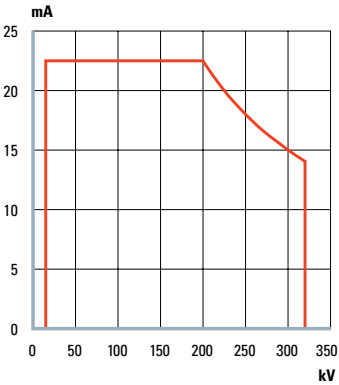




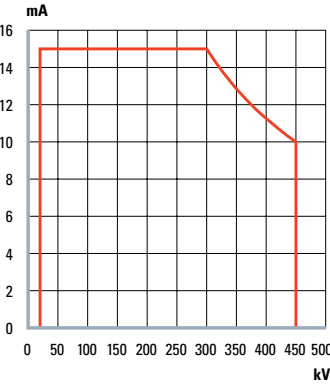
XRP-320/4500/2

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
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 / XRP-T320A
375 mm x 335 mm x 625 mm
80 kg



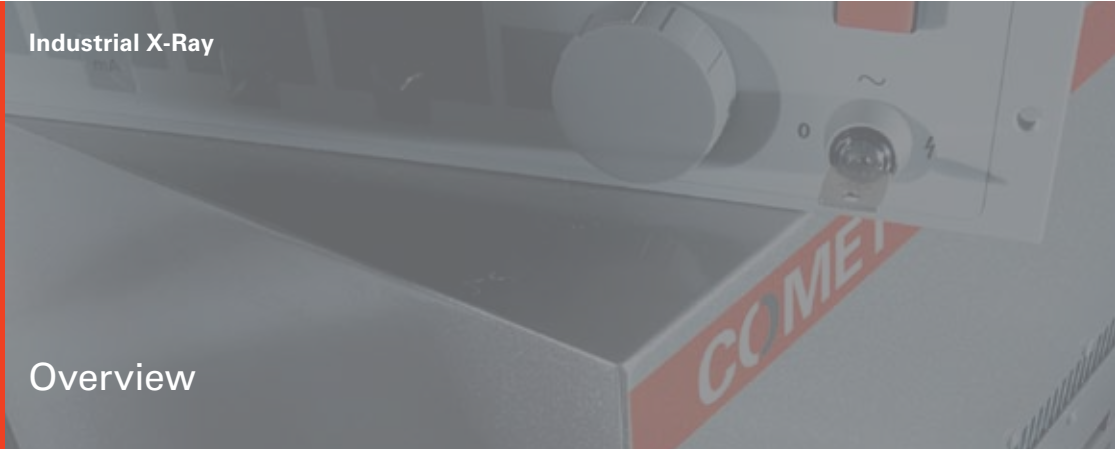
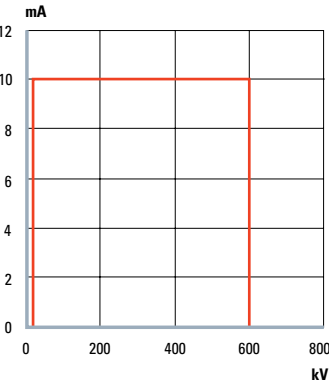
XRP-450/4500/2

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
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-T225K / XRP-T450A
514 mm x 364 mm x 624mm
125 kg



XRP-600/4500/2

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
XRG-600
483 mm x 133 mm x 300 mm
12.5 kg
XRP-POWER-600
340 mm x 350 mm x 628 mm
45 kg
XRP-T300K / XRP-T600A
950 mm x 417 mm x 557 mm
180 kg



