

# PERFECTION FOR THE SUN

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New HT solutions for performance optimization and troubleshooting.

Thanks to the decrease in the cost of components and the remarkable increase of performance, installing photovoltaic systems on the roof or on the ground has become increasingly common. In a photovoltaic system, problems connected to safety and to the system's performance must be checked, and maintenance of strings and single panels must be carried out.



# PHOTOVOLTAIC TESTERS

## Troubleshooting

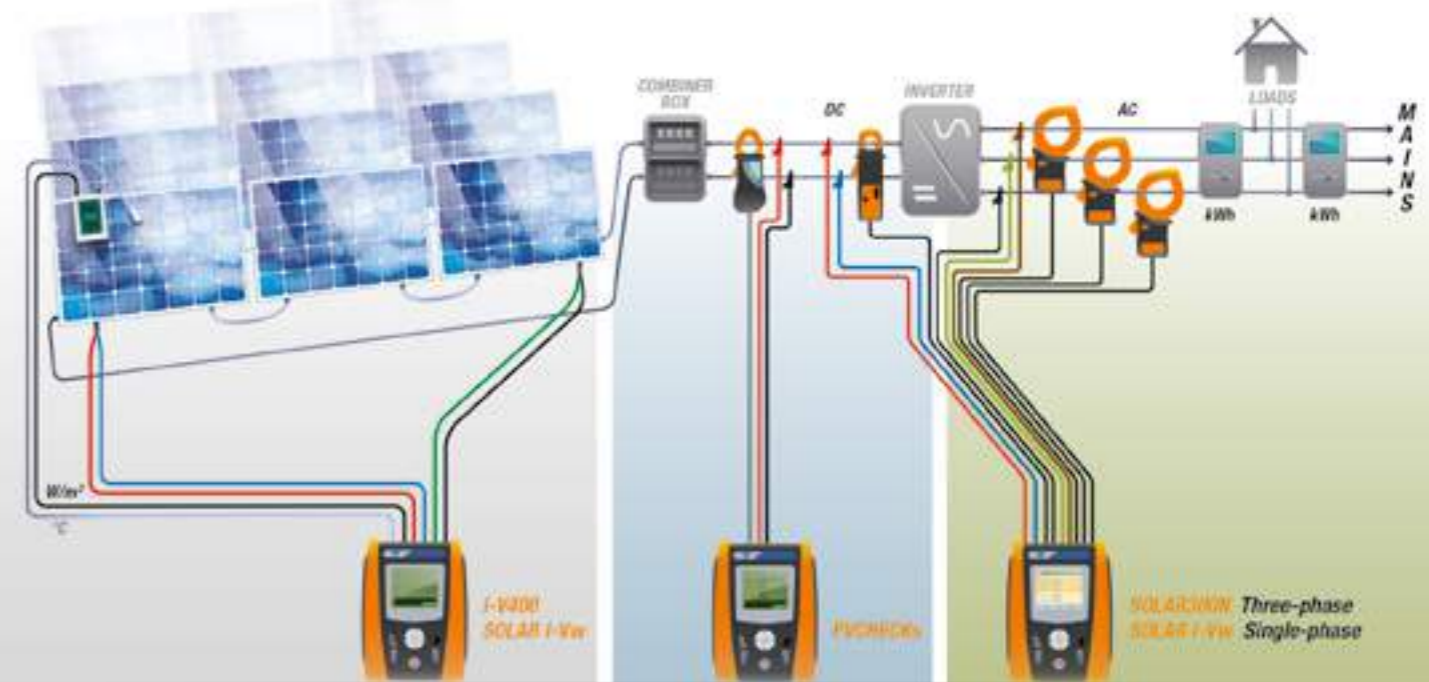
- It may happen that, during the operation of a system, **some modules may jeopardize the performance** of the whole system. When system efficiency is lower than expected, it is necessary **to detect the defective modules** so that they can be replaced. This can be achieved **by measuring the I-V curve** with devices **SOLAR I-Vw** and **I-V400w**.

## Commissioning Tests

- When **operating** a photovoltaic system, it is necessary to **certify its safety according to IEC62446**. The suitable device to carry out these verifications is **PVCHECKS**.

