

POWER SUPPLIES





"TO ALL EDUCATORS AND MEMBERS OF THE

Frederiksen Scientific is a privately-owned company which develops and produces science teaching equipment built for successful learning. We have been pioneering in this field for decades.

We are headquartered in Oelgod, Denmark, the place where Mr. Søren Frederiksen, a physics teacher, laid the foundations of our company.

Since then, we have developed into an international supplier of science teaching equipment – our products are available in more than 60 countries.

Whatever your teaching aid requirements, you can benefit from the complete range of Frederiksen Scientific products and experiment instructions, suitable for any curriculum. With us, teaching natural science is an easy and secure process. Why?

Because we have
passion for science
and would like to share it with you

NATURAL SCIENCE TEACHING COMMUNITY"



Selecting the right power supply

The power supplies in this catalogue are often used in experimental setups requiring voltages below 25 V. Frederiksen has several models in this range which raises the question: Which power supply should I choose? The list below shows the parameters that Frederiksen recommends for assessing your needs:

- Quality of DC voltage
- Quality of AC voltage
- Voltage range
- Current range
- Overload protection / current limiter

For a detailed discussion of these parameters, please consult:

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CONTENT

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LOW VOLTAGE (12 V, AC/DC)

Power supply, 1-12 V, AC/DC

Stepwise adjustment of the voltage in steps of 1 V. The DC voltage is full wave rectified but neither smoothed nor stabilized. The power supply is overload protected by a thermal circuit breaker.

Specifications:

<i>DC:</i>	
Voltage:	1-12 V (un-filtered), adjustable in 1 V steps
Current:	Max. 6 A
<i>AC:</i>	
Voltage:	1-12 V, adjustable in 1 V steps
Current:	Max. 6 A
Power consumption:	Max. 110 W
Dimensions:	203 x 225 x 117 mm
Weight:	3.5 kg

Item no. 361055



Power supply, 0-12 V, 3 A, AC/DC

The power supply delivers a stabilized DC voltage, adjustable continuously between 0 and 12 V. Moreover it delivers an AC voltage, selectable as 2, 4, 6, or 12 V. The AC voltage is not stabilized. Both outputs are overload protected.

Specifications:

<i>DC:</i>	
Voltage:	0-12 V (stabilized), cont. adj.
Current:	Max. 3 A
Ripple and noise:	Max. 100 mV
<i>AC:</i>	
Voltage:	2-4-6-12 V, stepwise
Current:	Max. 3 A
Power consumption:	Max. 110 W
Dimensions:	203 x 225 x 117 mm
Weight:	3.2 kg

Item no. 361600



Power supply with display, 0-12 V, 3 A, AC/DC

The power supply delivers a stabilized DC voltage, adjustable continuously between 0 and 12 V. The output voltage is shown in a display. Moreover it delivers an AC voltage, selectable as 2, 4, 6, or 12 V. The AC voltage is not stabilized. Both outputs are overload protected.

Specifications:

<i>DC:</i>	
Voltage:	0-12 V (stabilized), cont. adj.
Current:	Max. 3 A
Ripple and noise:	Max. 100 mV
<i>AC:</i>	
Voltage:	2-4-6-12 V, stepwise
Current:	Max. 3 A
Power consumption:	Max. 110 W
Dimensions:	203 x 225 x 117 mm
Weight:	3.2 kg

