting any of these elements brings up the voltage, that element is damaged and has to be replaced.
- d) Disconnect the PREDG board and the printer from the AJUNC 3 board. If any of these elements are faulty, 5V appears as it is disconnected. If there is still no 5V, the power supply is damaged.

### **6.2 System is ON - display is lit**

If the other LEDS are functioning the display is most likely damaged. Replace the PREDG board.

- 6.3 *System ON, display lit, erroneous or fragmented digits***  
The reasons for that may be faulty Real Time Clock, displays or microcontroller. Replace them or replace the complete PREDG board.
- 6.4 *System ON, display lit, digits are not visible***
- ◆ Check for 5 V between TP1 and TP17
  - ◆ If yes, calibrate POT 1 on PREDG board.
  - ◆ If digits remain invisible, this may be due to a faulty display or a faulty microcontroller. Replace them or replace the complete PREDG board.
- 6.5 *System ON, key responds without beeping***  
The problem may be with the buzzer or the buzzer driver. Replace the complete PREDG board, replace the buzzer or transistor 2N2222A, Q1.
- 6.6 *Exhaust valve is always on***  
The problem could be with the solenoid, the transistors, or the digital control, or a bad connection.
- ◆ Check and connect or replace all connections to and from the exhaust valve.
  - ◆ The problem could be with Q4 or Q5 on the PREDG board. If after pressing START and the water enters the chamber, the voltage on TP11 is between 10V - 12V the control and the transistors are O.K. If not, replace the PREDG board. At this point disconnect connector JP2 from the AJUNC3 board, and check the valve's control.
- If the connection to the valve is OK, (please refer to the wiring diagram) there must be a mechanical problem with the valve or the solenoid may be damaged.
- If the control is faulty, check and connect the flat cable between AJUNC3 and PREDG, replace the cable if necessary. If this does not help, there may be a problem in the LATCH DRIVE at U4 in PREDG. In that case the electronics unit should be replaced.
- 6.7 *Exhaust valve is always off***
- ◆ Check and connect or replace the connector between the EXHAUST valve and the AJUNC3.
  - ◆ Repeat transistors and control checks as in 7.6 but this time the voltage for the transistors should be vice versa: 0.0-1.0 DC. volt (on TP11) for open position.
  - ◆ Check and replace the valve or the coil.
- 6.8 *Water valve is always on and there is a continuous flow of water into the chamber.***
- ◆ Check the valve's solenoid and the control circuit as you have checked the respective exhaust valve and circuit. The valve could also be checked by pressing the MANUAL water inlet key. If water flows in the chamber, or if there is no flow of water once the system is initiated, the valve and its control are o.k., but the water level detector electrode may be damaged, or the connection between the electrode and the circuit may be bad.
  - ◆ Check wire and connector connecting electrode to AJUNC3 board.

**6.9 Inlet key does not let water into the chamber**

- ◆ Check if this key is faulty. If it beeps when pressed it is O.K. if not, replace the keypad. If this does not help, replace the complete PREDG and keypad unit.
- ◆ Check the float at the water reservoir by manipulating it using a screwdriver or a tool and repair/replace it. If the float is functioning, the problem could be with the control circuit at the PREDG board: the test board between TP1 (GND) and TP10 (water valve): GOOD = 0.0V to 0.05V.
- ◆ If the control is OK, there may be a problem with the valve itself or with its connector.
- ◆ Check and replace the coil if necessary.

**6.10 Pressure stays close to 100 kPa (0 psi), temperature does not exceed 110 - 115 °C (207 °F) or, water inlet lasts a longer time than usual**

This phenomenon is most likely due to malfunction of the air valve. The air valve's normal operation is as follows:

OPEN whilst turning the system on, OPEN throughout WATER INLET and HEAT until temperature has reached 90°C or 194°F, CLOSED from that stage on, and OPEN during DRY.

The valve's control on the AJUNC3 board should act as follows:

0.0V = valve OPEN

5.0V = valve CLOSED

If the problem lies on the AJUNC 3 board it should be replaced. It is recommended to replace both the AJUNC3 and the solenoid because a damaged solenoid may affect the AJUNC3 board. If the control circuit on the AJUNC3 is OK, the problem is probably with the PREDG board.

**6.11 Heaters are always ON or OFF**

**Warning: If you need to tighten a screw, make sure to do so only when the power cord is disconnected.**

- ◆ Check the heaters connections.
- ◆ Check the cutoff thermostat position and turn it clockwise to the end.
- ◆ Check the control at TP1 and TP12 for ON = 0.0V, OFF = 5v
- ◆ Check connections between AJUNC3 to SSR at TP4.
- ◆ Does AC voltage enter the SSR at AC connector and SSR pin 2?
- ◆ Is SSR output the AC voltage? Check AC connector and at SSR pin 1.
- ◆ Is the control OK? Check the SSR for 5.0V between pins 3&4. If control is OK, but SSR output is not the AC voltage, replace the SSR.

**6.12 Heaters o.k. but autoclave does not reach sterilization temperature**

- ◆ Check and calibrate the cutoff position.
- ◆ Check and clean/ replace leakage at the exhaust valve.
- ◆ It is also possible that there is a calibration variance, check the GAIN pressure calibration, perhaps it should be lowered or, the GAIN temperature should be increased.
- ◆ Another possibility is that insufficient water level in the chamber does not allow the pressure to build up. Check the water level detector electrode, or the leveling of the autoclave.

**6.13 *Fan is not on during the cycle***

- ◆ Check and connect properly the FAN'S connector at JP5 on the AJUNC3 board.
- ◆ Disconnect FAN and check the control TP1 and TP-13:

ON = 0.0V

OFF = 5.0V

**6.14 *Pressure display is incorrect (discrepancy between ANALOG and Digital displays)***

- ◆ Re-calibrate the displayed pressure by manipulating POT2 on the AJUNC3 board.
- ◆ Check the MPX2200A pressure transducer between TP2 & TP3:
- ◆ Working condition = 20mV for 100 kPa.
- ◆ If pressure transducer is faulty, replace it, and calibrate it according to the instructions in the Chapter on Calibration.
- ◆ If the pressure transducer is OK but display incorrect, replace the AJUNC3.

**6.15 *Temperature display is incorrect***

- ◆ Check the temperature sensor PT100.
- ◆ Check the calibration of the temperature circuit.

**6.16 *ADD WATER (to reservoir) Indicator is always ON***

- ◆ Check the connector at JP2 on AJUNC3 board.
- ◆ Check if the float at the water reservoir is stuck.
- ◆ Check the input: TP1 and TP8 FULL = 0.0V, EMPTY = 5.0V
- ◆ Check the float's buffer, it may be, the input at U5 on PREDG is damaged. PREDG board should be replaced.

**6.17 *DOOR CLOSED indicator is always ON/OFF***

- ◆ Check and fine tune the switch at the upper front left side of the autoclave, while the door is open. Check the switch with an ohmmeter. If the microswitch is damaged, replace it.
- ◆ Check the LED, if it is burnt, change the PREDG and keypad.
- ◆ Check the connector between microswitch and AJUNC3 on TP2.
- ◆ Check the connection on GND to the microswitch with an ohmmeter and be sure that the GND to the micro switch.
- ◆ If the switch and microswitch are OK, buffer at U5on PREDG may be damaged, in that case, replace the PREDG board.

***Note:***

***If replacing the microswitch is necessary, VERIFY THE ELECTRIC CORD IS DISCONNECTED.***

**6.18 *Start key does not let water into the chamber***

- ◆ Follow previous procedures for float, controls and valve.
- ◆ Check the water level electrode: Connect TP1 and TP6, close the door, press START.
- ◆ If 4V the electrode is short circuited or faulty. Same procedure may be followed without pressing START, if the door is open.

**6.19 *Back-up memory does not function does not function, new parameters are not stored in memory***

- ◆ The backup battery in the Real Time Clock is damaged so component U2 should be replaced.

**6.20 *LOW PRESSURE message is displayed***

***This is usually due to insufficient water inside the chamber.***

- ◆ If the water valve is OK, the electrode detecting the water level may be damaged. It may detect water in the chamber although it is actually empty.
- ◆ The normal operation procedure of the electrode is to let water in the chamber 8 additional seconds after it has detected a sufficient water level.
- ◆ If the electrode is short circuited, it may let water into the chamber for only a few seconds.
- ◆ Check if there is any contact between the electrode and the chamber. Use an ohmmeter for that purpose. Make sure none of the tools to be sterilized has any contact with the electrode. If the problem persists, the electrode circuit on the AJUNC3 board may be short circuited or damaged.

**6.21 *Clock and date are inaccurate, new data is not stored in memory***

- ◆ If new data (operator's own parameters) is not kept in memory, then the backup battery is down, and the same unit has to be replaced as the backup battery is an integral part of the Real Time Clock. Change the Real Time Clock (U2), on PREDG.
- ◆ The battery manufacturer offers a ten-year guarantee, but it is recommended to change the Real Time Clock including the integrated backup battery once every 8 years.

**6.22 *Unpredicted function of the autoclave***

- ◆ Check the input and output voltages. Disconnect the printer as it may be causing a short circuit if it is faulty. If the problem persists, the keypad may be short circuited, replace it with the PREDG board, if that does not help, replace the complete electronic system.

**6.23 *Displaying of low temperature***

If LOW TEMPERATURE is displayed, the following should be checked:

1. The proper amount of water is in the chamber.
2. The air jet has to be checked and cleaned.

#### **6.24 Memory reset**

To reset the memory of the autoclave control unit backed up by a battery, proceed as follows: Verify that there is no pressure in the autoclave chamber.

1. Turn the main switch to OFF position.
2. Press the STOP key. At the same time turn the main switch to ON position.
3. Keep pressing the STOP key until the program parameters are displayed.
4. Set the Sterilization temperature, Sterilization time, Date and Time.
5. Repeat the procedure of automatic water filling.

#### **6.25 Cycle counter reset**

To reset the cycle counter proceed as follows:

1. Press the STOP key a few times, till CODE 102 is displayed.
2. Press the UP key (8) up to CODE 134.
3. Press any key to continue.

The counter is now reset.

#### **6.26 EKA ONLY - Air pump and valve always ON or OFF**

- ◆ Check the S.S.R2 in the electric box.
- ◆ Check if TP 18 is in 0.0V if on and 5.0V if off, if yes replace PREDG.

If not replace the AJUNC3 board.

#### **6.27 EKA - Air pump is always on, valve is off**

- ◆ The problem is in the pump or in SSR2 located in the electric box.

#### **6.28 Pump is operating but no or low water flow.**

**Check pipes connecting the water reservoir, strainer and pump.**

- 1 Air accumulates at the pump inlet. Disconnect pipe from the pump, let water flow to remove air accumulation and reconnect pipe.
- 2 Pipe is clogged. Clean pipe.
- 3 Strainer is clogged. Clean strainer according to instructions.

#### **6.29 Water does not exit chamber.**

Outlet strainer is clogged. Clean strainer according to instructions.

## **7 REPLACEMENT OF COMPONENTS**

### **7.1 Safety Tests after Repair**



#### **ATTENTION!**

After every repair or dismantling the enclosure, the autoclave should pass two safety electrical test 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 and the circuit breaker.
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 Megger.
5. Connect the earth pins to the earth pole on the Megger.
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.

## 7.2 Replacing the Safety Valve



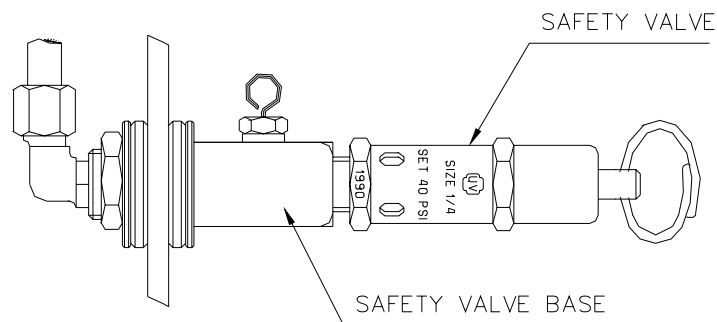
### Caution!

*Before starting, be sure that the electric cord is disconnected and that there is no pressure in the autoclave.*

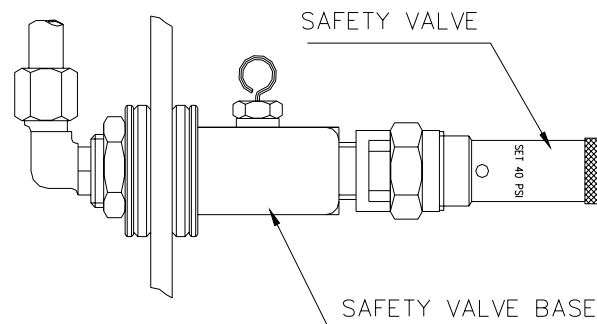
*These instructions are valid for both, PED and ASME type safety valves.*

1. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
2. Remove the water reservoir cover.
3. Unscrew the safety valve and remove it from the safety valve base.
4. Replace the valve with a new safety valve (install an original only!). Use Teflon tape for sealing the thread.
5. Perform one cycle and verify that the valve operates correctly.

### ASME approved Type



### CE marked Type





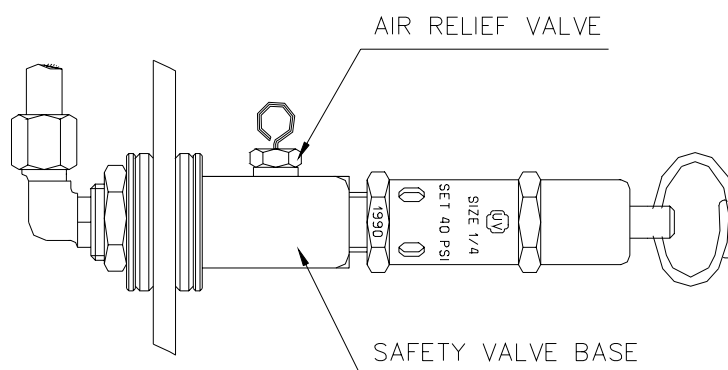
### 7.3 Replacing the Air Relief Valve



#### **Caution!**

***Before starting, be sure that the electric cord is disconnected and that there is no pressure in the autoclave.***

1. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
2. Remove the water reservoir cover.
3. Remove the water reservoir silicon gasket.
4. Unscrew the air relief Valve with a 10 mm wrench and remove it from the safety valve base.
5. Replace the valve with a new air relief (install an original only!). use Teflon tape for sealing the thread.
6. Test any autoclave cycle to verify that the valve operates correctly.



#### 7.4 *Replacing the Air-Relief/safety-relief Valve block*

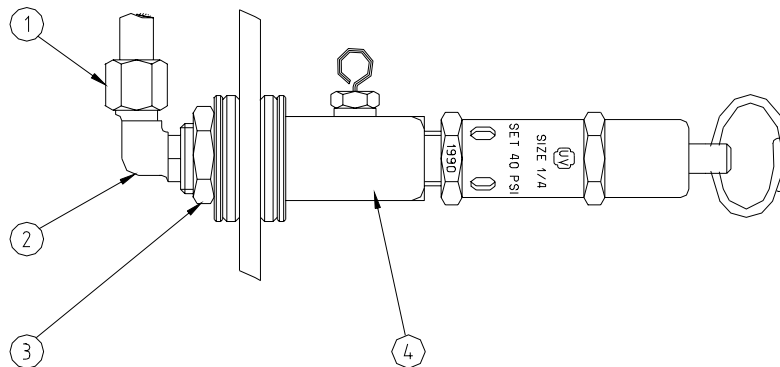


##### **Caution!**

*Before starting, be sure that the electric cord is disconnected and that there is no pressure in the autoclave.*

In case the water reservoir is deeply contaminated (soil, lime stone. etc.) it is recommended to replace the entire unit.

1. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
2. Remove the water reservoir cover.
3. Remove the water reservoir silicon gasket.
4. Unscrew and remove nut (1) with a 1/2” wrench.
5. Remove angle 1/8”-1/4” (2) from the relief valve base.
6. Unscrew and remove nut (3).
7. Remove the air-relief-safety valve block (4).
8. Install the new unit using Teflon tape for sealing the thread.
9. Perform one cycle and verify that the valve operates correctly.



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### 7.5 *Dismantling the Outer Covers of the Autoclave*

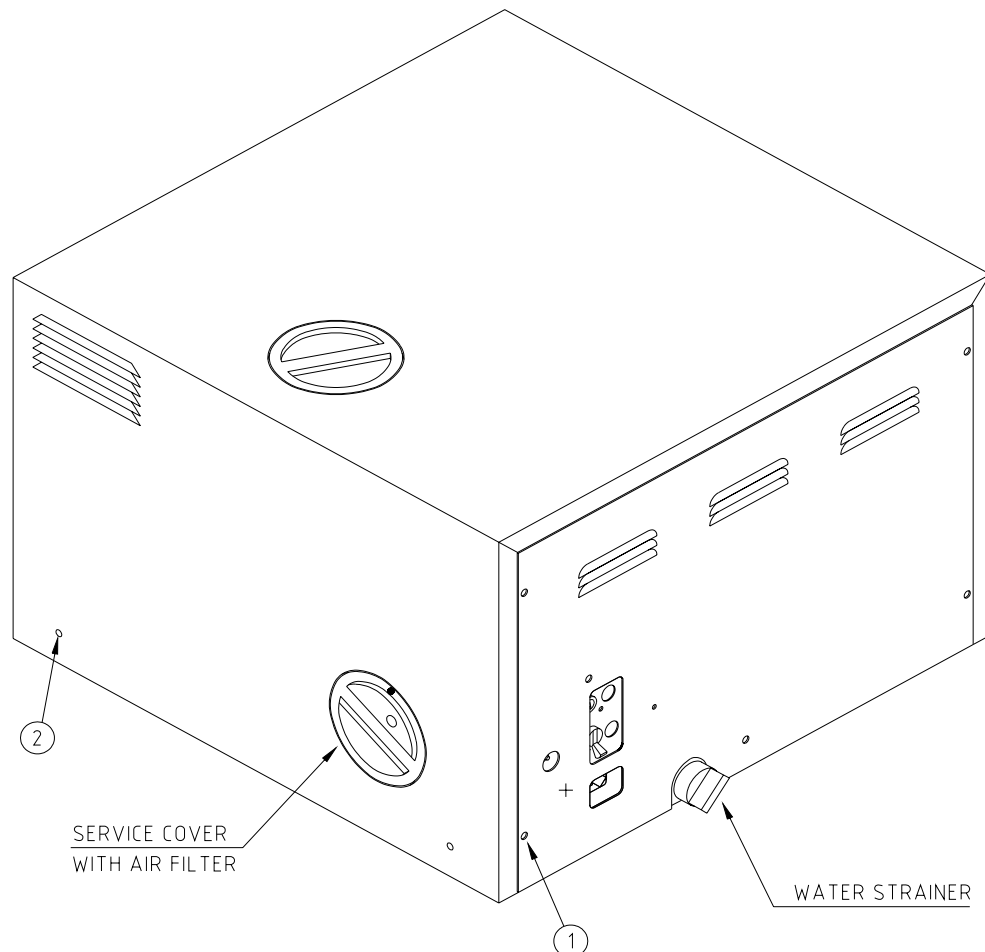


#### **Caution!**

**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. Remove the screws holding the rear cover (1).
2. Remove the screws holding the cover to the base (2).
3. On EA and EKA models dismantle the air filter from the service opening cover (3).
  - 3.1. Remove the screws holding the filter cover (on EA, EKA).
4. Remove the grounding wires from the cover.
5. Pull the cover upwards.



