Revolution.

MACROTESTG3 | COMBIG2 | HTANALYSIS

Artificial Intelligence.

Thanks to the creation of App HTanalysis it is possible to interface HT last generation instruments with tablets and smartphones.
HTanalysis is a professional software allowing to display and look at measurements or recordings on your devices then sharing them on HTCloud database.
HTanalysis permits to create professional reports complete with pictures, texts, video and voice notes. Interfacing the instrument with your device's display you can look at a fast and detailed tracking of the recorded quantities on touch-screen.

With PQA820

› It enables you to display **recordings of voltage, current, power, harmonics, THD%, cosphi and frequency**.

› It enables you to display **all waveforms, vector diagrams and harmonics instantly**.

› **It enables you to store all recordings** into **HTCloud** database **sharing** them through **mail** as well.

With MacroTestG3,- CombiG2 and GSC60

› It enables you to create **reports** complete with **pictures, videos, text and voice notes**, **store** them into **HTCloud** database and share them through **mails**.
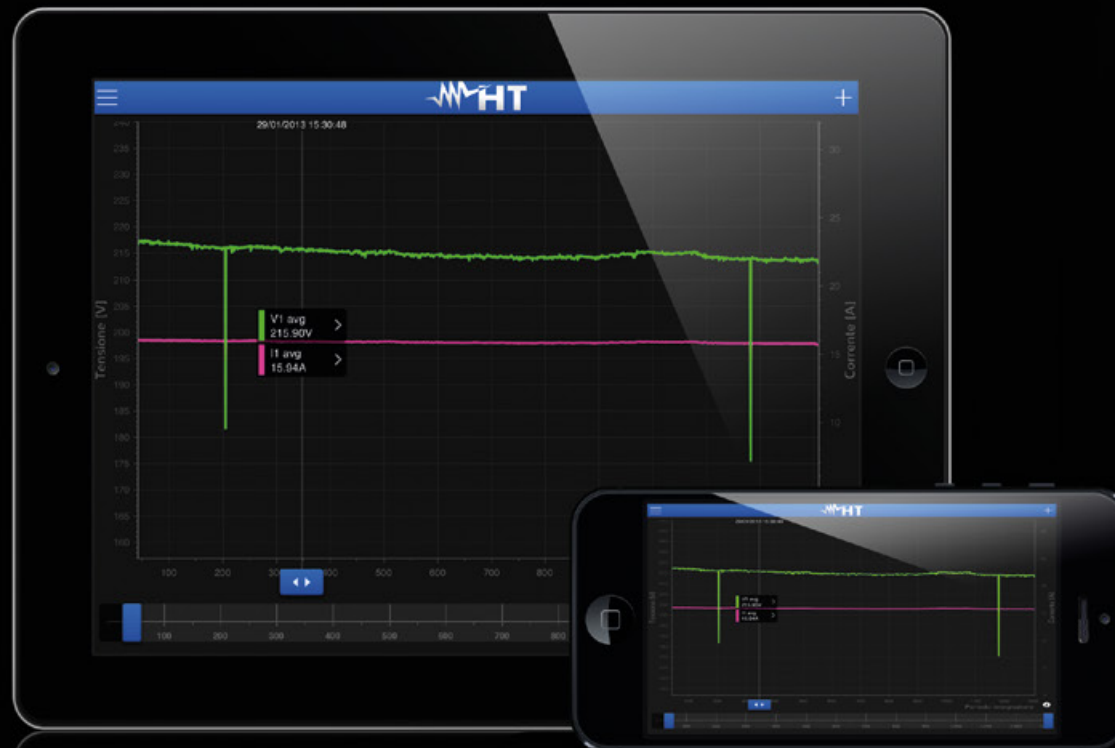
Share.
**Whenever, whatever
and wherever.**

Install App HTanalysis to avail yourself of **HTCloud** database and **share** measurement results and recordings with your colleagues **from any place on the planet**.

HT
Cloud ™

MACROTEST G3

I'm pure technology.
Touch me, please.

Clear answer.
Complying o not.

Save time!
You will take
half time!

Color Touch Screen
with icon intuitive
graphics

kW
Wi-Fi
and USB

Power
measurement

App HTanalysis
for iOS™
and Android™

Cloud
Share.
Whenever,
whatever and
wherever*

You can enter
voice notes,
text notes
and pictures*

100%
"Made in Italy"
technology
and quality

› **One instrument for all electrical safety tests** according to IEC/EN61557-1.

› **Advanced Loop.** Testing of MCBs, fuses and cable sizing.

› **Earth resistance** with 2- or 3-pole **volt-ampere method** in TT, TN and IT systems, **non-trip earth loop impedance measurement, stackless earth ground resistance measurement** with T2100 (optional). **Soil resistivity.**

› **Measurement of electrical parameters in single phase installations** (V, A ,W,VAR,VA, PF)

› **RCD testing** type A, AC, B with test current up to 10A.**

› **Insulation resistance** measurement.

› **Continuity** measurement of protective conductors.

› Measurement of **phase sequence (SEQ)** and **leakage currents.**

› **Measurement of environment parameters** through external probes.

RCD testing

- Test on **general, selective and delayed RCDs type A, AC up to 1A** and **B up to 300mA**.
- Test on **RCDs with external toroidal transformer and test current up to 10A***.
- Test mode **x½, x1, x2, x5** and **AUTO** to make **6 test sequences.**
- **Ramp**: measurement of real tripping current.
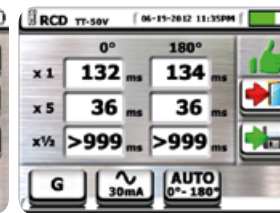 *with optional accessory RCDX10.
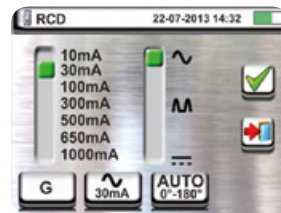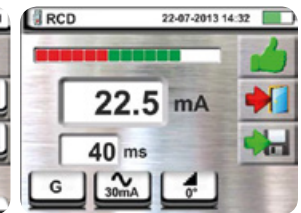
Selection of RCD type and tripping current

Selection of tripping current on RCDs with external toroidal transformer

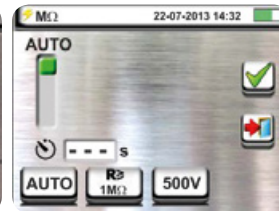Setting of RCD delayed time

AUTO test result on RCD

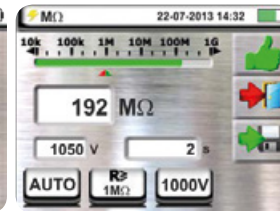Ramp test result on RCD

Insulation resistance

- AUTO function
- Rapid setting of **limit values** and **test voltages** through virtual keyboard.
- Setting of **Timer for the test**
- **Test voltage 50, 100, 250, 500, 1000 VDC**

Selection of test voltage and minimum limit value

Selection of AUTO or TIMER measuring mode

Insulation measurement outcome

Continuity of protection conductors with 200mA

- **Calibration of measuring cables**
- Rapid setting of **limit values** through virtual keyboard.
- Setting of **Timer for the test**

Negative outcome

Selection of maximum resistance value

Selection of AUTO or TIMER measuring mode

Measurement of environmental parameters through external probes

Using external transducer it is possible to measure the following environmental parameters
- **Air temperature** in °C, °F and RH%
- **Air relative humidity**
- **Illuminance** with ranges 20/2k/20kLux

Selection of measurement type

Real time display of temperature measurement

Real time display of LUX measurement

Measurement of phase sequence SEQ

- Check of **phase sequence** with 1 or 2 terminals.
- Check of **phase compliance**.

Measurement of leakage currents

Leakage current can be measured with external clamp **HT96U** (optional).
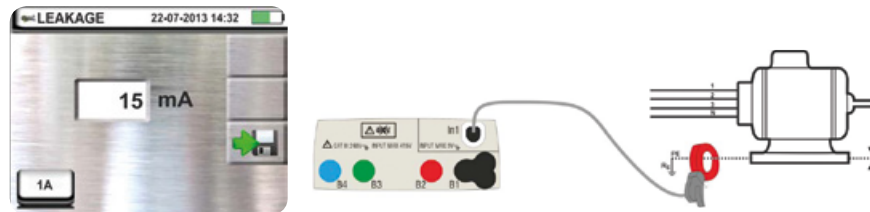
Evolution of saving.

- Virtual keyboard to enter comments.
- Saving on file structure.
- **New detailed reports** with **TopView** software.

Saving with file tree · Entering comments on measurements · Transfer of data to PC by TopView software

HTanalysis™ and HTCloud™

App HTanalysis will change your working concept.

