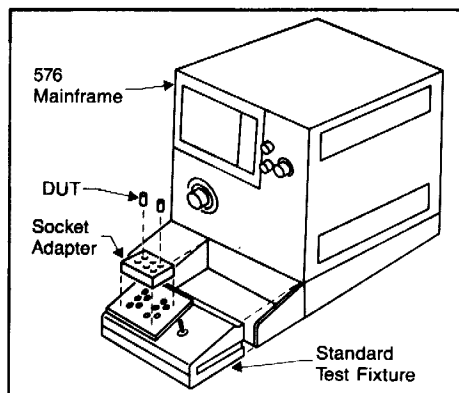


## 576/176

- Tests Two- and Three-Terminal Discrete Semiconductors
- Power Capability Up to 220 Watts
- Convenient Scale-Factor Readout
- Test Fixture (Optional) for Testing Power Devices to 1000 Watts

### TYPICAL APPLICATIONS

- Semiconductor R & D
- Production-Device Testing
- Incoming Inspection



176 High-Current Test Fixture (Optional)

The Tektronix 576 Curve-Tracer System continues to hold the title "standard of the industry." This general-purpose curve-tracer system performs well in applications where high-current testing is required.

With the Standard Test Fixture, the collector supply of the 576 delivers up to 220 W peak to the device under test. The step generator can deliver up to 2 A in both its current and voltage modes of operation. With the 176 High-Current Test Fixture, the 576 is capable of pulsed-collector operation up to 200-A peak.

Alphanumeric indicators provide readout of vertical and horizontal deflection factors, step amplitude, and Beta/div or  $g_m$ /div. The Beta or  $g_m$  readout saves the operator from the arithmetic usually necessary to arrive at these parameters. These indicators also provide a permanent record of major knob settings in 576 CRT photographs.

Other features of the 576 Curve Tracer include: calibrated display offset; adjustable current limiting in the step generator; either 300 or 80  $\mu$ s pulse width in pulsed-base operation; pushbuttons to check display zero and calibration; and an illuminated graticule.

A safety interlock protects the operator from dangerous voltages.



576 With Standard Test Fixture

## 576 CHARACTERISTICS

### COLLECTOR SUPPLY

**Modes/Polarity**—Norm: AC (at line frequency); positive or negative full-wave rectified ac. DC: Positive or negative dc. Leakage: Emitter-current rather than collector-current measurements. 1000X increase in vertical deflection sensitivity (1 nA/div).

#### Voltages\*

Range (V)	15	75	350	1500
Max Continuous Peak Current (A)	10	2	0.5	0.1
Peak Pulse Current (A)	$\geq 20$	$\geq 4$	$\geq 1$	$\geq 0.2$

\*<sup>1</sup> Peak open-circuit voltages within +35% and -5% of indicated range.

**Series Resistance**—From 0.3  $\Omega$  to 6.5 M $\Omega$  in 12 steps, all within 5% or 0.1  $\Omega$ . Peak Power Limit Setting: 0.1, 0.5, 2.2, 10, 50, and 220 W.

**Safety Interlock**—Protects operator from dangerous voltages.

### STEP GENERATOR

**Current Mode**—Step/Offset Amplitude Range: 5 nA/step (with X0.1 Mult) to 200 mA/step, 1-2-5 sequence. Maximum Current (Steps and Aiding Offset): X20 amplitude setting, except X10 (2 A) at 200 mA/step and X15 (1.5 A) at 100 mA/step. Maximum Voltage (Steps and Aiding Offset): At least 10 V. Maximum Opposing Offset Current: X10 amplitude setting or 10 mA, whichever is less. Maximum opposing voltage is limited at 1 to 3 V.

**Voltage Mode**—Step/Offset Amplitude Range: 5 mV/step (with X0.1 Mult) to 2 V/step, 1-2-5 sequence. Maximum Voltage (Steps and Aiding Offset): X20 amplitude-switch setting, 40 V maximum. Maximum Current (Steps and Aiding Offset): At least 2 A at 10 V, derating to 10 mA at 40 V. Short-Circuit Current Limiting: 20, 100, 500 mA +100%, -0%; 2 A +50%, -0%. Maximum Opposing Offset Voltage: X10 amplitude setting. Maximum Opposing Current: Limited between 5 and 20 mA.

