

# HAL Series

A versatile range of hipot testers ideal for manufacturing and production lines



The **HAL** comprehensive safety testers offer outstanding levels of flexibility and functionality to dramatically improve the quality and productivity of production line safety testing.

With a range of different tests and functionality, the HAL Series provides a solution for any production line testing requirement from low volume manual testing through to high volume automated test programmes. The large display and simple push-button operation makes the process of testing straightforward and fast, ensuring your production line continues to efficiently meet the demands of any number of quality and safety standards.

A choice of automatic, manual or direct PC modes offer maximum flexibility for use of the HAL Series.

Automatic mode provides a structured, repeatable route to testing through storing complete test sequences in the internal memory of the instrument, making it ideal for the production line environment.

For environments where flexibility of test parameters and diagnostic checks are required, a manual mode enables individual tests to be performed easily.

To see the **HAL** Series for yourself, request your live online demonstration today.

## Key Features

- > Fully configurable automatic test sequences
- > Compatibility with label printer and barcode scanner
- > Unlock advanced automation features with safety e-Base software
- > Ideal for mid to high volume production line testing



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For those wanting a fully automated approach, simple command protocols can be used in order for the HAL Series tester to be controlled via a PC or other device.

The HAL 104 can communicate with a PLC (programmable logic controller) to aid automated test processes, including remote start/stop and pass/fail outputs.

UK and international variants available.

## System Integration - Total solutions for increased efficiency

Whatever your system integration needs, Seaward has the answer. With a number of smart modules designed to improve the functionality of your HAL tester as well as a host of accessories and consumables to improve the productivity and traceability of your production line testing regime.

Seaward provides its customers with a total solution approach to electrical safety testing, and also supplies a range of accessories to help you meet EN50191, the European standard governing the safe erection and operation of electrical test installations; including enclosures, beacons and hand switches, contact us or visit our website to find out more.

## Safety e-Base - Production line productivity software

Safety e-Base has been designed to ensure production line testing is not only fast and simple, but also reliable and fully customisable to meet the unique needs of any given production environment.

Used in conjunction with a HAL Series safety tester, Safety e-Base Pro delivers supreme productivity, enabling totally customisable test sequences to be set up and operated via a PC from any safe, convenient location, even away from the production line if required.

Intuitive user-interface is taken a step further with the ability to provide user prompts in text or picture format - operators can be guided step-by-step on what to do next, saving time and reducing the risk of human error.

Total traceability of results is made possible through virtually unlimited storage, with results being stored on a PC or network drive.

## Electrical Test Functions

- > Earth Bond Test
- > AC Dielectric Strength Test
- > DC Dielectric Strength Test
- > Insulation Resistance
- > Earth Leakage
- > Power Test
- > Power Factor Test
- > ARC Detection

## HAL Series Users

Designed for greater productivity, the HAL Series is best suited for mid to high volume manufacturing and production lines.

- > Production and Manufacturing Engineers/Managers
- > Quality Managers
- > Safety Engineers



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The **HAL 104** is the flagship product in the HAL Series and is designed to dramatically improve the efficiency and productivity of production line testing and features:

## Advanced integration options

- > Analogue inputs allow testing to be recorded on the HAL, from external devices e.g. recording the speed of a motor whilst in operation
- > Digital outputs enable control of external devices using relay control e.g. switching matrices
- > Compatibility with PowerSmart and Switch Smart for advanced automation

## Full complement of electrical safety tests

- > Power/leakage measurement for operational, safety and quality checks

The **HAL LED** has been designed with a reduced power measurement range with greater resolution than the HAL 104, making it ideal for the testing of low power electronics such as LED lighting.

The **HAL 103** is a comprehensive tester capable of performing dielectric strength, earth/ground bond and DCIR tests.

The **HAL 101** is a simple dielectric strength and DCIR tester, enabling one test point or product to be tested at any one time.

## Comparison Chart:

| Features                            | 101 | 103 | 104 | LED |
|-------------------------------------|-----|-----|-----|-----|
| Ground Bond Test                    |     | •   | •   | •   |
| AC/Hipot Test                       | •   | •   | •   | •   |
| DC/Hipot Test                       | •   | •   | •   | •   |
| DC Insulation Resistance Test       | •   | •   | •   | •   |
| ARC Detection                       | •   | •   | •   | •   |
| Leakage Test                        |     |     | •   | •   |
| Load Power Test                     |     |     | •   |     |
| Load Power (200mVA resolution) Test |     |     |     | •   |
| Power Factor                        |     |     | •   | •   |
| Results Memory                      | •   | •   | •   | •   |
| Automation Option                   | •   | •   | •   | •   |
| Barcode Scanner/printer Option      | •   | •   | •   | •   |



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## Technical Specification:

### HAL 104/LED/103/101

#### Earth/Ground Bond Tests - 104, LED,103, 100

|                             |   |
|-----------------------------|---|
| Test Voltage:               | Nominal 6V AC                                   |
| Frequency:                  | 50 or 60 HZ (Independent of supply)             |
| Display Range and Accuracy: | 0-1500m $\Omega$ $\pm$ 2% $\pm$ 5 Counts        |
| Display Resolution:         | 1 m $\Omega$                                    |
| Compliance Test Ranges:     |   |
| Current/Time*               | 4A - 110 secs<br>25A - 60 secs<br>40A - 30 secs |

Test Duration limited Pro-Rata between 4A and 40A

|                                       |                  |
|---------------------------------------|------------------|
| Settable Output Current Range:        | 0.1A-40.0A       |
| Selectable Range of Pass/Fail Levels: | 0-1500m $\Omega$ |

#### Insulation Resistance Test - 104, LED,103, 101

|                         |   |
|-------------------------|---|
| DC Output Voltage:      | 0.10kV-6.00kV<br>(10V/Step when manually adjusted)<br>(50V/Step in test sequence program)               |
| Display Range:          | 0.01M $\Omega$ - 500M $\Omega$  |
| Display Range/Accuracy: | 0.03M $\Omega$ - 350M $\Omega$ $\pm$ 5% $\pm$ 5 Counts<br>350M $\Omega$ - 500M $\Omega$ Indication Only |
| Display Resolution:     | 0.01M $\Omega$  |
| Pass/Fail Level:        | 0.00M $\Omega$ -500.0M $\Omega$   |

#### AC Dielectric Strength Test - 104, LED, 103, 101

|                                       |   |
|---------------------------------------|---|
| Programmable Voltage Range:           | 0.10kV - 5.00kV<br>(10V/Step when manually adjusted)<br>(50V/Step in test sequence program) |
| Frequency Independent of Supply:      | 50 or 60HZ  |
| Voltage Display Range and Accuracy:   | 0.10kV-5.00kV $\pm$ 1% $\pm$ 5 Counts   |
| Voltage Display Resolution:           | 0.01kV  |
| Current Display Range and Accuracy:   | 0.01mA - 20.00mA $\pm$ 1% $\pm$ 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  |

#### DC Dielectric Strength Test - 104, LED, 103, 101

|                                       |   |
|---------------------------------------|---|
| Programmable Voltage Range:           | 0.10kV - 6.00kV<br>(10V/Step when manually adjusted)<br>(50V/Step in test sequence program) |
| Voltage Display Range and Accuracy:   | 0.10kV - 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   |

### Power and Leakage Test - 104 and LED

#### Power Output Rating

|                       |   |
|-----------------------|---|
| Test Voltage:         | 110V - 230V AC<br>20A nominal (VIn-Vout)        |
| Maximum Power Output: | Up to 5.0kVA (dependent on mains supply rating) |

#### Output Power Measurement - 104

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

#### Output Power Measurement - LED

|                                       |   |
|---------------------------------------|---|
| Single Phase Power Measurement        |   |
| Display Range and Accuracy:           | 000.0VA to 99.9VA $\pm$ 5% $\pm$ 5 digits<br>100.0VA to 999.9VA $\pm$ 5% $\pm$ 2 digits |
| Selectable Range of Pass/Fail Levels: | 000.2 - 999.9VA   |

#### Single Phase Power Factor Measurement - LED

|                                      |                |
|--------------------------------------|----------------|
| Display Range:                       | 0.000 - 1.000* |
| Selectable Range                     |                |
| Pass/Fail Levels:                    | 0.000 - 1.000  |
| *Displayed value for indication only |                |

#### Leakage Current Measurement

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

#### Touch Current Measurement

|                                       |   |
|---------------------------------------|---|
| Display Range and Accuracy:           | 0.02mA - 5.00mA $\pm$ 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                      |

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## Case Dimensions and Weight

Case Dimensions: 200W x 300H x 370D mm

Weight: 15kg approx

Operating Voltage Range: Selectable 115V - 230V AC RMS, 50/60Hz

EN50191: Compliant when used with the appropriate accessories

## Standard Accessories

Instruction Manual

Power Cord

Guard Plug

Comms Cable

Test probes and clips - dependent on model - contact us for more details.

## Optional Accessories

A range of optional accessories are available to compliment the HAL, contact us for details.

## Services

1 year warranty subject to product registration with Seaward. visit

[www.seaward.com/register-product](http://www.seaward.com/register-product)

Service and calibration by Callibration House.

## Part Number:

Varies dependent on model - contact us for details.



Test Equipment Depot - 800.517.8431 - 99 Washington Street Melrose, MA 02176 - [TestEquipmentDepot.com](http://TestEquipmentDepot.com)

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