

1. ELECTRICAL SPECIFICATIONS

Accuracy is calculated as $\pm [\% \text{ readings} + (\text{no. of digits} \times \text{resolution})]$ at $23^\circ\text{C} \pm 5^\circ\text{C}$, relative humidity $<80\%$ RH

SAFETY TEST

DMM – DC Voltage

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

DMM – AC TRMS Voltage

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

Frequency range: 42.5Hz ÷ 69Hz ; Voltage zeroed for measured values $<3\text{V}$

Insulation Resistance (MΩ) – DUAL Mode

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

(*) Accuracy indicated for $\text{VPN} \geq 240\text{V}$, $R_{\text{fault}} \geq 10\Omega$. Accuracy of R_p and $R(+)$ not declared if $R(+)\geq 0.2\text{M}\Omega$ and $R(-) < 0.2\text{M}\Omega$
 Accuracy of R_p and $R(-)$ not declared if $R(+)< 0.2\text{M}\Omega$ and $R(-)\geq 0.2\text{M}\Omega$

Open voltage $<1.25 \times$ nominal test voltage
 Short circuit current $<15\text{mA}$ (peak) for each test voltage
 Nominal measured current $>1\text{mA}$ on $R = 1\text{k}\Omega \times V_{\text{nom}}$ (with VPN, VPE, VNE= 0)
 Managed capacity per poles: $2\mu\text{F}$

Insulation Resistance (MΩ) – TMR Mode

Test voltage DC [V]	Range [MΩ]	Resolution [MΩ]	Accuracy
250, 500, 1000	0.01 ÷ 9.99	0.01	$\pm(5.0\% \text{rdg} + 5\text{dgt})$
	10.0 ÷ 99.9	0.1	

Open voltage $<1.25 \times$ nominal test voltage
 Short circuit current $<15\text{mA}$ (peak) for each test voltage
 Nominal measured current $>1\text{mA}$ on $R = 1\text{k}\Omega \times V_{\text{nom}}$ (with VPN, VPE, VNE= 0)
 Setting timer: $3\text{s} \div 999\text{s}$

Continuity of protection conductors (RPE)

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

Test current: $>200\text{mA}$ DC up to 5Ω (included cables), Resolution 1mA, Accuracy $\pm(5.0\% \text{rdg} + 5\text{dgt})$

Open voltage $4 < V_0 < 10\text{V}$

GFL (Ground Fault Locator) function

Test voltage DC [V]	Range [MΩ]	Resolution [MΩ]	Accuracy Rp (*)	Position accuracy
250, 500, 1000	0.1 ÷ 0.99	0.01	$\pm(5\% \text{rdg} + 5\text{dgt})$	$\pm 1\text{module}$ (NMOD ≤ 35) $\pm 3\text{module}$ (NMOD > 35)
	1.0 ÷ 19.9	0.1		
	20 ÷ 100	1		

(*) Accuracy indicated for $\text{VPN} \geq 240\text{V}$, $R_{\text{fault}} \geq 10\Omega$. Accuracy of R_p and $R(+)$ not declared if $R(+)\geq 0.2\text{M}\Omega$ and $R(-) < 0.2\text{M}\Omega$
 Accuracy of R_p and $R(-)$ not declared if $R(+)< 0.2\text{M}\Omega$ and $R(-)\geq 0.2\text{M}\Omega$

Open voltage $<1.25 \times$ nominal test voltage
 Short circuit current $<15\text{mA}$ (peak) for each test voltage
 Nominal measured current $>1\text{mA}$ on $R = 1\text{k}\Omega \times V_{\text{nom}}$ (with VPN, VPE, VNE= 0)
 Managed capacity per poles: $2\mu\text{F}$
 Set limit threshold on measure $0.05\text{M}\Omega, 0.1\text{M}\Omega, 0.23\text{M}\Omega, 0.25\text{M}\Omega, 0.50\text{M}\Omega, 1.00\text{M}\Omega$
 Number of set modules: $4 \div 60$

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

- Test carried out with $V_{\text{test}} \geq V_{\text{nom}}$ 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: $<1.00\text{M}\Omega$
- 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	$\pm(5\% \text{rdg} + 10\text{dgt})$
	1.0 ÷ 19.9	0.1	
	20 ÷ 250	1	
100 (MLPE without RSD)	0.1 ÷ 0.99	0.01	$\pm(5\% \text{rdg} + 10\text{dgt})$
	1.0 ÷ 19.9	0.1	
	20 ÷ 100	1	

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

Accuracy of Rp and R(-) not declared if $R(+) < 0.2\text{M}\Omega$ and $R(-) \geq 0.2\text{M}\Omega$

Open voltage	<1.25 x nominal test voltage
Short circuit current	<15mA (peak) for each test voltage
Nominal measured current	>1mA on $R = 1\text{k}\Omega \times V_{\text{nom}}$ (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	$\pm(1.0\% \text{rdg} + 2\text{dgt})$

Minimum VPN voltage to start the test: 15V

IDC Current @ OPC

Range [A]	Resolution [A]	Accuracy
0.10 ÷ 30.00	0.01	$\pm(1.0\% \text{rdg} + 2\text{dgt})$

DC Voltage @ STC

Range [V]	Resolution [V]	Accuracy
3.0 ÷ 1000.0	0.1	$\pm(4.0\% \text{rdg} + 2\text{dgt})$

IDC Current @ STC

Range [A]	Resolution [A]	Accuracy
0.10 ÷ 30.00	0.01	$\pm(4.0\% \text{rdg} + 2\text{dgt})$

Irradiation with connection to HT305 reference cell

Voltage range [mV]	Resolution [mV]	Accuracy (*)
0.00 ÷ 99.99	0.01	$\pm(1.0\% \text{rdg} + 0.02\text{mV})$

Measurement range [W/m²]	Resolution [W/m²]	Accuracy (*)
0 ÷ 1400	1	$\pm(1.0\% \text{rdg} + 1\text{dgt})$

(*) Accuracy of instrument without cell

Module temperature with connection to PT305 probe

Resistance range [Ω]	Resolution [Ω]	Accuracy (*)
846 ÷ 1385	0.385	$\pm(1.0\% \text{rdg} + 3.85\Omega)$

Measurement range [°C]	Resolution [°C]	Accuracy (*)
-40.0 ÷ 99.9	0.1	$\pm(1.0\% \text{rdg} + 1\text{°C})$

(*) 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 0.1Ω) GFL, MΩ: >500 test (Riso \geq 1kΩxVTest) 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 (2.5lb)
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, IEC/EN60904-1-5
MΩ measurement:	IEC/EN61557-2
RPE measurement:	IEC/EN61557-4
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