FINERO

Quanti

The Quanti single test and measurement device series offers and extremely flexible system for integrated functional testing

Images of Quanti

ETSS

EASY TEST SYSTEM SOLUTIONS

Contents

Quanti – Only One Device for Electrical Safety Testing and Functional Testing

Combined electrical safety and functional test & measurement

Quanti comes with a wide variety of functions in a single test device. Quanti enables most accurate, most efficient, and safest testing.

Quanti can perform the following tests in any order:

- Ground Bond - G
- Dielectric Withstand – H
- Insulation Resistance – I
- Continuity – S
- DMM - M
- Consumption – F
- Internal Relay Module – RM
- Communication

Quanti features

Can be used in a wide range of applications, such as:

- Cable testing
- Power supply testing
- Home appliances testing
- Information equipment testing
- Industrial equipment testing
- Medical equipment testing
- You name it!

Cost effectiveness

Finero's Quanti system is cost-effective as it reduces testing costs by consolidating electrical safety and functional testing into a single device. Functional tests can include measurements such as DMM, continuity test and consumption measurement. Additionally, the system's power factor correction mitigates EMC-network issues, further enhancing its efficiency and reliability.

Comfort

Comfortable to adjust test parameters. Easy programming of the units is achieved through the use of only four buttons and a flywheel knob. The four buttons are 'soft buttons', with their current meaning always clearly shown on the display, while the flywheel knob is used to select parameters.

PFC integrated in the input

The PFC (Power Factor Correction) forces the input current to follow the wave form of input AC voltage. It substantially reduces harmonic noise.

Reduced risk

Quanti's interactivity and easy-to-use user interface enables easier programming and learning as the user only needs to be familiar with one product family. Also the extensive help functions guide the user while testing and reduce human errors.

Labview compatible

Finero's Quanti product family is LabVIEW compatible, allowing for seamless integration and programming of test sequences using LabVIEW software.

Languages

With two selectable languages, English and German.

4.3" Graphical display

Quanti has a 4.3" Graphical display with excellent colors and graphics, which supports and already very interactive human to machine interface.

Independent Test System

Quanti can operate as a independent test system without PC. Quanti can run user-created (max. 100 pcs) test programs and store test results that can be downloaded to a USB memory. The program can contain up to 100 configurable tests. Quanti supports barcode and QR code readers, which allow the serial number of the device under test to be added to the test result.

General specifications

Environmental specifications:

- Indoor use
- Altitude: up to 2000m
- Operating temperature: +5 °C to 50 °C
- Storage temperature: -40 °C to +60 °C
- Maximum relative humidity:
  - 80% for temperatures up to 31 °C
  - decreasing linearly to 50% relative humidity at +40 °C
  - no condensation allowed
- Pollution degree is 1

Power requirements	Input voltage range: 100 - 250 VAC, 45 - 65 Hz
Mechanical	Rack mounting for 19" rack (3U) or table using with foldable feet
Weight	Depending on the model, approximately 15 - 25kg
Certification	EN61010, EN62368, EN61558 Safety, EN55024 and EN61000
Warranty	12 months limited, extended warranty available on request
USB slot	Type A connection in the front panel for the memory stick and barcode/QR reader

Protection functions

Fast output cut-off after fail

Panel operation lock, present password (four digits)

Arc detection (see the details on page 13)

Ensuring connectivity (see the details on page 13)

Pass / fail judgement function

Visual and audible indication

Memory

Max 25 steps per sequence

Max 20 test sequences, single possibility

Max last 100 test results saved with memory stick

Display

TFT-LCD 4.3" (480 x 272) with back light, 16 million colors

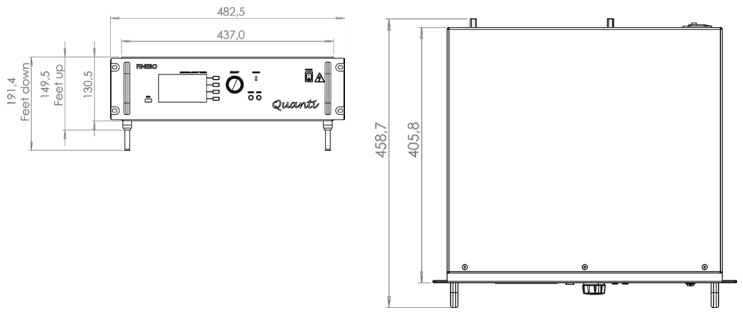
Other features

Calibration notification: The device notifies when the next calibration has to be done

