ROTARY VACUUM EVAPORATOR

RVO 004

User manual

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1. INTRODUCTION

1.1 Apparatus use and specifications

The RVO 004 rotary vacuum evaporator is used for evaporation under low pressure at a preset temperature of the heating bath (if the bath is a part of the delivery) and under permanent and in advance specified stirring of the evaporated solution. The exhausted vapours condense in a vertical cooler and are collected in a flask. This ensures that the evaporated solution cannot be damaged and therefore impaired.

RVO 004 is equiped by water bath with the electronic temperature control.

1.2 Technical characteristics

Evaporating flasks ..... 20 – 4000 ml
Rotation speed ..... 10 to 160 rpm
Bath temperature ..... from the ambient temperature +5°C – 100°C
Regulation accuracy ..... ±1°C
Power supply .....230V, ±10%, 50Hz
Power input ..... max.24 VA
Bath input ..... max.2000 VA
Weight without glass ..... 8 kg
Dimensions (w x h x d) .....600 x 950 x 390 mm (including glass)

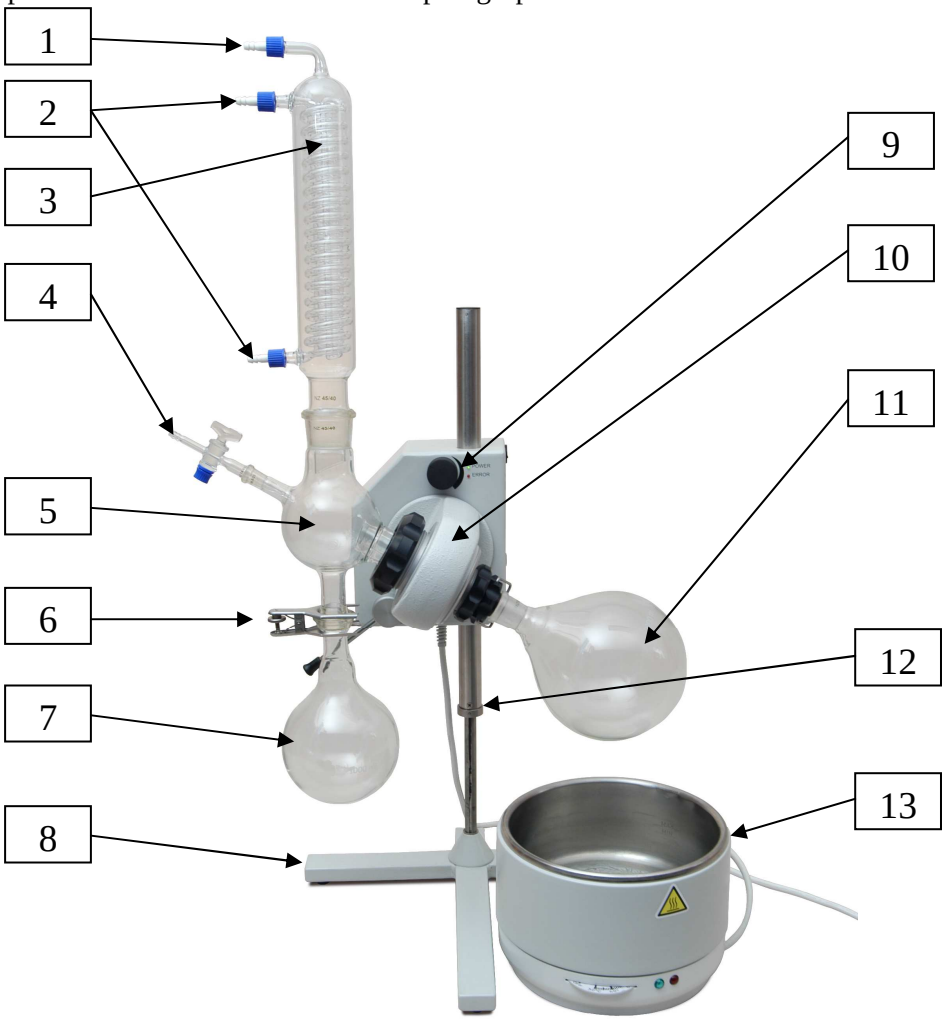
1.3 Symbol Explanation

 - hot surface

2. TECHNICAL DESCRIPTION

The instrument consists of a stand, head with rotating housing, cooler's holder, pipe, adapter of the bulb condenser, flask with a ball joint, round-bottomed flask, inlet pipe with a valve, flexible and fixed clamp.

