Industrial X-Ray

Bipolar Metal Ceramic Tubes

Overview

Bipolar Metal Ceramic Tubes

Overview and Configuration Information

About Bipolar Metal Ceramic X-Ray Tubes

The COMET Bipolar Metal Ceramic tubes are designed for use in demanding industrial applications like Security and Non-Destructive Testing.
The tube assembly consists of a Bipolar X-Ray tube and tube housing with two integrated high voltage receptacle sockets. The X-Ray proof housing has an integrated cooling system and is equipped with oil hose connections.
The main advantages are high power, small dimensions, low weight and rugged mechanical design.

"One Stop Shop" for Industrial X-Ray Sources: COMET's XRS Modules

COMET is pleased to offer all of the necessary components for a customized X-Ray Source: The new XRS modules each contain a COMET X-Ray tube, high voltage generator with cables and coolers designed for easy integration that will optimize system performance.
All XRS modules are factory prepared and tested for hassle free installation and operation.
This novel solution demonstrates COMET's continuous commitment and investment in delivering real added value to our worldwide customer base.

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 sources with small focal spot resolution (< 1 µm) up to 6 kW in output for more power demanding requirements. From the smallest footprint for use in portable units to 450 kV fixed gantry systems that are suitable for cargo screening.

Bipolar Metal Ceramic Tubes – Configuration Information

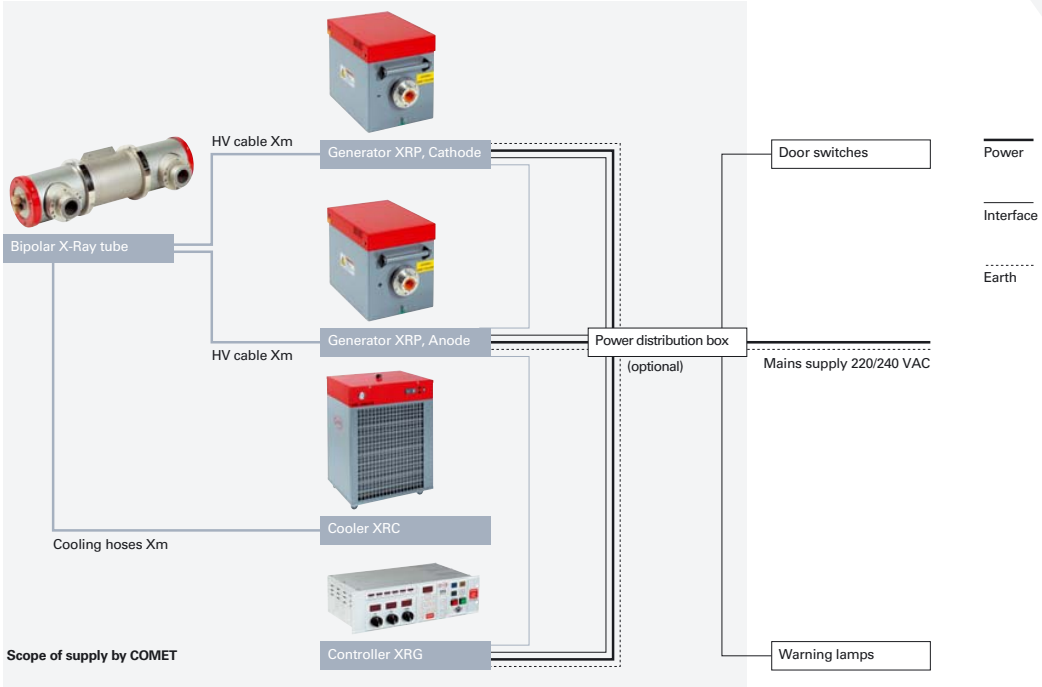
Overview of tubes and fitting module components; high voltage generator, high voltage cable and cooler.

Tube

Type	Ordering No.	Ordering No. with 90° housing	Nominal tube voltage	Continuous rating	Focal spot acc. EN 12543	Terminal type
MXR-320/23	915334.51	915334.56	320 kV	640 W / 1600 W	d = 1.9 mm / d = 3.6 mm	R24
MXR-320/26	915358.51	915358.56	320 kV	1500 W / 4200 W	d = 3.0 mm / d = 5.5 mm	R24
MXR-320HP/21	915362.51	915362.56	320 kV	900 W / 2000 W	d = 0.6 mm / d = 2.0 mm	R24
MXR-321	–	915341.51	320 kV	4000 W	d = 8 mm	R24
MXR-322	–	915337.61	320 kV	3200 W	d = 4.5 mm	R24
MXR-350/23	915334.61	915334.66	350 kV	640 W / 1600 W	d = 1.9 mm / d = 3.6 mm	R24
MXR-350/26	915358.61	915358.66	350 kV	1500 W / 4200 W	d = 3.0 mm / d = 5.5 mm	R24
MXR-420/25	915331.51	–	420 kV	1500 W / 4200 W	d = 3.0 mm / d = 7.0 mm	R24
MXR-451/26	915344.53	–	450 kV	900 W / 4500 W	d = 2.5 mm / d = 5.5 mm	R28
MXR-451HP/21	915364.53	–	450 kV	800 W / 1500 W	d = 0.6 mm / d = 1.0 mm	R28
MXR-452	915344.51	–	450 kV	900 W / 4500 W	d = 2.5 mm / d = 5.5 mm	R28

Bipolar X-Ray Source

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



Generator		High Voltage Cable	Cooler	
Type	**Ordering No.**	**Type/Xm**	**Type**	**Ordering No.**
XRP-320/1600/2	**10002220**	N3/160-R24-R24-Xm	XRC-3000-OW / XRC-3000-OA	**10003804 / 10003803**
XRP-320/4200/2	**10002222**	N3/160-R24-R24-Xm	XRC-4500-OW / XRC-4500-OA	**10003535 / 10002535**
XRP-320/4200/2	**10002222**	N3/160-R24-R24-Xm	XRC-3000-OW / XRC-3000-OA	**10003804 / 10003803**
XRP-320/4000/1	**10002223**	N3/160-R24-R24-Xm	XRC-4500-OW / XRC-4500-OA	**10003535 / 10002535**
XRP-320/3200/1	**10002224**	N3/160-R24-R24-Xm	XRC-4500-OW / XRC-4500-OA	**10003535 / 10002535**
XRP-350/1600/2	**10003920**	P3/250-R24-R24-Xm	XRC-3000-OW / XRC-3000-OA	**10003804 / 10003803**
XRP-350/4200/2	**10003921**	P3/250-R24-R24-Xm	XRC-4500-OW / XRC-4500-OA	**10003535 / 10002535**
XRP-450/4500/2	**10002225**	P3/250-R30-R24-Xm	XRC-4500-OW / XRC-4500-OA	**10003535 / 10002535**
XRP-450/4500/2	**10002225**	P3/250-R30-R28-Xm	XRC-4500-OW / XRC-4500-OA	**10003535 / 10002535**
XRP-450/4500/2	**10002225**	P3/250-R30-R28-Xm	XRC-3000-OW / XRC-3000-OA	**10003804 / 10003803**
XRP-450/4500/2	**10002225**	P3/250-R30-R28-Xm	XRC-4500-OW / XRC-4500-OA	**10003535 / 10002535**

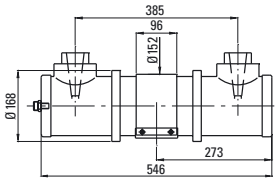
Bipolar Metal Ceramic Tubes

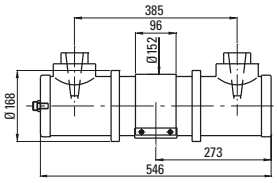
Technical Data

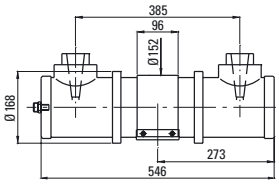
	MXR-320/23	MXR-320/26	MXR-320HP/21
Ordering No.	**915334.51**	**915358.51**	**915362.51**
Ordering No. with 90° housing	**915334.56**	**915358.56**	**915362.56**
Nominal tube voltage	320 kV	320 kV	320 kV
Continuous rating	640 W / 1600 W	1500 W / 4200 W	900 W / 2000 W
Focal spot acc. EN 12543	d = 1.9 mm / d = 3.6 mm	d = 3.0 mm / d = 5.5 mm	d = 0.6 mm / d = 2.0 mm
Former focal spot designation	0.8 / 1.8	1.5 / 4.0	–
Filament current, max.	4.9 A / 4.6 A	4.9 A / 4.6 A	4.1 A / 4.6 A
Filament voltage, typical	3.0 V / 6.8 V	2.6 V / 6.4 V	3.0 V / 6.8 V
Inherent filtration	3.0 mm Be	3.0 mm Be	3.0 mm Be
Target material	W	W	W
Target angle	20°	20°	10°
Radiation coverage	40°	40°	40° x 20°
Leakage radiation, max.	5 mSv/h	5 mSv/h	5 mSv/h
Cooling medium	Oil	Oil	Oil
Cooling medium flow, min.	14 l/min	14 l/min	14 l/min
Temperature at inlet, max.	50° C	50° C	50° C
Weight	40 kg	40 kg	40 kg
Terminal type	R24	R24	R24

