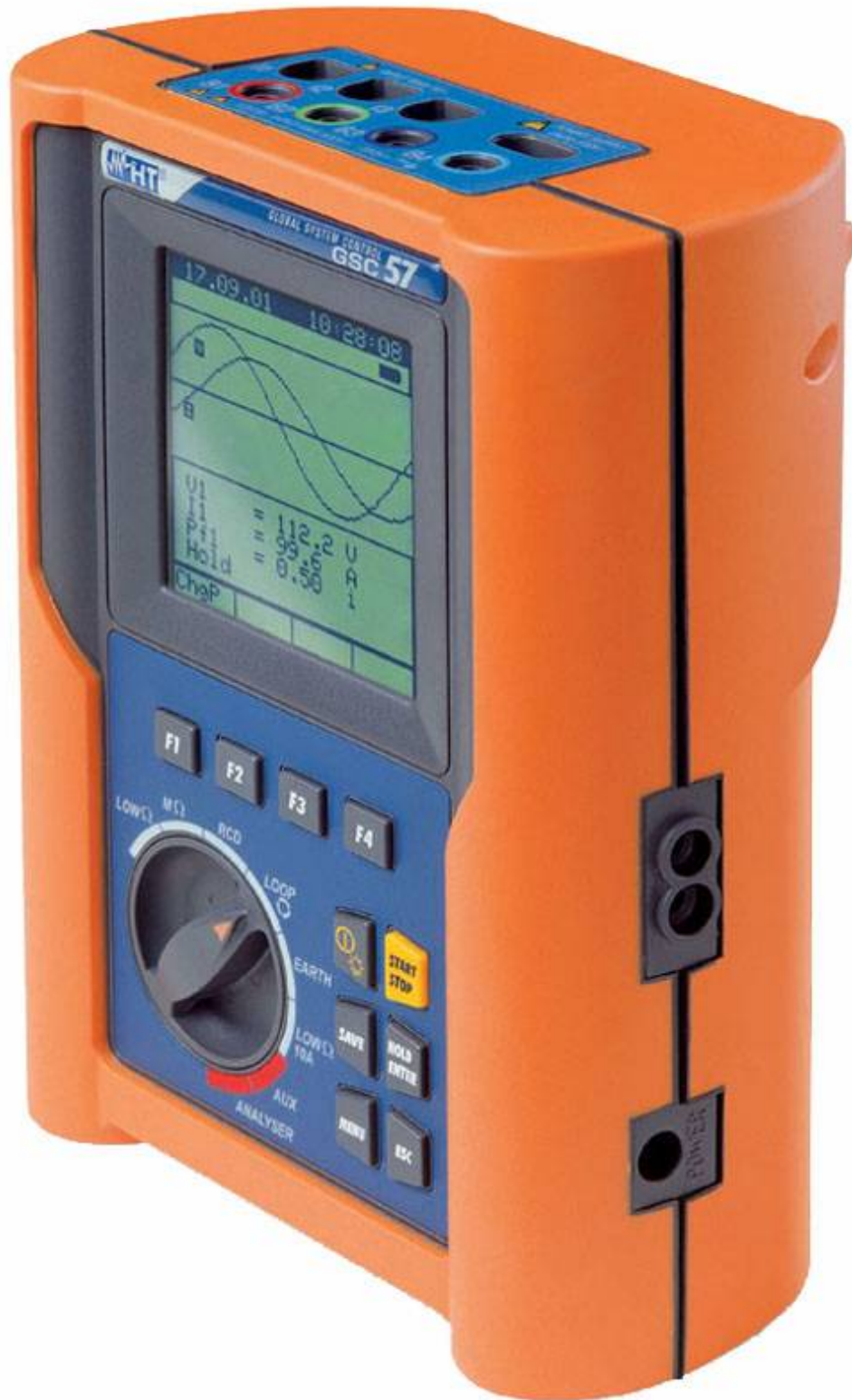


GSC57 & GSC53N

Integrated meter for test verify and Power Quality analysis



DESCRIPTION

GSC57 is the most complete model of the entire meters designed to verify both on electrical installations according to IEC61557, BS7671, VDE0100 and power quality on generic three phase systems. Flexibility of this meter consents using by installers, technicians, engineers and testers of electrical plants and equipment. GSC57 performs, from the other things, a fault Loop Impedance with high resolution (0.1 mOhm) nearly power transformer thanks use of IMP57 optional accessory. As logger meter, GSC57 can recording all values of electrical parameters (Voltages, Currents, Powers, Power Factor, Energies, etc.), performing harmonic analysis of Voltages and Currents (up to 49-th order) and consents a supply voltages quality analysis (sags, spikes, breaks) according to EN50160 standards reference. With optional probes GSC57 can also performing measures and recordings of environmental parameters as Temperature, Humidity, Illumination (Lux), Sound Level and Leakage currents very important for troubleshooting problem of RCDs wrong tripping. Each measure can stored inside instrument memory, recalled on instrument display and transferred to PC using the management standard software in way to create a professional relation which will improve the quality of work.

GSC53N is a strong evolution equipment developed by HT ITALIA to perform complete test and verify on electrical installations according to the most common safety standards (IEC 61557, VDE 0100, BS7671) and for power quality analysis on general electric networks.

This meter, sure, with high accuracy, dedicated to each proof technicians, is a very user-friendly instrument thanks to the followed new integrated features:

- Setting up to 5 predefined recordings on power quality (EN50160, Voltage Anomalies, Harmonics, Start-up and Power & Energies) for a easier and rapid analysis of the most common situation on plants.