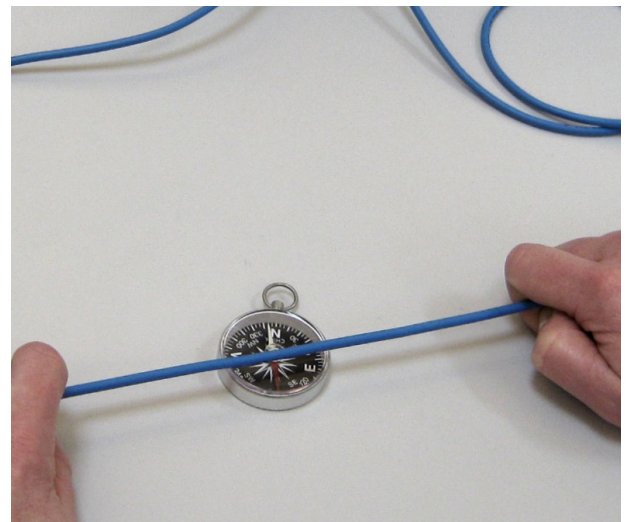
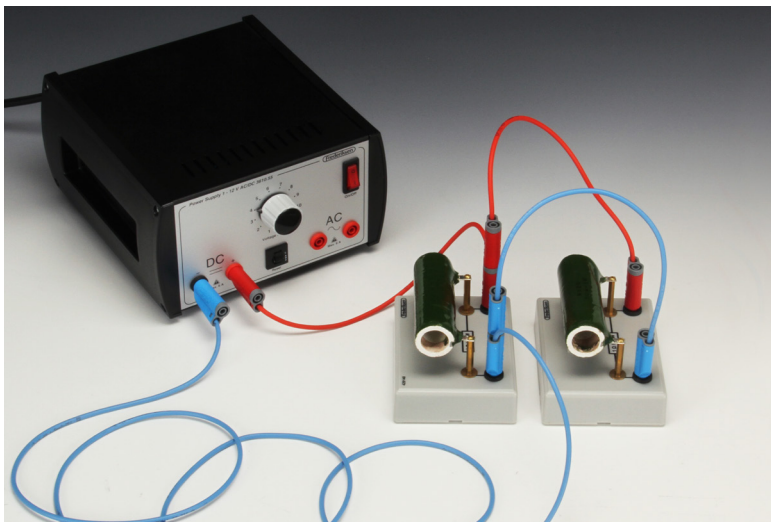
Item no. 361700



Experiment: Oersted's experiment (137110)

We examine the magnetic field around a current-carrying conductor. The direction of the magnetic field in a given point is found with a small compass. The direction of the field is the direction in which the north pole of the compass is pointing. The wire effectively constitutes a short circuit. If you wish to conduct this experiment with a power supply without a variable current limiter, insert a couple of parallel-coupled power resistors (429140).

The lab manual and a detailed equipment list can be found on www.frederiksen.eu



LOW VOLTAGE (24 V, AC/DC)

Power supply, 2-24 V, 5 A, AC/DC

Stepwise adjustment of both AC and DC in 2 V steps. The DC voltage is full wave rectified but neither smoothed nor stabilized. The power supply is overload protected by a thermal circuit breaker.

Specifications:

DC:
Voltage: 2-24 V (un-filtered), adjustable in 2 V steps
Current: Max. 5 A

AC:
Voltage: 2-24 V, adjustable in 2 V steps
Current: Max. 5 A

Power consumption: 180 W
Dimensions: 203 x 225 x 117 mm
Weight: 4.1 kg

Item no. 361065



Power supply with display, 0-24 V, AC/DC

Continuously adjustable AC and DC voltages. The DC voltage is full wave rectified and smoothed, but not stabilized. The power supply is overload protected by a thermal circuit breaker.

Specifications:

DC:
Voltage: 0-24 V, cont. adj.
Current: Max. 5 A
Ripple and noise: Max. 5 V

AC:
Voltage: 0-24 V, cont. adj.
Current: Max. 5 A

Power consumption: Max. 200 W
Dimensions: 259 x 225 x 117 mm
Weight: 6.3 kg

Item no. 361870



Power supply, 0-24 V, 0-10 A, AC/DC

A very versatile power supply for any low power experiment. Low weight which makes it easy to handle. Individual, continuously adjustable control of both AC and DC voltages. Continuously adjustable current limiter for DC. Electronic current limiter for AC.

