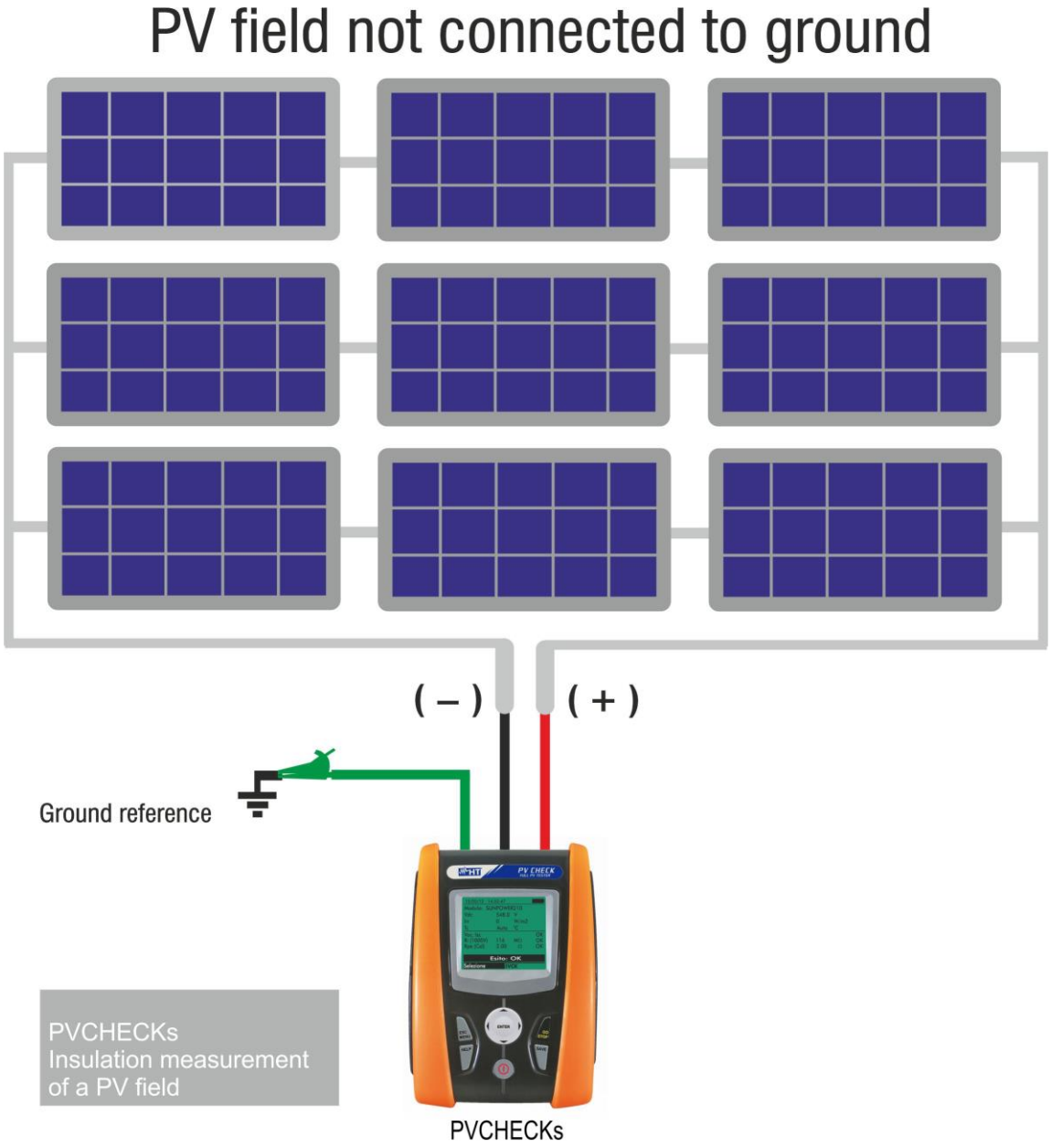
The multifunction instrument PVCHECKs performs prompt and safe electrical checks required for a PV system (DC section) and controls of the functionality of modules / strings in accordance with IEC/EN62446 guidelines.