For complete list of basic accessories see paragraph 7.1



1. Fitting –Vacuum connection
2. Fitting – Cooling water connection
3. Condenser (cooler)
4. Filling pipe with a valve
5. Fixed clip
6. Receiving flask 1000 ml with ball joint socket
8. Stand
9. Rotation controling
10. Rotation casing Head
11. Round bottom flask , joint NZ29/32
12. Fixing screw
13. Heating bath

Fig. 1. Location of individual parts of RVO

3. STARTING OF OPERATION

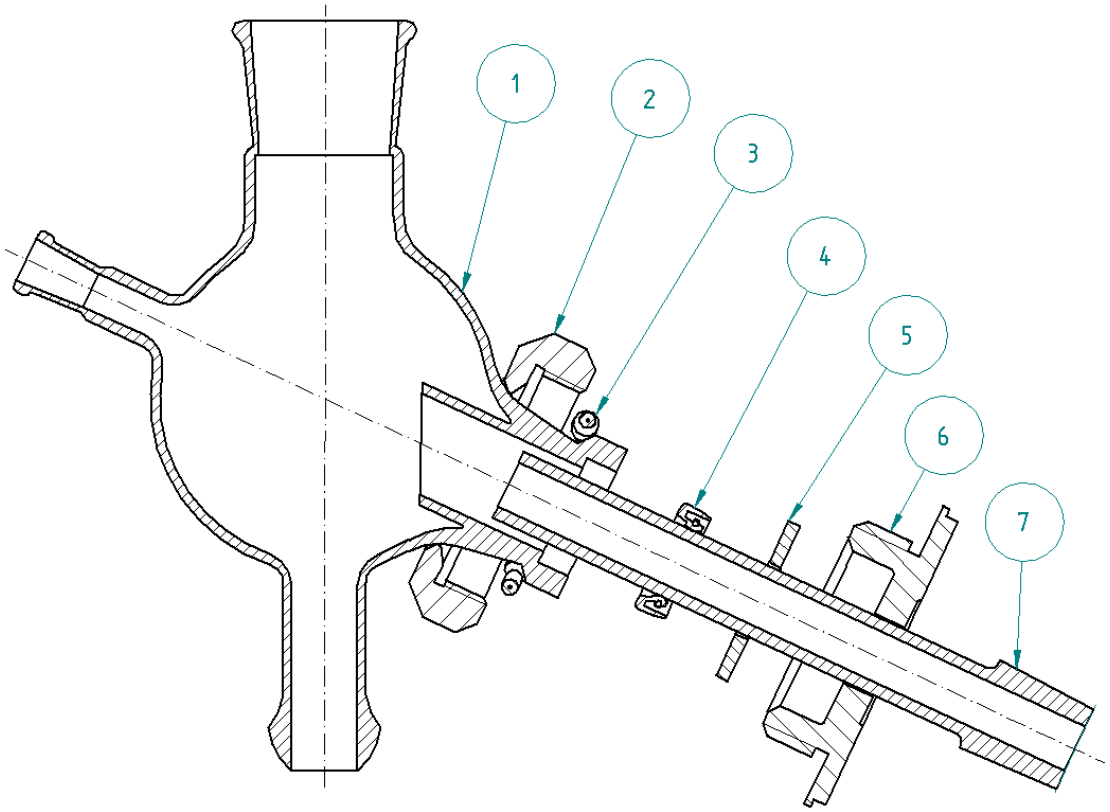
3.1 Unpacking of the apparatus

Remove the instrument from the transport packing, check the instrument surface and all the items according to the delivery note. Please contact the manufacturer or your dealer in case of instrument damage or a missing part.

Notification: Coat the glass joints with silicone vaseline prior to assembly.

