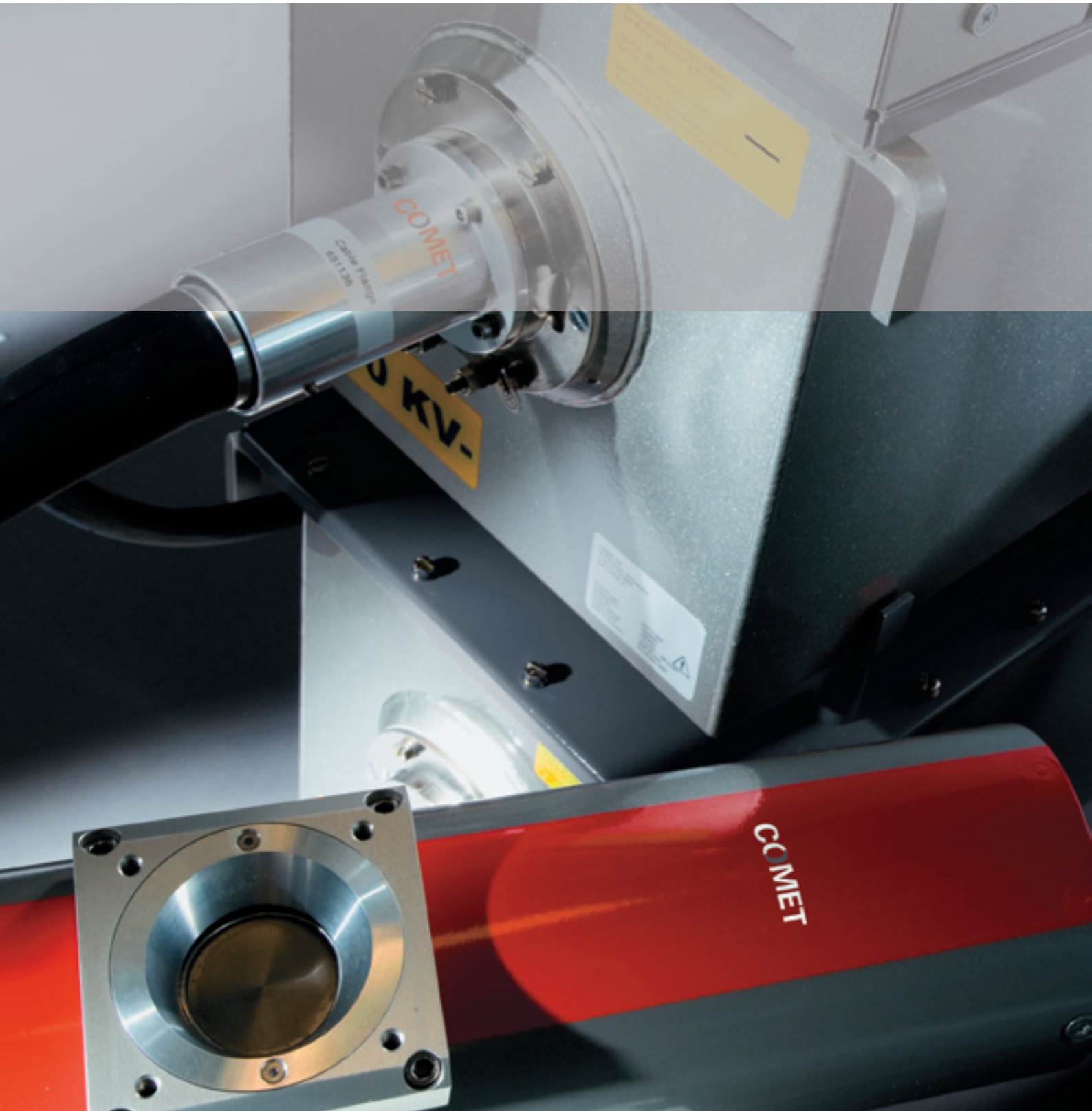


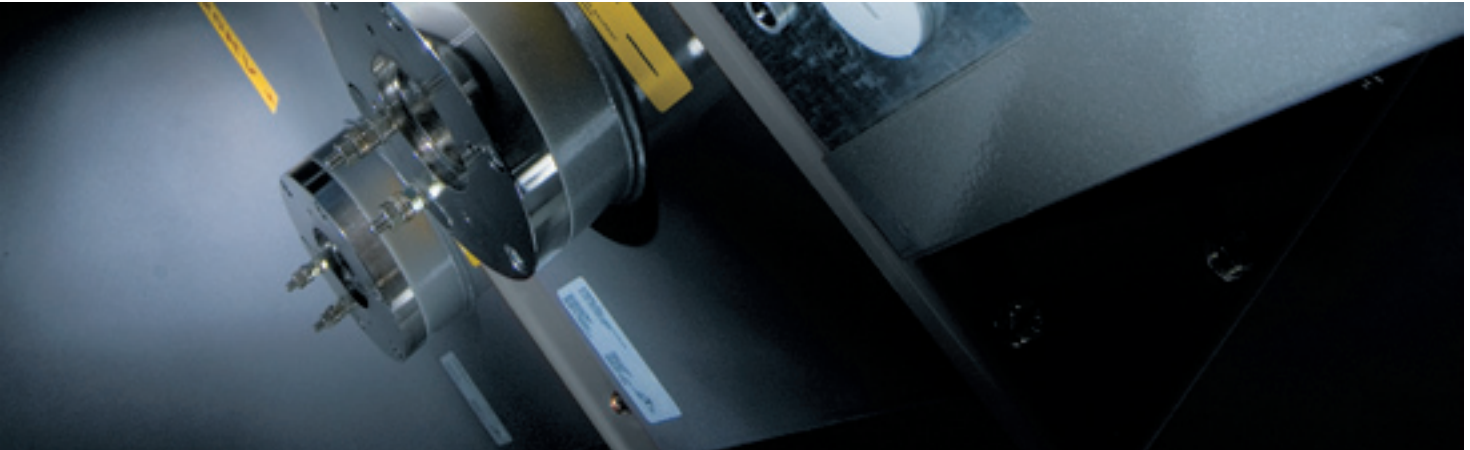
# XRP Generators

Industrial X-Ray

Overview







### **XRP Generators**

COMET Industrial X-Ray generators and COMET Metal Ceramic X-Ray tubes are perfectly matched for high stable performance. The high frequency XRP Generator has been designed to meet the tough requirements of modern industrial X-Ray applications. The XRP Generator is the ideal workhorse for both radiographic and real-time applications. All generators are factory-configured and pre-tested.

#### **COMET XRP Generators Offer**

- Voltages up to 600 kV
- Power up to 4.5 kW
- Unipolar and bipolar configurations
- Single or dual focal spot control

#### **XRP Generators Include the Following Components**

##### **Control unit**

Microprocessor based controller for 19" rack mounting

##### **Power supply**

- Power supply for the high voltage section as well as the external cooler
- Integrated terminal blocks: controls for the safety circuits to the cooler, door switches, warning lamps and other remote devices

##### **High voltage tank(s)**

Oil-insulated high voltage section

### **About the Business Unit Industrial X-Ray**

COMET Industrial X-Ray is an experienced supplier of components and modules for industrial X-Ray applications and is proud of its reputation as the preferred engineering partner in terms of innovation potential, know how, flexibility and speed. Our product range features X-Ray tubes and modules with small focal spot resolution ( $< 1\mu\text{m}$ ) up to 6 kW in output for more power demanding requirements: from the smallest footprint for use in portable units to 800 kV fixed gantry systems that are suitable for cargo screening.



### Product Highlights

#### Ease of control

- All COMET tubes are pre-programmed
- Constant current mode
- Constant power mode
- Language selection: English, German, French, Spanish
- Rotary-knob manual control of kV and mA
- Large LED display
- Serial interface
- Intelligent automatic tube warm up, optimized for COMET tubes
- Remote operation up to 100 m
- Easy installation with pre-manufactured interconnection cables
- RS232 C serial port for XRP controller

#### Industry-proven construction, compact and service friendly

- Outstanding reliability
- Rugged, oil-insulated, high voltage components
- Compact power supply for all module components including cooler, warning lamps and safety circuits
- Stackable components save floor space

#### Highly stable, low-ripple kV level with

- Precise and repeatable operation
- Very low high voltage ripple
- Very low temperature drift

#### Safety provisions

- Two separate, independently monitored safety-circuits (fail-safe, 24 V)
- Continuous system-function monitoring with fully automated system shut-down and failure indication
- Automated filament post-heating high voltage capacitor discharge upon termination
- "X-Ray on" warning lamp monitoring provided (fail-safe)
- External safety circuit for automated systems (24 V)
- High voltage primary circuit interruption for CDRH switch (US-standard)
- Monitored door lock feature
- External coolant monitoring
- I/O Terminals included