Mounting flange	10001711	10001711	10001711
Locking device	940303	940303	940303

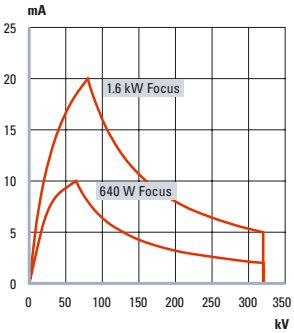
Outline drawing

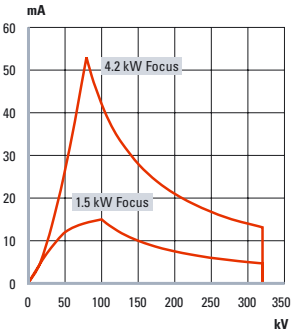


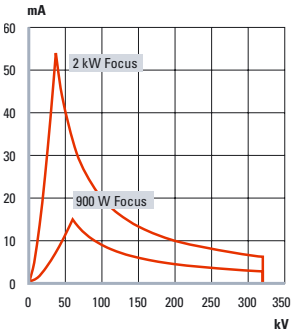




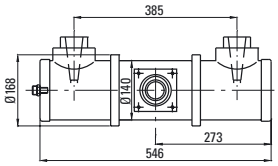
Tube diagram

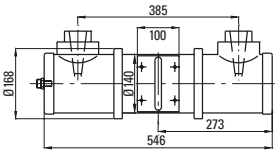


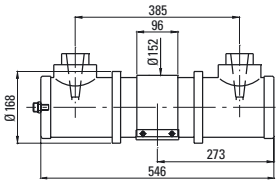


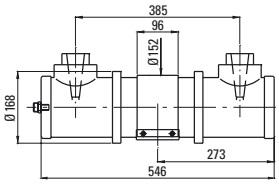


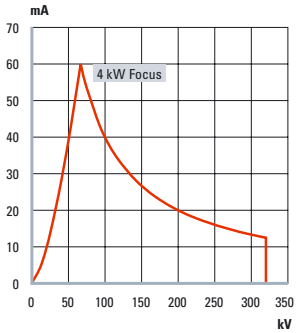
MXR-321	MXR-322	MXR-350/23	MXR-350/26
–	–	**915334.61**	**915358.61**
915341.51	**915337.61**	**915334.66**	**915358.66**
320 kV	320 kV	350 kV	350 kV
4000 W	3200 W	640 W / 1600 W	1500 W / 4200 W
d = 8 mm	d = 4.5 mm	d = 1.9 mm / d = 3.6 mm	d = 3.0 mm / d = 5.5 mm
5	2.0 x 3.0	0.8 / 1.8	1.5 / 4.0
4.6 A	4.6 A	4.9 A / 4.6 A	4.9 A / 4.6 A
6.4 V	6.4 V	3.0 V / 6.8 V	2.6 V / 6.4 V
3.0 mm Be	0.2 mm Cu + 0.4 mm Fe	3.0 mm Be	3.0 mm Be
W	W	W	W
30°	20°	20°	20°
40°	80° x 8°	40°	40°
10 mSv/h	10 mSv/h	5 mSv/h	5 mSv/h
Oil	Oil	Oil	Oil
14 l/min	14 l/min	14 l/min	14 l/min
50° C	50° C	50° C	50° C
40 kg	40 kg	40 kg	40 kg
R24	R24	R24	R24
10001711	10001711	10001711	10001711
940303	940303	940303	940303

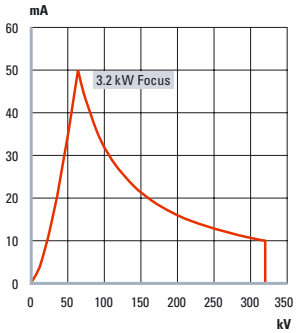


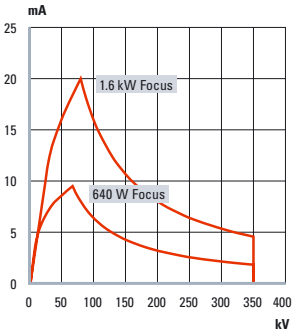


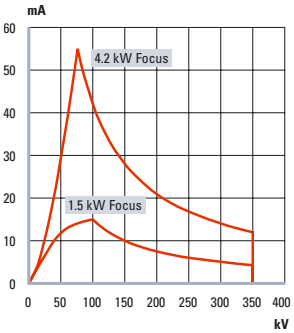






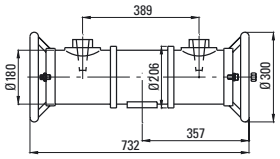


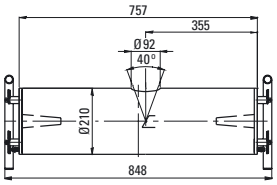


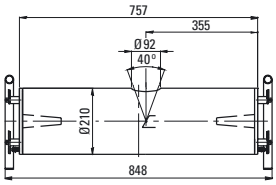


	MXR-420/25	MXR-451/26	MXR-451HP/21
Ordering No.	**915331.51**	**915344.53**	**915364.53**
Ordering No. with 90° housing	–	–	–
Nominal tube voltage	420 kV	450 kV	450 kV
Continuous rating	1500 W / 4200 W	900 W / 4500 W	800 W / 1500 W
Focal spot acc. EN 12543	d = 3.0 mm / d = 7.0 mm	d = 2.5 mm / d = 5.5 mm	d = 0.6 mm / d = 1.0 mm
Former focal spot designation	1.5 / 4.0	–	–
Filament current, max.	4.9 A / 4.6 A	4.9 A / 4.6 A	4.1 A / 4.6 A
Filament voltage, typical	2.6 V / 6.4 V	3.0 V / 6.8 V	3.0 V / 6.8 V
Inherent filtration	3.0 mm Be	3.0 mm + 2.0 mm Be	2.3 mm Fe + 1.0 mm Cu
Target material	W	W	W
Target angle	20°	30°	10°
Radiation coverage	38°	40°	20°
Leakage radiation, max.	10 mSv/h	10 mSv/h	10 mSv/h
Cooling medium	Oil	Oil	Oil
Cooling medium flow, min.	14 l/min	14 l/min	14 l/min
Temperature at inlet, max.	50° C	50° C	50° C
Weight	100 kg	95 kg	95 kg
Terminal type	R24	R28	R28
Mounting flange	10001711	10001710	10001710
Locking device	940303	–	–

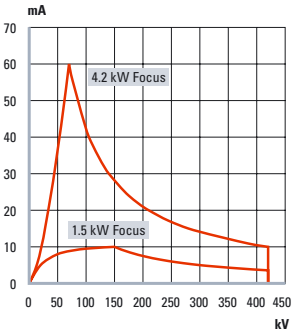
Outline drawing

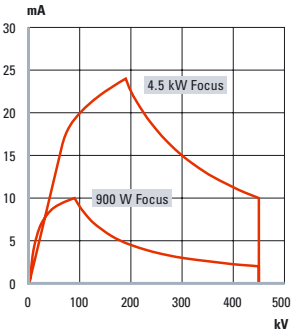


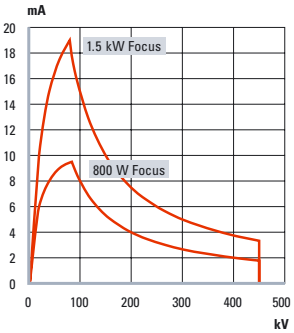




Tube diagram

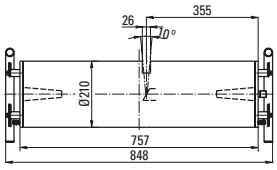


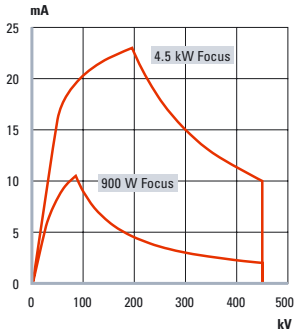




MXR-452

915344.51
–
450 kV
900 W / 4500 W
d = 2.5 mm / d = 5.5 mm
–
4.9 A / 4.6 A
3.0 V / 6.8 V
2.3 mm Fe + 1.0 mm Cu
W
30°
90° x 20°
10 mSv/h
Oil
14 l/min
50° C
95 kg
R28
10001710
–





COMET is a successful international technology company in the growth markets of security, inspection, electronics and communication. As an expert in the field of applied physics, COMET provides a complete and highly flexible portfolio of components, modules, systems and services from a single source.

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.

COMET – The X-perts for security, inspection, electronics and communication

June 2006
Specifications subject to change without notice

DETEK, Inc.
6805 Coolridge Drive
Temple Hills, MD 20748-6940
800-638-0554 **FAX 301-449-7011**
www.detek.com sales@detek.com

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"One Stop Shop" for Industrial X-Ray Sources: COMET's XRS Subsystems

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

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Unipolar Metal Ceramic Tubes – Configuration Information

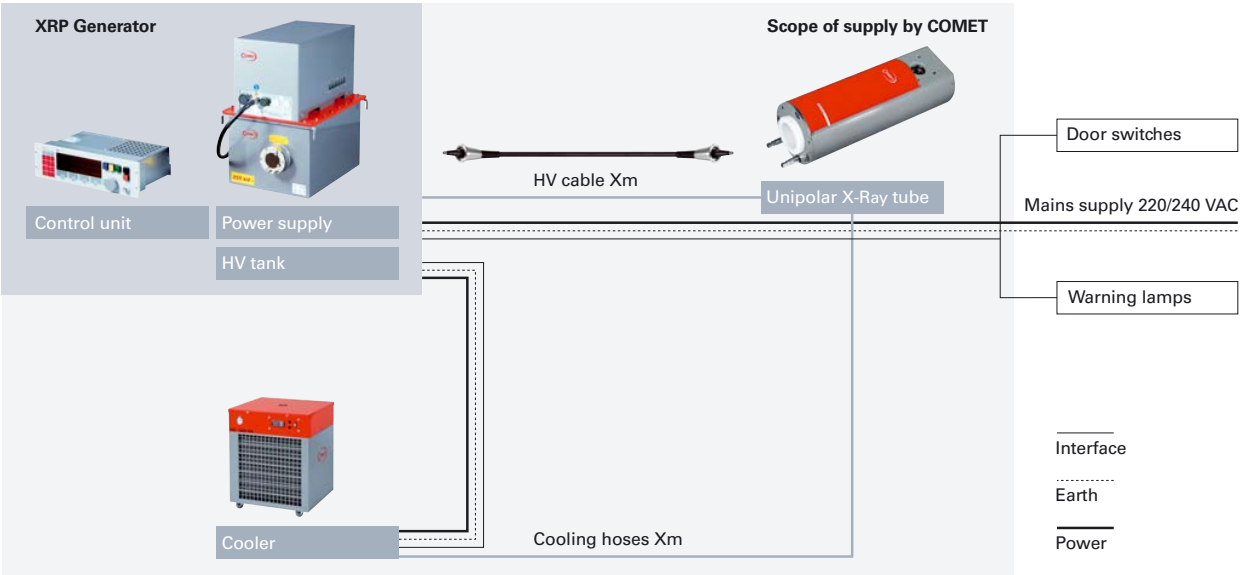
Overview of tubes and fitting system components; high voltage generator, high voltage cable and cooler.

