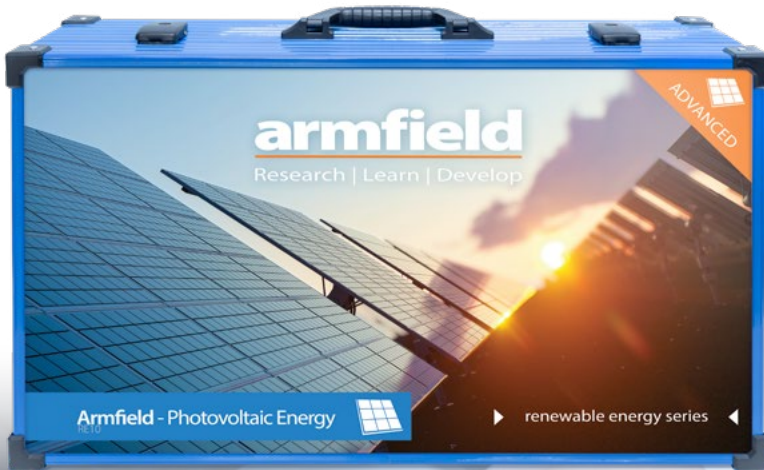


The Armfield advanced renewable energies range is a specialised learning system for the technical education in universities and vocational training centres.

The kits cover Photovoltaic and Wind Energy generation, Fuel Cell and Battery Technology, Thermal Energy and the construction of a controllable Smart Grid on a laboratory scale.



Supplied in an aluminium case

PROVIDES A WIDE RANGE OF EXPERIMENTS INCLUDING THE PHYSICAL FUNDAMENTALS OF PHOTOVOLTAIC, ANALYSIS OF THE COMPONENTS OF PV-SYSTEMS AND THE DESIGN OF COMPLEX PV-SYSTEMS ON A LABORATORY SCALE

“The RE10 Advanced Photovoltaic Energy system provides students with a self-contained modular system, covering the physical fundamentals of photovoltaics, the analysis of the components of PV-Systems, and the ability to design complex PV-Systems on a laboratory scale.

The system includes experiments to allow students to determine the fundamental properties of solar cells; analysing electrical characteristics of solar cells; measuring and describing the influence of environmental conditions on solar cell parameters.

Due to its modular design, very detailed specific characteristics of single components can be analysed, including switching threshold of series or shunt regulators, MPP tracking, PWM regulator and power generation.”



Features / benefits

- ▶ Photovoltaics training system for technical training and university students
- ▶ Setup of fully equipped PV-systems in laboratory scale
- ▶ Individual components of PV-systems can be evaluated
- ▶ Modular design
- ▶ Supplied in a self-contained aluminium case
- ▶ Includes in-depth manual and predefined experiments

Experimental content

Electrical engineering basic experiments:

- ▶ Measurement of voltage current, and power Ohm's law
- ▶ Series connection of resistors (voltage divider)
- ▶ Parallel connection of resistors (current divider)

Photovoltaic basic experiments

- ▶ Series and parallel connection of solar cells
- ▶ Power dependence on the surface area of the solar cell
- ▶ Power dependence on the angle of incidence
- ▶ Power dependence on level of illumination
- ▶ Power dependence on level of illumination under load
- ▶ Internal resistance dependence on level of illumination
- ▶ Shading effect on solar cells
- ▶ Dark characteristic curve of solar cells
- ▶ I-V-characteristics, MPP and fill factor of solar cells
- ▶ Dependence of the I-V-characteristics of solar cells on level of illumination
- ▶ Dependence of the I-V-characteristics of solar cells on temperature
- ▶ Characteristic curve of solar modules
- ▶ I-V-characteristics of partly shaded solar modules
- ▶ Temperature coefficient of solar cells

Photovoltaic system experiments:

- ▶ Components of an off-grid system
- ▶ Possible operating conditions of off-grid systems
- ▶ Working principle of shunt and series regulators
- ▶ Comparison of PWM and series regulator
- ▶ Load characteristic of PWM regulators
- ▶ Working principle of a MPP tracker
- ▶ Characteristics of a MPP tracker
- ▶ Working principle of deep discharge protection
- ▶ Working principle of an inverter
- ▶ Determination of the output voltage progression at an inverter

Related curriculums

- ▶ Electrical Engineering
- ▶ Renewable Energies

Ordering specification

- ▶ 1 x Solar module 5.33V, 370mA
- ▶ 1 x Diode module Pro
- ▶ 1 x Potentiometer module Pro
- ▶ 1 x Shunt regulator module Pro
- ▶ 1 x Motor module Pro
- ▶ 1 x Light bulb module Pro
- ▶ 1 x Base unit Professional
- ▶ 1 x LED module (high brightness) Pro
- ▶ 1 x Deep discharge protection module Pro
- ▶ 1 x Series regulator module Pro
- ▶ 1 x Capacitor module Pro
- ▶ 1 x Radio module Pro
- ▶ 1 x DC/ AC Inverter Pro
- ▶ 1 x MPP Tracker Pro
- ▶ 1 x PWM regulator Pro
- ▶ 1 x Resistor plug element 33 Ohm
- ▶ 3 x Resistor plug element 100 Ohm
- ▶ 2 x Resistor plug element 10 Ohm
- ▶ 3 x Solar module 0.5V, 840mA
- ▶ 2 x Resistor module (triple) Pro
- ▶ 3 x Lighting module (with safety sockets)
- ▶ 1 x Base for solar panel
- ▶ 2 x AV-module
- ▶ 1 x Power module
- ▶ 1 x Solar cell cover set (4 pieces)
- ▶ 1 x Propeller
- ▶ 1 x Aluminium case PV Professional
- ▶ 4 x Safety test lead, 25cm, red
- ▶ 3 x Safety test lead, 25cm, black
- ▶ 2 x Safety test lead, 50cm, red
- ▶ 1 x Safety test lead, 50cm, black
- ▶ 3 x Safety short-circuit plug, with mid socket
- ▶ 1 x Lamp housing
- ▶ 1 x Lamp 80W
- ▶ 1 x Manual

Requirements

Scale



Electrical supply: 110-230V AC 50-60Hz

- ▶ Level and stable work surface

Overall dimensions

Tray	
Length	0.640m
Width	0.165m
Height	0.370m
Packed and crated shipping specifications	
Volume	0.038m ³
Gross weight	7.5Kg

Other products in the advanced renewable energies range

- ▶ **RE12:** Advanced Wind Energy
- ▶ **RE14:** Advanced Fuel Cell Technology
- ▶ **RE16:** Advanced Thermal Energy
- ▶ **RE18:** Advanced Smart Grid Technology
- ▶ **RE24:** Advanced Battery Technology

Operational conditions

- ▶ Storage Temperature: -10°C to +70°C
- ▶ Operating temperature range: +10°C to +50°C
- ▶ Operating relative humidity range: 0 to 95%, non-condensing

Ordering codes

- ▶ **RE10:** Advanced Photovoltaic Energy

Armfield standard warranty applies with this product

Knowledge base

- > 28 years expertise in research & development technology
- > 50 years providing engaging engineering teaching equipment

Benefit from our experience, just call or email to discuss your laboratory needs, latest project or application.

An ISO 9001:2015 Company



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Aftercare

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Commissioning
Training
Service and maintenance
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