#### Additional components

- Optical interface kit

#### Operational features

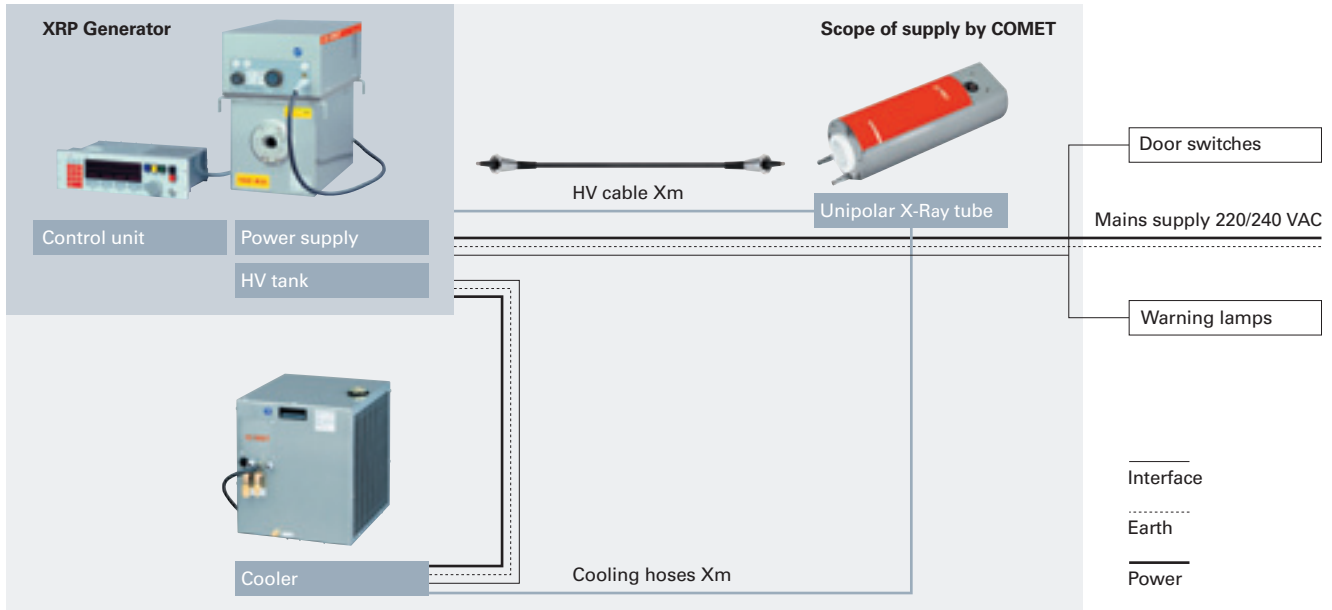
- High HV reproducibility
- Exact HV and mA settings
- Discharge resistance allows high availability
- Active arc suppression





**Unipolar X-Ray Source**

Diagram of a Unipolar X-Ray Source XRS and its environment.



**“One Stop Shop” for Industrial X-Ray: COMET’s XRS**

COMET is pleased to offer all of the necessary components for a customized X-Ray module: The new XRS modules contain a COMET X-Ray tube, XRP Generator, HV-cables, cooler and interconnections designed for easy integration that will optimize system performance.

All XRS modules are factory pre-tested for hassle free installation and operation.

This solution demonstrates COMET’s continuous commitment and investment in delivering real added value to our worldwide customer base.

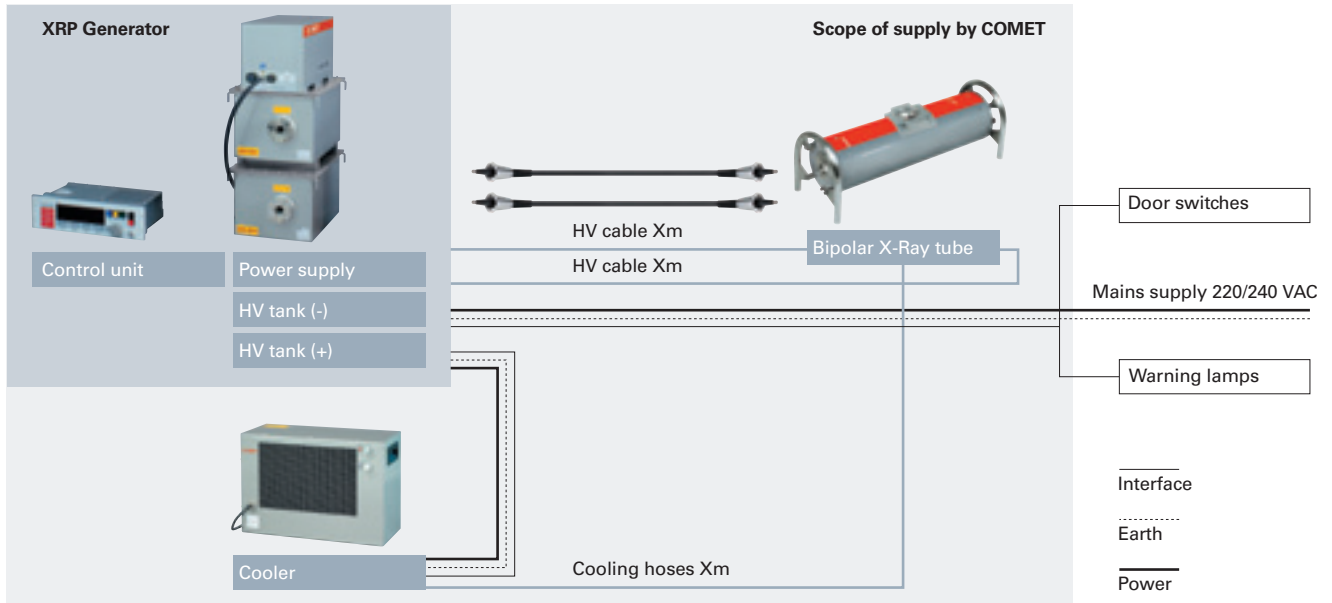
**XRP Generators – Configuration Information (examples)**