Industrial X-Ray

Overview



09/2012 – V1, specification subject to change without notice

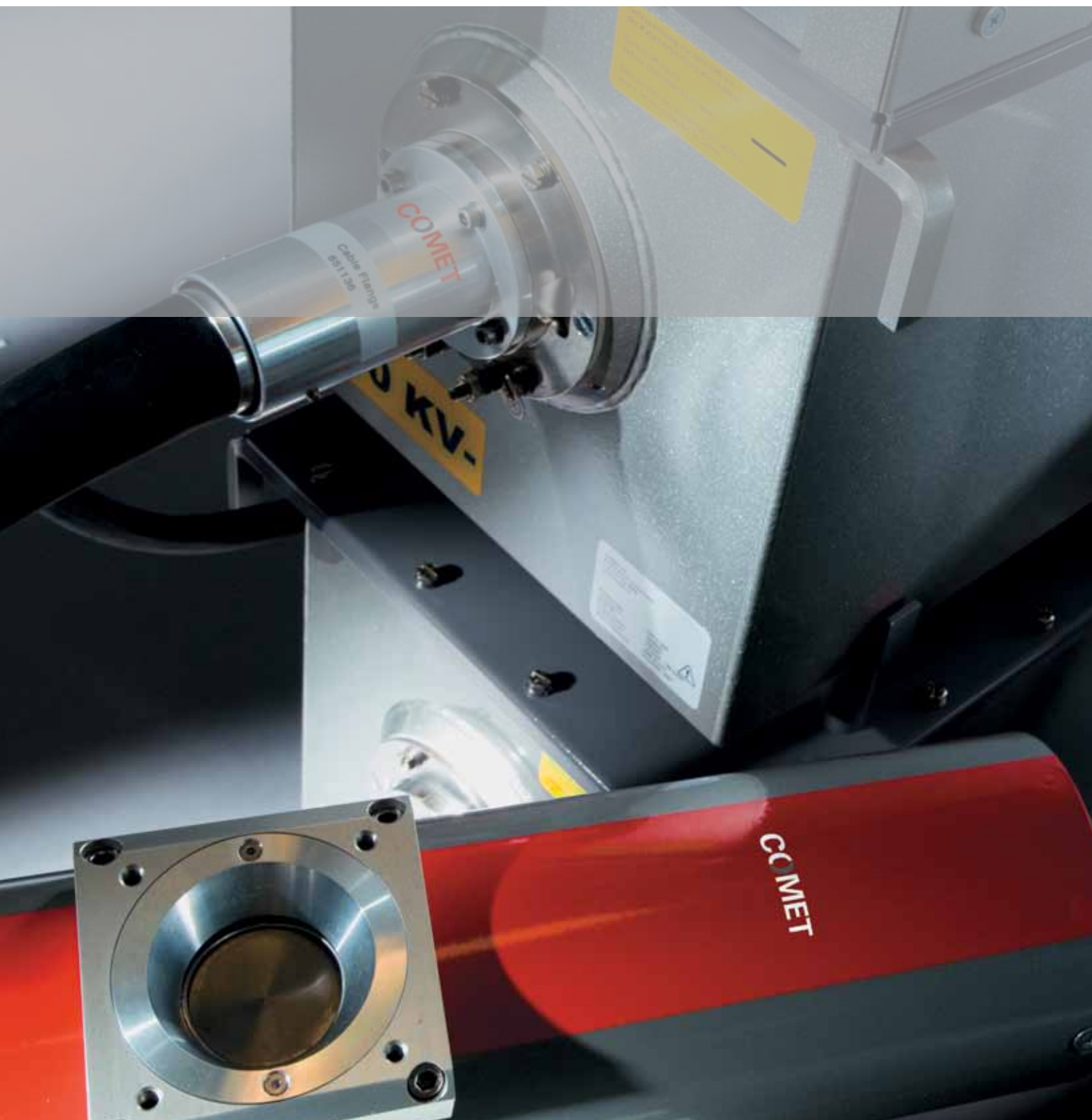
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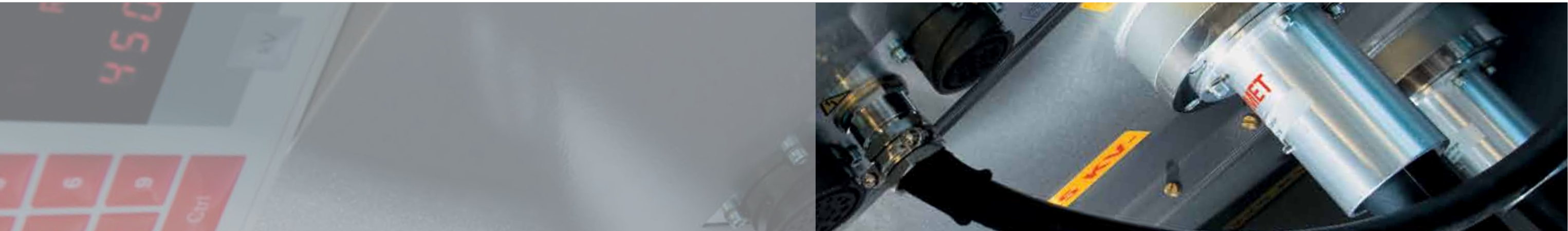
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COMET
Technology with Passion

**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 up to 6 kW in output for more power demanding requirements. From the smallest footprint for use in portable units to 600 kV fixed gantry systems that are suitable for cargo screening, we offer a solution.



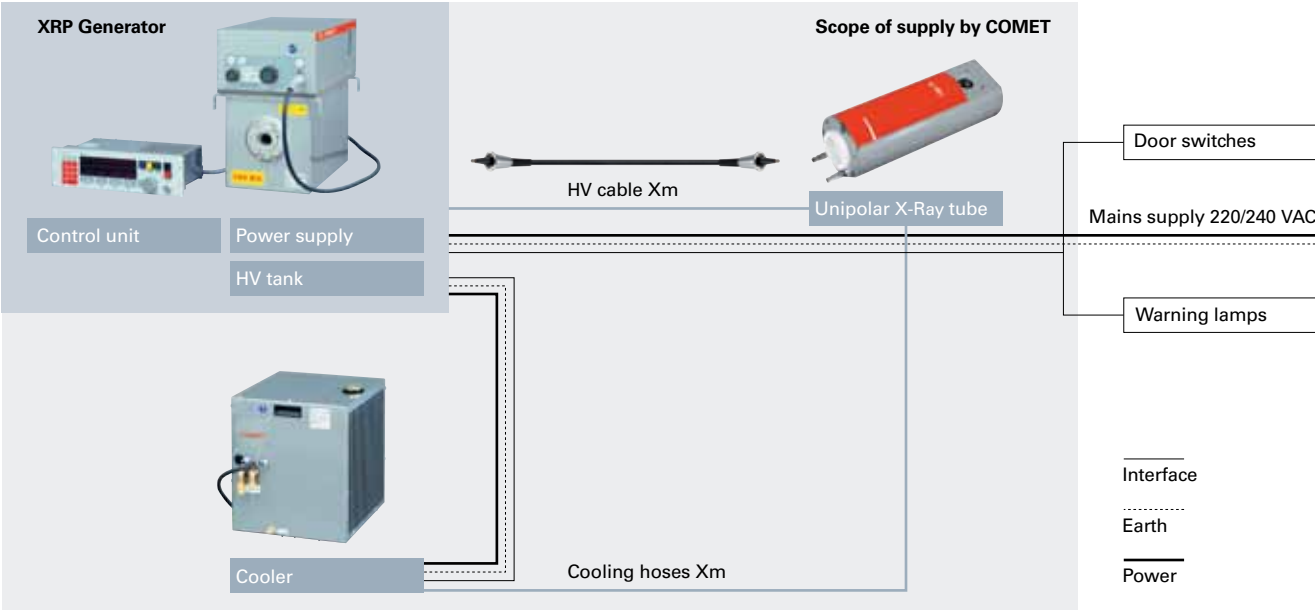
“One Stop Shop” for Industrial X-Ray: COMET’s XRS

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.