Easy to download test results, programs and settings to USB memory

Easy to upload test programs and settings from USB memory

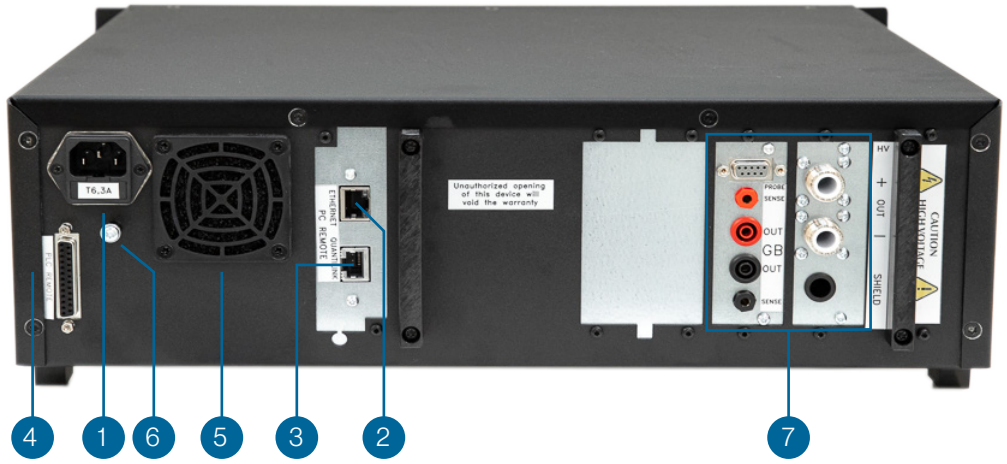
Dimensions



Panel information

Front panel information

1. USB slot - USB slot available in the front panel for storing and transferring test results without a connection to a PC
2. Display - 4.3" graphical display
3. Soft buttons - For easy navigation through different display menus.
4. Fly wheel knob - For choosing different tests, measurement ranges and setting up parameters.
5. Start / Stop buttons
6. Test status lights
7. Power switch



Back panel information

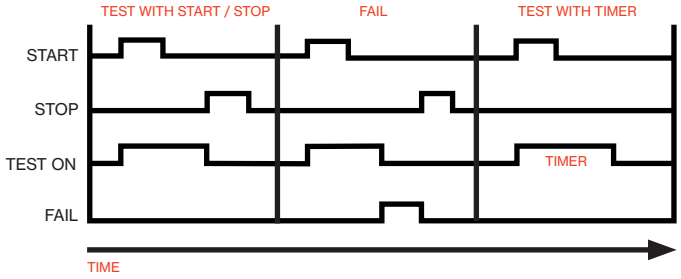
1. Power chord receptacle
2. PC interface - Optional
3. Quanti link interface - Connector for Finero's proprietary Quanti link interface
4. PLC remote connector
5. Cooling fan
6. Chassis ground terminal
7. Rear panel output connectors - These output connectors vary, depending upon the Quanti model

Safety circuit connector D25

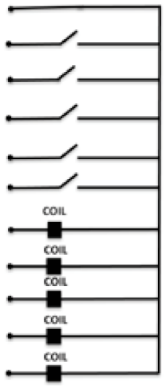
Quanti provides an external safety circuit; which prevents connection of the test voltage, when external safety circuits are open. the safety circuit connector is a part of the external D25 connector.

It is possible to start and stop Quanti with an external signal via D25 connector. Test status (TEST ON and FAIL) can be read from the D25 connector. After the test is completed, the TEST ON signal is deactivated. If the test fails, the FAIL signal is activated. The FAIL signal remains active until a new test is started or STOP is activated.

NOTE: The internal safety circuit of Quanti is not an approved safety relay system!



