

Advanced Test Equipment Rentals www.atecorp.com 800-404-ATEC (2832)

<u>TROUBLESHOOTING</u>



I-V400

MULTIFUNCTION INSTRUMENT FOR VERIFICATION OF I-V CHARACTERISTIC OF PHOTOVOLTAIC STRINGS AND MODULES

I-V 400 is the ideal solution for the ordinary and scheduled maintenance of photovoltaic systems. With I-V 400, searching for possible failures and problems in systems is extremely rapid, efficient and intuitive. I-V 400 carries out the field measurement of the I-V characteristic and of the main characteristic parameters both of a single module and of module strings.

The instrument measures, together with the I-V characteristic of the device being tested, also the values of its temperature and incident irradiation. The acquired data are then processed to extrapolate the I-V characteristic at standard test conditions (STC) in order to proceed with the comparison with the nominal data declared by the modules' manufacturer, thus immediately determining whether or not the string or the module being tested respects the characteristics declared by the manufacturer.

The operator must not do any calculation, nor any difficult operation. The instrument carries out the comparison rapidly and automatically, immediately providing the OK / NO result of the test.



PVCHECK

MULTIFUNCTION INSTRUMENT TO CHECK SAFETY, PARAMETERS AND PERFORMANCE OF A PV PLANT

In accordance with IEC/EN62446 guidelines, PVCHECK verifies the continuity of the protective conductors and the associated connections, and executes insulation resistance measurement of the active conductors without the need of short-circuiting the positive and negative terminals. PVCHECK allows verification of a PV string's parameters by measuring the open-circuit voltage and short-circuit current under operative conditions and reporting the results to STC (by means of radiation measurement). It provides an immediate outcome for both absolute measurements and for measurements compared with the previously tested PV strings. PVCHECK also allows carrying out performance analysis of PV array (DC) under operative conditions (connected to the inverter) providing an indication of the power generated and the efficiency of the field.

MPP300

ACCESSORY FOR MEASURING AND RECORDING THE EFFICIENCY OF SINGLE-PHASE AND THREE-PHASE MULTI-STRING SYSTEMS

MPP300, used together with SOLAR300N or SOLAR I-V, allows measuring and recording the main parameters which characterize single-phase and three-phase, single-string and multi-string (up to three strings) photovoltaic systems. MPP300 is perfect for use in systems with three-MPPT three-phase inverter and in three-phase systems provided with three single-phase inverters. MPP300 interfaces with SOLAR300N and SOLAR I-V which are used for MPP300 settings, to start/stop recording and to enable the download of the recorded values.

> Accessory for MAINTENANCE

<u>PERFORMANCE</u> <u>MAINTENANCE</u>



SOLAR300N

MULTIFUNCTION INSTRUMENT FOR TESTING SINGLE-PHASE AND THREE-PHASE PHOTOVOLTAIC SYSTEMS AND ANALYZING MAINS QUALITY IN COMPLIANCE WITH STANDARD EN50160

SOLAR300N allows carrying out all tests required for the verification of the efficiency of single-phase and three-phase photovoltaic systems.

SOLAR300N is provided with a remote unit, synchronized with the main unit. The remote unit is positioned next to the photovoltaic modules and it is connected to the probes for measuring environmental parameters (irradiation and temperature). SOLAR300N is connected upstream and downstream of the inverter in order to acquire the electric parameters (continuous power and alternating power). The synchronization between the two units guarantees the necessary contemporaneity of measurements, the two separate and independent units make measurements comfortable and safe.

SOLAR300N is also a powerful instrument for the complete analysis of mains quality in compliance with standard EN50160 (harmonic analysis, analysis of voltage anomalies, flicker, unbalance, etc.).

SOLAR I-V

MULTIFUNCTION INSTRUMENT FOR TESTING AND VERYFYING SINGLE-PHASE PHOTOVOLTAIC INSTALLATIONS

SOLAR I-V has been designed to meet any requirement of photovoltaic installation specialists.

Further to providing the possibility of measuring and recording the efficiency of single-string and single-phase photovoltaic systems, SOLAR I-V also measures the I-V characteristic both of a single module and of module strings. Thanks to SOLAR I-V, the operator can test the photovoltaic system and, should it give a negative result, immediately identify the problems of the system in order to promptly solve them. SOLAR I-V is provided with the remote unit SOLAR-02 which permits the remote measuring of irradiation and temperature with preliminary automatic synchronization between main unit and remote unit. SOLAR-02 is positioned next to the photovoltaic modules and it is connected to the probes for measuring environmental parameters. The synchronization between the two units guarantees the necessary contemporaneity of measurements.