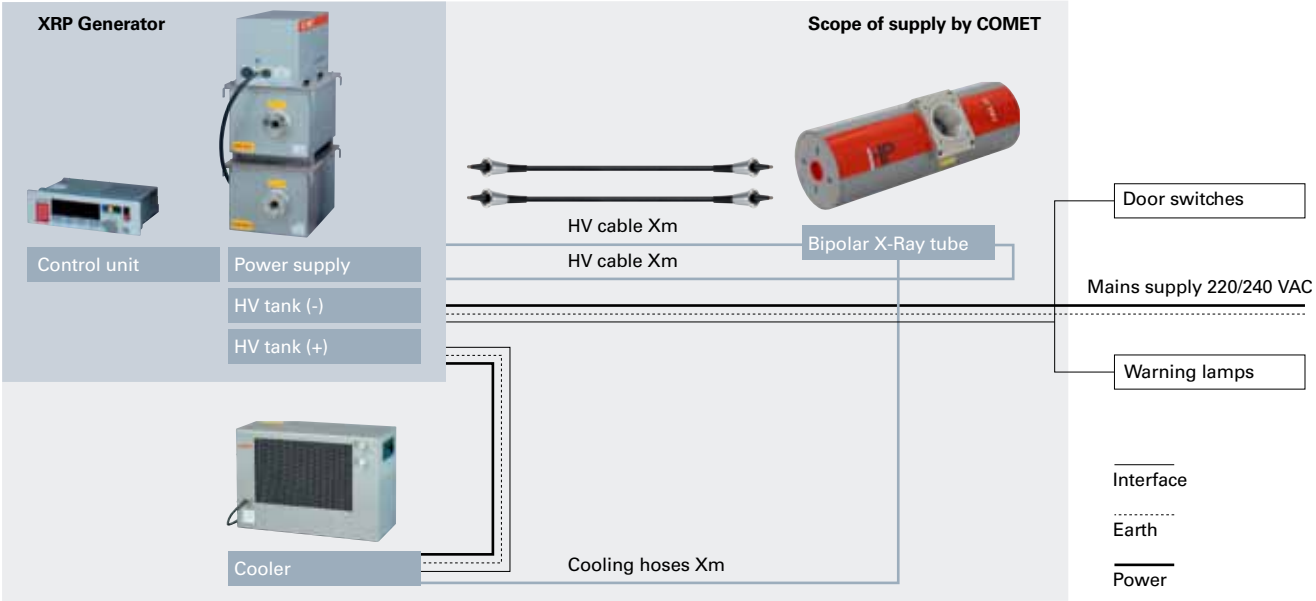
Unipolar X-Ray Source

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



Bipolar X-Ray Source

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





XRS Modules

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 interface 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 (fail-safe)
- External safety circuit for automated systems (24 V)
- High voltage primary circuit interruption for CDRH switch (US-standard)
- External 230V or 24V warning lamp monitoring
- 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
- Automatic arc detection

XRS-160

Components of XRS-160

TUBE	Ordering No.
MXR-160/21	915302.51
MXR-160/22	915301.51
MXR-160HP/20	915357.51
MXR-160HP/FB	915359.51
MXR-160HP/11	915370.51
MXRP-160C	915311.51

GENERATOR	Ordering No.
XRP-160/2250/2	N/A
XRP-160/4500/2	N/A

HV-CABLE (standard length)	Ordering No.
N3/160-R24SL-R24SL-5m	20031101
N3/160-R24SL-R24SL-10m	20031103
N3/160-R24SL-R24SL-15m	20031104
N3/160-R24SL-R24SL-20m	20031105

COOLER/CHILLER	Ordering No.
XRC-3001-WA (Cooler water/air)	10008640
XRC-3001-WW (Cooler water/water)	10008641
XRCA-3001-WA (Chiller water/air)	20033337

XRS-160 configurations

Examples of XRS-160 configurations

TUBE				CABLE	GENERATOR	COOLER
Type	Continuous rating	Focal spot acc. EN 12543	Radiation coverage	Type	Type	Type
MXR-160/21	640W/1600W	d=1.0/3.0mm	40°	N3/160-R24SL-R24SL-Xm	XRP-160/2250/2	XRC-3001-WA
MXR-160/22	640W/3000W	d=1.0/5.5mm	40°	N3/160-R24SL-R24SL-Xm	XRP-160/4500/2	XRC-3001-WA
MXR-160HP/20	1000W/1000W	d=1.0/1.0mm	40°	N3/160-R24SL-R24SL-Xm	XRP-160/2250/2	XRC-3001-WA
MXR-160HP/FB	1000W	d=1.0mm	60°x25°	N3/160-R24SL-R24SL-Xm	XRP-160/2250/2	XRC-3001-WA
MXR-160HP/11	800W/1800W	d=0.4*/1.0mm	40°x30°	N3/160-R24SL-R24SL-Xm	XRP-160/2250/2	XRC-3001-WA
MXRP-160C	1000W	d=0.4/4.0mm	360°x40°	N3/160-R24SL-R24SL-Xm	XRP-160/2250/2	XRC-3001-WA

*Threshold: 30%



XRS-225

Components of XRS-225

TUBE	Ordering No.	HV-CABLE (standard length)	Ordering No.
MXR-225/21	915325.51	P3/250-R24SL-R28SL-5m	20031099
MXR-225/22	915326.51	P3/250-R24SL-R28SL-10m	10010844
MXR-225/26	915386.51	P3/250-R24SL-R28SL-15m	10034152
MXR-225HP/11	915371.51		
MXR-225HP/11 FB	915362.51		

GENERATOR	Ordering No.	COOLER/CHILLER	Ordering No.
XRP-225/2250/2	N/A	XRC-3001-WA (Cooler water/air)	10008640
XRP-225/4500/2	N/A	XRC-3001-WW (Cooler water/water)	10008641
		XRCA-3001-WA (Chiller water/air)	20033337

XRS-225 configurations

Examples of XRS-225 configurations

TUBE				CABLE	GENERATOR	COOLER
Type	Continuous rating	Focal spot acc. EN 12543	Radiation coverage	Type	Type	Type
MXR-225/21	640W/1600W	d=1.0/3.0mm	40°	P3/250-R24SL-R28SL-Xm	XRP-225/2250/2	XRC-3001-WA
MXR-225/22	640W/3000W	d=1.0/5.5mm	40°	P3/250-R24SL-R28SL-Xm	XRP-225/4500/2	XRC-3001-WA
MXR-225/26	600W/4500W	d=1.0/5.0mm	40°	P3/250-R24SL-R28SL-Xm	XRP-225/4500/2	XRC-3001-WA
MXR-225HP/11	800W/1800W	d=0.4*/1.0mm	40°x30°	P3/250-R24SL-R28SL-Xm	XRP-225/2250/2	XRC-3001-WA
MXR-225HP/11 FB	800W/1800W	d=0.4*/1.0mm	90°x25°	P3/250-R24SL-R28SL-Xm	XRP-225/2250/2	XRC-3001-WA

