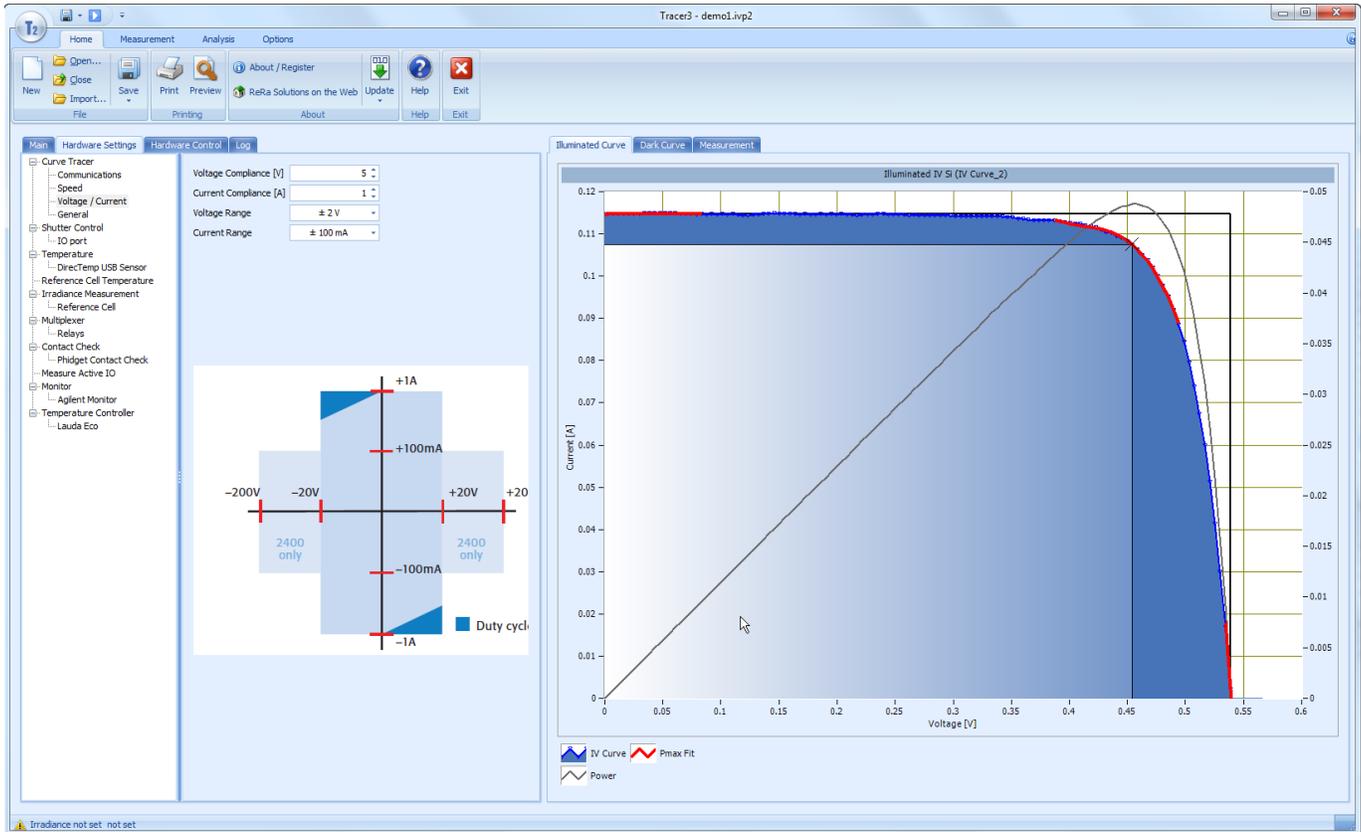


Tracer™ PV IV Software

Complete solar cell and module IV-curve tracing and analysis



Tracer 3 – Power and Convenience

This third generation Tracer™ software package, Model 15000, builds on the field experience with the previous offerings and greatly simplifies hardware interaction while adding more data acquisition and analysis power.

In Tracer™ you will find your all-in-one solution for the measurement and elaboration of IV-curve measurements. Tracer™ natively supports all of the Abet offered electronic loads including the complete range of Keithley 24xx and 26xx SourceMeters™, Kepco bipolar amplifiers and Agilent DMMs.

Tracer™ was developed with the latest Microsoft.NET Technology, which resulted in a modern “Microsoft Office 2013” look and feel and assures stable operation on the Microsoft Windows platform.

Computer Requirements

- Microsoft Windows Vista, 7, 8, 8.1
- Support for both x86 and x64 bit.
- Minimum Intel Core i3 (or similar), 2Gb memory

Elaboration algorithms

The algorithms used in Tracer meet the IEC-standards for Efficiency measurements. Different dedicated fitting algorithms to extract the two-diode model parameters are included. Spectral Mismatch correction is supported.

