# To ensure the safety of electric and electronic equipment

## 3158 AC WITHSTANDING VOLTAGE HiTESTER


### Combining safety, operability and reliability

The 3158 is a voltage endurance tester with built-in pass/fail comparator and timer functions designed to test for compliance with many safety standards. In addition to emphasis on safe testing with such functions as a power interlock and key lock, the 3158 provides superb voltage comparator functions, test condition storage and operability. External I/O and RS-232C interfaces are provided to facilitate easy automatic testing.

## Major Features

### ●Testing for various safety standards

The 3158 simplifies testing in conformance with various safety standards, providing voltage comparator and timer functions to make pass/fail decisions.

### ●Up to 20 test conditions can be saved

Storage of up to 20 test conditions allows quick switching between test conditions for different standards. Also, test conditions for production lines or periodic calibration can be saved in memory. Settings are retained if power is interrupted, and automatically restored.

### ●Voltage comparator

Testing begins only when voltage is within ±5% of the preset value. The voltage comparator prevents inadvertent testing with incorrect voltage settings.
(Even though voltage is generated, testing does not start until voltage falls within ±5% of a preset value.)

### ●Zero-Toggle Switch

This function ensures that the test voltage can be toggled on and off only at a sine wave zero crossings, to prevent damage to the device under test if it happens to be faulty.

### ●Automatic Testing Support

External I/O and RS-232C interfaces are provided to simplify automatic testing and control from a personal computer. This feature can also be used for product quality data management.

### ●Interlock Function

To ensures safety during automatic testing, this feature disables testing by disabling output when a signal is received from an external device, such as a starter circuit.

### ●Remote Control

Start/Stop control can be provided by the 9613 REMOTE CONTROL BOX (SINGLE) or by the 9614 REMOTE CONTROL BOX (DUAL).

## Standards Supported by the 3158

### ●IEC60065

Safety requirements for mains-operated electronic and related apparatus for household and similar general use

### ●IEC60204-1

Electrical equipment of industrial machines: Part 1, General requirements

### ●IEC60335-1

Safety of household and similar electrical appliances: Part 1, General requirements

### ●IEC60601-1

Medical electrical equipment: Part 1, General requirements for safety

### ●IEC60950

Safety of data processing equipment, including office equipment

### ●IEC61010-1

Safety requirements for measurement, control and laboratory electrical equipment

### ●UL standard

UL1012, UL1410, UL1950, UL3101-1, etc.

# Pursuing Safe Operation and Automation

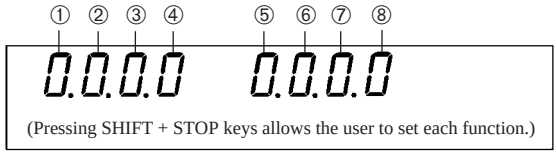
## ■ A multitude of functions

① Pass Hold Function (0: Disabled/1: Enabled)
Enable this function to hold the Pass state when detected, to facilitate confirmation.

② Fail Hold Function (0: Disabled/1: Enabled)
Enable this function to hold the Fail state when detected, to facilitate confirmation.

③ Hold Function (0: Disabled/1: Enabled)
Enable this function to hold the current state when testing is interrupted by the STOP key.

④ Momentary Output (0: Disabled/1: Enabled)
This function allows current output only when the START key is pressed. The START key on the remote control or the START signal via external I/O has the same effect.



(Pressing SHIFT + STOP keys allows the user to set each function.)

⑤ Double Action (0: Disabled/1: Enabled)
Enable this function to allow testing to start only when the START key is pressed within about 0.5 seconds after the STOP key.

⑥ FAIL Mode (0: Disabled/1: Enabled)
Enable this function to restrict hold release to the STOP key on the main unit.

⑦ RS Command [Start] (0: Disabled/1: Enabled)
Turn this function on to enable the RS-232C START Command.

⑧ Interlock Function (0: Disabled/1: Enabled)
Enable this function to activate the external I/O interlock terminals.

Analog Voltage Measurement
The meter indicates whenever voltage is present, even when power is off.

Warning Lamp
This lamp lights to warn that voltage is present between the terminals during testing.

External Switch Socket
(for remote control)

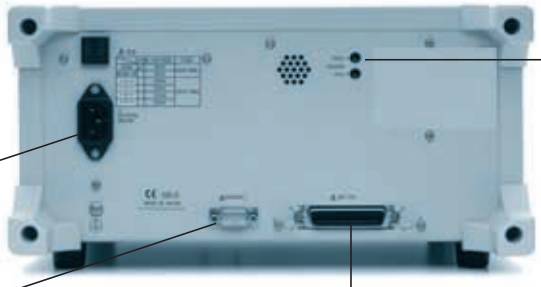
Flourescent Tube Display (VFD)
The fluorescent tube provides a bright, easy-to-read display.

Range Selection Switch (2.5/5 kV AC)

9613
REMOTE CONTROL BOX (SINGLE)
(option)

9614
REMOTE CONTROL BOX (DUAL)
(option)

The 9613 remote control box is designed for single-handed use, while the 9614 is designed to be held with both hands.