The measured values, correctly reported at standard test conditions, are immediately compared with the values declared by the manufacturer to give the OK / NO result of the test. The operator must not do any calculation, the instrument carries out the comparison rapidly and automatically.



PERFORMANCE TROUBLESHOOTING MAINTENANCE



INSTRUMENTS FOR TESTING AND VERIFYING PHOTOVOLTAIC INSTALLATIONS

Continuity of protective conductors with 200mA Imsuitation with test voltages of 250, 500, 1000V DC without Imsuitation with test voltages of 250, 500, 1000V DC without Imsuitation with test voltages of 250, 500, 1000V DC without Phase sequence Imsuitation with test voltages of 250, 500, 1000V DC without Imsuitation with test voltages of 250, 500, 1000V DC without Imsuitation with test voltages of 250, 500, 1000V DC without De voltage/current/power Imsuitation with test voltages of 250, 500, 1000V DC without Imsuitation with test voltages of 250, 500, 1000V DC without Imsuitation with test voltages of 250, 500, 1000V DC without A TRMNS voltage/current/power Imsuitation with test voltages of 250, 500, 1000V DC without Imsuitation with test voltages of 250, 500, 1000V DC without Imsuitation with test voltages of 250, 500, 1000V DC without Recording of mains parameters with programmable IP Imsuitation with test voltages of 250, 600, 1000V DC without Imsuitation with test voltages of 250, 600, 1000V DC without Recording of mains parameters with programmable IP Imsuitation with test voltages of 250, 600, 1000V DC without Imsuitation with test voltages of 250, 600, 1000V DC without Recording of mains parameters with programmable IP Imsuitation with test voltages of 250, 600, 1000V DC without Imsuitation with test voltages of 250, 600, 1000V DC without Recording of mains parameters with programmable IP Imsuitation with test voltages of 250, 600, 1000V DC without Imsuitation without Recording of dubles and withon S Sin (200kHz)	Model	MPP300	SOLAR300N	I-V400	SOLAR I-V	PVCHECK
Insulation with test voltages of 250, 500, 1000V DC without disconnections Phase sequence C voltage/current/power AC TRMS voltage/current/power Acting of mains parameters with programmable IP Maximum number of quantities contenporarily selectable Acting of mains parameters with programmable IP Maximum number of quantities contenporarily selectable At amonic analysis of voltages/currents up to the 49° order Detection of voltage anomalies (dips, paeks) in Toms Complete analysis according to FNSI60 Inrush current of electric motors Voltage attansients (spikes) with a resolution of 5µs (200kHz) Voltage fast transients (spikes) with a resolution of 5µs (200kHz) Voltage taranisets (spikes) with a resolution of 5µs (200kHz) Voltage of vector diagrams and waveforms of voltages/currents Inflactation of recording automomy Default and customizable recordings TFT fuch-screen colour display TET fuch-screen colour display Default and customizable recording (modules) AC efficiency measurement/recording (modules) AC efficiency measurement with reference solar cell AC efficiency measurement wit			SOLARSOON	1-1-00	JOLAN I-V	TVENLER
disconnectionsImage						•
DC voltage/current/power • (3 input) • (1 input) • (1 input) • (1 input) AC TRMS voltage/current/power • (3 input) • (3 input) • (3 input) • (1 input) • (1 input) MAC TRMS voltage/current/power • (3 input) • (1 input) • (1 input) • (1 input) Recording of mains parameters with programmable IP • (1 input) • (1 input) • (5 input) Maximum number of quantities contemporarily selectable 251 9 8 Detection of voltage/currents up to the 49° order • • • Detection of voltage/currents up to the 49° order • • • Display of voltage/currents (splikes) with a resolution of 5µs (200kHz) • • • Voltage inhalence (NEC%, ZERO%) and Flicker (Pst, PH) • • • • Display of voltage/currents • • • • • Indication of recording autonomy • • • • • Default and customizable recording (modules) •(3 string) •(1 string) •(1 string) •(1 string)						•