- Use of flexible clamp transducers with integrated control logic. In this way disappear the problem of replace batteries of power adaptor typical of transducers with external control logic.

GSC53N model can perform LINE/LOOP Impedance and prospective short circuit current measurements with high resolution (0.1 mOhm) with use of IMP57 optional accessory. In this way is possible realize important measures strictly nearly to power transformer.

MODELS AND FEATURES

Features	GSC 57	GSC 53N
Continuity on protective conductors PE with 200mA	✓	✓
Continuity on protective conductors PE with 10A	✓	
Insulation resistance	✓	✓
Tripping time and current of RCDs (type A, AC, general and selective)	✓	✓
Line and Loop impedance with calculation of the prospective short circuit current	✓	✓
Loop impedance with high resolution (0.1mOhm) with IMP57 optional accessory	✓	✓
Global Earth Resistance without RCDs tripping	✓	✓
Earth resistance with 3-wire and 2-wire methods	✓	✓
Ground resistivity with 4-wire method	✓	✓
Contact voltage	✓	✓
Phase rotation	✓	✓
TRMS measure and recording of any parameter (Voltages, Currents, Powers, etc)	✓	✓
Harmonic analysis of voltage and current up to the 49th order	✓	✓
Voltage anomalies (sags, spikes, breaks) with a 10ms resolution	✓	✓
Measurement and recording to leakage current to earth	✓	✓
Measurement and recording of Temperature (°C/°F), Humidity (HR%)	✓	✓
Measurement and recording Illuminations (Lux)	✓	✓
Measurement and recording of Type 1 Sound Level	✓	✓
Save results inside memory	✓	✓
Recall measured test at display	✓	✓
RS-232 serial opto-insulated interface for PC communication	✓	✓
Auto Power OFF	✓	✓
Backlight	✓	✓

MODELS AND ACCESSORIES

Standard Accessories	GSC 57	GSC 53N
C2033: cable 3-wire with Shuko plug	✓	✓
KITGSC5: kit of 4 cables 2m , 4 alligators e 2 test leads	✓	✓
KITTERNE bag with 4 cable banana/banana + 4 metal rods	✓	✓
A0050: power adaptor 230V/50Hz		✓
HTFLEX33: kit of 3 flexible clamp 1000/3000A (Ø 174mm)		✓
C5700: power cable for 10A continuity test	✓	
TOPLINK: PC software + serial cable	✓	✓
BORSA2051: carrying bag	✓	✓
Calibration certificate ISO9000	✓	✓
Instruction manual	✓	✓