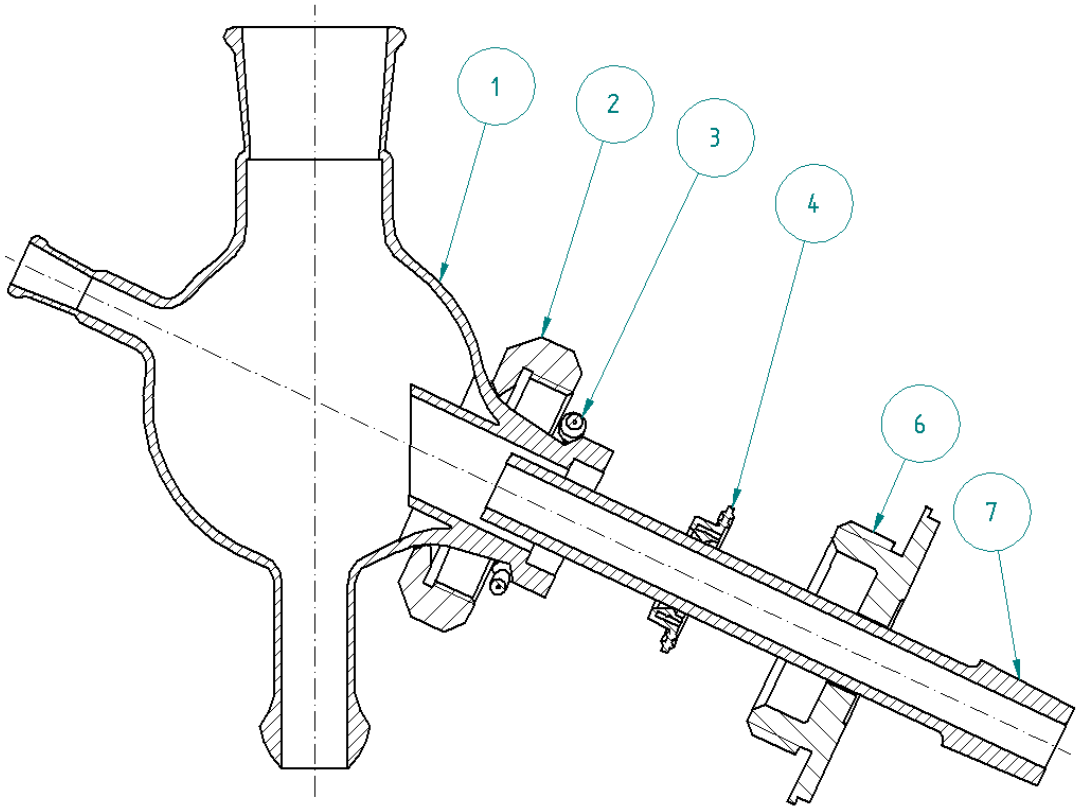
3.2 Apparatus assembly

1. Screw the bar of the cooler's holder into the nut in the head with the rotating housing, insert the housing with the openings and grooved nuts and the cooler's holder itself.
2. Insert the pipe into the head with the rotating housing from the side of the heating bath until the pipe joint snaps behind the ring in the rotating housing. Insert the arresting rod into the opening in the rotating housing and tighten the nut of the housing.
3. There is a fixed housing with a nut on the opposite side of the head with the rotating housing. Unscrew nut (2), insert on the recessed part of the ball adapter (1) and insert securing ring (3) until it snaps behind the recessed part of the ball adapter. Check if Gufero packing (4) coated with silicone vaseline is placed by the open side outside the recess. Check if flat packing (5) is inserted in the housing and carefully insert the ball adapter with Gufer and the nut on glass pipe (7). Insert the ball adapter until the end stop and tighten it carefully with nut (2). The half-ball joint of the ball adapter points downward.
4. Rotation blocking knob, which is placed on the rotary casing head, set to the ”Lock” position (marking by red point) (for easier locking try to turn the casing a little). Insert suck pipe in to the rotary casing until the sitting touches the plastic collar. Than tighten the nut on the rotating casing. Finally ”Unlock” the blocking knob (marking by green point).
5. Coat all the joints on the other glass parts finely with silicone vaseline.
6. Insert the cooler into the joint in the top part of the ball adapter and also into the cooler's holder. The top cooler's outlet serves for connecting the subpressure source, other outlets are for cooling water.
7. Attach the flask with the ball joint to the ball joint using the fixed clamp and tighten it.
8. Insert the round-bottomed flask on the pipe and secure with the flexible clamp.
9. Insert the inlet pipe with the cock (cock is closed) into the ball adapter.
10. Connect the bushing.
11. Pour water into the heating bath; adjust the end stop of the stand for the round-bottomed flask being immersed in the liquid. The maximum amount of the liquid is approximately 20 mm below the edge of the heating bath.
    Notification: A glass part with a visible crack or another defect must not be used!