## Performance

- Performance **Recording** is one of the **necessary requirements** to make **maintenance programs efficient**. By monitoring system performance it is possible to **certify a production loss** quickly and efficiently. **SOLAR300N**, **SOLAR I-Vw** and **MPP300** are the **ideal solution** for **recording over time the energy production of a system** and the **performance check of an inverter**.



Troubleshooting

Commissioning Tests

Performance

## COMPARISON TABLE FUNCTIONS



### MAINTENANCE AND EFFICIENCY OF THE PHOTOVOLTAIC SYSTEM

	SOLAR I-Vw	I-V400w	SOLAR300N	PVCHECKs	MPP300
Continuity of protective conductors with 200mA	-	-	-	•	-
Insulation measurement with test voltage 250, 500, 1000VDC with no service interruption	-	-	-	•	-
I-V Curve measurement on single module or string	•	•	-	-	-
VOC and ISC measurement on single module or string	•	•	-	•	-
Single-Phase and Three-Phase efficiency measurement	• 1MPPT (3MPPT with MPP300)	-	• 1MPPT (3MPPT with MPP300)	-	•
DC side efficiency of the photovoltaic field	-	-	•	•	-
Use of remote unit SOLAR-02 with USB \ RF connection	• RF	• RF	• USB	• RF	• RF • USB
Measurement of irradiation with reference cell	•	•	•	•	-
Temperature measurement of cell and environment	•	•	•	•	-

### POWER QUALITY ANALYSIS

AC/DC voltage in single-phase/three-phase systems	-	-	•	• DC	•
AC/DC current in single-phase/three-phase systems	-	-	•	• DC	•
Cosphi, Power Factor	-	-	•	-	-
Voltage unbalance (NEG%, ZERO%)	-	-	•	-	-
Power/Energy: Active P, Reactive Q, Apparent S	• only active P	-	•	• only active P	-
Voltage and current harmonics up to the 49th with THD%	-	-	•	-	-
Voltage anomalies (dips, peaks) with 10ms resolution (@ 50Hz)	-	-	•	-	-
Voltage fast transients (spikes) with 5µs resolution (200kHz)	-	-	•	-	-
Electric motor starting current (INRUSH)	-	-	•	-	-
Voltage flickers (Pst, Plt)	-	-	•	-	-
Full analysis according to EN50160	-	-	•	-	-
Phase sequence	-	-	•	-	-
Neutral-Ground Voltage	-	-	•	-	-
Neutral current	-	-	•	-	-

### MEMORY AND RECORDING

Max number of simultaneously selectable parameters	9	-	251	5	-
Recording with selectable integration period	5s-60m	-	1s-60m	5s-60m	1s-60m
Indicative memory duration (in days @ PI=10min @ max number of parameters)	8	-	90	-	8
Indication of recording duration for power quality analysis	-	-	•	-	-
Internal memory extension with Compact Flash card	-	-	•	-	-



### » FOLLOWS

Default and custom recordings	-	-	•	-	-
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### REAL-TIME DISPLAY

Summary table of main electric parameters	•	•	•	•	-
Voltage/current waveforms	-	-	•	-	-
Tables or histograms of Harmonics and THD%	-	-	•	-	-
Voltage/current vector diagram	-	-	•	-	-

### ADDITIONAL CHARACTERISTICS

Measuring range of I-V Curve / IVCK	1000V / 15A	1000V / 15A	-	1000V / 15A only VOC and ISC	-
Measuring range for efficiency measurement	1000VDC / 265VAC	-	1000VAC-DC 3000A	-	1000VDC / 600VAC 3000AC / 1000ADC
Measurement category:	CAT III 300V	CAT III 300V	CAT IV 600V	CAT III 300V	CAT IV 300V
Touchscreen colour display	-	-	•	-	-
LCD display with backlight	•	•	-	•	-
Internal memory capacity	200 curves I-V 8 days@ PI=10 min	200 curves I-V	15MB 90 days@ PI 10min	999 Locations	2MB 8 days@ PI=10 min
USB port for data download onto Pen Drive	-	-	•	-	-
PC interface with software for Windows	•	•	•	•	-
Integrated WiFi interface	•	•	-	-	-
Custom management of internal PV module database	•	•	-	•	-
Power supply with rechargeable battery and battery charger	-	-	•	-	•
Auto power off	•	•	•	•	•
Indication of recording duration for efficiency measurement	•	-	•	-	-
Reference standard for Power Quality Analysis	-	-	EN50160	-	-
Help on line on the display	•	•	•	•	-
Size (LxWxH) (mm)	235x165x75	235x165x75	235x165x75	235x165x75	300x265x214
Weight in kg (batteries included)	1.2	1.2	1	1.2	2.3
Reference standard for safety	IEC/EN61010-1	IEC/EN61010-1	IEC/EN61010-1	IEC/EN61010-1	IEC/EN61010-1
Order Code	HV000IVW	HV00400W	HV00300N	HV00PVCS	HVMPP300