Optional Accessories	GSC 57	GSC 53N
HT55: transducer for noise Type 1 measurements	✓	✓
CB-5: portable calibrator for HT55 probe	✓	✓
C7000/05: 2 cables, 5m length, for 10A test	✓	
C7000/10: 2 cables, 10m length, for 10A test	✓	
HT52/05: transducer for temperature/humidity	✓	✓
HT53/05: transducer for lux measurements	✓	✓
A0050: power adaptor 230V/50Hz	✓	
CN0050: kit to hang the instrument on the neck	✓	✓
HTFLEX3003: kit of 3 flexible clamps 300-3000A/1V - Ø 174mm	✓	
HT96U: clamp 1-100-1000A/1V for leakage currents - Ø 54mm	✓	✓
HT97U: clamp 10-100-1000A/1V for leakage currents - Ø 54mm	✓	✓
HT903: case 3x1-5A/1V for connection to TA	✓	✓
IMP57: accessory ZLoop at high resolution	✓	✓

STANDARDS

- CE mark
- EN 61557-4 Continuity test
- EN 61557-2 Insulation Resistance
- EN 61557-5 Earth resistance
- EN 61557-6 RCD test
- EN 61326 EMC Standards
- EN 50160
- EN 60204-1 safety of electrical devices equipment
- IEC 60439-1 Type-tested assemblies TTA and partially type-tested assemblies PTTA
- EN 61008
- EN 61009
- EN 61010-1
- EN 61036
- EN 61557
- IEC 1268
- IEC 651
- IEC 804
- 16th edition
- HD 384
- VDE 0413
- EN 61557-3 Loop impedance P-P, P-N, P-PE

ELECTRICAL SPECIFICATIONS

1. ELECTRICAL SPECIFICATIONS—VERIFY TESTS

Accuracy is indicated as \pm (% rdgs + no. of dgt) at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, con relative humidity <60%RH

Continuity test on protective and equalizing conductors

Range (Ω)	Resolution (Ω)	Accuracy (*)
0.00 ~ 9.99	0.01	\pm (2.0% rdg + 2dgt)
10.0 ~ 99.9	0.1	

(*) after cable calibration which eliminates the cable resistance

Test current >200mA DC per $R \leq 5 \Omega$ (calibration included)

Current measurement resolution: 1mA

Open leads voltage $4 < V_o < 24\text{V}$

Insulation resistance (DC voltage)

Test voltage (V)	Range (M Ω)	Resolution (M Ω)	Accuracy
50	0.01 ~ 9.99	0.01	\pm (2% rdg+2 dgt)
	10.0 ~ 49.9	0.1	
	50.0 ~ 99.9	0.1	\pm (5% rdg+2 dgt)
100	0.01 ~ 9.99	0.01	\pm (2% rdg+2 dgt)
	10.0 ~ 99.9	0.1	
	100.0 ~ 199.9	0.1	\pm (5% rdg+2 dgt)
250	0.01 ~ 9.99	0.01	\pm (2% rdg+2 dgt)
	10.0 ~ 199.9	0.1	
	200 ~ 249	1	
	250 ~ 499	1	\pm (5% rdg+2 dgt)
500	0.01 ~ 9.99	0.01	\pm (2% rdg+2 dgt)
	10.0 ~ 99.9	0.1	
	100 ~ 499	1	
	500 ~ 999	1	\pm (5% rdg+2 dgt)
1000	0.01 ~ 9.99	0.01	\pm (2% rdg+2 dgt)
	10.0 ~ 99.9	0.1	
	100 ~ 999	1	
	1000 ~ 1999	1	\pm (5% rdg+2 dgt)