Tube

Type	Ordering No.	Nominal tube voltage	Continuous rating	Focal spot acc. EN 12543	Terminal type
MXR-101	915343.51	100 kV	1000 W	d = 5.5 mm	R10
MXR-160HP/11	915370.51	160 kV	800 W / 1800 W	d = 0.4 mm / d = 1.0 mm	R24
MXR-160HP/20	915357.51	160 kV	1000 W / 1000 W	d = 1.0 mm / d = 1.0 mm	R24
MXR-160/01	915313.51	160 kV	320 W	d = 0.5 mm	R24
MXR-160/20	915317.51	160 kV	640 W / 640 W	d = 1.0 mm / d = 1.0 mm	R24
MXR-160/21	915302.51	160 kV	640 W / 1600 W	d = 1.0 mm / d = 3.0 mm	R24
MXR-160/22	915301.51	160 kV	640 W / 3000 W	d = 1.0 mm / d = 5.5 mm	R24
MXR-161	915305.51	160 kV	3000 W	d = 7.5 mm	R24
MXRP-160C	915311.51	160 kV	1000 W	l = 0.4 mm / w = 4.0 mm	R24
MXR-225HP/11	915371.51	225 kV	800 W / 1800 W	d = 0.4 mm / d = 1.0 mm	R24
MXR-225/21	915325.51	225 kV	640 W / 1600 W	d = 1.0 mm / d = 3.0 mm	R24
MXR-225/22	915326.51	225 kV	640 W / 3000 W	d = 1.0 mm / d = 5.5 mm	R24
MXR-226	915332.51	225 kV	3000 W	d = 7.5 mm	R24

Unipolar X-Ray Source

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



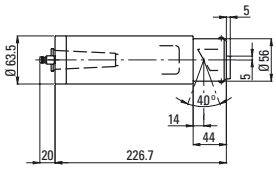
Generator		High Voltage Cable	Cooler			
Type	Ordering No.	Type/Xm	Type	Ordering No.	Type 2	Ordering No. 2
XRP-160/4500/2	**10006465**	U3/100-R24-R10-Xm	XRC-1000-WA	**10002533**	–	–
XRP-160/4500/2	**10006465**	N3/160-R24-R24-Xm	XRC-3000-WA	**10002534**	XRC-3000-WW	**10004730**
XRP-160/4500/2	**10006465**	N3/160-R24-R24-Xm	XRC-1000-WA	**10002533**	–	–
XRP-160/4500/2	**10006465**	N3/160-R24-R24-Xm	XRC-1000-WA	**10002533**	–	–
XRP-160/4500/2	**10006465**	N3/160-R24-R24-Xm	XRC-1000-WA	**10002533**	–	–
XRP-160/4500/2	**10006465**	N3/160-R24-R24-Xm	XRC-3000-WA	**10002534**	XRC-3000-WW	**10004730**
XRP-160/4500/2	**10006465**	N3/160-R24-R24-Xm	XRC-3000-WA	**10002534**	XRC-3000-WW	**10004730**
XRP-160/4500/2	**10006465**	N3/160-R24-R24-Xm	XRC-3000-WA	**10002534**	XRC-3000-WW	**10004730**
XRP-160/4500/2	**10006465**	N3/160-R24-R24-Xm	XRC-1000-WA	**10002533**	–	–
XRP-225/4500/2	**10006466**	P3/250-R28-R24-Xm	XRC-3000-WA	**10002534**	XRC-3000-WW	**10004730**
XRP-225/4500/2	**10006466**	P3/250-R28-R24-Xm	XRC-3000-WA	**10002534**	XRC-3000-WW	**10004730**
XRP-225/4500/2	**10006466**	P3/250-R28-R24-Xm	XRC-3000-WA	**10002534**	XRC-3000-WW	**10004730**
XRP-225/4500/2	**10006466**	P3/250-R28-R24-Xm	XRC-3000-WA	**10002534**	XRC-3000-WW	**10004730**

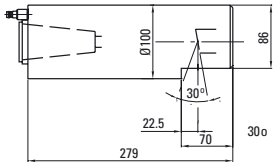
Unipolar Metal Ceramic Tubes

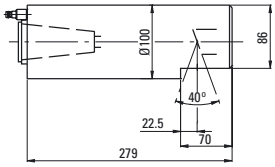
Technical Data

	MXR-101	MXR-160HP/11	MXR-160HP/20
Ordering No.	**915343.51**	**915370.51**	**915357.51**
Nominal tube voltage	100 kV	160 kV	160 kV
Continuous rating	1000 W	800 W / 1800 W	1000 W / 1000 W
Focal spot acc. EN 12543	d = 5.5 mm	d = 0.4 mm / d = 1.0 mm	d = 1.0 mm / d = 1.0 mm
Former focal spot designation	4	–	0.4 / 0.4
Filament current, max.	4.2 A	4.1 A / 4.1 A	4.1 A / 4.1 A
Filament voltage, typical	7.5 V	2.9 V / 7.3 V	4.2 V / 4.2 V
Inherent filtration	0.8 mm Be	0.8 mm Be	0.8 mm Be
Target material	W	W	W
Target angle	30°	11°	20°
Radiation coverage	40°	40° x 30°	40°
Leakage radiation, max.	–	2.5 mSv/h	2.5 mSv/h
Cooling medium	Water	Water	Water
Cooling medium flow, min.	4 l/min	4 l/min	4 l/min
Temperature at inlet, max.	40° C	35° C	35° C
Weight	3.5 kg	8 kg	8 kg
Terminal type	R10	R24	R24
Mounting flange	651142	10001756	10001756
Locking device	–	941002	941002

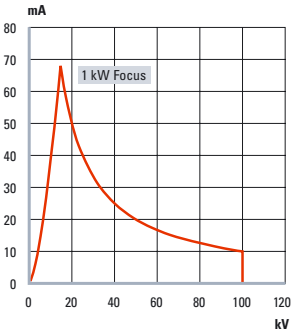
Outline drawing

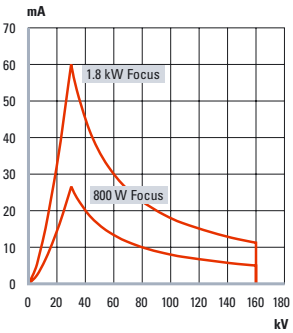


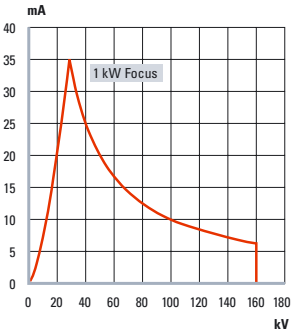




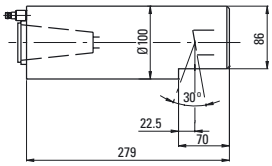
Tube diagram

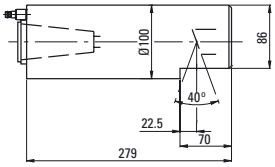


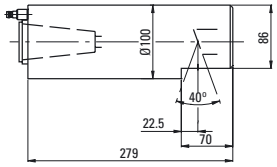


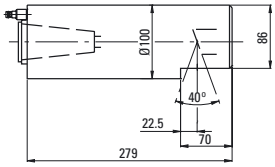


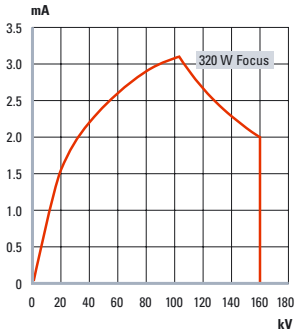
MXR-160/01	MXR-160/20	MXR-160/21	MXR-160/22
915313.51	**915317.51**	**915302.51**	**915301.51**
160 kV	160 kV	160 kV	160 kV
320 W	640 W / 640 W	640 W / 1600 W	640 W / 3000 W
d = 0.5 mm	d = 1.0 mm / d = 1.0 mm	d = 1.0 mm / d = 3.0 mm	d = 1.0 mm / d = 5.5 mm
0.2	0.4 / 0.4	0.4 / 1.5	0.4 / 3.0
3.3 A	4.1 A / 4.1 A	4.1 A / 4.2 A	4.1 A / 4.2 A
4.5 V	4.2 V / 4.2 V	4.2 V / 5.5 V	3.0 V / 5.5 V
0.8 mm Be	0.8 mm Be	0.8 mm Be	0.8 mm Be
W	W	W	W
10°	20°	20°	20°
40° x 30°	40°	40°	40°
2.5 mSv/h	2.5 mSv/h	2.5 mSv/h	2.5 mSv/h
Water	Water	Water	Water
4 l/min	4 l/min	4 l/min	4 l/min
35° C	35° C	35° C	35° C
8 kg	8 kg	8 kg	8 kg
R24	R24	R24	R24
10001756	10001756	10001756	10001756
941002	941002	941002	941002

