

ClareHAL 104 Electrical Safety Tester



Technical Data Sheet



Experts in what we do.



ClareHAL 104 helps production line test process by:

- Improving productivity
- Increasing efficiency
- Stores results automatically
- Custom Pass/Fail levels
- Safety guard operation
- IEC/EN International Standards compliance
- Fast testing

ClareHAL 104. A combined AC Ground Bond, AC/DC Flash, DC Insulation Resistance Tester with Power, Load and Leakage capabilities.

ClareHAL 104 is designed to offer advanced automation techniques which can make dramatic improvements in productivity and efficiency of the production line manufacturing test process.

COMPLIANCE – Standards and Directives

Validation testing is essential for manufacturers to ensure compliance with legislation for their products including CE marking. Electrical safety testing specialists Seaward have produced the HAL series that performs all of the applicable tests needed for demonstrating compliance with EU Directives, International, European and UK standards in one convenient package.

The ClareHAL 104 will help you meet your legal obligations.

All basic tests, as specified in widely used product and safety standards, are included:

- Earth Bond/ Ground Bond testing
- DC Insulation Testing
- AC/DC Flash/ Hipot/Dielectric withstand testing
- Functional/ Run testing
- Touch/Leakage Current testing

Test Methods using the ClareHAL 104

The ClareHAL 104 Tester can be used in three modes – automatic, manual and direct pc control via the external communications port.

Automatic Mode

In automatic mode complete test sequences are stored in the memory and new sequences can be programmed using testcodes. Up to 5 tests can be linked into 1 sequence, all tests are timed and all results are stored in memory.

Automatic mode provides a structured, repeatable route to testing which ensures all data is collected for traceability and auditing.

This mode is intended for standard production line use.

Manual Mode

Manual mode provides a quick, simple route to tests and is intended for use in the laboratory, repair or re-test environments where ease of use and quick repeatable tests are paramount.

Manual mode can be initiated by a one button press and allows individual tests to be performed more freely.

The type of test and its parameters are entered into the tester. The output can be maintained continuously, varied by means of the rotary encoder or timed as in automatic mode.

A facility to store results is available although this is not necessary to perform tests.

Key features

- Function/Power/Load/Leakage/ Touch current test
- Flash/Hipot/Dielectric Strength test
- Ground/Earth Bond test at 40A
- Fast testing – production efficiency savings
- Compact unit
- Tests in accordance with IEC/EN/UL International Standards
- Isolated test outputs on Flash/Hipot/Dielectric Strength/Insulation test to aid with EN 50191 and for safety
- Arc Detect
- Regulated outputs on Flash/Hipot/Dielectric Strength, Insulation and Ground/Earth Bond tests – independent of supply fluctuations
- PLC control. Simple command protocol for external control via communications port
- Visual and audible pass/fail indication

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Select the ClareHAL unit which suits your requirements

Features	100	101	102	103	104
Earth/Ground Bond	■			■	■
AC Flash/Hipot		■	■	■	■
DC Flash/Hipot		■	■	■	■
DC Insulation Resistance		■	■	■	■
ARC Detection		■	■	■	■
Leakage					■
Load Power					■
Power Factor					■
Results Memory	■	■	■	■	■
Automation Option	■	■	■	■	■
Barcode scanner/printer Option	■	■	■	■	■
Internal scanner			■		

Key features

- Operation from 115 and 230 V (nom.), 50 or 60 Hz mains supply.
- Barcode scanner support
- Storage of test results
- Large graphical display
- Selectable 50 or 60 Hz output frequency for AC tests.
- External scanner switching matrix for high voltage and high current switching (optional)
- Safety enclosure (optional)

Direct PC Control

Simple command protocols are incorporated to enable the product to be controlled directly by a PC or other device connected to the external control port. This level of control is particularly advantageous where the application requires a number of events to occur before test measurements are valid or if a number of measurements need to be taken and synchronized with each event. A typical example requiring this level of control would be the testing of equipment that has several modes of operation, each having the potential to present errors that would not be apparent until the product has reached the applicable state such as a washing machine.

PLC Control

A PLC can be used to control the ClareHAL unit via the external control ports. PLC control can be initiated with a barcode reader or simulation of the barcode protocol.

TESTING - General

The unit can perform either continuous or timed tests, except the Earth/ Ground bond test which is timed. If during the Flash test, the arc detect level is exceeded the test will be halted and the output removed.

A beeper is present to let the user know that a test fail condition has occurred.

The Reset button will clear the condition back to a default screen.