1. Ball adapter
2. Nut
3. Bead-type securing ring
4. Gufero sealing 35/22/10
5. Flat sealing
6. Housing
7. Suck pipe

Fig. 2a. Ball adapter sealing



1. Ball adapter
2. Nut
3. Bead-type securing ring
4. PTFE sealing
5. ------
6. Housing
7. Suck pipe

Fig. 2b. Ball adapter sealing (chemical resistant)

3.3 Apparatus control

The instrument is put into operation by connecting the network switch. The round-bottomed flask starts rotation after turning on the switch. The speed of rotation is controlled by the rotary knob.

The height of immersion into the heating bath is arrested with a bolt on the telescopic stand. The bath temperature setting by degrese scale.

4. MAINTENANCE

4.1 Apparatus maintenance

Do not leave the evaporator surface contaminated from corrosive substances. It could damage the evaporator coating. Clean the contamined surface with a clean soft cloth. The cloth may be moistened but not wet. It is also possible to use ordinary washing means for cleaning purposes. It is forbidden to clean the heating bath with the means which could spoil its smooth surface. In case of sediments of furning,impurities, particulates of water rusts ,use the cleaning compounds for cleaning of furning or mellow solution of HCL. In process of cleaning use the protective means recommended by producer of applied cleaning compounds.

Caution: Disconnect the apparatus from the network while cleaning it with a wet cloth!

4.2 Sealing replacement

Disassemble the condenser, remove the releasing pipe with the valve, remove the ball-and-socket ground joint flask, release the nut of the ball adapter and carefully remove the actual adapter. Release the gufero sealing, clean the ball adapter, slightly apply silicone Vaseline onto the new sealing and mount it into the ball adapter. The sealing cavity faces out of the ball adapter. If necessary, replace also the flat sealing between the ball adapter and the head fitted with a rotary casing. Perform the assembly according to the point 3.2. Apply a light layer of silicone Vaseline to the gufero sealing approximately after 80 operation hours (more often if necessary).

5. DEFECTS AND TROUBLESHOOTING

5.1 Leakage

The main cause of leakage is usually an incorrect sealing assembly. At first you should check that all joints have been installed correctly. If it is the case, disassemble the glass and verify the condition of the ball adapter sealing and flat sealing, if necessary replace them. Carefully assemble according to the instructions, switch the rotation ON and start the vacuum pressure up.

5.2 Other failures

The instrument does not react after being turned on. Check the fuse or replace for a new one of the same parameters, as appropriate. Check that the rotation is not hindered (turning by hand), turn on and off the network switch.

The window of the rotation key is flashing, rotating parts are not moving. Ensure that Rotation blocking knob is set to ”Unlock” and than press rotation key again. The window of the rotation key is flashing. Check that there is not anything which could impede the flask from its rotation (manually), switch the mains switch OFF and ON again.

The bath no warms. Put out the socket plug of the bath and let the bath cool down. Plug in again fill up the water or oil and set required temperature.

6. SAFETY AND OPERATION CONDITIONS

6.1 Operation safety

Securing the rotation of the evaporated sample: Overcurrent protection of the driving motor. If the resistance against rotation exceeds a specified limit, the power supply of the driving motor is disconnected. Securing the bath heating: With thermal fuse during overheating above 200°C.

6.2 Operation conditions

The instrument is designed for work under standard laboratory conditions at temperatures from 10 to 30°C and air humidity to 80°C.It is forbidden to handle a bath heated to a temperature higher than 40°C.