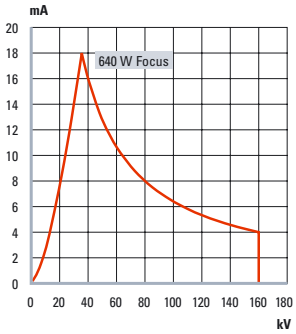


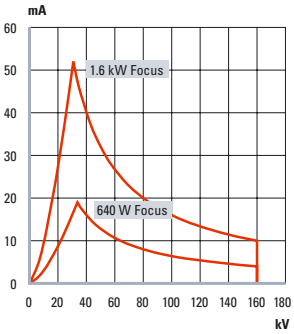


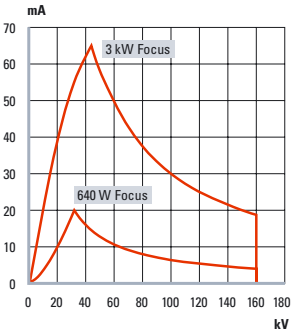








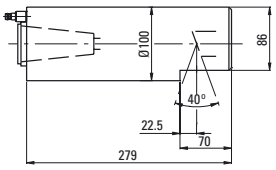


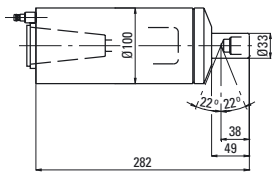


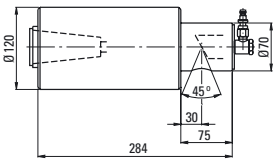
	MXR-161	MXRP-160C	MXR-165
Ordering No.	**915305.51**	**915311.51**	**915356.51**
Nominal tube voltage	160 kV	160 kV	160 kV
Continuous rating	3000 W	1000 W	6000 W
Focal spot acc. EN 12543	d = 7.5 mm	l = 0.4 mm / w = 4.0 mm	d = 5.5 mm
Former focal spot designation	3.0 x 6.0	0.3 x 3.0	–
Filament current, max.	4.2 A	4.2 A	4.2 A
Filament voltage, typical	5.5 V	2.7 V	5.5 V
Inherent filtration	0.8 mm Be	0.5 mm Ti + 2.0 mm H_2O + 2.0 mm Al	4 mm Be
Target material	W	W	W
Target angle	30°	22°	30°
Radiation coverage	40°	360° x 40°	45°
Leakage radiation, max.	1 mSv/h	2.5 mSv/h	2.5 mSv/h
Cooling medium	Water	Water	Water
Cooling medium flow, min.	4 l/min	4 l/min	5 l/min
Temperature at inlet, max.	35° C	35° C	30° C
Weight	8 kg	8 kg	9.4 kg
Terminal type	R24	R24	R24

Mounting flange	10001756	10001756	10001756
Locking device	941002	941002	940303

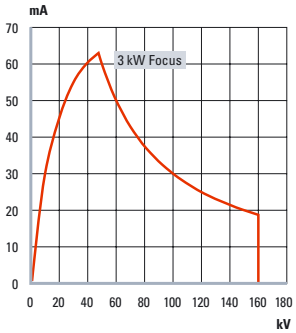
Outline drawing

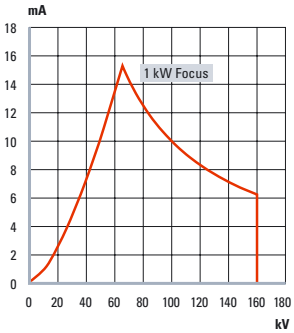


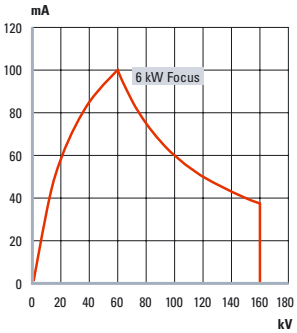




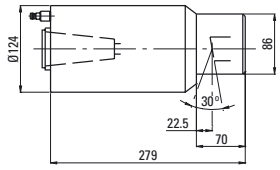
Tube diagram

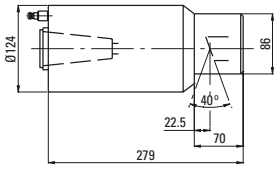


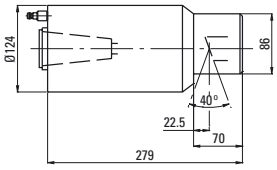


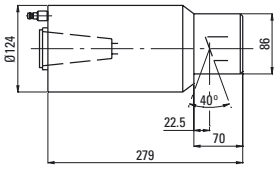


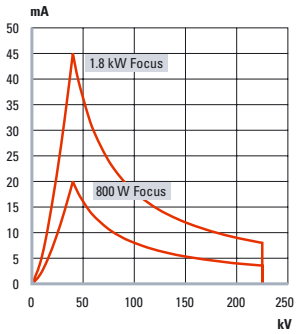
MXR-225HP/11	MXR-225/21	MXR-225/22	MXR-226
915371.51	**915325.51**	**915326.51**	**915332.51**
225 kV	225 kV	225 kV	225 kV
800 W / 1800 W	640 W / 1600 W	640 W / 3000 W	3000 W
d = 0.4 mm / d = 1.0 mm	d = 1.0 mm / d = 3.0 mm	d = 1.0 mm / d = 5.5 mm	d = 7.5 mm
–	0.4 / 1.5	0.4 / 3.0	3.0 x 6.0
4.1 A / 4.1 A	4.1 A / 4.2 A	4.1 A / 4.2 A	4.2 A
2.9 V / 7.3 V	4.2 V / 5.5 V	3.0 V / 5.5 V	5.5 V
0.8 mm Be	0.8 mm Be	0.8 mm Be	0.8 mm Be
W	W	W	W
11°	20°	20°	30°
40° x 30°	40°	40°	40°
5 mSv/h	10 mSv/h	10 mSv/h	10 mSv/h
Water	Water	Water	Water
4 l/min	4 l/min	4 l/min	4 l/min
35° C	35° C	35° C	35° C
11 kg	11 kg	11 kg	11 kg
R24	R24	R24	R24
10001756	10001756	10001756	10001756
941002	941002	941002	941002

