

Impulse magnetizer X-Series

• Features

- 3000 V Maximum voltage
- Energy up to 300000 Ws
- Impulse current up to 50000 A
- Up to 10 high current outputs possible
- Siemens PLC control
- Various control panel options
- Various remote interfaces available
- Real-time analog capacitor voltage monitor with display
- Real-time impulse current monitor and display
- Fixture temperature monitor
- Modular construction in control cabinet form
- Many options available
- Configured to customer's requirements
- 12 month warranty for single shift operation



• Description

Wide scope of applications

The X-Series impulse magnetizers are suited for a wide scope of applications in the laboratory and in production.

High variety of functions

X-Series magnetizers are available in different current and energy classes with various combinations of magnetizing, demagnetizing and magnet calibration functions.

X-Series: The Industrial standard for reliability and long service life

The X-Series magnetizer is built around 3000 volt technology, a level which enjoys wide acceptance in industry for reasons of safety and efficacy. Magnetizers can be delivered with total energy levels ranging from 8500 Ws (8.5 kJ) up to 300000 Ws (300 kJ). Because of the modular design, units can be built for later expansion to higher energy levels.

Comprehensive process monitoring

All models have a current comparator for continuous monitoring of the magnetizing process. An integrated measuring unit monitors the temperature of the connected magnetizing fixture. The actual capacitor charge voltage is continuously displayed on a front panel analog voltmeter.

Powerful charging circuits – short cycle times

The use of efficient charging circuits allows for very fast cycle times even at high energy levels.

Magnetizing of large magnet assemblies

In combination with magnetizing fixtures of the type **MF-RI**, rotors with diameter > 80 mm, as are used in vehicle drive applications, can be magnetized. Sufficiently high energy levels are possible so that even magnetizing of large rare earth-magnet assemblies in wind power generators is practical.

With our patented **ITL**-series Impulse Transformers, currents > 300 kA can be produced, making possible very high magnetic fields as required for magnetizing transverse- and axial-flux machines as are often found in hybrid vehicle drives.

• **Safety functions**

Safety is a key area for Magnet-Physik. Protection of the operator and operation without interruption are primary concerns.

Continuous monitoring

All basic functions are controlled continuously by the PLC. The voltage at the capacitors is monitored by the PLC and additionally by a separate circuit. In case of a fault or interruption of the mains power the capacitors are discharged automatically. Each magnetizer is equipped with at least two of these circuits.

Temperature control of magnetizing fixture

Magnet-Physik magnetizing fixtures are equipped with thermocouples that allow monitoring of the fixture temperature. A second internal snap-switch also will open should excessive heat build-up. The magnetizer continuously monitors these interlocks. It will disable the output and generate a fault warning when an overtemperature condition exists. Operation can continue only when the fixture has cooled to a safe level.

• **Options**

Interfaces:

Standard: 24 V I/O

Optional: RS232, Ethernet, or Profibus

Control Panel:

The ability of the operator to change process parameters can be locked out using a key switch. The following control panel configurations are offered, also in combination with the optional communication and control interfaces:

Display and Pushbuttons



Touch Panel



High current output to connect magnetizing fixture:

The X-Series can be upgraded to have multiple high current outputs, configured to fire synchronously or individually, depending on the system configuration. The selection of the active output can be implemented electronically or mechanically.

Electronic output selection:

Up to 3 electronically selectable outputs can be built into an X-Series magnetizer. Electronic switching makes sense when it is necessary to switch frequently among the available outputs.

Mechanical output selection:

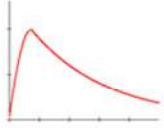
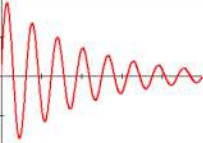
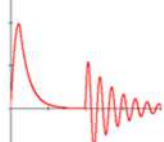
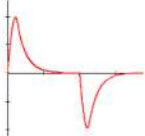
Up to 10 mechanically selectable outputs can be built into an X-Series magnetizer. An output is selected using high current mechanical contacts. Mechanical selection is practical when infrequent switching between the available outputs is required. Maximum current is limited to 15 kA in this configuration.

Capacitance switching:

X-Series magnetizers with high total energy can be configured to allow bridging of capacitors in various combinations. For example, the amount of capacitance in use can be reduced when using a smaller magnetizing fixture, to avoid overheating of the fixture and unnecessary internal stress. The switched out capacitance can be added back by the user when required. In combination with several high current outputs this is helpful for the magnetization of small quantities of a variety of parts.



• **Functions / impulse waveforms**

<p>A Aperiodically damped</p>		<p>Magnetization</p>
<p>D Damped oscillation</p>		<p>Demagnetization Stabilization</p>
<p>AD Aperiodically damped with subsequent Damped oscillation (Functions A and D can also be used separately)</p>		<p>Magnetization and Demagnetization (Weakening, stabilization and adjustment of magnets)</p>
<p>AK Aperiodically damped, commutated (Functions A and K can also be used separately)</p>		<p>Magnetization with polarity change</p>

• **Technical data**

Energy	8500 Ws – 300000 Ws
Voltage U_{max}	3000 V
Setting resolution of voltage	Resolution 0.1 V, 1 V
Maximum current	35 kA, 50 kA
Short circuit protection	Yes
Cycle time (at U_{max})	standard 6 s (depending on energy and charging circuit cycle times < 2 s are possible)
Peak current measurement	Accuracy 1 %
Operation	Display / Touch Panel / Control via Interfaces
Interfaces	RS232 / Ethernet / Profibus / 24 V digital
High current outputs	1, optional up to 10
Mains connections	1-phase, 230 V AC \pm 10 %, 50/60 Hz, 16 A 3-phase, 400 V AC \pm 10 %, 50/60 Hz, 32 A Other mains connections are possible
Weight	approx. 500 kg depends on configuration
Dimensions	Energy up to 17000 Ws: Width: 1200 mm Height: 1860 mm Depth: 450 mm Energy up to 100000 Ws: Width: 1200 mm Height: 1860 mm Depth: 900 mm Depends on configuration