During testing you can:
- Dictate comments orally
- Associate a picture or a video to each measurement
- Review and customize your measurements

HTCloud will enable you to **share your measurements with everybody.**

Advanced Loop

Testing of MCBs, fuses and cable sizing.

For the first time ever.

For the first time you will be able to check whether a complex system is working in compliance with standards. **HT enriched loop measurement** including functions and tests which were earlier possible just thanks to project-oriented calculations.

The rules of the game? We know all the answers.

In order to protect power lines, IEC/EN61557-1 standards require designers to size the installation to grant:
- **protection against indirect contacts**
- **protection against short circuits.**

MacrotestG3 is quite familiar with standards and is capable of directing you in solving any problem.

Just challenge us.

› **STD** Line impedance measurement between L-N, L-L, L-PE and calculation of prospective short circuit current.
› **I²t** Testing of MCB against short circuit thermal effect.
› **kA** Testing of MCB tripping power.
› Testing of MCB against indirect contacts (TT-TN-IT systems).
› Testing of MCB tripping time.

All the a.m. measurements can be also effected with high resolution (0.1mΩ) using IMP57 (optional accessory).

No more guessing.

› **I²t Testing of MCB against short circuit thermal effect.**

Are cables suitably sized to support short circuit currents? Is MCBs' tripping time short enough to safeguard your cables? MactrotestG3 will direct you in solving those problems. After setting the type of MCB/fuse, of cable section and conductor material you will be advised of line protection according to the following relation:

$$I_{cc}^2 \times t \leq K^2 \times S^2$$

Where, according to standards, K represents the conductor material while S is the cable section.

› **kA Testing of MCB tripping power.**

Is the short circuit current calculated in every point of the line suitable? If yes your MCB is correctly sized.
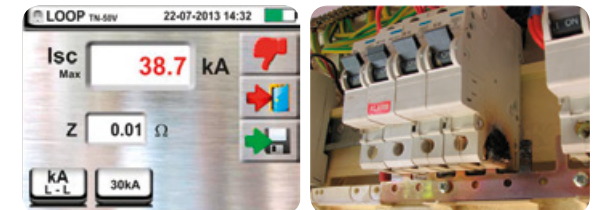
Setting of MCB/fuse type and rated current

Selection of material type and conductor section

› **Testing of protection against indirect contacts (TT-TN-IT systems)**

When an earth fault occurs masses can become potentially dangerous as long as protection trips out. The instrument checks that danger does not overcome the limits set by the standards. For example in a TN system after setting the curve type and tripping time of MCB the instrument calculates short circuit current with positive outcome if MCB trips out before contact voltage becomes dangerous.

› **Testing of MCB tripping time.**

If MCBs comply with tripping times provided by the standards the instrument will indicate positive outcome.

Selection of tripping time   Positive outcome of measurements

Earth Resistance

Any kind of installation.

Earth resistance with 2- or 3-pole volt-ampere method in TT, TN and IT systems.

After setting the distribution system (TT, TN, IT) the instrument can check the requisites provided by the standards IEC/EN61557-1 for protection against indirect contacts with positive outcome in case of compliance.

Watchword: make it easier.

In TN systems after setting maximum earth fault current **Ig** and tripping time for medium voltage protections (data provided by the Electricity Board) the instrument calculates contact voltage **Utp** after measuring earth resistance comparing it with reference guidelines data. If outcome is **OK!** the user does not need to carry out step and contact voltage measurement.

More than one earth.

In addition to volt ampere method other testing modes can be adopted as follows:

› **Stackless earth ground resistance measurement with T2100 (optional)**

MacrotestG3 adopts an innovative method for earth resistance measurement eliminating the worry of finding a place for auxiliary earth rods. Earth resistance measurement will be easier thanks to an algorithm HTEarth storing all measurements effected with clamp T2100 and calculating earth resistance value without disconnecting rods.

› **Non-trip earth loop impedance measurement**

It measures earth resistance and contact voltage without causing protections tripping in systems with neutral and without neutral.
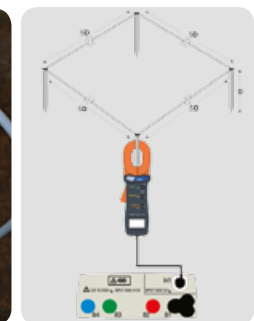
› **Soil resistivity**

It measures soil resistivity (ρ) with 4-pole Wenner method.

Earth resistance measurement by Volt-ampere method
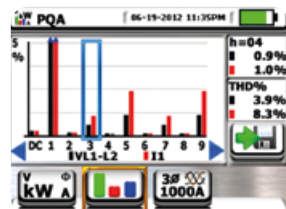

Measurement with clamp T2100

Power and Load Analysis

› **Single Phase** and **Three Phase** balanced systems

› **Voltage, Current and frequency** measurement

› **Active power, reactive power** and **apparent power** measurement

› **Cosphi**, **power factor** measurement

› **THD%** and **Harmonics analysis** up to 25th

Power Analysis

Harmonics Analysis up to 25th

Tech specs

Continuity with 200mA
Measuring range: $0,01\Omega \div 99.9\Omega$
Accuracy: $\pm(5.0\%\ reading + 3\ digits)$
Test current: $> 200mA\ (R \leq 2\Omega)$
Open circuit voltage: $4V \leq V_0 \leq 12V$

Insulation resistance
Test voltage: 50, 100, 250, 500, 1000VDC
Measuring range: $0.01M\Omega \div 99.9M\Omega$ (50V)
$\quad\quad 0.01M\Omega \div 199.9M\Omega$ (100V)
$\quad\quad 0.01M\Omega \div 499M\Omega$ (250V)
$\quad\quad 0.01M\Omega \div 999M\Omega$ (500V)
$\quad\quad 0.01M\Omega \div 1999M\Omega$ (1000V)
Basic accuracy: $\pm(2.0\%\ reading + 2\ digits)$
Test current: $> 1mA$ on $1k\Omega$ x Vnom (50,100, 250, 1kV)
$\quad\quad > 2.2mA$ on $230k\Omega$ @ 500V
Short circuit current: $<6.0mA$ for each test voltage

Line/Loop Impedance (L-L, L-N, L-PE)
Measuring range: $0.01\Omega \div 199.9\Omega$
Resolution: 0.01Ω min ($0.1m\Omega$ with optional accessory IMP57)
Accuracy: $\pm(5.0\%\ reading + 3\ digits)$
Test voltage: $100\div265V$ (L-N) / $100\div460V$ (L-L), 50/60Hz
Maximum test current: 5.81A (@265V); 10.10A (@457V)
Selectable MCB protections: curves B, C, D, K
Selectable fuse protections: type aM and gG
Insulating material (test I2t): PVC, butyl rubber, EPR, XLPE

Earth resistance and ground resistivity
Measuring range R: $0.01\Omega \div 49.99k\Omega$
Measuring range: $\rho\ 0.60\Omega m \div 3.14M\Omega m$
Accuracy: $\pm(5.0\%reading + 3digits)$
Test current: 10mA, 77.5Hz
Open circuit voltage: $<20Vrms$

RCD tripping time and current
RCD type: AC ($\sim$), A ($\sim$), B, General (G), Selective (S), Delayed (R)
RCD rated currents: 10, 30, 100, 300, 500, 650, 1000mA
Relays: 0.3..10A (with optional accessory RCDX10)
L-N, L-PE voltage: $100V \div 265V$, 50/60Hz $\pm 5\%$
Half sine-wave test current: 0°, 180°
Tripping time accuracy: $\pm(2.0\%reading + 2\ digits)$
Test current multipliers: x1/2, x1, x2, x5
Tripping current range: $(0.3 \div 1.1)$ Idn (AC, A, B)
Tripping current accuracy: 5%Idn (10mA - 650mA)

Non-trip earth loop impedance
L-N, L-PE voltage range: 100V ÷ 265V, 50/60Hz ± 5%
Measuring range: 0,01Ω÷1999Ω (systems with neutral)
                 1Ω÷1999Ω (systems without neutral)
Accuracy: ±(5.0% reading + 3 digits)
Test current: <15mA

Contact voltage Ut
Measuring range: 0 ÷ Utlim (Utlim = 25V o 50V)
Accuracy: ±(5.0% reading + 3V)

1 terminal phase sequence
L-N, L-PE voltage range: 100V ÷ 265V, 50/60Hz ± 5%
Measurement type: contact on metal parts (no insulating material)

Leakage current (with clamp HT96U)
Measuring range: 2mA ÷ 999mA
Resolution: 1mA
Accuracy: ±(5.0% reading + 2 digits)