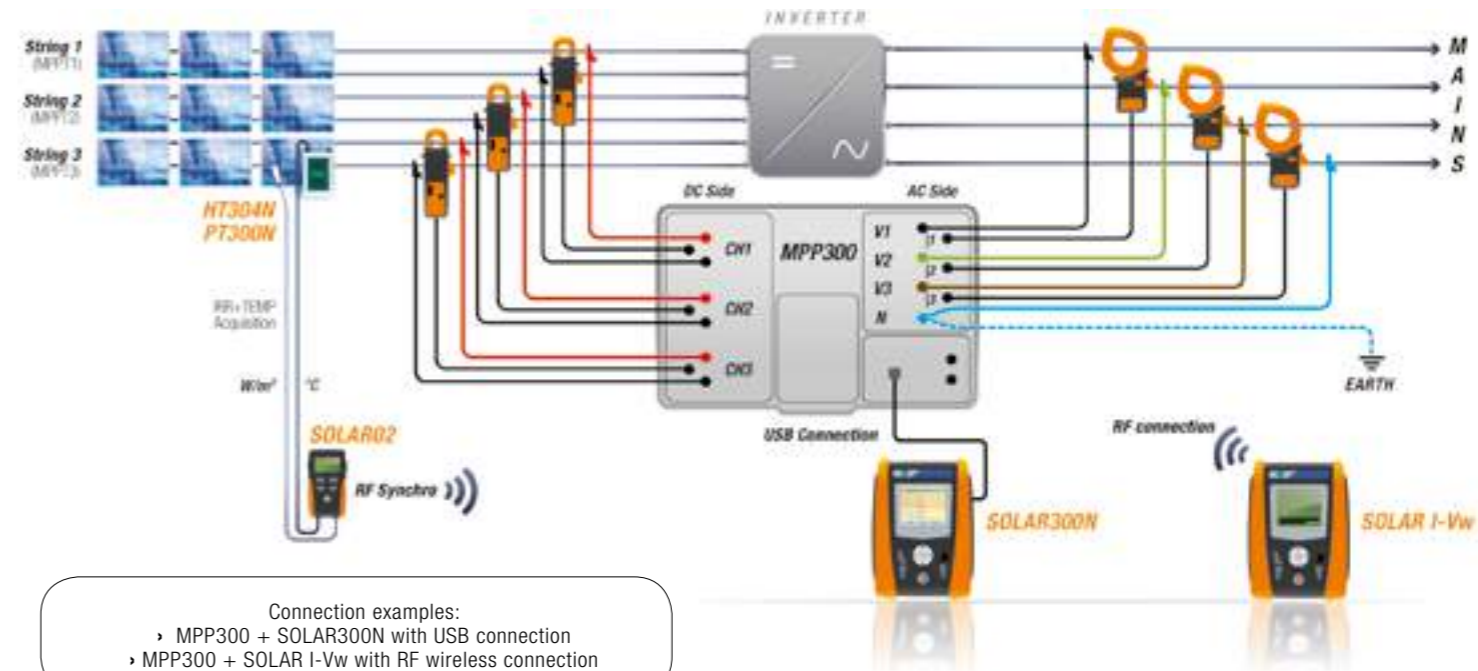
ORDER CODE **HVMPP300**

# MPP300

ACCESSORY FOR MEASURING AND RECORDING THE EFFICIENCY OF A SINGLE- AND THREE-PHASE, SINGLE- AND MULTI-STRING PHOTOVOLTAIC SYSTEM (UP TO THREE MPPT).