**Accuracy**—Incremental: Within 5%, between steps, within 10% with X1.0 Mult. Absolute: Within 2% of total output including offset, or 1% of amplitude setting, whichever is greater. Offset Multiplier: Continuously variable from 0 to X10 the amplitude setting, either aiding or opposing the step polarity.

**Step Rates**—Selectable at X1, X2, or X4 line frequency.

**Pulsed Steps**— $\approx 80$  or  $300 \mu s$  width.

**Step/Offset Polarity**—Same as Collector-Supply polarity and positive in ac position. Polarity can be independently inverted with Step/Offset Polarity control or from the test fixture.

**Step Family**—Repetitive or single family.

**Number of Steps**—Selectable from 1 to 10.

**Vertical-Deflection Factor**—Collector Current:  $1 \mu A$  to 2 A/div, 20 steps in 1-2-5 sequence ( $0.1 \mu A$ /div with X10 magnification). Emitter Current: 1 nA to 2 mA/div, 20 steps in 1-2-5 sequence. Step Generator: 1 step/div.

**Horizontal-Deflection Factor**—Collector Volts: 50 mV to 200 V/div, 12 steps (5 mV/div with X10 magnification). Base Volts: 50 mV to 2 V/div, 6 steps (5 mV/div with X10 magnification). Step Generator: 1 step/div.

## POWER REQUIREMENTS

**Voltage Ranges**—90 to 136 V ac or 180 to 272 V ac (six positions).

**Line Frequency**—48 to 66 Hz.

**Maximum Power Consumption (Including DUT Power)**—305 W. Standby Power:  $\approx 60$  W.

## ENVIRONMENTAL AND SAFETY

**Ambient Temperature**—Operating:  $+10$  to  $+40^\circ C$ . Nonoperating:  $-40$  to  $+65^\circ C$ .

**Altitude**—Operating: To 3000 m (10,000 ft). Nonoperating: 15 000 m (50,000 ft).

**Vibration**—Operating: 15 minutes along each of the three major axes.  $0.04$  cm ( $0.015$  in) p-p displacement 10 to 50 to 10 Hz in one minute cycles. Held for three minutes at 50 Hz.

**Shock**—Nonoperating: 30 g's,  $\frac{1}{2}$  sine, 11-ms duration in each direction along each major axis. Total of six shocks.

**Safety**—CSA Certified (CSA 556 B).

## PHYSICAL CHARACTERISTICS

Dimensions	mm	in.
Width	299	11.8
Height	381	15.0
Depth	591	23.3
Weight ~	kg	lb
Net	32.0	70.5
Shipping	48.5	107.0

## STANDARD TEST FIXTURE (650-0459-01)

A plug-in fixture with two sets of five-pin test terminals, the Emitter Grounded or Base Grounded switch, Left-Off-Right switch, Step Gen Output, Ext Base or Emitter input, and the Safety Shield. The test terminals accept either the six-pin universal adapters, three-pin adapters, or the high-power transistor adapters with Kelvin contacts.

**Position Controls**—Fixed 5-div increments within 0.1 div. Continuous fine control over 5 div or less.

**Display Offset**—21 calibrated positioning increments, vertically or horizontally, of 0.5 div or 5 div with X10 Magnifier.

## CRT

**CRT**—165-mm (6.5 in.) rectangular with  $10 \times 10$ -cm divisions (12 cm usable horizontal) parallax-free, illuminated graticule, GH (P31) phosphor standard. Accelerating potential is 4.0 kV.

**Readout**—The readouts, adjacent to CRT, are digital indicators of the following parameters: Per Vert Div from 1 nA to 2 A/div; per Horiz Div from 5 mV to 200 V/div; Per Step from 5 nA to 2 A/step, 5 mV to 2 V/step; A (Beta) or gm, per Div from  $1 \mu$  to 500 k calculated from Current/Div, X10 Mag, Step Amplitude, and X0.1 Mult.