*Threshold: 30%

XRS-320

Components of XRS-320

TUBE	Ordering No.	HV-CABLE (standard length)	Ordering No.
MXR-320/23	915334.51	N3/160-R24SL-R24SL-5m	20031101
MXR-320/26	915358.51	N3/160-R24SL-R24SL-10m	20031103
MXR-320/23 AX	915334.58	N3/160-R24SL-R24SL-15m	20031104
MXR-320/26 AX	915358.58		
MXR-320HP/11	915368.51		
MXR-320HP/11 FB	915388.51		

GENERATOR	Ordering No.	COOLER/CHILLER	Ordering No.
XRP-320/4500/2	N/A	XRC-4501-OA (Cooler oil/air)	10008642
		XRC-4501-OW (Cooler oil/water)	10008643
		XRCA-5001-OA (Chiller oil/air)	20033338

XRS-320 configurations

Examples of XRS-320 configurations

TUBE				CABLE	GENERATOR	COOLER
Type	Continuous rating	Focal spot acc. EN 12543	Radiation coverage	Type	Type	Type
MXR-320/23	640W/1600W	d=1.9/3.6mm	40°	N3/160-R24SL-R24SL-Xm	XRP-320/4500/2	XRC-4501-OA
MXR-320/26	1500W/4200W	d=3.0/5.5mm	40°	N3/160-R24SL-R24SL-Xm	XRP-320/4500/2	XRC-4501-OA
MXR-320/23 AX	640W/1600W	d=1.9/3.6mm	40°	N3/160-R24SL-R24SL-Xm	XRP-320/4500/2	XRC-4501-OA
MXR-320/26 AX	1500W/4200W	d=3.0/5.5mm	40°	N3/160-R24SL-R24SL-Xm	XRP-320/4500/2	XRC-4501-OA
MXR-320HP/11	800W/1800W	d=0.4*/1.0mm	40°x30°	N3/160-R24SL-R24SL-Xm	XRP-320/4500/2	XRC-4501-OA
MXR-320HP/11 FB	800W/1800W	d=0.4*/1.0mm	80°x11°	N3/160-R24SL-R24SL-Xm	XRP-320/4500/2	XRC-4501-OA

*Threshold:25%



XRS-450

Components of XRS-450

TUBE	Ordering No.	HV-CABLE (standard length)	Ordering No.
MXR-421/26	915366.55	P3/250-R28SL-R28SL-5m	20031100
MXR-451/26	915366.51	P3/250-R28SL-R28SL-10m	20047443
MXR-451HP/11	915369.51	P3/250-R28SL-R28SL-15m	20047444
MXC-451HP/11	915705.51		
MXC-451	915704.51		
MXR-452/Y	915344.55		
GENERATOR		COOLER/CHILLER	
Ordering No.		Ordering No.	
XRP-450/4500/2		XRC-4501-OA (Cooler oil/air)	
		10008642	
		XRC-4501-OW (Cooler oil/water)	
		10008643	
		XRCA-5001-OA (Chiller oil/air)	
		20033338	

XRS-450 configurations

Examples of XRS-450 configurations

TUBE				CABLE	GENERATOR	COOLER
Type	Continuous rating	Focal spot acc. EN 12543	Radiation coverage	Type	Type	Type
MXR-421/26	900W/4500W	d=2.5/5.5mm	40°	P3/250-R28SL-R28SL-Xm	XRP-450/4500/2	XRC-4501-OA
MXR-451/26	900W/4500W	d=2.5/5.5mm	40°	P3/250-R28SL-R28SL-Xm	XRP-450/4500/2	XRC-4501-OA
MXR-451HP/11	700W/1500W	d=0.4*/1.0mm	40°x30°	P3/250-R28SL-R28SL-Xm	XRP-450/4500/2	XRC-4501-OA
MXC-451HP/11	700W/1500W	d=0.4*/1.0mm	40°x30°	P3/250-R28SL-R28SL-Xm	XRP-450/4500/2	XRC-4501-OA
MXC-451	800W	d=7.5mm	40°x40°	P3/250-R28SL-R28SL-Xm	XRP-450/4500/2	XRC-4501-OA
MXR-452/Y	900W/4500W	d=2.5/5.5mm	90°x20°	P3/250-R28SL-R28SL-Xm	XRP-450/4500/2	XRC-4501-OA