- Simultaneous analysis of **3 strings**
- **Compatible** with SOLAR300N and SOLAR I-Vw
- **Integrated rechargeable battery**

MPP300 is an innovative accessory which allows **measuring and recording the main parameters** which characterize single and three-phase, single and multi-string photovoltaic systems (up to three MPPT). Provided with a practical **rigid anti-shock case**, thanks to its **lightness** and its **reduced size** is the ideal solution for on-site use. MPP300 **interfaces** with SOLAR300N and SOLAR I-Vw for its settings, to start/stop recording electric and environmental parameters and to allow for the download of the recorded values. The master devices SOLAR300N or SOLAR I-Vw are only used in the initial and final phase of recording, and they do not play any active role while recording electrical and environmental parameters. Remote unit SOLAR02 (**synchronized** with MPP300) is positioned next to the photovoltaic modules to measure environmental parameters (**irradiation and temperature**). Thanks to this synchronization, **it is not necessary to place long connection cables between the environmental probes and the device** (cables which would impair the operator's movements) **nor to use a wireless connection** between the environmental probes and the device, what is generally impossible due to the attenuation of the signal caused by the presence of floors, reinforced concrete or metal structures.



- Connection examples:
- MPP300 + SOLAR300N with USB connection
  - MPP300 + SOLAR I-Vw with RF wireless connection

**Synchronization** between the two units **guarantees the necessary simultaneity of measurements** and the two separate and independent units make **measurements comfortable and safe under any condition.**

MPP300's **best partner is SOLAR I-Vw**: while MPP300 records the electrical and environmental parameters, it is possible to measure the I-V curves of strings and modules with SOLAR I-Vw, **thus saving time and money.**



- Practical rigid anti-shock case
- Small size (mm 300x265x140) for an extreme portability

## Functions

- DC/AC TRMS voltage measurement (single-phase and three-phase)
- DC/AC TRMS current measurement (single-phase and three-phase)
- DC/AC power measurement (single-phase and three-phase)
- Simultaneous multi-string tests (max 3 MPPT)
- Connection with master unit SOLAR300N and SOLAR I-Vw
- Power supply with rechargeable Li-ION battery
- LED operating indications
- USB port for connection to unit SOLAR300N
- RF connection for connection to SOLAR02 and SOLAR I-Vw
- Internal memory for saving recordings

## Main features

<b>Inputs:</b>	3 DC voltage inputs (CH1, CH2, CH3), 3 DC current inputs (CH1, CH2, CH3), 4 AC voltage inputs (L1, L2, L3, N), 3 AC current inputs (L1, L2, L3)
<b>Front panel:</b>	4 two-colour LEDs (red, green)
<b>Power supply:</b>	Rechargeable Li-Ion battery Duration >3 hours
<b>Internal memory:</b>	2 MBytes
<b>Communication interfaces</b>	USB + RF
<b>Safety:</b>	IEC/EN61010-1
<b>Insulation:</b>	double insulation
<b>Pollution level:</b>	2
<b>Mechanical protection:</b>	IP40 (open), IP65 (closed)
<b>Measurement category:</b>	CAT IV 300 VAC (to earth), 600 VAC (between inputs) CAT III 1000 VDC (to earth), 1000 VDC (between inputs)
<b>Size:</b>	300 x 265 x 140 mm
<b>Weight (batteries included):</b>	2.3 kg

## Accessories provided













<b>KITMPPDCW</b>	Set of 2 cables, red and black banana-banana length 2m, 3 pieces
<b>KITMPPDCC</b>	Set of 2 alligator clips, black and red, 3 pieces
<b>KITMPPACW</b>	Set of 4 cables for AC voltage, 2m
<b>KITMPPACC</b>	Set of 4 alligator clips for AC voltage
<b>A0055</b>	External AC/DC battery charger power supply
<b>C2007</b>	USB cable
<b>ACON3F4M</b>	Adapter for the connection of clamps HT98U, HP30D1 and HT4004N, 3 pieces
<b>BORSA2051</b>	Soft carrying bag for accessories
	User Manual
	ISO9000 calibration certificate