PVCHECKs: safety checks

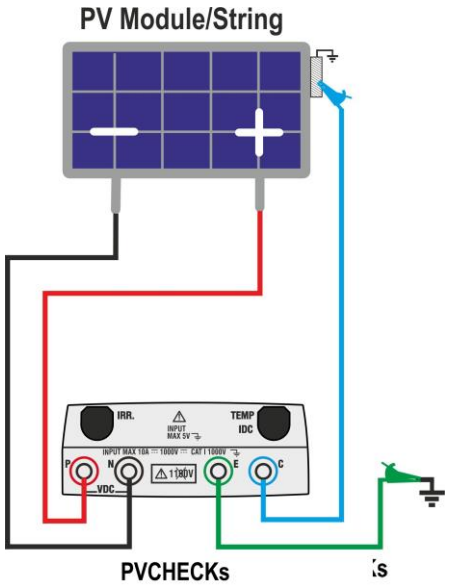
PVCHECKs verifies continuity of protective conductors (and associated connections) and measures insulation resistance of the active conductors on a module, a string, or a photovoltaic field in accordance with IEC/EN62446 guidelines, so avoiding to use any external switch to short-circuit positive and negative terminals.



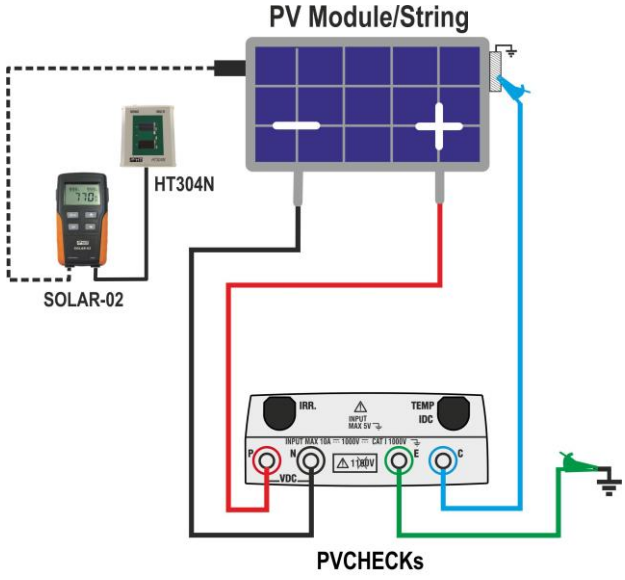
Direct measurement of insulation resistance on a PV Field not connected to ground

PVCHECKs: functionality checks

PVCHECKs verifies functionality of a PV string in accordance with the IEC/EN62446 guidelines by measuring open circuit voltage and short-circuit current under operating conditions **up to 15A** and extrapolating the results referred to the STC (by measuring the solar radiation). Finally, it displays measurements as well as comparison with the PV strings previously tested.



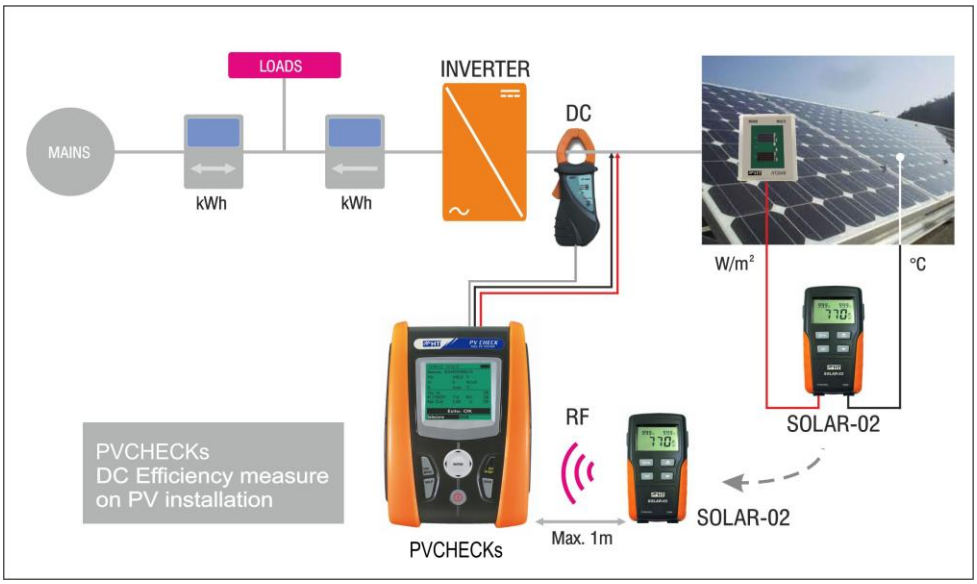
Test IVCK – Automatic measurement of Voc, Isc + Insulation + Continuity on a PV Module/String without irradiance measurement