X2-5 - X2-9	+ 24V
X2-22	INPUT 1
X2-10	START
X2-23	INPUT2
X2-11	STOP
X2-1	SAFETY CIRCUIT
X2-3	DISCHARGE
X2-2	TEST ON
X2-4	FAULT
X2-24	OUTPUT1
X2-25	OUTPUT2
X2-17 - X2-27	0V



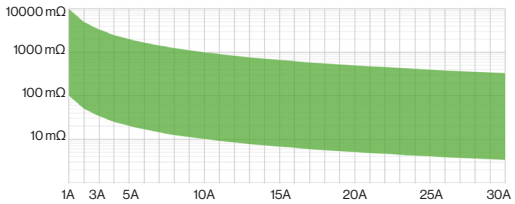
Ground Bond - G

Quanti's ground bond test is a high current resistance test. Ground continuity is important in contexts such as manufacturing, where it is crucial to ensure that customer products are safely grounded.

Why conduct a Ground Bond test?

Ground bond test (also referred to as PE resistance test) determines whether the safety ground circuit of the Device Under Test (DUT) can adequately handle fault current if the product should ever become defective.

The measured resistance has to be lower than the indicated limit from the applicable international standards. Typical values are << 500mΩ.

Output	AC current:	1A - 30A
	Resolution:	0.01A
	Accuracy:	±(1% of setting + 0.15A)
	Frequency:	50Hz / 60Hz, user selectable
	Waveform:	True Sine Wavev
Resistance measurement	Range:	500mΩ / 10Ω
	Resolution:	0.1 mΩ
	Accuracy:	±(1% of reading + 0.2% of range)
Operating load vs test current		
Test method		4 wire measurement
Test time		0.3s - 999.9s / continuous
Offset		0...500.0mΩ (manual or automatic)
Test voltage		0.1 - 10 Vac
Open circuit voltage		max. 20 Vac
Max. load		300W

Current	Max. load
1 A	10000 mΩ
5 A	2500 mΩ
20 A	500 mΩ
30 A	333 mΩ

Output current range 1 – 30A AC

With Quanti's ground bond test you will test with the currents that most common standards require. User programmable output current from 1A to 30A AC provides extensive coverage for testing accodring to UL, IEC, EN and other requirements.

Output current resolution 0.01A

Adjustable output current and milliohm trip ranges to meet all safety specifications for ground bond test requirements.

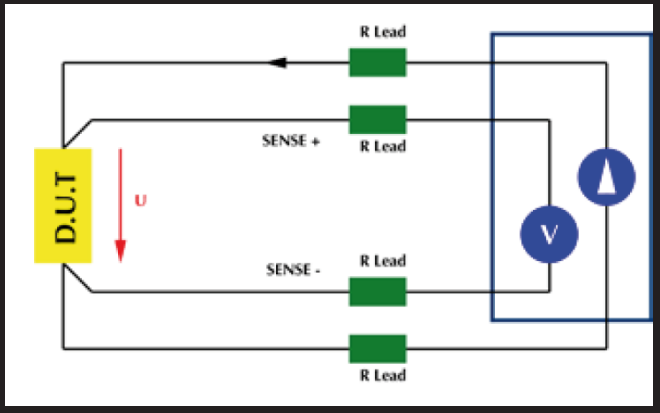
Programmable high and low resistance limits

A resistance measurement range from 0.5mΩ to 10Ω, in conjunction with user-programmable high and low resistance limits with Pass/Fail indication, makes this tester ideal for production testing.

4 wire measurement, constantly accurate results

4 wire measurement ensures accurate and repeatable measurements. When measuring low values resistances, and important error source can be found in the contact resistance. In many applications, the contact resistance value can go beyond the value which has to be measured. To cancel this error source a 4 wire measurement is used.

For instance during the day the factory ambient temperature can change, which would mean wrong resistance values with 2 wire measure-ments if the error is not manually and constantly offset.



Dielectric Withstand - H

In a typical Dielectric Withstand test (Hipot test) high voltage is applied between a product's current-carrying conductors and, for instance, its metallic chassis. Hipot equipment measure extremely low currents from microamps to milliamps.

Why conduct a Dielectric withstand test?

A Hipot test verifies that the insulation of the Device Under Test (DUT) is continuous and safe.

Output voltage range 50-12000 V, output voltage resolution 1 V, and programmable high and low current limits 1 µA – 100 mA.

