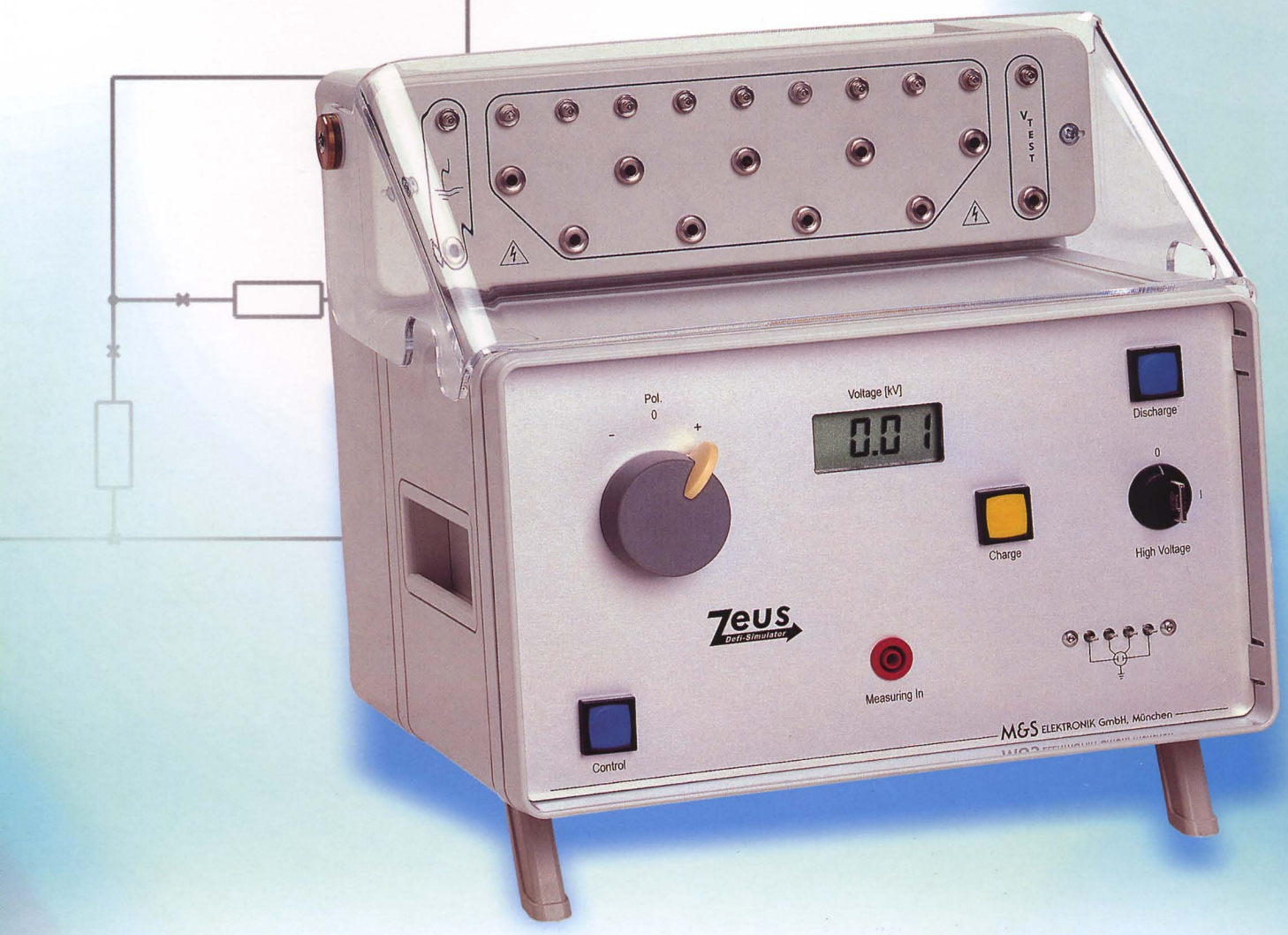
Device for Testing the

Defibrillation Protection of ECG Equipment

Zeus
Defi-Simulator



MÜLLER & SEBASTIANI
ELEKTRONIK-GMBH

M&S

ZEUS is the first device specially developed for testing the defibrillation protection of medical equipment.

M&S has developed the ZEUS defibrillation simulator in response to the increasing need for performing defibrillation tests in compliance with European standards.

Thanks to its many years of experience and extensive know-how in the design and production of medical devices, M&S has the technical skill needed to develop high-quality testing equipment of this type. The Zeus defibrillation simulator features reliable operation, ease-of-use, and a high safety level.