Test IVCK – Automatic measurement of Voc, Isc + Insulation + Continuity on a PV Module/String with irradiance measurement with optional accessories SOLAR-02 and HT304N

PVCHECKs: performance checks

PVCHECKs analyses the performance of a PV array (DC) under the operating conditions (connected to the inverter) displaying the generated power and the efficiency of the PV plant in accordance with IEC/EN62446.



2. ELECTRICAL SPECIFICATIONS

Accuracy is calculated as ± [% readings + (no. of digits) * resolution] at 23 °C ± 5 °C, relative humidity <80%RH

2.1. PERFORMANCE TEST

DC Voltage

Range (V)	Resolution (V)	Uncertainty
5.0 ÷ 199.9	0.1	± (1.0%rdg + 2dgt)
200.0 ÷ 999.9	0.5	

DC Current (by mean external clamp)

Range (mV)	Resolution (mV)	Uncertainty
-1100 ÷ -5	0.1	± (0.5%rdg + 0.6mV)
5 ÷ 1100		

DC current is always positive ;DC current zeroed if the related voltage value is < 5mV

FS DC clamp [A]	Resolution [A]	Minimum read value [A]
1< FS ≤ 10	0.001	0.05
10< FS ≤ 100	0.01	0.5
100< FS ≤ 1000	0.1	5

DC Power (Vmeas > 150V)

Clamp FS (A)	Range (W])	Resolution (W)	Uncertainty
1< FS ≤ 10	0.000k ÷ 9.999k	0.001k	±(1.5%rdg + 3dgt) (Imeas < 10%FS) ±(1.5%rdg) (Imeas ≥ 10%FS)
10< FS ≤ 100	0.00k ÷ 99.99k	0.01k	
100< FS ≤ 1000	0.0k ÷ 999.9k	0.1k	

Irradiance (by mean HT304k)

Range (mV)	Resolution (mV)	Uncertainty
1 ÷ 40.0	0.02	±(1.0%rdg + 0.1mV)

Temperature (by mean PT300N)

Range (°C)	Resolution (°C)	Uncertainty
-20.0 ÷ 100.0	0.1	± (1.0%rdg +1°C)

2.2. FUNCTIONALITY TEST (IVCK)

DC Voltage @ OPC

Range (V)	Resolution (V)	Uncertainty
5.0 ÷ 199.9	0.1	±(1.0%rdg+2dgt)
200 ÷ 999	1	

Minimum VPN voltage to start the test: 15V

DC Current @ OPC

Range (A)	Resolution (A)	Uncertainty
0.10 ÷ 15.00	0.01	±(1.0%rdg+2dgt)

DC Voltage @ STC

Range (V)	Resolution (V)	Uncertainty
5.0 ÷ 199.9	0.1	±(4.0%rdg+2dgt)
200 ÷ 999	1	

DC Current @ STC

Range (A)	Resolution (A)	Uncertainty
0.10 ÷ 15.00	0.01	±(4.0%rdg+2dgt)

Irradiance (by mean HT304k)

Range (mV)	Resolution (mV)	Uncertainty
1 ÷ 40.0	0.02	±(1.0%rdg + 0.1mV)

Temperature (by mean PT300N)

Range (°C)	Resolution (°C)	Uncertainty
-20.0 ÷ 100.0	0.1	± (1.0%rdg +1°C)

CAUTION

Do not use the instrument for IVCK tests **on PV modules with efficiency >19%**. Check the technical characteristics of the PV modules **before** carrying out the tests in order to avoid possible damage to the instrument

2.3. SAFETY TEST

Continuity Test (LOWΩ)