Specifications:

DC:
Voltage: 0-24 V (stabilized), cont. adj.
Current: Max. 10 A (0-12 V)
Ripple and noise: Max. 25 mVpp

AC:
Voltage: 0-24 V, (stabilized sinus)
Current: Max. 6 A

Power consumption: Max. 320 W
Dimensions: 312 x 225 x 117 mm
Weight: 3.4 kg

Item no. 364000

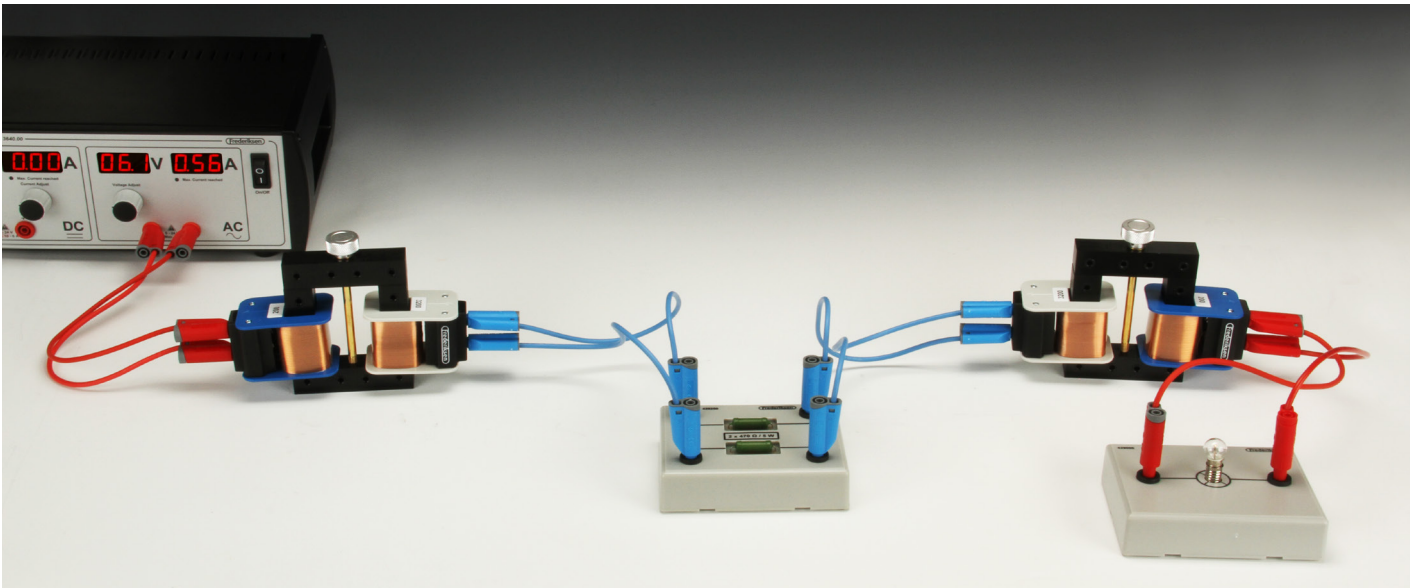
Item no. 364010 Current limiter with slot



Experiment: High voltage lines (136090)

We examine how line resistance influences the energy transferred using low and high voltage. A small light bulb is connected to a power supply, first directly, next through a couple of resistors that simulate long power lines. Finally, two transformers are inserted so that the resistors are placed in the "high voltage lines".

The lab manual and a detailed equipment list can be found on www.frederiksen.eu



LOW VOLTAGE (15 V, 30 V, DC)

Power supply, 0-15 V, 3 A DC

A low cost alternative if you need a stabilized DC power supply (switch-mode type), that outputs up to 30 V / 5 A. Two displays show voltage and current. Continuously adjustment of voltage and current with extra an control knob for fine tuning.

Specifications:

Voltage: 0-15 V (stabilized), cont. adj.
 Current: Max. 3 A
 Ripple and noise: 20 mVpp
 Dimensions: 270 x 150 x 95 mm
 Weight: 2.9 kg

Item no. 362510



Power supply, 0-30 V, 5 A DC

A low cost alternative if you need a stabilized DC power supply (switch-mode type), that outputs up to 30 V / 5 A. Two displays show voltage and current. Continuously adjustment of voltage and current with extra an control knob for fine tuning.