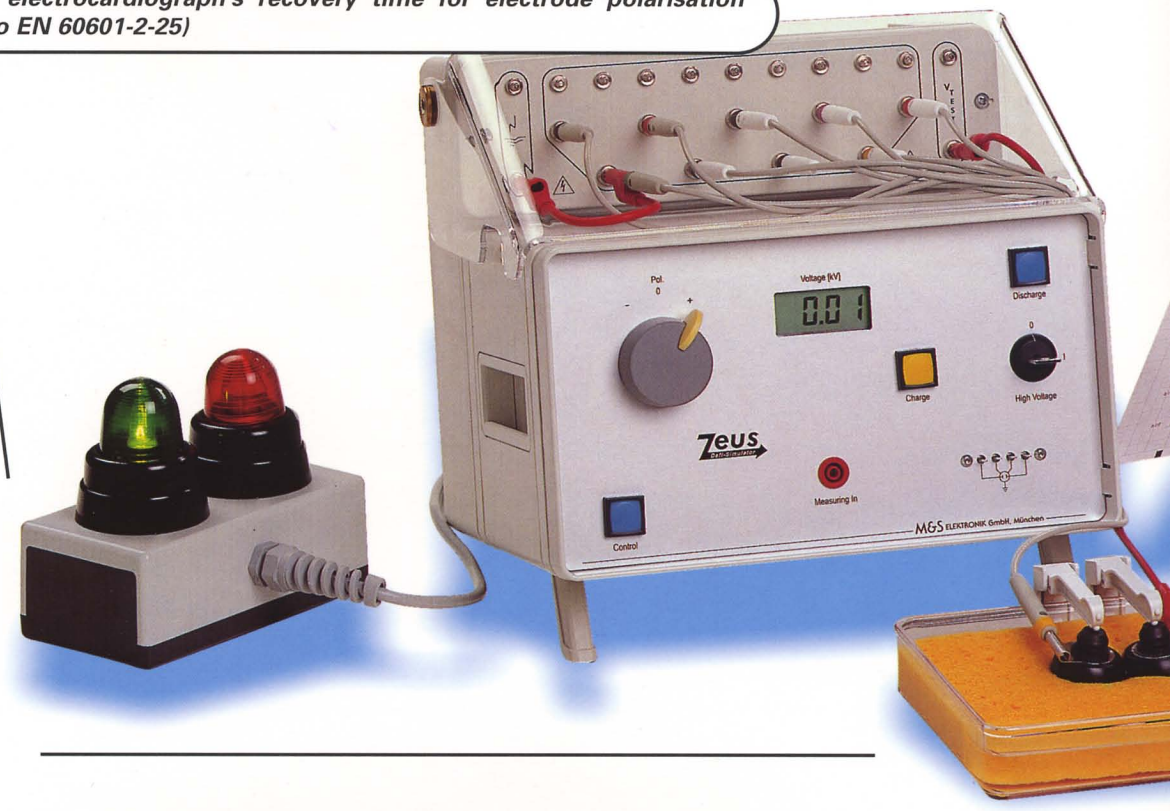
*This device now make it possible for **manufacturers of ECG equipment** and **manufacturers of accessories** (such as patient cables, suction systems, electrodes, etc.) to test their equipment themselves.*

*For **testing laboratories**, ZEUS represents a safe and reliable device for performing tests in conformity with the standards.*