Open circuit voltage <1.3 x nominal test voltage

Short circuit current <6.0mA @ 500V

Nominal current >2.2mA @ 230k Ω , load (500V); >1mA su 1k Ω per Vnom (others)

Measurement limits fitted 0.05, 0.10, 0.23, 0.25, 0.50, 1.00, 100M Ω

RCDs tripping time

Range (ms)		Resolution (ms)	Accuracy
$\frac{1}{2} I_{\Delta N}, I_{\Delta N}$	1 ~ 999	1	$\pm (2.0\% \text{rdg} + 2\text{dgt})$
$2 I_{\Delta N}$	1 ~ 200 general 1 ~ 250 selective		
$5 I_{\Delta N}$ RCD	1 ~ 50 general 1 ~ 160 selective		

Nominal trip-out currents 10mA, 30mA, 100mA, 300mA, 500mA

RCD type AC, A, general and selective

Phase-PE voltage 100V ~ 255V

Frequency 50Hz \pm 0.5Hz

RCDs tripping current

$I_{\Delta N}$	RCDs type	Range $I_{\Delta N}$ (mA)	Resolution (mA)	Accuracy $I_{\Delta N}$
$I_{\Delta N} \leq 10\text{mA}$	AC	$(0.5 \sim 1.4) I_{\Delta N}$	0.1 $I_{\Delta N}$	$-0\%, + (5.0\% I_{\Delta N})$
	A	$(0.5 \sim 2.4) I_{\Delta N}$		
$I_{\Delta N} > 10\text{mA}$	AC	$(0.5 \sim 1.4) I_{\Delta N}$		
	A	$(0.5 \sim 2.0) I_{\Delta N}$		

Contact voltage U_t

Range (V)	Resolution (V)	Accuracy
0 ~ $2U_t$ lim	0.1	$-0\%, +(5.0\% \text{rdg} + 3\text{dgt})$

$U_{t\text{lim}}$ (UI) 25V, 50V

Line Impedance (Phase-Phase, Phase-Neutral)

Range (Ω)	Resolution (Ω) (*)	Accuracy
0.01 ~ 9.99	0.01	$\pm(5.0\% \text{rdg} + 3\text{dgt})$
10.0 ~ 199.9	0.1	

(*) 0.1 m Ω on range 0.0 ~ 199.9 m Ω (with IMP57 optional accessory)

Maximum peak current 3.65A @ 127V; 6.64A @ 230V; 11.5A @ 400V

Test voltage 100 ~ 265V (phase-neutral) / 100 ~ 460V (phase-phase); 50Hz \pm 0.5Hz

Fault Loop Impedance (Phase-Ground)

Range (Ω)	Resolution (Ω) (*)	Accuracy
0.01 ~ 19.99	0.01	$\pm(5.0\% \text{rdg} + 3\text{dgt})$
20.0 ~ 199.9	0.1	
200 ~ 1999	1	

(*) 0.1 m Ω on range 0.0 ~ 199.9 m Ω (with IMP57 optional accessory)

Maximum peak current 3.65A @ 127V; 6.64A @ 230V; 11.5A @ 400V

Test voltage 100 ~ 265V (phase-neutral) / 100 ~ 460V (phase-phase); 50Hz \pm 0.5Hz

Fault Loop Resistance R_A without tripping the RCD

Range (Ω)	Resolution (Ω)	Accuracy
1 ~ 1999	1	$-0\%, \pm(5.0\% \text{rdg} + 3\text{dgt})$

Test current 0.5 $I_{\Delta N}$ set on U_t test

15mA on $R_{a15\text{mA}}$ test

Earth Resistance 3-wire and 2-wire systems

Range (Ω)	Resolution (Ω)	Accuracy
0.01 ~ 19.99	0.01	$\pm (5.0\%rdg + 3dgt)$
20.0 ~ 199.9	0.1	
200 ~ 1999	1	

