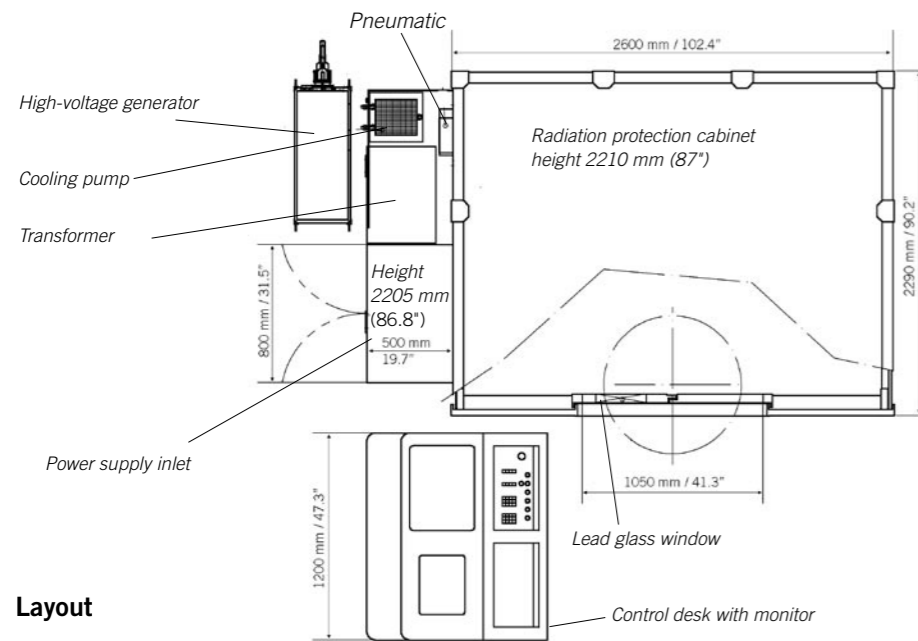


### Additional Technical Data DP 435 Vario

- System S7 PLC control for easy teach and learn programming via industrial PC, with TFT color display for critical machine data, simple operation by mouse click.
- Absolute encoders for the motorized axes.
- The number of programs / program steps are nearly unlimited as stored on a hard disk of the industrial PC.
- Programmable parameters for each test step:
  - Spatial position of workpiece in all axes positions
  - Motorized axes, variable speed
  - Continuous rotation Rz axis
  - Tube voltage (kV)
  - Tube current (mA)
  - Cycle time
  - Image intensifier ZOOM
  - Automatic shutter
  - Program end



**Layout**

**DP 435 Vario - Options -**

- Manual inspection with 160 kV and three axes manipulator
- Manual inspection with 160 kV and five axes manipulator
- Customized solution with additional axes
- Programmable version for high throughput applications
- Customized programmable version optionally available

The DP 435 Vario (P) is designed to meet or exceed domestic and international standards and regulations, including, but not limited to:

- |   |                           |                          |
|---|---------------------------|--------------------------|
| • ISO 9001  | • CFR 1020.40             | • DIN EN 954-1           |
| • UVV   | • CE Conformity           | • DIN EN 60529 / IEC 529 |
| • VBG 4   | • VDE 0100                | • DIN 54113              |
| • German X-Ray Regulations RöV in their updated version | • DIN EN 60204 (VDE 0113) |                          |

# SEIFERT DP 435 Vario

## Radioscopic Inspection System



**Application**

The DP 435 Vario (P) is a highly versatile Real-time X-ray Inspection System designed for the 100% on line inspection or off line inspection of different materials and sizes such as aluminum, plastic, steel and special alloys.

The design of the system allows the greatest flexibility in applications as diverse applications like production, incoming inspection, failure analysis or research and development.

For high throughput allocations the DP 435 Vario P with CNC programmable control is recommended.

