

**ISOVOLT HS
Series**

No. 1.539.50.00.02



The PANTAK SEIFERT ISOVOLT HS Series is the state of the art in technology and design of high stability constant potential X-ray equipment.

ISOVOLT 450 HS

**High Stability Industrial X-ray Equipment
for Radiographic and Radioscopic Materials Inspection**

Features

- High Stability
- High accuracy
- Precise reproducibility
- Extremely low ripple
- High dose rate output
- Intelligent X-ray tube warm-up
- Large-size LCD display
- Clear text messages in up to 16 languages
- Rugged and reliable design
- Proven reliability
- Full on-site maintainability
- Local and remote diagnostics
- Systems Integration via standard RS 232C
optional: RS 422 or RS 485 / Profibus (EN 50170)
- Remote operation up to 100 m (> 300 ft)
- CE compliant

Available tube housings in accordance to application

Radiography	420 / 10	450 / 10		
Radioscopy			420 / 5	450 / 5

Control Module

The control module is designed for ease of operation providing messages in 16 languages. Input of parameters are entered by keypad, with set and actual values displayed on a clear text LCD readout. Upon shut-down previous operation parameters are stored and recalled automatically upon next switch-on. Alternatively the HS Series can be integrated into any X-ray inspection system control by remote PC interface with optional WINHS remote control program.

High Voltage Generator

The high voltage generator features:

- Rugged oil-insulated high voltage components
- SMD technology and advanced IGBT power electronics in compact design
- Complete on-site maintainability
- Stackable components minimizes the required floor space

Cooling System

The cooling oil temperature and flow rate are constantly monitored to ensure protection of the X-ray tube. Upon shut-down the cooler will automatically continue for a set time to prevent heat accumulation and to extend X-ray tube life.

* In case of water re-cooled oil cooler, cooling water has to be provided by the customer.

Modes of Operation

- Constant Current Mode
The X-ray tube is operated at the values preset for voltage, current and - if necessary - exposure time.
- Constant Wattage Mode
The X-ray tube is operated at the values preset for voltage and - if necessary - exposure time.
The tube current is automatically set at the maximum 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 by a number.

Intelligent Automatic Tube Warm-up

X-ray tubes require warm up to reach desired operating values and ensure long life. The unique built-in real time clock tracks the operating history and calculates appropriate warm-up cycle reflecting idle time and previous operational values.

Safety and Protective Devices

- Comprehensive safety devices are designed to meet international standards
- Automatic switch-off upon X-ray-On lamp failure
- Dual high voltage contactors with redundancy monitoring
- EMERGENCY-STOP lock down push button
- Two independent external safety circuits (e.g. door interlock)
- Radiation safety interlock (DIN 54113) or primary interlock (US FCR 1020.40)
- Adjustable pre-warning time
- Key switch protection inhibiting unauthorized operation

For the protection of all components including X-ray tube the following are continuously monitored and will shut down in the event of:

- Over and undervoltage (absolute and relative)
- Over and undercurrent (absolute and relative)
- Over power (wattage control)
- Over temperature and low flow rate in cooling circuit
- Over temperature in high voltage generator or power electronics

Service and Maintenance

For efficient service and maintenance, built-in diagnostics are provided locally or via remote access. 128 sets of previous operation parameters and events plus 128 warm-up cycles are stored for historical analysis.

Technical Data

High Voltage Generator

Maximum output voltage	-225 kV (cathode), +225 kV (anode)
Maximum output current	45 mA
Maximum output power	3 kW each (cathode, anode), limited by tube specification
High voltage ripple	12 V/mA (with high voltage cable 10 m), 40 kHz
Insulation	oil
Housing dimensions (anode)	350 x 800 x 475 mm (WxDxH) / 13.8 x 31.5 x 18.7 inch (WxDxH)
Housing dimensions (cathode)	350 x 800 x 705 mm (WxDxH) / 13.8 x 31.5 x 27.8 inch (WxDxH)
Weight (anode)	123 kg / 272 lb
Weight (cathode)	170 kg / 375 lb, including power module

Tube Voltage

Preselection and setting	from 5 to 450 kV in 0.1 kV increments
Digital display of set and actual values	simultaneous 4 digits each
Display resolution	0.1 kV
Accuracy	< ± 1%
Reproducibility	± 0.01% at constant temperature level
Temperature drift	< 65 ppm/°C

Tube Current

Preselection and setting	from 0.1 to 45 mA in 0.1 mA increments
Digital display of set and actual values	simultaneous 3 digits each
Actual value display	digital, 3 digits
Display resolution	0.1 mA
Accuracy	± 1%
Reproducibility	± 0.01% at constant temperature level
Temperature drift	< 65 ppm/° C