If the programmed limit is exceeded at any time during a test, the unit will display the appropriate test fail message. If the test fails the unit will light the red fail indicator, and sound the audible alarm.

If hazardous voltages (50V AC or DC) are present on the outputs of the unit, this will be indicated by a red warning indicator and a "lightning strike" icon will blink on the display. Also the HT present LED indicator will illuminate adjacent to the test output sockets.

Auto discharge - at the end of Insulation and Flash testing test all capacitances and inductances will be automatically discharged.

The tester would normally be used with a test fixture or guard system and no tests can be performed without positive confirmation that the guard is in place. If the guard is opened or the RESET button is pressed at any time, the test will be halted and an appropriate test fail message will be displayed.

Earth/ Ground Bond test

The unit generates a constant current output independent of input voltage, which is ramped linearly to the set value. The voltage across and current through the ground

connections of the equipment under test are continuously measured and the impedance calculated and displayed in real-time

The parameters that can be set with this test are:

- Test Current – the desired test current up to 40A (time limited)
- Ramp up – the time required for the current to be ramped from zero to the desired test current.
- Ramp hold - the time required for the constant test current to be applied.
- Ramp down - the time required for the test current to be ramped down to zero amps.
- Resistance Limit in ($m\Omega$)

Flash/Hipot/Dielectric strength test

The voltage generated by this test is isolated at the test outputs for assisting with complying with EN 50191. This test can be timed or continuous.

The unit will generate a regulated flash test voltage (independent of the supply voltage), which is ramped linearly to the desired value. The unit will then sample the total leakage current and display it in real-time. The unit will compare the instantaneous measured total leakage against the upper programmed leakage limit to indicate pass or fail. There is a programmable upper and lower limit which ensures that there is a positive indication that the Flash probe has been connected.

The parameters that can be set with this test are:

- Test Voltage – the desired test voltage.
- Ramp up – the time required for the voltage to be ramped from zero to the desired test voltage.
- Ramp hold - the time required for the constant voltage to be applied.
- Ramp down - the time required for the test voltage to be ramped down to zero volts.
- Total Leakage limit upper (mA)
- Total Leakage limit lower (mA)
- Arc detection level

All times will be configurable between 0.1 and 300s. The displayed Total Leakage value will be displayed from 0.01 to 10mA (DC) and 0.01 to 20mA (AC). The arc

detection level can be programmed between 0 and 10, where 0 disables the function altogether, and 10 provides the least sensitive setting.

Insulation Test

An insulation resistance measurement at a DC test voltage of 250V, 500V or 1000V is available. This test can be continuous or timed.

The selected voltage is ramped linearly to the desired value, where it is then held. The insulation resistance is displayed in real time.

If this value is less than the minimum pass value programmed, then the appropriate fail message is displayed along with the red fail indicator

The parameters that can be set with this test are:

- Test Voltage – which can be pre-selected for 250V, 500V or 1000V
- Ramp up – the time required for the voltage to be ramped from zero to the desired test voltage.
- Ramp hold - the time required for the constant voltage to be applied.
- Ramp down - the time required for the test voltage to be ramped down to zero volts.
- Insulation Resistance value, lower limit ($M\Omega$)

Functional/Run/Leakage test

An operational test will be conducted at the value of the input supply voltage. The measured power of the unit under test will be displayed in real time.

An auxiliary input is provided so that any voltage up to 300VAC can be used in conjunction with the powered test. A simple switch is used to choose between the supply input and Aux input for powered tests.

The parameters that can be set with this test are:

- Load Power Min/Max Value (kVA)
- Power Factor Min/Max Value (Ratio)
- Leakage Current Min/Max Value (mA)
- Touch Current Min/Max Value (mA)

The touch current test will be conducted at the value of the supply and applied via the probe. The measured touch current will be displayed in real time and will use the body model in BS EN 1010 fig A1 Annex A and BS 60990 fig 4.