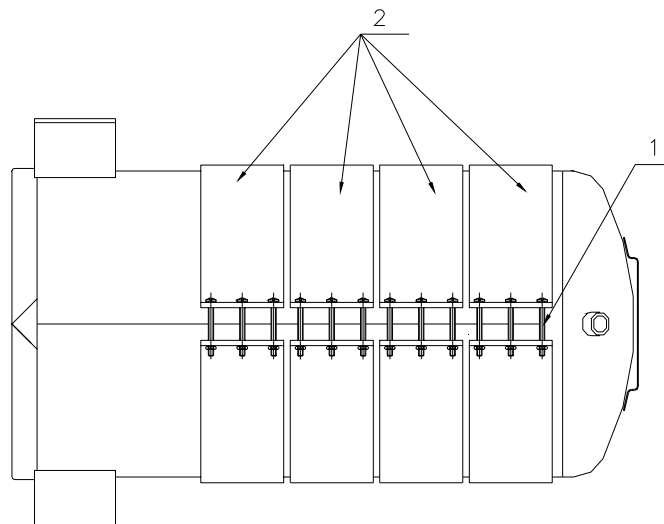
## 7.6 Replacing Heating elements



### Caution:

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

1. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
2. Remove the insulation.
3. Remove the heating element tightening bolts (1).
4. Release the two terminal wires from the heating element.
5. Replace the heating element (s)
  - 5.1 verify that the thermo-couple upper tube is connected to the upper (cut-off) thermostat and the lower thermo-couple to the lower (safety) thermostat.
6. Ensure that the heating element strap is well tightened to the autoclave body, ensuring proper heat dissipation from the heating element.
7. Re-assemble the autoclave insulation and cover.
8. After replacing one or more heating elements run a cycle and verify that it operates as required.
9. Retighten the fixing screws of the heaters. This operation is done with the autoclave hot, but with the power cord disconnected from the power outlet and autoclave door open, to ensure that the chamber is not pressurized.
10. Re-assemble the autoclave’s cover.
11. Test the autoclave by performing a full cycle.



### 7.7 ***Replacing the Temperature Safety Thermostat***

The autoclave is supplied with a temperature thermostat, which protects the heaters and autoclave against overheating, during the dry cycle. This device reconnects automatically when the chamber cools down.

#### ***Caution***

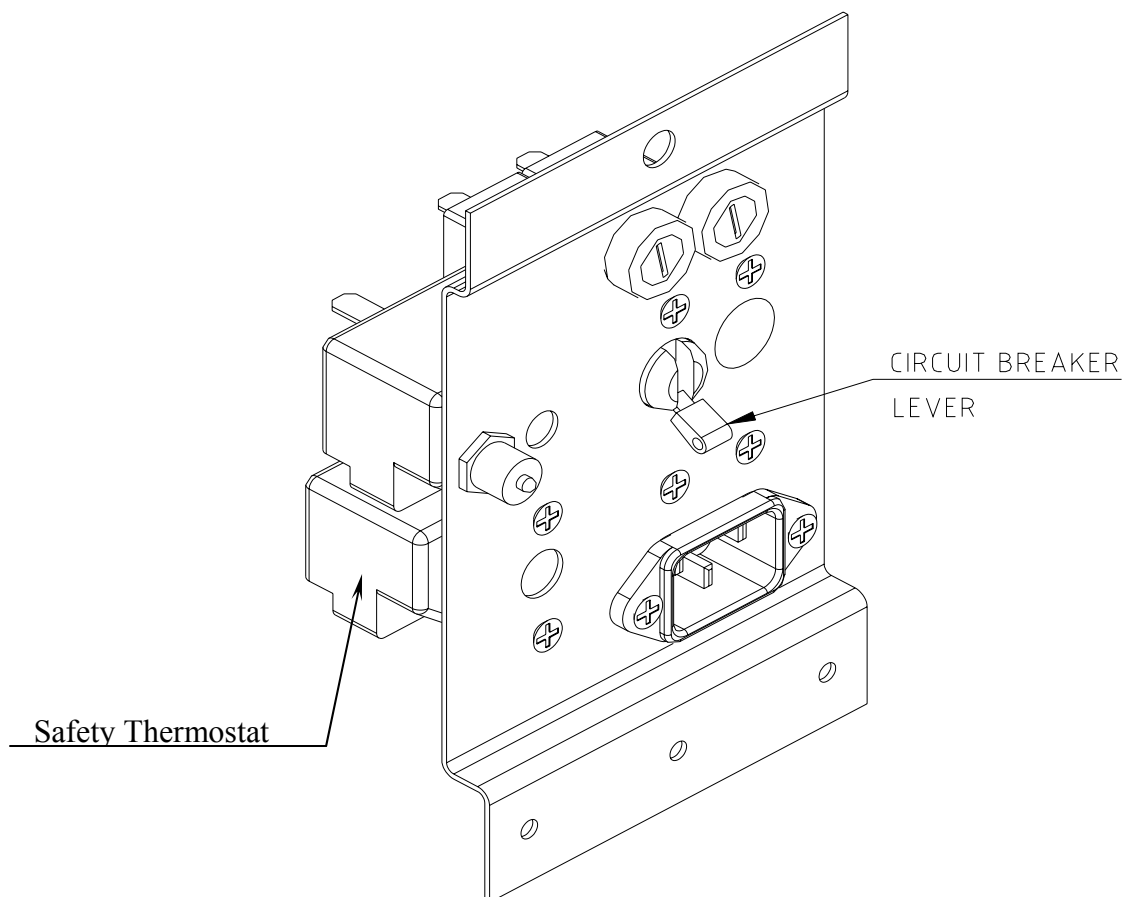


***Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave.***

***Allow the autoclave to cool before removing outer covers.***

The temperature safety thermostat is located on the lower side of the fuse and socket panel on the rear of the autoclave.

1. Remove the rear cover.
2. Loosen the heating band.
3. Unscrew the thermostat and replace it with a new one.
4. Perform any dry cycle to verify that the temperature safety thermostat disconnects the heating units.



### 7.8 Replacing the Cut-Off Thermostat

This thermostat cuts out power to the autoclave, in the event that all other safety means do not function.

For example: If the safety thermostat is defective and the temperature continues to rise, then the cut-off thermostat cuts out the power to the autoclave. In order to restart the operation press the Reset Button. If the autoclave is operated according to the instructions, and the thermostat again cuts out, the Cut-Off Thermostat must be replaced.

#### **Caution**

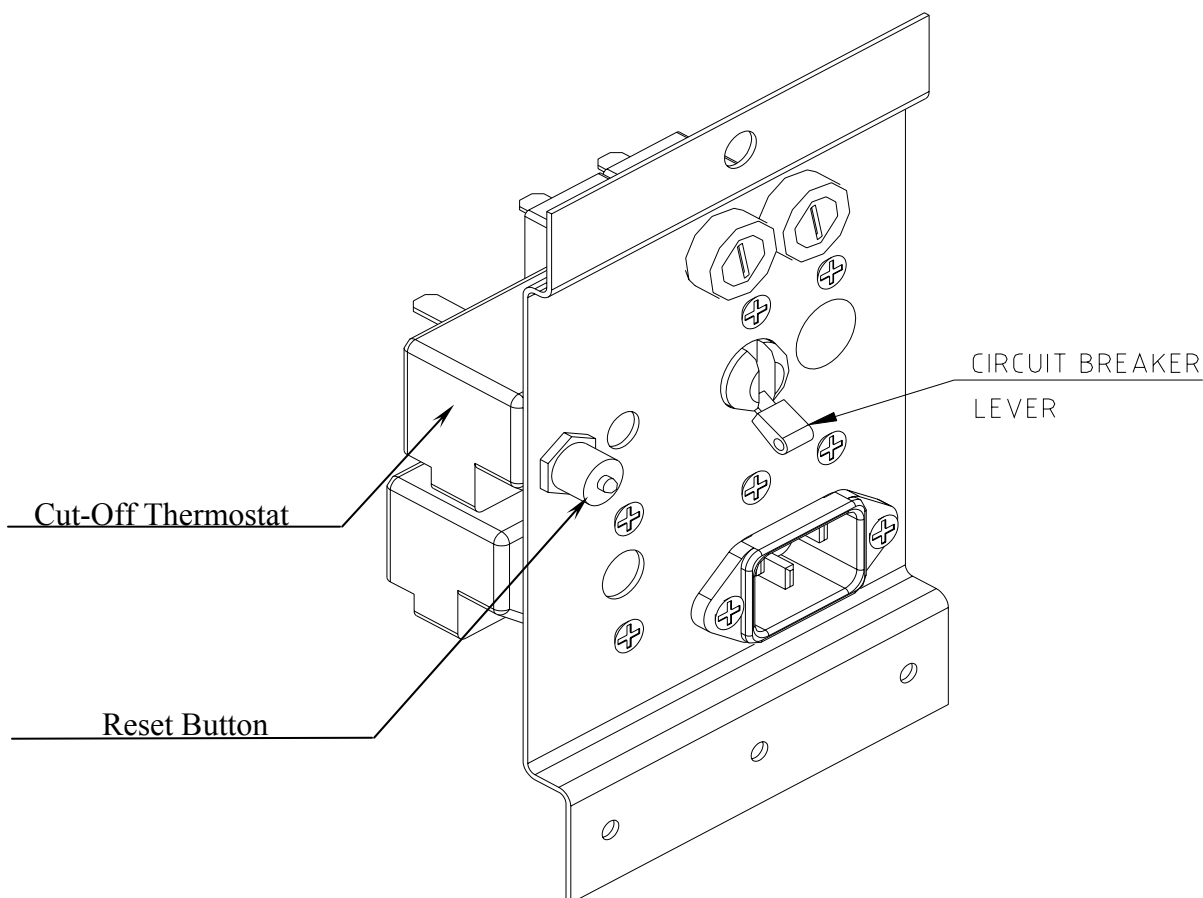


***Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave.***

***Allow the autoclave to cool before removing outer covers.***

The Cut-Off Thermostat is located on the upper side of the fuse and socket panel on the rear of the autoclave.

1. Remove the rear cover.
2. Loosen the heating band.
3. Unscrew the thermostat and replace it with a new one.



## 7.9 ***Cleaning and Replacing the Water Level Electrodes***

The water level electrode is located at the rear bottom area of the chamber.

### 7.9.1 ***Replacing*** ***Caution***

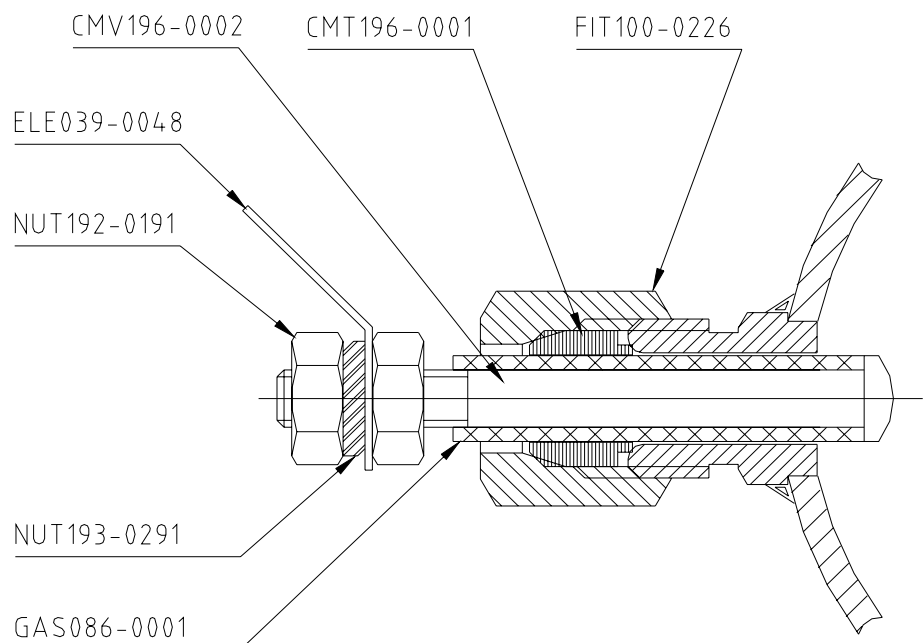


***Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave. Allow the autoclave to cool before removing outer covers.***

1. Remove the rear cover.
2. Disconnect the wire from the electrode connection.
3. Open the nut that tightens the electrode.
4. Insert a new electrode and tighten the fixing nut to avoid leakage.
5. Reconnect the wire to the electrode.
6. Test the unit.

### 7.9.2 ***Cleaning***

1. Pull out the trays and tray holder.
2. Clean the electrode tip.
3. Test the unit.



***Water Level Electrode Assembly***  
***Cat No. CMT196-0004***

### 7.10 Replacing the Drain Valve

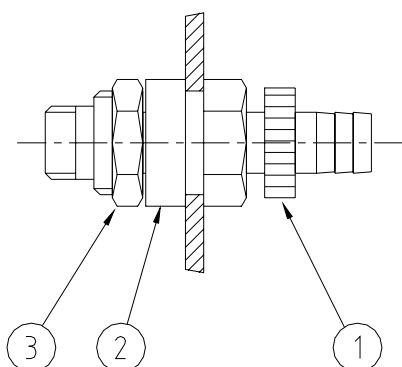


#### **Caution!**

**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.**

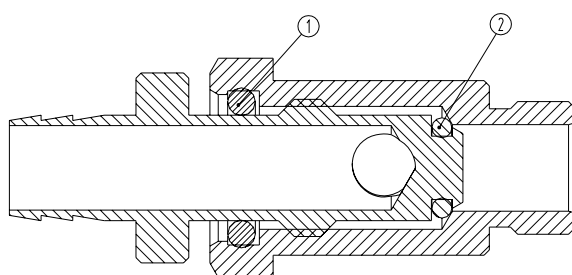
1. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
2. Disconnect the drainpipe from the valve, using a 9/16” wrench.
3. Remove the nut (3) and the “ring for drain valve” (2).
3. Remove the drain valve (1) from the panel.
4. Install a new valve according to the drawing below.
5. Verify that there is no leakage.



CMT240-0020

CMT240-0003

VLV170-0066



Item	Cat No.
1	SRV000-0224
2	SRV000-0232



## **7.11 Replacing the Pressure Gauge**



### ***Caution!***

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

#### **7.11.1 Models 2340, 2540**

1. Remove the door cover.
2. Remove the pressure gauge from the door.
3. Install the new pressure gauge using Teflon tape for sealing the thread.
4. Operate the autoclave and verify that there is no leakage.
5. Install the door cover.
6. Readjust the screw pressing the door microswitch (see para. 7.11, Replacement of the Door Cover).

#### **7.11.2 Models 3140, 3850, 3870**

1. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
2. Remove the pressure gauge from the panel.
3. Install the new pressure gauge using Teflon tape for sealing the thread.
4. Operate the autoclave and verify that there is no leakage.
5. Install the autoclave cover.

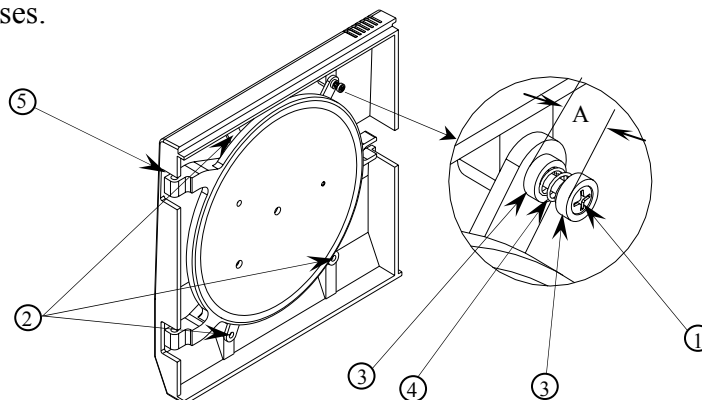
### 7.12 Replacement of the Door Cover

#### Caution:



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

1. Unscrew the four screws attaching the door cover and remove the door cover. Since the screw pressing the door microswitch includes two washers and a spring, be aware not to lose them.
2. Reassemble the new cover.
3. Insert screw (1) until dimension A is approximately 15 mm.
4. Perform final adjustment of the screw as follows:
  - 4.1 While the autoclave is disconnected from electricity turn on the circuit breaker.
  - 4.2 Connect the electrical plug to a multi-meter.
  - 4.3 Press the microswitch and verify that the microswitch functions as required.
  - 4.4 Close the door and verify that the microswitch operates.
  - 4.5 If the microswitch does not operate unscrew the screw one turn counter-clockwise and check per point 4.4 above. Repeat until microswitch operates.
  - 4.6 Connect the autoclave to electricity.
  - 4.7 Close the door until the microswitch indicates that the door is closed. Operate the autoclave and verify that there is no steam or pressure leak.
  - 4.8 If there is a steam leak stop, the autoclave's operation, reduce steam pressure, open the door and turn the screw one turn clockwise and check per point 4.7 above. Repeat until leakage ceases.



