# Soxtec™ 2050/2055
# Service Manual

**1000 7416 / Rev. 3**


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FOSS

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| Rev. | Date of Issue | Revised Material |
|---|---|---|
| 3 | 2009-09-23 | Soxtec 2058 discontinued. Section 5 and 6 updated. |
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Please inform Customer Support - Technical Communication Team at the address given below, if you have any opinions about or proposals for changes to this manual.

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# 1 General

## 1.1 Introduction

This manual contains material for the Soxtec Avanti Units.

## 1.2 Terms of Limited Warranty

All tecator products are warranted against defects in materials and workmanship under normal use in accordance with FOSS terms of sale. The warranty period is one year for replacements parts. The warranty period becomes effective at installation (or 3 months from date of shipment), whichever occurs first. No other warranty is expressed or implied.

FOSS further guarantees that the goods have been thoroughly checked and tested before shipment and that they are free of mechanical and electrical defects. Should defects due to faulty material or workmanship develop during the WARRANTY PERIOD, parts will be supplied on a no-charge basis in accordance with FOSS terms of sale (except for expendable materials).

The Seller accepts no contingent liability and shall in no event be liable for consequential damages.

Warranty Disclaimer

Local market regulations and market conditions may require a change of the above stated warranty. Please check with the local FOSS distributor to confirm the prevailing warranty policy for your area.

## 1.3 Safety Precautions and Procedures

### ⚠Warning

***This device is equipped with a grounding/earthing type power plug for your protection against electrical shock hazard and should only be attached to a properly grounded/earthed receptacle.***

### ⚠Warning

***Before replacing the fuses, disconnect incoming mains supply.***

### ⚠Warning

***Electrical shock hazard. Covers or panel(s)should be removed by qualified personnel only.***

### ⚠Warning

***Modifications, alterations, rebuilding or use of safety parts not authorized by Foss Analytical AB violates the warranty. Foss Analytical AB has no responsibility for damages, material or personal, occuring as a result of such actions.***

**Note! To maintain the limits for the CE approval only CE approved instruments may be connected.**

# 2 Installation Instruction for 2050

**Note! Soxtec 2050 should be installed by a FOSS trained service engineer.**

## 2.1 Extra Equipment Useful for the Installation

When adjusting the height of the thimbles, glass cups are useful.

## 2.2 Unpacking

Unpack the Soxtec Avanti 2050 Automatic System and its accessories with care. Use the enclosed packing list to check that no parts are missing. If you have any questions, please contact your FOSS representative.

### 2.2.1 Inspection of Glassware and Wires

Check all glassware, **condensers**, the **level indicator** and the **front glass**.
Check the solvent **collection vessel connections** and the **wires position** on the wire wheels by opening the small plate on the right side. If necessary remove the rear cover by loosening the four screws on each side and the three on the middle of the rear panel. Do not replace the rear cover until the installation is ready.

## 2.3 Installation Requirements

**Table 1**

| **Soxtec Avanti 2050 Automatic Extraction System** | |
|---|---|
| Power consumption | 1550 W |
| Power consumption, Drive Unit | 40 W |
| Power supply | 230V ±10%, 50-60 Hz<br>115V ±10%, 50-60 Hz |
| Water supply | 2 l/min tap water at 20°C |
| Weight, Extraction Unit | approx. 30 kg |
| Weight, Control Unit | approx. 3 kg |
| Weight, Drive Unit | approx. 8 kg |
| Dimensions LxDxH, Extraction Unit | 6000x3800x5800 mm |
| Dimensions LxDxH, Control Unit | 310x240x165 mm |
| Dimensions LxDxH, Drive Unit | 397x280x115 mm |
| Ventilation | Fume hood or equivalent location. |

## 2.4 Installation Location

The **Extraction Unit (EU)** should be installed in such a way as to comply with the regulations issued by local authorities. A fumehood is normally recommended. It is important that the EU is placed on a horizontal surface, otherwise the collection vessel may not function.

The **Control Unit (CU)** and the **Drive Unit (DU)** are not intended for use in potentially explosive atmosphere and should therefore be placed **outside the fumehood** or according to the instructions when the system is placed on the laboratory bench, alternatively in a separate room.
A good advise is to place the DU to the left of the EU, giving a better drawing (bigger radius) of the wires.

If the system is installed with cables, wires and/or tubes passing through a wall, the **opening** in the wall **must be sealed**.

## 2.5 Transport Security

The counter weight for the front glass is secured during transportation. Unscrew the Phillips screw holding the counter weight under the instrument.

## 2.6 Cooling Water and Air

1. Connect the **water tube** (1582 0066) with the nuts between the water tap (alternatively a circulating chiller) and the water inlet on the DU (Fig. 2:1 pos. 3).

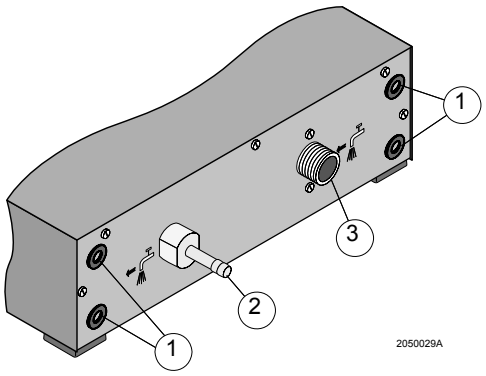


*Fig. 2:1 Drive Unit (DU), rear side*

2. Connect a **water tube** between the outlet on the DU (Fig. 2:1 pos. 2) and the inlet of the **Extraction Unit (EU)** (Fig. 2:1 pos. 1). Use tube clamps to ensure that the tube stays in position.
3. Connect another **water tube** from the EU (Fig. 2:2 pos. 7) to the drain (alternatively back to the circulating chiller). Use a tube clamp to ensure that the tube stays in position.
4. Finally connect the **air tube** between the CU (Fig. 2:3 pos. 7) and the EU (Fig. 2:2 pos. 2).

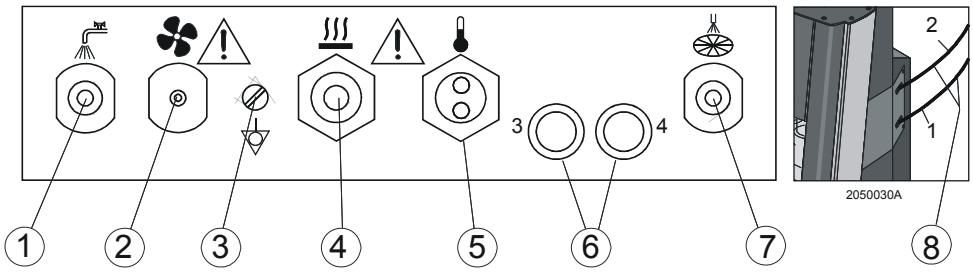


*Fig. 2:2 Extraction Unit (EU)*

| | | | |
|---|---|---|---|
| 1 | Cooling water inlet (from DU) | 5 | Temperature sensors |
| 2 | Air | 6 | Wires to lift / lower the sample rods |
| 3 | Earthing screw | 7 | Cooling water outlet |
| 4 | Heating | 8 | Wires to lift / lower the condensers |

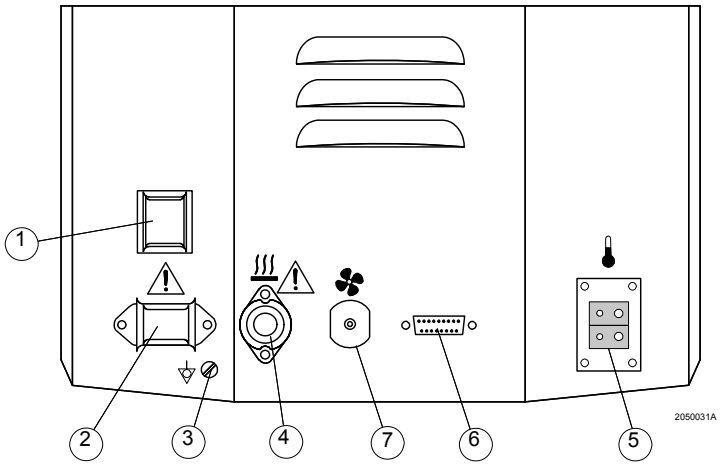


*Fig. 2:3 Control Unit (CU), rear side.*

| | | | |
|---|---|---|---|
| 1 | Power button | 5 | Temperature sensors |
| 2 | Mains inlet | 6 | Communication with the DU |
| 3 | Earthing screw | 7 | Air |
| 4 | Heating | | |

## 2.7 Electrical Connections

1. Connect the **contact for the temperature sensors** (two cables) from the EU (Fig. 2:2 pos. 5) to the CU (Fig. 2:3 pos. 5).
2. Connect the **power cable** for the hot plate from the EU (Fig. 2:2 pos. 4) to the CU (Fig. 2:3 pos. 4). Tighten the knurled nut to ensure that the contact stays in position.

### ⚠Warning

***The power cable/contact should never be exchanged or altered.***

3. Connect the **communication cable** (15 pin (D--sub) extension cable) from the CU (Fig. 2:3 pos. 6) to the DU (Fig. 2:4 pos. 4) . Tighten the screws to ensure that the cable stays in position.

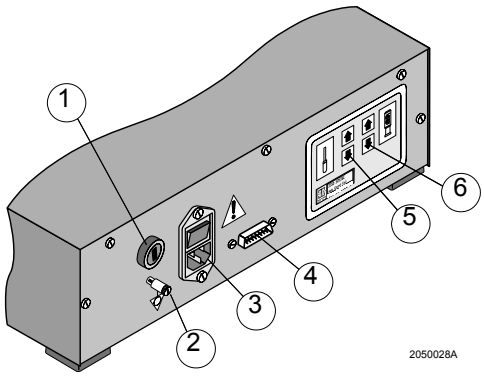


*Fig. 2:4 Drive Unit (DU), front side.*

| | | | |
|---|---|---|---|
| 1 | Fuse holder | 4 | Communication cable |
| 2 | Earthing screw | 5 | Key to lift / lower the sample rods |
| 3 | Mains inlet | 6 | Key to lift / lower the condensers |

## 2.8 Wires

**Note: The wires are available in two different lengths, 2 (P/N 1000 7846) or 3 (P/N 1000 7847) meters.**

### ⚠Warning

***Disconnect the incoming mains supply before replacing fuses or removing any cover.***

### ⚠Warning

***Electric shock hazard. Covers or panel(s) should be removed by qualified personnel only.***

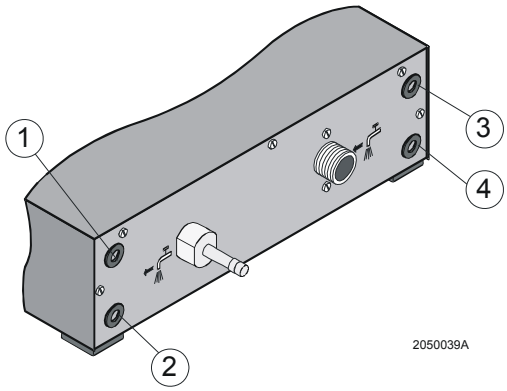


*Fig. 2:5 Where to connect the wires on the Drive Unit (DU).*

| | | | |
|---|---|---|---|
| 1 | Condenser wires | 4 | Sample rod wires |
| 2 | Condenser wires | 5 | Sample rod wires |

1. Open the cover of the DU to be able to connect the **wires**. Loosen five screws on each side. Take away the cover and disconnect the earthcable.
2. The **wires way** between the EU and the DU should be as **straight as possible**. If the wires need to be bended, for instance arround the fumehood wall, the

**minimum** radius should be **25 cm** and **maximum two 180 ° bends** is allowed. See the drawing in Fig. 6:8.

### Installation of the condenser wires

1. The **wires**, for raising and lowering the condensors, **goes** from the EU (Fig. 2:2 pos.6) marked 1--2, to the DU (Fig. 2:5 pos 1 and 2).
2. **Check** that **the wires** are in the track of the wheel inside the EU.
3. When the **wires** should be **mounted** in the tracks of the wheel on the motor, you need help from the motor.
4. Check that you have the **correct voltage version** and connect the DU using the mains cable to the wall socket. Turn on the power.

