ERESCO MF4
Reliable, Lightweight, Portable X-ray Generator
ERESCO MF4 – For the toughest of tasks

The ERESCO MF4 portable X-ray units are designed for reliability in some of the world’s toughest conditions. With the ERESCO MF4 line, mobile X-ray inspection becomes lighter in the true sense of the word.

The robust construction of the control and the tube heads make them suitable for hostile environments. Due to its low power consumption, not only is energy cost reduced, but operation with portable power supplies are made easier. Special power electronics allow for an alternative operation in the field as well as integration in crawlers. Even with reduced weight, the new tube heads comply with the strict requirements of the European X-ray regulations.

Using modern compact electronics to minimize weight and provide a high power output with extremely low ripple, together with a sturdy metal ceramic X-ray tube, the ERESCO MF4 generates a high X-ray dose rate which allows the shortest exposure time, resulting in higher productivity.

A glance at the benefits

The **metal/ceramic technology** ensures both continuous operation and a long operating life.

The **MF4 cooling system** also assists in prolonging long trouble-free operation as its specially designed copper cooler optimises the air flow for maximum cooling effect.

The ERESCO MF technology allows the X-ray generator to be **operated in power mode**, because, unlike competitive generators, it can drive high tube currents. As a result, continuous power ratings of up to 900 W and high currents ensure that the ERESCO MF4 range of X-ray generators offer the best image definition in the 200 kV to 300 kV class.

Operation starts from 5 kV to enable **optimized exposure** of low-density materials, such as aluminum, composites and plastics resulting in **high-contrast images**.

The power electronics of ERESCO units provide extremely **low power consumption** between 1 to 2 kW.

**Full graphic display** and intuitive user interface for simple and guided operation.

**On-Board exposure calculator** for determination of the optimum exposure settings and further exposure time reduction through unique ERESCO power mode.

Several programming and reporting features to shorten X-ray setup and evaluation times.

**Microprocessor platform** enables fast and safe unit control providing intelligent features, such as automatic tube head identification, autonomous operation with event recording, multi-lingual user interface and different exposure programs.
MF Technology for constant potential high dose output

A medium frequency output (around 20 kHz) can be used to produce a high power output with extremely low ripple.

<table>
<thead>
<tr>
<th>Simple X-Ray Unit</th>
<th>Mains Power In</th>
<th>High Voltage Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Basic CP Unit</th>
<th>Mains Power In</th>
<th>High Voltage Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ERESCO MF High Performance Unit</th>
<th>AC Waveform</th>
<th>Output Power of the ERESCO MF Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>42 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control Unit

The portable ERESCO X-ray digital control can operate any X-ray generator in the MF4 range. It features modern power electronics and is ruggedly constructed to withstand heavy use in the field.

The MF4 Control facilitates an ergonomical interaction concept for safe and efficient unit operation. Several on-board features, such as Exposure Calculator, Parameter Monitoring or Programming / Reporting tools are simplifying inspections.

A large, back-lit, full graphic, transreflective display allows easy viewing even in very strong sunlight and provides details of the system status in up to 19 languages supporting different character-sets. All operating and setup parameters can be entered by means of function keys, an alphanumeric keypad and cursor keys. Menu driven interfaces complete the ease of use. Alternatively setup parameters can be retrieved from a bank of 250 pre-entered exposure programmes, stored in a non-volatile memory. In addition, these programs can be uniquely named or commented and can be downloaded, modified, uploaded and archived. In power operation, the maximum tube current is calculated and set, so minimizing exposure times. Besides interfaces for warning lamps, interlocks and pumps, the MF4 control also offers a serial interface for external control or communication with PC based tools.

Applications

The ERESCO MF range of X-ray generators finds application throughout the industrial spectrum in the inspection of welds and in the examinations for structural integrity.