No.	Description	Model	Cat. No.	No.	Description	Model	Cat. No.
1	Screw	2340, 2540	BOL191-0032	3	Washer	All models	ELE036-0009
		1730, 3140	BOL191-0091	4	Spring	All models	SPR177-0012
		3850, 3870					
2	Screw	2340, 2540	BOL191-0033	5	Door cover	See spare parts list	
		3140	BOL191-0115				
		1730, 3850, 3870	BOL191-0140				

## 7.13 Replacing the Printer

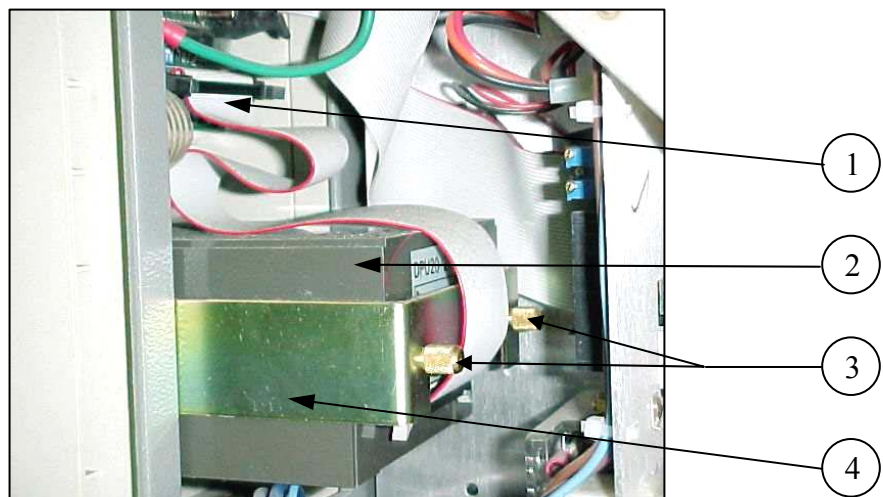
### 7.13.1 DPU20 Printer



#### **Caution!**

***Before starting, disconnect the instrument from the power source.***

1. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
2. Disconnect the connector of the flat cable (1) connecting the electronic box to the printer (2).
3. Unscrew the two screws (3) attaching the fastening bracket (4) to the printer.
4. Remove the printer and insert the new one.
5. Assemble the fastening bracket to the printer with the two screws (2) and verify that it "sits" firmly in its seat.
6. Connect the flat cable (1) to the printer.
7. Verify connection of power by performing a self-test.
8. Run a cycle and verify that the printer operates correctly.



No.	Cat. No.	Description
1	WIR040-0070	Cable, Flat, Printer, DPU20, 25CM, 34P
2	THE002-0005	Printer, DPU-20, Seiko
3	BOL190-0144	Screw, printer tightening
4	Supplied with the printer	Fastening bracket

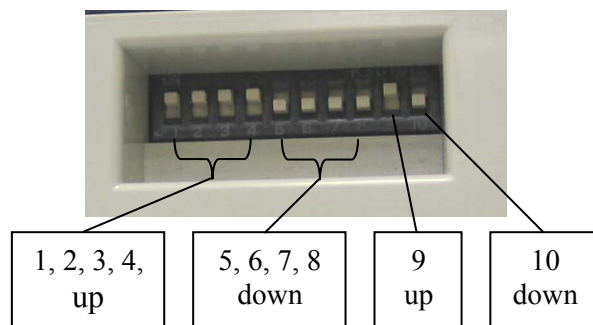
### 7.13.2 DPU30 Printer



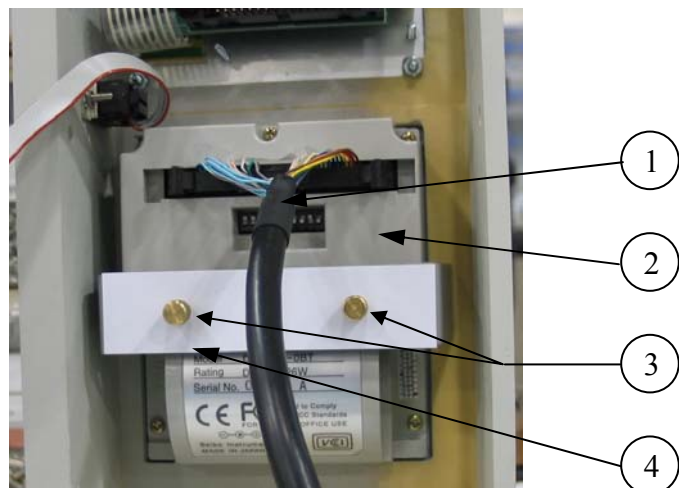
#### **Caution!**

**Before starting, disconnect the instrument from the power source.**

1. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
2. Disconnect the connector of the cable (1) connecting the electronic box to the printer (2).
3. Unscrew the two screws (3) attaching the fastening bracket (4) to the printer.
4. Remove the printer.
5. Set the dip switches on the new printer, located on the back side of the printer, as follows:



6. Insert the new printer into its frame.
7. Assemble the fastening bracket to the printer with the two screws (2) and verify that it is placed firmly.
8. Connect the (1) cable to the printer.
9. Verify connection of power by performing a self-test.
10. Run a cycle and verify that the printer operates correctly.



No.	Cat. No.	Description
1	CTP201-0127	Cable, Printer, DPU-30, 30cm, 34p
2	THE002-0022	Printer, DPU-30, Seiko
3	BOL190-0144	Screw, printer tightening
4	Supplied with the printer	Fastening bracket

#### 7.14 Replacing the Door Switch

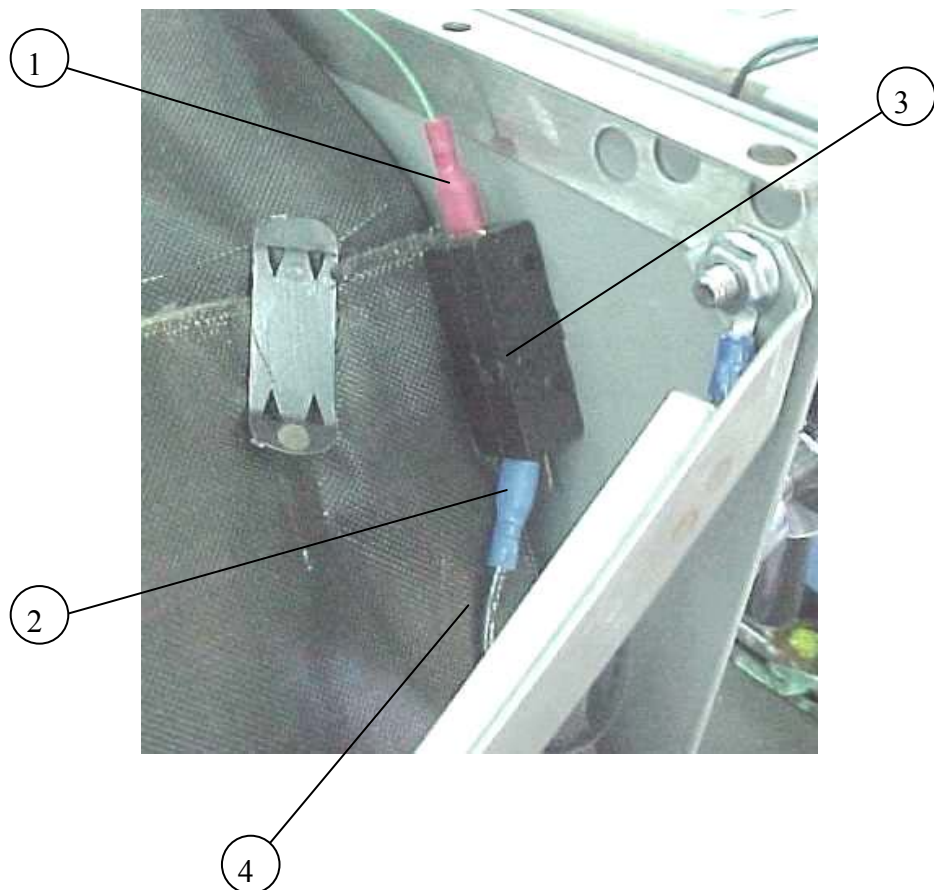


##### **Caution!**

***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. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
2. Disconnect wires (1), (2) from the door switch (3).
3. Remove the microswitch and replace it with a new one.
4. Reconnect the wires the microswitch. Verify that the wire is placed on the isolating cover (4) and does not touch the chamber.
5. Reassemble the door cover.
6. Test the connection with an ohmmeter. In “open” position the ohmmeter shows disconnection and in “close” position the ohmmeter shows connection.



### 7.15 *Cleaning water inlet strainer*

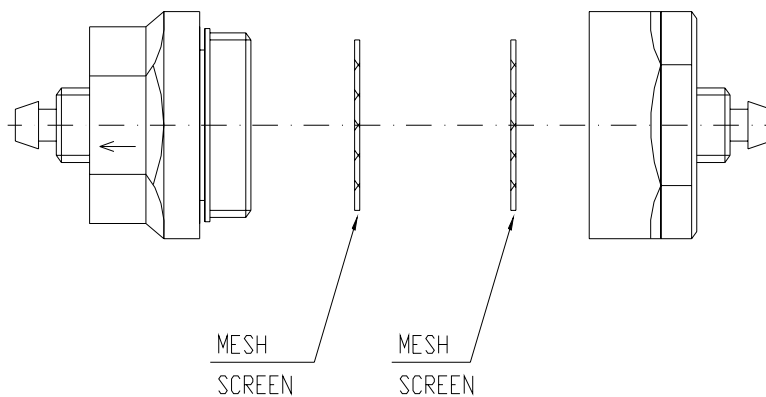


#### **Caution!**

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

1. Remove the cover of the autoclave.
2. Drain the water from the water reservoir.
3. Remove the water filter from the silicon tube.
4. Open the filter by unscrewing the two filter parts.
5. Clean the filter by flushing it under running water for a few minutes.
6. Replace the filter parts and reconnect it to the silicon tube.
7. Open the water valve.

### **Water Reservoir Filter**



### 7.16 *Replacing the circuit breaker*



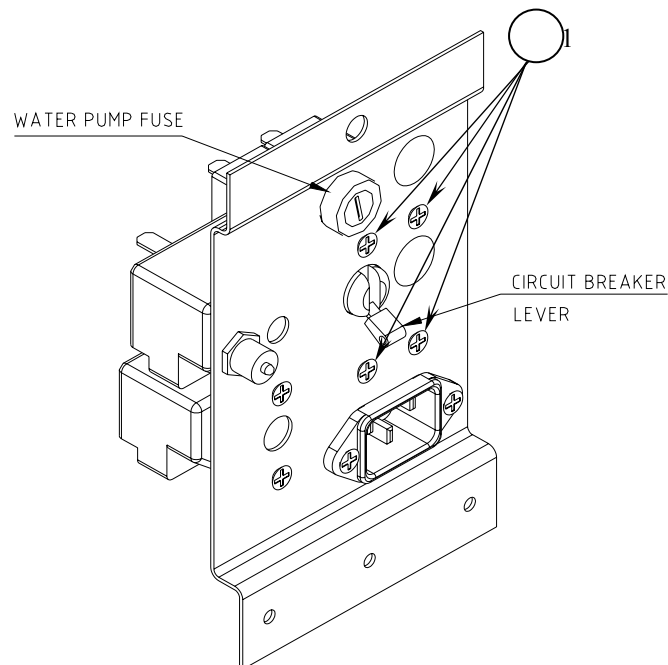
#### **Caution!**

**Before starting, disconnect the instrument from the power source.**

1. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
2. Disconnect the wires from the circuit breaker.
3. Remove the four screws connecting the circuit breaker to the panel (1).
4. Replace the circuit breaker with a new one.
5. Reconnect the electrical wires.
6. Reassemble the cover.
7. Turn on the autoclave and verify it operates correctly.
8. Move the circuit breaker’s lever to the “tripped” position and verify that the autoclave turns off.

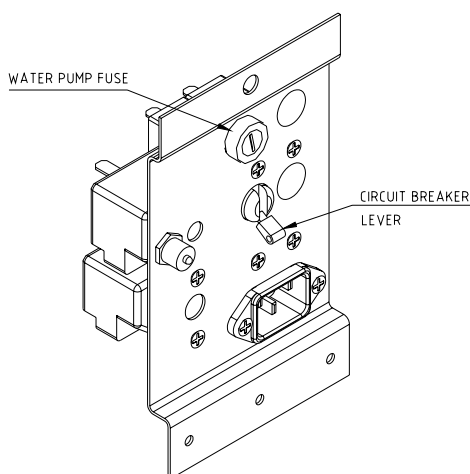


**Make sure that the correct circuit breaker is installed as marked in para. 7.16 (Fuses and Circuit Breaker Data)!**

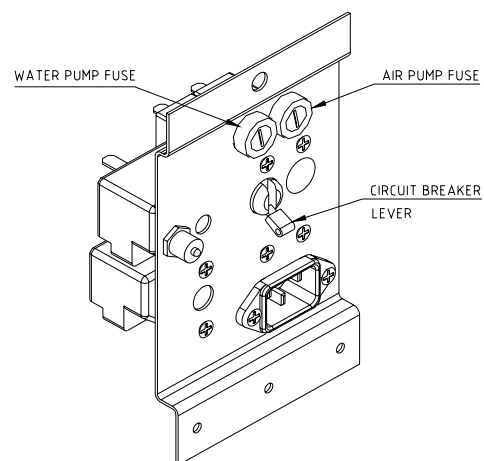


### 7.17 Fuses and Circuit Breaker Data

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	—	—	—	—



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



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



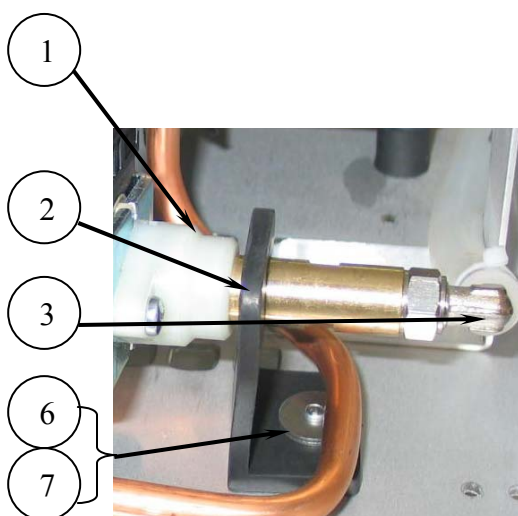
### 7.18 Replacing the water pump



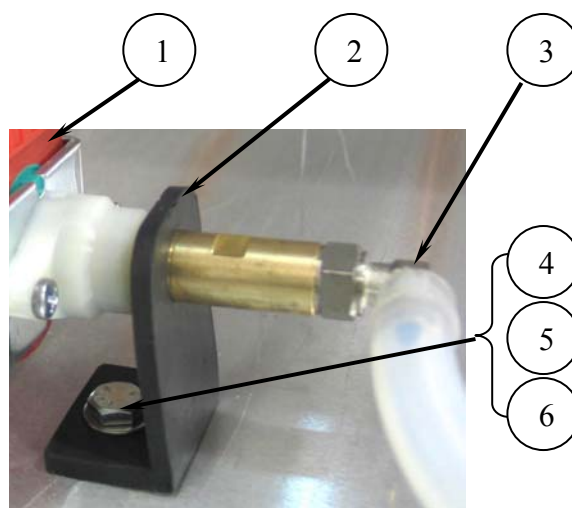
#### **Caution!**

**Before starting, disconnect the instrument from the power source.**

1. Remove the autoclave cover (see para. 9.1 “Dismantling the Outer Covers of the Autoclave”).
2. Disconnect the wires from the pump
3. Empty the water reservoir.
4. Disconnect the piping from the pump.
5. Remove the pump from the rubber shock absorbers.
  - 5.1 If the rubber shock absorbers are damaged, replace them. Note that on models 2340/2540 the shock absorber’s bases are pointed outward and on models 3140/3850/3870 they are pointed inward.
6. Replace the damaged pump with a new pump.
7. Reconnect wiring and piping.
8. Reassemble the cover.
9. Turn on the autoclave and verify it operates correctly.



**2340/2540**



**3140/3850/3870**

No.	Description	2340/2540	3140/3850/3870
1	Pump, Water, EXA7, 220V, Ulka	PUM055-0014	PUM055-0014
2	Rubber shock absorber	SKR203-0006	SKR203-0006
3	Hose adaptor, male, elbow, 1/8BSP, for 6 mm Hose.	FIT100-0806	FIT100-0806
4	Screw	BOL191-0140	BOL194-0342
5	Nut, Hex, Flange, 1/4NC	—	NUT192-0155
6	washer	NUT193-0347	NUT193-0276
7	Rivet, Dome Head, Aluminum, 4x14	BOL194-0331	—

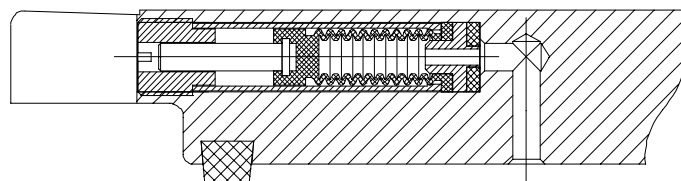
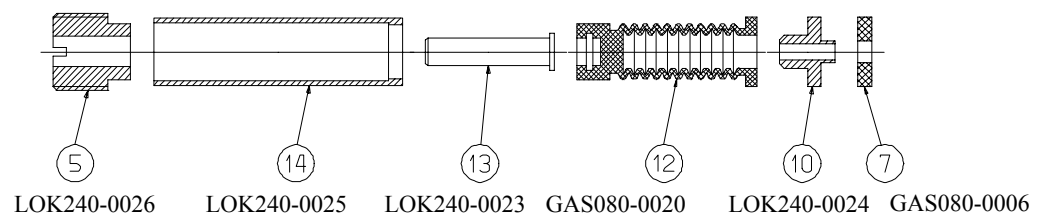
### 7.19 *Replacing the Door Bellows*

(Located in the door bridge)

1. Open the door.
2. Unscrew and remove the tightening screw (5).
3. Gently pull out the door safety device locking pin (13).
4. It is possible that the washers (7, 10) will be stuck - if so, push them out by introducing pressurized air through the steam inlet hole (8).

No lubrication or cleaning is required.