Beeper volume adjustments

Mains Power Connector
- ■3158-01 (120V AC)
- ■3158-03 (220V AC)
- ■3158-04 (230V AC)
- ■3158-05 (240V AC)

RS-232C Terminal
for remote control

External I/O Connector (photocoupler isolated)

| | | |
|---|---|---|
| READY | OUT | Low during Ready state |
| L-FAIL | OUT | Low after Fail occurs at the Lower level value |
| U-FAIL | OUT | Low after Fail occurs at the Upper level value |
| PASS | OUT | Low during Pass state |
| TEST | OUT | Low during Test state |
| H.V.ON | OUT | Low when voltage is present at the output terminals |
| START | IN | Same function as the START key. Low = key pressed. |
| STOP | IN | Same function as the STOP key. Low = key pressed. |
| INT.LOCK | IN | Open when Interlock engaged. |
| ISO.COM | IN | Signal ground for external devices |
| ISO.DCV | OUT | +15 V (0.1 A) auxiliary power output |

# ■ 3158 Specifications

## ●Basic Specifications

### [ Test Voltages ]

| | |
|---|---|
| Voltage | : 0 - 2.5 kV / 0 - 5.0 kV AC, dual-range configuration |
| Voltage testing method | : Zero-toggle switch |
| Transformer capacity | : 500VA (maximum 30 min) |
| Voltage adjustment method | : Manually adjusted slidac |
| Voltage measurement | : Average value rectified effective value display |
| Digital | : 0.00 - 5.00 kV AC (full-scale) |
| Accuracy | : ± 1.5% f.s. |
| Analog | : 0-5kV (full-scale) |
| Accuracy | : ± 5% f.s. |
| Waveform | : Mains waveform |
| Frequency | : Mains synchronous |

### [ Current Detection Section ]

| | |
|---|---|
| Current measurement range | : 0.01 - 120 mA |
| Designated value | : Average value rectified effective value display(digital) |
| Measurement resolution | : 0.01 mA (2- and 8-mA ranges)<br>0.1 mA (32-mA range)<br>1 mA (120-mA range) |
| Measurement accuracy | : ±3% f.s. +20 µA . . for all ranges<br>(power waveform distortion is less than 5%) |

### [ Decision Function ]

| | |
|---|---|
| Decision method | : Window comparator method (digital setting) |
| Decision contents | : UPPER-FAIL; when measured current exceeds the max. setting<br>PASS; when measured current remains between the max./min. settings for the set time<br>LOWER-FAIL; when the measured current is below the min. setting |
| Decision process | : Output to the display, beeper sound, signals to EXT I/O for each decision result |
| Setting range | : 0.1 - 120 mA (both max. and min. values) |
| Setting resolution | : 0.1 mA (0.1 - 9.9 mA)<br>1 mA (10 - 120 mA) |

### [ Timer Section ]

| | |
|---|---|
| Setting ON | : Counts down time from start to preset time |
| Setting OFF | : Shows elapsed time from start |
| Setting range | : 0.5 - 999 s |
| Setting resolution | : 0.1 s (0.5 - 99.9 s) ± 50ms |
| Accuracy | : 1 s (100 - 999 s) ± 5s |

### [ Interfaces ]

| | |
|---|---|
| EXT I/O (Rear panel) | : Output signals<br>Open collector output<br>Max. load: 30 V DC<br>Max. output current: 100 mA DC per signal<br>Output saturation voltage: 1.5 V DC or less<br>: Input signals<br>Active low input<br>Max testing voltage: 30 V DC<br>HIGH level voltage : 15 V DC or more, or open<br>LOW level voltage : 5 V DC or less (-6 mA typ.) |
| EXT SW (front socket) | : Input signal (contact input)<br>START/STOP/SW.EN (front socket SW enable)<br>: Output signal<br>LED light signal (40 mA max. load current) |
| RS-232C | : Duplex asynchronous with start/stop flow control<br>Transfer speed 9600 bps, 8 data bits,<br>No parity, 1 stop bit,<br>X-on/X-off flow control (no hardware flow control)<br>Receiving delimiter : CR, CR+LF<br>Transmitted delimiter : CR+LF |
| START signal priority | : RS-232C>EXT.SW>EXT I/O>panel START key (only with RS-232C START command enabled) |

## ●General Specifications

| | |
|---|---|
| Display | : Flourescent tube display (digital display) |
| Monitor function | : Output voltage/detection current |
| Monitor cycle | : 2 Hz or faster |
| Ambient operating conditions | : 0 to 40˚C (32 to 104˚F),<br>20 to 80% RH (no condensation) |
| Ambient storage conditions | : -10 to 50˚C (14 to 122˚F),<br>less than 90% RH (no condensation) |
| Ambient conditions for assured accuracy | : 23 ± 5˚C (73˚F ± 9˚F),<br>20 to 80% RH (no condensation)<br>after 5-minute minimum warm-up |
| Suitable environment | : Indoors, altitude up to 2000 m |
| Power supply | : 120 V AC ± 10% (3158-01)<br>220 V AC ± 10% (3158-03)<br>230 V AC ± 10% (3158-04)<br>240 V AC ± 10% (3158-05) |
| Power line frequency | : 50 - 60 Hz |
| Withstand voltage | : 1.35 kV AC 10 mA for 1 min. between power supply and chassis |
| Maximum rated power | : 800 VA |
| Dimensions | : Approx. 320(W) × 155(H) × 263(D) mm<br>Approx. 12.60" (W) × 6.10" (H) × 10.73" (D)<br>(not including protrusions) |
| Mass | : Approx. 16 kg. (564.4oz)(3158-01)<br>Approx. 18 kg. (634.9oz)(3158-03 to -05) |
| Fuse | : 250 V T8AL (3158-01)<br>250 V T4AL (3158-03 to -05) |
| Compatible standards | : EMC<br>EN55011: 1991+A1:1997+A2:1996 Group 1 CLASS A<br>EN50082-1:1992<br>: Safety<br>EN61010-1:1993+A1:1995<br>Contamination 2 Overvoltage category II<br>(expected overvoltage category 2500 V) |
| Standard accessories | : 9615 H.V. test lead (high voltage side and return, 1 each), power cord, spare fuse |