**Features**

- High flexibility manipulator with up to 7 axis with variable speeds
- Motorized axes with joy stick control
- Maximum workload up to 65 kg / 143 lbs (100 kg / 220 lbs)
- Inspection diameter up to up to 650 mm / 25.6" (800 mm / 31.9" \*)
- Inspection height up to 1000 mm / 39.4"
- ± 30° tilt capability, position-independent
- C-arm X-ray manipulator
- Lead glass viewing window
- Full size double sliding door for easy loading of large size workpieces and easy of service
- The manipulator moves out motorized for loading by crane or forklift
- Minimal maintenance required
- Manufactured under ISO 9001 certified Quality Management System

\*) The penetrable inspection volume varies with the total material thickness and material density

## Description

The DP 435 Vario (P) features two manipulators, the first is an integrated C-arm (X-ray) manipulator upon which the X-ray tube and image Intensifier are mounted and which has two axis motion in the Tz (lifting axis) and Rx (tilt).

The second manipulator (workpiece) provides alignments in three axes which are stepless adjustable and allow precise positioning by the operator.

The standard workpiece manipulator is adjustable in the Tx axes (across the beam path), Ty (geometrical magnification) and Rx (rotation). Additional axes are optionally available upon request.

For high throughput applications a programmable version of the workpiece manipulator is available equipped with PLC Control S7.

All control and power electronics of the DP 435 Vario (P) are integrated in the control cabinet, which mounts on the side of the shielded cabinet.

Operator interface is by a mobile control desk, which includes joystick control of the manipulators and push button open/close door control.

In the programmable option the control includes the TFT display and an industrial PC for the teach and learn programming.

### Radiation Protection Cabinet

The DP 435 Vario (P) is a self contained Real-time X-ray Inspection System designed to meet all current international radiation safety standards including the German X-ray Regulations (RöV) in their up-to-date version and CFR1020-40 (USA). Safety circuits incorporated into the systems are in accordance with DIN EN 954-1, Safety Class 4.

The DP 435 Vario (P) is capable of external loading of workpieces on the ma-

nipulator when its outside/load position is selected. This allows the loading by fork lift and overhead crane of heavy or difficult workpieces.

### X-ray System

The X-ray source in the DP 435 Vario (P) is the proven ISOVOLT HS Series of generators. As standard it is available with the ISOVOLT 160 HS with beryllium window X-ray tube and output from 5 kV to 160 kV. For applications requiring greater penetrating power the ISOVOLT 225 HS is available.

The ISOVOLT HS offers you the following features:

- 40 kHz operation
- Automatic X-ray tube warm-up
- Microprocessor control
- Integrated safety circuitry

A choice of X-ray tubes to allow optimal performance of the System are:

- ISOVOLT 160 M2 / 0.4-0.4 mm dual focal spot X-ray tube, each 1.00 mm (EN 12543) [0.4 (IEC336)] capable of a tube current of 16 mA at 40 kV to achieve the best possible contrast especially for the inspection of "low density" materials,
- ISOVOLT 160 MM2 / 0.2 mm single focal spot X-ray tube of 0.5 mm (ENI 12543) [0.2 (IEC336)] capable of 2 mA at 160 kV to detect very small defects especially for the inspection of aircraft components.

### Imaging System

The DP 435 Vario (P) features a VISTALUX 9S3 imaging system, which includes a 23 cm / 9" state of the art metal ceramic technology intensifier switchable to two smaller fields of view allowing built in magnification. Coupled

to the image intensifier by a precision lens system is a CCD camera with wide dynamic range.

Display is by a high-resolution b/w monitor, which provides superior imaging capabilities.