Test current <10mA – 77.5Hz

Open circuit voltage <20V rms

Earth Resistivity ρ with 4-wire method

Range $\rho(\Omega)$	Resolution (Ω)	Accuracy
0.06 ~ 19.99	0.01	$\pm (5.0\%rdg + 3dgt)$
20.0 ~ 199.9	0.1	
200 ~ 1999	1	
2.00 ~ 99.99k	0.01k	
100.0 ~ 125.5k	0.1k	

Test current <10mA – 77.5Hz

Open circuit voltage <20V rms

Probe distance range 1 ~ 10m

Continuity test with 10A according to EN60204-1 (GSC57 only)

Range (Ω)	Resolution (Ω)	Accuracy
0.001 ~ 0.999	0.001	$\pm (1.0\% rdg + 2dgt)$

Test current >10AAC for $R \leq 0.45 \Omega$

Resolution test current 0.1A

Open-circuit voltage between 6 and 12V AC

Power supply voltage 230V- 50Hz

Continuity test with 10A according to EN60204-1 (GSC57 only)

Range (Ω)	Resolution (Ω)	Accuracy
0.01 ~ 9.99	0.01	$\pm (1.0\% rdg + 2dgt)$

Test current >10AAC for $R \leq 0.45 \Omega$

Resolution test current 0.1A

Open-circuit voltage <12V AC

Power supply voltage 230V- 50Hz

Voltage (RCD, LOOP, Phase Sequence)

Range (V)	Resolution (V)	Accuracy
15 ~ 460	1	$\pm (3.0\% rdg + 2dgt)$

Frequency

Range (Hz)	Resolution (Hz)	Accuracy
47.0 ~ 63.6	0.1	$\pm (0.1\% rdg + 1dgt)$

2. ELECTRICAL SPECIFICATIONS – ANALYZER AND AUX

Accuracy is indicated as \pm (% rdgs + no. of dgt) at 23°C \pm 5°C, con relative humidity <60%RH

Voltage DC/AC TRMS –Single phase / Three phase system (Autorange)

Range (V)	Resolution (V)	Accuracy	Input Impedance
15 ~ 310V	0.2V	$\pm(0.5\% \text{ rdg}+2\text{dgt})$	300k Ω (Phase-Neutral)
310 ~ 600V	0.4V		300k Ω (Phase-Phase)

Voltage Anomalies – Single / Three phase systems (Manual range)

Range(V)	Resolution(V)	Resolution(S)	Accuracy(V)	Accuracy (50Hz)(S)
15 ~ 310V	0.2V	10ms	$\pm(1.0\% \text{ rdg}+2\text{dgt})$	$\pm 10\text{ms}$
30 ~ 600V	0.4V			

Input Impedance: 300k Ω (Phase-Neutral and Phase-Phase)

Current by external clamp transducer – STD

Range (V)	Resolution(mV)	Accuracy	Input impedance	Overload protection
0.005 ~ 0.26V	0.1	$\pm(0.5\% \text{ rdg}+2\text{dgt})$	200k Ω	5V
0.26 ~ 1V	0.4			

(*) Example: by using a clamp whose range is 1000A/1V, the instrument measures currents higher than 5A

Current by external clamp transducer—FlexINT (1000A AC Range)

Range (A)	Input voltage	Resolution	Accuracy
10.0 ~ 19.9	950.0 μ V ~ 1.691mV	8.5 μ V	$\pm(4.0\% \text{ rdg} + 8.5\mu\text{V})$
20.0 ~ 99.9	1.7mV ~ 8.491mV		$\pm(1.0\% \text{ rdg} + 8.5\mu\text{V})$
100.0 ~ 999.9	8.5mV ~ 84.99mV		$\pm(1.0\% \text{ rdg} + 85\mu\text{V})$