*Threshold: 25%

XRS-600

Components of XRS-600

TUBE	Ordering No.	HV-CABLE (standard length)	Ordering No.
MXR-600HP/11	915378.51	F3/300-R30-R30-5m	20033844
GENERATOR		COOLER/CHILLER	
Ordering No.		Ordering No.	
XRP-600/4500/2		XRC-4501-OA (Cooler oil/air)	
		10008642	
		XRC-4501-OW (Cooler oil/water)	
		10008643	
		XRCA-5001-OA (Chiller oil/air)	
		20033338	

XRS-600 configurations

Examples of XRS-600 configurations

TUBE				CABLE	GENERATOR	COOLER
Type	Continuous rating	Focal spot acc. EN 12543	Radiation coverage	Type	Type	Type
MXR-600HP/11	700W/1500W	d=0.4*/1.0mm	40°x30°	F3/300-R30-R30-5m	XRP-600/4500/2	XRC-4501-OA

*Threshold: 25%



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

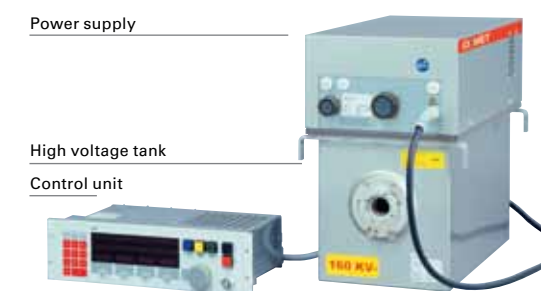
High voltage tank(s)

Oil-insulated high voltage section

Arc handling

- Automatic arc detection
- Built-in arc characterization logic (weak / strong arcs)
- Distinct, automatic reaction:
 - a) Weak arc: immediate ramp up after arc quenching
 - b) Strong arc: system shut-off — manual restart required
- XRS-600: pre-programmable down-time after weak arcs for system recovery

XRP Generator Components – Unipolar



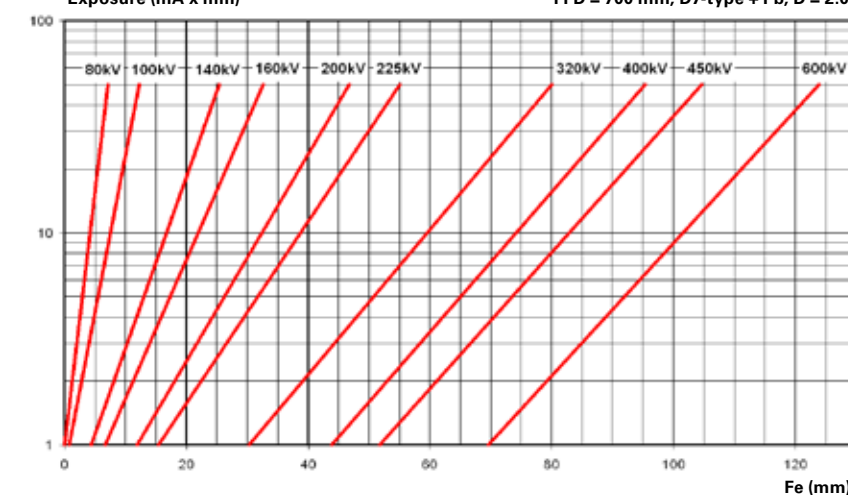
XRP Generator Components – Bipolar



Exposure chart

Exposure (mA x min)