AC TRMS voltage/current/power • (3 inputs) • (3 inputs) • (3 inputs) Power factor (cos %) on single-Athree-phase systems • • • Energies on single-Athree-phase systems • • • Recording of mains parameters with programmable IP •11s-60m) •(55-60m) •(55-60m) Maximum number of quantities contemporarily selectable 251 9 8 Marmonic analysis of voltages/currents up to the 49° order • • • Detection of voltage anomalies (dips, peaks) in 10ms • • • • Outage instansients (epikes) with a resolution of 5µs (200kHz) • • • • Voltage instansients (epikes) with a resolution of 5µs (200kHz) • • • • Voltage instansients (epikes) with a resolution of 5µs (200kHz) •	Phase sequence		•			
Power factor (cos 9) on single-/hnee.phase systemsImage on single-/hase and three-phase systemsImage of the system of the	DC voltage/current/power	• (3 inputs)	• (1 input)		• (1 input)	• (1 input)
Energies on single-phase and three-phase systems ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· ···· </td <td>AC TRMS voltage/current/power</td> <td>• (3 inputs)</td> <td>• (3 inputs)</td> <td></td> <td></td> <td></td>	AC TRMS voltage/current/power	• (3 inputs)	• (3 inputs)			
Recording of mains parameters with programmable IP(1:s-60m)	Power factor (cos φ) on single-/three-phase systems		•			
Maximum number of quantities contemporarily selectable 251 9 8 Harmonic analysis of voltages/currents up to the 49° order -	Energies on single-phase and three-phase systems		•			
Harmonic analysis of voltages/currents up to the 49" order Detection of voltage anomalies (dips, peaks) in 10ms Complete analysis according to EN50160 Inrush current of electric motors Voltage tast transients (spikes) with a resolution of 5µs (200kHz) Voltage ubalance (NEG%, ZEO%) and Flicker (Pst, Pt1) Display of vector diagrams and waveforms of voltages/currents Indication of recording autonomy Default and customizable recordings TFT touch-screen colour display LCD custom backlit display Power supplier Use of remote unit De efficiency measurement/recording (modules) AC efficiency measurement/recording (inverter) Voltage ubalance Termeture measurement/recording (inverter) Tradiation measurement with reference solar cell Tradiation measurement with reference solar cell Macadition and the soft of the soft	Recording of mains parameters with programmable IP		• (1s-60m)		• (5s-60m)	• (5s-60m)
Detection of voltage anomalies (dips, peaks) in 10ms · · Incl Incl Incl Complete analysis according to ENSO160 · · · · · Inrush current of electric motors · · · · · Voltage fast transients (spikes) with a resolution of \$µs (200kHz) · · · · · Voltage transients (spikes) with a resolution of \$µs (200kHz) ·<	Maximum number of quantities contemporarily selectable		251		9	8
Complete analysis according to EN50160•••Image of the second o	Harmonic analysis of voltages/currents up to the 49 th order		•			
Inrush current of electric motors••••Voltage fast transients (spikes) with a resolution of 5ps (200kH2)•••••Voltage unbalance (NEG%, ZERO%) and Flicker (Pst, Ptl)••••••Display of vector diagrams and waveforms of voltages/currents•••••••Indication of recording autonomy••• </td <td>Detection of voltage anomalies (dips, peaks) in 10ms</td> <td></td> <td>•</td> <td></td> <td></td> <td></td>	Detection of voltage anomalies (dips, peaks) in 10ms		•			
Voltage fast transients (spikes) with a resolution of 5µs (200kHz)••••Voltage unbalance (NEG%, ZERO%) and Flicker (Pst, Pti)••••••Display of vector diagrams and waveforms of voltages/currents••••••Indication of recording autonomy•• <td>Complete analysis according to EN50160</td> <td></td> <td>•</td> <td></td> <td></td> <td></td>	Complete analysis according to EN50160		•			
Voltage unbalance (NEG%, ZERO%) and Flicker (Pst, Ptl)Image of the second	Inrush current of electric motors		•			