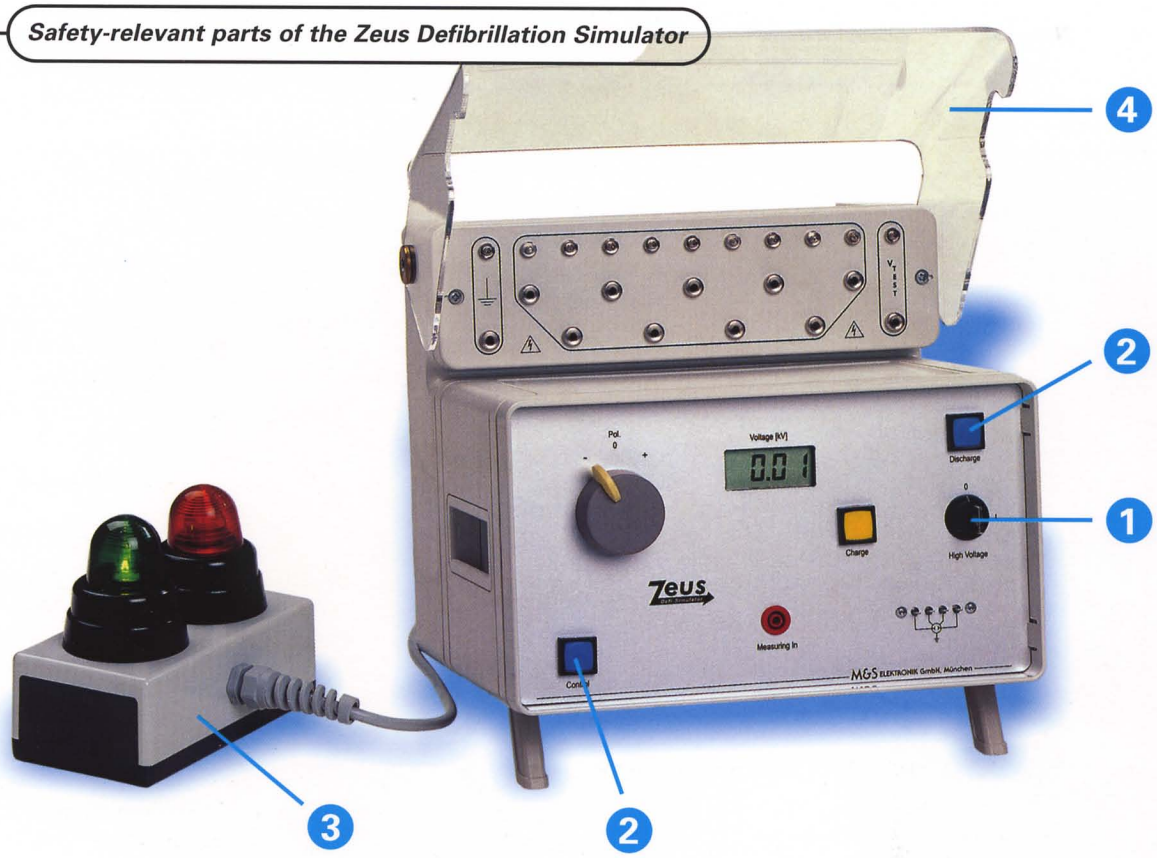
ZEUS makes it possible to perform defibrillation tests according to EN 60601-1, point 17h:

- *The test voltage can be increased steplessly up to 5 kV.*
- *A 10-core patient cable with banana-type plugs or clips can be connected directly to the device.*
- *The device has an integrated 10-Hz sine-wave generator.*
- *Oscilloscope and test terminal connectors make it possible to perform dynamic tests for limitation of energy for different parts of the equipment being tested.*
- *The polarity selector switch is used to switch the polarity of the test voltage. This makes it easier to repeat every test with reversed polarity as required by the standards.*

Test of the electrocardiograph's recovery time for electrode polarisation (according to EN 60601-2-25)



Safety-relevant parts of the Zeus Defibrillation Simulator



Safety

With the ZEUS defibrillation simulator, the focus is on a high level of safety for the operator, which is based on the following requirements for high-voltage test equipment:

1. *The high voltage can only be turned on via a key-operated switch*
2. *Two-hand operation*
3. *Red and green warning lights (accessory)*
4. *Protective cover for the electrode plugs*

Automatic discharge for the capacitor

***Two-hand operation** for the triggering of the charge and discharge protects against the hazard of electrical shock, which could be caused by accidentally touching the equipment that is being tested during discharge.*

*The capacitor has an **automatic discharge circuit**, which is activated when the supply voltage is interrupted or when the control button is released.*

*The **special protective cover** prevents undesired contact with live parts that conduct high voltage and against possible injury when the electrodes are damaged.*
The discharge can only be triggered when the protective cover is closed.

M&S

Specifications

Housing

Material:	Solid plastic, aluminium front plate
D x B x H:	Approx. 24 x 27 x 24 cm
Weight:	Approx. 7.0 kg

- 3.5-character liquid crystal display for monitoring the voltage
- Connection for 10-core patient cable with banana plugs or clips
- Polarity selector switch
- Safety features:
  - Protective cover with safety switch for electrode plugs
  - Connector for red/ green warning lights (12V)
  - Two-hand operation
  - Key-operated switch
  - Automatic discharge

Accessories

- Red/green warning light
- for testing recovery times: sponge, pan, electrode clips
- Test terminal

Electronics

- Supply voltage: 230 V / 250 mA
- Test voltage can be increased steplessly up to 5 kV
- Automatic discharge at 5.2 kV
- Measurement procedure in accordance with EN 60601-1
- Integrated 10-Hz sine wave generator
- Integrated measuring circuit for connecting oscilloscope and test terminal (dynamic test)

TÜV PRODUCT SERVICE | QM system certified according to DIN ISO 9001

MÜLLER & SEBASTIANI ELEKTRONIK-GMBH

M&S

M&S - Müller & Sebastiani Elektronik GmbH - Leibnizstr. 7 - D-85504 Ottobrunn - Germany
Tel: 089 71098 10 - Fax: 089 71098 325 - Email: info@ms-gmbh.de - HP http://www.ms-gmbh.de