High voltage function specifications	Hipot model	AC	DC	Max. test apparent power
Output	H10AC	50V - 3500V / 10mA	-	40VA
	H10	50V - 3500V / 10mA	50V - 4000V / 10mA	40VA
	H40AC	50V - 6000V / 40mA	-	400VA
	H40	50V - 6000V / 40mA	50V - 6000V / 10mA	400VA
	H100AC	50V - 6000V / 100mA	-	600VA
	H100	50V - 6000V / 100mA	50V - 6000V / 10mA	600VA
	H100 - HC	50V - 6000V / 100mA	50V - 6000V / 100mA	600VA
	H10-12kVAC	100V - 12000V / 10mA	-	120VA
	HD10	-	50V - 4000V / 10mA (dual channel)	2 x 40VA
	Resolution:	1V		
	Accuracy:	±(1% of settings + 5V)		
Current measurement	Range:	10 mA	100 mA	
	Resolution:	1 µA	10 µA	
	Accuracy:	AC total: ±(0.5% of range + 5 counts) AC real: ±(1% of range + 5 counts) AC total: ±(0.5% of range + 5 counts)		
AC output	Frequency:	50Hz / 60Hz, user selectable		
	Regulation:	±(2% of reading + 5V)		
	Waveform:	True Sine Wave, THD < 1%		
Max. capacitive load in DC mode		0.03µF ≤ 6kV 0.5µF ≤ 3kV 1µF ≤ 1kV		
Measurement circuit discharge time		<0.2s, see max. capacitive load		
Ramp up time		0.1s - 99.9s / no ramp		
Ramp down time		0.1s - 99.9s / no ramp		
Test time		0.3s - 999.9s / continuous		
Measurement safety		Fully floating output[1]		
Arc detection	Pulse width setting:	5µs - 100µs		
	Resolution:	1µs		
	Detection current	1mA - 20mA		

(1) except with H10-12kVa, HD10 and some combination with other functions

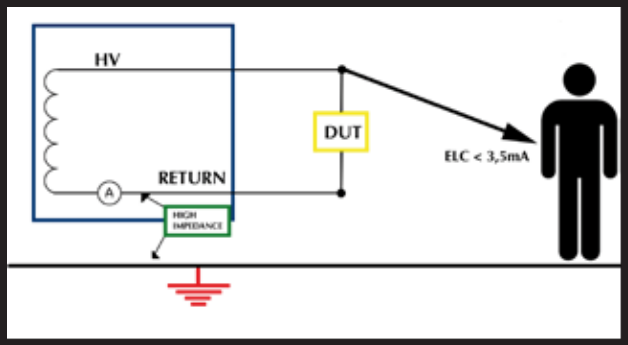
Dielectric Withstand - H

Ensuring connectivity

For optimum quality process control the connectivity to the DUT has to be ensured. Quanti gives the user several options to check this. The user can select either automatic or manual mode connectivity check. The parameters can be adjusted in order to meet high quality control standards and optimum yield.

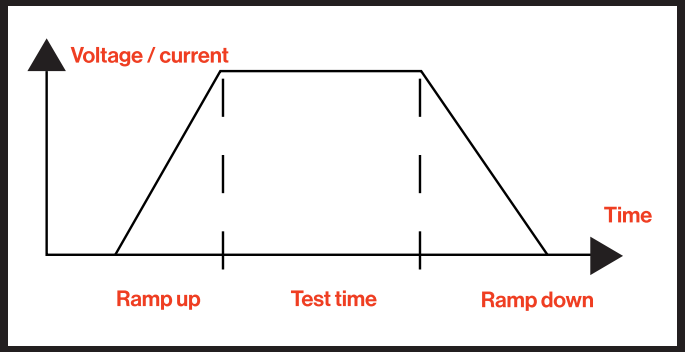
Intrinsically safe - floating output

A floating electrical circuit is created by separating grounds; one for the operator, one for the equipment. This method creates and intrinsically safe operator environment. (please see the picture below).



Ramp timer

The voltage is ramped up from zero to the final value. Once the voltage reaches the selected value, it is kept at that value for a brief period (typically up to 5 seconds) before the resistance value is measured.