The 176 Pulsed-High-Current Fixture provides the 576 Curve Tracer with pulsed-collector operation to 200 A peak and pulsed-base steps to 20 A peak. When selected, the step offset is also pulsed. The pulsed operating mode allows many tests previously considered impossible. For example, small-signal transistors can be tested under pulsed-collector-breakdown conditions without overdissipation. The 176 Test Fixture fits in place of the 576 Standard Test Fixture. The collector pulse is slaved to the step generator in regard to width and repetition rate.

## CHARACTERISTICS

### COLLECTOR SUPPLY (PULSED)

**Width**—300 or  $80 \mu s$  determined by 576.

**Repetition Rate**—Power-line frequency.

**Polarity**— $\pm$  determined by 576 polarity control.

**Amplitude**—Ranges: 15, 75, 350 V nominal, controlled by Max Peak Volts switch on 576. Current (minimum available at low line into shorted load): 15-V range, 200 A; 75-V range, 40 A; 350-V range, 8 A.

**Maximum Peak Watts**—Three illuminated pushbuttons select 10, 100, or 1000 W maximum peak power.

### STEP GENERATOR

**Current Ranges (X10 Step Selected)**—Step/Offset Amplitude Range: 100 mA to 2 A, 5 steps, 1-2-5 sequence. Maximum Current (Steps and Aiding Offset):  $200 \times 576$  Amplitude setting or 20 A, whichever is less. Maximum Voltage (Steps and Aiding Offset): At least 5 V up to 10 A and 2 V up to 20 A.

**Accuracy (Current Steps Including Offset)**—Incremental: Within 5% between any two steps; within 10% with X0.1 Step Mult. Absolute: Within 3% of total output  $\pm 1\%$  of one step or within 3% of one step, whichever is greater.

**576 Offset Multiplier**—0 to  $100 \times 576$  Amplitude switch setting.

**Step Rate**—Power-line frequency.

**Pulsed Steps**—300 or  $80 \mu s$  wide.

**Step/Offset Polarity**—Same as Collector-Supply polarity. Polarity can be independently inverted with Step/Offset Polarity control.

## VERTICAL AMPLIFIER

**Deflection Factor (X10 Vert Selected)**—1 to 20 A/div, 5 steps in a 1-2-5 sequence.

## ORDERING INFORMATION

### 576 Curve Tracer

With Standard Test Fixture **\$17,050**  
Includes: Standard test fixture (650-0459-01); transistor adapter A1007; FET adapter A1009; TO-3/TO-66 adapter A1003 Opt. 01; axial lead diode adapter A1005; stud diode adapter (013-0110-00); Kelvin sensors for large and small plastic transistors A1002 Opt. 01; safety shield (337-1194-02); power cord (161-0066-00); instruction manual (070-0905-01).

### OPTION

**Option 01**—Deletes the auto scale-factor readout module but maintains provisions for insertion of the module (020-0031-00) at any time. **— \$975**

### CONVERSION KIT

**Auto Scale-Factor Readout Module**—Order 020-0031-00 **\$1,735**

### INTERNATIONAL POWER PLUG OPTIONS

**Option A1**—Universal Euro 220 V, 50 Hz.  
**Option A2**—UK 240 V, 50 Hz.  
**Option A3**—Australian 240 V, 50 Hz.  
**Option A4**—North American 240 V, 60 Hz.  
**Option A5**—Switzerland 220 V, 50 Hz.

### OPTIONAL ACCESSORIES

**Test Set-Up Chart**—Package of 250.

Order 070-0970-01 **\$10**

**Test Fixture**—176 **\$6,800**

**Socket Adapters**—In this section.

**Camera**—C-59A and adapter.

See Instrumentation Documentation Devices section, page 501.

**Cart**—K217. **\$510**

## 176 Pulsed High-Current Fixture

### ORDERING INFORMATION

**176 Pulsed-High-Current Fixture** **\$6,800**  
Includes: TO36 adaptor (013-0112-00); stud diode adaptor (013-0110-00); safety shield (337-1194-02); instruction manual (070-1073-00).