

## Defined charge distribution for SMPS measurements by means of X-ray ionization



### Description

The XRC 049 is a neutralizer on the basis of X-ray ionization. It can be used the same way as the Kr-85-370 (for example in SMPS systems), i.e. when the measurement task requires a reliable and defined charge distribution of the aerosol. The XRC 049 is especially suitable for mobile measurements performed at different locations, as there are no official requirements for the transport that need to be considered in most countries. The XRC 049 is a bipolar neutralizer generating positive and negative ions through ionization. If these ions are brought together with an aerosol, a defined equilibrium charge distribution is set, as it is necessary for measuring systems such as a scanning mobility particle sizer (e.g. Palas® U-SMPS\*). Compared to an unipolar neutralization, a bipolar neutralization has a significant advantage: regardless of the initial state of charge of the particles, a reproducible equilibrium charge distribution is always set. This is why a bipolar neutralization is mandatory for a traceable calibration of a condensation particle counter (e.g. ISO/CD 27891). The XRC 049 can be integrated into the U-SMPS / DEMC control unit (figure 3). The full performance is immediately available after switching on the device, after switching off no ionization takes place and therefore no further radiation. **Function** The soft X-rays ionize the carrier gas. As a first result of the ionization process, positively charged gas ions and free electrons are generated. Neutral gas molecules with a strong electron affinity (e.g. O<sub>2</sub>) collect the free electrons to build negatively charged ions. When, at this point, aerosol particles are exposed to this mixture of ions during a determined period of time, the charge level of the aerosol particles is set at a defined equilibrium charge distribution.

## Benefits

- Reliable method for setting defined bipolar charge distributions
- Powerful alternative to radioactive neutralizers
- Flexibility in operation, no additional operating licence required\*\*
- Can be integrated into U-SMPS / DEMC control unit
- After switching on full performance available, after switching off no further ionization
- Suitable for concentrations up to  $10^7$  particles/cm<sup>3</sup>
- Reduces your operating costs!

\*\* Regulations and requirements can vary depending on the state/country

## Datasheet

<i>Parameter</i>	<i>Description</i>
<b>Volume flow</b>	up to 5 l/min
<b>Power supply</b>	
	115 – 230 V, 50 – 60 Hz
<b>Housing</b>	Aluminium
<b>Maximum particle number concentration</b>	
	10 <sup>7</sup> particles/cm <sup>3</sup>
<b>Carrier/dispersion gas</b>	
	Air, nitrogen
<b>Aerosol outlet connection</b>	∅ <sub>outside</sub> = 8 mm, ∅ <sub>inside</sub> = 6 mm
<b>Special features</b>	
	requires no certification in most countries
<b>Activity of the radiator</b>	
	4.9 keV
<b>Type of radiation</b>	γ radiation
<b>Operation principle</b>	Ionisation with X-rays
<b>Mains fuse</b>	
	F5A, 250 V
<b>Aerosol inlet connection</b>	∅ <sub>outside</sub> = 8 mm, ∅ <sub>inside</sub> = 6 mm

## Applications

- Neutralization for SMPS systems
- Neutralization for filter test systems
- Neutralization for diverse measuring tasks and to avoid particle losses due to electrostatic deposition
- Aerosol research
- Laboratory and field measurements

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