5. Reconnect the door device locking pin (13) into a new silicone bellows (12).
6. Put the silicone bellows (12) and pin (13) into the bellows housing (14) and replace the washers (7,10).
7. Reconnect all the above into the door bridge.
8. Screw in the screws and tighten the tightening screw (5).
9. Test all the autoclave cycles.



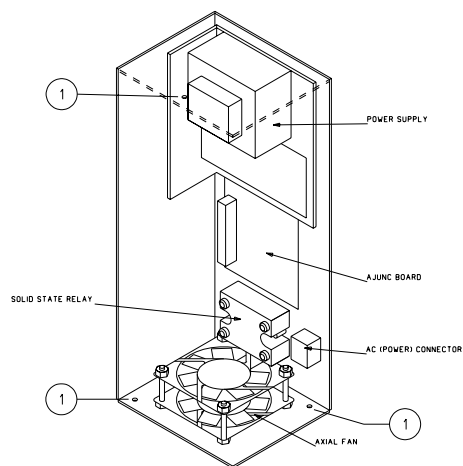
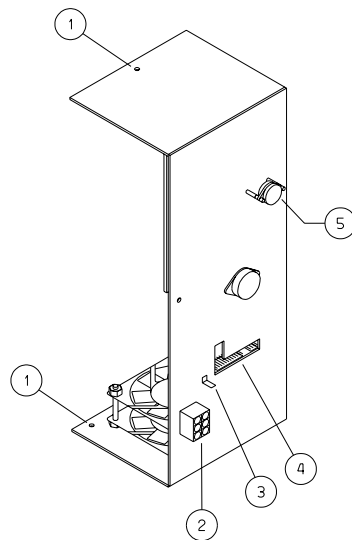
## 7.20 Replacing the Electronics Box



### Caution

**Ensure the electrical power cord is disconnected!**

1. Allow the instrument to cool before removing the outer covers.
2. Remove the autoclave cover (see para. 7.5 “Dismantling the Outer Covers of the Autoclave”).
3. After the cover is off, remove the two screws that connected the box to the autoclave base (1).
4. Remove the top screw which is connected the box to the upper panel frame.
5. Disconnect the connectors No.6, 8 and cable shoe no.7.
6. Remove the PVC tube (5) from the pressure transducer (4). Pull up the electronic box and replace with a new one.



## 7.21 Validation

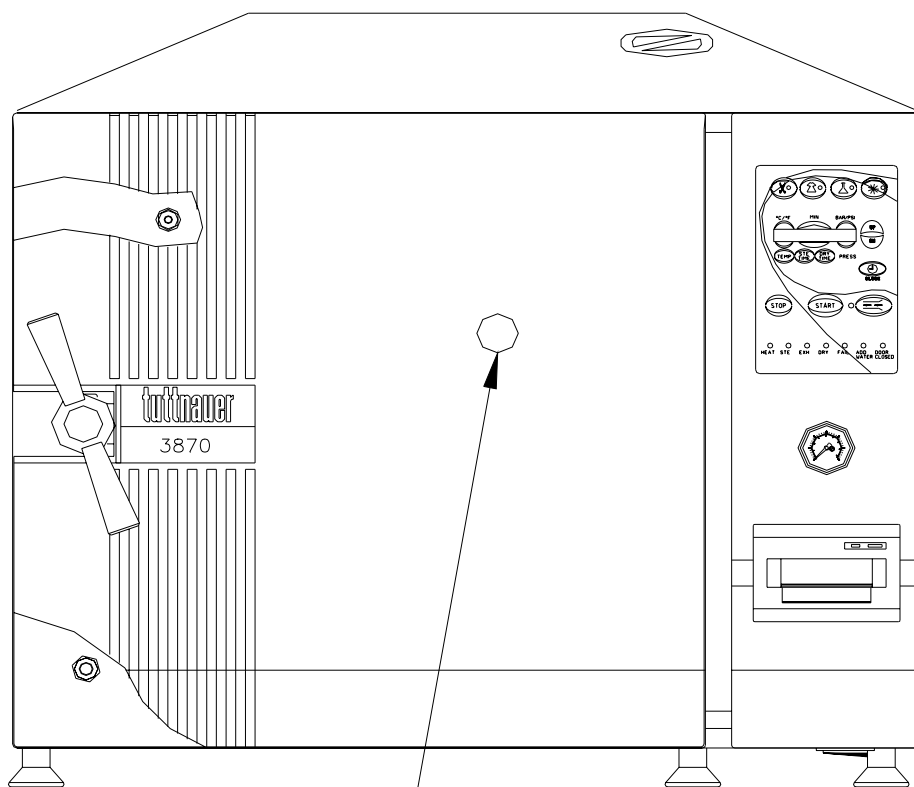


### Caution!

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

*The validation port is located on the autoclave's door, behind a plastic plug inserted in the door cover.*

1. Remove the plastic plug from the door cover.
2. Unscrew the validation plug from the door.
3. Attach the validation adapter to the validation port. The 1/4" BSP thread of the validation port matches the thread of the adapter.
4. Perform the validation according to EN554 or the appropriate Pharmacopea.
5. After completing the validation, reassemble the validation plug. Use Teflon tape on the plug's thread to assure sealing. Tighten the plug carefully to avoid damage to the door.



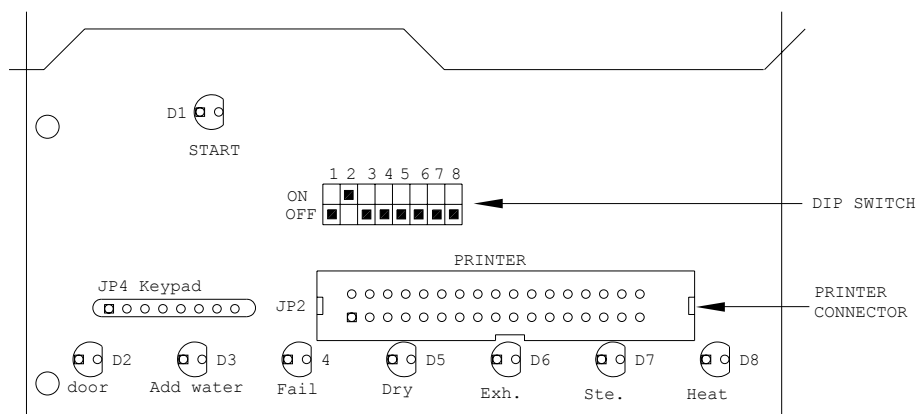
VALIDATION PORT COVER

## 8 ***DESCRIPTION AND FUNCTION OF DIP-SWITCHES***

The system allows certain changes of specific parameters:

1. Connection of an optional printer.
2. Change of parameters (temperature and time).
3. Setting autoclave identification, if there is more than one autoclave in vicinity.
4. Stand by shoot mode.
5. Selecting between °F, °C, kPa, PSI.
6. Selection of dry cycle shoot mode for the quick or regular autoclave.

Changing the position of the DIP - SWITCH, as described below determines these parameters.



### 8.1 *Changing the parameters*

Not all the switches are relevant to this autoclave, details will be given for the relevant switches only:

**Note: Changes must be done when the autoclave is shut off.**

SWITCHES 1,2 — Selecting an identification number for the autoclave

1 ON,	2 ON	=	number 1
1 ON,	2 OFF	=	number 2
1 OFF,	2 ON	=	number 3
1 OFF,	2 OFF	=	number 4

SWITCH 3 — Change of parameters

ON	=	Unable to change option
OFF	=	Able to change option

SWITCH 4 — Stand by shoot mode

ON	=	Able
Off	=	Unable

SWITCHES 5,6 — Selection of temperature and pressure parameters

5 OFF,	6 OFF	= °F ,psi
5 OFF,	6 ON	= °F ,kPa
5 ON,	6 OFF	= °C ,psi
5 ON,	6 ON	= °C ,kPa

SWITCH 7 — Factory use only.

SWITCH 8 — Option for connecting a printer.

ON	—	printer is connecting.
OFF	—	printer not connected.

## 9 **TEST POINTS - TABLE AUTOCLAVE (AJUNC 3 BOARD)**

NU TP	FUNCTION	VALUE
TP1	GND	————
TP4	ANALOG PRESSURE	“0”B - 0.5V
TP5	————	————
TP6	ELECTRODE (WATER LEVEL)	ON-4V; OFF-0V
TP7	OUT PT-100	134°C - 151.4 Ω - 2.385V
TP8	FLOAT SWITCH	OPEN -5V; CLOSE-0V
TP9	DOOR SWITCH	OPEN-5V;CLOSE-0V
TP10	WATER	ON-0V; OFF -12V
TP11	EXHAUST VALVE CONTROL	ON-0V; OFF-12V
TP12	HEATERS CONTROL	ON-0.7V; OFF-5V
TP13	FAN CONTROL	ON-0V; OFF -12V
TP14	AIR VALVE (TOP EXH’) CONTROL	ON-0V; OFF-5V
TP15	VEE	12V
TP16	-VCC	- 5.2V
TP17	VCC	+5.2V
TP18	AIR INLET VALVE (Compressed air)	ON -0V; OFF-12V
TP19	————	————
TP21	————	————
TP22	THERMOSTAT	ON-0V; OFF-5V
TP23	————	————
TP24	————	————
TP25	ZERO PT-100 “-”	0°C - 100Ω-“0”mV
TP26	ZERO PT-100 “+”	0°C - 100Ω-“0”mV

## **10 DETAILED DESCRIPTION OF ELECTRONIC SUB-ASSEMBLIES**

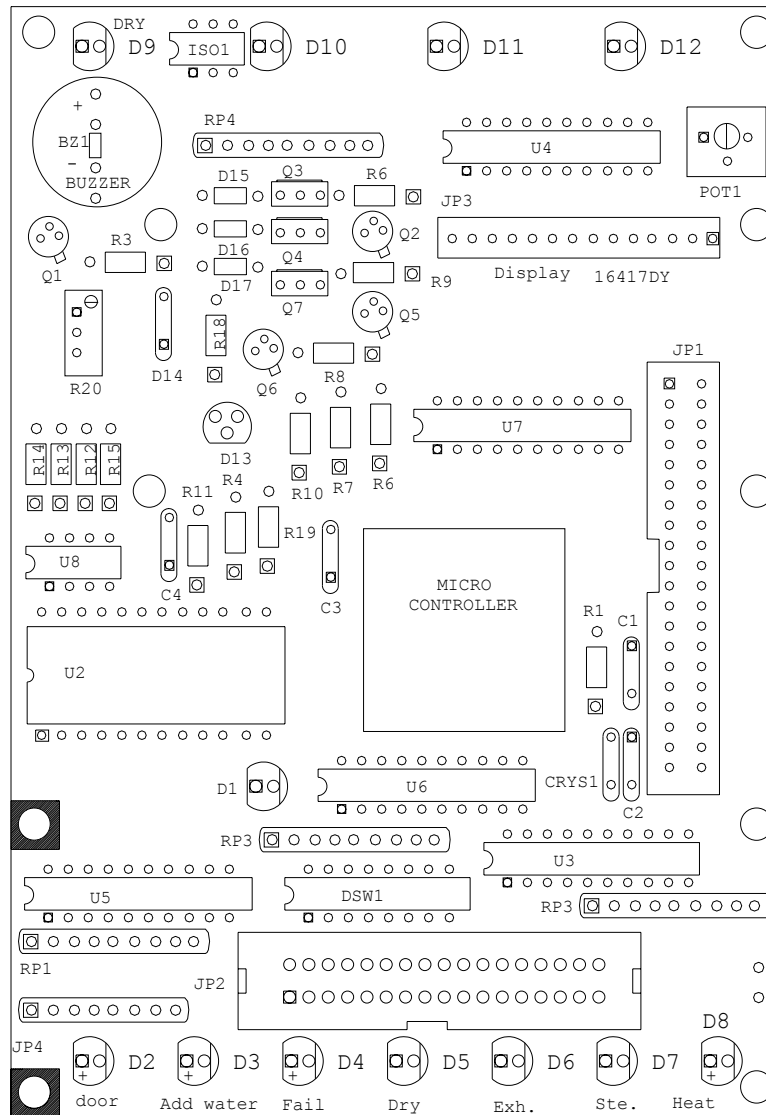
### **10.1 PREDG board**

1. U1 Micro-controller (MOTOROLA) comprises of the memory (RAM and EPROM) A/D which is the central processing unit.
2. U2 Real time clock, contains the date and time of the day with a 100 years calendar, is the pilot clock of the system. It contains the back up memory for that data which must not be lost in case of a power failure.  
  
The battery is good for ten years. It is recommended to replace U2 every 8 years.
3. The LCD display, is an alphanumeric display, with 16 characters on one line.
4. JP2, connector to the printer unit (SEIKO)..
5. JP1 connector to AJUNC3 BOARD.
6. U3, U4, integrated circuit 74H C373 having the function of latch - drivers for the light signal LEDS, U7 and the valves controls.
7. U5, integrated circuits, has the function of buffer to the dip-switch.
8. U6, integrated circuit has the function of buffer to the keypad.
9. Transistors Q2 and Q7 are the control of the EXHAUST and WATER valves, as well as of the FAN.
10. Temperature circuit is based on LM34AH, and the component U2.
11. There are also other components like capacitors, diodes and resistors belonging to the battery back - up and crystal oscillator circuits.

See electrical schematic drawing for a more detailed view of the board.



## PREDG BOARD



## **10.2 AJUNC 3 Board**

The AJUNC3 analog board is connected to the digital board, by a flat cable, on connector JP1. This board contains all the analog and digital inputs required for the system. The board converts the analog input signal so the digital board can process it. In addition to this the board enables the microprocessor (on the digital board) to control all the digital outputs on the analog board.

### ***The Board's Connections and Functions:***

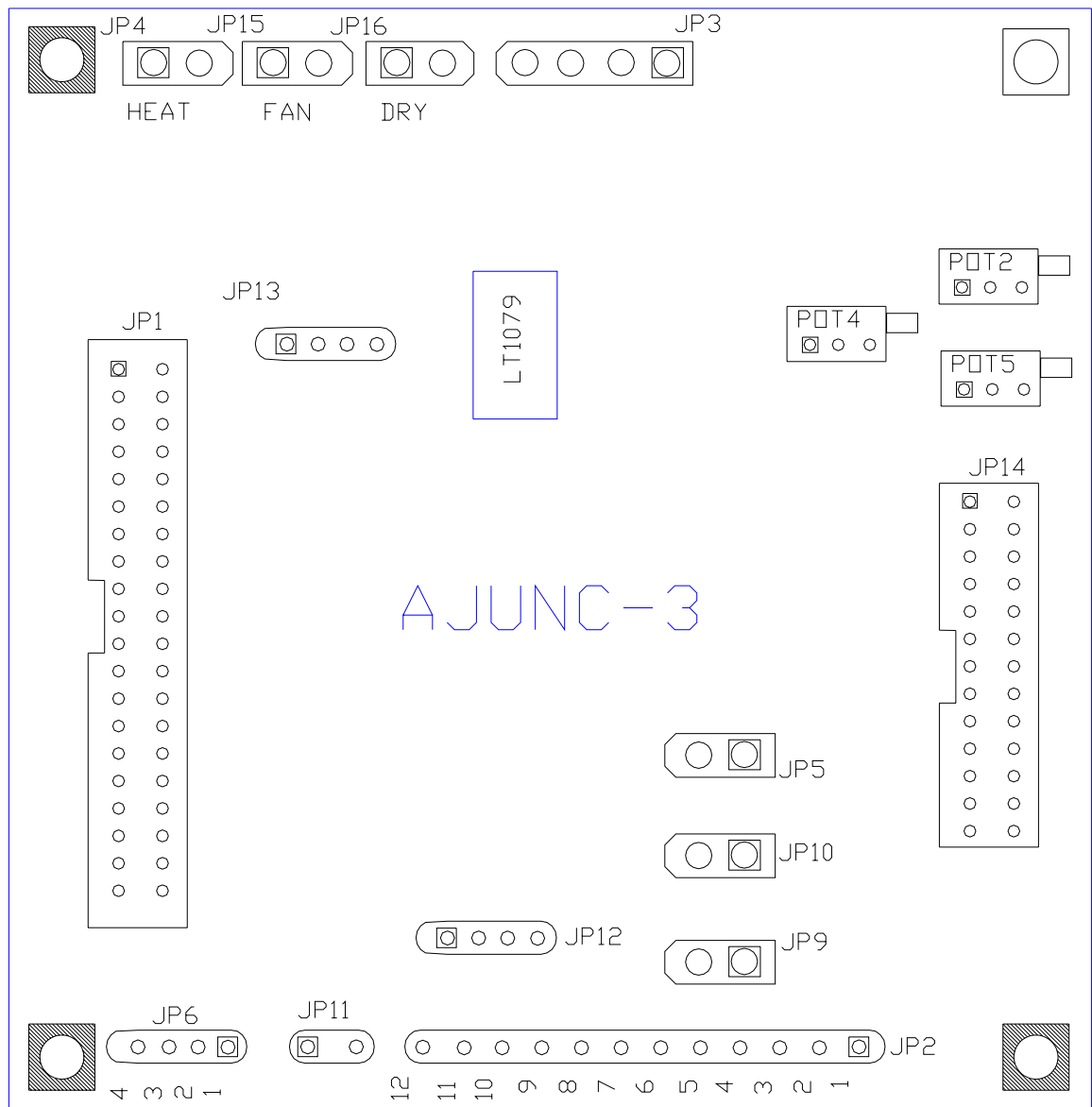
- JP1 Connection between the analog board and the digital board.
- JP2 Digital outputs for WATER, EXH, and AIR valves.  
Digital inputs for: thermostat, door switch, float switch and analog input of the electrode.
- JP3 Power connection to the board: 5V & 12V.
- JP4 Control of the SSR controlling the heating elements.
- JP6 MPX2200AP pressure transducer input.
- JP10 Voltage output to the fan.
- JP11 PT100 temperature sensor input.
- JP12 Voltage output to DRY valve (EA, EKA only).
- JP13 Communication port
- JP14 Connection to TEST BOARD.
- JP15 Connection to drying-pump control (EA, EKA).

### ***Potentiometers***

By setting the potentiometers, the input signal is adjusted to the signal required to be processed by the digital board.

- POT1 Setting "Gain Pressure".
- POT4 Setting "Zero Temp".
- POT5 Setting "Gain Temp".

## AJUNC 3 BOARD



## **11 CALIBRATION AND TESTING PROCEDURE**

The system is provided with a number of test points for check-up and adjustment purposes.

