

# Photovoltaic Workshop "Installation, Commissioning & avoiding Mistakes"



## Let's create the future together!

**Avoiding mistakes during the installation** but also during the design of PV arrays is may be the biggest challenge in the PV-market. A PV array should produce 30 a reliable power without much losses. But to assure this quality requires knowledge about many things – **you/ your customer can save a huge amount of money by avoiding the typical mistakes.**

**Commissioning is a must after the PV array is installed.** A right commissioning will find installation mistakes and it assures you and your customer the quality of the PV-Power-Plant. The task is to install a PV array that is "permanent weather resistant" and that it generates energy reliable during the following 30 years.

**Don't miss this seminar, avoid costly mistakes and become a PV-professional!**



**The Academy of Solar Power Education** (The Academy) aims to provide you the latest and best and photovoltaic education in the world. During the last 20 years Germany was the largest PV-market worldwide, the German education about PV is world leading. The content will be presented easy to understand, interactive and with strong relation to the practice. **Experience learning with excitement and fun. It is the initial key for your success.**

The Academy has trained Universitas Sumatra (USU), Universitas Indonesia (UI); and cooperates as well as with foreign or national companies and Institutions such as AHK-EKONID, PSPA, GIZ-GPCCI.

**Don't miss it, register now!**

inutec solarcenter international gmbh  
www.inutec-int.com  
Im Gewerbegebiet 17  
38315 Schladen GERMANY



## REQUIREMENTS

Good knowledge about PV-systems and their fundamentals is required! You should also now all the electrical basics. The knowledge from PV-Basics course is mandatory to join this course. Knowledge about design is helpful (PV-Advanced/ Design course).



## INSTRUCTOR

CEO/Dipl.-Ing. Environment Techniques  
Authorized Expert for Photovoltaic Equipment (TÜV)

**Alexander Kaub**



## TARGET GROUP

All successful participants of PV-Basics, entrepreneurs and their teams, installers, architects, planners, decision makers, sales specialists, government, education and

- ✓ you if you want to get your business growing fast
- ✓ you if you want to avoid costly mistakes!



## COURSE FEE

Around 320 USD per participant  
✓ inclusive certificate

- 5% Early Bird discount (30 days prior the event)
- 20% if you book all four PV courses!



## LOCATION/DURATION

Multiple locations

Register online at  
www.TheAcademyOfSolarPowerEducation.com  
e-mail: support@inutec-int.com

# Photovoltaic Workshop "Installation, Commissioning & avoiding Mistakes"

## In 2 days, you will work out about:

- 1 site survey, preparation, transport**
  - summary
  - group task about site survey, preparation, transport
- 2 installation of PV arrays**
  - overview, installation rules
  - pitch roof installation, 3 possibility's to install on a flat roof, free field installation
  - static issues and wind load
  - how to find the right mounting system
  - installation roles module and inverter
  - task and exercise about installation
- 3 grounding and lightning protection**
  - purpose of grounding
  - how to ground my system
  - grounding mistakes
  - group task grounding
  - purpose of lightning protection
  - tips & tricks
- 4 expensive mistakes in design and installation**
  - examples: typical mistakes in design and installation
  - system design, building regulations, standards, structural stability,
  - electrical installation, DC and AC lines, defective installation and more.
  - group tasks: Knowledge transfer to the practice
- 5 measurement of PV-Systems**
  - measurements AC and DC, reports
  - measurements before and after commissioning
  - troubleshooting measurements
- 6 Characteristic Curve Measurement**
  - examples: typical mistakes in design and installation
  - failure analyze tasks
- 7 commissioning of PV-systems**
  - commissioning roles
  - system documentation
  - requirements in commissioning
  - exercise and knowledge transfer
- 8 Hands on Training "measurement of solar modules"**
  - practical measurement of solar modules with a Volt Meter and Ampere Clamp
  - measurement with a characteristic curve measurement device
  - commissioning measurements with the Benning PV 1
  - group task and exercise
- 9 Quality assurance**
  - service and maintenance
  - troubleshooting
  - Group tasks: Knowledge transfer to the practice
- 10 brief test and certificate award**



**Alexander Kaub**, founder and lecturer of **The Academy and inutec** is working successfully for the last 20 years in the field of solar photovoltaic (PV) energy. With his company inutec solarcenter he is a true pioneer who has taken part in all aspects of the solar market. From 2008, 2009 and 2010 his company generated every year around 18 million USD turn-over in Germany. He has impressive experience in designing, planning, installation, training, the growing solar market and operating a business. In 2013 he attended 12 seminars about the latest PV knowledge in Germany to be up to date. He is an Authorized Expert for Photovoltaic Equipment (TÜV).



## BRING YOUR LAPTOP AND CHARGER!

### Registration:

Online at [www.TheAcademyOfSolarPowerEducation.com](http://www.TheAcademyOfSolarPowerEducation.com)

e-mail: [support@inutec-int.com](mailto:support@inutec-int.com)

### Venue:

