BigRef

Large Area PV Reference Cell

The BigRef is designed as reference cell for measurement and adjustment of irradiance for sun simulators. The the very precise calibration allows an exact determination of sun simulator irradiance. The BigRef can also be used for the measurement of non-uniformity of light for sun simulators for PV modules. Specially the large area of the sensor element offers a large advantage to reference cell designed as WPVS reference cells, as non-uniformity effects are compensated by the BigRef.

Development and Design has been in Cooperation with Solar Cell Calibration Laboratory CalTeC - Solar Cells of Institute for Solar Energy Research Hamelin (ISFH) www.caltec.isfh.de.

Features

- à PV Reference Cell for Calibration and Measurement of Sun Simunators
- à Design as per IEC 60904-2:2023
- à Pt100 IEC 60751 Class A for Cell Temperature Measurement
- à Development and Design in Cooperation with Institute for Solar Energy Research Hamelin (ISFH)
- à PV Reference Cell for Measurement of Non-Uniformity of Sun Simunators
- à Excellent Linearity of Isc, much better than required as per IC 60904-10
- à Very good thermal conduction of PV Cell with Back-Plane
- à Output Signal: Shunt Voltage or I/V-Curve

Options

- à DAkkS Calibration related to Light Spectrum as per IEC 60904-3
- à Measurement of Spectral Response as per IEC 60904-8
- à Measurement of Linearity as per IEC 60904-10
- à Customised Cable Length

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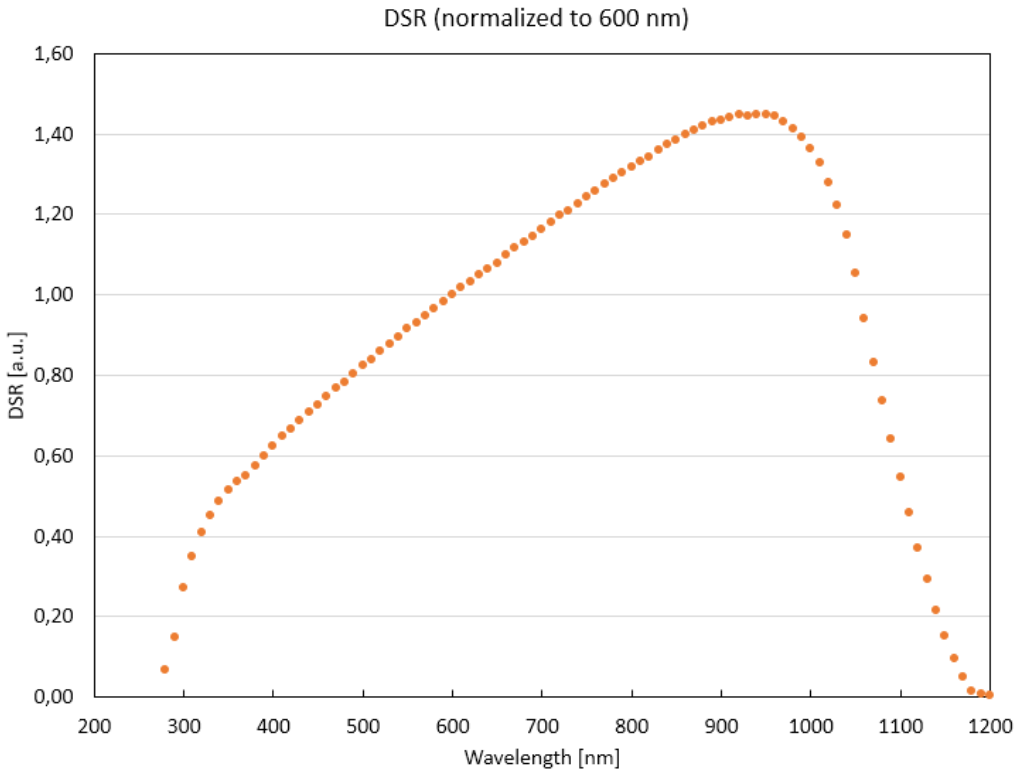
Technical Data

Type	BigRef-IV-03	BigRef-mV-03
Signal	IV Curve (4-Wire) [1]	Shunt Voltage approx. 80 mV @ STC
Shunt Nominal Value / TC	./.	9 mOhm / 15 ppm/K
Uncertainty of Isc resp. Vshunt with DAkkS Calibration	typ. 1.2% (max. 1.4%)	typ. 1.6% (max. 1.8%)
Design as per IEC60904-2	Yes [2]	
Sensor Element	Mono Crystalline PV Cell 156,75 x 156,75 mm², pseudo-square Vendor: BigSun, Type: B156X1D4A-2020	
Linearity bei 25°C	Typ. 0.1% from 100 to 1200 W/m²	
Temperature Coeffiecient Isc	Typ. 0,0005 1/K [3]	
Temperature Meas. PV cell	Pt100 Class A as per IEC 60751	
Case Size / Protection	210 mm x 210 mm x 12 mm / IP 50	
Case Material	Black Anodised Aluminium	
Cable PV Cell	ASS 3x2x0,5 mm², Shielded, Red, 2 m Length	
Cable Pt100	LiYCY 2x2x0,14 mm², Shielded, Black, 2 m Length	
Operating Temperature	+5 to +70 °C	
Customs Tariff Number	90 25 19 20	

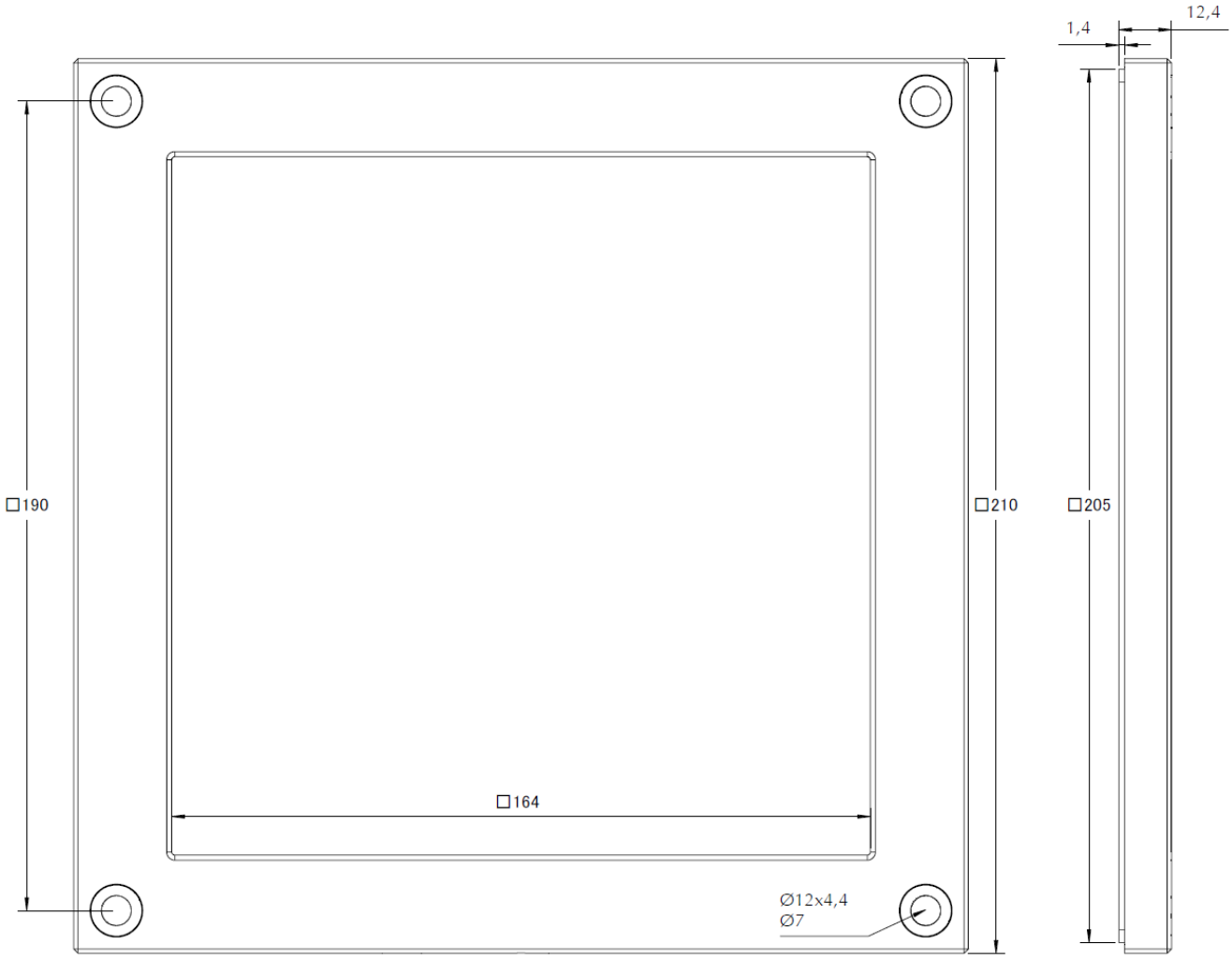
[1] See page 5 for measurement instruction
[2] The sensor complies to IEC 60904-2 completely when ordered with DAkkS calibration
[3] The temperature coefficient is valid for AM1.5 light spectrum. For temperature compensation the temperature coefficient has to be measured under the sun simulator the BigRef should be used, even for class A+ sun simulator spectrum.