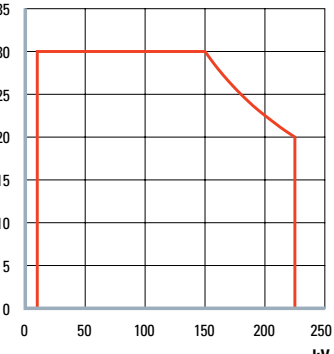
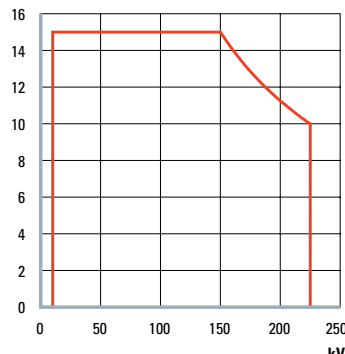
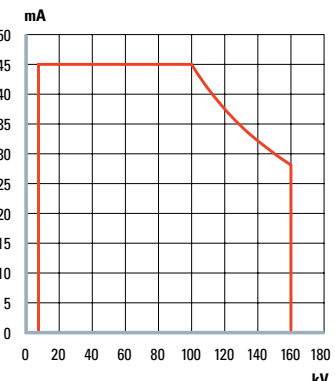
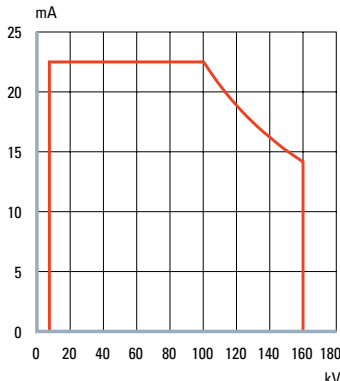
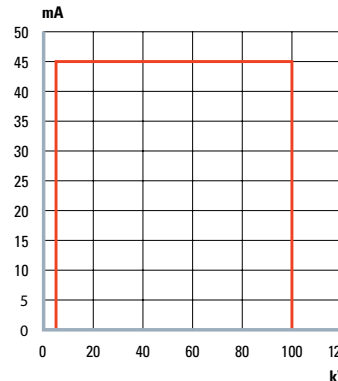
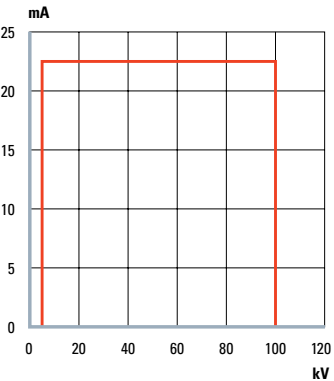
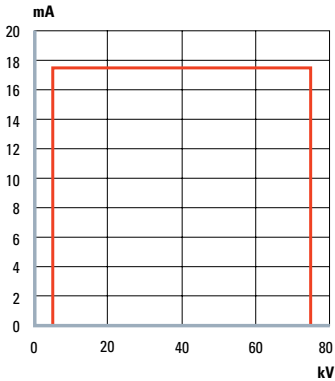
FFD = 700 mm; D7-type + Pb; D = 2.0





	XRP-75/1000/1	XRP-100/2250/2
	5–75 kV	5 – 100 kV
Voltage range	0.1 kV increments	0.1 kV/step
Adjustment increments (minimum step)	+/- 0.5%	+/- 1% of output value +/- 0.1 kV
Accuracy	+/- 0.1%	+/- 0.01% of maximum kV-value
Reproducibility (at constant temperature)	+/- 0.1%	5 V/mA, min. 20 V
High voltage ripple (with 10 m high voltage cable)	< 50 ppm/°C of output value	80 ppm/°C based on output value
Temperature induced drift		
Current range	0 – 17.5 mA	0 – 22.5 mA
Adjustment standard range	0.1 mA increments	in 0.05 mA steps from 0.5 mA to maximum value
High resolution range (recommended)	–	in 0.01 mA steps from 0.0 mA to maximum value
Accuracy (at constant temperature)	–	+/- 0.2% of output value +/- 0.01 mA
Reproducibility (at constant temperature)	+/- 0.1%	+/- 2 µA
Temperature induced drift	< 50 ppm/°C of output value	50 ppm/°C of output value (on request 30 ppm/°C possible)
Maximum power	1000 W	2250 W
High voltage connector type	CA11	R24
Control Unit	XRG (PC Required, No integrated Controller)	XRG
Dimensions (W x H x D)	–	483 mm x 133 mm x 300 mm
Weight	–	12.5 kg
Power Supply		XRP-POWER-2250
Dimensions (W x H x D)		340 mm x 200 mm x 628 mm
Weight		26 kg
High Voltage Tank (Oil Insulated)	XRP-T75K	XRP-T100K
Dimensions (W x H x D)	320 mm x 130 mm x 250 mm	375 mm x 335 mm x 625 mm
Weight	15 kg	80 kg