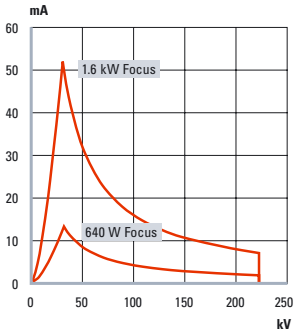


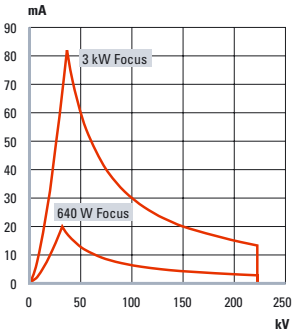


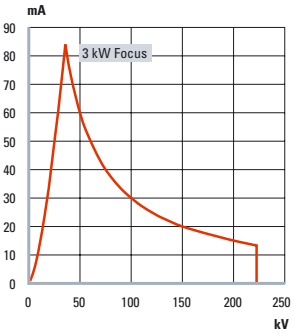












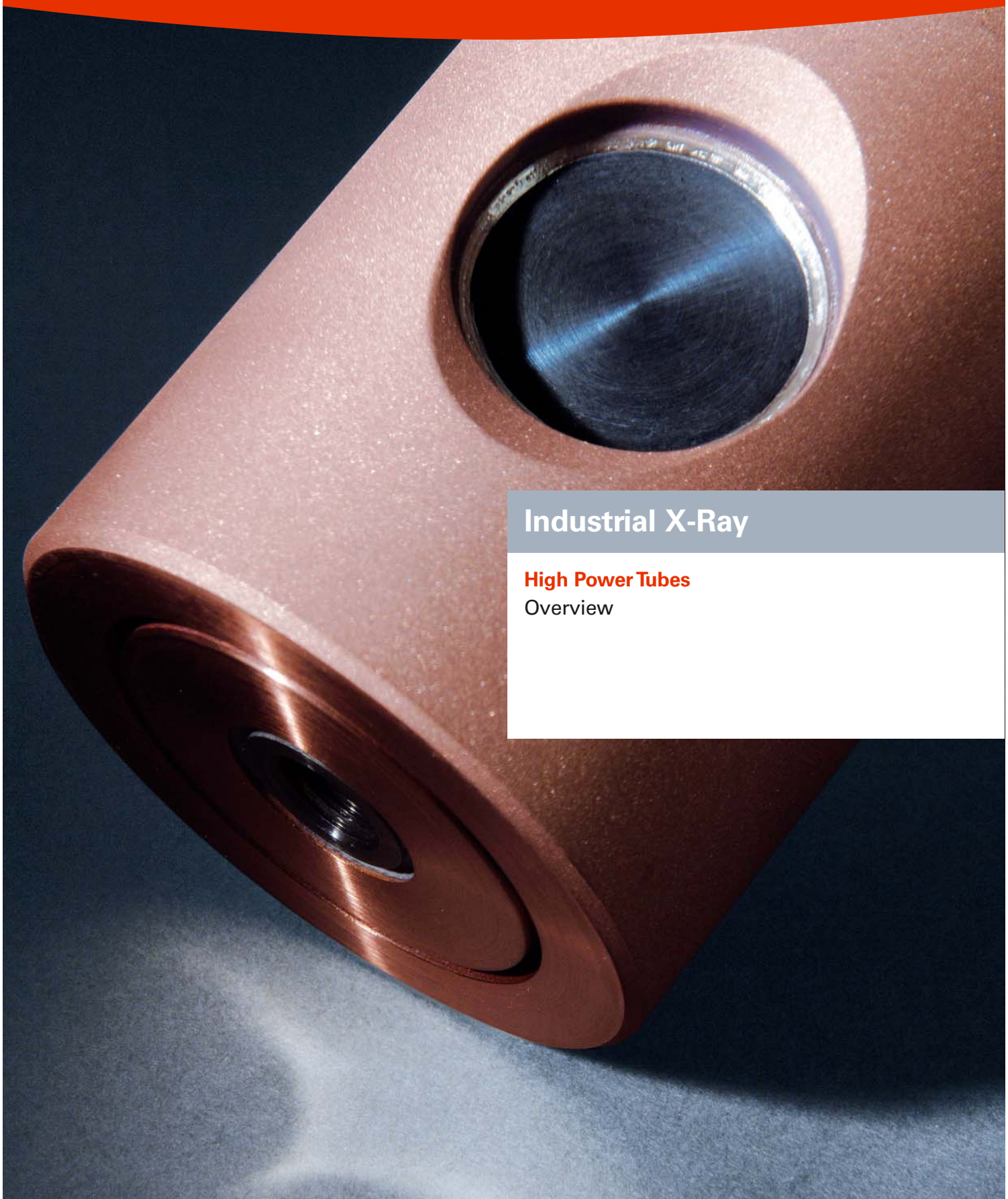
COMET is a successful international technology company in the growth markets of security, inspection, electronics and communication. As an expert in the field of applied physics, COMET provides a complete and highly flexible portfolio of components, modules, systems and services from a single source.

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.

COMET – The X-perts for security, inspection, electronics and communication

August 2007
Specifications subject to change without notice

DETEK, Inc.
6805 Coolridge Drive
Temple Hills, MD 20748-6940
800-638-0554 **FAX 301-449-7011**
www.detek.com sales@detek.com



Industrial X-Ray

High Power Tubes

Overview

High Power Tubes

Overview

High Power HP Technology for X-Ray Tubes

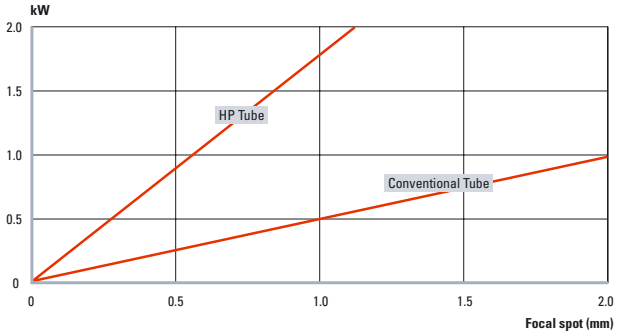
Since the invention of the X-Ray tube in 1895, the ratio between focal spot size and power has not improved significantly.

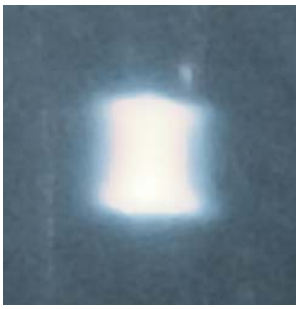
COMET AG has achieved a breakthrough in this historical relation with its new High Power (HP) technology. The HP family of X-Ray tubes has nearly doubled the power density of the conventional fixed-anode X-Ray tube.

The Benefit of the HP Innovation

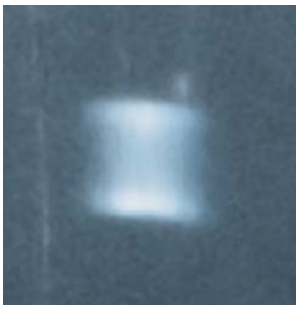
- Higher power with the same focal spot size. With higher power, shorter exposure times are necessary. The result is higher throughput through the inspection process.
- Smaller focal spot at the same power. Previously, when striving for finer resolution, the customer had to sacrifice power (and thus throughput) to achieve a smaller focal spot. You must no longer suffer this compromise.

Power/Focal Spot Ratio





1 mm focal spot of a conventional MXR-160/20. At 640 W (maximum power) the temperature reaches 1500° C.



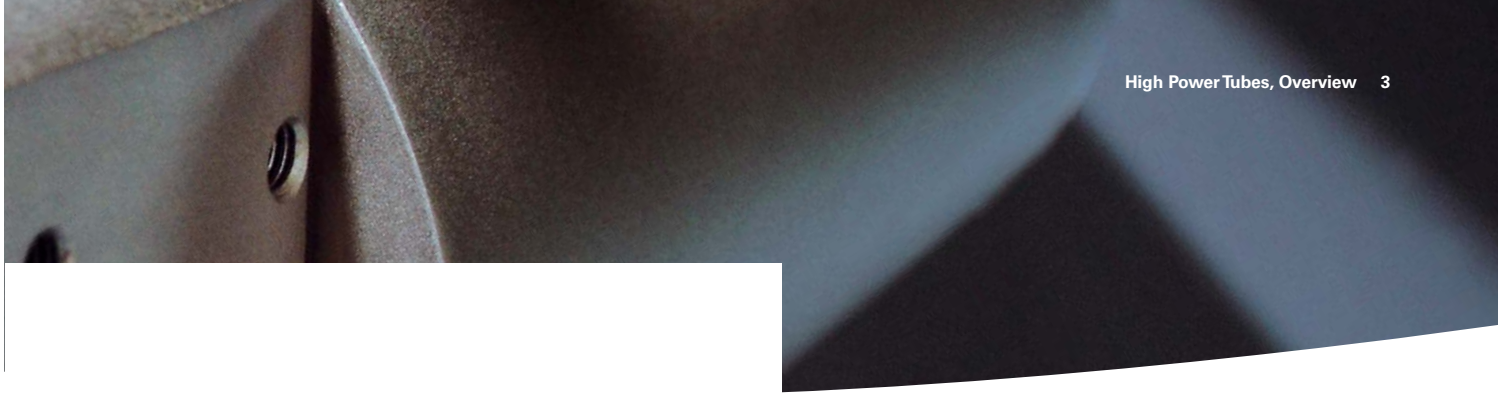
1 mm focal spot of the HP tube MXR-160HP/20, same focal spot size, same power, but with 900° C, a significantly lower temperature. The power can be increased to 1000 W before the temperature reaches 1500° C.

The Demanding Challenge to Increase the Power Density of an X-Ray Tube

X-Ray tubes operate in extreme conditions:

- Ultra high vacuum technology (10^{-9} mbar)
- Temperatures up to 1500° C
- Rough environment

To make an X-Ray tube more efficient, one must go to work on the focal spot, the very small place where the electron beam strikes the heavy-metal target and produces X-Rays. The power dissipation by a standard X-Ray tube is approx 300 W/mm². With our revolutionary new construction of the anode we can reach 600 W/mm². This success of COMET's development team was the result of the convergence of unconventional thinking, the use of the latest simulation techniques and more than 50 years of experience in the construction of X-Ray tubes.



What Are the Trends?

In the coming years, digital detectors will increasingly replace traditional X-Ray techniques such as film and image intensifiers. The consumer's demand for cost-effective products dictates that everything must be more efficient. Everything must move faster. Cycle times must be shorter. With digital detectors, already flux-starved imaging chains will be at their limits just to produce adequate pictures.
The public's increasing demand for safer products will push manufacturers to find ever smaller defects, thus increasing the need for high-resolution X-Ray inspection.

Our Response

To meet the challenges evoked by these trends, COMET invented the HP technology and thereby revolutionized the X-Ray industry.
Smaller focal spots with more power enable our customers to develop "best in class" solutions.
Today, COMET offers a broad portfolio of tubes based on HP technology in the range from 160 kV to 450 kV.