Arc detection

Arc is electrical spark occured by voltage or current quickly changing. there should be no “sparking” in a hipot test. Arc detection can help you to solve product quality issues.

Multiple-channel models available

The HQ model has 4 hipot channels that Quanti can measure simultaneously.

The HD model has 2 hipot channels that Quanti can adjust and measure simultaneously.

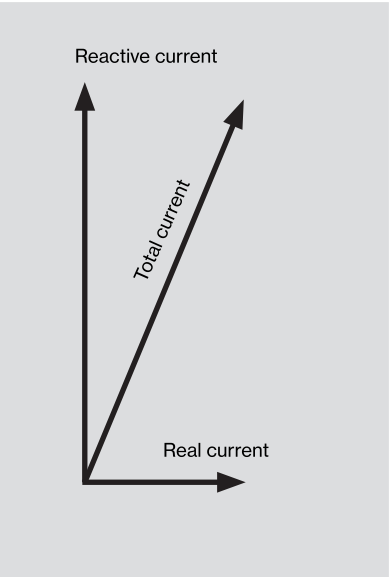
Intrinsically safe - floating output

A floating electrical circuit is created by separating grounds; one for the operator, one for the equipment. This method creates and intrinsically safe operator environment. (please see the picture to the right).

Total and real current measurements

Real Current measurement allows operators to monitor total and real current on a single screen. When testing highly capacitive devices, it is often desirable to make a distinction between real and total current.

Total current is the vector sum of resistive and capacitive leakage current (see picture on the right). If the tester monitors only the total current, a substantial change in real current can often go undetected. The ability to separate the real and capacitive currents is an important requirement for AC Hipot testing. Nowadays some test requirements clearly specify the measurement of real rather than total current.



Insulation Resistance - I

An insulation resistance test is one of the tests required by electrical safety testing standards. The test measures the insulation resistance of the Device Under Test (DUT), while phase and neutral conductors are short circuited together.

Why conduct an insulation resistance test?

Quanti measures insulation resistance in electrical systems and in equipment such as electrical machines, household appliances, transformers, cables, power supplies, and so on. Once the voltage reaches the selected value, it is maintained at that value for a brief period (typically up to 5 seconds), after which the resistance value is measured.

Measuring range is from 0.5MΩ to 50GΩ with adjustable voltage 50...1000Vdc.

Output voltage	Range: Resolution: Accuracy:	50V - 1000V dc 1V ±5 V				
Resistance measurement	Range: Resolution:	10 MΩ 0.001 MΩ	100 MΩ 0.01 MΩ	1000 MΩ 0.1 MΩ	10000 MΩ 1 MΩ	50000 MΩ 1 MΩ
	Accuracy:	<500V: ±(5% of reading + 2 counts) ≥500V: ±(3% of reading + 2 counts)			<500V: ±(8% of reading + 2 counts) ≥500V: ±(6% of reading + 2 counts)	<500V: ±(17% of reading + 2 counts) ≥500V: ±(15% of reading + 2 counts)
Ramp up time		0.1s - 99.9s / no ramp				
Ramp down time		0.1s - 99.9s / no ramp				
Test time		0.3s - 999.9s / continuous				
Measurement safety		Fully floating output[1]			[(1)] except with some combination with other functions	
Max. capacitive load		1µF				

Ensuring connectivity

For optimum quality process control the connectivity to the DUT has to be ensured. Quanti gives the user several options to check this. The user can select either automatic or manual mode connectivity check. The parameters can be adjusted in order to meet high quality control standards and optimum yield.