1A = 85 μ V ; Rinput = 400k Ω

Current by external clamp transducer—FlexINT(3000A AC Range)

Range (A)	Input voltage	Resolution	Accuracy
30.0 ~ 999.9	2.55mV ~ 84.99mV	8.5 μ V	$\pm(1.0\% \text{ rdg} + 17\mu\text{V})$
1000 ~ 3000	85.0mV ~ 255mV	85 μ V	$\pm(0.5\% \text{ rdg} + 85\mu\text{V})$

1A = 85 μ V ; Rinput = 400k Ω

Power factor (Cos ϕ) – Single / Three phase systems

Range (Cos ϕ)	Resolution	Accuracy [°]
0.20 ~ 0.50	0.01	1.0
0.50 ~ 0.80		0.7
0.80 ~ 1.00		0.6

Leakage current (by optional clamp transducer)

Range (mA) *	Resolution (mA)	Accuracy	Input Impedance	Overload protection
0.5 ~ 999.9	0.1	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$	200k Ω	5V

(*) While recording the instrument stores only current values > 5mA with 1mA resolution

Maximum stored value is the peak value calculated with response time of 1ms

Power – Single / Three phase systems

Measures type	Range	Accuracy	Resolution
ACTIVE POWER	100.0 ~ 999.9W	0.1W	±(1.0%rdg+2dgt)
	1.000 ~ 9.999kW	0.001kW	
	10.00 ~ 99.99kW	0.01kW	
	100.0 ~ 999.9kW	0.1kW	
	1.000 ~ 9.999MW	0.001MW	
	10.00 ~ 99.99MW	0.01MW	
	100.0 ~ 999.9MW	0.1MW	
REACTIVE POWER	100.0 ~ 999.9VAR	0.1VAR	
	1.000 ~ 9.999kVAR	0.001kVAR	
	10.00 ~ 99.99kVAR	0.01kVAR	
	100.0 ~ 999.9kVAR	0.1kVAR	
	1.000 ~ 9.999MVAR	0.001MVAR	
	10.00 ~ 99.99MVAR	0.01MVAR	
	100.0 ~ 999.9MVAR	0.1MVAR	
APPARENT POWER	100.0 ~ 999.9VA	0.1VA	
	1.000 ~ 9.999kVA	0.001kVA	
	10.00 ~ 99.99kVA	0.01kVA	
	100.0 ~ 999.9kVA	0.1kVA	
	1.000 ~ 9.999MVA	0.001MVA	
	10.00 ~ 99.99MVA	0.01MVA	
	100.0 ~ 999.9MVA	0.1MVA	
ACTIVE ENERGY (Class 2 EN61036)	100.0 ~ 999.9Wh	0.1Wh	
	1.000 ~ 9.999kWh	0.001kWh	
	10.00 ~ 99.99kWh	0.01kWh	
	100.0 ~ 999.9kWh	0.1kWh	
	1.000 ~ 9.999MWh	0.001MWh	
	10.00 ~ 99.99MWh	0.01MWh	
	100.0 ~ 999.9MWh	0.1MWh	
REACTIVE ENERGY (Class 3 IEC1268)	100.0 ~ 999.9VARh	0.1VARh	
	1.000 ~ 9.999kVARh	0.001kVARh	
	10.00 ~ 99.99kVARh	0.01kVARh	
	100.0 ~ 999.9kVARh	0.1kVARh	
	1.000 ~ 9.999MVARh	0.001MVARh	
	10.00 ~ 99.99MVARh	0.01MVARh	
	100.0 ~ 999.9MVARh	0.1MVARh	

Harmonics - Single / Three phase systems

Range	Maximum resolution	Accuracy
DC ~ 25a	0.1V / 0.1A	±(5.0% rdg+2 dgt)
26a ~ 33a		±(10% rdg+2 dgt)
34a ~ 49a		±(15% rdg+2 dgt)