About the Business Unit Industrial X-Ray

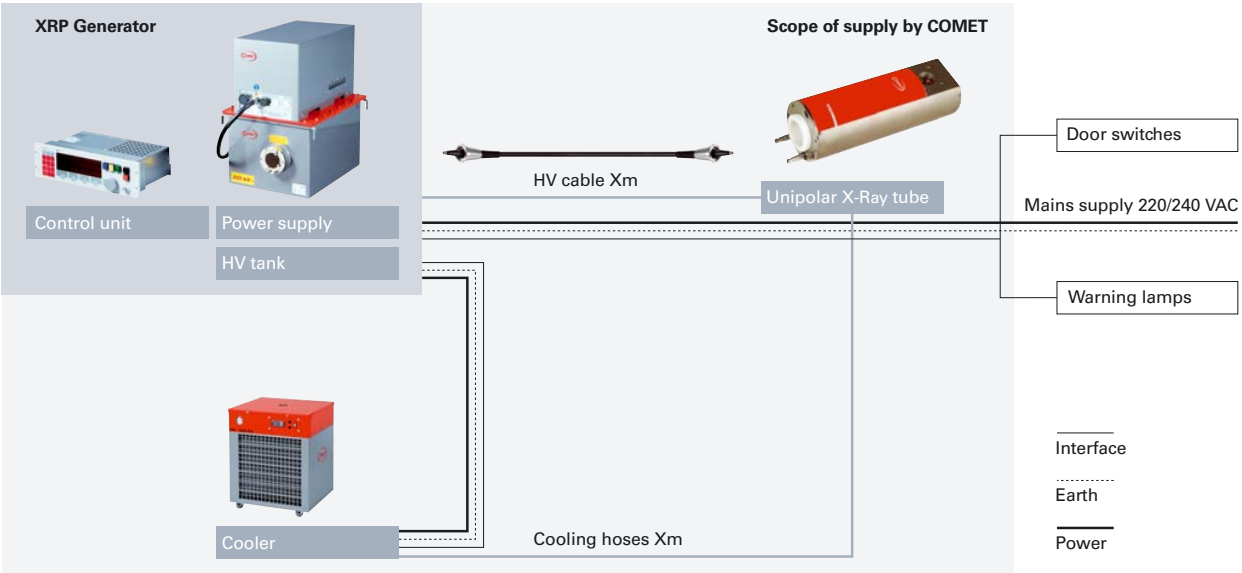
COMET Industrial X-Ray is an experienced supplier of components and modules for industrial X-Ray applications and is proud of its reputation as the preferred engineering partner in terms of innovation potential, know how, flexibility and speed. Our product range features X-Ray tubes and sources with small focal spot resolution (< 1 µm) up to 6 kW in output for more power demanding requirements. From the smallest footprint for use in portable units to 450 kV fixed gantry systems that are suitable for cargo screening.

High Power Tubes

Overview and Configuration Information

Unipolar X-Ray Source

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



"One Stop Shop" for Industrial X-Ray Sources: COMET's XRS Modules

COMET is pleased to offer all of the necessary components for a customized X-Ray Source: The new XRS modules each contain a COMET X-Ray tube, high voltage generator with cables and coolers designed for easy integration that will optimize system performance.

All XRS modules are factory prepared and tested for hassle free installation and operation.
This novel solution demonstrates COMET's continuous commitment and investment in delivering real added value to our worldwide customer base.

High Power Tubes – Configuration Information

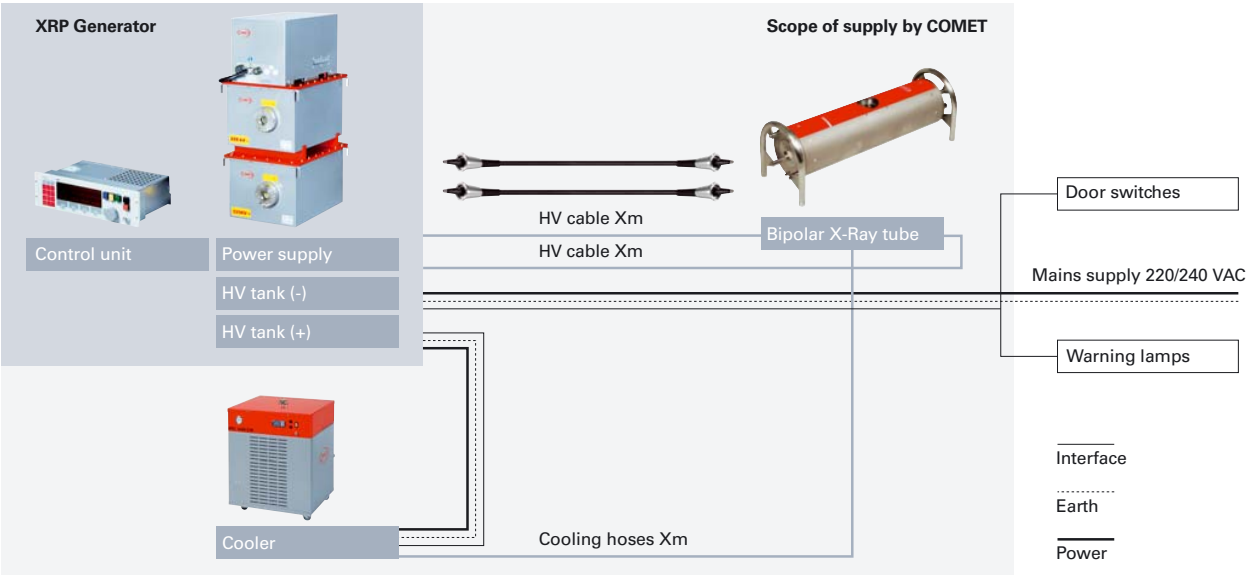
Overview of tubes and fitting module components; high voltage generator, high voltage cable and cooler.

Tube

Type	Ordering No.	Ordering No. with 90° housing	Nominal tube voltage	Continuous rating	Focal spot acc. EN 12543	Terminal type
MXR-160HP/11	915370.51	–	160 kV	800 W / 1800 W	d = 0.4 mm / d = 1.0 mm	R24
MXR-160HP/20	915357.51	–	160 kV	1000 W / 1000 W	d = 1.0 mm / d = 1.0 mm	R24
MXR-225HP/11	915371.51	–	225 kV	800 W / 1800 W	d = 0.4 mm / d = 1.0 mm	R24
MXR-320HP/11	915368.51	–	320 kV	800 W / 1800 W	d = 0.4 mm / d = 1.0 mm	R24
MXR-451HP/11	915369.51	–	450 kV	700 W / 1500 W	d = 0.4 mm / d = 1.0 mm	R28

Bipolar X-Ray Source

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



Generator		High Voltage Cable	Cooler	
Type	**Ordering No.**	**Type/Xm**	**Type**	**Ordering No.**
XRP-160/4500/2	**10006465**	N3/160-R24-R24-Xm	XRC-3000-WA	**10002534**
			XRC-3000-WW	**10004730**
XRP-160/4500/2	**10006465**	N3/160-R24-R24-Xm	XRC-1000-WA	**10002533**
XRP-225/4500/2	**10006466**	P3/250-R28-R24-Xm	XRC-3000-WA	**10002534**
			XRC-3000-WW	**10004730**
XRP-320/4500/2	**10006467**	N3/160-R24-R24-Xm	XRC-4500-OW	**10003535**
			XRC-4500-OA	**10002535**
XRP-450/4500/2	**10006468**	P3/250-R28-R28-Xm	XRC-4500-OW	**10003535**
			XRC-4500-OA	**10002535**

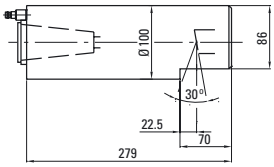
High Power Tubes

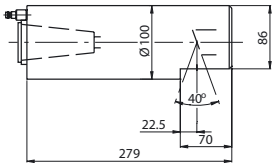
Technical Data

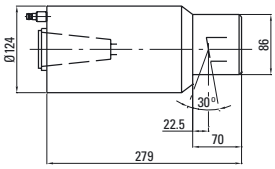
	MXR-160HP/11	MXR-160HP/20	MXR-225HP/11
Ordering No.	**915370.51**	**915357.51**	**915371.51**
Ordering No. with 90° housing	–	–	–
Nominal tube voltage	160 kV	160 kV	225 kV
Continuous rating	800 W / 1800 W	1000 W / 1000 W	800 W / 1800 W
Focal spot acc. EN 12543	d = 0.4 mm / d = 1.0 mm	d = 1.0 mm / d = 1.0 mm	d = 0.4 mm / d = 1.0 mm
Former focal spot designation	–	0.4 / 0.4	–
Filament current, max.	4.1 A / 4.1 A	4.1 A / 4.1 A	4.1 A / 4.1 A
Filament voltage, typical	2.9 V / 7.3 V	4.2 V / 4.2 V	2.9 V / 7.3 V
Inherent filtration	0.8 mm Be	0.8 mm Be	0.8 mm Be
Target material	W	W	W
Target angle	11°	20°	11°
Radiation coverage	40° x 30°	40°	40° x 30°
Leakage radiation, max.	2.5 mSv/h	2.5 mSv/h	5 mSv/h
Cooling medium	Water	Water	Water
Cooling medium flow, min	4 l/min	4 l/min	4 l/min
Anode temperature, max.	–	–	–
Temperature at inlet, max.	35° C	35° C	35° C
Weight	8 kg	8 kg	11 kg
Terminal type	R24	R24	R24