## Optional accessories

<b>HT4004P</b>	Standard 10-100ADC clamp, diameter 32mm (only MPP300)
<b>HT4005N</b>	Standard AC 0÷5A, 0÷100A clamp, diameter 20mm
<b>HT4005K</b>	Standard 200A AC clamp, diameter 40mm
<b>HT96U</b>	Standard 1-100-1000A AC clamp, diameter 54mm
<b>HT97U</b>	Standard 10-100-1000A AC clamp, diameter 54mm
<b>HT98U</b>	Standard 1000A DC clamp, diameter 50mm
<b>HP30C2</b>	Standard 200-2000A AC clamp, diameter 70mm
<b>HP30C3</b>	Standard 3000A AC clamp, diameter 70mm
<b>HP30D1</b>	Standard clamp, diameter 83mm 1000A DC
<b>HTFLEX33E</b>	Flex 3000A clamp, for power analysis, diameter 174mm
<b>HTFLEX35</b>	Flex 3000A clamp, for power analysis, diameter 274mm
<b>606-IECN</b>	Magnetic connectors for voltage measurement

COMPARISON TABLE OF ACCESSORIES




	SOLAR I-Vw	I-V400w	SOLAR300N	PVCHECKs	MPP300
	<b>S</b> TOPVIEW2006	<b>S</b> TOPVIEW2006	<b>S</b> TOPVIEW2007	<b>S</b> TOPVIEW2006	-
<b>TOPVIEW2006 TOPVIEW2007*</b> PC Windows software + USB/optical cable ORDER CODE HA000716 * ORDER CODE HA000714					
	<b>S</b>	<b>O</b>	<b>S</b>	<b>O</b>	-
<b>PT300N</b> PT1000 probe for PV module temperature ORDER CODE HA00300N					
	<b>S</b>	<b>O</b>	<b>S</b>	<b>O</b>	-
<b>SOLAR02</b> Remote unit for Irradiation and Temperature ORDER CODE HA000120					
	<b>S</b>	<b>S</b>	-	<b>S</b>	-
<b>KITGSC4</b> Set of 4 cables + 4 alligator clips ORDER CODE HA000021					
	<b>S</b>	<b>S</b>	-	<b>S</b>	-
<b>KITPVMC3 - KITPCMC3*</b> Set of 2 adapters with connectors MC3 ORDER CODE HA000032 * ORDER CODE HA000757					
	<b>S</b>	<b>S</b>	-	<b>S</b>	-
<b>KITPVMC4 - KITPCMC4*</b> Set of 2 adapters with connectors MC4 ORDER CODE HA000034 * ORDER CODE HA000758					
	-	-	<b>S</b>	-	-
<b>KIT800</b> Set of 5 cables + 5 alligator clips ORDER CODE HA008000					
	-	-	-	-	<b>S</b>
<b>KITMPPACC</b> Set of 4 alligator clips for AC voltage ORDER CODE HA000752					
	-	-	-	-	<b>S</b>
<b>KITMPPACW</b> Set of 4 cables for AC voltage 2m ORDER CODE HA000753					
	-	-	-	-	<b>S</b>
<b>KITMPPDCC</b> Set of 2 alligator clips for DC voltage ORDER CODE HA000754					
	-	-	-	-	<b>S</b>
<b>KITMPPDCW</b> Set of 2 alligator clips for DC voltage ORDER CODE HA000755					
	-	-	<b>S</b>	-	<b>S</b>
<b>A0055</b> External power supply AC/DC battery charger 230V 50/60Hz** ORDER CODE HA005500					

S = Standard O = Optional \*Adapter ACON3F4M necessary \*\*Please check accessory line to find the correct power adapter for your country



» FOLLOWS

	SOLAR I-Vw	I-V400w	SOLAR300N	PVCHECKs	MPP300
	-	-	<b>S</b>	-	-
<b>PT400</b> Touch-screen pen ORDER CODE HA0PT400					
	<b>S</b>	<b>S</b>	<b>S</b>	<b>O</b>	-
<b>HT304N</b> Sensor for irradiation measurement ORDER CODE HA0304N0					
	<b>S</b>	<b>S</b>	-	<b>O</b>	-
<b>M304</b> Mechanical inclinometer ORDER CODE HA000026					
	<b>S</b>	-	<b>S</b>	-	<b>O*</b>
<b>HT4004N</b> Standard 10-100A DC clamp, diameter 32 mm ORDER CODE HP04004N					
	<b>S</b>	-	<b>S</b>	-	<b>O</b>
<b>HT4005K</b> Standard 200A AC clamp, diameter 40 mm ORDER CODE HP04005K					
	-	-	<b>S</b>	-	<b>S</b>
<b>C2007</b> USB cable ORDER CODE HA002007					
	-	-	-	<b>S</b>	<b>S</b>
<b>BORSA2051</b> Soft carrying bag ORDER CODE HA002051					
	<b>O</b>	<b>O</b>	<b>O</b>	<b>O</b>	-
<b>SP-0400</b> Shoulder strap to use the device with free hands ORDER CODE HA000112					
	<b>O</b>	<b>O</b>	-	<b>O</b>	-
<b>KITPVEXT25M</b> Green and black cable extension, length 25m ORDER CODE HA000129					
	<b>S</b>	<b>S</b>	<b>S</b>	-	-
<b>VA500</b> Rigid Carrying case ORDER CODE HA050000					
	<b>O</b>	-	<b>O</b>	-	-
<b>MPP300</b> Accessory for measuring and recording the efficiency of a single- and three-phase single- and multi-string photovoltaic system (up to three MPPT) ORDER CODE HVMPP300					
	<b>O</b>	-	<b>O</b>	-	<b>O</b>
<b>HT96U</b> Standard clamp 1-100-1000A AC, diameter 54 mm ORDER CODE HP00096U					