Organic cells

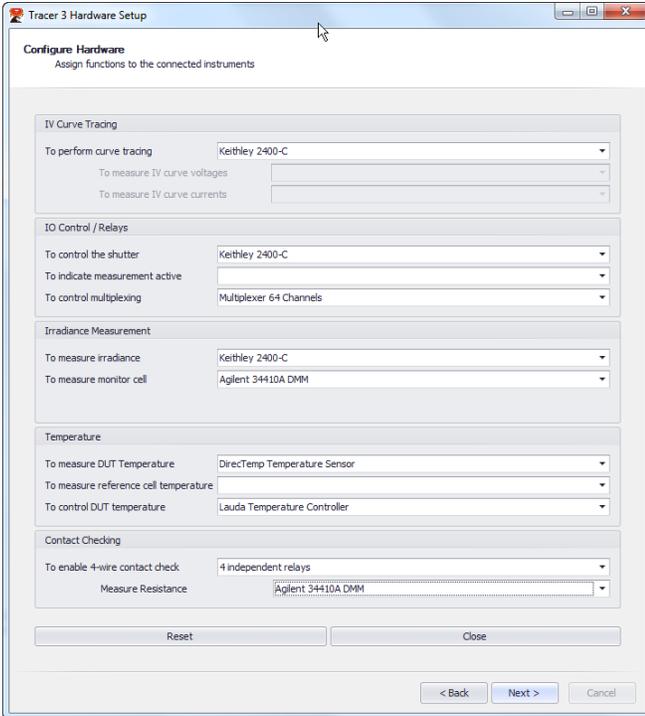
Since crystalline cell based models may not represent organic materials quite as well Tracer™ supports import of additional fitting algorithms that may be better suited for analysis of these cells.

Free Viewer

Purchasing the Tracer™ software entitles you to download up to 5 licenses for the Tracer™ Viewer, Model 15001. The Viewer is similar to the full software, however it does not offer hardware control. The Viewer allows you to analyze your data in your office while IV curves are being acquired in your laboratory.

Hardware Configuration

The hardware configurator is a flexible tool which allows creation of a large number of different setups. The configuration can be a simple IV measurement system based on a Keithley Source-Meter™ and low-cost solar simulator. For the more expert user it is possible to configure Tracer to be used in a highly sophisticated setup, with contact checking, irradiance monitoring, multiplexing and temperature readout/control.



Tracer™ has the ability to control the following instruments:

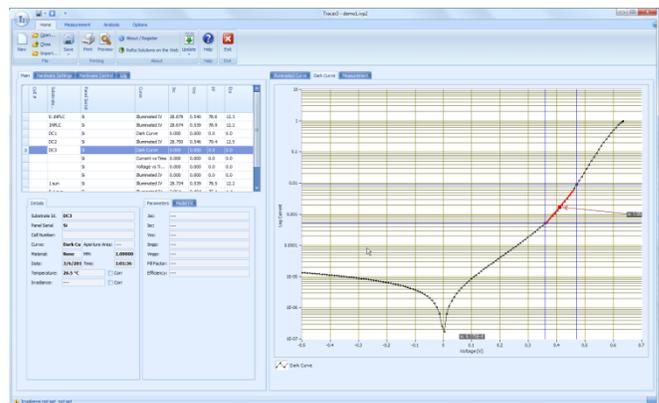
- Complete range of Keithley Source-Meters™ (both 2400 and 2600 series).
- Kepco Bi-Polar power supplies, NI DAQ
- Common models of Keithley and Agilent DMM's and multiplexers.
- DirecTemp high precision temperature sensors
- Lauda ECO liquid chiller/heaters
- All of Abet's applicable instruments (Reference Cells, Loads, Read Out units, Shutter Controllers, Module measurement systems, Temperature measurements devices, XY positioning tables and multiplexers)

Example: you have a Keithley 2400 Source-Meter™ and Agilent 34410A DMM available. You can configure Tracer™ to measure the solar cell by the front input of the Keithley 2400, use the rear input to measure the reference cell. Use the Agilent DMM to measure a Pt100 that is connected to your solar cell and also use it, with the help of an Abet multiplexer, for a continuous monitor cell.

- **Measurements: V_{OC} , I_{sc} , J_{sc} , V_{mpp} , I_{mpp} , FF, η , R_{sh} , R_s , n, Suns over V_{OC} , I vs. time, V vs. time and more**
- **IEC standards compliant correction to STC**
- **Wide range of Electronic Loads (Source-Meters) and Solar Simulators supported**
- **Single cell and module metrology**
- **Light and Dark curve measurement**
- **Long term measurements and light soaking**
- **Temperature dependency analysis**
- **Full database support (SQL, MySQL)**
- **Numerous solar cell material specific models included**
- **Integrated scripting engine**
- **Remote control (http) for simple integration in existing applications**

Automatic Data Storage

All data is stored in native project files. Export to many different file formats is included (.txt, .csv, .xlsx, etc....). Tracer™ supports the usage of MySQL or SQL Server databases. Our experts can help you set up a database system where all measurements are automatically stored. A simple viewer that shows the results in the database is included with the software package.



Tracer™ 3 Dark curve data screen