



PVCHECKS-ONE

ADVANCED INSTRUMENT FOR ELECTRICAL SAFETY TESTING
AND TROUBLESHOOTING IN PV SYSTEMS UP TO 1000V/30A





CODE **HVPVCSO**N

PVCHECKs-ONE

ADVANCED INSTRUMENT FOR ELECTRICAL SAFETY TESTING AND TROUBLESHOOTING IN PV SYSTEMS UP TO 1000V/30A



- > A single, simple “GO” to run **Commissioning Tests**
- > Tests on monofacial and **bifacial** modules (also high efficiency) up to **1000V / 30A**
- > All electrical safety tests, continuity, polarity, Voc, Isc, insulation, **on active systems**
- > **Ground fault locator (GFL function)** to identify insulation problems between modules
- > **AUTOSTART/AUTOSAVE mode** to test all strings of a field switchboard in sequence.
- > **OPT function** for insulation testing on MLPE-equipped PV strings (including optimizers and RSDs), allowing measurements to be performed **without the need to disconnect the MLPE devices**

OPT
FUNCTION

GFL
FUNCTION

1000V
30A

DUAL
MODE
Test

MONO AND
BIFACIALS
MODULES

OK
CERTIFICATE OF
CALIBRATION



PRODUCT
DATA SHEET



TECHNICAL DATA SHEET

TECHNICAL SPECIFICATIONS

Measurement of open-circuit voltage Voc on PV modules and strings	1000V DC
Measurement of short-circuit current Isc on PV modules and strings	30A DC
Polarity check	●
Use of SOLAR03 remote unit with Bluetooth connection	●
Front irradiation measurement	● also with SOLAR03 remote unit and PT305 probe (optional accessories)
Direct measurement of the module temperature	● also with SOLAR03 remote unit and PT305 probe (optional accessories)
PV string/field insulation measurement with test voltages 100, 250, 500, 1000VDC	●
P.I. polarisation index measurement	●
Dielectric absorption ratio D.A.R measurement	●
GFL function to locate the position of the low-insulation module within a string	●
OPT function for insulation testing on PV strings in the presence of MLPE devices, such as optimizers and RSDs, without the need to disconnect them from the modules	●
Protective conductor continuity testing with test current 200mA	●
Measurement category	CAT III 1000V AC, CAT III 1000VDC Max 1000VAC, 1000VDC between inputs
Backlit LCD display	●
Internal memory	Max 999 tests
Integrated Wi-Fi connection for PC connectivity	●
Optical/USB serial port for connection with PC	●
Management of customisable internal PV module database	● (Max 64 modules)
Auto power off	●
Online help on display	●

GENERAL SPECIFICATIONS

Dimensions (L x W x H)	235 x165 x 75mm
Weight (batteries included)	1.2 kg
Operating temperature	from -10°C to 50°C
Operating humidity	<80% RH
Protection rating	IP40
Power supply	6x1.5V type AA alkaline batteries or 6x1.2V type AA rechargeable NiMH batteries

(*) This characteristic is only available for certain models

ACCESSORIES

STANDARD ACCESSORIES

KITGSC4	Set of 4 cables banana 4mm, 2m + 4 alligator clips
KITPCMC4	Set of 2 adapters with connector compliance MC4 and single wire
C2006-0	Optical/USB connection cable
YABAT0007HTO	Alkaline battery 1.5V, type AA LR06 (6 pcs)
VA507	Hard carrying case
SP-5100	Set of bells for slinging the instrument over one's shoulder
Quick start guide	
Calibration report	
Complete user manual and management software available online	

OPTIONAL ACCESSORIES

SOLAR03	Remote unit
PT305	PT1000 probe for cell temperature measurement
HT305	Reference cell for irradiance measurement with set of fixed screws
M304	Mechanical inclinometer for detection of sun incidence angle
SP-2002	Strap with magnetic termination for SOLAR03
KITPVPROEXT20	Set of 2 cables banana male/banana female 4mm, Red/Black, 20m
KIT2TIPS15	Set of 2 cables with test leads/MC4, CAT III 1500V, 25cm, Red/Black
YABAT0003000	Rechargeable battery NiMH, 1.2V, type AA
YABAT0004001	External charger
KITBIFACIALONE	2 × HT305, reference cells for irradiance measurement, and SOLAR03, remote unit for measurement of irradiance, temperature and inclination of PV modules

HT ITALIA S.R.L.