## ⚠Warning

***Be careful, do not touch the board under the safety shield, when the mains is on.***

5. Use the **two buttons** on the DU (Fig. 2:4 pos 7) to control the movements of the motor.
6. Start with the **wire No 2**. Press the button so the wheel goes to the **bottom position**. Connect the wire in the **inside track** and the hole marked 2.
7. **Tighten** the two nuts on the wire from two directions. Tighten the wire coating until there is no play with the screw connectors.
8. Continue with the **wire No 1**. Press the button so the wheel goes to the **upper position**. Connect the wire in the **outside track** and the hole marked 1 and tighten as before.

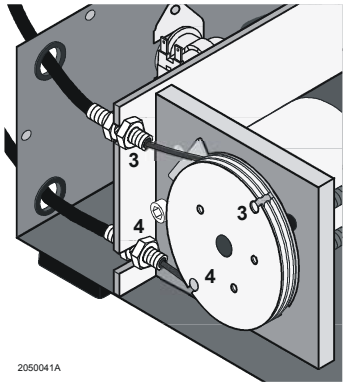


*Fig. 2:6 How to connect the wires inside the Drive Unit (DU)*

### Installation of the sample rod wires

9. The wires, for raising and lowering the sample rods, goes from the EU (Fig. 2:2 pos.6) marked 3--4, to the DU (Fig. 2:5 pos 3 and 4).
10. When the **wires** should be **mounted** in the tracks of the wheel on the motor, you need help from the motor.

11. Check that you have the **correct voltage version** and connect the DU using the mains cable to the wall socket. Turn on the power.

## ⚠Warning

***Be careful, do not touch the board under the safety shield, when the mains is on.***

12. Use the **two buttons** on the DU (Fig. 2:4 pos 6) to control the movements of the motor.

**Note: At installation of the sample rod wires you must insert a cup holder with cups in the Extraction Unit and have sample thimbles mounted.**

**Note: Use the positioning buttons on the DU and test the different extreme positions. The thimbles should not reach the bottom of the cups in their lowest position. This can be adjusted inside the EU.**

13. Start with the wire No 4. Press the button so the wheel goes to the bottom position. Connect the wire in the inside track and the hole marked 4.
14. **Tighten** the two nuts on the wire from two directions.
15. After installation of wire No 4, move the wheel to its **upper position**. The **springs** shall be **pressed together**.
16. Continue with the **wire No 3** in this upper position. Connect the wire in the **outside track** and the hole marked 3 and tighten.

**Note: Check the ligth emitting diodes on the inductive transmitters. They are turned on when the sensor is close enough to metal and off when not. Make sure that both conditions exists when running the motors.**

**Note: If only lighted: the sensor is mounted to close to the wheel. If never lighted: the sensor is mounted to far away from the wheel.**

17. Connect the Mains cable for the CU (Fig. 2:3 pos. 2) to the wall socket and turn on the power. The EU should now reset and go to position 1 (Condensers in upper position and sample positioning rods in lowest position) when the motors have stopped.

### 2.8.1 Adjustment of Wires

**Note! Adjust the wires in the Extraction Unit at installation, then it is easier to adjust the wires in the Drive Unit at service.**

The position of the condensers and sample rods is affected by the installation of the wires in the EU and DU. Check that the cups are lifted from the hot plate 3-5 mm at the end of a run.

18. Insert six thimbles into the EU and put six glass cups in a holder. Press the XX key and insert the cups.
19. Start a programme and check if the thimbles are touching the bottom of the cups during the boiling step. If so, adjust the nuts on wire No. 3 and 4 in the EU (when maximum adjustment is reached in the EU adjust in the DU). First stop XX and then restart the programme to see the adjustment. After each adjustment, stop and restart the programme. The lowest thimble should be approx. 1mm from the cup bottom.

20. The cups need to be lifted during the last step in the analysis, the drying step. Start a programme and check if the cups are lifted 1-2mm from the hot plate. If not, adjust the nuts on wire No. 1 and 2 in the EU (when maximum adjustment is reached in the EU adjust in the DU). First stop XX and then restart the programme to see the adjustment. After each adjustment, stop and restart the programme.
21. Reassemble **covers** on the EU and the DU.

## 2.9 Seals

**Note: Check that the hot plate is cold before installing the seals.**

The seals are available in four materials: Viton, Butyl, Teflon and Resell.
The seals are available in choice of three materials: Viton, Butyl and Resell.
To select the correct material for different solvents, please follow the recommendations in table 2.

**Table 2**

Condenser sealing rings, + = Recommended, - = Not recommended.

| SOLVENT | Viton | Butyl | Resell |
|---|---|---|---|
| Acetone | - | ++ | ++ |
| Acetonitrile | - | ++ | ++ |
| Carbon tetrachloride | ++ | - | ++ |
| Chloroform | ++ | - | ++ |
| Chloroform-methanol(2:1) | ++ | - | ++ |
| Cyclohexane | ++ | - | ++ |
| Dichloromethane | ++ | - | ++ |
| Ethanol | ++ | (+) | ++ |
| Ethyl acetate | - | ++ | ++ |
| Heptane | ++ | - | ++ |
| Hexane | ++ | - | ++ |
| Hexane: Acetone | - | - | ++ |
| Methanol | ++ | (+) | ++ |
| Methyl Ethyl Ketone | ++ | - | ++ |
| Petroleum ether 30-60 °C | ++ | - | ++ |
| Toluene | ++ | - | ++ |
| Thrichloroethylene | ++ | - | ++ |
| Xylene | ++ | - | ++ |

1. Place the seal in your hand (ridge downwards).
2. Press the outer rim of the seal into the slot on the bottom part of the Teflon adapter on the condenser. Start from the back and work towards the front.
3. Insert seals in all extraction positions.

## 2.10 How to Mount the Drive Unit on the Wall

Assemble the mounting plate on the Drive Unit by taking off the two feet on the side of the DU that should be upwards and then place the mounting plate between the chassis and the each foot.

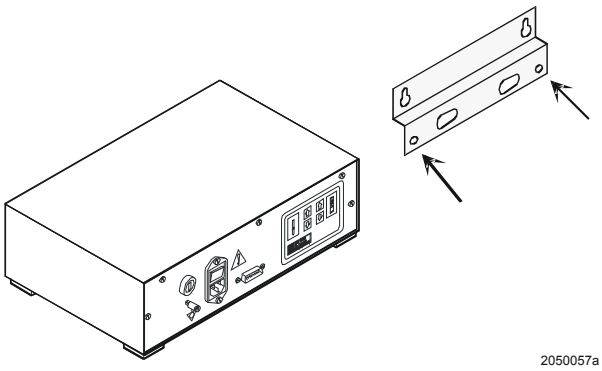


*Fig. 2:7 How to assemble the mounting plate to the DriveUnit (DU)*

## 2.11 Installation Check List for 2050

When you are familiar with the installation procedure use the check list below and tick off the different steps.

| | |
|---|---|
| Unpack and check all glassware | |
| Remove the transport security for the front glass | |
| Install the cooling water and the air | |
| Install the electrical connections | |
| **Installation of wires** | |
| Start with No. 2 (condensers in lower position) | |
| Wire No. 1 (condensers in upper position) | |
| Wire No. 4 (sample rods in lower position) | |
| Wire No. 1 (sample rods in upper position) | |
| **Adjustment of wires** | |
| Adjust so that the lowest thimble is approx. 1mm from the bottom of the cups during boiling. | |
| Adjust so that the lowest cup is approx. 1mm from the from the hot plate during drying. | |
| Insert the proper seals | |

# 3 Installation Instruction for 2055

**Note: the Soxtec 2055 should be installed by a FOSS trained service engineer.**

## 3.1 Unpacking

Unpack the Soxtec Avanti 2055 Manual System and its accessories with care. Use the enclosed packing list to check that no parts are missing. If you have any questions, please contact your FOSS representative.

### 3.1.1 Inspection of Glassware

Check all glassware, **condensers**, the **level indicator**, the **front glass** and the solvent **collection vessel connections.**

## 3.2 Installation Requirements

**Table 1**

| **Soxtec Avanti 2055 Manual Extraction System** | | **2055** |
|---|---|---|
| Power consumption, Control Unit/ | 1550 W | X |
| Power supply,<br>Control Unit/ | 230V ⁄10%, 50-60 Hz<br>115V ⁄10%, 50-60 Hz | X |
| Water supply | 2 l/min tap water at 20°C | X |
| Weight, Extraction Unit | approx. 30 kg | X |
| Weight, Control Unit | approx. 3 kg | X |
| Dimensions LxDxH, Extraction Unit | 600x380x580 mm | X |
| Dimensions LxDxH, Control Unit | 310x240x165 mm | X |
| Ventilation | Fume hood or equivalent location | X |

## 3.3 Installation Location

The Extraction Unit (EU) should be installed in such a way as to comply with the regulations issued by local authorities. A fumehood is normally recommended. It is important that the EU is placed on a horizontal surface, otherwise the collection vessel may not function.

The **Control Unit (CU)** is not intended for use in potentially explosive atmosphere. They should therefore be placed outside the fumehood or according to the instructions when the system is placed on the laboratory bench, alternatively in a separate room.

If the system is installed with cables, and/or tubes passing through a wall, the opening in the wall must be sealed.

## 3.4 Transport Security

The counter weight for the front glass is secured during transportation. Unscrew the Phillips screw holding the counter weight at the bottom of the instrument.

## 3.5 Cooling Water

The positions refer to Fig. 3:1. when a Soxtec Avanti 2055 is to be installed and Fig. 3:2. for 2058.

1. Connect a **water tube** between the water tap (alternatively a circulating chiller) and the water inlet on the EU (pos 1). Use tube clamps to ensure that the tube stays in position.

