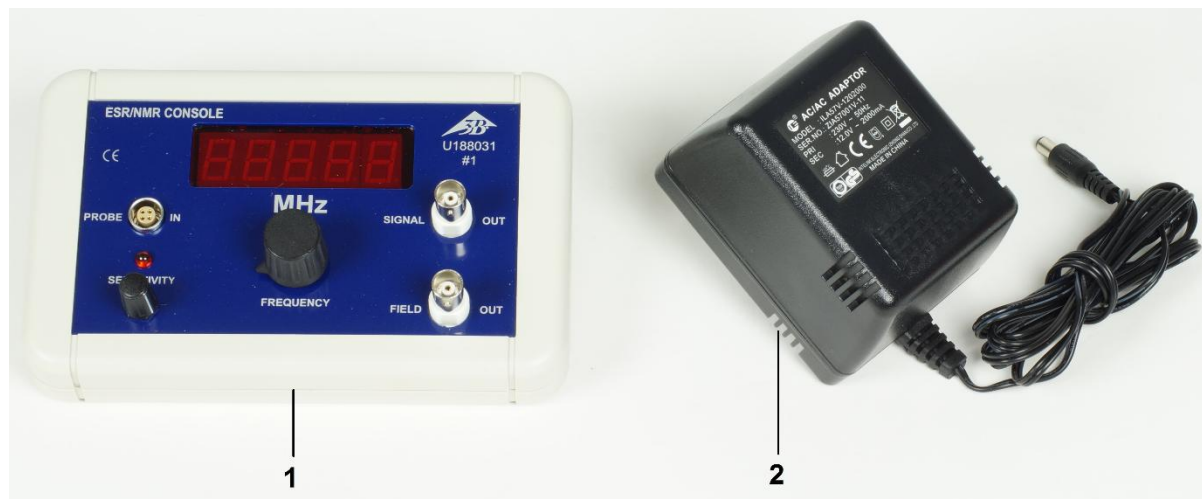


ESR-NMR Control Unit

1022700 (230 V, 50/60 Hz)
1022702 (115 V, 50/60 Hz)

Product Manual

08/20 SD



1) Control Unit

2) Plug-In Power Supply

1. Safety Instructions

The ESR/NMR control unit complies with the safety requirements for electrical equipment for measurement, control, and laboratory use according to DIN EN 61010 Part 1. It is intended for operation in dry rooms suitable for electrical equipment.

The supplied plug-in power supply meets the particular requirements and tests for safety isolating transformers in accordance with DIN EN 61558 Part 2-6, and all outputs are safe to touch.

When used as intended, safe operation of the equipment is ensured. However, safety is not guaranteed if the equipment is operated improperly or handled carelessly.

If it must be assumed that safe operation is no longer possible (e.g. in the event of visible damage), the equipment must be taken out of operation immediately.

- Use the equipment only in dry rooms.
- Do not apply any external voltage to the output sockets.
- Operate only with the supplied plug-in power supply.

2. Description

The ESR-NMR control unit is used in conjunction with the ESR module (item no. 1022705) to investigate electron spin resonance (ESR) in DPPH (2,2-diphenyl-1-picrylhydrazyl) and in conjunction with the NMR module (item no. 1022706) to measure nuclear magnetic resonance (NMR) in glycerin, polystyrene, and Teflon®.

The observation of the resonances is performed through radio-frequency-induced transitions as the external magnetic field is varied. The resonance absorption curves can be displayed using a simple two-channel oscilloscope.

The control unit provides the control and supply voltages for the measuring head of the respective module and for the pair of coils. It processes the measurement signal for display on an oscilloscope. It also indicates the frequency of the RF signal.

The ESR-NMR control unit with item number 1022700 is designed for a mains voltage of 230 V / 50–60 Hz (±10%), while item number 1022702 is designed for 115 V / 50–60 Hz (±10%).