Typical Spectral Response



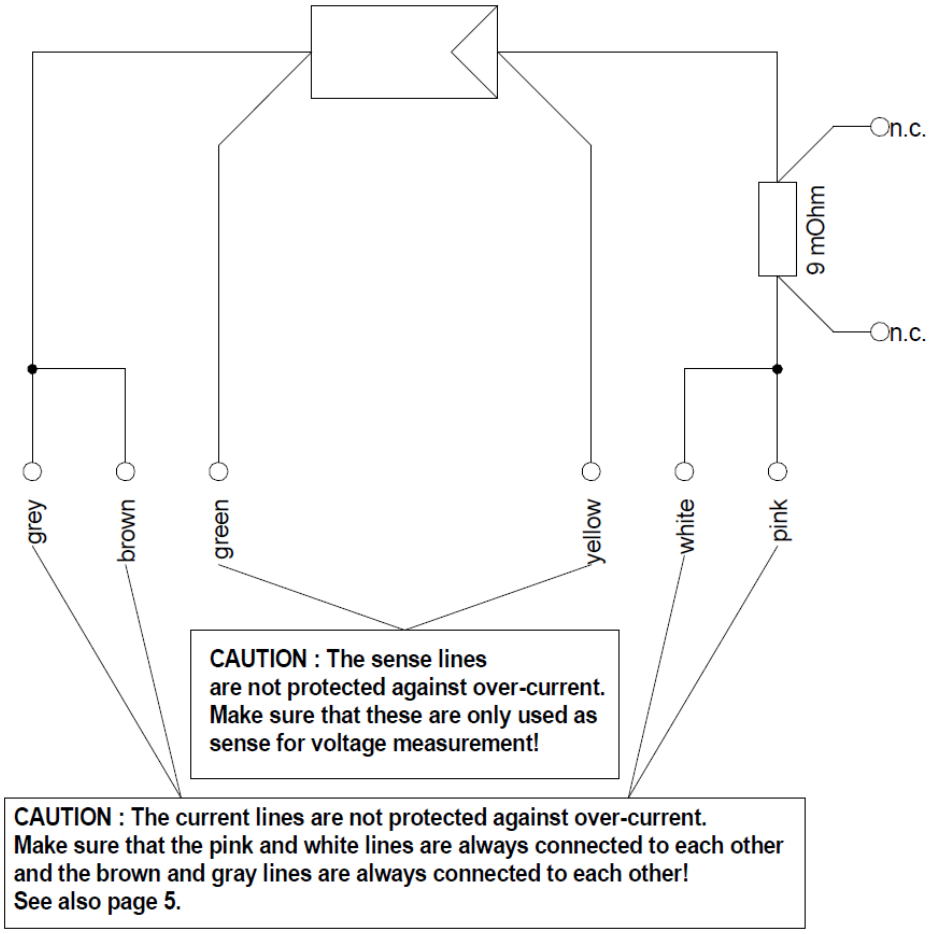
Drawing

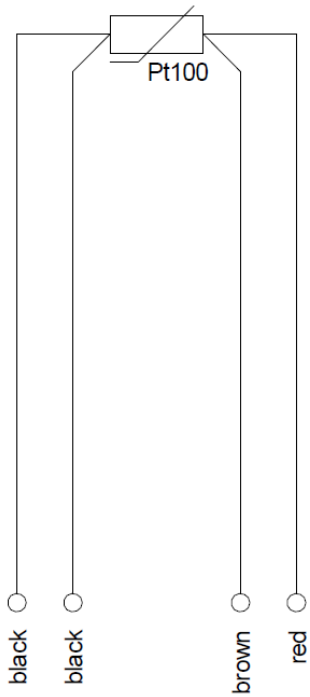
(All dimensions in mm)



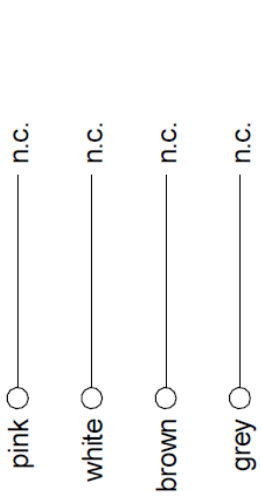
Connection

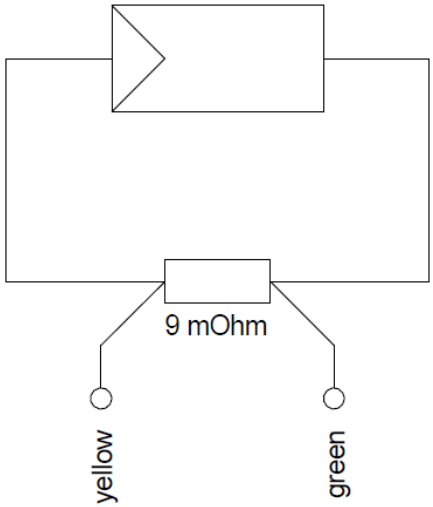
BigRef-IV-03:

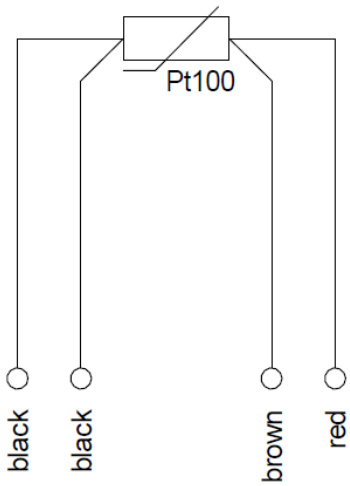




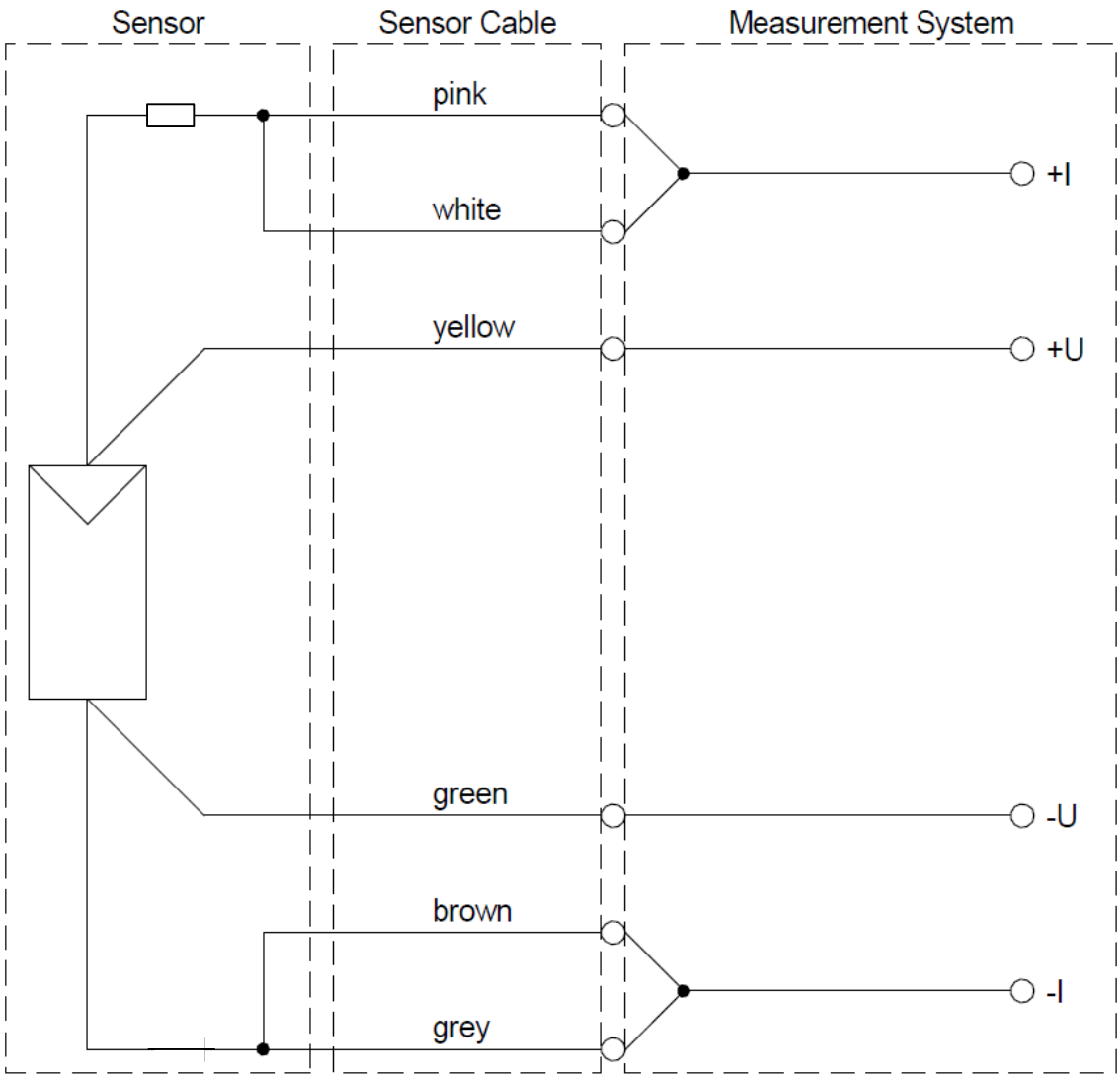
BigRef-mV-03:







Connection of BigRef-IV-03 to the External Measurement System:



When connected to the external measurement system the current lines shall always be run together (pink and white line for +I and brown and gray line for -I).

Important Note:

Short circuit measurement of BigRef-IV-03 cannot be done with an external shunt resistor. For measurements a sourcemeter or IV curve tracer is required which does support a negative bias voltage and 4-wire measurement. The negative bias voltage has to be at least 2 V for the standard sensor version with 2 m cable.