Intrinsically safe - floating output

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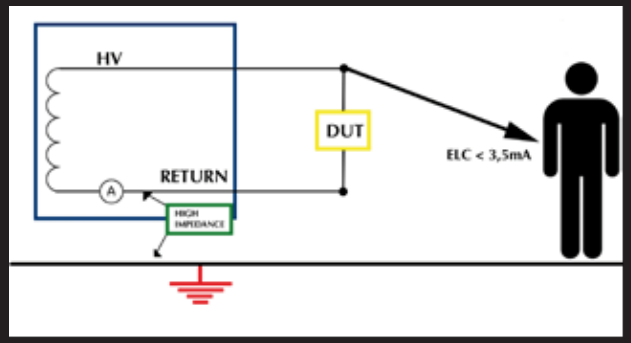
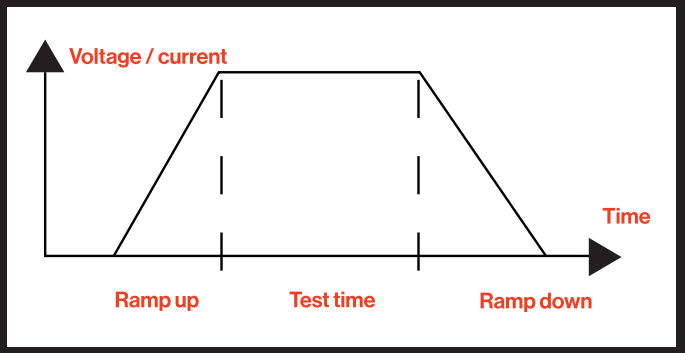


Ramp timer

The voltage is ramped up from zero to the final value. Once the voltage reaches the selected value, it is kept at that value for a brief period (typically up to 5 seconds) before the resistance value is measured.



Continuity - S

The continuity test module measures resistance. Whether an electric circuit is open or closed, resistance can be tested easily with a continuity test.

Why conduct a continuity test?

This test is used, for example, to measure the resistance of heating elements. With Quanti, this functional test can be combined with electrical safety tests. When Quanti operates as an independent system, all test results are recorded in a single test report.

DC output current: 1mA / 10mA / 100mA
Measurement range: 0.00 Ω – 2000 Ω

Continuity function specifications

Output	DC current:	1 mA	10 mA	100 mA
	Accuracy:	± 10% of setting	± 10% of setting	± 10% of setting
	Type:	floating	floating	floating
Resistance measurement	Range[1]:	2000Ω / 10000Ω	200Ω / 1000Ω	20Ω / 100Ω
	Open circuit voltage:	max. 5Vdc / max. 15Vdc	max.5Vdc / max.15Vdc	max. 5Vdc / max.15Vdc
	Resolution:	0.1Ω	0.1Ω	0.1Ω
	Accuracy:	± (1% of reading + 0.1% of range)	± (1% of reading + 0.1% of range)	± (1% of reading + 1% of range)

Test method	2 wire measurement
Test time	0.3 - 999.9s / continuous
Offset	0..10.0Ω (manual or automatic)
NPLC averaging	1 - 127 counts at user selectable 50 or 60Hz

[1] Possibility to select the voltage range manually

DMM - M

Quanti's digital multimeter (DMM) combines several measurement functions in one unit. DMM is used in R&D, type tests and production test.

Why choose the Quanti DMM?

With the Quanti DMM, you receive all the tools you need at an affordable price without compromising on quality. The Quanti DMM provides a broad range of features and measurement functions such as DC voltage, DC current, true-RMS AC voltage and AC current, resistance, frequency – all designed to meet common industrial needs.

Quanti is the only electrical safety tester available with DMM. When Quanti operates as an independent system, all test results are recorded in a single test report.

Measurement ranges
DC voltage: 0 mV – 1000 V
AC voltage (True RMS): 0 mV – 750 V
DC current: 0 mA – 10 A
AC current (True RMS): 0 mA – 10 A
Resistance: 0 Ω – 100 MΩ
Frequency: 3 Hz – 500 kHz

Measurement function	Range		Accuracy % of range
Voltage DC	100 mV 1 V 10 V 100 V 1000 V		0.025
Voltage AC TRMS	100 mV 1 V 10 V 100 V 750 V	10Hz...50Hz 50Hz...100Hz 100Hz...25kHz 25kHz...120kHz	1 0.5 0.25 1
Current DC	10 mA 100 mA 1 A 10 A		0.1
Current AC TRMS	10 mA 100 mA 1 A 10 A	20Hz...5kHz	0.5
Resistance 2 wire	100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ		0.05 0.05 0.05 0.05 0.1 0.25 2.5

Frequency	Voltage	Accuracy % of reading
3 Hz...3kHz	**0.1V...750AC (RMS)**	**0.1**
3 kHz...500kHz		**0.02**

Consumption - F

Consumption test is designed to measure the input power characteristics of devices operating on mains AC supply.

