

## Technical Data (2)

### Exposure Time

The equipment has one programmable timer with a non-volatile memory.

Preselection and setting	digital setting from 0.1 to 99.9 minutes
Setpoint value display	digital, 3 digits
Actual value display	digital, 3 digits; the remaining time is displayed, i.e. after a mains failure exposure can be continued without any time error.

### Prewarning Time

Preselection and setting	digital setting from 2 to 250 seconds or de-activated
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### Programmed Mode

Number of storable programs	250
Tube Parameters (Limit Data)	
Number of memory locations for tube parameters	8
	with digitally assigned tube limit data, e.g. nominal voltage, limit filament current, anode power dissipation

### Technology

20 kHz IGBT technology for high voltage circuit and filament current circuit

Emitted interference	as per EN 55011A, Class A
Immunity to interference	as per IEC 801-2/1991, 801-3/1984, 801-4/1988

### Connected Loads and Mechanical Dimensions

Power connection	1/N~ 230 V ±10%, 50/60 Hz
Power consumption	4150 W at 60 kV, 58 mA
Max. mains current	24 A
Mains fuse	32 A (as per VDE)
Ground terminal	6 mm <sup>2</sup> Cu
Type of protection	as per EN 60529, IP00 (rack mount), IP32 (desk-top)
Cooling water connection	3/4 inch
Cooling water consumption	minimum 3.5 l/min, minimum 4.5 bar, maximum 7 bar, at outlet point pressure-free
Cooling water temperature	> dew point < 25° C
Dimensions overall	483 mm x 266 mm x 680 mm (WxHxD), 19" (48 cm) rack mount
Weight	approximately 57 kg

# SEIFERT ISOVOLT 3003



## Highly stabilized X-Ray equipment ISOVOLT 3003 for Radiographic and Radioscopic Materials Inspection

Characteristics of the ISOVOLT equipment are a medium-frequency converter, IGBT technology in the power module, SMD technique, LCD display, soft-keys and the possibilities of integration into computer-controlled X-ray systems; a memory for operating data is a further feature.

The use of the medium-frequency converter technique entails high stability, low weight, small dimensions and low power consumption.

The employment of a microprocessor offers increased operation safety, dialogue capability, user-comfort and easy servicing (history memory and modem support).

### Features

- High stability of voltage and current through modern power electronics
- Voltage divider for exact high voltage measurements
- Proven medium-frequency converter technology
- High user comfort through microprocessor technology
- SMD technology
- Automatic warm-up program (real-time clock)
- Possibility of integration into existent systems (via RS232C-interface)
- Fail-safe circuit for "X-RAY ON" lamp
- Produced under ISO 9001 certified quality management system
- CE conformity

GE imagination at work



## Stand-By Operation

This mode is selected via the key-operated switch of the control module. The supply voltage of the IV 3003 remains switched on and the cooling system continues to be active. Any build-up of condensation water in the power electronics is prevented via thermostatic control.

In this mode the system remains at operating temperature, but cannot be operated since all entries are inhibited.

Since the key can be withdrawn in this position, operation of the IV 3003 by unauthorized personnel is impossible.

## Cooling System

The cooling water temperature\* and the cooling water flow rate are constantly monitored when X-ray is switched on to ensure the protection of the X-ray tube. The temperature is monitored via a thermostat. The flow rate is monitored via a fail-safe water turbine flow rate monitor. In case of the use of a cooling pump the water turbine flow rate monitor is integrated in the pump.

\*) If only the water turbine flow rate monitor is used, temperature monitoring of the cooling water has to be provided by the customer.

## Automatic Tube Warm-up

To reach the desired operating values, the X-ray tube is warmed up automatically thus extending its life time.

The non-operational interval is established from the operating values run thus far and from the data of the built-in real time clock.

## Switch-Off

Upon switch-off of the equipment the last-selected values for voltage, current and operating mode are kept until the next switch-on.

## Protective Devices

The power limits of 8 tube types can be programmed; the tube parameters can be freely selected. The following tube parameters are selectable via menu:

- Voltage limit
- Power limit
- Filament current limit

During operation the following control functions are activated:

- Relative overvoltage and undervoltage switch-off
- Absolute overvoltage and undervoltage switch-off
- Relative overcurrent switch-off
- Absolute overcurrent and undercurrent switch-off
- Power control
- Cooling circuit control for water flow
- Temperature control for high voltage generator and power electronics

## Safety Devices

- Fail-safe circuit for HV-lamp ("High Voltage ON" in front panel)
- External warning lamp with fail-safe circuit (option)
- Double high-voltage relays with serially switched contacts
- EMERGENCY-OFF palm button switches, can be linked to external EMERGENCY-OFF switches
- Two door contact connections, acting upon one high voltage relay each

## Modes of Operation

The following modes of operation can be selected:

- Constant Current Mode

The X-ray tube is operated at the operating values preset for voltage, current and - if necessary - exposure time.

- Constant Wattage Mode

The X-ray tube is operated at the operating values preset for voltage and - if necessary - exposure time. The tube current is automatically set at the value which the tube output permits with a given high voltage.

- Programmed Mode

This mode constitutes a considerable help in frequently recurrent inspection tasks. The possibility of wrong entries is reduced to a minimum.

The operator calls up all X-ray parameters via a program number.

For each program the parameters set for tube voltage, tube current, exposure time, focal spot size and tube type are stored under a number.

**The basic configuration comprises**

- Basic equipment IV 3003 as 19" chassis with integrated high voltage generator
- 3 Water hoses, standard length 5 m each
- Computer interface RS 232 C

**Extensions**

- X-ray tubes as per individual choice and respective separate specifications
- High voltage cable, standard length 5 m
- Tube adapter plug 60 kV
- Desk-top casing 19"/6 HE
- Fail-safe warning lamp
- Tubehousing support
- Water cooling aggregate
- Cooling water checking device

**Sockets for connection of additional components**

- RS 232C interface for connection of machine controls etc., as per customer specifications, as well as modem and printer
- 20 mA current loop (with additional adapter)
- RS 422 / 485 (with additional adapter)
- Interlock as per DIN 54113
- Additional warning element that is active during prewarning time
- External START/STOP
- External EMERGENCY-STOP
- Water cooling pump
- Cooling circuit monitoring
- External warning flash lamp (fail-safe), mandatory for mobile use as per DIN 54113, part 2

**Technical Data****High Voltage Generator**

Maximum output voltage	60 kV
Maximum output current	80 mA
Maximum output power	3,5 kW
Shunt and discharge resistance	600 M $\Omega$ $\pm$ 1% TK25

**Tube Voltage**

Preselection and setting	digital or quasi-continuous from 2 to 60 kV in steps of 0.1 kV
Setpoint value display	digital, 4 digits
Actual value display	digital, 4 digits
Display accuracy	$\pm$ 0.1 kV
Absolute accuracy	$\pm$ 1.5%
Repeat accuracy	$\pm$ 0.01% at constant temperature level
Temperature drift	< 100 ppm/C

**Tube Current**

Preselection and setting	digital or quasi-continuous from 2 to 80 mA in steps of 0.1 mA
Setpoint value display	digital, 3 digits
Actual value display	digital, 3 digits
Display accuracy	$\pm$ 0.1 mA
Absolute accuracy	$\pm$ 1%
Repeat accuracy	$\pm$ 0.01% at constant temperature level
Temperature drift	< 100 ppm/ C