Measurement of environmental parameters (with optional probes)
Air temperature (°C/°F): -20.0 ÷ 60.0 °C / -4.0 ÷ 140.0 °F
Relative humidity: 0% ÷ 100%RH
Illuminance (Lux): 0.001lux ÷ 20klux
Accuracy: ±(2.0% reading + 2 digits)

Measurement of main parameters and harmonics (PQA)

AC TRMS Voltage		
Range (V)	Resolution (V)	Accuracy
15.0÷459.9	0.1 V	± (1.0%rdg + 1dgt)

Allowed crest factor ≤ 1,5 • Frequency 42.5 ÷ 69.0 Hz

Frequency		
Range (Hz)	Resolution (V)	Accuracy
42.5÷69.0	0.01 V	±(2.0%rdg + 2dgt)

Allowed voltage: 15.0 ÷ 459.9V • Allowed current: 5%FS clamp ÷ FS clamp

AC TRMS Current			
FS clamp	Range (A)	Resolution (A)	Accuracy
≤10A	5% FS ÷ 9.99	0.01	1ph: ±(1.0%rdg + 3dgt) 3ph: ±(2.0%rdg + 5dgt)
10A ≤ FS ≤ 200	5% FS ÷ 199.9	0.1	
200A ≤ FS ≤ 3000	5% FS ÷ 2999	1	

Range: 5 ÷ 999.9 mV • Values under 5mV are zeroed • Allowed crest factor ≤ 3 • Frequency: 42.5 ÷ 69.0 Hz

Active Power (@ 230V in 1Ph systems, 400V in 3 Ph systems, cosphi=1, f=50.0Hz)			
FS clamp	Range (kW)	Resolution (kW)	Accuracy
≤10A	0.000 ÷ 9.999	0.001	1ph: ±(2.0%rdg + 5dgt) 3ph: ±(2.5%rdg + 8dgt)
10A ≤ FS ≤ 200	0.00 ÷ 999.99	0.01	
200A ≤ FS ≤ 1000	0.0 ÷ 999.9	0.1	
1000A ≤ FS ≤ 3000	0 ÷ 999.9	1	

Reactive Power (@ 230V in 1Ph systems, 400V in 3 Ph systems, cosphi=0, f=50.0Hz)			
FS clamp	Range (kVAr)	Resolution (kVAr)	Accuracy
≤10A	0.000 ÷ 9.999	0.001	1ph: ±(2.0%rdg + 7dgt) 3ph: ±(3.0%rdg + 8dgt)
10A ≤ FS ≤ 200	0.00 ÷ 999.99	0.01	
200A ≤ FS ≤ 1000	0.0 ÷ 999.9	0.1	
1000A ≤ FS ≤ 3000	0 ÷ 999.9	1	

Power Factor (@ 230V in 1Ph systems, 400V in 3 Ph systems, f=50.0Hz)		
Range	Resolution	Accuracy
0.70c÷1.00÷0.70i	0.01	±(4.0%rdg + 10dgt) if I ≤ 10% FS ±(1.0%rdg + 7dgt) if I >10% FS

Voltage Harmonics (@ 230V in 1Ph systems, 400V in 3 Ph systems, f=50.0Hz)			
Range (%)	Resolution (%)	Order	Accuracy
0.1÷100.0	0.1	01÷25	±(5.0%rdg + 5dgt)

Frequency of fundamental: 42.5 ÷ 69 Hz, DC accuracy not declared.

Current Harmonics (f=50Hz)			
Range (%)	Resolution (%)	Order	Accuracy
0.1÷100.0	0.1	01÷9	±(5.0%rdg + 5dgt)
		10÷17	±(10.0%rdg + 5dgt)
		18÷25	±(15.0%rdg + 10dgt)

General specifications

Power supply	6x1.2V rechargeable type AA NiMH or 6x1.5V type AA alkaline
Battery life	> 550 test (alKaline)
Display	320x240 resistive color LCD with touch screen
Memory	999 locations, 3 marker levels
PC interface	optical/USB and Wi-Fi
Dimensions (L x D x H)	225 x 165 x 75 mm / 8.8 x 6.5 x 2.9 in
Weight (including batteries)	1.2 kg / 2.5 lb
Safety	IEC/EN61010-1, double insulation
Pollution degree	2
Mechanical protection	CAT III 240V, max 415V among inputs
Reference standards	IEC/EN61557-1-2-3-4-5-6-7
Working temperature	0°÷ 40°C / 32°÷104°F
Working humidity	<80%RH
Storage temp.	-10°÷ 60°C / 14°÷140°F
Storage humidity	<80%RH