Voltage unbalance (NEG%, ZERO%) and Flicker (Pst, Ptl)Image of the second	Voltage fast transients (spikes) with a resolution of 5µs (200kHz)		•			
Indication of recording autonomyImageImageImageImageDefault and customizable recordingsImageImageImageImageIFT touch-screen colour displayImageImageImageImageICC custom backlit displayImageImageImageImagePower supply by rechargeable battery and by means of external power supplierImageImageImageImageUse of remote unitImageImageImageImageImageImageDC efficiency measurement/recording (modules)ImageImageImageImageImageImageAC efficiency measurement/recording (modules-inverter)Image<			•			
Indication of recording autonomyImageImageImageImageDefault and customizable recordingsImageImageImageImageIFT touch-screen colour displayImageImageImageImageICC custom backlit displayImageImageImageImagePower supply by rechargeable battery and by means of external power supplierImageImageImageImageUse of remote unitImageImageImageImageImageImageDC efficiency measurement/recording (modules)ImageImageImageImageImageImageAC efficiency measurement/recording (modules-inverter)Image<	Display of vector diagrams and waveforms of voltages/currents		•			
Default and customizable recordings•••••TFT touch-screen colour display•••<			•			
TFT touch-screen colour display•••••LCD custom backlit display••••••Power supply by rechargeable battery and by means of external power supplier••••••Use of remote unit••••••••DC efficiency measurement/recording (modules)•(3 strings)•(1 string)•(1 string)·(1 string)·(1 string)·(1 string)·(1 string)·(1 string) <t< td=""><td></td><td></td><td>•</td><td></td><td></td><td></td></t<>			•			
Power supply by rechargeable battery and by means of external power supplier•••••Use of remote unit•••••••DC efficiency measurement/recording (modules)•(3 strings)•(1 string)•(1 string)•(1 string)•(1 string)AC efficiency measurement/recording (inverter)•(3 phase)•(3 phase)•(1 phase)•(1 phase)Overall efficiency measurement/recording (modules+inverter)•••••Irradiation measurement with reference solar cell••••••Temperature measurement of modules and environment•• <td< td=""><td></td><td></td><td>•</td><td></td><td></td><td></td></td<>			•			
Power supply by rechargeable battery and by means of external power supplier•••••Use of remote unit•••••••DC efficiency measurement/recording (modules)•(3 strings)•(1 string)•(1 string)•(1 string)•(1 string)AC efficiency measurement/recording (inverter)•(3 phase)•(3 phase)•(1 phase)•(1 phase)Overall efficiency measurement/recording (modules+inverter)•••••Irradiation measurement with reference solar cell••••••Temperature measurement of modules and environment•• <td< td=""><td>LCD custom backlit display</td><td></td><td></td><td>•</td><td>•</td><td>•</td></td<>	LCD custom backlit display			•	•	•
Use of remote unit••••••DC efficiency measurement/recording (modules)•(3 strings)•(1 string)•(1 string)•(1 string)•(1 string)AC efficiency measurement/recording (modules+inverter)••••••Overall efficiency measurement/recording (modules+inverter)•••		•	•			
DC efficiency measurement/recording (modules)•(3 strings)•(1 string)•(1 string)·(1 string) <td></td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td>		•	•	•	•	•
AC efficiency measurement/recording (inverter) • (3 phase) • (1 phase) Overall efficiency measurement/recording (modules+inverter) • • • Irradiation measurement with reference solar cell • • • Temperature measurement of modules and environment • • • • Detection of I-V curve of modules and strings • • • • • Quick test mode •	DC efficiency measurement/recording (modules)	• (3 strings)	• (1 string)		• (1 string)	• (1 string)