Overview of high voltage generators and fitting module components; tube, high voltage cable and cooler.

GENERATOR							
XRS Module	Type	Ordering No.	Voltage range (kV)	Current range (mA)	Max. power (W)	Output connector	Ordering No. flange
XRS-75	XRP-75/1000/1	20032831	5 - 75	0 – 17.5	1000	CA11	–
XRS-100	XRP-100/2250/2	10008861	5 – 100	0 – 22.5	2250	R24	651136
	XRP-100/4500/2	10008862					
XRS-160	XRP-160/2250/2	10008863	7.5 – 160	0 – 22.5	2250	R24	651136
	XRP-160/4500/2	10006465					
XRS-225	XRP-225/2250/2	10008864	10 – 225	0 – 15	2250	R28	10001710
	XRP-225/4500/2	10006466		0 – 30	4500	R28	10001710
XRS-320	XRP-320/4500/2	10006467	15 – 320	0 – 22.5	4500	R24	651136
XRS-450	XRP-450/4500/2	10006468	20 – 450	0 – 15	4500	R28	10001710
XRS-600	XRP-600/4500/2	20039607	20 - 600	0 - 10	4500	R30	20038982

## Bipolar X-Ray Source

Diagram of a Bipolar X-Ray Source XRS and its environment.



### TUBE

Tube type example	Ordering No.	Focal spots (EN 12543)	Terminal type	Ordering No. flange
MXR-75/30	915376.51	5.5	CA11	-
MXR-75HP/20	915377.51	1.0	CA11	-
MXR-101	915343.51	5.5	R10	651142
MXR-160HP/11	915370.51	0.4* / 1.0	R24	10001756
MXR-160/22	915301.51	1.0 / 5.5	R24	10001756
MXR-225HP/11	915371.51	0.4* / 1.0	R24	10001756
MXR-225/22	915326.51	1.0 / 5.5	R24	10001756
MXR-320/26	915358.51	3.0 / 5.5	R24	10001711
MXR-320HP/11	915368.51	0.4** / 1.0	R24	10001711
MXR-451HP/11	915369.51	0.4** / 1.0	R28	10001710
MXC-451HP/11	915705.51	0.4** / 1.0	R28	10001710
MXR-600HP/11	915378.51	0.4** / 1.0	R30	20038982

### CABLE

Type	Ordering No.
L3/75-CA11-CA11-Xm	
L3/75-CA11-CA11-Xm	
U3/100-R10-R24SL-Xm	
N3/160-R24SL-R24SL-Xm	
N3/160-R24SL-R24SL-Xm	
P3/250-R24SL-R28SL-Xm	
P3/250-R24SL-R28SL-Xm	
N3/160-R24SL-R28SL-Xm	
N3/160-R24SL-R28SL-Xm	
P3/250-R28SL-R28SL-Xm	
P3/250-R28SL-R28SL-Xm	
F3/300-R30-R30-Xm	

### COOLER

Type	Ordering No.
XRC-1001-WA	20033773
XRC-1001-WA	20033773
XRC-3001-WA	10008640
XRC-3001-WA	10008640
XRC-3001-WW	10008641
XRC-3001-WA	10008640
XRC-3001-WA	10008640
XRC-4501-OW	10008643
XRC-4501-OA	10008642
XRC-4501-OW	10008643
XRC-4501-OA	10008642
XRC-4501-OA	10008642

\*Threshold: 30%

\*\*Threshold: 25%



**XRP-75/1000/1**

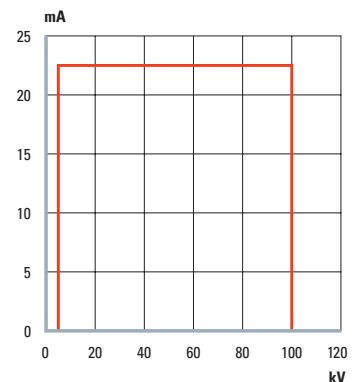
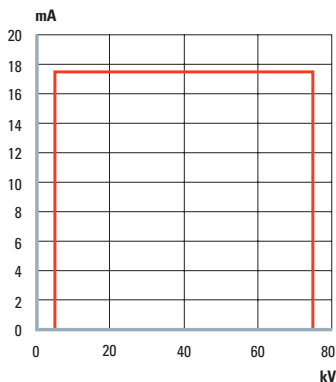
**XRP-100/2250/2**