Via della Boaria, 40 48018 Faenza (RA) Italy

T +39 0546 621002 | F +39 0546 621144

M sales@ht-instruments.com | ht-instruments.com

1. ELECTRICAL SPECIFICATIONS

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

SAFETY TEST

DMM – DC Voltage

Range [V]	Resolution [V]	Accuracy
3 ÷ 1000	1	\pm (1.0%rdg + 2dgt)

DMM – AC TRMS Voltage

Range [V]	Resolution [V]	Accuracy
3 ÷ 1000	1	\pm (1.0%rdg + 3dgt)

Frequency range: 42.5Hz ÷ 69Hz ; Voltage zeroed for measured values <3V

Insulation Resistance (M Ω) – DUAL Mode

Test voltage DC [V]	Range [M Ω]	Resolution [M Ω]	Accuracy (*)
250, 500, 1000	0.1 ÷ 0.99	0.01	\pm (5%rdg + 5dgt)
	1.0 ÷ 19.9	0.1	
	20 ÷ 100	1	

(*) Accuracy indicatec for VPV \geq 240V, R_{fault} \geq 10 Ω . Accuracy of Rp and R(+) not declared if R(+) \geq 0.2M Ω and R(-) <0.2M Ω
Accuracy of Rp and R(-) not declared if R(+) < 0.2M Ω and R(-) \geq 0.2M Ω

Open voltage <1.25 x nominal test voltage
Short circuit current <15mA (peak) for each test voltage
Nominal measured current >1mA on R = 1k Ω x Vnom (with VPV, VPE, VNE= 0)
Managed capacity per poles: 2 μ F

Insulation Resistance (M Ω) –TMR Mode

Test voltage DC [V]	Range [M Ω]	Resolution [M Ω]	Accuracy
250, 500, 1000	0.01 ÷ 9.99	0.01	\pm (5.0%rdg+ 5dgt)
	10.0 ÷ 99.9	0.1	
	100 ÷ 250	1	

Open voltage <1.25 x nominal test voltage ; Short circuit current: <15mA (peak) for each test voltage
Nominal measured current >1mA on R = 1k Ω x Vnom (with VPV, VPE, VNE= 0)
Setting timer: 3s ÷ 999s

Continuity of protection conductors (RPE)

Range [Ω]	Resolution [Ω]	Accuracy
0.00 ÷ 9.99	0.01	\pm (2%rdg + 2dgt)
10.0 ÷ 99.9	0.1	
100 ÷ 1999	1	

Test current: >200mA DC up to 5 Ω (included cables), Resolution 1mA, Accuracy \pm (5.0%rdg + 5dgt)
Open voltage 4 < V₀ < 10V

GFL (Ground Fault Locator) function

Test voltage DC [V]	Range [M Ω]	Resolution [M Ω]	Accuracy Rp (*)	Position accuracy
250, 500, 1000	0.1 ÷ 0.99	0.01	\pm (5%rdg + 5dgt)	\pm 1module (NMOD \leq 34) \pm 3module (NMOD>34)
	1.0 ÷ 19.9	0.1		
	20 ÷ 100	1		

(*) Accuracy indicatec for VPV \geq 240V, R_{fault} \geq 10 Ω . Accuracy of Rp and R(+) not declared if R(+) \geq 0.2M Ω and R(-) <0.2M Ω
Accuracy of Rp and R(-) not declared if R(+) < 0.2M Ω and R(-) \geq 0.2M Ω

Open voltage <1.25 x nominal test voltage
Short circuit current <15mA (peak) for each test voltage
Nominal measured current >1mA on R = 1k Ω x Vnom (with VPV, VPE, VNE= 0)
Managed capacity per poles: 2 μ F
Set limit threshold on measure 0.05M Ω , 0.1M Ω , 0.23M Ω , 0.25M Ω , 0.50M Ω , 1.00M Ω
Number of set modules: 4 ÷ 60

The GFL function allows obtaining correct results with the following conditions:

- > Test carried out with V_{test} \geq V_{nom} on a **single string** disconnected from the inverter, from possible arresters and from earth connections
- > Test performed upstream of any blocking diodes
- > **Single fault** of low insulation located at any position in the string
- > Insulation resistance of the single fault: <1.00M Ω
- > Environmental conditions similar to those in which the fault was reported



OPT (Insulation test with optimizers and MLPE devices)

Test voltage DC [V]	Range [MΩ]	Resolution [MΩ]	Accuracy Rp (*)
100, 250, 500, 1000 (MLPE with RSD)	0.1 ÷ 0.99	0.01	±(5%rdg + 10dgt)
	1.0 ÷ 19.9	0.1	
	20 ÷ 250	1	
100 (MLPE without RSD)	0.1 ÷ 0.99	0.01	
	1.0 ÷ 19.9	0.1	
	20 ÷ 100	1	

(*) Accuracy indicated for VPN ≥ 240V, R_{fault} ≥ 10Ω. Accuracy of Rp and R(+) not declared if R(+) ≥ 0.2MΩ and R(-) < 0.2MΩ
Accuracy of Rp and R(-) not declared if R(+) < 0.2MΩ and R(-) ≥ 0.2MΩ