Attention! Be especially careful when replacing a round-bottomed flask after increasing the concentration of the evaporated sample. If the flask cannot be removed easily from the cone, carry out further operation only after cooling the bath.

Caution! If you are replacing the round-bottom flask after the vaporized solution has become thicker, pay particular attention and if it is not possible to remove the flask easily from the cone, carry out any other handling only after the cooling of the bath.

Caution! If you use oil as the filling of the heating bath, the heating bath must be properly dried before its being filled.

7. ACCESSORIES AND SPARE PARTS

7.1 Basic accessories (comes with evaporator)

Inlet cord Glass assembly

- Round bottom flask (1000, 2000 ml) NZ29/32
- Receiving flask (1000 ml) KS 35/20
- Suck pipe
- Ball adapter
- Vertical condenser
- Filling pipe with a valve
- 3 pieces of GL14 connection fitting

Sealing: gufero sealing 35/22/10 (Fig. 2c, pos. 4),

Metal clasp

Vacuum tube

7.2 Other accessories

7.2.1 Glass accessories (Fig. 3)

4SKL0021	Evaporating flask 50 ml, joint NZ29/32
4SKL0025	Evaporating flask 100 ml, joint NZ29/32
4SKL0022	Evaporating flask 250 ml, joint NZ29/32
4SKL0023	Evaporating flask 500 ml, joint NZ29/32
4SKL0004	Evaporating flask 1000 ml, joint NZ29/32
4SKL0003	Evaporating flask 2000 ml, joint NZ29/32
4SKL0012	Evaporating flask 4000 ml, joint NZ29/32
4SKL0017	Receiving flask 250 ml, joint KS35/20
4SKL0024	Receiving flask 500 ml, joint KS35/20
4SKL0006	Receiving flask 1000 ml, joint KS35/20
4SKL0034	Receiving flask 2000 ml, joint KS35/20
4SKL0005	Vertical condenser
4SKL0033	Diagonal condenser
4SKL0020	Dry ice trap
4SKL0001	Filling pipe with a valve - short
4SKL0002	Filling pipe with a valve - long
4SKL0008	Ball adapter
4SKL0009	Flask 100 ml, joint NZ14/23
4SKL0010	Flask 250 ml, joint NZ14/23
4SKL0019	Spider with 3 sleeves NZ14/23 (max. flask 250ml)
4SKL0018	Spider with 5 sleeves NZ14/23 (max. flask 100ml)
4SKL0011	Spider with 6 sleeves NZ14/23 (max. flask 20ml)
4SKL0014	Foam trap NZ29/32 - NZ14/23
4SKL0015	Foam trap NZ29/32 - NZ29/32
4SKL0016	Test tube 20ml, joint NZ14/23
4SKL0035	Adapter NZ29/32 - NZ14/23
RO3212	Suck pipe

7.2.2 Spare parts, other accessories

RO1520	Protection bath cover
1TOO0007	Gufero sealing 35/22/10 (Fig.2a)
1TG24524	Flat sealing
1TOO0010	Scraper ring
1TOO0008	Sealing PTFE (Fig.2b)
RO1080	Fixed clip (for KS32/20)
RO1041	Elastic clip (for NZ14/23)
4SKL0026	Straight fitting GL 14
4SKL0027	Cap nut GL 14
90000013	Tubing coupler
5HAD0003	PA Vacuum tubing
90000036	Vacuum pump (VM20D recomended)
90000044	Spare diphragms and sealing for VM20D
	Heating bath stainless steel
Fuses:	T 200 mA