For this purpose, the connector JP14 on the AJUNC3 board has to be connected with the Test board.

The above board is supplied only to service personnel who maintain and service the autoclaves.

A digital multi-meter with a 1 mV resolution is needed for check - up and repair.

### **11.1 Check-Up of Voltages**

GND check up - check the voltage between test point TP1 and the body of the autoclave. If the measured voltage is higher than 30mV, we face a problem of unsuitable grounding at one of the electronic boards or some other electronic component (like power supply).

Checking of 12V - connect the negative probe of the multi-meter at TP1 and the positive probe at TP 15, the measured voltage should be 12V.

If voltage is not correct, the fuses on the primary and secondary circuits have to be checked to see if they are not blown.

Take the connector off the board, and check for a short-circuit on the board.

Checking of 5V - connect the negative probe of the multi-meter at TP1 and the positive probe at TP17, the measured voltage should be 5V. If voltage is incorrect the fuses on primary and secondary circuits have to be checked.

### **11.2 Calibration Procedure**

#### **11.2.1` Calibration MPX 2200**

Connect the (negative probe) of the multi-meter at TP1 and the (positive probe) at TP4 turn POT2, the measured voltage should be 0.5 V.

#### **11.2.2 Temperature Calibration OF PT-100**

1. Connect to JP11 resistor 100 $\Omega$  (2°C) and calibrate between TP25 (negative probe) and TP26 (positive probe) with POT4 to 5.1m.
2. Connect to JP11 resistor 151.4 $\Omega$  (134°C) and calibrate between TP1(negative probe) and TP7 (positive probe) with POT5, the measured voltage should be 2.385V.

## 12 LIST OF SPARE PARTS

Description		1730 E/EK	2340 E/EAEK/EKA	2540 E, EK/EKA	3140 E	3850 EA	3870 EA
Printer	DPU 20	—	THE002-0005	THE002-0005	—	THE002-0005	THE002-0005
	DPU 30	—	—	—	THE002-0022	—	—
Printer paper roll	DPU 20	—	THE002-0003	THE002-0003	—	THE002-0003	THE002-0003
	DPU 30	—	—	—	THE002-0025	—	—
Cable, Flat, Printer, DPU20, 25cm, 34P		—	WIR040-0070	WIR040-0070	—	WIR040-0070	WIR040-0070
Cable, Printer, DPU-30, 30cm, 34p		—	—	—	CTP201-0127	—	—
Sensor, Temperature, PT100, 3 Wires		ELC258-0003	ELC258-0003	ELC258-0003	ELC258-0003	ELC258-0003	ELC258-0003
Thermostat, Safety, 180C, TY95/AC, Campini		THE005-0003	THE005-0003	THE005-0003	THE005-0003	THE005-0003	THE005-0003
Thermostat, CUT-OFF, TY95-H, Campini		THE005-0014	THE005-0014	THE005-0014	THE005-0014	THE005-0014	THE005-0014
Transducer, Pressure, MPX 2200 AP		THE006-0003	THE006-0003	THE006-0003	THE006-0003	THE006-0003	THE006-0003
Switch, Float, Mini, Rico		THE007-0001	THE007-0001	THE007-0001	THE007-0001	THE007-0001	THE007-0001
Heating Element, 120V, 350W 1730 M/E		HEA009-0001	—	—	—	—	—
Heating Element, 120V, 350W 2340 M/E		—	HEA009-0002	—	—	—	—
Heating Element, 120V, 350W 2540 M/E		—	—	HEA009-0003	—	—	—
Heating Element, 230V, 350W, 1730 M/E		HEA009-0004	—	—	—	—	—
Heating Element, 230V, 350W, 2340 M/E		—	HEA009-0005	—	—	—	—
Heating Element, 230V, 350W, 2540 M/E		—	—	HEA009-0006	—	—	—
Heating Element, 120V, 450W, 1730 MK/EK		HEA010-0007	—	—	—	—	—
Heating Element, 230V, 450W, 1730 MK/EK		HEA010-0008	—	—	—	—	—
Heating Element, 230V, 550W, 2340 MK/EK		—	HEA010-0003	—	—	—	—
Heating Element, 230V, 550W, 2540 MK/EK		—	—	HEA010-0004	—	—	—
Heating Element 230V 600W 3140 M/E		—	—	—	HEA009-0014	—	—
Heating Element, 230V, 600W, 3850 M/E		—	—	—	—	HEA009-0007	—
Heating Element, 240V, 600W, 3870 M/E		—	—	—	—	HEA009-0013	—

Description		1730 E/EK	2340 E/EAEK/EKA	2540 E, EK/EKA	3140 E	3850 EA	3870 EA
Heating Element, 230V, 500W, 3870 M/E		—	—	—	—	—	HEA009-0008
Valve, Solenoid 1/4"x6		SOL026-0006	SOL026-0006	SOL026-0006	SOL026-0006	SOL026-0006	SOL026-0006
Valve, Solenoid 1/4"x3		SOL026-0004	SOL026-0004	SOL026-0004	SOL026-0004	SOL026-0004	SOL026-0004
Coil, Solenoid 220V-12W		SRV000-0239	SRV000-0239	SRV000-0239	SRV000-0239	SRV000-0239	SRV000-0239
Plunger 1/4", Solenoid 1.6-4		SOL026-0015	SOL026-0015	SOL026-0015	SOL026-0015	SOL026-0015	SOL026-0015
Plunger 1/4", Solenoid 6		SOL026-0016	SOL026-0016	SOL026-0016	SOL026-0016	SOL026-0016	SOL026-0016
Fuse, mini, Slow Blow, 1.25A, 5*20		—	ELE035-0005	ELE035-0005	ELE035-0005	ELE035-0005	ELE035-0005
Fuse Holder, Mini, 5*32		—	ELE035-0001	ELE035-0001	ELE035-0001	ELE035-0001	ELE035-0001
Switch, Rocker, 16A		ELE035-0012	ELE035-0012	ELE035-0012	ELE035-0012	ELE035-0012	ELE035-0012
Microswitch, E13-00M, 15A, 125/250VAC, 3/4HP, Cheery		ELE036-0001	ELE036-0001	ELE036-0001	ELE036-0001	ELE036-0001	ELE036-0001
Pump, Air, 230v, 50/60Hz ZA.12, DVP		—	PUM058-0011	PUM058-0011	—	PUM058-0011	PUM058-0011
Air pump for EKA 115V		—	PUM058-0009	PUM058-0009	—	PUM058-0009	PUM058-0009
Gauge, Pressure, Steam, -30+60 psi, 1.5"		—	GAU029-0009	GAU029-0009	GAU029-0009	GAU029-0009	GAU029-0009
Cover, Reservoir, Water, Superp.		POL067-0004	POL067-0004	POL067-0004	POL067-0004	POL067-0004	POL067-0004
Panel Completion, 1730E, Superp.		POL063-0004	POL063-0002	POL063-0002	POL063-0005	POL063-0003	POL063-0003
Panel (console) base	DPU20	POL062-0001	POL062-0002	POL062-0002	—	POL062-0003	POL062-0003
	DPU30		—	—	POL062-0013	—	—
Cover, Door	E	POL065-0001	POL065-0019	POL065-0023	COV314-0001	—	—
	EA	POL065-0001	POL065-0020	POL065-0025	—	POL065-0003	POL065-0003
	EK	—	POL065-0021	POL065-0024	—	—	—
	EKA	—	POL065-0022	POL065-0026	—	—	—
Printer opening cover	DPU20	—	POL067-0002	POL067-0002	—	POL067-0002	POL067-0002
	DPU30	—	—	—	POL067-0007	—	—
Gasket, Door		GAS080-0021	GAS080-0002	GAS080-0003	GAS080-0029	GAS080-0004	GAS080-0004
Gasket, Silicone, Water Reservoir		GAS080-0007	GAS080-0007	GAS080-0007	GAS080-0007	GAS080-0007	GAS080-0007
Tube, Silicon, drain		GAS084-0007	GAS084-0007	GAS084-0007	GAS084-0007	GAS084-0007	GAS084-0007
Socket for electric cord 15A/USA		WIR040-0016	WIR040-0016	WIR040-0016	WIR040-0016	WIR040-0016	WIR040-0016
Cable, Plug+Socket 230V 10A, EUR		WIR040-0003	WIR040-0003	WIR040-0003	WIR040-0003	WIR040-0003	WIR040-0003

Description		1730 E/EK	2340 E/EAEK/EKA	2540 E, EK/EKA	3140 E	3850 EA	3870 EA
Cable, Plug+Socket 120V 15A, USA		WIR040-0004	WIR040-0004	WIR040-0004	—	—	—
Cable, Plug+Socket 230V 15A, USA		—	WIR040-0005	WIR040-0005	WIR040-0005	WIR040-0005	WIR040-0005
Cable, Flat, AJUNC2 Board, 225CM, 40P		WIR040-0071	WIR040-0071	WIR040-0071	WIR040-0071	WIR040-0071	WIR040-0071
Safety valve	CE marked 1/4x2.76 Bar	SVL029-0028	SVL029-0028	SVL029-0028	SVL029-0028	SVL029-0028	SVL029-0028
	ASME 1/4"-40 psi	SVL029-0004	SVL029-0004	SVL029-0004	SVL029-0004	SVL029-0004	SVL029-0004
Filter, air, 0.2M, 36MM, 55041, ARBOR		—	FIL175-0010	FIL175-0010	—	FIL175-0010	FIL175-0010
Valve, Drain, Sag.		VLV170-0066	VLV170-0066	VLV170-0066	VLV170-0066	VLV170-0066	VLV170-0066
Predg Unit with Keyboard		CTP201-0040	CTP201-0040	CTP201-0040	CTP201-0040	CTP201-0040	CTP201-0040
Leg, Front, TTA		WHE070-0012	WHE070-0012	WHE070-0012	WHE070-0012	WHE070-0012	WHE070-0012
Leg, Rubber, Rear, TTA		WHE070-0014	WHE070-0014	WHE070-0014	WHE070-0014	WHE070-0014	WHE070-0014
Power Supply, 12V, PU40-23S		ELE035-0031	ELE035-0031	ELE035-0031	ELE035-0031	ELE035-0031	ELE035-0031
Fan, Axial, 12VDC, 80mm		CTP201-0000	CTP201-0000	CTP201-0000	CTP201-0000	CTP201-0000	CTP201-0000
Relay, Solid State, 25A/230V		CTP201-0065	CTP201-0065	CTP201-0065	CTP201-0065	CTP201-0065	CTP201-0065
Control Unit, Electronic, E, Complete		CTP200-0002	CTP200-0008	CTP200-0008	CTP200-0072	CTP200-0022	CTP200-0022
Control Unit, Electronic, EK/EKA, Complete		—	CTP200-0004	CTP200-0004	—	CTP200-0017	CTP200-0017
Cover, Outer E, EK		COV173-0002	COV240-0004	COV240-0004	COV314-0002	COV385-0002	COV387-0002
Cover, Outer EA, EKA		—	COV240-0003	COV240-0003	—	COV385-0013	COV387-0012
Cover, rear		RCV173-0002	RCV240-0002	RCV240-0002	RCV314-0001	RCV387-0005	RCV387-0005
Door, assembly		DOR173-0001	DOR234-0001	DOR254-0001	DOR314-0010	DOR387-0001	DOR387-0001
Tightening Bolt, Door, Assembly		LOK240-0001	LOK240-0001	LOK240-0001	LOK387-0032	LOK387-0032	LOK387-0032
Air Jet, MK/EK, Red		CMT100-0003	CMT100-0003	CMT100-0003	—	—	—
Air Jet, M/E, Black		CMT100-0006	CMT100-0006	CMT100-0006	CMT100-0006	CMT100-0006	CMT100-0006
Reservoir, Water ,assy., complete E		CMT173-0029	SRV000-0277	SRV000-0277	CMT314-0005	SRV000-0272	SRV000-0272
Reservoir, Water ,assy., complete EK		CMT173-0030	CMT240-0042	CMT240-0042	—	—	—
Reservoir, Water, with Stand		SRV000-0400	SRV000-0402	SRV000-0402	SRV000-0402	SRV000-0404	SRV000-0404
Support, Tray, Upper		SRV000-0247	SRV000-0247	SRV000-0247	—	—	—
Holder, Tray		TRH173-0001	TRH234-0001	TRH254-0001	TRH314-0004	TRH385-0001	TRH387-0001
Tray, big		TRY173-0001	TRY240-0001	TRY240-0001	TRY314-0003	TRY385-0003	TRY387-0001

<b>Description</b>	<b>1730 E/EK</b>	<b>2340 E/EA/EK/EKA</b>	<b>2540 E, EK/EKA</b>	<b>3140 E</b>	<b>3850 EA</b>	<b>3870 EA</b>
Tray, small	—	—	—	TRY314-0004	TRY385-0004	TRY387-0003
Handle, Tray,	CMT240-0001	CMT240-0001	CMT240-0001	—	—	—
Bellows, Door Lock	GAS080-0020	GAS080-0020	GAS080-0020	GAS080-0020	GAS080-0020	GAS080-0020
Tightening Bolt, Door Locking Bellows	LOK240-0026	LOK240-0026	LOK240-0026	LOK240-0026	LOK240-0026	LOK240-0026
Housing, Door Locking Bellows	LOK240-0025	LOK240-0025	LOK240-0025	LOK240-0025	LOK240-0025	LOK240-0025
Pin, Membrane	L0K240-0023	L0K240-0023	L0K240-0023	L0K240-0023	L0K240-0023	L0K240-0023
Bushing, Inner, bellows	CMT067-0002	CMT067-0002	CMT067-0002	CMT067-0002	CMT067-0002	CMT067-0002
Disc, Silicone, Door Bellows	GAS080-0006	GAS080-0006	GAS080-0006	GAS080-0006	GAS080-0006	GAS080-0006
O-Ring, 10 x 2.5, Viton	GAS082-0020	GAS082-0020	GAS082-0020	GAS082-0020	GAS082-0020	GAS082-0020
O-Ring, 6 x 2, Viton	GAS082-0021	GAS082-0021	GAS082-0021	GAS082-0021	GAS082-0021	GAS082-0021
Electrode, Water Level, Assembly, For TTA	CMT196-0004	CMT196-0004	CMT196-0004	CMT196-0004	CMT196-0004	CMT196-0004
Dipstick, Reservoir, Water, Superp.	POL067-0005	POL067-0005	POL067-0005	POL067-0005	POL067-0005	POL067-0005
Cap, water strainer, 1/4"	FIL175-0027	FIL175-0027	FIL175-0027	FIL175-0027	FIL175-0027	FIL175-0027
Screen, 400 Micron, For Strainer 1/4"	FIL175-0046	FIL175-0046	FIL175-0046	FIL175-0046	FIL175-0046	FIL175-0046
Gasket, 3mm, Silicon, for 1/4" Strainer	GAS082-0007	GAS082-0007	GAS082-0007	—	—	—
Gasket, 4mm, Silicon, for 1/4" Strainer	—	—	—	GAS082-0008	GAS082-0008	GAS082-0008
Strainer, Water, Housing + cap, 1/4	FIL175-0051	FIL175-0051	FIL175-0051	FIL175-0051	FIL175-0051	FIL175-0051
Circuit Breaker, Rail, 1PH, 10A, Carlingswitch	ELE035-0019	ELE035-0019	ELE035-0019	ELE035-0019	ELE035-0019	ELE035-0019
Circuit Breaker, Rail, 1PH, 15A, Carlingswitch	ELE035-0021	ELE035-0021	ELE035-0021	ELE035-0021	ELE035-0021	ELE035-0021
Cover, Door	POL065-0001	POL065-0002	POL065-0002	COV314-0001	POL065-0003	POL065-0003
Cover, Validation Port	—	POL065-0006	POL065-0006	POL065-0006	POL065-0006	POL065-0006
Cover, RS232 Opening, Superp.	POL067-0003	POL067-0003	POL067-0003	POL067-0003	POL067-0003	POL067-0003
Capacitor, 470nF	CTP201-0016	CTP201-0016	CTP201-0016	CTP201-0016	CTP201-0016	CTP201-0016