3. Scope of Delivery

- 1 ESR-NMR control unit
- 1 Plug-in power supply 12 V AC
(230 V, 50/60 Hz)
- or
- 1 Plug-in power supply 12 V AC
(115 V, 50/60 Hz)

4. Specifications

Control unit:

Sample signal input:	Four-pole LEMO socket
Connection pair of coils:	Sawtooth current source; 0 – 250 mA, 50 ms; pair of DC power input jacks
Magnetic field output:	Proportional to coil current; 0 – 1 V, BNC socket
Signal output:	Resonance signal; 0 – 1 V, BNC socket
Frequency range: (approx.)	38 bis 75 MHz (ESR) 11 bis 15 MHz (NMR)

General data:

Power supply:	Plug-in power supply 12 V AC, 2.0 A; DC power plug, 5.5 mm x 2.5 mm; cable length: 2 m
Ambient temperature:	5 °C bis 40 °C
Maximum relative humidity:	80 %
Dimensions:	<u>Control unit:</u> 170x105x45 mm ³ <u>Plug-in power supply:</u> 100 x 90 x 70 mm ³
Weight:	approx. 1050 g incl. plug-in power supply

Electromagnetic compatibility:

Electromagnetic emission:	DIN EN 55011:2009
Electromagnetic immunity:	DIN EN 61326-1:2013

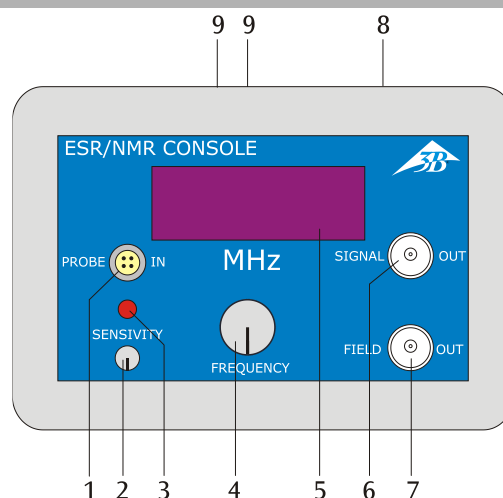
Electrical safety:

Protection class:	2
Pollution degree:	2
Degree of protection:	IP20

5. Additionally Required

1 ESR module	1022705
or	
1 NMR module	1022706
1 Digital oscilloscope, 2x 30 MHz	1020910
or	
1 PC oscilloscope 2x 25 MHz	1020857
2 RF cables	1002746

6. Control Panel of Control Unit



- 1 Connection socket for measuring head
- 2 Sensitivity control
- 3 Sensitivity indicator
- 4 Frequency control
- 5 Frequency display
- 6 Measurement signal output
- 7 Magnetic field output
- 8 Connection socket for plug-in power supply
- 9 Coil connection

7. Operation

For the experimental setup and experimental procedure, see the following product manuals:

ESR module	1022705
NMR module	1022706

The following experiment descriptions are also recommended:

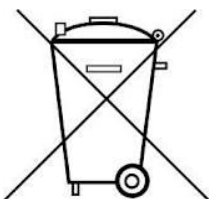
Electron spin resonance	8000719 8000720
Nuclear magnetic resonance	8000721 8000722

8. Care and Maintenance

- Disconnect the equipment from the power supply before cleaning.
- Use a soft, damp cloth for cleaning the equipment.

9. Disposal of Waste (WEEE)

The symbol of the crossed-out wheeled bin means that this device must be collected separately from unsorted municipal waste at the end of its service life. Do not dispose of the device in normal household waste. For return, please use the local free collection and return systems provided by municipalities (e.g., recycling centers) or the take-back options provided by retailers.



- Batteries and Lamps: Remove waste batteries and accumulators that are not enclosed by the waste equipment, as well as lamps that can be removed without being destroyed, from the waste equipment prior to delivery to a collection point.
- Data Protection: As an end-user, you are legally responsible for deleting personal data from the waste equipment to be disposed of.
- Packaging: Dispose of the packaging materials separately at local recycling points (e.g., paper/cardboard in paper waste, plastics in designated recycling bins).