<b>Ordering No.</b>	20032831
<b>Voltage range</b>	5–75 kV
<b>Adjustment increments (minimum step)</b>	0.1 kV increments
<b>Accuracy</b>	+/- 0.5%
<b>Reproducibility (at constant temperature)</b>	+/- 0.1%
<b>High voltage ripple (with 10m high voltage cable)</b>	+/- 0.1%
<b>Temperature induced drift</b>	< 50 ppm/C° of output value
<b>Current range</b>	0 – 17.5 mA
<b>Adjustment standard range</b>	0.1 mA increments
<b>High resolution range (recommended)</b>	–
<b>Accuracy (at constant temperature)</b>	–
<b>Reproducibility (at constant temperature)</b>	+/- 0.1%
<b>Temperature induced drift</b>	< 50 ppm/C° of output value
<b>Maximum power</b>	1000 W
<b>High voltage connector type</b>	CA11
<b>Control Unit</b>	XRG (PC Required, No integrated Controller)
<b>Dimensions (W x H x D)</b>	–
<b>Weight</b>	–
<b>Power Supply</b>	
<b>Dimensions (W x H x D)</b>	
<b>Weight</b>	
<b>High Voltage Tank (Oil Insulated)</b>	XRP-T75K
<b>Dimensions (W x H x D)</b>	320 mm x 130 mm x 250 mm
<b>Weight</b>	15 kg

<b>Ordering No.</b>	10008861
<b>Voltage range</b>	5 – 100 kV
<b>Adjustment increments (minimum step)</b>	0.1 kV/step
<b>Accuracy</b>	+/- 1% of output value +/- 0.1 kV
<b>Reproducibility (at constant temperature)</b>	+/- 0.01% of maximum kV-value
<b>High voltage ripple (with 10m high voltage cable)</b>	5 V/mA, min. 20 V
<b>Temperature induced drift</b>	80 ppm/C° based on output value
<b>Current range</b>	0 – 22.5 mA
<b>Adjustment standard range</b>	in 0.05 mA steps from 0.5 mA to maximum value
<b>High resolution range (recommended)</b>	in 0.01 mA steps from 0.0 mA to maximum value
<b>Accuracy (at constant temperature)</b>	+/- 0.2% of output value +/- 0.01 mA
<b>Reproducibility (at constant temperature)</b>	+/- 2 µA
<b>Temperature induced drift</b>	50 ppm/C° of output value (on request 30 ppm/C° possible)
<b>Maximum power</b>	2250 W
<b>High voltage connector type</b>	R24
<b>Control Unit</b>	XRG
<b>Dimensions (W x H x D)</b>	483 mm x 133 mm x 300 mm
<b>Weight</b>	12.5 kg
<b>Power Supply</b>	XRP-POWER-2250
<b>Dimensions (W x H x D)</b>	340 mm x 200 mm x 628 mm
<b>Weight</b>	26 kg
<b>High Voltage Tank (Oil Insulated)</b>	XRP-T100K
<b>Dimensions (W x H x D)</b>	375 mm x 335 mm x 625 mm
<b>Weight</b>	80 kg

<b>Ordering No.</b>	10008861
<b>Voltage range</b>	5 – 100 kV
<b>Adjustment increments (minimum step)</b>	0.1 kV/step
<b>Accuracy</b>	+/- 1% of output value +/- 0.1 kV
<b>Reproducibility (at constant temperature)</b>	+/- 0.01% of maximum kV-value
<b>High voltage ripple (with 10m high voltage cable)</b>	5 V/mA, min. 20 V
<b>Temperature induced drift</b>	80 ppm/C° based on output value
<b>Current range</b>	0 – 22.5 mA
<b>Adjustment standard range</b>	in 0.05 mA steps from 0.5 mA to maximum value
<b>High resolution range (recommended)</b>	in 0.01 mA steps from 0.0 mA to maximum value
<b>Accuracy (at constant temperature)</b>	+/- 0.2% of output value +/- 0.01 mA
<b>Reproducibility (at constant temperature)</b>	+/- 2 µA
<b>Temperature induced drift</b>	50 ppm/C° of output value (on request 30 ppm/C° possible)
<b>Maximum power</b>	2250 W
<b>High voltage connector type</b>	R24
<b>Control Unit</b>	XRG
<b>Dimensions (W x H x D)</b>	483 mm x 133 mm x 300 mm
<b>Weight</b>	12.5 kg
<b>Power Supply</b>	XRP-POWER-2250
<b>Dimensions (W x H x D)</b>	340 mm x 200 mm x 628 mm
<b>Weight</b>	26 kg
<b>High Voltage Tank (Oil Insulated)</b>	XRP-T100K
<b>Dimensions (W x H x D)</b>	375 mm x 335 mm x 625 mm
<b>Weight</b>	80 kg