Mounting flange	10001756	10001756	10001756
Locking device	941002	941002	941002

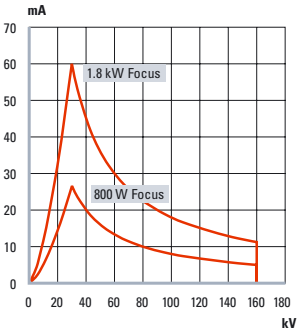
Outline drawing

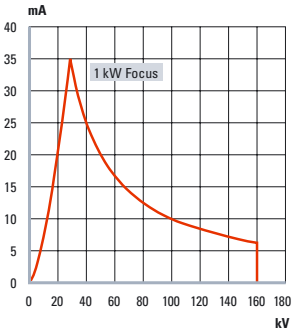


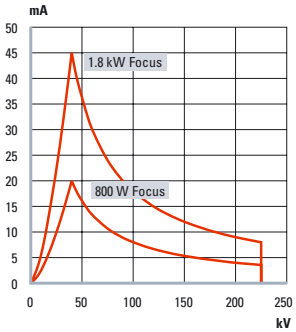




Tube diagram

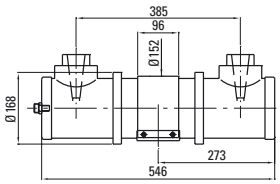


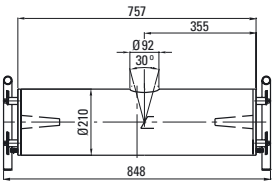


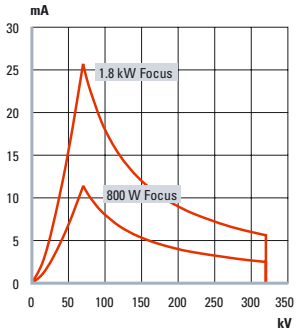


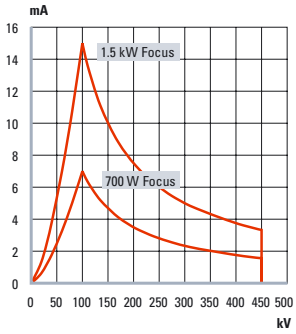
MXR-320HP/11	MXR-451HP/11
915368.51	**915369.51**
–	–
320 kV	450 kV
800 W / 1800 W	700 W / 1500 W
d = 0.4 mm / d = 1.0 mm	d = 0.4 mm / d = 1.0 mm
–	–
4.1 A / 4.6 A	4.1 A / 4.6 A
2.3 V / 6.8 V	2.3 V / 6.8 V
3 mm Be	5 mm Be
W	W
11°	11°
40° x 30°	40° x 30°
5 mSv/h	5 mSv/h
Oil	Oil
14 l/min	14 l/min
–	–
50° C	50° C
40 kg	95 kg
R24	R28

10001711	10001710
–	–









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March 2007
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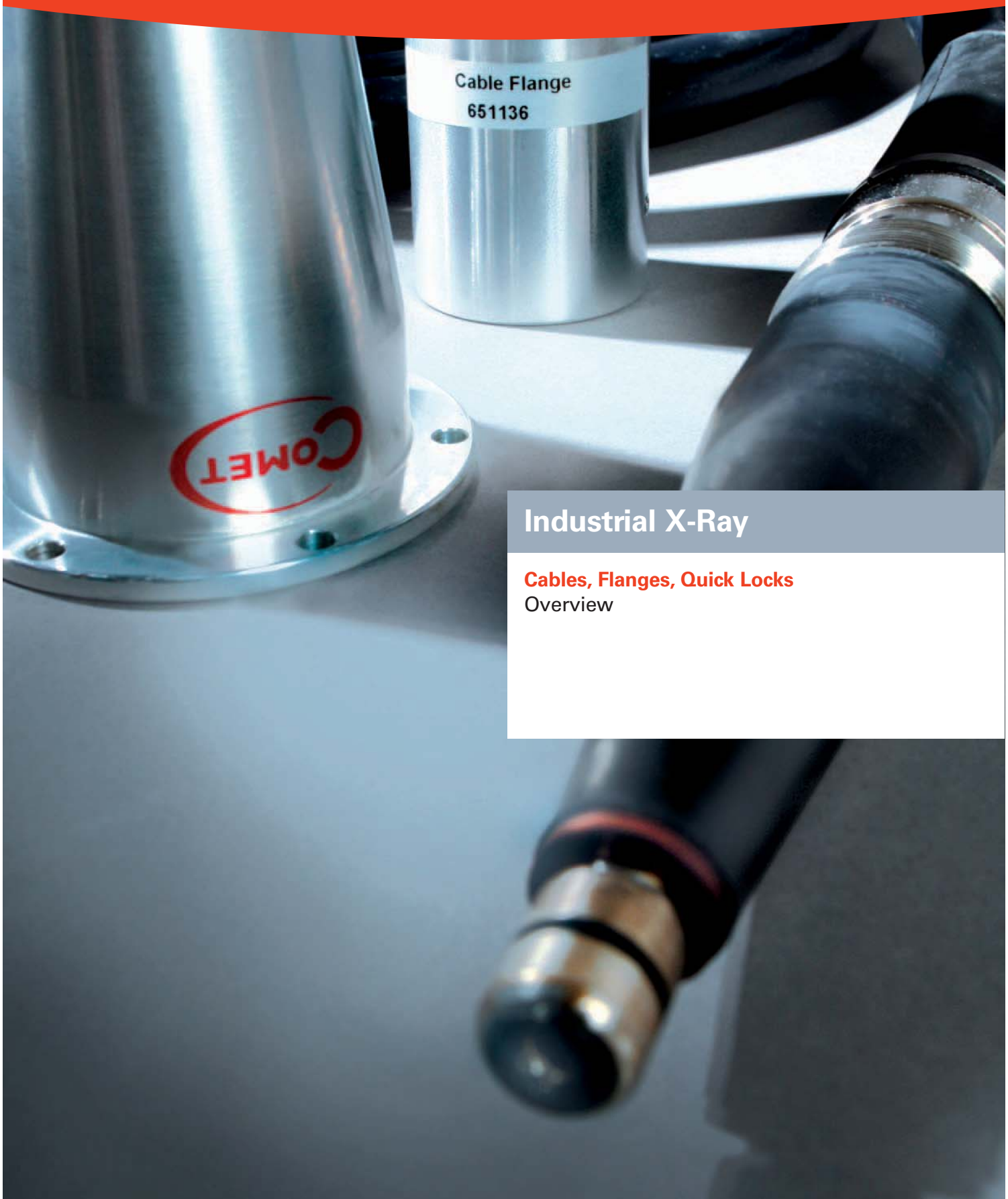
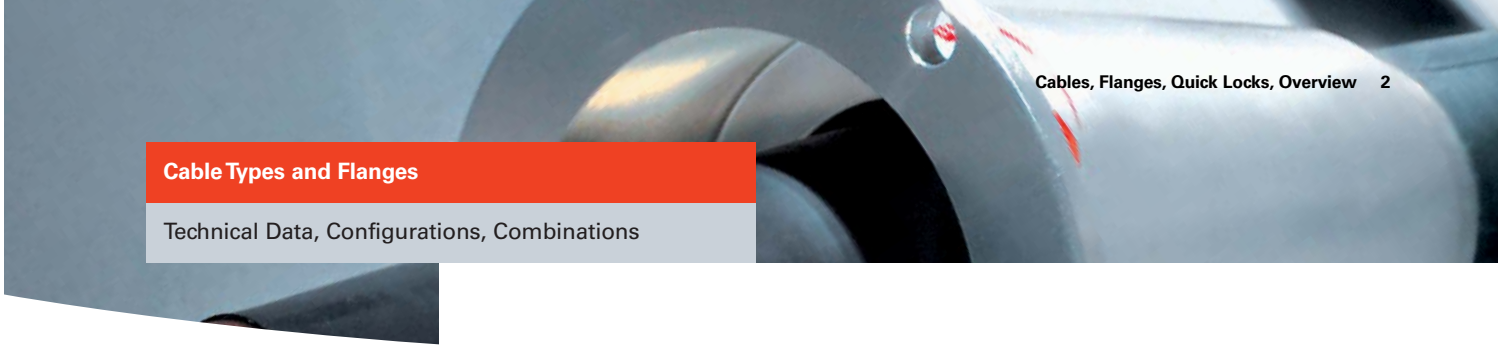
DETEK, Inc.
6805 Coolridge Drive
Temple Hills, MD 20748-6940
800-638-0554 **FAX 301-449-7011**
www.detek.com sales@detek.com



Industrial X-Ray

Cables, Flanges, Quick Locks

Overview



Cable Types and Flanges

Technical Data, Configurations, Combinations

Technical Data Cables

	U3/100	N3/160	P3/250
Rated voltage	100 kVDC	160 kVDC	250 kVDC
Nominal outside diameter	20mm	29mm	36mm
Coverage shielding braid	>95%	>95%	>80%
Conductor resistance Bare Conductor @ 20°C	6.6 mΩ/m	6.6 mΩ/m	6.6 mΩ/m
Conductor resistance Red & White Cond. @ 20°C	9.5 mΩ/m	11.4 mΩ/m	11.4 mΩ/m
Minimum bending radius (dynamic)	80 mm	120 mm	148 mm
Insulation resistance (wires to shield)	$\geq 5 \times 10^{12}$ Ω·m	$\geq 1 \times 10^{12}$ Ω·m	$\geq 1 \times 10^{12}$ Ω·m
Capacitance (wires to shield)	136 pF/m	126 pF/m	107 pF/m
Max. operating temperature	+70°C	+70°C	+70°C

Configurations with COMET Tubes

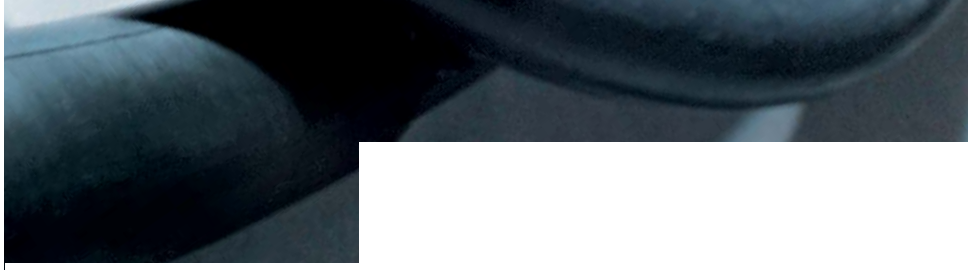
Cable	MXR-101	CXR-10X	CXR-150	MXR-160	MXR-225	MXR-320	MXR-350	MXR-420	MXR-45X	Power Supply	
U3/100	R10	R10									
N3/160			R24	R24		R24					
P3/250					R24		R24	R24	R28	R24	R30
Cable flange Ordering No.											
651142	■										
100001700		■									
100001710									■		
100001711			■			■	■	■			
100001756				■	■						
651136										■	
651138											■
Locking device Ordering No.											
941002				■	■						
940303			■			■	■	■			
651053			■	■	■	■	■	■			

Combinations

	R10	R24	R24 RA	R28	R28 RA	R30	R30 RA
U3/100 cable	100 kV	100 kV	100 kV	–	–	–	–
N3/160 cable	–	160 kV	160 kV	160 kV	160 kV	160 kV	160 kV
P3/250 cable	–	225 kV	225 kV	225 kV	225 kV	225 kV	225 kV

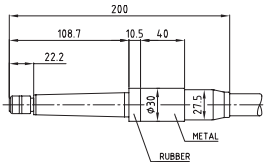
Within the high voltage system the part with the lowest specified high voltage rating defines the maximum allowed voltage.