### 13 PRESSURE VS TEMPERATURE FOR SATURATED STEAM

psia	psig	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
14.7	0.0	212.0	1.01	101.3	100.0	17.5	2.8	220.8	1.20	120.4	104.9
14.8	0.1	212.2	1.02	101.7	100.1	17.5	2.8	221.0	1.21	120.7	105.0
14.8	0.1	212.4	1.02	102.1	100.2	17.6	2.9	221.2	1.21	121.3	105.1
14.9	0.2	212.5	1.02	102.4	100.3	17.7	3.0	221.4	1.22	122.0	105.2
14.9	0.2	212.7	1.03	102.8	100.4	17.7	3.0	221.5	1.22	122.0	105.3
15.0	0.3	212.9	1.03	103.2	100.5	17.8	3.1	221.7	1.23	122.7	105.4
15.0	0.3	213.1	1.04	103.6	100.6	17.8	3.1	221.9	1.23	122.7	105.5
15.1	0.4	213.3	1.04	104.0	100.7	17.9	3.2	222.1	1.23	123.4	105.6
15.1	0.4	213.4	1.04	104.3	100.8	18.0	3.3	222.3	1.24	124.1	105.7
15.2	0.5	213.6	1.05	104.7	100.9	18.0	3.3	222.4	1.24	124.1	105.8
15.2	0.5	213.8	1.05	105.1	101.0	18.1	3.4	222.6	1.24	124.7	105.9
15.3	0.6	214.0	1.05	105.4	101.1	18.2	3.5	222.8	1.25	125.1	106.0
15.4	0.7	214.2	1.06	105.8	101.2	18.2	3.5	223.0	1.26	125.5	106.1
15.4	0.7	214.3	1.06	106.2	101.3	18.3	3.6	223.2	1.26	126.0	106.2
15.5	0.8	214.5	1.07	106.6	101.4	18.3	3.6	223.3	1.26	126.2	106.3
15.5	0.8	214.7	1.07	106.9	101.5	18.4	3.7	223.5	1.27	126.8	106.4
15.6	0.9	214.9	1.07	107.3	101.6	18.5	3.8	223.7	1.27	127.2	106.5
15.6	0.9	215.1	1.08	107.7	101.7	18.5	3.8	223.9	1.28	127.7	106.6
15.7	1.0	215.2	1.08	108.1	101.8	18.6	3.9	224.1	1.28	128.1	106.7
15.7	1.0	215.4	1.08	108.4	101.9	18.6	3.9	224.2	1.29	128.5	106.8
15.8	1.1	215.6	1.09	108.8	102.0	18.7	4.0	224.4	1.29	129.0	106.9
15.8	1.1	215.8	1.09	109.2	102.1	18.8	4.1	224.6	1.29	129.6	107.0
15.9	1.2	216.0	1.10	109.6	102.2	18.9	4.2	224.8	1.30	129.9	107.1
16.0	1.3	216.3	1.10	110.0	102.4	18.9	4.2	225.0	1.30	130.4	107.2
16.1	1.4	216.5	1.11	110.7	102.5	19.0	4.3	225.1	1.31	130.8	107.3
16.1	1.4	216.7	1.11	111.1	102.6	19.0	4.3	225.3	1.31	131.3	107.4
16.2	1.5	216.9	1.12	111.5	102.7	19.1	4.4	225.5	1.32	131.7	107.5
16.2	1.5	217.0	1.12	111.9	102.8	19.2	4.5	225.7	1.32	132.2	107.6
16.3	1.6	217.2	1.12	112.3	102.9	19.3	4.6	225.9	1.33	132.6	107.7
16.4	1.7	217.4	1.13	112.7	103.0	19.3	4.6	226.0	1.33	133.1	107.8
16.4	1.7	217.6	1.13	113.1	103.1	19.4	4.7	226.2	1.34	133.5	107.9
16.5	1.8	217.8	1.14	113.5	103.2	19.4	4.7	226.4	1.34	134.0	108.0
16.5	1.8	217.9	1.14	114.0	103.3	19.5	4.8	226.6	1.34	134.4	108.1
16.6	1.9	218.1	1.14	114.3	103.4	19.6	4.9	226.8	1.35	134.9	108.2
16.6	1.9	218.3	1.15	114.7	103.5	19.6	4.9	226.9	1.35	135.3	108.3
16.7	2.0	218.5	1.15	115.1	103.6	19.7	5.0	227.1	1.36	135.8	108.4
16.8	2.1	218.7	1.16	115.6	103.7	19.8	5.1	227.3	1.36	136.2	108.5
16.8	2.1	218.8	1.16	116.0	103.8	19.8	5.1	227.5	1.37	136.7	108.6
16.9	2.2	219.0	1.16	116.3	103.9	19.9	5.2	227.7	1.37	137.1	108.7
16.9	2.2	219.2	1.17	116.7	104.0	19.9	5.2	227.8	1.38	137.6	108.8
17.0	2.3	219.4	1.17	117.1	104.1	20.0	5.3	228.0	1.38	138.1	108.9
17.1	2.4	219.6	1.18	117.5	104.2	20.1	5.4	228.2	1.39	138.5	109.0
17.1	2.4	219.7	1.18	117.9	104.3	20.2	5.5	228.4	1.39	139.0	109.1
17.2	2.5	219.9	1.18	118.6	104.4	20.3	5.6	228.6	1.39	139.5	109.2
17.2	2.5	220.1	1.19	118.6	104.5	20.3	5.6	228.7	1.40	140.0	109.3
17.3	2.6	220.3	1.19	119.3	104.6	20.4	5.7	228.9	1.40	140.5	109.4
17.4	2.7	220.5	1.20	120.0	104.7	20.4	5.7	229.1	1.41	140.9	109.5
17.4	2.7	220.6	1.20	120.0	104.8						

psia	psig	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
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
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

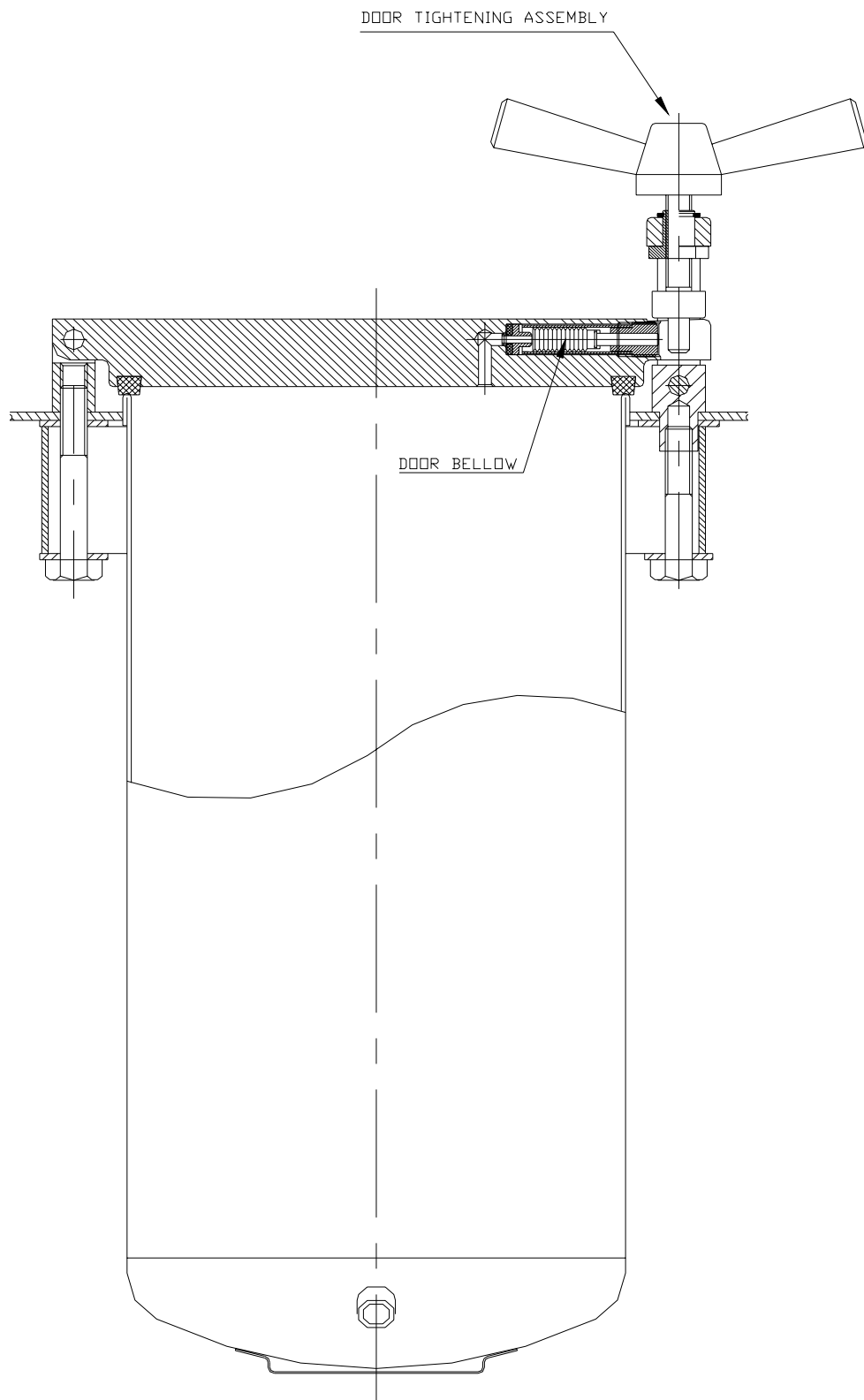
psia	psig	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
29.4	14.7	249.1	2.02	202.4	120.6	34.6	19.9	258.6	2.39	238.7	125.9
29.5	14.8	249.3	2.03	203.1	120.7	34.7	20.0	258.8	2.39	239.4	126.0
29.5	14.8	249.4	2.04	203.7	120.8	34.8	20.1	259.0	2.40	240.2	126.1
29.6	14.9	249.6	2.04	204.4	120.9	34.9	20.2	259.2	2.41	240.9	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
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

psia	psig	°F	Bar	kPa	°C	psia	psig	°F	Bar	kPa	°C
40.6	25.9	268.2	2.80	280.0	131.2	45.7	31.2	275.4	3.15	315.0	135.2
40.7	26.0	268.3	2.81	280.9	131.3	45.8	31.3	275.5	3.16	315.9	135.3
40.9	26.2	268.5	2.82	281.7	131.4	45.9	31.5	275.7	3.17	316.8	135.4
41.0	26.3	268.7	2.83	282.6	131.5	46.1	31.6	275.9	3.18	317.7	135.5
41.1	26.4	268.9	2.83	283.4	131.6	46.2	31.7	276.1	3.19	318.6	135.6
41.2	26.5	269.1	2.84	284.3	131.7	46.3	31.9	276.2	3.20	319.5	135.7
41.4	26.7	269.2	2.85	285.1	131.8	46.5	32.0	276.4	3.20	320.5	135.8
41.5	26.8	269.4	2.86	286.0	131.9	46.6	32.1	276.6	3.21	321.4	135.9
41.6	26.9	269.6	2.87	286.8	132.0	46.8	32.3	276.8	3.22	322.4	136.0
41.7	27.0	269.8	2.88	287.7	132.1	46.9	32.4	277.0	3.23	323.3	136.1
41.8	27.1	270.0	2.89	288.5	132.2	47.0	32.6	277.2	3.24	324.3	136.2
42.0	27.3	270.1	2.89	289.4	132.3	47.2	32.7	277.3	3.25	325.2	136.3
42.1	27.4	270.3	2.90	290.2	132.4	47.3	32.8	277.5	3.26	326.2	136.4
42.2	27.5	270.5	2.91	291.1	132.5	47.4	33.0	277.7	3.27	327.1	136.5
42.3	27.6	270.7	2.92	291.9	132.6	47.6	33.1	277.9	3.28	328.1	136.6
42.5	27.8	270.9	2.93	292.8	132.7	47.7	33.2	278.1	3.29	329.0	136.7
42.6	27.9	271.0	2.94	293.6	132.8	47.9	33.3	278.2	3.30	330.0	136.8
42.7	28.0	271.2	2.94	294.5	132.9	48.0	33.3	278.4	3.31	330.9	136.9
42.8	28.1	271.4	2.95	295.4	133.0	48.1	33.4	278.6	3.32	331.9	137.0
43.0	28.3	271.6	2.96	296.2	133.1	48.3	33.6	278.8	3.33	332.8	137.1
43.1	28.4	271.8	2.97	297.1	133.2	48.4	33.7	279.0	3.34	333.8	137.2
43.2	28.5	271.9	2.98	297.9	133.3	48.5	33.8	279.1	3.35	334.7	137.3
43.3	28.6	272.1	2.99	298.8	133.4	48.7	34.0	279.3	3.36	335.6	137.4
43.5	28.8	272.3	3.00	299.7	133.5	48.8	34.1	279.5	3.37	336.6	137.5
43.6	28.9	272.5	3.01	300.6	133.6	49.0	34.3	279.7	3.38	337.5	137.6
43.7	29.0	272.7	3.01	301.5	133.7	49.1	34.4	279.9	3.38	338.5	137.7
43.9	29.2	272.8	3.02	302.4	133.8	49.2	34.5	280.0	3.39	339.4	137.8
44.0	29.3	273.0	3.03	303.3	133.9	49.4	34.7	280.2	3.40	340.4	137.9
44.1	29.4	273.2	3.04	304.2	134.0	49.5	34.8	280.4	3.41	341.4	138.0
44.2	29.5	273.4	3.05	305.1	134.1	49.7	35.0	280.6	3.42	342.4	138.1
44.4	29.7	273.6	3.06	306.0	134.2	49.8	35.1	280.8	3.43	343.4	138.2
44.5	29.8	273.7	3.07	306.9	134.3	49.9	35.2	280.9	3.44	344.4	138.3
44.6	29.9	273.9	3.08	307.8	134.4	50.1	35.4	281.1	3.45	345.4	138.4
44.8	30.1	274.1	3.09	308.7	134.5	50.2	35.5	281.3	3.46	346.4	138.5
44.9	30.2	274.3	3.10	309.6	134.6	50.4	35.7	281.5	3.47	347.4	138.6
45.0	30.3	274.5	3.10	310.5	134.7	50.6	35.9	281.7	3.48	348.4	138.7
45.2	30.5	274.6	3.11	311.4	134.8	50.7	36.0	281.8	3.49	349.4	138.8
45.3	30.6	274.8	3.12	312.3	134.9	50.8	36.1	282.0	3.50	350.4	138.9
45.4	30.7	275.0	3.13	313.2	135.0	51.0	36.3	282.2	3.51	351.4	139.0
45.6	31.1	275.2	3.14	314.1	135.1	51.1	36.4	282.4	3.52	352.4	139.1

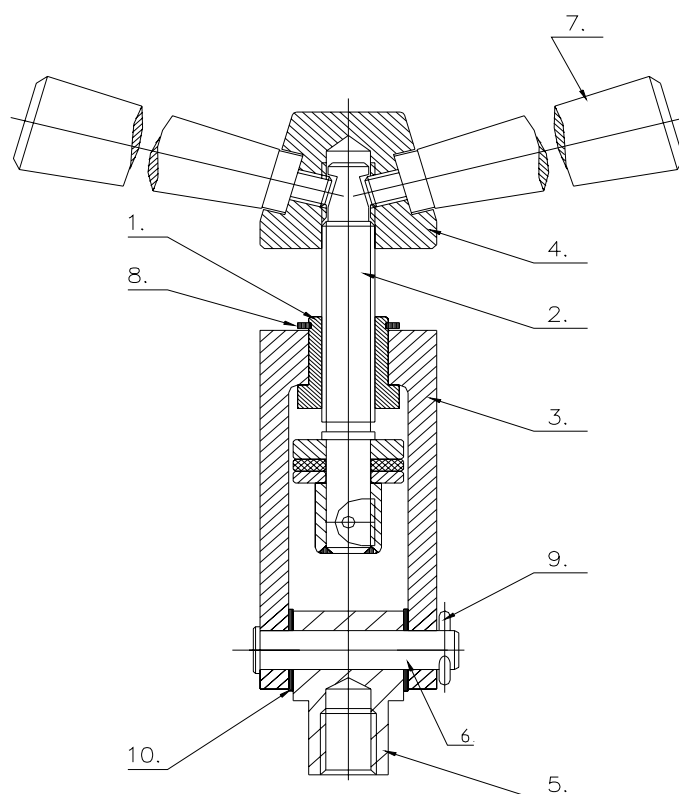
**Legend:**

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

## ***VESSEL ASSEMBLY***



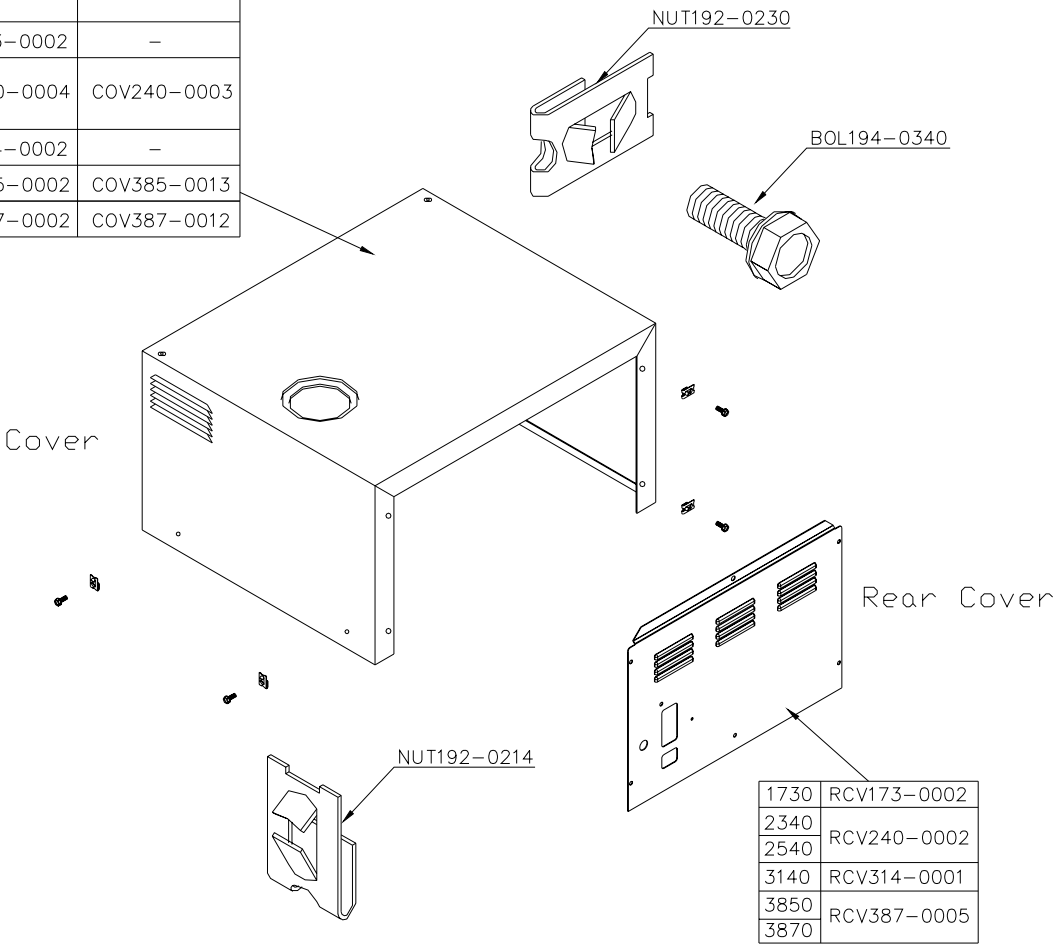
### **DOOR TIGHTENING BOLT – ASSEMBLY**



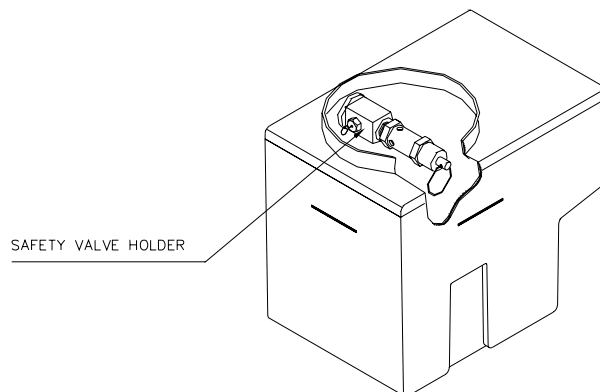
No.	Description	Cat. No.	
		1730, 2340, 2540	3140, 3850, 3870
1	Bushing	LOK240-0003	LOK387-0003
2	Bolt, Door Tightening, - assembly	LOK240-0036	LOK387-0007
3	Locking screw housing	LOK240-0005	LOK387-0005
4	Locking base	LOK240-0012	LOK387-0012
5	Locking housing axe - assembly	LOK240-0013	LOK387-0036
6	Door locking device pin	LOK240-0035	LOK387-0016
7	Bakelite handle	HAN071-0003	HAN071-0006
8	Closing bridge “c” clip	NUT193-0302	NUT193-0303
9	Cotter pin	LOK692-0039	LOK692-0039
10	Okolon disc	LOK240-0017	LOK387-0018
	Door tightening bolt – assembly (w/o 5, 6, 9, 10)	LOK240-0001	LOK387-0032