Why conduct a consumption test?

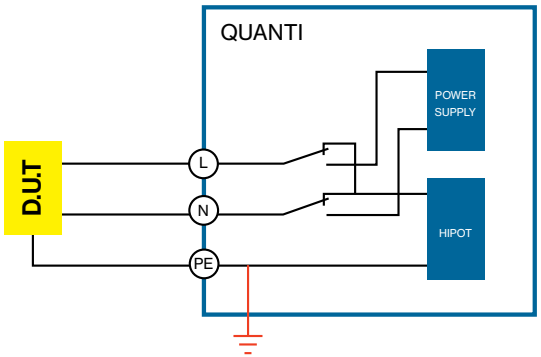
Consumption test is used to measure and verify the power consumption of a DUT. Consumption test module is integrated into Quanti. Measured values can be incorporated into the test report. Quanti is the only electrical safety tester available with a consumption test. When Quanti operates as an independent system, all test results are recorded in a single test report.

Power consumption test specification	
Voltage measurement	Range: 0V - 300V Resolution: 0.1V Accuracy: ±(1% of reading + 0.5V)
Current measurement	Range: 0A - 16A Resolution: 0.01A Accuracy: ±(2% of reading + 0.05A)
Power measurement	Range: 0VA - 4800VA Resolution: 1VA Accuracy: ±(5% of reading + 3VA)
Power factor measurement	Range: 0 - 1 Resolution: 0.001 Accuracy: ±(8% of reading + 0.002)
Frequency of measured mains voltage	50/60Hz
Measurement type	True RMS
Test time	0.3s - 999.9s / continuous
Measurement start up delay	0s - 1s

The consumption test module includes a switching relay, which enables the Quanti to perform dielectric withstand testing, insulation resistance testing, and consumption testing on the DUT without any external switching changes.

The Quanti functional test module is connected between the mains power supply and the tested equipment. It measures the following parameters:

Votage: 0V – 300V
Current: 0A – 16A
Power: 0VA – 4800VA
Power factor: 0 –1

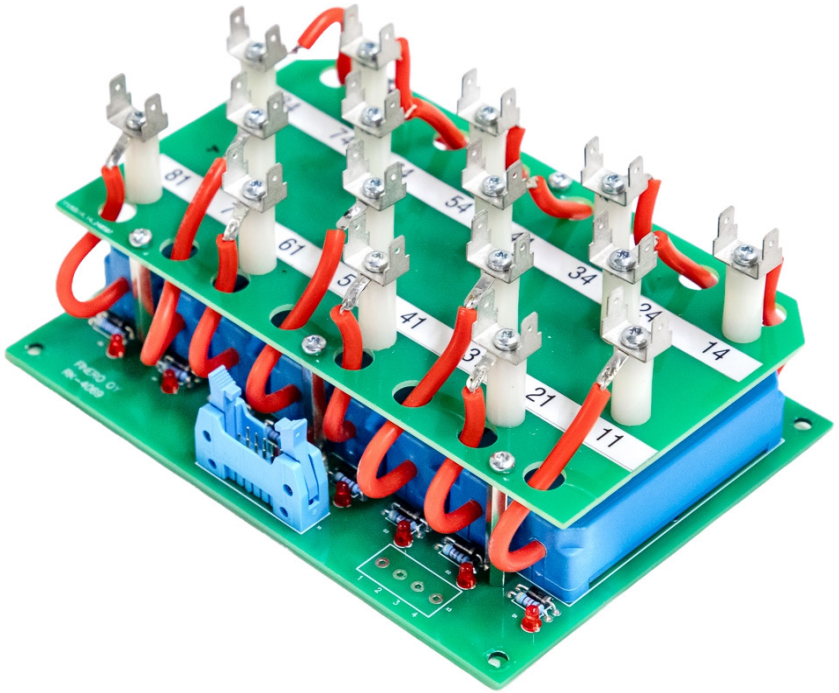


Internal Relay Matrix

Quanti can be equipped with a relay module. Depending on the model, it is possible to choose a maximum of 16 hipot or ground bond relays.

Why choose the internal relay module?