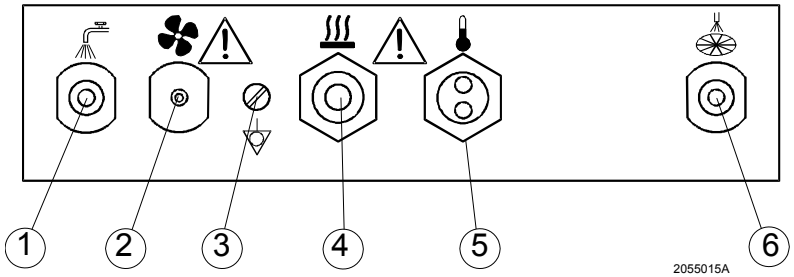


*Fig. 3:1 Extraction Unit (EU) 2055*

| | | | |
|---|---|---|---|
| 1 | Cooling water inlet | 4 | Heating |
| 2 | Air | 5 | Temperature sensors |
| 3 | Earthing screw | 6 | Cooling water outlet |

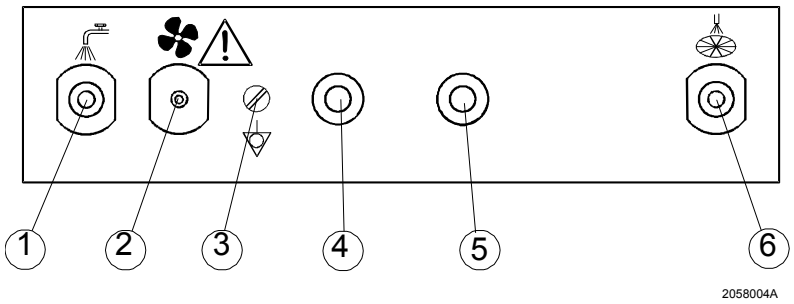


*Fig. 3:2 Extraction Unit (EU) 2058*

| | | | |
|---|---|---|---|
| 1 | Cooling water inlet | 4 | Connectors for heat transfer medium |
| 2 | Air | 5 | Connectors for heat transfer medium |
| 3 | Earthing screw | 6 | Cooling water outlet |

2. Connect another **water tube** from the EU (pos. 6) to the drain (alternatively back to the circulating chiller). Use a tube clamp to ensure that the tube stays in position.

## 3.6 Electrical Connections and Air (2055)

### ⚠Warning

***The power cable/contact should never be exchanged or altered.***

1. Connect the contact for the temperature sensors (two cables) from the EU (pos. 5) to the CU (Fig. 3:3 pos. 5).
2. Connect the **power cable for the hot plate** from the EU (pos. 4) to the CU (Fig. 3:3 pos. 4). Tighten the knurled nut to ensure that the contact stays in position.

   Finally connect the **air tube** between the CU (Fig. 3:3 pos. 7) and the EU (pos. 2).

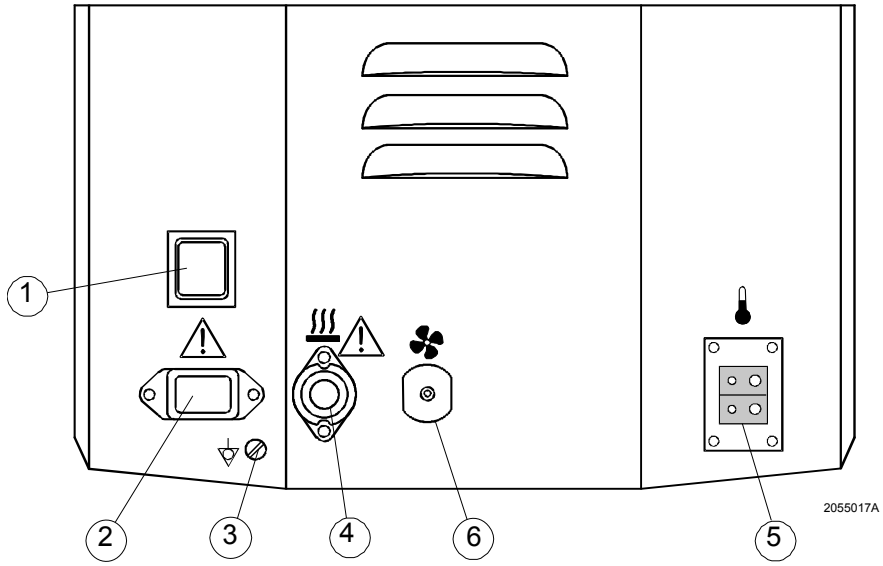


*Fig. 3:3 Control Unit (CU) rear side*

| | | | |
|---|---|---|---|
| 1 | Power button | 4 | Heating |
| 2 | Mains inlet | 5 | Temperature sensors |
| 3 | Earthing screw | 6 | Air |

## 3.7 Seals

**Note: Check that the hot plate is cold before installing the seals.**

The seals are available in choice of three materials: Viton, Butyl and Resell. To select the correct material for different solvents, please follow the recommendations in table 2.

**Table 2**

Condenser sealing rings, + = Recommended, - = Not recommended.

| SOLVENT | Viton | Butyl | Resell |
|---|---|---|---|
| Acetone | - | ++ | ++ |
| Acetonitrile | - | ++ | ++ |
| Carbon tetrachloride | ++ | - | ++ |
| Chloroform | ++ | - | ++ |
| Chloroform-methanol(2:1) | ++ | - | ++ |
| Cyclohexane | ++ | - | ++ |
| Dichloromethane | ++ | - | ++ |
| Ethanol | ++ | (+) | ++ |
| Ethyl acetate | - | ++ | ++ |
| Heptane | ++ | - | ++ |
| Hexane | ++ | - | ++ |
| Hexane: Acetone | - | - | ++ |
| Methanol | ++ | (+) | ++ |
| Methyl Ethyl Ketone | ++ | - | ++ |
| Petroleum ether 30-60 °C | ++ | - | ++ |
| Toluene | ++ | - | ++ |
| Thrichloroethylene | ++ | - | ++ |
| Xylene | ++ | - | ++ |

1. Place the seal in your hand (ridge downwards).
2. Press the outer rim of the seal into the slot on the bottom part of the Teflon adapter on the condenser. Start from the back and work towards the front.
3. Insert seals in all extraction positions.

## 3.8 Installation Check List for 2055

When you are familiar with the installation procedure use the check list below and tick off the different steps.

| | |
|---|---|
| Unpack and check all glassware | |
| Remove the transport security for the front glass | |
| Install the cooling water and the air | |
| Install the electrical connections | |
| Insert the proper seals | |

# 4 Electrical Description

**Note: The 2050 CU and the 2055 CU are not exactly the same units. A position of a jumper on the PCB (see chapter 6 Schematics on page 6:1) and the overlay differ.**

## 4.1 Control Unit PCB (2050, 2055)

See schematics Fig. 6:2- Fig. 6:7 in section 6 Schematics on page 6:1.

### ⚠Warning

***You are not allowed to do more than change fuses, adjust the potentiometer and change proms on the Control Unit Board. You are not allowed to calibrate the instrument. These recommendations must be followed due to EX-classification.***

### 4.1.1 Fuses

See circuit diagram, Power supply Fig. 6:5.
There are two internal fuses:
F1A = T 160 mA (230 V), type TR5
F1B = T 315 mA (115 V), type TR5
F2 = T 500 mA, type TR5

### 4.1.2 Potentiometer

The potentiometer, P1, on the schematic for processor A (Fig. 6:2) is regulating the contrast on the LCD. The potentiometer is physically placed on the rear side of the board to be within easy reach.

### 4.1.3 Temperature Measurement

There are two thermocouples (type J) (TA and TB) going from the heating plate to the Control Unit Board (TB+,TB-,TA+,TA-).
The resistance for each thermocouple shall be between 2-20 Ω.

If ΔT= 0 °C between the measuring point and the cold junction point then U= 0 V.
If ΔT~ 20 °C then U~1 mV.
If ΔT~ 300 °C then U~15 mV.

You can check the function of these couplers by just heating with your hands on the top and measure at the connection.

### 4.1.4 Heating

There are two Micro Controllers (MC) to control the heating of the hot plate (see Fig. 4:1.). Processor A is controlling the main temperature, Processor B the over temperature. When Processor A sends out a signal to start heating, the power goes from R-, R+ (see Fig. 4:2) via the solid state relay (SSR) to the hot plate. Processor B is controlling the other power line to the hot plate. It goes from HN, HL (see Fig. 4:2) via REL1 (Fig. 6:3) to the hot plate.

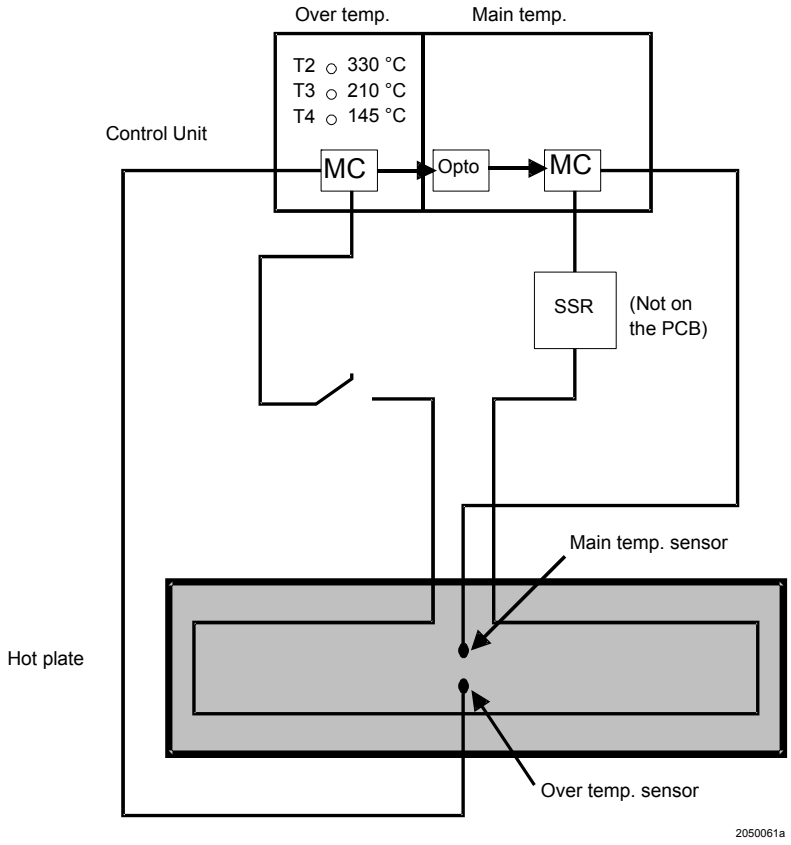


*Fig. 4:1 Heating diagram*

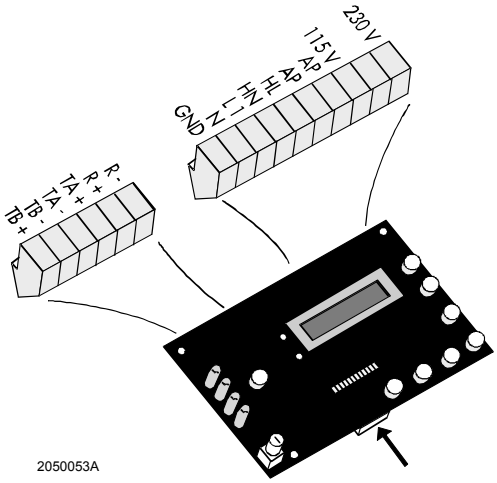


*Fig. 4:2 Contact block on the Control Unit Board*

### 4.1.5 Controlling the Heating Cable

The heating cable (red) ends in a contact with four pins. The power is connected between pin 1 and 2 and the resistance should be 30-40 ohm. Pin 4 goes to ground.