Special cables, terminals and flanges are available on request. Please contact us. xray@comet.ch

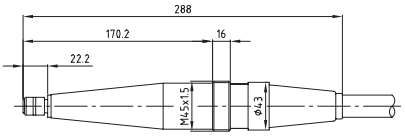


Plugs

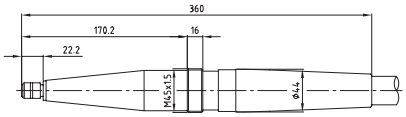
R10 with U3 cable



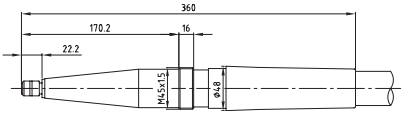
R24 with U3 cable



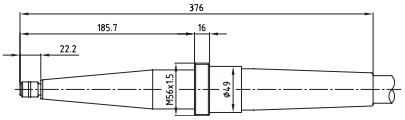
R24 with N3 cable



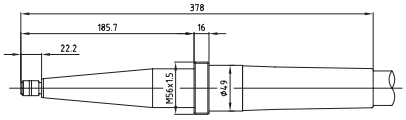
R24 with P3 cable



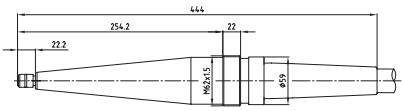
R28 with N3 cable



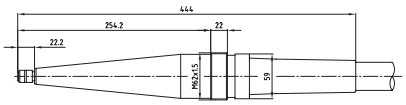
R28 with P3 cable



R30 with N3 cable



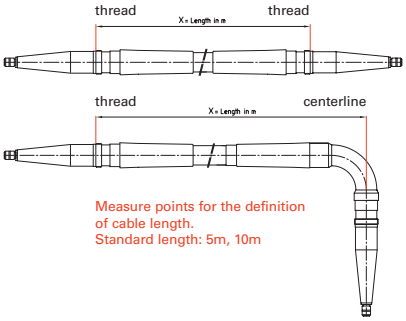
R30 with P3 cable

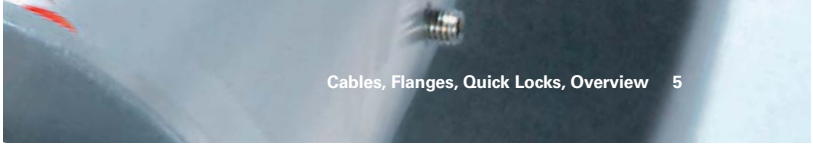


Ordering Example

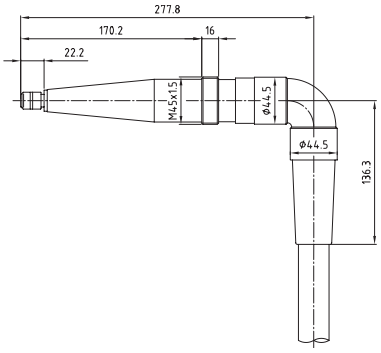
	cable	–	plug	–	plug	–	length
Cable	N3/160	–	R24	–	R24 RA	–	5m
Flange	10001756						

Example: 160 kV cable with straight and rectangular connector, length 5m with a flange for MXR-160.

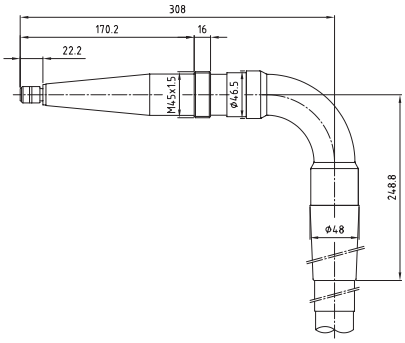




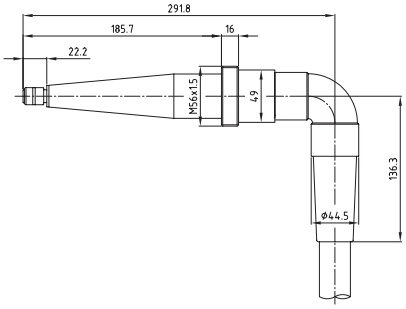
R24 RA with N3 cable



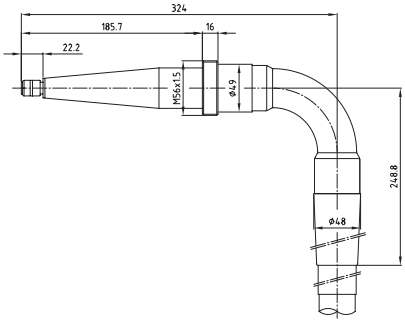
R24 RA with P3 cable



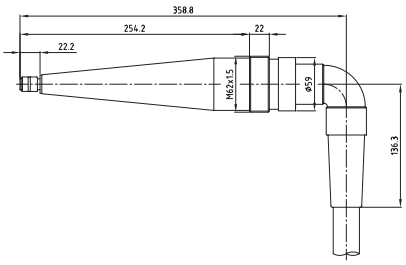
R28 RA with N3 cable



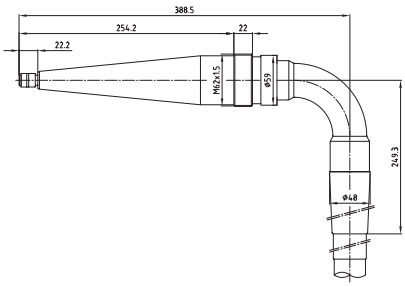
R28 RA with P3 cable

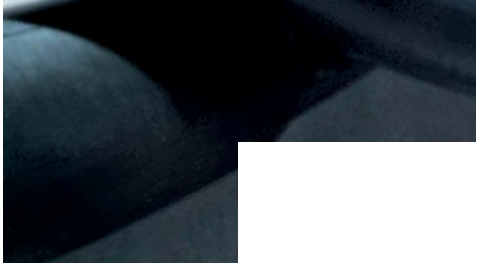


R30 RA with N3 cable



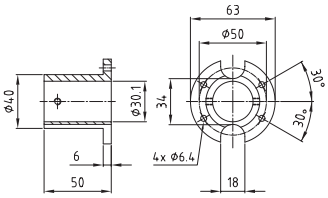
R30 RA with P3 cable



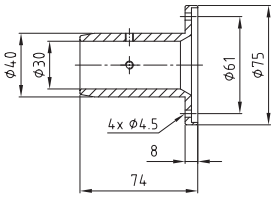


Flanges

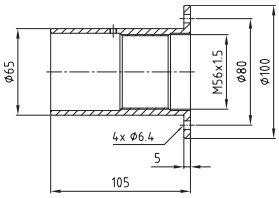
R10 cable flange 651142



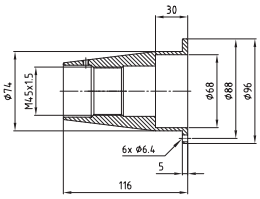
R10 cable flange 10001700



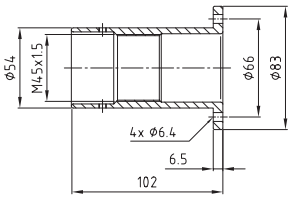
R28 cable flange 10001710



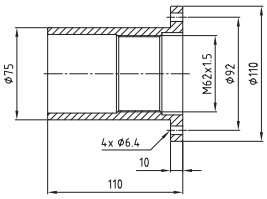
R24 cable flange 10001711



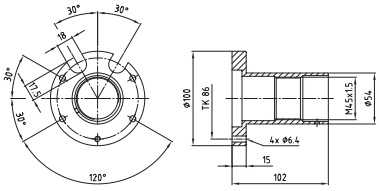
R24 cable flange 651136



R30 cable flange 651138

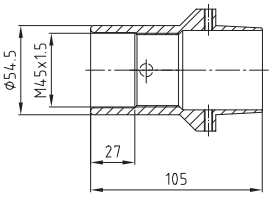


R24 cable flange 10001756

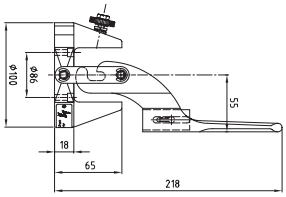


Locking Devices

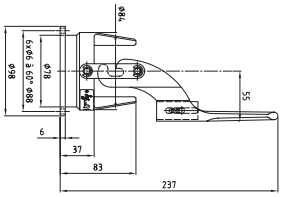
R24 clamping sleeve 651053



R24 locking device 941002



R24 locking device 940303



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DETEK, Inc.
6805 Coolridge Drive
Temple Hills, MD 20748-6940
800-638-0554 **FAX 301-449-7011**
www.detek.com sales@detek.com