- Standard radiographic inspections, such as those carried out in fabrication yards in the oil and gas segment, in power plants, in the automotive sector and in general engineering.
- Oil and Gas segments require inspections in extreme conditions, such as pipeline inspections — both off-shore and land-based applications — where equipment have to withstand hostile environment like very low or very high ambient temperature or permanent exposure to salt-water, sand or dirt.
- Structural integrity testing in the aerospace segment, where special materials, honeycomb sections and composites demand exceptional tube performance.

With direct emission and panoramic emission models as well as small focal spot radioscopy units, the ERESCO MF4 range offers a comprehensive solution to meet virtually all customer portable X-ray generation needs.
ERESCO MF4 Generators

- Highest power output, with best image definition in its class
- High X-ray dose permitting short exposure times with associated increases in productivity
- Operation with 100% Duty Cycle at 30°C at 1 hour operation time
- Light weighted and compact design
- Robust construction of control and tube heads allowing operation in hostile environments (IP65)
- Lower power consumption meaning low energy costs
- Range of designs, including panoramic output and small focal spot, suitable for radioscopy
- Wide range of accessories, including stands and carriages to facilitate positioning during exposure set-up

ERESCO MF4 Control Unit

- Intuitive and menu driven user interface with multifunction-, numeric- and cursor keys input
- Transreflective, backlit, graphic display for contrast optimized indoor and outdoor operation exposure calculator
- Integrated, real time clock, enabling intelligent and automatic warm-up of the generating unit, taking past operational intervals into account
- Robust and ergonomic design for operation in different working position
- Automatic recognition of the type and serial number of the connected X-ray tube head
- Free configurable exposure programming mode
- Off-line report generation and programming
- Multi-lingual graphical user interface
- Easily adapts to different main supplies, including portable generators and batteries
- Built-in fail-safe warning lamp
- Emergency stop button, in compliance with international standards

Features Summary
Accessories

A wide range of accessories complements the ERESCO MF4 generators.

Other available accessories

- Portable power generator
- Carrying cradle for the MF3 tube
- Door contact cable
- Bracing belts
- Interface cables
- Diaphragm caps for panoramic units
- 20 m extension cable
- PC based exposure calculator
- MF4 Administrator Kit (Serial Interface cable and SW CD-ROM)
- Pipe inspection carriage to facilitate transport and set-up
## Technical Specifications