Range [Ω]	Resolution [Ω]	Uncertainty
0.00 ÷ 1.99	0.01	±(2.0%rdg + 2dgt)
2.0 ÷ 19.9	0.1	
20 ÷ 199	1	

Test current >200mA DC up to 2Ω (test leads included), Resolution 1mA, Uncertainty ±(5.0%rdg + 5dgt)
Open loop voltage $4 < V_0 < 10V$

Insulation Test (MΩ) – Mode TIMER

Test voltage [V]	Range [MΩ]	Resolution [MΩ]	Uncertainty
250, 500, 1000	0.01 ÷ 1.99	0.01	±(5.0%rdg+ 5dgt)
	2.0 ÷ 19.9	0.1	
	20 ÷ 199	1	

Open voltage: < 1.25 * nominal test voltage
Short circuit current: <15mA (peak) for all test voltages
Generated voltage: Resolution 1V, uncertainty ±(5.0%rdg + 5dgt) @ Rmis> 0.5% FS
Test current: > 1mA with load = 1kΩ x Vnom

Insulation Test (MΩ) – Mode FIELD (*), STRING (**)

Test voltage [V]	Range [MΩ]	Resolution [MΩ]	Uncertainty (***)
250	0.1 ÷ 1.9	0.1	±(20.0%rdg+ 5dgt)
	2 ÷ 99	1	
500	0.1 ÷ 1.9	0.1	
	2 ÷ 99	1	
1000	0.1 ÷ 1.9	0.1	
	2 ÷ 99	1	

(*) For FIELD mode: if VPN >1V the minimum voltage VEP and VEN for the calculation of Ri(+) and Ri(-) is 1V
(**) For STRING mode: minimum VPN voltage to start the test: 15V
Open voltage: <1.25 x nominal test voltage
Short circuit current: < 15mA (peak) for each test voltage
Generated voltage: resolution 1V, accuracy ±(5.0%reading + 5digits) @ Rmis> 0.5% FS
Rated current measured: > 1mA with 1kΩ @ Vnom
(***) For FIELD mode: add 5 dgts to the accuracy if [Max (R+,R-) / Min (R+,R-) ≥ 100]

3. GENERAL SPECIFICATIONS

DISPLAY AND MEMORY:	
Features:	128x128pxl custom LCD with backlight
Memory:	max 999 test
POWER SUPPLY:	
PVCHECK internal power supply:	6x1.5V alkaline batteries type AA LR06
Battery life:	approx.120 hours (DC efficiency test)
SOLAR-02 power supply:	4x1.5V alkaline batteries type AAA LR03
SOLAR-02 max recording time (@ IP=5s):	approx 1.5h (@ PI=5s); approx 8gg (@ PI = 600s)
OUTPUT INTERFACE	
PC communication port:	optical/USB
Interface with SOLAR-02:	wireless RF communication (max distance 1m)
CHARACTERISTIC OF RADIO MODULE	
Frequency range:	2.400 ÷ 2.4835GHz
R&TTE category:	Class 1
Max transmission power:	30μW
Max RF connection distance:	1m
MECHANICAL FEATURES	
Size (L x W x H):	235 x 165 x 75mm
Weight (batteries included):	1.2kg
Mechanical protection:	IP40
ENVIRONMENTAL CONDITIONS:	
Reference temperature:	23°C ± 5°C
Working temperature:	0°C ÷ 40°C
Working humidity:	<80%RH
Storage temperature (remove the batteries):	-10°C ÷ 60°C
Storage humidity:	<80%RH
Max height of use:	2000m
GENERAL REFERENCE STANDARDS:	
Safety:	IEC/EN61010-1
EMC:	IEC/EN61326-1
Safety of measurement accessories:	IEC/EN61010-031
Measurements:	IEC/EN62446 (PV performance, IVCK) IEC/EN 61557-1, 2, -4 (LOWΩ, MΩ)
Insulation:	double insulation
Pollution degree:	2
Overvoltage category:	CAT III 300V to ground Max 1000V DC between inputs

This instrument satisfies the requirements of Low Voltage Directive 2014/35/EU (LVD) and of EMC Directive 2014/30/EU
This instrument satisfies the requirements of 2011/65/EU (RoHS) directive and 2012/19/EU (WEEE) directive