### 4.1.6 Air Pump

You have to press the air key on and off, then you can measure on AP on the PCB-board (see Fig. 4:2). The output is mains voltage.

Or you can measure on the air pump cable. The resistance shall be approx. 2,5 kΩ.

## 4.2 Drive unit PCB (2050)

**See schematics Fig. 6:6 and Fig. 6:7 in section 6 Schematics on page 6:1.**

This PCB board is controlling the motors.

### 4.2.1 Fuses

See circuit diagram, Power supply Fig. 6:7.

There are two internal fuses:
F1A = T 160 mA, type TR5
F1B = T 315 mA, type TR5
F2 = T 500 mA, type TR5

There is also one external fuse:
T 315 mA (5x20)

### 4.2.2 Inductive Transmitters

There are four inductive transmitters connected to PC1, PC2, PC3 and PC4 on the PCB, see Fig. 4:3.

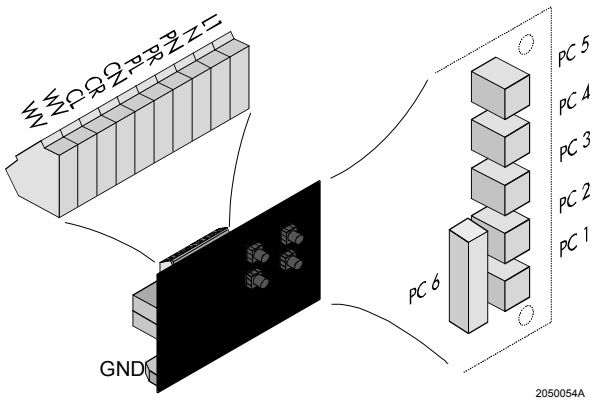


*Fig. 4:3 The inductive transmitters are connected to PC1-PC4*

Each of the transmitters has a light emitting diode which is turned on when the sensor is close enough to metal (<1 mm distance).

Turn off the Control Unit and press the arrow keys on the Drive Unit to each end position. Check that the light emitting diodes on the respectively sensor are both turned on and off during a turn.

If the diodes are turned on, during the whole turn, it means that the distance between the sensor and the wire wheel is too small. Adjust.

If the diodes are turned off, during the whole turn, it means that the distance between the sensor and the wire wheel is too large. Adjust.

Below is a table explaining when the diodes should be lit/black in the different positions.

| **Position** | Inductive sensors<br>**Sample rod** | Inductive sensors<br>**Condenser** |
|---|---|---|
| Power turned on (thimble load manually) (position 1) | Upper = Black<br>Lower = Black | Upper = Black<br>Lower = Lit |
| Cup load (position 2) | Upper = Black<br>Lower = Lit | Upper = Black<br>Lower = Lit |
| Solvent load (position 3) | Upper = Lit<br>Lower = Black | Upper = Lit<br>Lower = Black |
| Boiling | Upper = Black<br>Lower = Black | Upper = Black<br>Lower = Black |
| Rinsing | Upper = Lit<br>Lower = Black | Upper = Black<br>Lower = Black |
| Recovery | Upper = Black<br>Lower = Lit | Upper = Black<br>Lower = Black |
| Drying (position 3) | Upper = Black<br>Lower = Lit | Upper = Lit<br>Lower = Black |

# 5 Service and Maintenance

## 5.1 Pressure Sensor

The pressure sensor is deactivated by default. The pressure sensor senses if the water disappears or decreases. If this happens the ongoing extraction sequence will be interrupted.
To **activate** the pressure sensor press both the plus key ⍙ and turn the power switch on.
To **deactivate** the pressure sensor press both the minus key ▽ and turn the power switch on.

## 5.2 The Buzzer Signal

The signal sounds continuously after step 3. To deactivate the signal you must press the set key ⟳ and turn on the power switch at the same time on the Control Unit. Reactivate the signal by repeating the procedure above.

## 5.3 Adjustments

### 5.3.1 Wires

Instructions for adjustment of wires are found in chapter 2.8.1 Adjustment of Wires on page 2:8.

Wires becomes slightly longer as they are used. When maximum adjustment is not enough, it is time to change wires.

### 5.3.2 Paralellism Between the Hot Plate and the Beam

If the height between the cups and the hot plate differs more than 3 mm durig the drying step adjust the paralellism between the hot plate and the beam. Measure the distance between the hot plate and the beam in boiling position (without cups in the EU). It should be 96 mm ont he left side and 97 mm on the right side, see Fig. 5:1.

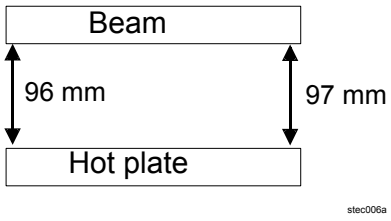


*Fig. 5:1*

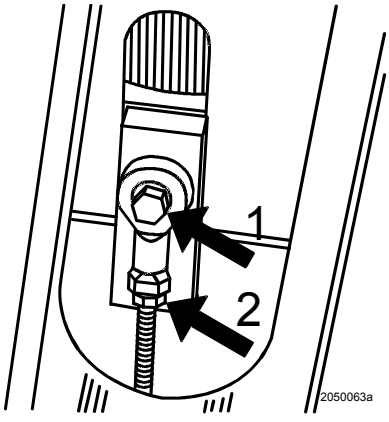


*Fig. 5:2*

If not, do the following:
Positions refer to Fig. 5:2.

1. Unscrew the right panel cover by loosening the two screws (to the right) on the top lid and the the two corresponding screws in the bottom.
2. Loosen the screw (pos 1) and the nut (pos 2) on the on the upper balljoint.
3. Turn the ball joint to adjust the beam 0,8 mm/turn.
4. Assemble in reverse order.

## 5.4 Replacement Instructions

### 5.4.1 Extraction Unit

#### Replacement of the temperature sensors

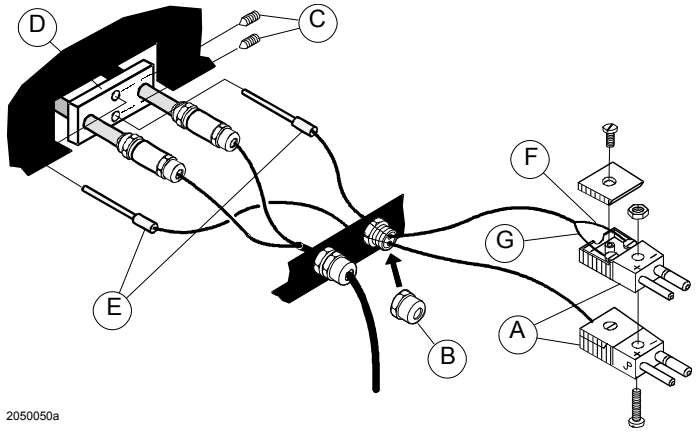


*Fig. 5:3*

Positions refer to Fig. 5:3.

1. Before any disassembling, disconnect incoming mains supply.
2. Remove the rear cover by loosen the four screws on each side and the three on the middle of the rear panel and the two by the wires cover plate.
3. Unscrew the sensor cables from the contacts (pos A).
4. Open the lead-through (pos B).
5. Unscrew the two stop screws M4 (pos C) (with a long Allen key no 2) from the holder (pos D).
6. Change the temp sensors (pos E).

**Note! The contact for the top sensor cable must be connected to the top contact at the rear on the Control unit.**

7. Connect the red cable (pos F) to minus (large pin) and the white cable (pos G) to plus (small pin).

#### Replacement of the hot plate

Positions refer to Fig. 5:4. and Fig. 5:5.

1. Before any disassembling, disconnect incoming mains supply.
2. Remove the rear cover by loosen the four screws on each side and the three on the middle of the rear panel and the two by the wires cover plate.

3. Take away the three earthing cables from the earthing screw (pos D).
4. Unscrew the contact (pos E) from the hot plate cable. (The contact to the Control Unit, brown cable from 1, blue cable from 2 and yellow/green cable from protective earth.
5. Open the two lead-through (pos G) and the one to the temperature sensors.
6. Tilt the instrument a bit backwards and put two extraction cups under the front. Then you can reach the screws easier.
7. Take away the front plate (pos 1) by loosening the three nuts in the draining opening (socket wrench no 7).

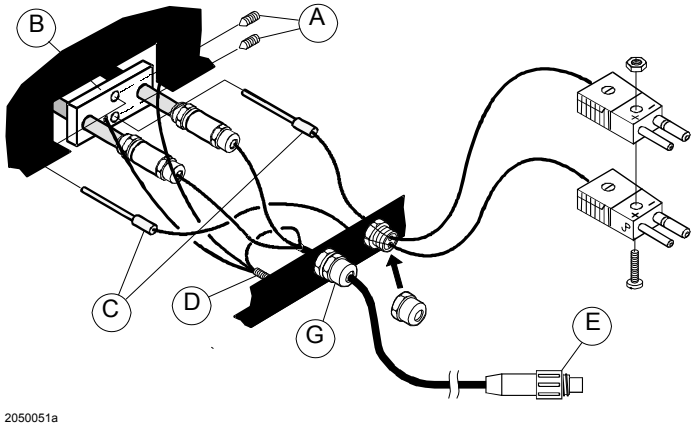


*Fig. 5:4*

8. Unscrew the five screws holding the “hot plate frame” (pos 2)(Allen key no 3).
9. Unscrew the six screws holding the hot plate (pos 3) (Allen key no 3).
10. Now it is possible to pull out the hot plate (pos 3) and the plate around (pos 2).

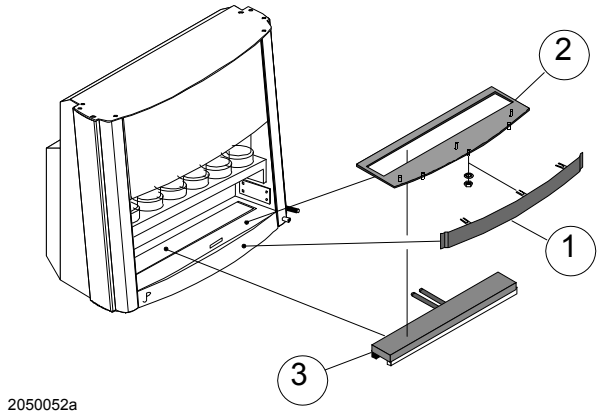


*Fig. 5:5*

**Note: It is important to put the sensors back in the same position as before. The contact for the top sensor cable must be connected to the top contact at the rear on the Control unit. A good advise is therefore to mark the top sensor.**

11. Loosen the two stop screws M4 (pos A)(with an Allen key no 2) holding the temperature sensors, from the holder (pos B) and take out the temp sensors (pos C).
12. Repeat the above steps in reversed order with the new hot plate.

