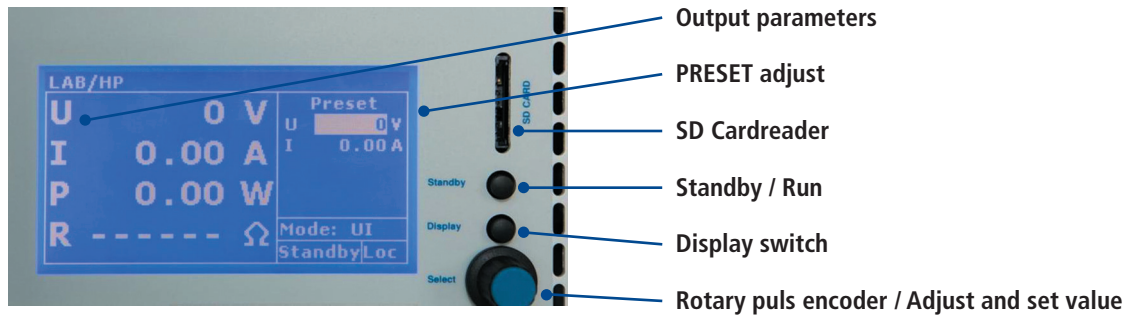


Operation Modes LAB HP & LAB SMP ETSYSTEM

UI mode

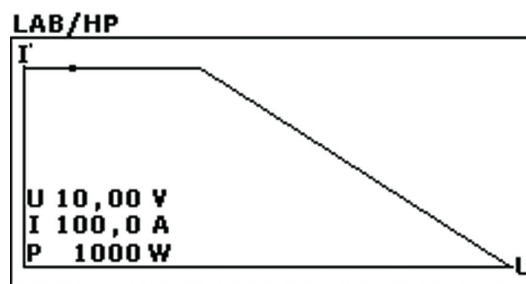
In the UI mode the set values for voltage and current are transferred directly to the switch mode regulator. There is no additional digital control.



UI Mode

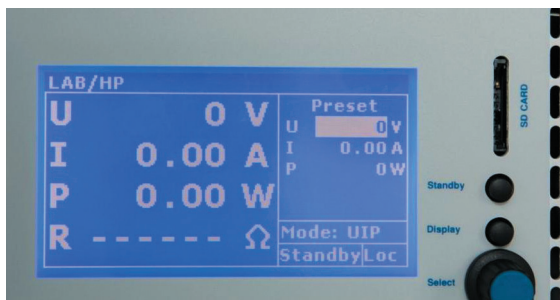
The output diagram is graphically displayed as UIR diagram. The picture shows the operating mode UIR.

The diagram is always relative to the selected values. For example, the current limiting would be changed from 100 A to 50 A, while the internal resistance would be doubled, the diagram would still be the same. The horizontal part of the diagram corresponds then to 50 A and not to 100 A.

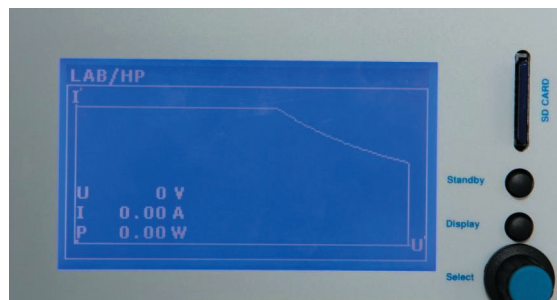


UIP Mode

In the UIP mode the set values for voltage and current are transferred directly to the switch mode regulator. If the output current exceeds an adjustable limit value, the current setpoint will be regulated.



UIP Mode

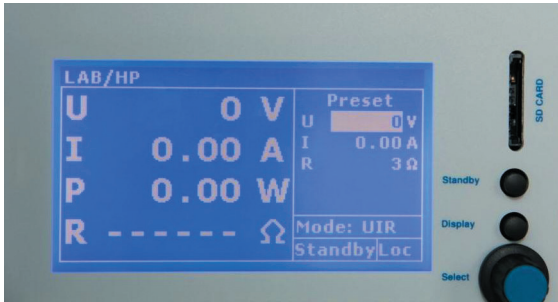


UIP Mode Graph

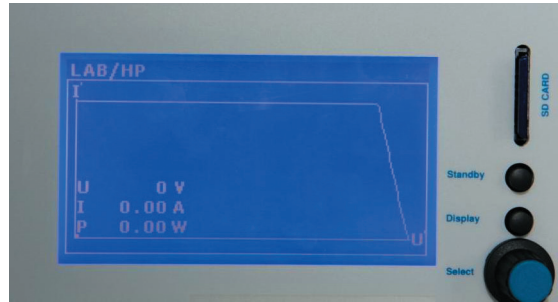
Operation Modes LAB HP & LAB SMP

UIR Modus

In the UIR mode the voltage set point is regulated by simulating a power supply unit with (adjustable) internal resistance. The set point for the current limiting is transferred directly to the switch mode regulator.



