SEIFERT ID 3003

Highlystabilized X-Ray equipment ISO-DEBYEFLEX 3003 for structure analysis

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

General

When the direct voltage X-ray equipment of the type ISO-DEBYEFLEX was introduced in 1950 for structure analysis it set standards in X-ray generator technology from the very beginning. Characteristics of the new ID equipment are a medium-frequency converter, IGBT technology in the power module, SMD technique, dialogue processor, 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)..

Stand-By Operation

This mode is selected via the key-operated switch of the control module. The supply voltage of the ID 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 Since the key can be withdrawn in this position, operation of the ID 3003 by unauthorized personnel is impossible.

Warm-Up Program

After switch-on of the equipment an operator-controlled inquiry and entry routine is run to decide whether the tube has to be warmed up or not. There is a choice between manual and automatic warm-up.

- For manual warm-up the non-operational period is selected via function keys (1 day, 2 days, week).
- For automatic warm-up the non-operational period is determined 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
- Anode material
- Focus dimensions
- Filament current limit

During operation the following control functions are activated:

- Relative over voltage and under voltage switch-off
- Absolute over voltage switch-off
- Relative over current switch-off
- Absolute over current switch-off
- Under voltage switch-off
- 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 high voltage-lamp (“High Voltage ON” in front panel)
- External warning lamp with fail-safe circuit (option)
- 2 safety circuits for 2 (optionally 4) shutters
- Double high-voltage relays with serially switched contacts
- EMERGENCY-OFF palm button switches, can be linked to external EMERGENCY-OFF palm button switches
- Two door contact connections, acting upon one high voltage relay each

The basic configuration comprises

- Basic equipment ID 3003 as 19" chassis with integrated high voltage generator
- Cooling water checking device
- 1 Water hose (ID 3003 - Tubehousing), standard length 2 m
- 2 Water hoses (inlet hose, outlet hose), standard length 5 m each (maximum 20 m *)
- Computer interface RS 232 C
- 20 mA current loop (with additional adapter)
- RS 422 / 485 (with additional adapter)

* Hose lengths of more than 5 m require special diameters to keep pressure loss low

Extensions

- Tubehousing V 4 with X-ray tubes as per individual choice and respective separate specifications
- High voltage cable, standard length 2 m (maximum 20 m)
- Tube adapter plug 60 kV
- Desk-top casing 19"/6 HE
- Work table as per individual choice
- Multiple socket outlet 230 V
- Radiation protection cabinet
- Fail-safe warning lamp "X-RAY ON"
- Tubehousing support
- Water cooling aggregate

Sockets for connection of additional components

- Serial interface, see separate specification
- Interlock as per German standard
- Extended interlock, assigned to shutters
- Additional fail-safe warning lamp
- External START/STOP
- External EMERGENCY-STOP
- Control contacts for peripherals, assigned to shutters (maximum load 230 V, 2 A)
- 230 V switched at MAINS ON (230 V, 4 A)
- Control contacts, assigned to MAINS ON (maximum load 230 V, 4 A)
- 230 V switched at HIGH VOLTAGE ON (230 V, 4 A)
- Control contacts, assigned to HIGH VOLTAGE ON (maximum load 230 V, 4 A)

Technical Data

High Voltage Generator

Maximum output voltage	60 kV direct voltage
Maximum output current	80 mA
Maximum output power	3.5 kW
Shunt and discharge resistance	600 MΩ ± 1% TC 25

Tube Voltage

Preselection and setting	digital or quasi-continuous from 2 to 60 kV in steps of 1 kV
Set point value display	digital, 2 digits
Actual value display	digital, 2 digits
Absolute accuracy	± 2% (minimum ± 1 digit)
Stability	± 0.01% at ± 10% mains voltage fluctuations
Ripple	< 1%

Tube Current

Preselection and setting	digital or quasi-continuous from 2 to 80 mA in steps of 1 mA
Set point value display	digital, 2 digits
Actual value display	digital, 2 digits
Absolute accuracy	± 1% (minimum ± 1 digit)
Stability	± 0.01% at ± 10% mains voltage fluctuations

Tube Shutter Timer

The equipment has two independent, programmable timers with a non-volatile memory. A total of four timers can be supplied if required. Depending on the number of timers it is possible to time-control one to two or one to four window shutter elements.

Preselection and setting	hours from 0 to 99, minutes from 0 to 59, seconds from 0 to 59
	digital setting individually for 1 to 2(4) window shutter elements
Set point value display	digital, 6 digits
Actual value display	digital, 6 digits

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^2 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 < 35° C
Dimensions overall	483 mm x 266 mm x 680 mm (WxHxD), 19” (48 cm) rack mount
Weight	approximately 57 kg

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