Generator diagram



	XRP-100/4500/2	XRP-160/2250/2	XRP-160/4500/2
	5 – 100 kV	7.5 – 160 kV	7.5 – 160 kV
Voltage range	0.1 kV/step	0.1 kV/step	0.1 kV/step
Adjustment increments (minimum step)	+/- 1% of output value +/- 0.1 kV	+/- 1% of output value +/- 0.1 kV	+/- 1% of output value +/- 0.1 kV
Accuracy	+/- 0.01% of maximum kV-value	+/- 0.01% of maximum kV-value	+/- 0.01% of maximum kV-value
Reproducibility (at constant temperature)	5 V/mA, min. 20 V	5 V/mA, min. 20 V	5 V/mA, min. 20 V
High voltage ripple (with 10 m high voltage cable)	80 ppm/°C based on output value	80 ppm/°C based on output value	80 ppm/°C based on output value
Temperature induced drift			
Current range	0 – 45 mA	0 – 22.5 mA	0 – 45 mA
Adjustment standard range	in 0.05 mA steps from 0.5 mA to maximum value	in 0.05 mA steps from 0.5 mA to maximum value	in 0.05 mA steps from 0.5 mA to maximum value
High resolution range (recommended)	in 0.01 mA steps from 0.0 mA to maximum value	in 0.01 mA steps from 0.0 mA to maximum value	in 0.01 mA steps from 0.0 mA to maximum value
Accuracy (at constant temperature)	+/- 0.2% of output value +/- 0.01 mA	+/- 0.2% of output value +/- 0.01 mA	+/- 0.2% of output value +/- 0.01 mA
Reproducibility (at constant temperature)	+/- 2 µA	+/- 2 µA	+/- 2 µA
Temperature induced drift	50 ppm/°C of output value (on request 30 ppm/°C possible)	50 ppm/°C of output value (on request 30 ppm/°C possible)	50 ppm/°C of output value (on request 30 ppm/°C possible)
Maximum power	4500 W	2250 W	4500 W
High voltage connector type	R24	R24	R24
Control Unit	XRG	XRG	XRG
Dimensions (W x H x D)	483 mm x 133 mm x 300 mm	483 mm x 133 mm x 300 mm	483 mm x 133 mm x 300 mm
Weight	12.5 kg	12.5 kg	12.5 kg
Power Supply	XRP-POWER-4500	XRP-POWER-2250	XRP-POWER-4500
Dimensions (W x H x D)	340 mm x 350 mm x 628 mm	340 mm x 200 mm x 628 mm	340 mm x 350 mm x 628 mm
Weight	45 kg	26 kg	45 kg
High Voltage Tank (Oil Insulated)	XRP-T100K	XRP-T160K	XRP-T160K
Dimensions (W x H x D)	375 mm x 335 mm x 625 mm	375 mm x 335 mm x 625 mm	375 mm x 335 mm x 625 mm
Weight	80 kg	80 kg	80 kg



	XRP-225/2250/2	XRP-225/4500/2
	10 – 225 kV	10 – 225 kV
Voltage range	0.1 kV/step	0.1 kV/step
Adjustment increments (minimum step)	+/- 1% of output value +/- 0.1 kV	+/- 1% of output value +/- 0.1 kV
Accuracy	+/- 0.01% of maximum kV-value	+/- 0.01% of maximum kV-value
Reproducibility (at constant temperature)	5 V/mA, min. 20 V	5 V/mA, min. 20 V
High voltage ripple (with 10 m high voltage cable)	80 ppm/°C based on output value	80 ppm/°C based on output value
Temperature induced drift		
Current range	0 – 15 mA	0 – 30 mA
Adjustment standard range	in 0.05 mA steps from 0.5 mA to maximum value	in 0.05 mA steps from 0.5 mA to maximum value
High resolution range (recommended)	in 0.01 mA steps from 0.0 mA to maximum value	in 0.01 mA steps from 0.0 mA to maximum value
Accuracy (at constant temperature)	+/- 0.2% of output value +/- 0.01 mA	+/- 0.2% of output value +/- 0.01 mA
Reproducibility (at constant temperature)	+/- 2 µA	+/- 2 µA
Temperature induced drift	50 ppm/°C of output value (on request 30 ppm/°C possible)	50 ppm/°C of output value (on request 30 ppm/°C possible)
Maximum power	2250 W	4500 W
High voltage connector type	R28	R28
Control Unit	XRG	XRG
Dimensions (W x H x D)	483 mm x 133 mm x 300 mm	483 mm x 133 mm x 300 mm
Weight	12.5 kg	12.5 kg
Power Supply	XRP-POWER-2250	XRP-POWER-4500
Dimensions (W x H x D)	340 mm x 200 mm x 628 mm	340 mm x 350 mm x 628 mm
Weight	26 kg	45 kg
High Voltage Tank (Oil Insulated)	XRP-T225K	XRP-T225K
Dimensions (W x H x D)	514 mm x 364 mm x 624 mm	514 mm x 364 mm x 624 mm
Weight	125 kg	125 kg