## 5.4.2 Control Unit

### Exchanging the proms in the Control Unit

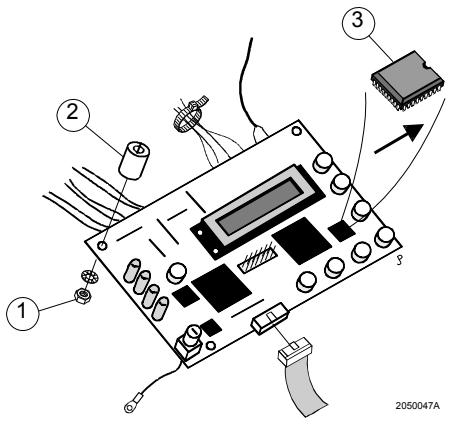


*Fig. 5:6*

To change PROMs in the Control Unit you need the following tools:

- 2.5 mm Allen key
- Screwdriver parallell tip 3-6 mm
- Screwdriver parallell tip 1-1.2 mm alternatively PROM “lifter”
- M3 nutdriver (preferable >100 mm long shaft)

Positions refer to Fig. 5:6.

1. Turn the power off on the Control Unit and remove the mains cable.
2. Turn the CU up side down.
3. Remove the two footstands near the front (it is necessary to be able to reach all six screws).
4. Remove the six symetrical placed Allen screws in the bottom of the CU.
5. Lift the bottom of the CU and place it so that you can access the PCB without disconnecting the cable to the airpump.
6. Remove the four nuts (pos 1) the four toothed washers and the plastic spacers (pos 2) that holds the PCB.
7. Lift the PCB without removing any cables. Turn it so you can see the IC:s towards the front “Main” and “OT”.
8. Remove the PROM marked with “MAIN X.XX” (pos 3) gently with the smallest screwdriver. Insert the tip of the screwdriver between the IC and the socket and lift the screwdriver while pressing against the IC.

**Note! When changing prom to a new revision both proms needs to be exchanged to the same revision number.**

**Note! Do not use the IC socket as stand for the screwdriver lever. The IC socket breaks very easily and the PCB must then be replaced.**

**Note! The proms has a circle indicating first pin. This pin must be headed in the same direction as the arrow in the IC socket.**

9. Put the new proms in the IC sockets.
   Make sure that the plastic spacers (pos 2) that are placed between the PCB and the front panel are still in place. There should be one long spacer (10 mm) and two short ones (1 mm) on each bolt.

10. Put back the PCB, the plastic spacers, the toothed washers and the nuts.
11. Put back the bottom of the Control Unit. Make sure no cables are pressed.

## Replacement of the PCB in the Control Unit.

1. Turn the power off on the Control Unit and remove the mains cable.

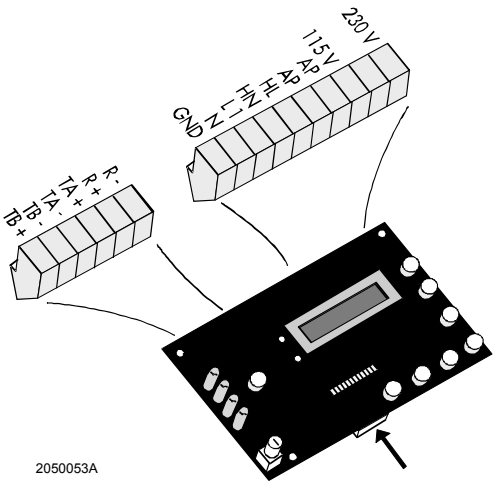


*Fig. 5:7 The Control Unit PCB*

2. Turn the CU up side down.
3. Remove the two footstands near the front (it is necessary to be able to reach all six screws).
4. Remove the six Allen screws in the bottom of the CU.
5. Lift the bottom of the CU and place it so that you can access the PCB.
6. Disconnect the cables:
   **TB+** the white cable from the lowest temp sensor
   **TB-** the red cable from the lowest temp sensor
   **TA-** the red cable from the upper temp sensor
   **TA+** the white cable from the upper temp sensor
   **R+** the cable from the solid state relay on no 3+
   **R-** the cable from the solid state relay on no 4-
   **GND** the cable from the protective earth
   **N** the cable from the filter on no 3
   **L1** the cable from the filter on no 4
   **HN** not connected
   **HL** the cable from the hot plate contact on no 1
   **AP** one cable from the air pump
   **AP** one cable from the air pump
   **115 V** not connected
   **NOT MARKED**
   **230 V** jump this two connections, the unmarked and 230 V
   **ARROW** the communication cable to Drive Unit
7. Remove the four nuts and the plastic washers that holds the PCB.
8. Change the PCB.
9. The new PCB needs to be configured depending if it is a Soxtec 2050 (auto) or a 2055 (manual) CU. Start the Control Unit and check what the display says **AUTO (used with 2050) or MANUAL (used with 2055)**. Turn it OFF again.

**Note! It is important to only use the jumper enclosed on the pins J2B or J2D. Otherwise, you endanger the calibration.**

If it is in the wrong mode do following:

10. Put the jumper over the two pins **J2D if you want to change to AUTO** and **J2B if you want to change to MANUAL**, see Fig. 5:8.

## ⚠Warning

***Accessible hazardous voltage.***

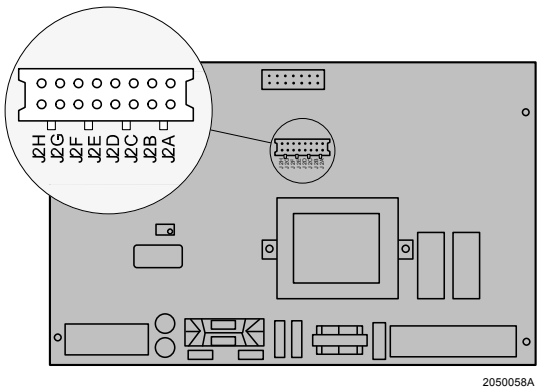


*Fig. 5:8 The location of the pins on the Control Unit PCB*

11. Turn the power ON.
12. When the Control Unit beeps remove the jumper.
13. Turn the power OFF and then ON again to check that the display says AUTO.
14. Assemble in reversed order.
    Make sure that the plastic washers that are placed between the PCB and the front panel are still in place. There should be one long spacer (10 mm) and two short ones (1 mm) on each bolt.
15. Put back the bottom of the Control Unit. Make sure no cables are pressed.

## 5.4.3 Drive Unit

### Replacement of the PCB in the Drive Unit

1. Turn the power off on the Control Unit and remove the mains cable.
2. Unscrew the five screws and washers on each side of the cover and take it off.

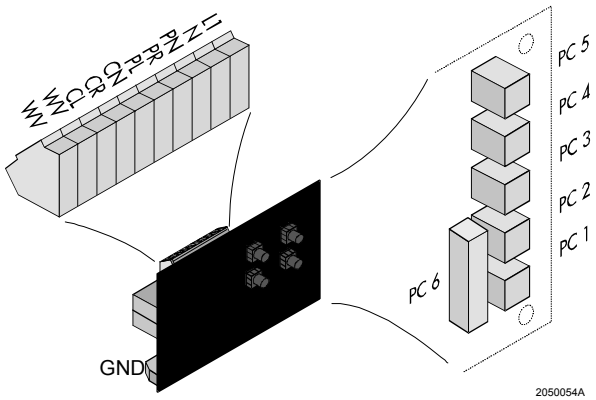


*Fig. 5:9 The Drive Unit PCB*

3. Disconnect the cables:
   **L1 (J1A)** the brown cable to mains inlet
   **N (J1B)** the blue cable to mains inlet
   **PN (J3A)**the black cable to the condenser motor (right)
   **PR (J3B)** the blue cable to the condenser motor (right)
   **PL (J3C)** the brown cable to the condenser motor (right)
   **CN (J4A)** the black cable to the sample rod (piston) motor (left)
   **CR (J4B)** the brown cable to the sample rod (piston) motor (left)
   **CL (J4C)** the blue cable to the sample rod (piston) (left)
   **WV (J5A)** one cable to water valve
   **WV (J5B)** one cable to water valve
   **GND (J1C)** the cable to the protective earth
   **PC1** the contact from sensor 1 (top on condenser motor)
   **PC2** the contact from sensor 2 (bottom on condenser motor)
   **PC3** the contact from sensor 3 (top on sample rod motor)
   **PC4** the contact from sensor 4 (bottom on sample rod motor)
   **PC5** the contact from the water pressure sensor
   **PC6** the communication cable from the Control Unit
4. Remove the four long nuts and the plastic washers that holds the PCB.
5. Change the PCB.
6. Assemble in reversed order.
   Make sure that the plastic washers that are placed between the PCB and the front panel are still in place.

## 5.5 Changes Since the Launch of Soxtec Avanti 2050

These changes are already made on instruments with serial numbers above 460 (230 V) and 184 (115 V)
Positions are referring to figure below.

| **Improved parts** | **Purpose** |
|---|---|
| Flat washer (pos 1) for closing the reflux on the sample rod | Prevent leaking back to cup during recovery |
| New sample springs (pos 2) | Prevent leaking back to cup during recovery |
| New sample rods (pos 3) | Prevent leakage back to tank during boiling and rinsing. The old type bent more easy which caused the leak. |
| New hot plate, copper instead of mikanit in cup position 1 and 6 (from serial no 416) | Improve boiling in position 1 and 6 |
| The cooling water inlet is splitted to both condenser 2 and 5 | Improve cooling |
| New glass front, 3 mm instead of 2 mm. New counter weight (brass) and sliding list is required with the thicker front. See TN 181. | Not so easy to crack. |
| The upper condenser holder is removed on new instruments, because of eg. noise. To achieve the same stability on the condenser stronger adapter springs are used. | |

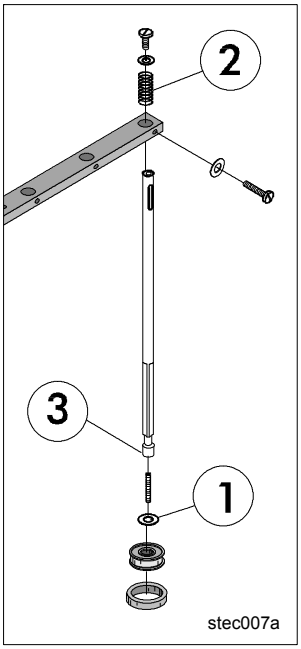


*Fig. 5:10 Sample rod with parts*

# 6 Schematics

## 6.1 Electrical Schematics


| | | |
|---|---|---|
| | **Control Unit 2050** | |
| | Circuit diagram, Processor A | Fig. 6:1 |
| | Circuit diagram, Processor B | Fig. 6:2 |
| | Circuit diagram, I/O signal A,B | Fig. 6:3 |
| | Circuit diagram, Thermo inputs | Fig. 6:4 |
| | Circuit diagram, Power supply | Fig. 6:5 |
| | **Drive Unit 2050/2055** | |
| | Circuit diagram, Drive unit | Fig. 6:6 |
| | Circuit diagram, Drive unit power supply | Fig. 6:7 |

