

SMUs and Multiplexers

infiniPV ApS offers a versatile range of source/sink measure units (SMUs) enabling testing of many solar cells in the same setup (from 1 to 40 channels) using a unique series multiplexers (MUXs) that cover from low voltage to high voltage 1kV or above. It is all controlled by powerful software enabling determination of power conversion efficiency and follow performance over time when solar cells are subjected to different test conditions following for instance the ISOS testing protocols in connection with our ISOSun series of solar simulators. Our multiplexed units enable access to the device under test at all times (except when periodically tested by the SMU). This allows the user to control the electrical conditions of the devices under test at all times. This could be electrical stress through forward or reverse bias, a short circuit, open circuit, or a load. It is also possible to add active load to each channel such that the device on that channel is subject to maximum power point tracking (MPPT). When combined with our ISOSun, ISOS-L-3 chamber, weather station and software a complete turnkey system is at hand.



Key highlights:

infiniPV SMUs are unique on several fronts:

- Available in many sizes to meet specific needs
- From volts to kilovolts and from μ Amperes to Amperes
- From a single channel to 40 channel multiplexing
- Active loads with Maximum Power Point Tracking
- Designed for continuous operation for many years
- Fully CE-approved and compliant
- Rugged aluminium cabinets that are easily mechanically fixed to other components
- Standalone touchscreen control and PC interface on all models
- Equipment that does not interfere with adjacent equipment or experiments
- Additional 8-channel weather input platform comprising wind speed, wind direction, 2 x humidity, 2 x temperature, AM15.D and AM1.5G (sensors not included)
- Weather input is easily software configured to accepts a large range of weather probes (resistive, voltage, current, source V / measure I, source I / measure V)
- Fast industry 4.0 ready test software packages and interfacing to robotics
- Free software available online with the most recent additions



SMU Selection Guide

There are 2 overall SMU options: **Low Power SMUs** and **High Power SMUs**, each option with a high degree of customization. The **Low Power SMUs** are designed for laboratory PV devices and small modules with a voltage of up to 4 V and a current of up to 40 mA. The **High Power SMUs** can be applied for both small laboratory PV devices and large PV modules with high power output and a voltage of more than 1kV. See tables below for more detailed information:

- Low Power SMUs:

	USB SMU	8CH MPPT SMU	16CH ISOS SMU
No. of channels	1 (up to 4 with active loads)	8	16
Active load for MPPT (4V/40MA)	Option	Integrated	Option
Voltage range [V]	-4 to +4	-4 to +4	-4 to +4
Current range [mA]	-40 to +4	-40 to +4	-40 to +4
IV scan in	3 rd to 4 th Quadrant	3 rd to 4 th Quadrant	3 rd to 4 th Quadrant
Resolution	16 bit	16 bit	16 bit
Source/Sink Limit	40 mA	40 mA	40 mA
Multiplexed	Optional	Yes	Yes
Weather channels	No	Temp. and humidity	Temp. and humidity
Compatible with ISOS Testing Laboratory	No	No	Yes
Touch screen control	No	Yes	Yes
PC control	Yes	Yes	Yes
Software	IV characterization and lifetime measurement with MPPT option	IV characterization and lifetime measurement with MPPT option	IV characterization and lifetime measurement with MPPT option
Stand alone	Yes	No	No

- High Power SMUs:

	High voltage SMU	High power SMU	ISOS testing SMU
No. of channels	Up to 16	Up to 16	40
Active load option (4V/40MA)	Yes	Yes	No
Voltage range [V]	0 to 1000	up to 600	-20 to +20
Current range [mA]	-60 to 0	0 to 2500	0 to 1000
IV scan in	4 th Quadrant	4 th Quadrant	All Quadrants
Resolution	12 bit	12 bit	16 bit
Source/Sink Limit	<250 mA	<5 A*	1 A
Multiplexed	Yes	Yes	Yes
Weather channels	No	No	8 channels for indoor and outdoor weather measurements
Compatible with ISOS Testing Laboratory	No	No	Yes
Touch screen control	Yes	Yes	No
PC control	Yes	Yes	Yes
Software	IV characterization and lifetime measurement with MPPT option	IV characterization and lifetime measurement with MPPT option	IV characterization and lifetime measurement
Stand alone	No	No	No

*Depending on version