Specifications:

Voltage: 0-30 V (stabilized), cont. adj.
 Current: Max. 5 A
 Ripple and noise: 200 mVpp
 Dimensions: 85 x 155 x 200 mm
 Weight: 2 kg

Item no. 362540



Power supply, 0-30 V, 20 A

This DC power supply allows current-hungry experiments or several concurrent setups. The power supply has digital displays for both voltage and current. Continuously adjustment of voltage and current with extra an control knob for fine tuning.

Specifications:

Voltage: 0-30 V DC (stabilized), cont. adj.
 Current: Max. 20 A, cont. adj.
 Ripple and noise: 5 mV
 Dimensions: 265 x 140 x 360 mm
 Weight: 17 kg

Item no. 362570



HIGH VOLTAGE (500 V, 6 kV)

Power supply, 500 V, 50 mA

This power supply is not for student use due to the high output current. Used with electron tubes and other equipment that requires a voltage up to 500 V DC and a moderate current. The device also provides two auxiliary voltages: A negative voltage, adjustable down to -50 V, coupled in series with the 500 V output – and a stepwise adjustable AC voltage that is galvanically isolated from the other outputs. The -50 V and 500 V outputs are individually and continuously adjustable. The current is limited to 50 mA. Voltage and current are displayed digitally.

Specifications:

<i>DC:</i>	
Negative voltage:	0 til -50 V (stabilized), cont. adj.
Positive voltage:	0 til +500 V (stabilized), cont. adj.
Current:	Max. 50 mA
Ripple and noise:	Less then 0,1%
<i>AC:</i>	
Voltage:	2-7 V, adjustable in 1 V steps
Current:	Max. 3 A
Dimensions:	312 x 225 x 117 mm
Weight:	4.8 kg

Item no. 365575



Power supply with display, 0-6 kV DC

The power supply provides a stabilized DC voltage that is continuously adjustable between 0 and 6 kV. For safety reasons, the current is limited by a built-in series resistor. The voltmeter displays the actual voltage under load. The power supply also provides a 6.3 V AC output (max. 3 A). The high power output is "floating" with respect to ground, which allows for a voltage range from 0 to +6 kV, resp. 0 to -6 kV, relative to ground.

Specifications:

<i>DC:</i>	
Voltage:	0-6 kV (stabilized), cont. adj.
Current:	Max. 2 mA
Ripple and noise:	Max. 1% (RMS, 100 V-6 kV)
<i>AC:</i>	
Voltage:	6,3 V
Current:	Max. 3 A
Power consumption:	Max. 80 W
Dimensions:	312 x 225 x 117 mm
Weight:	4.5 kg

Item no. 367060



Experiment: The plate capacitor (136930)

We examine a plate capacitor with and without dielectric in order to find its capacitance. This also allows us to determine experimentally a value for the vacuum permittivity ϵ_0 .

The lab manual and a detailed equipment list can be found on www.frederiksen.eu



MAINS ADAPTERS

Universal mains adapter

Provided with a Europlug. Choose from 7 different stabilized output voltages and select one of the 9 different output plug types included.

Specifications:

AC Voltage:	100-240 V
DC Voltage:	3-4,5-5-6 -7,5-9-12 V
Current:	Max. 1500 mA
Power:	Max. 18 W
Standby Power consumption:	0,3 W

Item no. 355035



Mains adapter, 12 V DC, 1.5 A, 2.1 mm, DC plug

Switchmode mains adapter. Stabilized 12 V DC provided through a 2.1 mm DC plug. With exchangeable mains plug attachments for Europe, UK, US and Australia.

Specifications:

Voltage:	12 V, DC (stabilized)
Current:	Max. 1500 mA Net
Voltage:	100-240 V AC / 50-60 Hz

Item no. 355050



Mains adapter for light box (12 V)

Use a 3 A adapter (No. 293520) for optics set 293500. You only need a 2 A adapter (No. 293210) for optics set 293600. Both adapters can be used for the student reuter lamp with festoon bulb (280030). The adapters are supplied with safety plugs.