S = Standard O = Optional \*Adapter ACON3F4M necessary

# COMPARISON TABLE OF ACCESSORIES

> FOLLOWS



	SOLAR I-Vw	I-V400w	SOLAR300N	PVCHECKs	MPP300
<b>HT97U</b> Standard clamp 10-100-1000A AC, diameter 54 mm ORDER CODE <i>HP000972</i>	0	-	0	-	0
<b>HT98U</b> Standard 1000A DC clamp, diameter 50 mm ORDER CODE <i>HP00098U</i>	0	-	0	-	0*
<b>HTFLEX33E</b> Flex 3000A AC clamp, diameter 174mm ORDER CODE <i>HP00033E</i>	-	-	0	-	0
<b>HP30D1</b> Standard 1000A DC clamp, diameter 83 mm ORDER CODE <i>HP0030D1</i>	0	-	0	-	0*
<b>HP30C3</b> Standard 3000A AC clamp, diameter 70 mm ORDER CODE <i>HP003003</i>	-	-	0	-	0
<b>HP30C2</b> Standard 200-2000A AC clamp, diameter 70 mm ORDER CODE <i>HP003002</i>	-	-	0	-	0
<b>HT4004P</b> Standard 10-100 ADC clamp, diameter 32 mm ORDER CODE <i>HP04004P</i>	-	-	-	-	0
<b>HT4004</b> Standard 10-100A DC clamp, diameter 30 mm ORDER CODE <i>HP004004</i>	-	-	-	S	-
<b>HT903</b> 3x1 - 5A/1V box for TA connection ORDER CODE <i>HA019030</i>	-	-	0	-	-
<b>606-IECN</b> Magnetic connectors for voltage measurement ORDER CODE <i>HA006060</i>	0	-	0	0	0
<b>ACON3F4M</b> Adapter for the connection of clamps HT4004N, HP30D1 and HT98U to MPP300 ORDER CODE <i>HA00ACON</i>	-	-	-	-	S 3 pieces

S = Standard    0 = Optional    \*Adapter ACON3F4M necessary



ORDER CODE *HA000406*

## ANALYSIS TAB 7.85" IPS Touchscreen, Quad Core, Dual SIM 3G

HT introduces the new tablet with pre-installed HTAnalysis App to immediately start working, right from the first time.

WITH **ANALYSIS TAB** you will:

- Work in a quicker way
- Work in a more collaborative way
- Reduce the amount of paper documents
- Work more safely, protected from any danger of direct contact
- Through HTCLOUD you will be able to share all measurements with your colleagues and/or download them from the PC without physically connecting the device to the PC

CHARACTERISTICS **TABLET**

- CPU: MT8382 Cortex A7 Quad Core 1.2Ghz
- GPU: Mali-400 MP2 Graphic Processor
- RAM: 1GB DDR3
- Cell network: Dual SIM 3G
- Internal memory: NAND FLASH 8 GB
- External memory: MicroSD Slot
- Display: 7.85" LCD 1024 x768 (4:3)
- OS: Android 4.4 OS
- Display: Capacitive touchscreen
- Photo camera: 0.3MP (front), 2.0MP (back)

COMPATIBLE DEVICES  
**MacroTestG3, G2, G1**  
**CombiG2**  
**PQA820, PQA819**  
**HT9022**