The internal relay module allows Quanti to be automatically connected to different measurement points on the DUT. The internal relay module reduces misconnections and improves operator safety. The Quanti safety tester can be supplemented with an external relay module if additional connection relays are needed.



Communication

Quanti can be controlled by a PC through USB, Ethernet, RS-232 or GPIB. Communication port is situated on the back panel. Quanti is LabVIEW compatible and drivers are available.

In addition, multiple Quanti devices can be linked together using the QuantiLink communication module.

Why choose a communication module?

The communication module enables Quanti to be controlled by a remote device such as a PC. You can either develop your own test software or use Finero's SafeTest program. SafeTest is an easy-to-use test sequencer that allows you to easily create various test programs.

Quanti has a USB host port on the front panel as standard. It is used for USB memory and barcode/QR-code reader.

Ordering information

Functional test
" " - without functional test
M - DMM
F - Consumption test
S - Continuity test

Ground bond
" " without Ground bond
G Ground bond

Insulation resistance
" " without insulation resistance
I insulation resistance

Hipot

" "	Without hipot
H 10AC	3500Vac / 10mA
H 10	3500Vac / 10mA, 4000 Vdc / 10mA
H 40AC	6000Vac / 40mA
H 40	6000Vac / 40mA, 6000 Vdc / 10mA
H 100AC	6000Vac / 100mA
H 100	6000Vac / 100mA, 6000 Vdc / 10mA
H 10-12 kVAC	12000Vac / 10mA
HD10	4000Vdc / 10mA (dual channel)

Options
" " - without options
RM = Relay matrix
HC = High DC current, 100mA (only with H100)
CLI = current limited insulation resistance (only with I)

Communication (only one)
M = Manual
QL = Quanti link
U = USB
R = RS-232
E = Ethernet
G = GPIB

- **Outlet type** / **Country**

B:	USA, Canada, Japan
F:	Europe (France, Belgium, compatible with type E)
G:	UK
I:	China, Australia

Example ordering code
GHI100 – E – F
- Ground Bond
- Insulation Resistance
- Hipot max. 100mAac / 10mAdc
- Ethernet Communication
- Outlet type F

Accessories

Accessories - Model G (Ground bond):

Standard	GB-Cable with banana connectors, 2 meters
Optional	GB crocodile clip set (black + red), max 25A
	GB probe, remote controlled, 2 meters cable

Accessories - Model H, I (High voltage, ISO):

Standard	HV-cable with HS10 connectors, 2 meters
	HV-cable with special safety banana connectors, 2 meters (output voltage max. 5kV)

Optional	HV crocodile clip set (black + red), max. 1kV
	HV crocodile clip set (black + red), max. 5kV
	HV-probe, 2 meters cable with banana or HS10 connectors
	HV-probe, remote controlled, 2 meters cable with banana or HS10 connectors

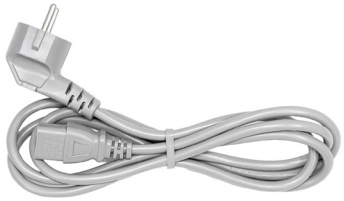
Accessories - Model M (DMM)

Standard	DMM test cables with safety banana connectors, 2 meters

Accessories - Model F, FA (power consumption)

Standard	Test cables with banana/HS10 connectors, 2 meters

Standard accessories for all models:



Power cord according to selected country

Safety circuit connector D25

Optional accessories for all models:

Barcode and QR reader

PE probe with remote control

Key features:

- For ground bond measuring
- Combatible with Quanti and FST (with adapter)
- Green and red leds indicate result
- Standard delivery content:
  - 2 meter cable
  - Banana connectors for current and sense
  - D9 male connector for control
  - Special length of cable and connectors also available

HV-probe

Key features:

- For dielectric withstand and insulation resistance measuring
- Combatible with Quanti and FST
- Available with and without remote control
- Also double model available
- Standard delivery content:
  - 2 meter cable
  - HS10 or special safety banana connectors
  - D25 male connector for control
  - Special length of cable and connectors also available

ETSS
EASY TEST SYSTEM SOLUTIONS

Kauppatie 10 A
65610 Mustasaari, Suomi

sales@etss.fi
+358(0)50 436 1920

CERTIFIED
ISO 9001
ISO 14001

BUREAU VERITAS