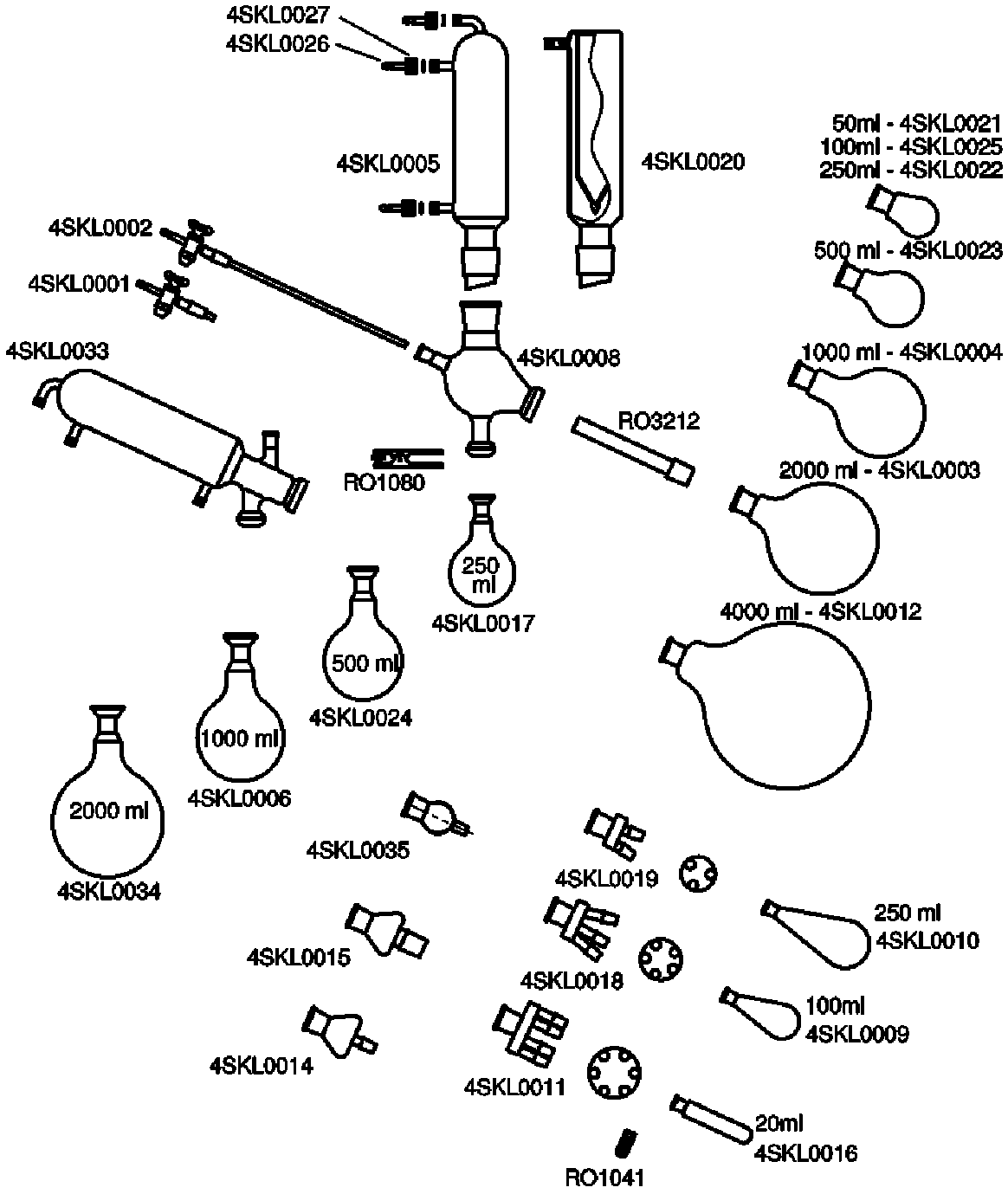


Fig. 3. Glass accessories overview

8. CONCLUSION

8.1 Carrying out of repairs

All warranty and after-warranty repairs shall be carried out by the manufacturer or by the organization authorized by them. If the delivery note does not state otherwise, contact the distributor for any repair requirements.

8.2 Warranty

A warranty will be provided for the product by the manufacturer for a period of one year after handing it over to the buyer. The instrument may be used only in the manner described in these instructions for use. The instrument must not be used in a manner different from that indicated in these instructions, otherwise the safety of operation may be affected. The manufacturer does not accept responsibility for damage arising by non-fulfilment of the requirements of these instructions.

8.3 Waste disposal

When the instruments operating life is over dispose it in respect to valid regulations, also it can be returned to the vendor or producer for liquidation.

Warning: Instrument contains parts (PCB's) which are rated as hazardous waste.

9. TABLE OF CONTENTS

9.1 List of picturtes and tables