

MODEL V-211/V-212/V-222/V-422
OSCILLOSCOPE
Service Manual

1. SPECIFICATIONS

[] : Specifications for V-422

CRT

Type

Large 6" screen with internal graticule

Approximate 2kV [12kV] acceleration potential

Screen type

P31 phosphor standard

Useful screen area

8 × 10 div

Graticule

Internal graticule with centimeter divisions and 2 mm subdivisions along the central axis, 10 % and 90 % lines are indicated.

Illumination continuously variable. (For : V-222, V-422)

Focussing

Possible (with automatic focus correction circuit : V-222 and V-422)

Trace rotation Provided

Scale illumination Variable (For : V-222, V-422)

Intensity control Provided

Z-AXIS INPUT (INTENSITY MODULATION)

DC-coupled, positive-going signal decreases intensity: 5 Vp-p signal causes noticeable modulation at normal intensity: DC to 2 MHz.

Input impedance 47 k Ω (typ.) [33 k Ω (typ.)]

Maximum input voltage 30 V (DC + peak AC)

Coupling DC

VERTICAL DEFLECTION SYSTEMS (2 Identical Channels)

Bandwidth and rise time

DC to at least 20 MHz [40 MHz] and rise time 17.5 ns [8.8 ns] or less.

DC to at least 7 MHz and rise time 50 ns or less at magnifier extends.

The AC coupled lower -3 dB point is 10 Hz or less.

Deflection factor

5 mV/div to 5 V/div in 10 calibrated steps, in a 1-2-5 sequence.

The uncalibrated continuous control extends deflection factor to at least 12.5 V per division in the 5 volts/div position. The $\times 5$ magnifier increases sensitivity of each deflection factor setting to 1 mV/div.

Accuracy

$\pm 3\%$ (+10 to +35 °C)

Additional error for magnifier $\pm 2\%$

Display modes

CH1, CH2 (normal or invert), Alternate, Chopped (Approx. 250 kHz),
Added

Input impedance

1 M Ω $\pm 3\%$ in parallel with 23 ± 3 pF

Maximum input voltage

300 V (DC + peak AC)

Input coupling

AC, GND, DC

HORIZONTAL DEFLECTION SYSTEM

Time base

0.2 μ s/div to 0.2 s/div in 19 calibrated steps, in a 1-2-5 sequence.

The uncalibrated continuous control extends deflection factor to at least 0.5 seconds per division in the 0.2 sec/div position. The $\times 10$ magnifier extends maximum sweep rate to 100 ns/div [20 ns/div].

Accuracy

$\pm 3\%$ (+10 to +35 °C)

Additional error for magnifier $\pm 2\%$

TRIGGERING SYSTEM

Trigger modes

Automatic, Normal, TV (TV-H or TV-V)

Trigger source

Internal (CH1, CH2, V.MODE), Line, External : V-212, V-222, V-422

Internal, Line, External, EXT-H : V-211

Trigger slope

+ or -

TV sync polarity

TV (-)

Triggering level

Internal ; ± 6 div or more

variable range

External ; approx. ± 2 V

Triggering sensitivity

and frequency

Frequency	Internal (V.MODE)	External
20 Hz - 2 MHz [20 Hz - 5 MHz]	0.5 div (2.0 div)	200 mV
2 - 20 MHz [5 - 40 MHz]	1.5 div (3.0 div)	800 mV

(Except ; (V.MODE) : V-211)

TV-V, TV-H sensitivity: SYNC level more than 1 div or 1 V

AUTO: Approx. 25 Hz (when time base is 0.1 μ s/div to 2 ms/div)

Trigger coupling

AC : 25 Hz to full bandwidth

External trigger input impedance

1 M Ω $\pm 20\%$ in parallel with 25 pF ± 5 pF

(EXT ☒ ; about 100 k Ω : V-211)

Maximum input voltage

300 V (DC + AC to 1 kHz or less)

X-Y OPERATION

V·INPUT ; Vert, EXT TRIG IN ; Horiz : V-211

CH1 ; Horiz, CH2 ; Vert : V-212, V-222, V-422

Deflection factor

Same as vertical deflection

(X-axis; about 200 mV/div : V-211)

Accuracy

Y: $\pm 3\%$ (+10 to +35 °C)

X: $\pm 5\%$ (+10 to +35 °C)

Additional error for magnifier $\pm 2\%$

X-bandwidth

DC to at least 500 kHz

Phase error

3° or less from DC to 50 kHz : V-212, V-222, V-422

3° or less from DC to 10 kHz : V-211

CALIBRATOR

An approx. 1 kHz frequency 0.5 V ($\pm 3\%$) square wave.

POWER SUPPLY

VOLTAGE (50/60 Hz)	FUSE
100 V (90 - 110 V)	2A
120 V (108 - 132 V)	2A
220 V (198 - 242 V)	1A
240 V (216 - 264 V)	1A

Nominal voltage $\pm 5\%$ at 400 Hz

Power supply frequency : 50, 60, 400 Hz

Power consumption : Approximately 30 W

ENVIRONMENT

Limit of operation temperature 0 - 40 °C

Limit of operation humidity 35 - 85 %

Rated range of use temperature 10 - 35 °C

Rated range of use humidity 45 - 85 %

Storage and transportation temperature -20 - 70 °C

DIMENSIONS AND WEIGHT

Approx. 310(W) × 130(H) × 370(D) mm
(12.4(W) × 5.2(H) × 14.8(D) inch)

Approx. 6 kg (13.5 lbs): for V-211, V-212

Approx. 6.5 kg (14.6 lbs): for V-222, V-422