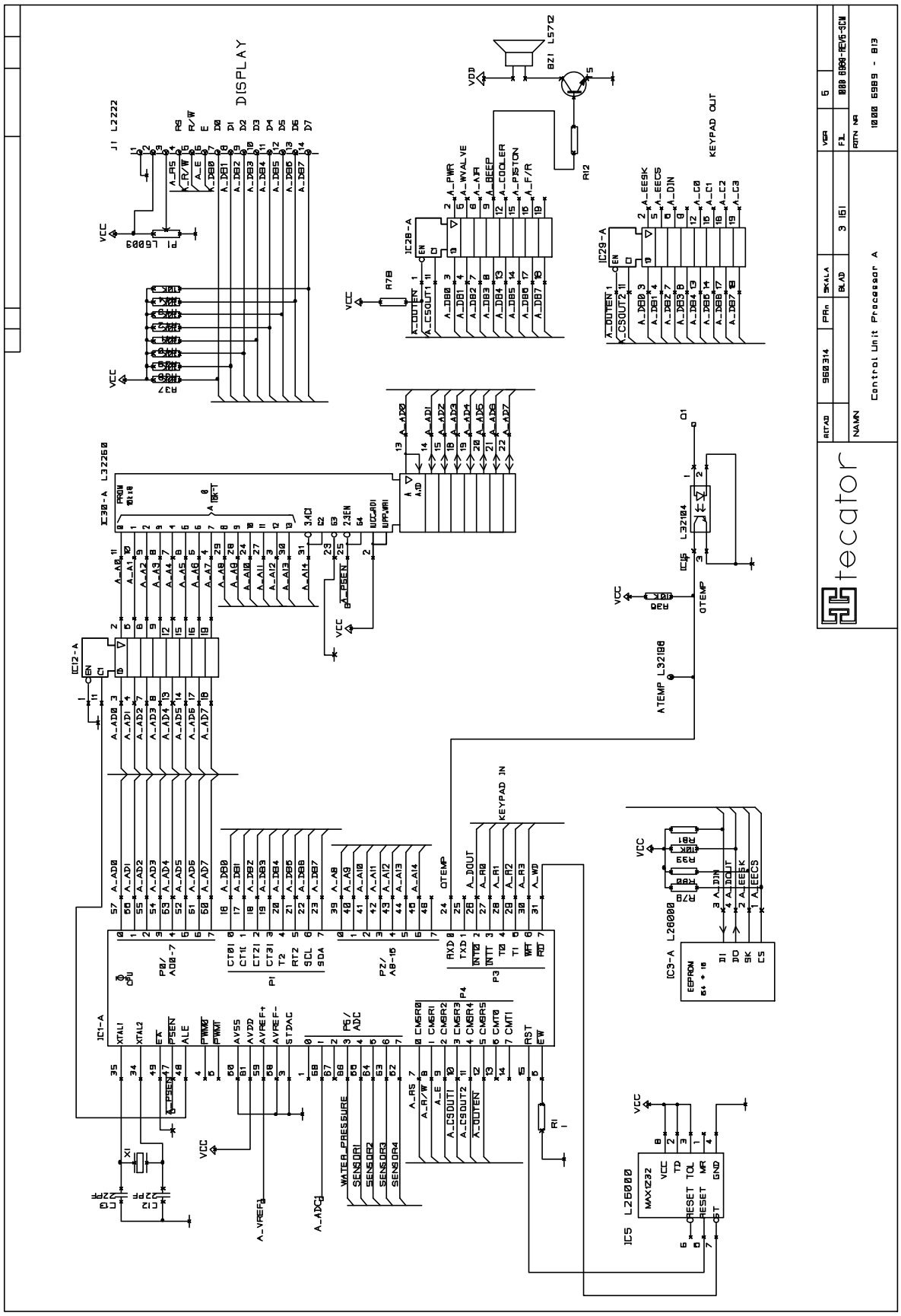
DISPLAY
KEYPAD OUT
KEYPAD IN
Control Unit Processor A
tecator

*Fig. 6:1*

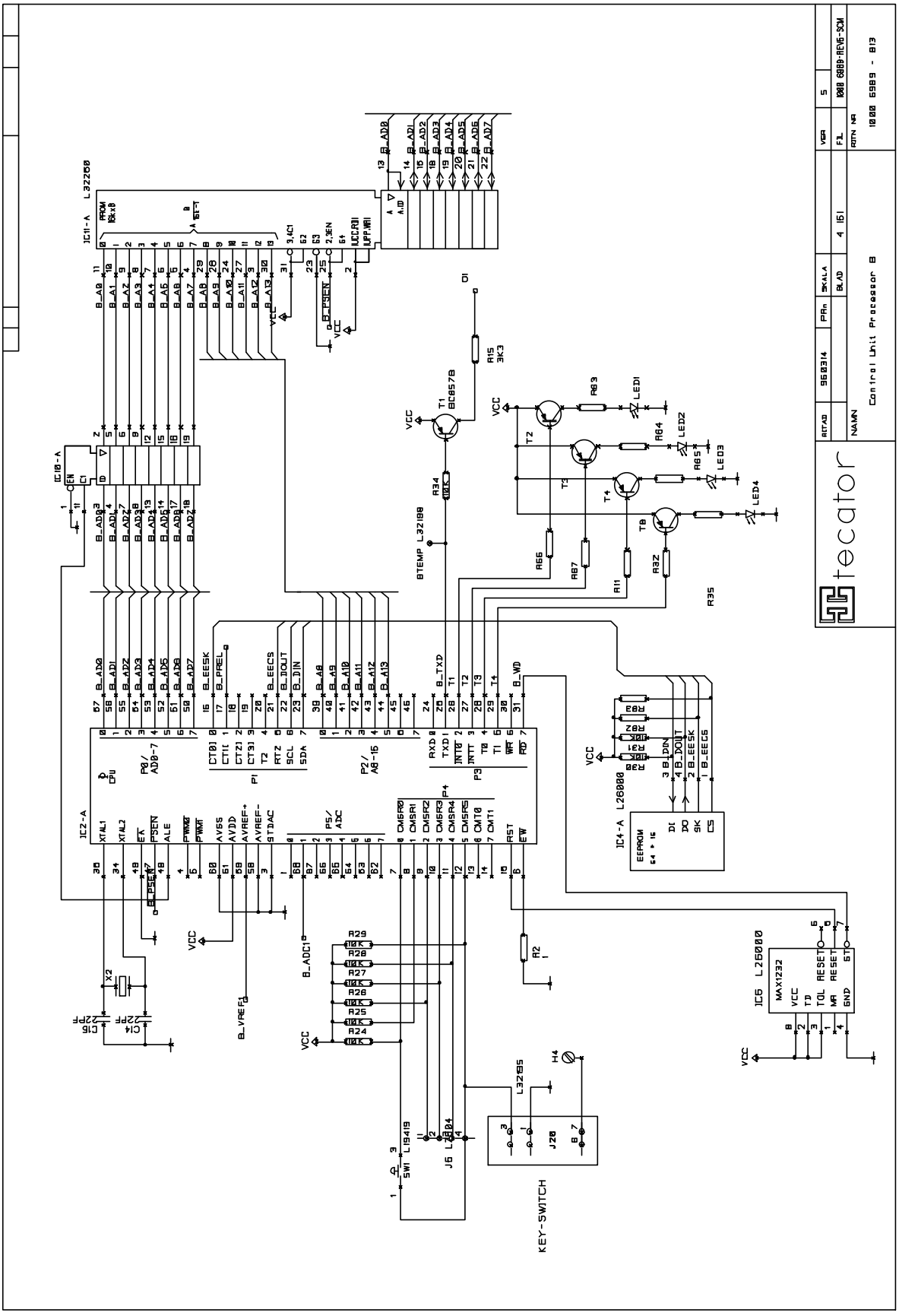


*Fig. 6:2*

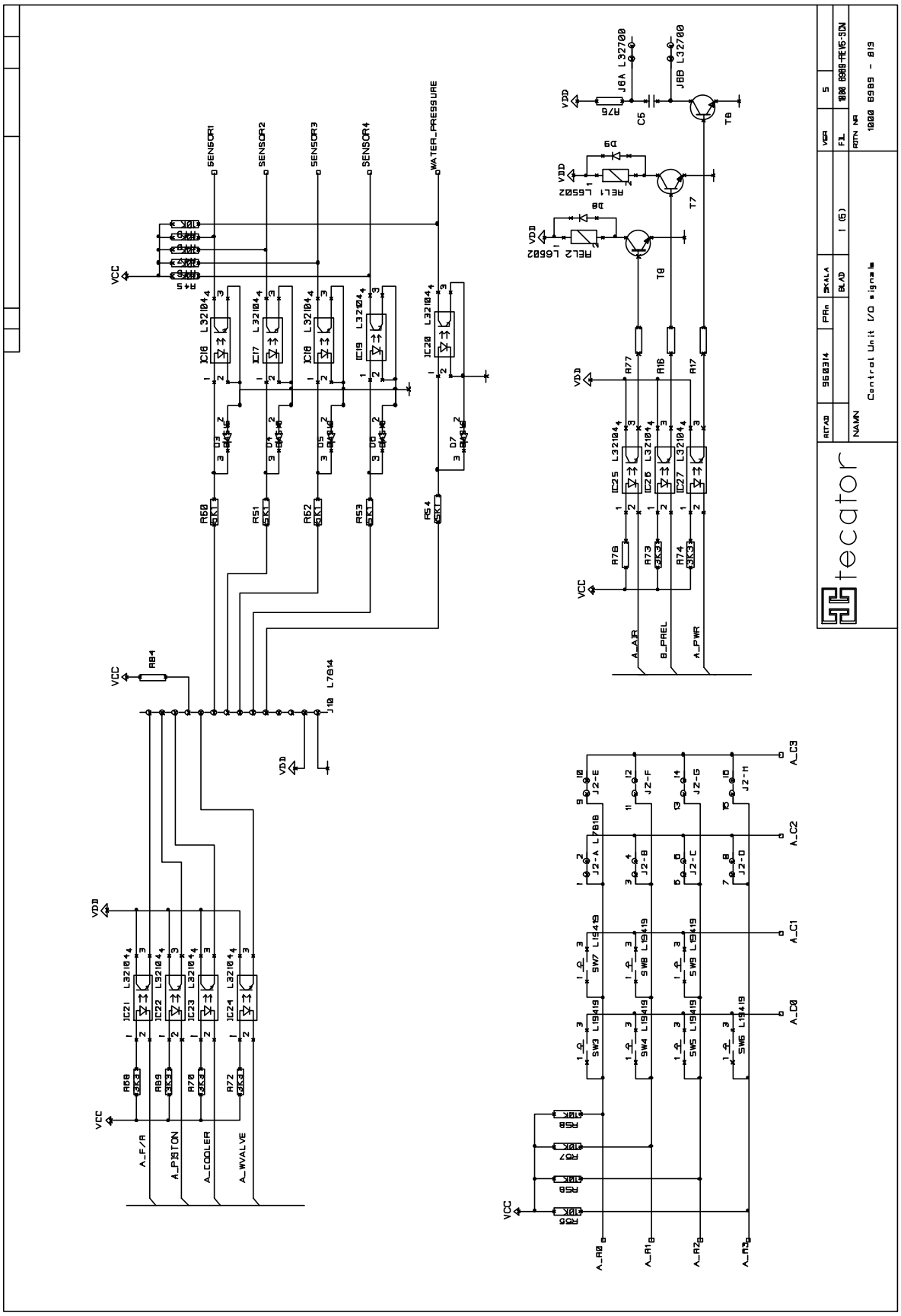
SENSOR1
SENSOR2
SENSOR3
SENSOR4
WATER_PRESSURE
VCC
VDD
A_F/R
A_PISTON
A_COOLER
A_WVALVE
A_AIR
B_PREL
A_PWR
A_C3
A_C2
A_C1
A_C0
A_R0
A_R1
A_R2
A_R3
tecator
Control Unit I/O signals