<table>
<thead>
<tr>
<th>ERESCO MF4 – Serie</th>
<th>200 MF4-R</th>
<th>280 MF4-R</th>
<th>300 MF4-R</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>A real time imaging device, with small focal spot (EN12543), for applications requiring geometric enlargement</td>
<td>A real time imaging device, with small focal spot (EN12543), for applications requiring geometric enlargement</td>
<td>A real time imaging device, with small focal spot (EN12543), for applications requiring geometric enlargement or fast exposure time</td>
</tr>
<tr>
<td><strong>Emergent Beam</strong></td>
<td>Direct Emission</td>
<td>Direct Emission</td>
<td>Direct Emission</td>
</tr>
<tr>
<td><strong>Penetration of Steel in 10 min</strong></td>
<td>-</td>
<td>-</td>
<td>65 mm (2.55&quot;)</td>
</tr>
<tr>
<td><strong>High Voltage Range</strong></td>
<td>10 - 200 kV</td>
<td>10 - 280 kV</td>
<td>10 - 300 kV</td>
</tr>
<tr>
<td><strong>Tube Current Range</strong></td>
<td>0.5 - 10 mA</td>
<td>0.5 - 4.5 mA</td>
<td>0.5 - 6 mA</td>
</tr>
<tr>
<td><strong>Tube Current at U max</strong></td>
<td>3.0 mA / 200 kV</td>
<td>1.2 mA / 280 kV</td>
<td>3.0 mA / 300 kV</td>
</tr>
<tr>
<td><strong>Continuous Rating</strong></td>
<td>600 W</td>
<td>340 W</td>
<td>900 W</td>
</tr>
<tr>
<td><strong>Nominal Focus Spot Value</strong></td>
<td>1.0 mm (EN 12 543) 0.5 (IEC 336)</td>
<td>0.5 mm (EN 12543)</td>
<td>1 mm (EN 12543)</td>
</tr>
<tr>
<td><strong>Anode Material</strong></td>
<td>Tungsten (W)</td>
<td>Tungsten (W)</td>
<td>Tungsten (W)</td>
</tr>
<tr>
<td><strong>Target Angle</strong></td>
<td>20°</td>
<td>15°</td>
<td>15°</td>
</tr>
<tr>
<td><strong>Emergent Beam Range</strong></td>
<td>Elliptical, 40° x 60°</td>
<td>Elliptical, 30° x 60°</td>
<td>Elliptical, 30° x 60°</td>
</tr>
<tr>
<td><strong>Inherent Filtration</strong></td>
<td>0.8 ± 0.1 mm, Be</td>
<td>0.8 mm ± 0.1 mm Be</td>
<td>0.8 mm ± 0.1 mm, Be</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td>Air-cooled</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Duty Cycle (1 hour operation time)</strong></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current and Voltage Stability</strong></td>
<td>± 1 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power Supply Requirements</strong></td>
<td>160 V - 253 V AC, 80 V - 127 V AC, 50/60 Hz *</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight of Tube Head</strong></td>
<td>26.8 kg (59.1 lbs)</td>
<td>40 kg (88.2 lbs)</td>
<td>40 kg (88.2 lbs)</td>
</tr>
<tr>
<td><strong>Certifications</strong></td>
<td>CE Conformity, NFC 74100 **, BfS Certification (PTB Approval) **</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Operation with reduced output is possible at main voltages below 205 V and 108 V respectively

**Available for selected models
### Technical Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight of Tube Head</th>
<th>Penetration of Steel in 10 min</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 MF4-C</td>
<td>26.8 kg (59.1 lbs)</td>
<td>32 mm (1.26&quot;)</td>
<td>Panoramic-Beam unit designed for pipeline and butt-weld inspection</td>
</tr>
<tr>
<td>42 MF4</td>
<td>26.8 kg (59.1 lbs)</td>
<td>42 mm (1.65&quot;)</td>
<td>Air-cooled unit, for a wide range of applications in weld inspection, aluminum casting and also composite materials</td>
</tr>
<tr>
<td>52 MF4-CL</td>
<td>31 kg (68.3 lbs)</td>
<td>52 mm (2.04&quot;)</td>
<td>Panoramic unit designed for pipeline and butt-weld inspection where high penetration power is demanded</td>
</tr>
<tr>
<td>65 MF4</td>
<td>40 kg (88.2 lbs)</td>
<td>65 mm (2.55&quot;)</td>
<td>Air-Cooled unit for a wide range of applications in weld inspection, Al casting and composite materials, especially where high penetration power is demanded</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal Focal Spot Value</th>
<th>Anode Material</th>
<th>Target Angle</th>
<th>Elliptical, Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 MF4-C</td>
<td>1.0 mm (EN 12543)</td>
<td>Tungsten (W)</td>
<td>20°</td>
<td>40° x 60°</td>
</tr>
<tr>
<td>42 MF4</td>
<td>1.5 (IEC 336)</td>
<td>Tungsten (W)</td>
<td>20°</td>
<td>38° x 360°</td>
</tr>
<tr>
<td>52 MF4-CL</td>
<td>3.0 mm (EN 12543)</td>
<td>Tungsten (W)</td>
<td>20°</td>
<td>Elliptical, 40° x 60°</td>
</tr>
<tr>
<td>65 MF4</td>
<td>3.0 mm (EN 12543)</td>
<td>Tungsten (W)</td>
<td>20°</td>
<td>40° x 60°</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Supply Requirements</th>
<th>Current and Voltage Stability</th>
<th>Duty Cycle</th>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - 200 kV 0.5 - 10 mA</td>
<td>± 1 %</td>
<td>0.5 (IEC 336)</td>
<td>CE Conformity, NFC 74100 **, BfS Certification (PTB Approval) **</td>
</tr>
<tr>
<td>5 - 300 kV 0.5 - 4.5 mA</td>
<td>± 1 %</td>
<td>1.5 (IEC 336)</td>
<td></td>
</tr>
<tr>
<td>5 - 300 kV 0.5 - 6 mA</td>
<td>± 1 %</td>
<td>1.5 (IEC 336)</td>
<td></td>
</tr>
<tr>
<td>5 - 300 kV 2.0 mA / 300 kV</td>
<td>± 1 %</td>
<td>1.5 (IEC 336)</td>
<td></td>
</tr>
<tr>
<td>5 - 200 kV 0.5 - 10 mA</td>
<td>± 1 %</td>
<td>0.5 (IEC 336)</td>
<td></td>
</tr>
<tr>
<td>5 - 200 kV 0.5 - 4.5 mA</td>
<td>± 1 %</td>
<td>1.5 (IEC 336)</td>
<td></td>
</tr>
<tr>
<td>5 - 200 kV 0.5 - 4.5 mA</td>
<td>± 1 %</td>
<td>1.5 (IEC 336)</td>
<td></td>
</tr>
<tr>
<td>5 - 200 kV 0.5 - 4.5 mA</td>
<td>± 1 %</td>
<td>1.5 (IEC 336)</td>
<td></td>
</tr>
</tbody>
</table>