Specifications:

Voltage:	12 V, DC
Current:	2 A

Item no. 293510

Specifications:

Voltage:	12 V, DC
Current:	3 A

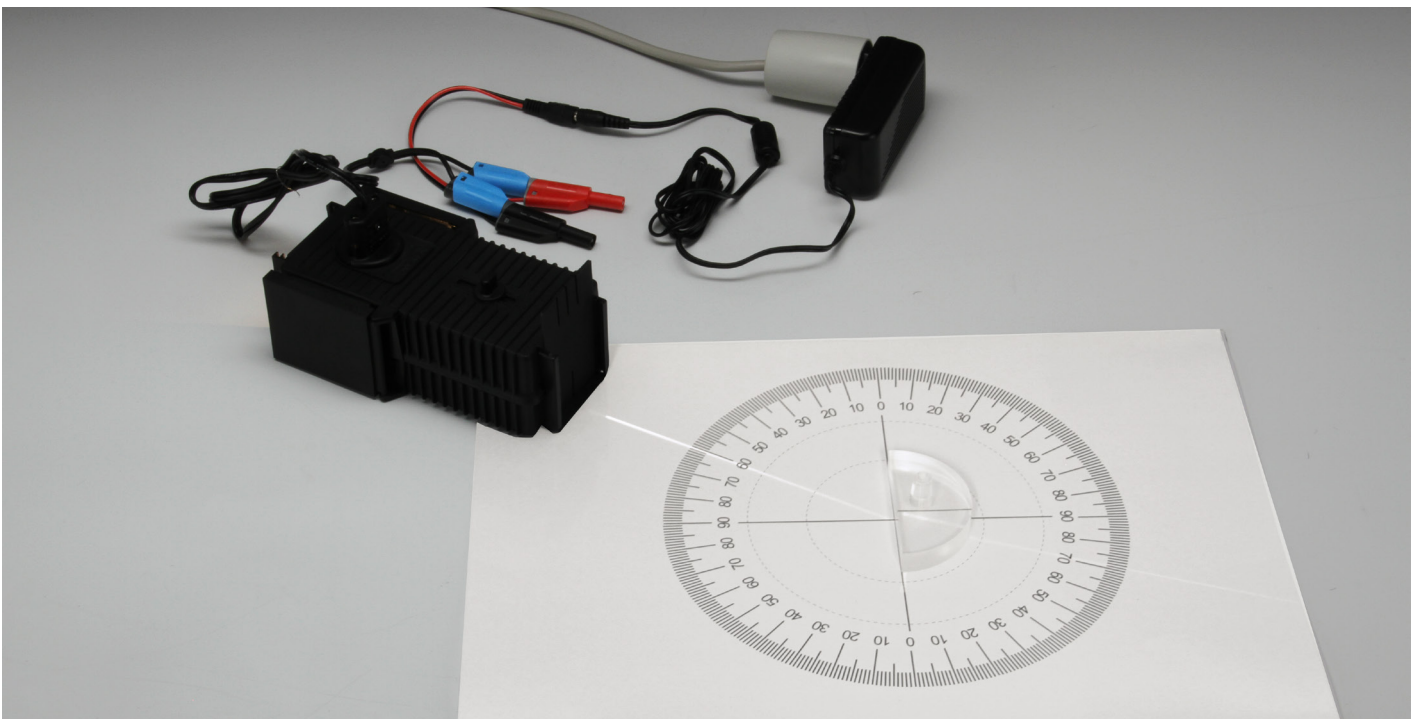
Item no. 293520








Experiment: Optics set – refraction of light







We examine the refraction of light in a semi-circular acrylic lens and study the relation between the angle of incidence and the angle of transmission. Different liquids can be used instead of the solid acrylic block, leading to different indexes of refraction.