Open voltage	< 1.25 x nominal test voltage
Short circuit current	< 15mA (peak) for each test voltage
Nominal measured current	> 1mA on R = 1kΩ x V _{nom} (with VPN, VPE, VNE = 0)
Managed capacity per poles:	2μF
Set limit threshold on measure:	0.10MΩ, 0.25MΩ, 0.60MΩ, 1.00MΩ, 100MΩ, 200MΩ (MLPE with RSD) 0.10MΩ, 0.25MΩ, 0.60MΩ, 1.00MΩ, 50MΩ (MLPE with out RSD)
Number optimizers:	1 ÷ 60
Max current in RSD mode:	1A (RSD = Rapid Shut Down function)

FUNCTIONALITY TEST (IVCK)

DC Voltage @ OPC

Range [V]	Resolution [V]	Accuracy
3.0 ÷ 1000.0	0.1	±(1.0%rdg+2dgt)

Minimum VPN voltage to start the test: 15V; For Start&Save function minimum VPM voltage is 30V

IDC Current @ OPC

Range [A]	Resolution [A]	Accuracy
0.10 ÷ 30.00	0.01	±(1.0%rdg+2dgt)

DC Voltage @ STC

Range [V]	Resolution [V]	Accuracy
3.0 ÷ 1000.0	0.1	±(4.0%rdg+2dgt)

IDC Current @ STC

Range [A]	Resolution [A]	Accuracy
0.10 ÷ 30.00	0.01	±(4.0%rdg+2dgt)

Irradiation with connection to HT305 reference cell

Voltage range [mV]	Resolution [mV]	Accuracy (*)
0.00 ÷ 99.99	0.01	±(1.0% rdg + 0.02mV)

Measurement range [W/m ²]	Resolution [W/m ²]	Accuracy (*)
0 ÷ 1400	1	±(1.0%rdg + 1dgt)

(*) Accuracy of instrument without cell

Module temperature with connection to PT305 probe

Resistance range [Ω]	Resolution [Ω]	Accuracy (*)
846 ÷ 1385	0.385	±(1.0%rdg + 3.85Ω)

Measurement range [°C]	Resolution [°C]	Accuracy (*)
-40.0 ÷ 99.9	0.1	±(1.0%rdg + 1°C)

(*) Accuracy of instrument without probe



2. GENERAL SPECIFICATIONS

DISPLAY AND MEMORY

Features:	240x240pxl custom LCD with backlight
Memory:	max 999 test, 3 marker levels
Internal database for PV modules:	max 64 saving modules

POWER SUPPLY

Internal power supply:	6x1.5V alkaline batteries type LR6, AA or 6x1.2V rechargeable NiMH batteries type LR6, AA (External adapter needed for NiMH batteries recharging)
Battery life (@Temp = 20°C):	RPE: >500 Test (RPE \geq 0.1 Ω) GFL, M Ω : >500 test (Riso \geq 1k Ω xVTest) IVCK: >500 test (no SOLAR03)
Auto Power OFF:	after 5 minutes of idleness

OUTPUT INTERFACE

PC communication port:	optical/USB and WiFi
Interface with SOLAR03:	Bluetooth BLE communication (up to 100m/328ft in free space)

MECHANICAL FEATURES

Dimensions (L x W x H):	235 x 165 x 75mm (9 x 6 x 3in)
Weight (batteries included):	1.2kg (25lv)
Mechanical protection:	IP40

ENVIRONMENTAL CONDITIONS

Reference temperature:	23°C \pm 5°C (73°F \pm 41°F)
Working temperature:	-10°C \div 50°C (14°F \pm 122°F)
Working humidity:	<80%RH (without condensation)
Storage temperature:	-10°C \div 60°C (14°F \pm 140°F)
Storage humidity:	<80%RH (without condensation)
Max height of use:	2000m (6562ft)

REFERENCE GUIDELINES

Safety:	IEC/EN61010-1, IEC/EN61010-2-030 IEC/EN61010-2-033, IEC/EN61010-2-034
EMC:	IEC/EN61326-1, IEC/EN61326-2-2
Safety of measurement accessories:	IEC/EN61010-031
IVCK measurements:	IEC/EN62446-1, IEC/EN60891
M Ω measurement:	IEC/EN61557-2-10
RPE measurement:	IEC/EN61557-4
Bifacial module measurements:	IEC/EN60904-1-2
Module temperature calculation:	IEC/EN60904-5
Insulation:	double insulation
Pollution degree:	2
Radio:	ETSI EN300328, ETSIEN301489-1, ETSIEN301489-17
Measurement category:	CAT III 1000V to ground Max 1000VAC, 1000VDC between inputs

This instrument complies with the requirements of the European Low Voltage Directives 2014/35/EU (LVD), EMC directive 2014/30/EU and RED 2014/53/EU directive
This instrument satisfies the requirements of 2011/65/EU (RoHS) directive and 2012/19/EU (WEEE) directive