*Fig. 6:3*

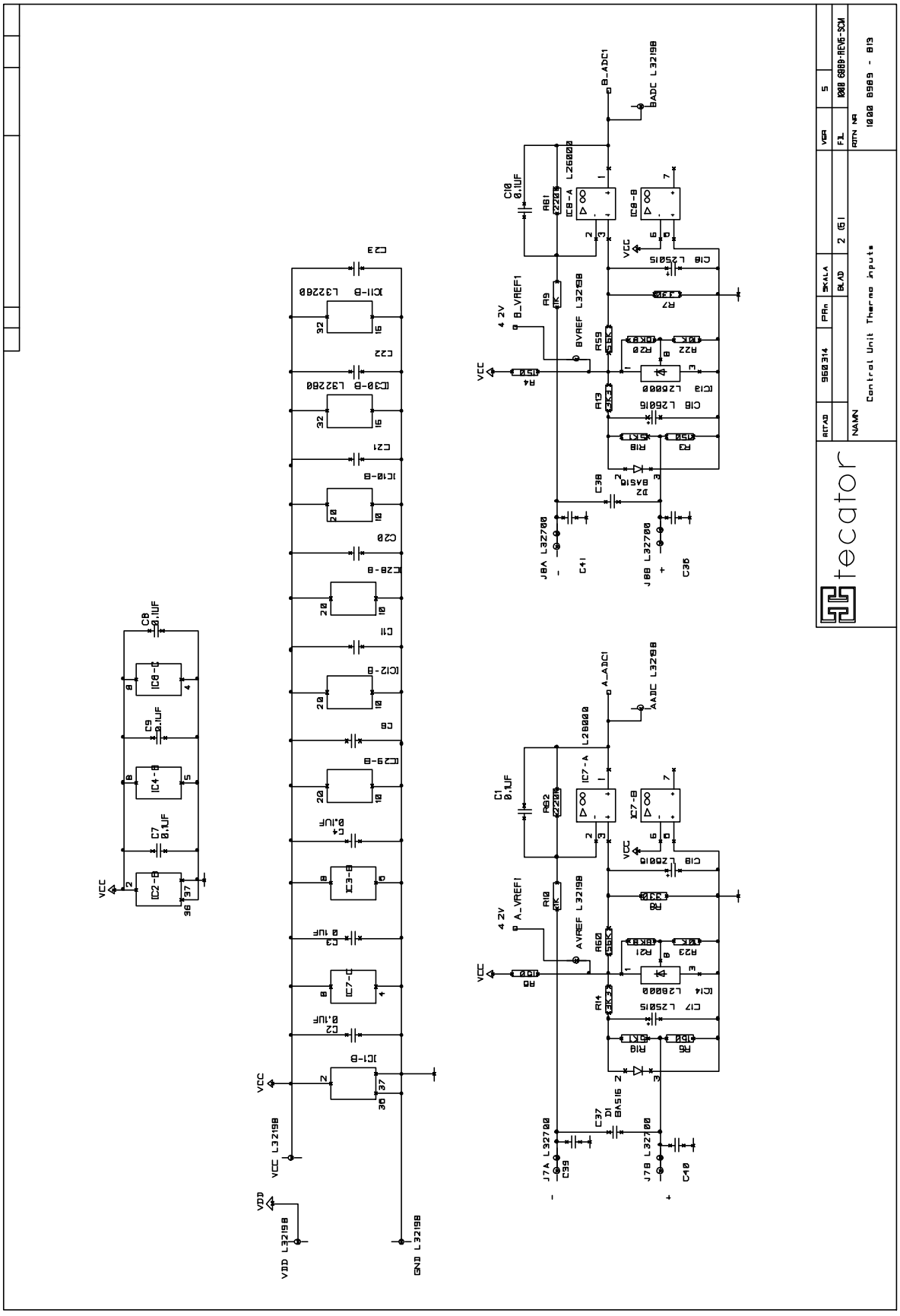
B_ADC1
BADC L32198
A_ADC1
AADC L32198
B_VREF1
4.2V
BVREF L32198
A_VREF1
AVREF L32198
VCC
VCC L32198
VDD
VDD L32198
GND L32198
Control Unit Thermo Inputs
tecator

*Fig. 6:4*

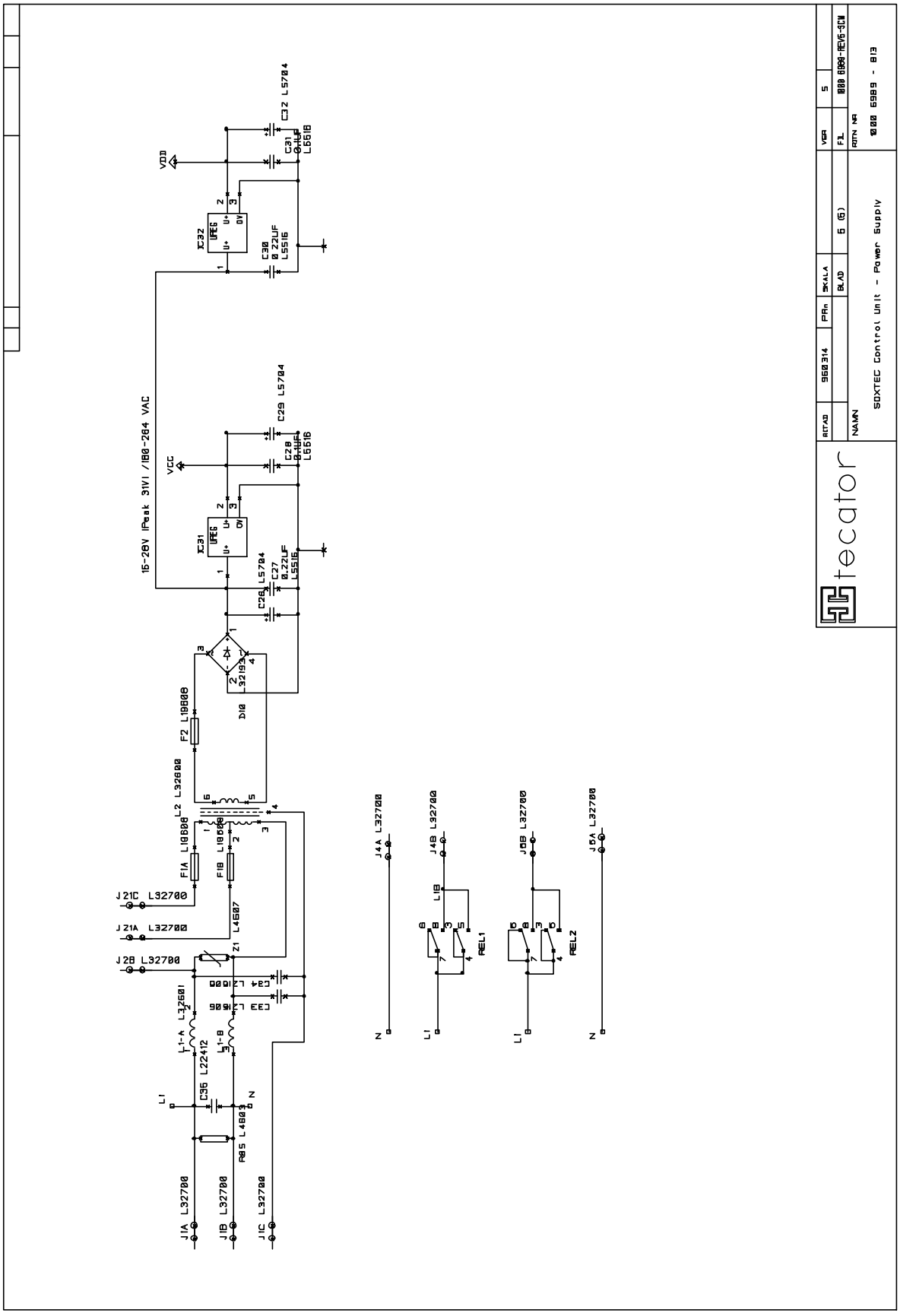
16-20V IPeak 31VI /180-264 VAC
VDD
VCC
IC32
IC31
UREG
C32 L5704
C31 0.1UF L5618
C30 0.22UF L5516
C29 L5704
C28 0.1UF L5618
C27 0.22UF L5516
C26 L5704
L32193
D10
F2 L19800
L2 L32800
F1A L19800
F1B L19800
J21C L32700
J21A L32700
J2B L32700
Z1 L4607
C34 L32501
C33 L32501
L1-A L32501
L1-B L22412
C36 L22412
RES L4803
J1A L32700
J1B L32700
J1C L32700
J4A L32700
J4B L32700
J5B L32700
J5A L32700
REL1
REL2
N
L1
tecator
SOXTEC Control Unit - Power Supply
NAMN
1000 6989 - 813