**OUTER CABINET - ASSEMBLY**

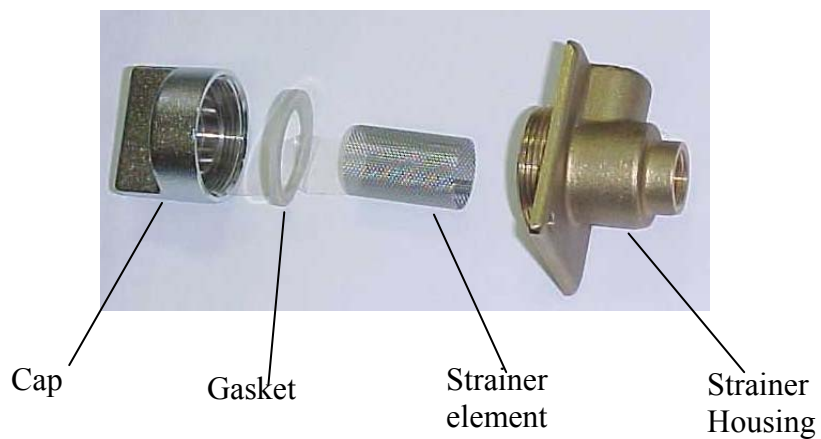
	E, EK	EA, EKA
1730	COV173-0002	—
2340	COV240-0004	COV240-0003
2540		
3140	COV314-0002	—
3850	COV385-0002	COV385-0013
3870	COV387-0002	COV387-0012



## ***WATER RESERVOIR***



## ***WATER OUTLET STRAINER***



Description	Cat. No.
Cap, water strainer, 1/4"	FIL175-0027
Screen, 400 Micron, For Strainer 1/4"	FIL175-0046
Gasket, 4mm, Silicon, for 1/4" Strainer	GAS082-0008
Strainer, Water, Housing + cap, 1/4	FIL175-0051



## 14 VALVES NUMBERING

The valves in the drawing and the manual are numbered according to their function. The following list includes all the valve numbers that are in use in Tuttnauer

<b>0.</b>	<b>FUNCTION</b>	01. Change-over : steam / electricity 02. Locking door cylinder (front door) 03. Locking door cylinder (Rear door)
<b>1.</b>	<b>FEED WATER</b>	11. Feed water – cool jacket 12. Feed water – cool heat exchanger 13. Feed water – cool fast exhaust 14. Feed water – to reservoir 15. feed water – to vacuum pump 16. Water outlet 17. Shut 18. Feed water – to ejector
<b>2.</b>	<b>MINERAL FREE WATER</b>	21. Mineral free water - inlet 22. Detergent 23. To spray 24. Recycling inlet 25. Recycling outlet
<b>3.</b>	<b>COMPRESSED AIR</b>	31. Air inlet 32. Air inlet - to chamber 33. To splash cooling pipe 34 – 1. To door 1 seal 34 – 2. To door 2 seal 38 – 1. Open door 1 38 – 2. Open door 2 39 – 1. Close door 1 39 – 2. Close door 2
<b>4.</b>	<b>AIR</b>	41. Air release N.C. 42. Air release N.O. 43. Filtered air - inlet 44. Air Inlet 45. Aeration
<b>5.</b>	<b>VACUUM</b>	51. Vacuum - break 52. Vacuum - to pump 53.1 Vacuum - from door 1 seal 53-2. Vacuum - from door 2 seal

<b>6.</b>	<b>DRAIN</b>	61. Drain – from reservoir 62. Drain – from jacket overflow 63. Drain – from vacuum pump / ejector 64. Drain – from chamber 65. Drain – from cooler 66. Drain – from sanitary filter 67. Drain – from steam generator 68. Drain – jacket 69. Drain – condense from seal
<b>7.</b>	<b>EXHAUST</b>	70. Exhaust – from chamber 71. Exhaust – to reservoir 72. Exhaust – to drain 73. Fast exhaust 74. Slow exhaust 75. Exhaust to ejector / to vacuum pump 76. Exhaust – from heat exchanger 77. Exhaust – from steam generator 78. Exhaust through heat exchanger (pre-vacuum stage only) 79. Jacket steam trap
<b>8.</b>	<b>GAS</b>	81. Inlet 82. Main inlet 83. Inlet through humidifier
<b>9.</b>	<b>STEAM</b>	90. Steam – from building source 91. Steam – to jacket (From outer source) 92. Steam – inlet 93. Steam – to chamber 94 – 1. Steam – to door 1 seal 94 – 2. Steam – to door 2 seal 95. Steam – to heat exchanger 96. Steam – to sanitary filter 97. Steam – from steam generator 98. Steam – to activate ejector

### PIPING DIAGRAM FOR MODELS 1730 E AND EK

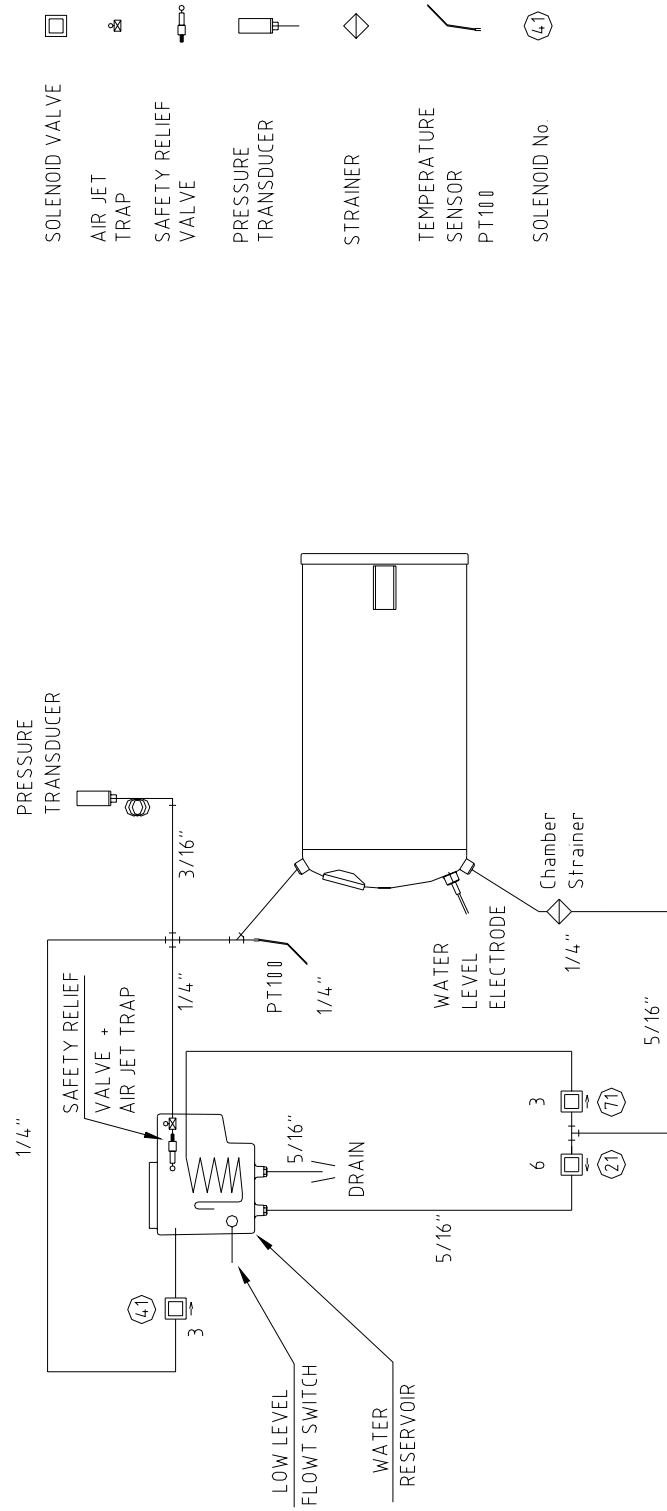
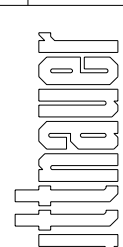
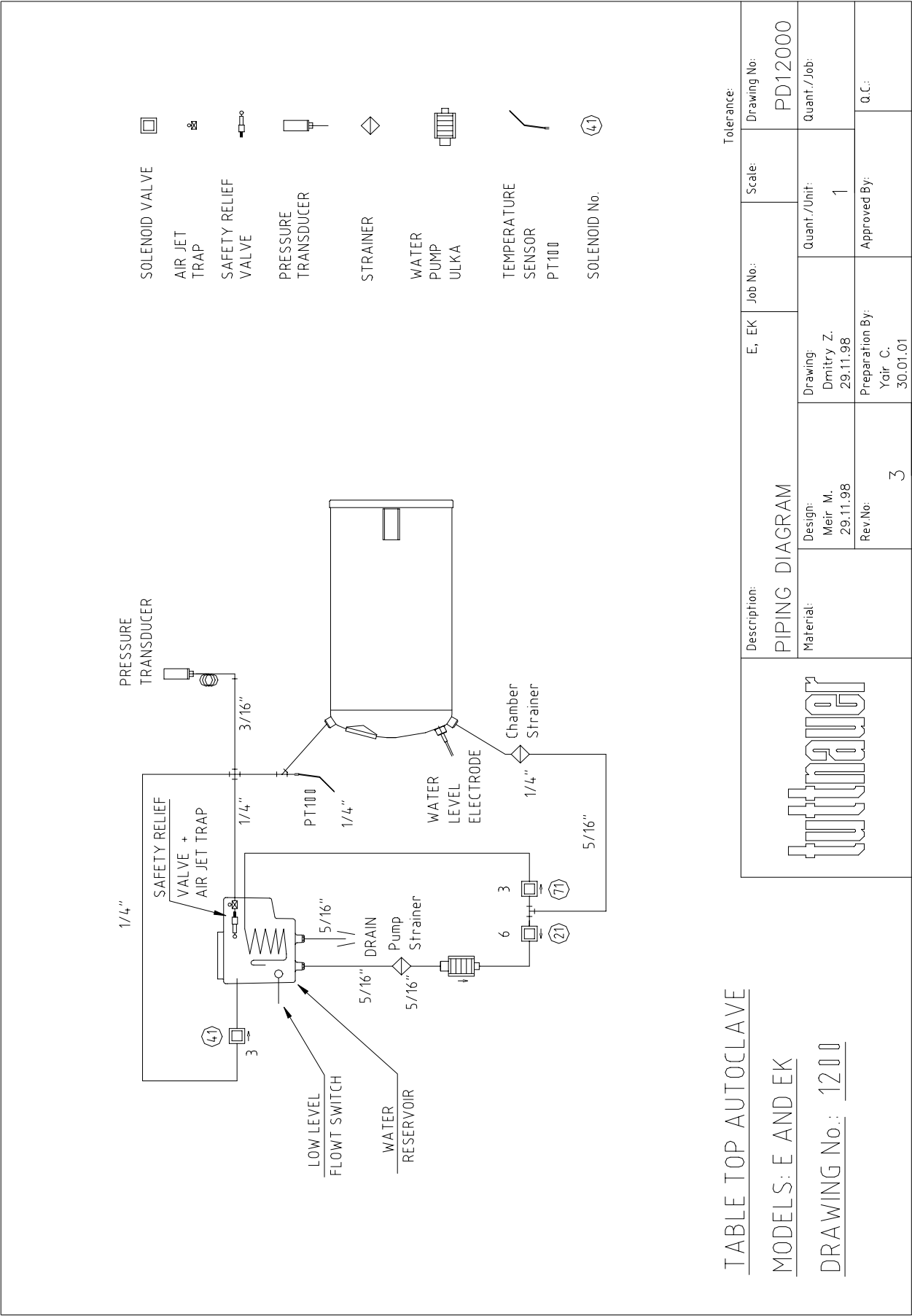


TABLE TOP AUTOCLAVE

MODELS: 1730 E, 1730 EK

	Description: 1730 E, 1730 EK					Job No.:	Scale: 1:1	Drawing No: 1730 E, EK
	PIPING DIAGRAM							
	Material:	Design: Mirel L. 25.03.02	Drawing: Yoel C. 25.03.02	Quant /Unit: 1	Quant /Job:	Approved By:	Q.C.:	
		Rev No:	Preparation By:					