- **Available for selected models**
- **Operation with reduced output is possible at main voltages below 205 V and 108 V respectively**

ERESCO Type 160 MF4-R 160 MF4-RW 200 MF4-R 200 MF4-RW 32 MF4-C 42 MF4 52 MF4-CL 65 MF4
Regional Offices

Europe

Germany
Robert Bosch Str. 3
50354 Huerth
+49 2233 6010

Niels-Bohr-Str. 7
31515 Wunstorf
P.O. Box 6241
(RT only)
31510 Wunstorf
+49 5031 172 0

Bogenstr. 41
22926 Ahrensburg
(RT only)
+49 4102 807 117

United Kingdom
892 Charter Avenue Canley
Coventry CV4 8AF
+44 845 130 3925

France
68, Chemin des Ormeaux
Limonest 69760
+33 47 217 9216

Spain
San Maximo, 31, Planta 4A, Nave 6
Madrid 28041
+34 915 500 59 90

Americas

United States
50 Industrial Park Road
Lewistown, PA 17044
+1 866 243 2638 (toll-free)
+1 717 242 0327

721 Visions Drive
Skaneateles, NY 13152
(RT only)
+1 888 332 3848 (toll-free)
+1 315 554 2000 ext. 1

Brazil
Av. Maria Coelho Aquiar, 215
Building C, 6th floor
Jd. Sao Luiz - Sao Paulo - SP
CEP 05804-900 - Brazil
+ 55 11 3614-1840

GE has sales and service offices all over the world.
Below are some of our locations. Visit www.ge-mcs.com for a complete listing.

• Berchem, Belgium
• Alzenau, Germany
• Burford, United Kingdom
• Moscow, Russia
• Bucharest, Romania
• Prague, Czech Republic
• Stockholm, Sweden
• Milan, Italy

Asia

China
5f, Building 1, No.1 Huatuo Road,
Zhangjiang High-Tech Park,
Shanghai 201203
+86 800 915 9966 (toll-free)
+86 (0) 21-3877 7888

Unit 1602, 16/F Sing Pao Building
101 King’s Road
North Point
Hong Kong
+852 2877 0801

Japan
Harumi Island Triton Square Office Tower X
1-8-10, Harumi, Chuo-ku, Tokyo 104-6023
Tel: +81 3 6890 4567
Fax: +81 3 6864 1738

www.ge-mcs.com/x-ray
xray.info@ge.com