UIR Mode



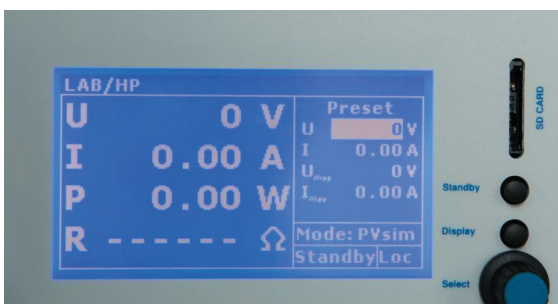
UIR Mode Graph

PVsim Mode

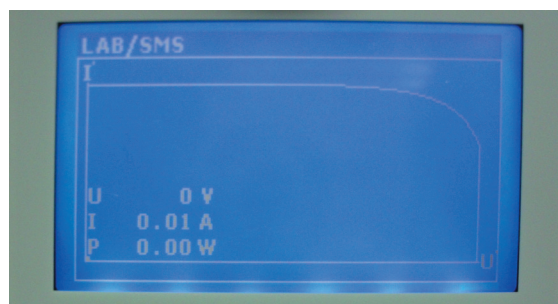
In the Pvsim mode the diagram of a PV generator is simulated. Open-circuit voltage U_0 , short-circuit current I_k , as well as voltage and current of whom the PV generator brings the maximum power (U_{mpp} , I_{mpp}), are given. Parameters may be found in the specification sheet of the simulated PV generator.

Value for U_{mpp} may be in the range from 0.6 to $0.95 \cdot U$.

Value for I_{mpp} may be in the range from 0.6 to $0.95 \cdot I$.



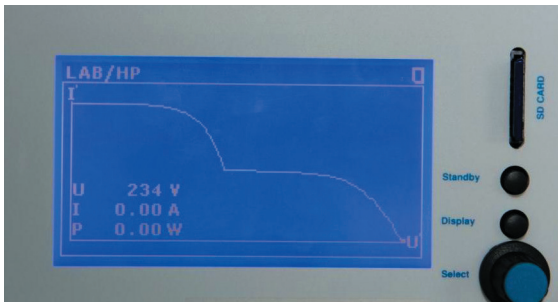
PVsim



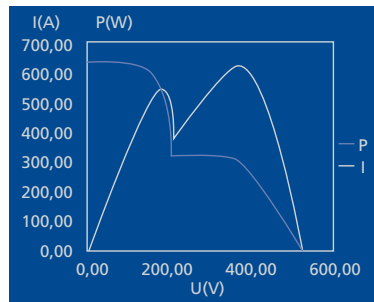
PVsim Graph

Script Mode

In Script mode, the unit is controlled by memory card. The display "Mode" shows the operation mode "UI". The lower right display shows the word "Scr", which indicates that script operation is selected. For detailed information about memory card control see → chap. Script control.



Script Mode



Different I/U characteristics of a PV generator depending on solar radiation.

Using an Excel table to program a I/U curve corresponding to a partly shaded solar modul.

Data 1. PV-Generator		
Uo	217	V
Ik	3,65	A
Umpp	175	V
Impp	3,15	A

Data 2. PV-Generator		
Uo	217	V
Ik	1,83	A
Umpp	175	V
Impp	1,58	A

Parameter		
M	-2,2241	Ohm
Rpv	-6,2412	Ohm
Iph	3,6500	A
Io	0,0033	A
Ut	30,8984	V
Step dl	0,0143	A

Parameter		
M	-4,4781	Ohm
Rpv	-12,3385	Ohm
Iph	1,8300	A
Io	0,0016	A
Ut	30,7745	V

Inputfields

Shading simulation

Under real conditions, solar modules are unable to generate permanent currents. In the medium term, the current strength varies due to solar radiation and outside temperature; and passing clouds or shading caused by leaves cause short term variations.

Inverters quickly need to adapt to such variations. In order to test how well this works, the power source to which the inverter is connected must be able to simulate such short term variations. The units of our LAB series manage these tasks without problems and therefore fulfill the requirements of the EN 50530 norm, which controls the test of inverters. With units from our LAB series, the user is able to upload free selectable U/I characteristics via SD card or digital interface and therefore to simulate the shading for an arbitrary number of modules even when assembling strings by parallel connections.