**Generator diagram**





**XRP-100/4500/2**

10008862
5 – 100 kV
0.1 kV/step
+/- 1% of output value +/- 0.1 kV
+/- 0.01% of maximum kV-value
5 V/mA, min. 20 V
80 ppm/°C based on output value

0 – 45 mA
in 0.05 mA steps from 0.5 mA to maximum value
in 0.01 mA steps from 0.0 mA to maximum value
+/- 0.2% of output value +/- 0.01 mA
+/- 2 $\mu$ A
50 ppm/°C of output value (on request 30 ppm/°C possible)

4500 W
R24

**XRG**

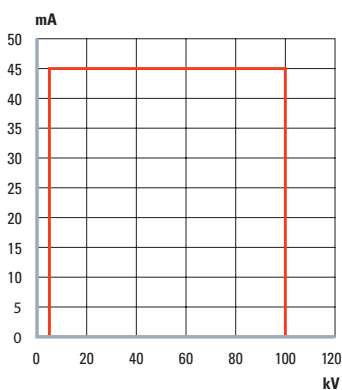
483 mm x 133 mm x 300 mm
12.5 kg

**XRP-POWER-4500**

340 mm x 350 mm x 628 mm
45 kg

**XRP-T100K**

375 mm x 335 mm x 625 mm
80 kg

**XRP-160/2250/2**

10008863
7.5 – 160 kV
0.1 kV/step
+/- 1% of output value +/- 0.1 kV
+/- 0.01% of maximum kV-value
5 V/mA, min. 20 V
80 ppm/°C based on output value

0 – 22.5 mA
in 0.05 mA steps from 0.5 mA to maximum value
in 0.01 mA steps from 0.0 mA to maximum value
+/- 0.2% of output value +/- 0.01 mA
+/- 2 $\mu$ A
50 ppm/°C of output value (on request 30 ppm/°C possible)

2250 W
R24

**XRG**

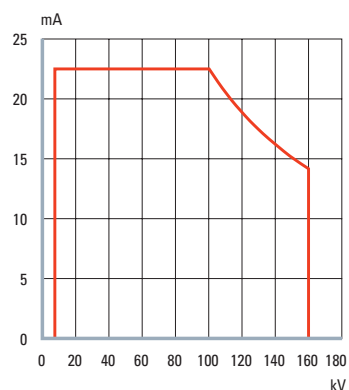
483 mm x 133 mm x 300 mm
12.5 kg

**XRP-POWER-2250**

340 mm x 200 mm x 628 mm
26 kg

**XRP-T160K**

375 mm x 335 mm x 625 mm
80 kg

**XRP-160/4500/2**

10006465
7.5 – 160 kV
0.1 kV/step
+/- 1% of output value +/- 0.1 kV
+/- 0.01% of maximum kV-value
5 V/mA, min. 20 V
80 ppm/°C based on output value

0 – 45 mA
in 0.05 mA steps from 0.5 mA to maximum value
in 0.01 mA steps from 0.0 mA to maximum value
+/- 0.2% of output value +/- 0.01 mA
+/- 2 $\mu$ A
50 ppm/°C of output value (on request 30 ppm/°C possible)

4500 W
R24

**XRG**

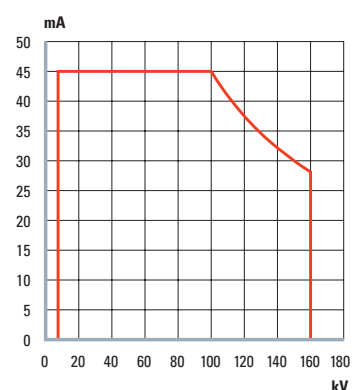
483 mm x 133 mm x 300 mm
12.5 kg

**XRP-POWER-4500**

340 mm x 350 mm x 628 mm
45 kg

**XRP-T160K**

375 mm x 335 mm x 625 mm
80 kg





**XRP-225/2250/2**

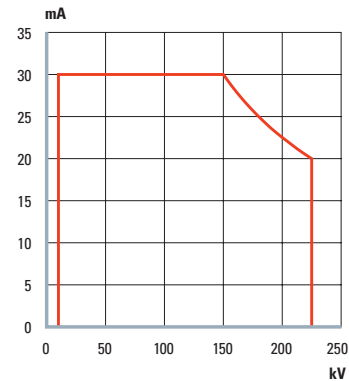
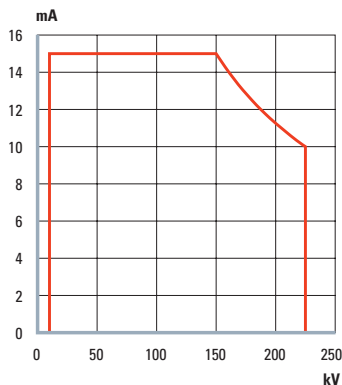
**XRP-225/4500/2**