### Options

- ISOVOLT 225 HS
- Collimator
- Beam shader
- ISDN-router for diagnostics
- X-ray beam filter
- VISTAPLUS image enhancement system, featuring
  - Image enhancement functions
  - Pre-programmed process routines
  - Image archiving
  - Network capable
  - Measurement functions
  - SXGA Monitor

### Benefits

- Ideally suited for difficult and complex inspections
- Capable of inspection of heavy parts up to 100 kg / 220 lbs
- Design allows inspection of large workpieces \*)
- High throughput
- Motorized movement into the outside loading position
- Heavy parts can be loaded easily
- Nearly limitless number of programs or program steps

\*) The penetrable inspection volume varies with the total material thickness and material density

## Technical Data DP 435 Vario

### Radiation protection cabinet

#### At standard workpiece dimensions

Dimensions	2580 x 2000 x 2210 mm, 97.3" x 78.7" x 87" (W x D x H)
Weight	approx. 4900 kg / 10780 lbs

#### Dimensions with extended workpiece

Dimensions	2580 x 2290 (90") x 2210 mm (W x D x H)
Weight	approx. 7500 kg / 16530 lbs

### Movements

Horizontal motion across the X-ray beam	Tx	max. 700 mm / 27.9"
Maximum Motion, with open sliding door	Tx	1430 mm / 56"
Horizontal motion, Magnification axis	Ty	± 400 mm / 15.9"
Vertical motion	Tz	max. 1000 mm / 39.9"
Tilt of the workpiece	Rxm	± 30°
Tilt of the C-arm	Rxr	± 30° *)
Tilt of the workpiece	Ry	± 30°
Rotation of the workpiece	Rz	n x 360°

### Axis

### Travel

### Speed

0...18.0 m/min, 708.5"/min **)
0...18.0 m/min, 708.5"/min **)
0...18.0 m/min, 708.5"/min **)
0...9.0 m/min, 354"/min
0...36 °/sec
0...36 °/sec
0...36 °/sec
0...50 °/sec

\*) restricted in stop position

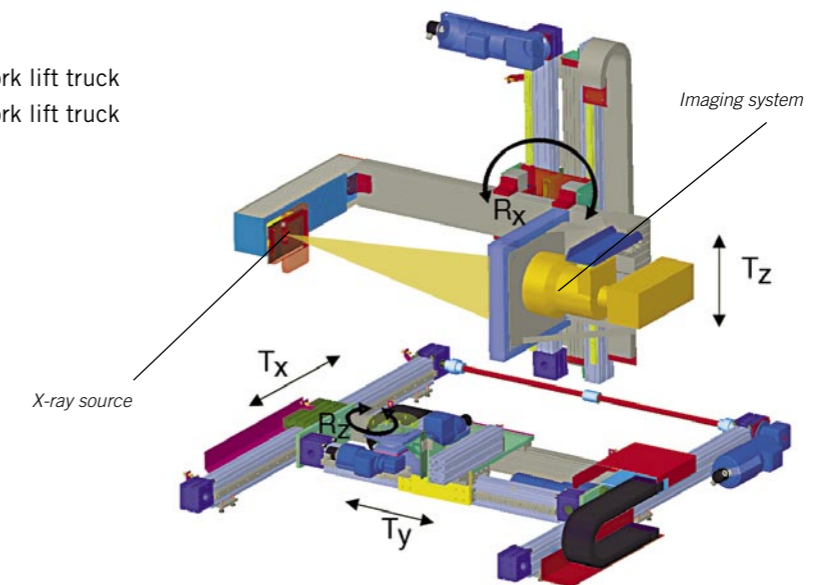
\*\*\*) 0...36.0 m/min (1417"/min) for P-version

### Control console

DP 435 Vario V, non programmable: 800 x 500 x 2000 mm / 31.5" x 19.7" x 78.7" (W x D x H), weight approx. 300 kg / 660 lbs  
 DP 435 Vario P, programmable: 1000 x 500 x 2200 mm / 39.3" x 19.7" x 86.6" (W x D x H), weight approx. 400 kg / 880 lbs

### System Installation / Relocation

Radiation protection cabinet	fork lift truck
Control console (on pallet)	fork lift truck



### Power requirements

Supply voltage	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)
Supply power	approx. 11 kVA *)
Power supply fuse	max. 35 A *) , customer-provided
Grounding	separate grounding for X-ray equipment and high voltage generator (< 2 Ω) of at least 6mm <sup>2</sup>

\*) Maximum power input dependent on X-ray tube used