Overall efficiency measurement/recording (modules+inverter)••••Irradiation measurement with reference solar cell••••Temperature measurement of modules and environment••••Detection of I-V curve of modules and strings••(1000V, 10A)•(1000V, 10A)Quick test mode••••Internal database of PV modules••••Measurement of modules and strings data (Voc, Vmpp, Impp, Isc, Pmax, FF, Dpmax)••••Auto power off•••••Memory capacity2 Mbyte1 month @ IP=15min, 251 par> 200 curves 8 days @ IP=10min999 locationsUSB port for connection of external memory sticks•••••PC interface with software for Windows•••••Context-sensitive help on the display300x265x140235x165x75 </td <td></td> <td>• (3 phase)</td> <td> (3 phase) </td> <td></td> <td>• (1 phase)</td> <td></td>		• (3 phase)	 (3 phase) 		• (1 phase)	
Irradiation measurement with reference solar cell•••Temperature measurement of modules and environment••••Detection of I-V curve of modules and strings•(1000V, 10A)•(1000V, 10A)•(1000V, 10A)Quick test mode•(1000V, 10A)•(1000V, 10A)•(1000V, 10A)•(1000V, 10A)Internal database of PV modules•••••Measurement of modules and strings data (Voc, Vmpp, Impp, Isc, Pmax, FF, Dpmax)•••••Auto power off•••••••Memory capacity2 Mbyte1 month @ IP=15min, 251 par> 200 curves 8 days @ IP=10min999 locationsExtension of internal memory with external Compact Flash•••••USB port for connection of external memory sticks•••••PC interface with software for Windows••••••Context-sensitive help on the display••••••Saving of recordings and instant values••••••Dimensions (LxWxH) (mm)300x265x140235x165x75						
Temperature measurement of modules and environment••••Detection of I-V curve of modules and strings•(1000V, 10A)•(1000V, 10A)•(1000V, 10A)Quick test mode•(1000V, 10A)•(1000V, 10A)•(1000V, 10A)•(1000V, 10A)Internal database of PV modules••••Measurement of modules and strings data (Voc, Vmpp, Impp, Isc, Pmax, FF, Dpmax)••••Auto power off•••••Memory capacity2 Mbyte1 month @ IP=15min, 251 par> 200 curves> 200 curves 8 days @ IP=10min999 locationsExtension of internal memory with external Compact Flash•••••USB port for connection of external memory sticks•••••PC interface with software for Windows••••••Context-sensitive help on the display••••••Saving of recordings and instant values••••••Dimensions (LxWxH) (mm)300x265x140235x165x75235x165x75235x165x75235x165x75235x165x75235x165x75235x165x75235x165x75Weight (batteries included)2,3 Kg1 Kg1,2 Kg1,3 Kg1,2 Kg1,2 Kg1,2 Kg1,2 Kg			•	•	•	•
Detection of I-V curve of modules and strings• (1000V, 10A)• (1000V, 10A)Quick test mode• (1000V, 10A)• (1000V, 10A)• (1000V, 10A)Internal database of PV modules••••Measurement of modules and strings data (Voc, Vmpp, Impp, Isc, Pmax, FF, Dpmax)••••Auto power off•••••Memory capacity2 Mbyte1 month @ IP=15min, 251 par> 200 curves 8 days @ IP=10min999 locationsExtension of internal memory with external Compact Flash••••USB port for connection of external memory sticks••••PC interface with software for Windows•••••Context-sensitive help on the display•••••Saving of recordings and instant values•••••Dimensions (LxWxH) (mm)300x265x140235x165x75235x165x75235x165x75235x165x75235x165x75235x165x75Weight (batteries included)2,3 Kg1 Kg1,2 Kg1,3 Kg1,2 Kg			•	•	•	•
Quick test mode• (1000V, 10A)• (1000V, 10A)• (1000V, 10A)Internal database of PV modules••••Measurement of modules and strings data (Voc, Vmpp, Impp, Isc, Pmax, FF, Dpmax)••••Auto power off•••••Memory capacity2 Mbyte1 month @ IP=15min, 251 par> 200 curves 8 days @ IP=10min999 locationsExtension of internal memory with external Compact Flash••••USB port for connection of external memory sticks••••PC interface with software for Windows•••••Context-sensitive help on the display•••••Saving of recordings and instant values•••••Dimensions (LxWxH) (mm)300x265x140235x165x75235x165x75235x165x75235x165x75235x165x75235x165x75Weight (batteries included)2,3 Kg1 Kg1,2 Kg1,3 Kg1,2 Kg1,2 Kg				• (1000V, 10A)	• (1000V, 10A)	