The lab manual is included with optics set with lightbox (293500)



OVERVIEW OVER FREDERIKSEN'S POWER SUPPLIES

Item no.	361055	361065	361870	361600	361700
					
DC:					
Voltage	1-12 V	2-24 V	0-24 V	0-12 V	0-12 V
Voltage adjustment	Stepwise (adj. in 1 V steps)	Stepwise (adj. in 2 V steps)	Continuously	Continuously	Continuously
Current	Max. 6 A	Max. 5 A	Max. 5 A	Max. 3 A	Max. 3 A
Current adjustment	None	None	None	None	None
Protection	Thermal circ. brk. 6 A	Thermal circ. brk. 6 A	Thermal circ. brk. 8 A	Electronically	Electronically
Quality of DC	Full wave rectified	Full wave rectified	Full wave rectified, smoothed	Stabilized	Stabilized
Ripple and noise	Not smoothed	Not smoothed	< 5 V	100 mV	100 mV
Display	Knob with scale	Knob with scale	Voltmeter (Select AC eller DC)	Knob with scale	DC-Voltmeter AC Knob with scale
Digital reading	± 10 %	± 10 %	± 1 % ± 0,2 V	± 5 %	± 5 %
AC:					
Voltage	1-12 V	2-24 V	0-24 V	2-4-6-12 V	2-4-6-12 V
Voltage adjustment	Stepwise (adj. in 1 V steps)	Stepwise (adj. in 2 V steps)	Continuously	Stepwise	Stepwise
Current	Max. 6 A	Max. 5 A	Max. 5 A	Max. 3 A	Max. 3 A
Current adjustment	None	None	None	None	None
Protection	Thermal circ. brk. 6 A	Thermal circ. brk. 6 A	Thermal circ. brk. 8 A	Automatic	Automatic
Quality of AC	Good	Good	Acceptable	Acceptable	Acceptable
Display	Knob with scale	Knob with scale	Voltmeter (Select AC eller DC)	Knob with scale	DC-Voltmeter AC Knob with scale
Digital reading	± 10 %	± 10 %	± 1 % ± 0,2 V	± 5 %	± 5 %
Dimensions B x D x H (mm)	203 x 225 x 117	203 x 225 x 117	259 x 225 x 117	203 x 225 x 117	203 x 225 x 117
Weight	3.5 kg	4.1 kg	6.3 kg	3.2 kg	3.2 kg

364000, 364010	365575	367060	362510	362540	362570
					
0-24 V	0-50 V, 0-500 V	0-6 kV	0-15 V	0-30 V	0-30 V
Continuously	Continuously	Continuously	Continuously	Continuously	Continuously
0-10 A (0-12 V) 0-10/6 A (12-24 V)	Max. 50 mA	Max. 2 mA	Max. 3 A	Max. 5 A	Max. 20 A
Continuously - Current limiter	None	None	Continuously - Current limiter	Continuously - Current limiter	Continuously - Current limiter
Electronically	Electronically	Electronically	Electronically	Electronically	Electronically
Stabilized	Stabilized	Stabilized	Stabilized	Stabilized	Stabilized
< 25 mVpp	< 0,1 %	< 1 %	< 20 mVpp	< 200 mVpp	< 5 mV
Volt- and amperemetre	Volt- and amperemeter	Voltmeter	Volt- and amperemeter	Volt- and amperemeter	Volt- and amperemeter
±1 % ± 2 LSD	±1 %	±1 %		±1 %	
0-24 V	2-7 V	6,3 V			
Continuously	Stepwise (adj. in 1 V steps)	Fixed			
Max. 6 A	Max. 3 A	Max. 3 A			
None	None	None			
Electronically	Thermal circ. brk. 3 A	Thermal circ. brk. 3 A			
Excellent	Acceptable	Acceptable			
Volt- and amperemetre	Knob with scale	None			
± 2 % ± 2 LSD					
312 x 225 x 117	312 x 225 x 117	312 x 225 x 117	270 x 150 x 95	85 x 155 x 200	265 x 140 x 360
3.4 kg	4.8 kg	4.5 kg	2.9 kg	2 kg	17 kg



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