<b>Ordering No.</b>	10008864
<b>Voltage range</b>	10 – 225 kV
<b>Adjustment increments (minimum step)</b>	0.1 kV / step
<b>Accuracy</b>	+/- 1% of output value +/- 0.1 kV
<b>Reproducibility (at constant temperature)</b>	+/- 0.01% of maximum kV-value
<b>High voltage ripple (with 10m high voltage cable)</b>	5 V/mA, min. 20 V
<b>Temperature induced drift</b>	80 ppm/°C based on output value
<b>Current range</b>	0 – 15 mA
<b>Adjustment standard range</b>	in 0.05 mA steps from 0.5 mA to maximum value
<b>High resolution range (recommended)</b>	in 0.01 mA steps from 0.0 mA to maximum value
<b>Accuracy (at constant temperature)</b>	+/- 0.2% of output value +/- 0.01 mA
<b>Reproducibility (at constant temperature)</b>	+/- 2 µA
<b>Temperature induced drift</b>	50 ppm/°C of output value (on request 30 ppm/°C possible)
<b>Maximum power</b>	2250 W
<b>High voltage connector type</b>	R28
<b>Control Unit</b>	XRG
<b>Dimensions (W x H x D)</b>	483 mm x 133 mm x 300 mm
<b>Weight</b>	12.5 kg
<b>Power Supply</b>	XRP-POWER-2250
<b>Dimensions (W x H x D)</b>	340 mm x 200 mm x 628 mm
<b>Weight</b>	26 kg
<b>High Voltage Tank (Oil Insulated)</b>	XRP-T225K
<b>Dimensions (W x H x D)</b>	514 mm x 364 mm x 624 mm
<b>Weight</b>	125 kg

<b>Ordering No.</b>	10006466
<b>Voltage range</b>	10 – 225 kV
<b>Adjustment increments (minimum step)</b>	0.1 kV/step
<b>Accuracy</b>	+/- 1% of output value +/- 0.1 kV
<b>Reproducibility (at constant temperature)</b>	+/- 0.01% of maximum kV-value
<b>High voltage ripple (with 10m high voltage cable)</b>	5 V/mA, min. 20 V
<b>Temperature induced drift</b>	80 ppm/°C based on output value
<b>Current range</b>	0 – 30 mA
<b>Adjustment standard range</b>	in 0.05 mA steps from 0.5 mA to maximum value
<b>High resolution range (recommended)</b>	in 0.01 mA steps from 0.0 mA to maximum value
<b>Accuracy (at constant temperature)</b>	+/- 0.2% of output value +/- 0.01 mA
<b>Reproducibility (at constant temperature)</b>	+/- 2 µA
<b>Temperature induced drift</b>	50 ppm/°C of output value (on request 30 ppm/°C possible)
<b>Maximum power</b>	4500 W
<b>High voltage connector type</b>	R28
<b>Control Unit</b>	XRG
<b>Dimensions (W x H x D)</b>	483 mm x 133 mm x 300 mm
<b>Weight</b>	12.5 kg
<b>Power Supply</b>	XRP-POWER-4500
<b>Dimensions (W x H x D)</b>	340 mm x 350 mm x 628 mm
<b>Weight</b>	45 kg
<b>High Voltage Tank (Oil Insulated)</b>	XRP-T225K
<b>Dimensions (W x H x D)</b>	514 mm x 364 mm x 624 mm
<b>Weight</b>	125 kg