*Fig. 6:5*

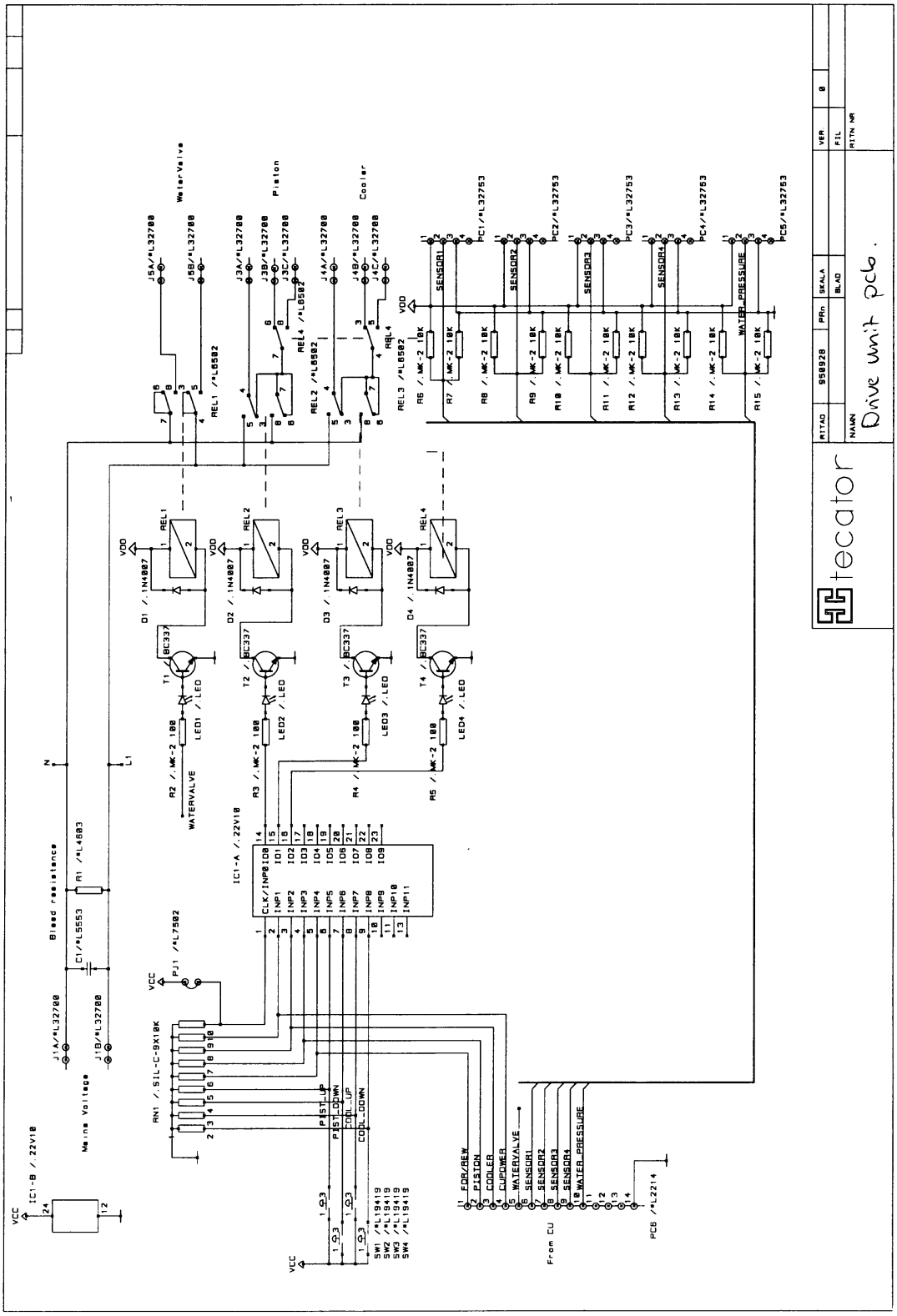
tecator
Drive unit pcb.
Water Valve
Piston
Cooler
Blood resistance
Mains Voltage
WATERVALVE
LED1
LED2
LED3
LED4
SENSOR1
SENSOR2
SENSOR3
SENSOR4
WATER PRESSURE
FOR/REW
PISTON
COOLER
CUPOWER
WATERVALVE
SENSOR1
SENSOR2
SENSOR3
SENSOR4
WATER PRESSURE
PIST_UP
PIST_DOWN
COIL_UP
COIL_DOWN
From CU
PCB /*L2214

*Fig. 6:6*

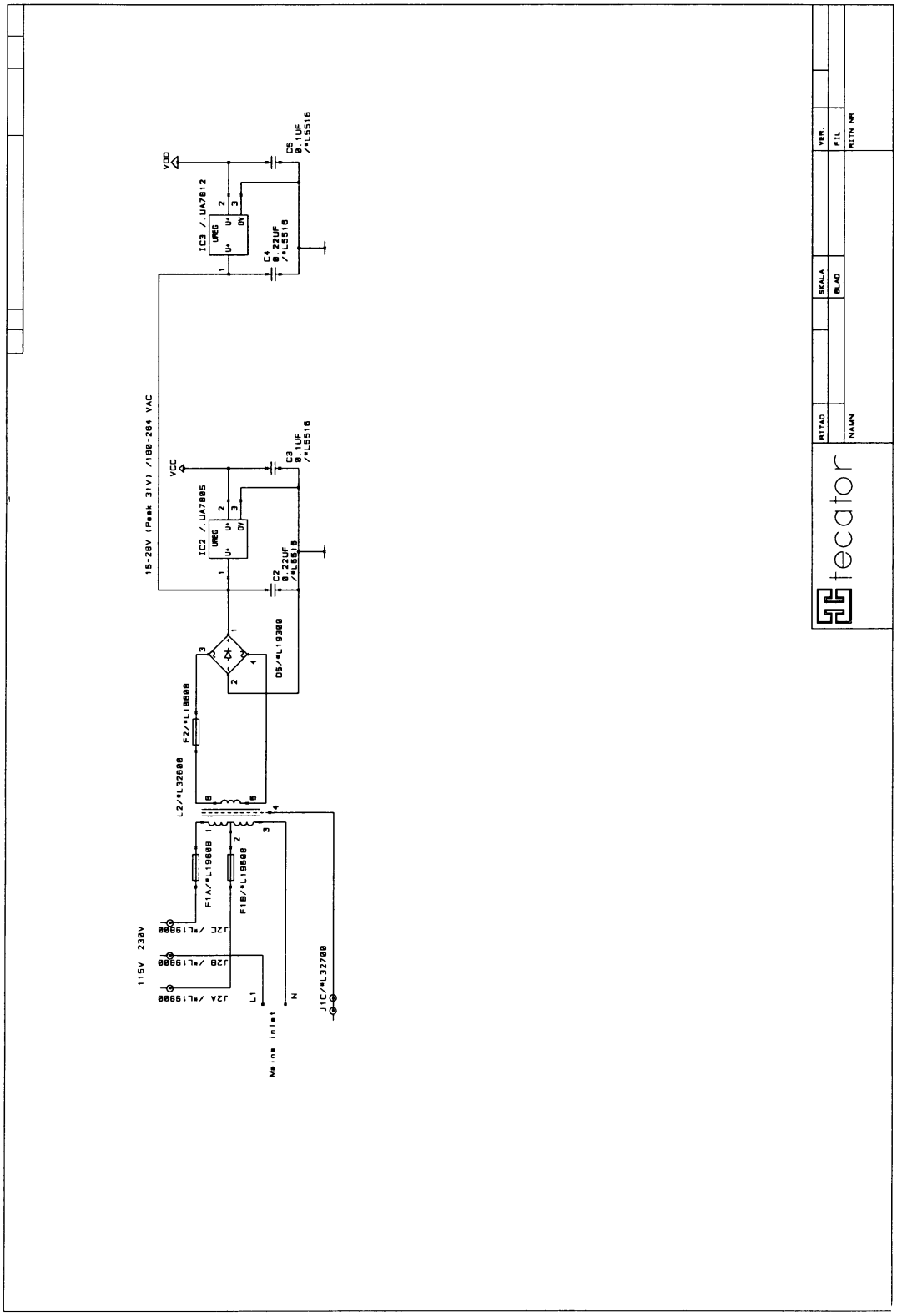
VDD
C5 0.1UF /*L5518
IC3 / UA7812
UREG
C4 0.22UF /*L5518
15-28V (Peak 31V) /180-264 VAC
VCC
C3 0.1UF /*L5518
IC2 / UA7805
UREG
C2 0.22UF /*L5518
D5/*L19300
F2/*L19600
L2/*L32600
F1A/*L19600
F1B/*L19600
J2C /*L19600
J2B /*L19600
J2A /*L19600
115V 230V
L1
N
J1C/*L32700
Mains inlet
tecator
SKALA
BLAD
RITAD
NAMN
VER
FIL
RITN NR

*Fig. 6:7*

## 6.2 Drawing of Minimum Radius on the Wires

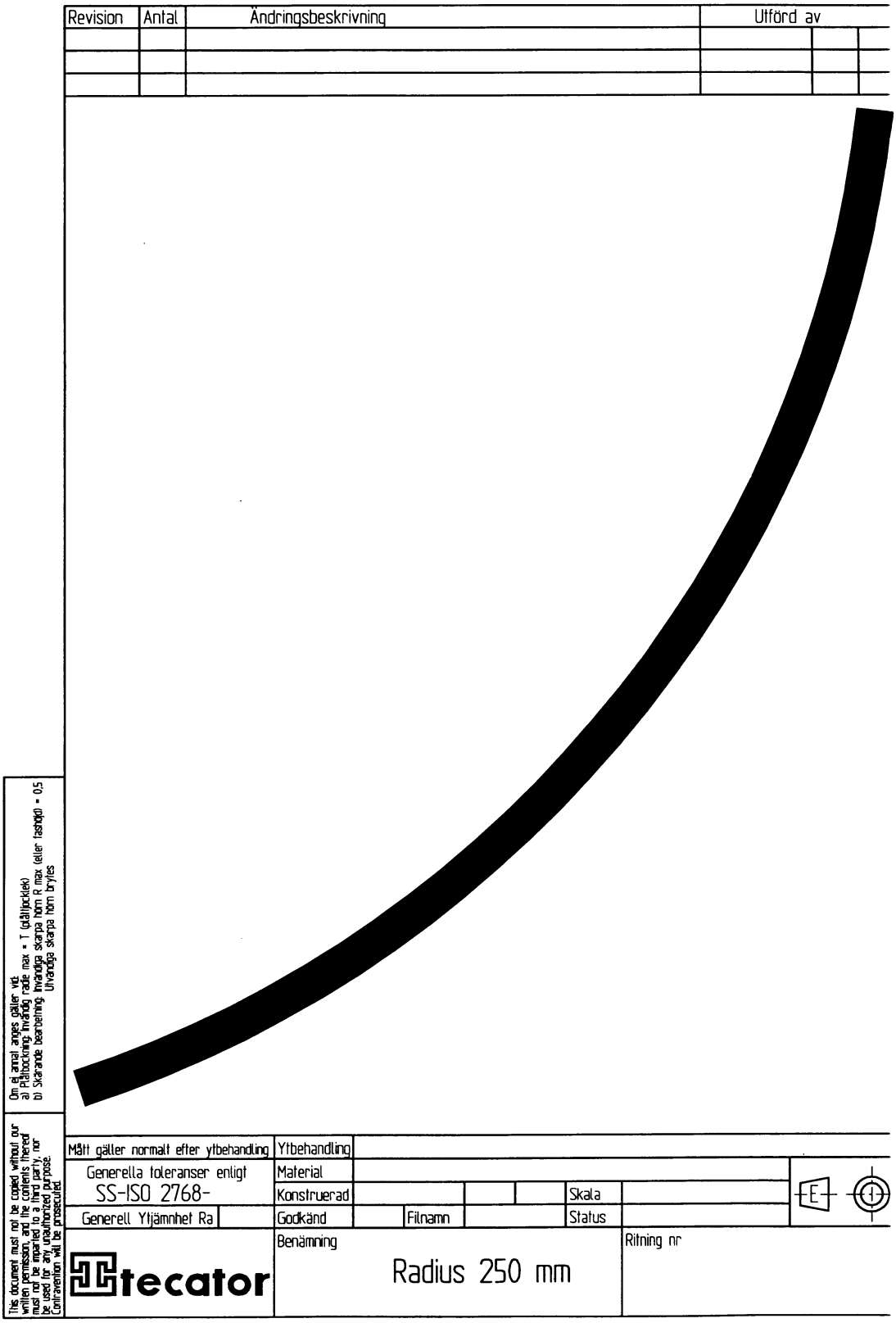


*Fig. 6:8*

# 7 References

- 1000 7622 Spare Parts Manual - Soxtec™ 2050
- 1000 9121 Spare Parts Manual - Soxtec™ 2055
- 1000 7414 User Manual - Soxtec™ 2050
- 1000 7415 User Manual - Soxtec™ 2055