Standard accessories

- **C2033X** 3-banana to Shuko plug cable
- **KITGSC5** Kit including 4 cables, 4 alligator clips and 2 test leads
- **KITTERRNE** Soft carrying bag containing 4 cables and 4 earth rods
- **PR400** Remote switch probe
- **PT400** Stylus
- **VA507** Hard carrying case
- **TOPVIEW2006** PC software and optical-to-USB connection cable C2006
- **YABAT0003000** Rechargeable NiMH battery 1.2V, AA, 6 pcs
- **YABAT0004000** External battery charger for 8 pcs. type AA batteries
- **Quick user's guide**
- **User's manual** on CD-ROM
- **Calibration certificate** ISO9000

PR400

KITGSC5

YABAT0004000

PT400

YABAT0003000

C2033X

Optional accessories

- **HT96U** Transducer for AC currents (including leakage current) 0 ÷ 1, 0 ÷ 100, 0 ÷ 1000A AC
- **IMP57** High resolution impedance measurement adapter
- **T2100** Earth ground clamp transducer
- **HT52/05** Transducer for temperature/humidity measurement
- **HT53/05** Transducer for illuminance measurement
- **SP-0400** Free hands kit
- **606-IECN** Magnetic adapter for connection to screw heads
- **1066-IECN** Black connector for extensions (4mm banana)
- **RCDX10** Accessory for industrial RCDs up to 10A

IMP57

HT53/05

HT52/05

HT96U

T2100

RCDX10

Crosstable

Functions	MACROTEST G3	COMBI G2
Insulation with 50, 100, 250, 500, 1000VDC test voltage	•	•
Continuity of earth conductors with 200mA	•	•
Earth resistance with 2-wire and 3-wire methods	•	
Earth resistance with clamp	•**	
Ground resistivity with 4-wire methods	•	
Global earth resistance without RCD's tripping	•	•
Line/Fault impedance, Phase-Phase, Phase-Neutral, Phase-PE	•	•
Line/Fault impedance, Phase-Phase, Phase-Neutral, Phase-PE with high res. (0.1 mΩ)	•*	•*
Prospective short circuit/fault current	•	•
Contact voltage	•	•
General, Selective and Delayed RCD's tripping time	•	•
RCD's test current type A, AC max 1A and B type max 300mA	•	•
Test on earth leakage delay testers RCD up to 10A	• ***	• ***
RCD trip out current (Ramp test)	•	•
Phase sequence indication	•	•
Main lines percentage voltage drop measurement	•	•
Test with remote probe (with PR400, optional accessory)	•	•
Leakage current (with HT96U optional accessory)	•	•
Measurement of electrical parameters (V, A, W, VAR, VA, Wh, cosphi)	•	•
V, A harmonic analysis up to 49th order and THD% calculation	• (1) (25ª)	• (1) (25ª)
Measurement of environmental parameters (with HT52/05 e HT53/05 optional probes)	•	•
Help on line	•	•
Internal memory to save measures	•	•
Optical/USB ports for PC connection	•	•
Built-in Wi-Fi communication interface	•	•

* With IMP57 optional accessory   ** With T2100 optional accessory   *** With RCDX10 optional accessory   (1) Single Phase and Three Phase balanced systems

165 mm / 225 mm / 75 mm / 225 mm / 165 mm / 75 mm

HT ITALIA S.R.L.

Via della Boaria, 40
48018 Faenza (RA) Italia
T **+39 0546 621002**
F **+39 0546 621144**
E-mail **export@htitalia.it**
ht-instruments.it

HT INSTRUMENTS AMERICAS LLC

3145 Bordentown Avenue
W3, Parlin, NJ 08879
USA
Tel. **1 719 421 9323**
E-mail: **sales@ht-instruments.us**
ht-instruments.us

HT INSTRUMENTS GMBH

Am Waldfriedhof, 1b
D-41352 Korschenbroich, Deutschland
Tel. **+ 49 (0)2161 564 581**
Fax **+ 49 (0)2161 564 583**
E-mail: **info@ht-instruments.de**
ht-instruments.de

HT INSTRUMENTS SA

C/ Legalitat, 89
08024 Barcelona, España
Tel. **+34 93 4081777**
Fax **+34 93 4083630**
E-mail: **info@htinstruments.es**
ht-instruments.es