Internal database of PV modules•••Measurement of modules and strings data (Voc, Vmpp, Impp, Isc, Pmax, FF, Dpmax)••••Auto power off•••••Memory capacity2 Mbyte1 month @ IP=15min, 251 par> 200 curves> 200 curves 8 days @ IP=10min999 locationsExtension of internal memory with external Compact Flash•••••USB port for connection of external memory sticks•••••PC interface with software for Windows••••••Context-sensitive help on the display•••••••Saving of recordings and instant values••• </td <td></td> <td></td> <td></td> <td>• (1000V, 10A)</td> <td>• (1000V, 10A)</td> <td>• (1000V, 10A)</td>				• (1000V, 10A)	• (1000V, 10A)	• (1000V, 10A)
Pmax, FF, Dpmax)Image: Constraint of the second						•
Auto power off••••Memory capacity2 Mbyte1 month @ IP=15min, 251 par> 200 curves> 200 curves 8 days @ IP=10min999 locationsExtension of internal memory with external Compact Flash•••••USB port for connection of external memory sticks•••••PC interface with software for Windows••••••Context-sensitive help on the display••••••Saving of recordings and instant values•••••••Dimensions (LxWxH) (mm)300x265x140235x165x75235x165x75235x165x75235x165x75235x165x75235x165x75235x165x75235x165x75Weight (batteries included)2,3 Kg1 Kg1,2 Kg1,3 Kg1,2 Kg1,2 Kg1,2 Kg1,2 Kg				•	•	
Memory capacity2 Mbyte1 month @ IP=15min, 251 par> 200 curves> 200 curves 8 days @ IP=10min999 locationsExtension of internal memory with external Compact Flash•••••USB port for connection of external memory sticks•••••PC interface with software for Windows• (USB)• (optical/USB)• (optical/USB)• (optical/USB)• (optical/USB)Context-sensitive help on the display••••••Saving of recordings and instant values••••••Dimensions (LxWxH) (mm)300x265x140235x165x75235x165x75235x165x75235x165x75235x165x75235x165x75Weight (batteries included)2,3 Kg1 Kg1,2 Kg1,3 Kg1,2 Kg1,2 Kg		•	•	•	•	•
USB port for connection of external memory sticks••··PC interface with software for Windows• (USB)• (optical/USB)• (optical/USB)• (optical/USB)Context-sensitive help on the display•••••Saving of recordings and instant values•••••Dimensions (LxWxH) (mm)300x265x140235x165x75235x165x75235x165x75235x165x75Weight (batteries included)2,3 Kg1 Kg1,2 Kg1,3 Kg1,2 Kg		2 Mbyte		> 200 curves		999 locations
USB port for connection of external memory sticks••··PC interface with software for Windows• (USB)• (optical/USB)• (optical/USB)• (optical/USB)Context-sensitive help on the display•••••Saving of recordings and instant values•••••Dimensions (LxWxH) (mm)300x265x140235x165x75235x165x75235x165x75235x165x75Weight (batteries included)2,3 Kg1 Kg1,2 Kg1,3 Kg1,2 Kg	Extension of internal memory with external Compact Flash		•			
PC interface with software for Windows• (uss)• (optical/USB)• (optical/USB)• (optical/USB)Context-sensitive help on the display•••••Saving of recordings and instant values•••••Dimensions (LxWxH) (mm)300x265x140235x165x75235x165x75235x165x75235x165x75235x165x75Weight (batteries included)2,3 Kg1 Kg1,2 Kg1,3 Kg1,2 Kg			•			
Context-sensitive help on the display • • • • Saving of recordings and instant values • • • • • Dimensions (LxWxH) (mm) 300x265x140 235x165x75 235x165x75 235x165x75 235x165x75 235x165x75 Weight (batteries included) 2,3 Kg 1 Kg 1,2 Kg 1,3 Kg 1,2 Kg			• (USB)	• (optical/USB)	(optical/USB)	 (optical/USB)
Dimensions (LxWxH) (mm) 300x265x140 235x165x75 235x165x75 235x165x75 235x165x75 Weight (batteries included) 2,3 Kg 1 Kg 1,2 Kg 1,3 Kg 1,2 Kg						
Dimensions (LxWxH) (mm) 300x265x140 235x165x75 235x165x75 235x165x75 235x165x75 Weight (batteries included) 2,3 Kg 1 Kg 1,2 Kg 1,3 Kg 1,2 Kg	Saving of recordings and instant values		•	•	•	•
Weight (batteries included) 2,3 Kg 1 Kg 1,2 Kg 1,3 Kg 1,2 Kg		300x265x140	235x165x75	235x165x75	235x165x75	235x165x75
						1,2 Kg
	Safety in compliance with IEC/EN61010-1					



HT ITALIA s.r.l. Via della Boaria 40, 48018 Faenza RA Italy Tel. +39.0546.621002 Fax +39.0546.621144 E-mail: export@htitalia.it www.ht-instruments.com