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SPECIFICATIONS: ClareHAL 104, 103, 102, 101, 100

Power Requirement

AC Voltage	Selectable 115 or 230 VAC RMS
Frequency	50/60 Hz

Mechanical Specification

Size (HxWxL)	300mm-200mm-370mm
Weight	15kg Approx

Ground Bond Test – 104, 103, 100

Test Voltage	Nominal 6V AC
Frequency	50 or 60 Hz (Independent of supply)
Display Range and Accuracy	0-1500mΩ ±2% ±5 Counts
Display Resolution	1 mΩ
Compliance Test Ranges:	
Current/Load Resistance/Time	5 A-1000mΩ - Continuous
	10 A-500mΩ - Continuous
	25 A-200 mΩ - Continuous
	30 A-150 mΩ - 60 secs
	40A-100 mΩ - 60 secs
Settable Output Current Range	0.1A-40.0A
Selectable Range of Pass/Fail Levels	0-1500mΩ

Insulation Resistance Test – 104, 103, 102, 101

DC Output Voltage	250V, 500V, or 1000V Selectable
Display Range	0.01MΩ-500MΩ
Display Range / Accuracy	0.03MΩ-350MΩ ± 5% ± 5 Counts
	350MΩ-500MΩ Indication Only
Display Resolution	0.01MΩ
Pass/Fail Level	0.00MΩ-500.0MΩ

AC Flash / Hipot Test – 104, 103, 102, 101

Programmable Voltage Range	0.10kV-5.00kV (10V/Step Resolution)
Frequency Independent of Supply	50 or 60 Hz
Voltage Display Range and Accuracy	0.10kV-5.00kV ±1% ± 5 Counts
Voltage Display Resolution	0.01kV
Current Display Range and Accuracy	0.01mA-20.00mA ±1% ± 5 Counts
Current Display Resolution	0.01mA
Selectable Range of Pass/Fail Levels	0.01mA-20.00mA
Maximum Current Output	20.00mA @5kV
Optional Arc Detection	9 Levels

Accessories

- **Hipot Probe & lead**
Part number: 03918/2
- **Hipot Clip (Std. Black) & lead**
Part number: H-5003
- **Hipot Clip (Red) & lead**
Part number: H-5003/R
- **Ground Bond Clip Lead**
Part number: 01521/1
- **Hand Held Guard Switch**
Part number: DCS317
- **Calibration Checkbox**
Part number: V242
- **CCD Barcode Scanner**
Part number: 194A922
- **Status Beacon**
(mains cord 230/110V)
Part number: H – 5017
- **Enclosures**
ENC 6:
W300mm x H240mm x D280mm
Part Number: 73B239
ENC 7:
W600mm x H475mm x D280mm
Part Number: 73B240
- **EN50191 Kit**
- **Switching Matrix**
Part number: 485A910
- **PowerSmart**
1 phase Part number: 483A910

DC Flash / Hipot Test – 104, 103, 102, 101

Programmable Voltage Range	0.10kV-6.00kV (10V/Step Resolution)
Voltage Display Range and Accuracy	0.10 kV-6.00kV $\pm 1\% \pm 5$ Counts
Voltage Display Resolution	0.01kV
Current Display Range and Accuracy	0.01mA-10.00mA $\pm 1\% \pm 5$ Counts
Current Display Resolution	0.01mA
Selectable Range of Pass/Fail Levels	0.01mA-10.00mA
Maximum Current Output	10.00mA
Optional Arc Detection	9 Levels

Power and Leakage Test – 104 only

Power Output Rating

Test Voltage	110V – 230V AC 20A nominal (Vin-Vout)
Maximum Power Output	Up to 5.0kVA (dependant on mains supply rating)

Output Power Measurement

Single Phase Power Measurement	
Display Range and Accuracy	0.02kVA-5.00kVA $\pm 2\% \pm 0.02$ kVA
Selectable Range of Pass/Fail Levels	0.001kVA-5.000kVA

Single Phase Power Factor Measurement

Display Range and Accuracy	Ratio 0.000 -1.000 ± 0.030
Selectable Range of Pass/Fail Levels	0.000-1.000

Leakage Current Measurement

Display Range and Accuracy	0.10mA-20.00 mA $\pm 1\% \pm 5$ Counts
Display Resolution	0.01mA
Selectable Range of Pass/Fail Levels	0.01mA-20mA

Display Range and Accuracy	0.02mA - 5.00 mA $\pm 1\% \pm 5$ Counts
Display Resolution	0.01mA
Selectable Range of Pass/Fail Levels	0.02mA-5.00mA
Measuring Device	IEC/EN 60990 Fig 4 (IEC/EN 60990 Fig 3 or Fig 5 Upon Request)

Also available

- ClareHAL 103
AC/DC Hipot (flash dielectric strength) and DC Insulation and Ground/Earth Bond Tester
Part No: H103
- ClareHAL 102
AC/DC Hipot and DC Insulation Tester with built-in scanner switching matrix
Part No: H102
- ClareHAL 101
AC/DC Hipot and DC Insulation Tester
Part No: H101
- ClareHAL 100
40A Ground/Earth Bond Tester
Part No: H100

ClareHAL 104 Part No: H104

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