<b>Ordering No.</b>	10006466
<b>Voltage range</b>	10 – 225 kV
<b>Adjustment increments (minimum step)</b>	0.1 kV/step
<b>Accuracy</b>	+/- 1% of output value +/- 0.1 kV
<b>Reproducibility (at constant temperature)</b>	+/- 0.01% of maximum kV-value
<b>High voltage ripple (with 10m high voltage cable)</b>	5 V/mA, min. 20 V
<b>Temperature induced drift</b>	80 ppm/°C based on output value
<b>Current range</b>	0 – 30 mA
<b>Adjustment standard range</b>	in 0.05 mA steps from 0.5 mA to maximum value
<b>High resolution range (recommended)</b>	in 0.01 mA steps from 0.0 mA to maximum value
<b>Accuracy (at constant temperature)</b>	+/- 0.2% of output value +/- 0.01 mA
<b>Reproducibility (at constant temperature)</b>	+/- 2 µA
<b>Temperature induced drift</b>	50 ppm/°C of output value (on request 30 ppm/°C possible)
<b>Maximum power</b>	4500 W
<b>High voltage connector type</b>	R28
<b>Control Unit</b>	XRG
<b>Dimensions (W x H x D)</b>	483 mm x 133 mm x 300 mm
<b>Weight</b>	12.5 kg
<b>Power Supply</b>	XRP-POWER-4500
<b>Dimensions (W x H x D)</b>	340 mm x 350 mm x 628 mm
<b>Weight</b>	45 kg
<b>High Voltage Tank (Oil Insulated)</b>	XRP-T225K
<b>Dimensions (W x H x D)</b>	514 mm x 364 mm x 624 mm
<b>Weight</b>	125 kg

**Generator diagram**





**XRP-320/4500/2**

10006467
15 – 320 kV
0.2 kV/step
+/- 1% of output value +/- 0.2 kV
+/- 0.01% of maximum kV-value
10 V/mA, min. 40 V
80 ppm/°C based on output value
0 – 22.5 mA
in 0.05 mA steps from 0.5 mA to maximum value
in 0.01 mA steps from 0.0 mA to maximum value
+/- 0.2% of output value +/- 0.01 mA
+/- 2 µA
50 ppm/°C of output value
4500 W
R24
<b>XRG</b>
483 mm x 133 mm x 300 mm
12.5 kg
<b>XRP-POWER-4500</b>
340 mm x 350 mm x 628 mm
45 kg
<b>XRP-T160K / XRP-T320A</b>
375 mm x 335 mm x 625 mm
80 kg



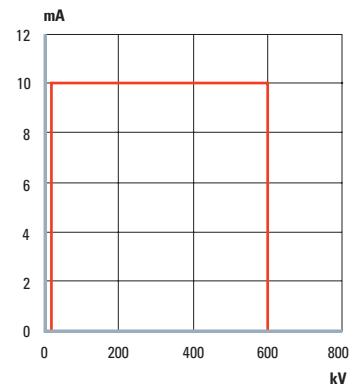
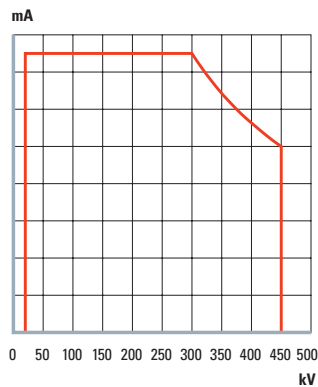
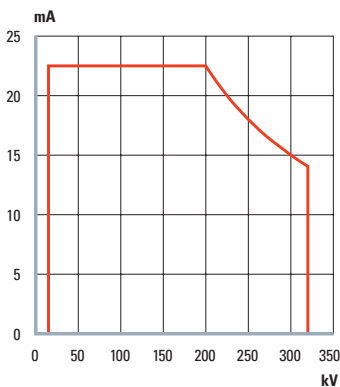
**XRP-450/4500/2**

10006468
20 – 450 kV
0.2 kV/step
+/- 1% of output value +/- 0.2 kV
+/- 0.01% of maximum kV-value
10 V/mA, min. 40 V
80 ppm/°C based on output value
0 – 15 mA
in 0.05 mA steps from 0.5 mA to maximum value
in 0.01 mA steps from 0.0 mA to maximum value
+/- 0.2% of output value +/- 0.01 mA
+/- 2 µA
50 ppm/°C of output value
4500 W
R28
<b>XRG</b>
483 mm x 133 mm x 300 mm
12.5 kg
<b>XRP-POWER-4500</b>
340 mm x 350 mm x 628 mm
45 kg
<b>XRP-T225K / XRP-T450A</b>
514 mm x 364 mm x 624mm
125 kg



**XRP-600/4500/2**

20039607
20 – 600
0.2 kV increments
+/- 1% of output value +/- 0.2 kV
+/- 0.01% of maximum kV-value
10 V/mA, min. 40 V
80 ppm/°C
0 – 10 mA
in 0.05 mA steps from 0.5 mA to maximum value
in 0.01 mA steps from 0.0 mA to maximum value
+/- 0.2% of output value +/- 0.01 mA
+/- 2 µA
50 ppm/°C of output value
4500 W
R30
<b>XRG-600</b>
483 mm x 133 mm x 300 mm
12.5 kg
<b>XRP-POWER-600</b>
340 mm x 350 mm x 628 mm
45 kg
<b>XRP-T300K / XRP-T600A</b>
950 mm x 417 mm x 557 mm
180 kg





12/2010

**COMET**

Technology with Passion

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