Exposure Time

The equipment has one programmable timer with a non-volatile memory.	
Preselection and setting	from 0.1 to 99.9 minutes in 0.1 min increments or from 1 to 999 sec in 15 sec increments or continuous
Digital display of set and actual values	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
Warm-up	automatic intelligent tube conditioning
X-ray tube setup	menu selectable tube parameters

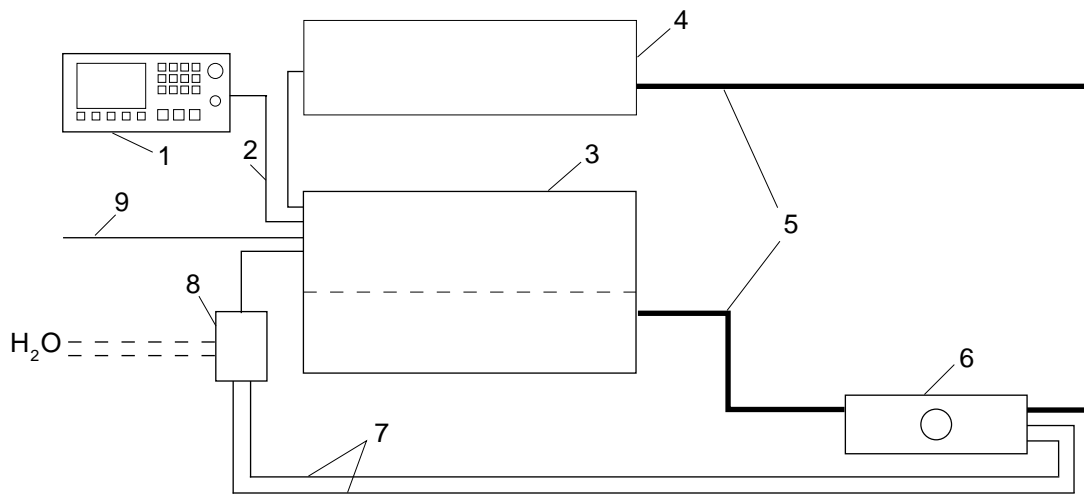
Control Module

Dimensions	605 x 270 x 100 mm (WxDxH) / 23.8 x 10.6 x 3.9 inch (WxDxH), built into desk housing
Weight	1.5 kg / 3.3 lb without housing, 6 kg / 13.2 lb including desk housing

Connected Loads

Power connection	3N PE 400/230 V ± 10%, 50/60 Hz, 3-phase, grounded neutral, TN-S or TN-C-S mains (star connected system, optional 3-phase isolation transformer)
Grounding	Separate grounding for X-ray tube and high voltage generator (minimum 6 mm ²)
Mains fuses	16 A time-delay fuses, customer-supplied

Configuration of Equipment Components



Standard Delivery Scope

- (1) 1 Control module ISOVOLT HS in desktop housing (optional 19" rackmount)
- (2) 1 Connecting cable control/power stage, standard length 10 m (max. approx. 100 m) / 32 ft (max. approx. 320 ft)
- (3) 1 High voltage generator, 225 kV cathode, with integrated power module HS
- (4) 1 High voltage generator, 225 kV anode, incl. connecting cable
- (5) 2 High voltage cables 225 kV, standard length 5 m (maximum 20 m) / 16 ft (max. 64 ft)
- (6) 1 Bipolar X-ray tubehousing, see separate product information
- (7) 2 Cooling oil hoses, standard length 6 m (max. 20 m) / 19 ft (max. 64 ft)
- (8) 1 Oilcooling pump, see separate product information
- (9) 1 Mains connecting cable 5 x 2.5 mm², standard length 10 m (32 ft), with wire end ferrules

Input and output connections

- RS 232C interface for connection of machine controls etc., as per customer specifications, as well as modem and printer
- Interlock as per DIN 54113
- Interlock as per United States Radiation Control Act of 1968, § 1020.40
- Additional warning output that is active during pre-warning time
- External START/STOP
- External EMERGENCY-STOP
- Cooling system
- External warning flash lamp (fail-safe)
- "Mains ON" (230V / 2 A ²⁾)
- "High Voltage ON" (230V / 2 A ²⁾)
- Potential-free contact, for "Mains ON" (60V AC / 75V DC ¹⁾/ 2 A)
- Potential-free contact, for "Pre-warning Time ON" (30V AC / 36V DC ¹⁾/ 2 A)
- Potential-free contact, for "High Voltage ON" (60V AC / 75V DC ¹⁾/ 2 A)

1)This voltage corresponds to the max. operating voltage (rating as per VDE 0110 Group B)

2)These 230 V contacts are collectively fused with 2.5 A

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