PIPING DIAGRAM FOR MODELS: E AND EK EXCEPT 1730



PIPING DIAGRAM FOR MODELS: EA AND EKA

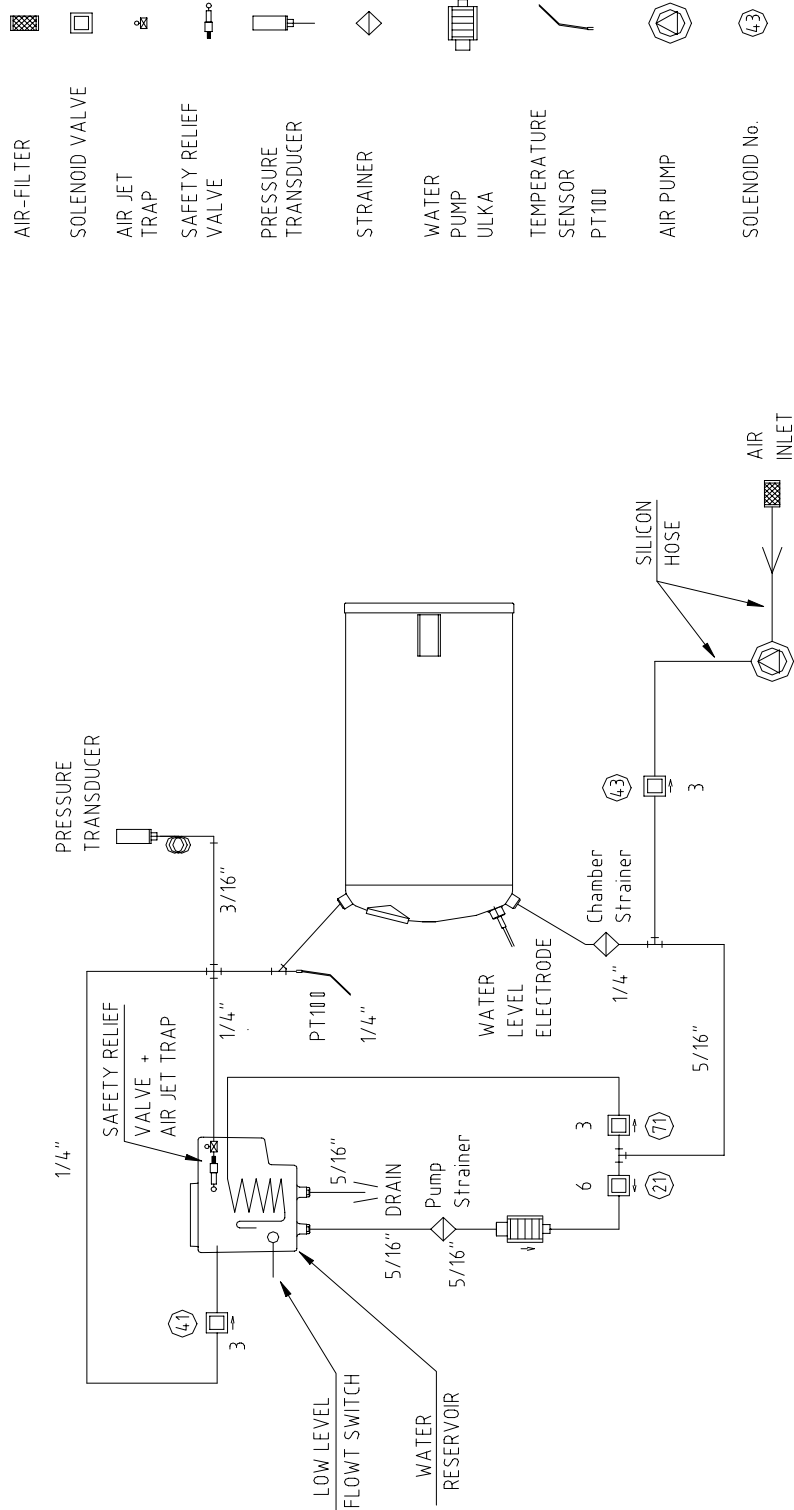


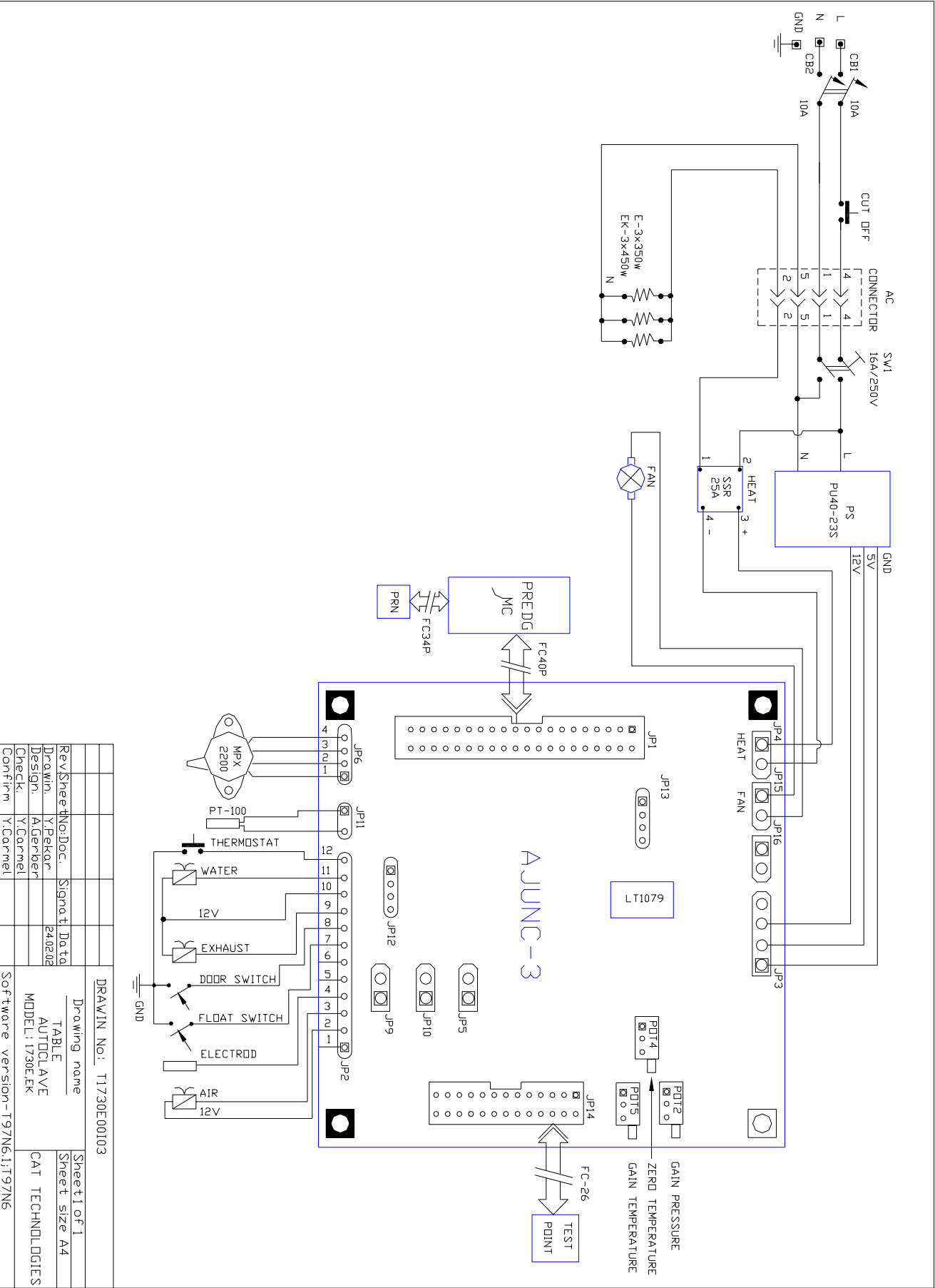
TABLE TOP AUTOCLAVE

MODELS: EA AND EKA

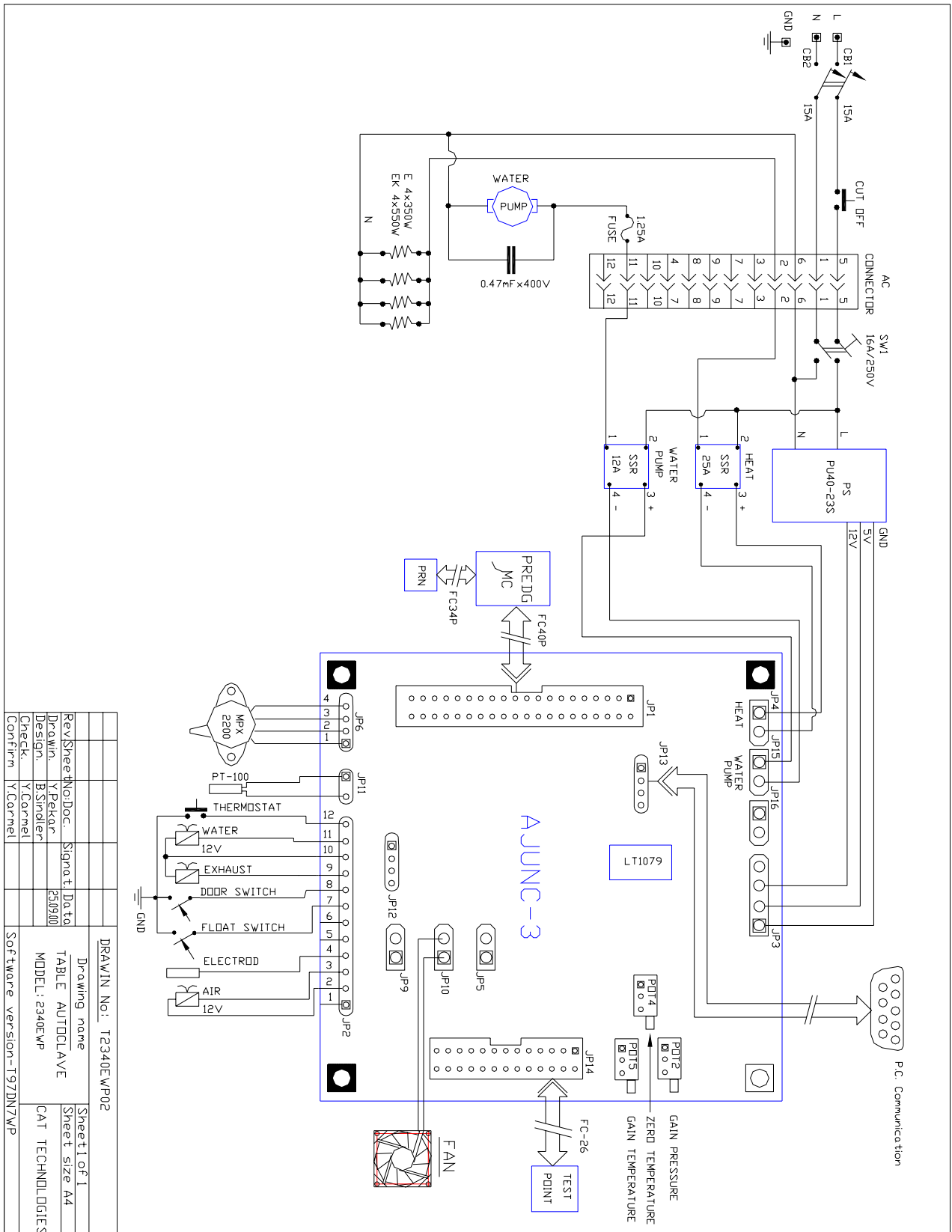
DRAWING No.: 1201

Description:		EA, EKA	Job No.:	Scale:	Drawing No:
Material:	Design:	Dmitry Z.	Quant./Unit:	Quant./Job:	PD12010
	Rev No:	Yair C.	Approved By:	q.c.:	

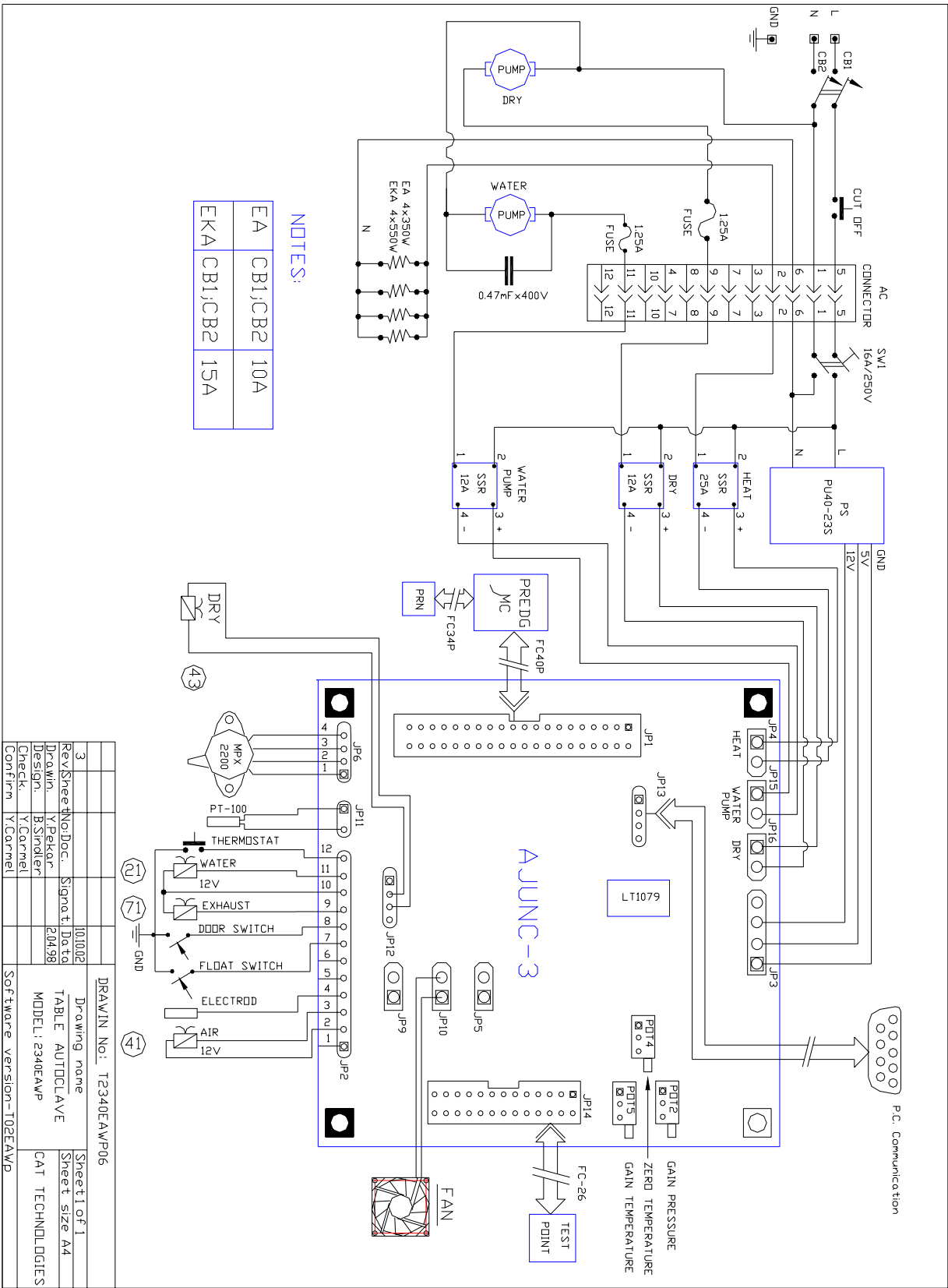
ELECTRICAL DIAGRAM FOR MODELS 1730 E, EK



# **ELECTRICAL DIAGRAM FOR MODELS 2340/2540 E, EK**

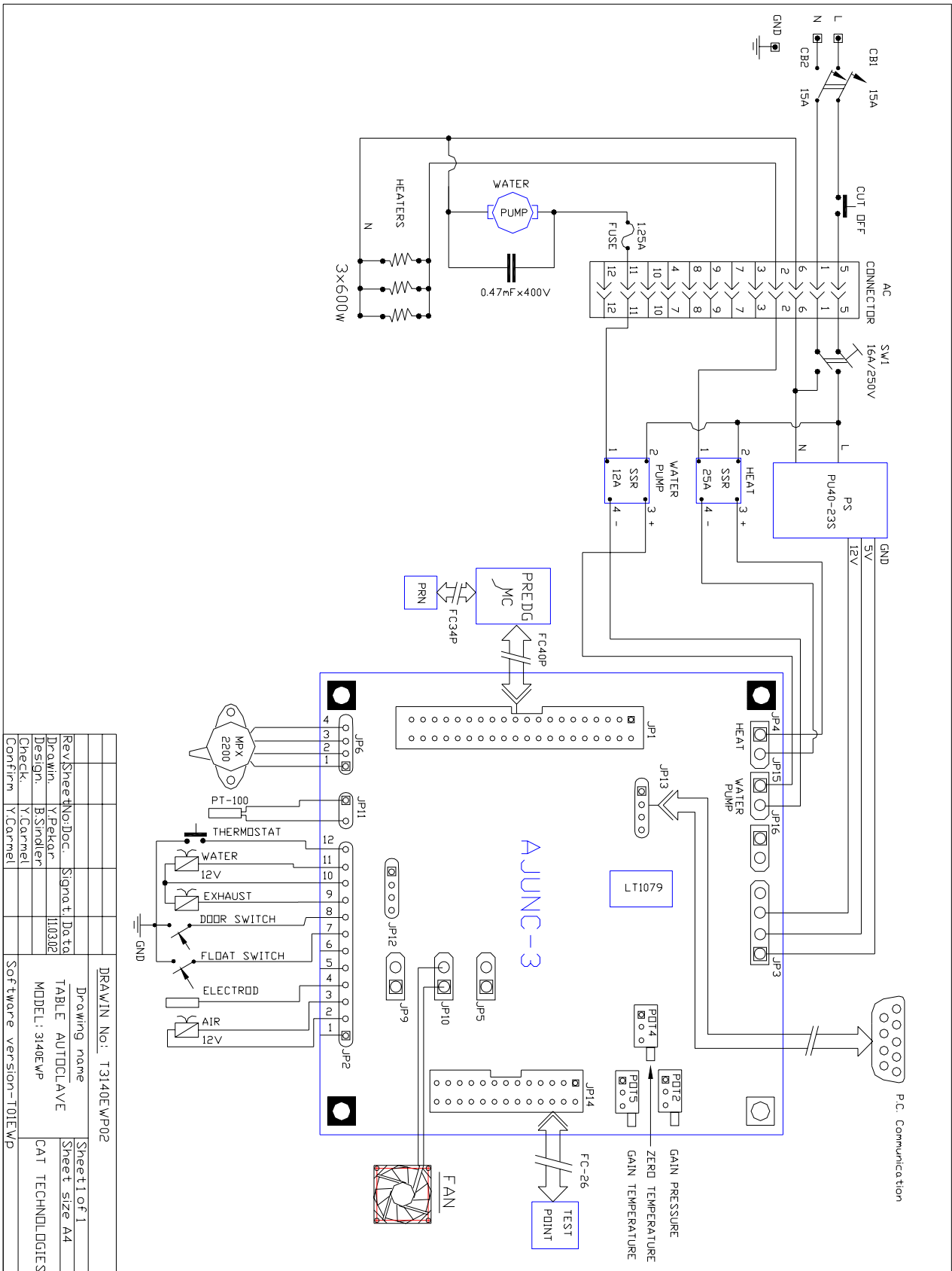


## ***ELECTRICAL DIAGRAM FOR MODELS 2340/2540 EA, EKA***

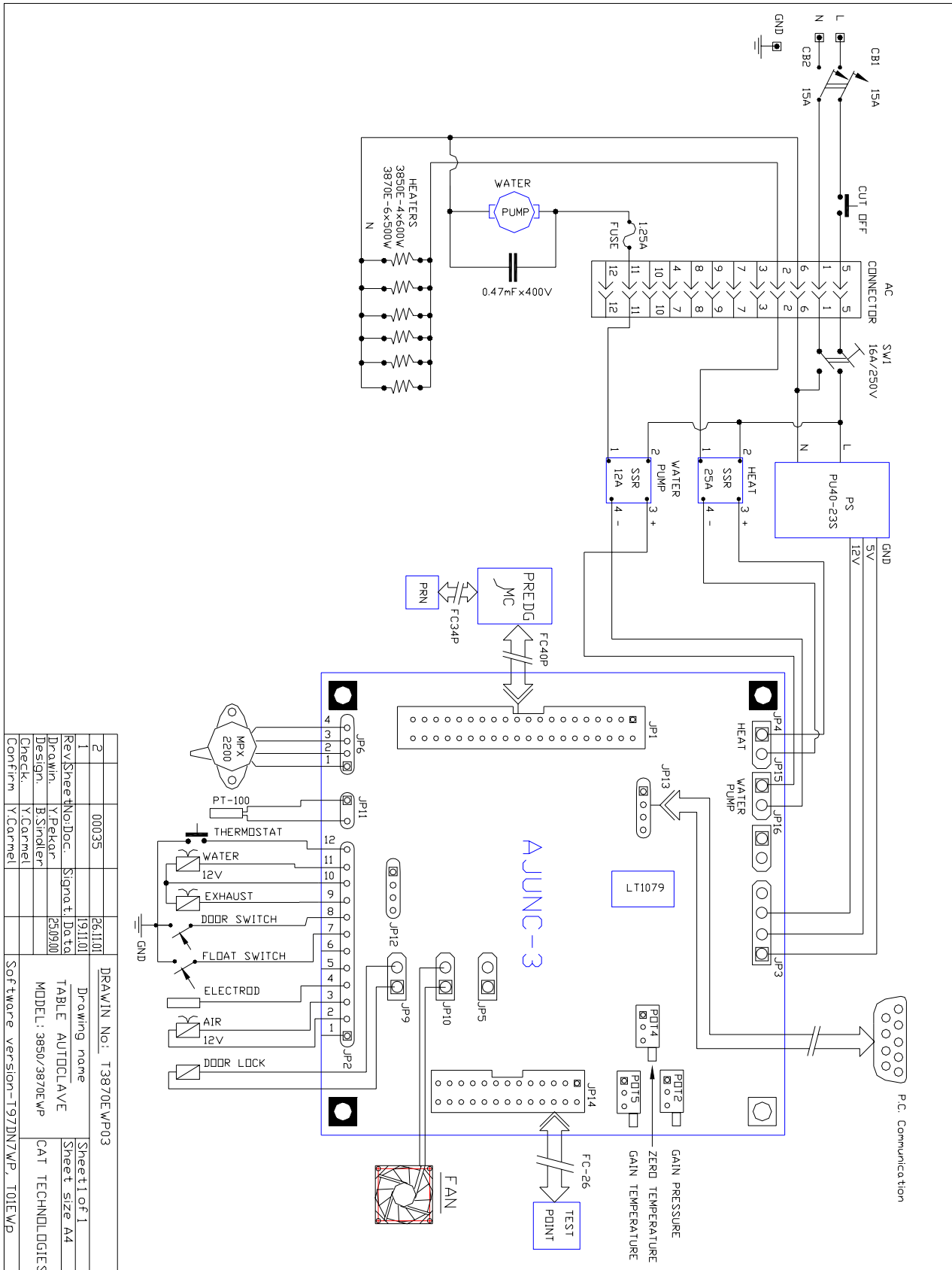




## ELECTRICAL DIAGRAM FOR MODEL 3140 E



### ***ELECTRICAL DIAGRAM FOR MODELS 3850/3870 E, EK***



### ***ELECTRICAL DIAGRAM FOR MODELS 3850/3870 EA, EKA***

