

# Model 370

## DC-Stable Electrostatic Voltmeter



The Trek Model 370 is a precision electrostatic voltmeter with the unique capability of making noncontacting surface voltage measurements in the range of 0 to  $\pm 3$  kV DC or peak AC.

The 370 employs an electrostatic field-nulling technique which achieves high DC stability and high measurement accuracy even if the probe to measured surface spacing changes. This permits measurements of either stationary or moving surfaces without the need to establish fixed spacing to maintain accuracy.

An automatic gain control feature of the 370 eliminates the need for manual adjustment when changing probes or when changing the probe to measured surface separation.

The 370 also features one-step, push-button zeroing. When the ZERO button on the front panel is pressed, the 370 automatically adjusts the output to zero volts when the probe is coupled to a known zero volt surface.

A precision voltage monitor provides a low-voltage replica of the measured electrostatic voltage for external monitoring purposes, or for use as a feedback signal in a closed-loop system.

An optional data acquisition module is available, featuring an IEEE-488 compatible interface, 14-bit resolution, 12-bit accuracy, and a programmable sampling period from 10  $\mu$ s to 30 minutes.

The 370 can be operated on a bench top or, with optional hardware, in a standard 19-inch rack.

- **Very High Speed of Response: Less than 50  $\mu$ s for a 1 kV step**
- **Measurement Range: 0 to  $\pm 3$  kV DC or Peak AC**
- **Measurement Accuracy: Better Than 0.05% of Full Scale**
- **Automatic Gain Control (eliminates manual adjustment)**
- **One Step, Push-Button Zeroing**
- **Precision Voltage Monitor Output**
- **Optional Data Acquisition Module (with an IEEE-488 compatible interface)**

# Model 370 Specifications

All specifications are with a 3800E-2 probe at a probe-to-surface separation of 2 mm unless otherwise noted.

## Performance

### Measurement Range

0 to  $\pm 3$  kV DC or peak AC.

### Measurement Accuracy

#### At the Voltage Monitor

Better than  $\pm 0.05\%$  of full scale.

#### At the Voltage Display

Better than  $\pm 0.1\%$  of full scale

$\pm 1$  count, referred to the voltage monitor.

### Speed of Response (10% to 90%)

Less than 50  $\mu$ s for a 1 kV step.

### Stability

#### Drift with Time

Less than 150 ppm/hour, noncumulative.

#### Drift with Temperature

Less than 100 ppm/ $^{\circ}$ C.

### Probe-to-Surface Separation

2 mm  $\pm$  1 mm (recommended).

## Features

### Zero Control

A momentary push-button switch to produce zero volts output when the probe is coupled to a known zero volt surface.

### Automatic Gain Control

The 370 automatically optimizes the gain of the AC response when changing the type of probe being used or when changing the probe-to-surface separation.

### Voltage Display

4-character, 7-segment LED display.

**Range** 0 to  $\pm 3000$  V.

**Resolution** 1 V.

**Zero Offset**  $\pm 1$  count, referred to the voltage monitor.

#### Sampling

**Rate** 2.5 readings per second.

## Features (cont.)

### Voltage Monitor Output

A buffered output providing a low-voltage replica of the measured voltage. 1/200, 1/300, 1/600, 1/1000 options available. (Offset Voltage and Output Noise specifications vary based on output scale factor.)

#### Scale Factor

1/100th of the measured voltage.

#### Offset Voltage (at 1/100th scale)

Less than 10 mV.

#### Output Noise (at 1/100th scale)

Less than 20 mV rms (measured with the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

#### Output Impedance

Less than 0.1  $\Omega$ .

#### Output Current Limit

$\pm 10$  mA

### Digital Enable

An open collector, TTL compatible input to enable or disable the measurement. A TTL high will disable the measurement, while a TTL low will enable the measurement.

### Data Acquisition Module (optional)

Provides data output using an IEEE-488 compatible interface.

#### Resolution

14 bit.

#### Accuracy

12 bit.

#### Sampling Period

Programmable from 10  $\mu$ s to 30 minutes.

#### Storage

32 Kbytes (16 Kbytes of data words).

#### Acquisition Start Signal

External trigger or IEEE-488 Talk

Enable or Group Trigger command.

#### Successive Data Acquisition

Internal timer or external trigger.

#### Interface Functions

SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0, E2.

#### Address

Switch selectable between 0 and 30.

## General

### Dimensions

108 mm H x 223 mm W x 430 mm D (4.25" H x 8.75" W x 17" D).

### Weight

5 kg (11 lb).

### Digital Enable

BNC connector.

### Voltage Monitor Output Connector

BNC connector.

### Ground Receptacle

Binding post.

### Power Requirements

#### Line Voltage

Factory set for one of two ranges: 90 to 127 V AC or 180 to 250 V AC, at 48-63 Hz (specify when ordering).

#### Power Consumption

60 VA, maximum.

### Operating Conditions

#### Temperature

0  $^{\circ}$ C to 40  $^{\circ}$ C.

#### Relative Humidity

To 85%, noncondensing.

#### Altitude

To 2000 meters

### Certification and Compliance

TREK, INC. certifies that each Model 370 is tested and calibrated to specifications using measurement equipment traceable to the National Institute of Standards and Technology. A Certificate of Calibration accompanies each instrument when it is shipped from the factory.

### Low-Voltage Safety Compliance

(EN 61010-1)

### Overvoltage Category

CAT II: Local-level mains, appliances, portable equipment.

### Pollution Category

Degree 1: Operate in environments where no pollution or only dry, nonconductive pollution occurs.

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All specifications are subject to change.  
1122/DEC

## Model 370

| Item                                                               | Part No.                        |
|--------------------------------------------------------------------|---------------------------------|
| Electrostatic Voltmeter with 1/100 Monitor Output Ratio . . . . .  | 370-1                           |
| Electrostatic Voltmeter with 1/200 Monitor Output Ratio . . . . .  | 370-2                           |
| Electrostatic Voltmeter with 1/300 Monitor Output Ratio . . . . .  | 370-3                           |
| Electrostatic Voltmeter with 1/600 Monitor Output Ratio . . . . .  | 370-6                           |
| Electrostatic Voltmeter with 1/1000 Monitor Output Ratio . . . . . | 370-10                          |
| <b>Line Voltage</b>                                                |                                 |
| 90 to 127 V AC . . . . .                                           | (Part Number)-L                 |
| 180 to 250 V AC . . . . .                                          | (Part Number - Contact Factory) |

## Optional Accessories

| Item                                                                 | Part No. |
|----------------------------------------------------------------------|----------|
| Data Acquisition Module with IEEE-488 Compatible Interface . . . . . | 16073    |
| 603RA Full-Rack Mounting Kit . . . . .                               | 603RA    |
| 604RA 1/2 Rack Mounting Kit . . . . .                                | 604RA    |
| <b>Probes</b>                                                        |          |
| <b>Standard Probe</b>                                                |          |
| Model 7000ER (end-viewing) . . . . .                                 | 7000ER   |
| <b>Miniature Probes</b>                                              |          |
| Model 3800E-2 (end-viewing) . . . . .                                | 3800E-2  |
| Model 3800S-2 (side-viewing) . . . . .                               | 3800S-2  |