Environmental parameters (AUX function)		
Range	Resolution	Accuracy
-20°C(4°F) ~ 80°C(140°F)	0.1°C/0.1°F	±(2.0% rdg+2dgt)
0 ~ 100% UR	0.1% UR	
0.001Lux ~ 20.00 Lux(*)	0.001 ~ 0.02 Lux	
0.1Lux ~ 2000 Lux(*)	0.1 ~ 2 Lux	
1Lux ~ 20 kLux(*)	1 ~ 20 Lux	

(*) Accuracy of HT53 luxmeter probe is according to Class AA

GENERAL SPECIFICATIONS

SINGLE/THREE PHASE RECORDING

STORED PARAMETERS:

- Phase and delta voltage
- Phase current, neutral current
- Phase and total three phase Active, Reactive, Apparent power
- Active energy (Class 2 EN61036), Reactive energy (Class 3 IEC1268)
- Phase and total three phase Power factor $\cos\varphi$
- Voltage, current harmonics (DC,1,2,...49)
- Voltage anomalies (sags, swells, breaks)
- Predefined settings (EN50160, Voltage anomalies, Harmonics, Start up, Power & Energy)
- Max selectable parameters: 63 or 3 AUX (environmental and/or leakage)
- Integration period: 5 ~ 3600 sec.
- Recording autonomy: > 30 days with 15 minutes integration period
- Memory size: 2Mbyte

DISPLAY AND MEMORY:

Features:	Dot matrix with backlight
Resolution:	128x128dots
Visible area:	73 x 73mm
Memory:	999 locations

POWER SUPPLY:

Batteries:	6 batteries 1.5V type LR6-AA-AM3-MN 1500
External power supply adapter:	Code A0050 (AUX e ANALYZER functions only)
Mains power supply:	230V- 50Hz (LOW Ω 10A function only)—(GSC57 only)

MECHANICAL FEATURES:

Dimensions:	225(W) x 165(L) x 105(D)mm
Weight (batteries included):	GSC57:about 2.0 kg / GSC53N:about 1.7 kg

WORKING ENVIRONMENTAL CONDITIONS:

Reference temperature:	23°C \pm 5°C
Working temperature:	0°C ~ 40°C
Allowed relative humidity:	< 80% HR
Storage temperature:	-10°C ~ 60°C
Storage humidity:	< 80% HR

TEST VERIFIES REFERENCE STANDARDS:

Continuity test with 200mA:	IEC61557—4
Insulation resistance:	IEC61557—2
Earth resistance:	IEC61557—5

Fault Loop Impedance:	IEC61557—3
RCDs test:	IEC61557—6
Phase sequence:	IEC61557—7
Insulation test on switchboards:	EN60439-1
Continuity test with 10A:	EN60439-1, EN60204-1

POWER/ENERGY MEASUREMENTS REFERENCE STANDARDS:

Features of voltage supplied by public utilities:	IEC/ EN50160
Active energy static counters for AC current:	IEC / EN61036 (Class 2)
Reactive energy static counters for AC current:	IEC1268 (Class 3)

NOISE MEASUREMENTS REFERENCE STANDARDS:

Sound measurements (with HT55 accessory):	IEC / EN60651:1994/A1 type 1
	IEC / EN60804:1994/A2 type 1

GENERAL REFERENCE STANDARDS:

Safety of measuring instruments:	EN61010-1+A2 (1997)
Product type standard:	IEC61557-1, 2, 3, 4, 5, 6
Insulation:	class 2 (double insulation)
Pollution degree:	2
Overvoltage category:	CAT II 600V / 350V~ (to ground)
	CAT III 600V / 300V~ (to ground)
Use:	max altitude 2000m
EMC:	EN61326—1 (1998) +A1 (1999)

This instrument complies with the requirements of the European Low Voltage Directives 72/23/CEE (LVD) and EMC 89/336/CEE, amended with 93/68/CEE

This instrument complies with the European Directive for CE marking.

HT ITALIA

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