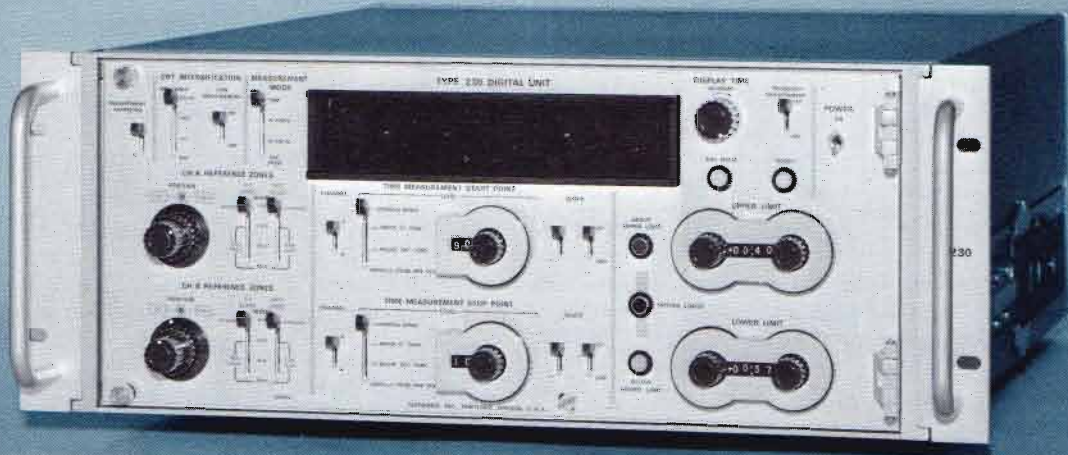


TYPE 230 R230

DIGITAL UNIT



- PRESENTS OSCILLOSCOPE MEASUREMENTS

- IN DIGITAL FORM

- DIGITAL READOUT PARAMETERS

- PULSE AMPLITUDE
 - PULSE RISE AND FALL TIME
 - PULSE WIDTH
 - TIME INTERVAL

- UP TO 50 MEASUREMENTS PER SECOND

- PARALLEL GROUND-CLOSURE BCD PROGRAMMING

- BCD DATA OUTPUT (1 2 4 8)

- ALL SOLID STATE—EXTENSIVE USE OF INTEGRATED CIRCUITS

The Type 230 and Type R230 Digital Units are new high-speed solid-state units that provide digital measurements of signals displayed on the Type 568 Oscilloscope. The Type 230 has flexible measurement capabilities with up to 50 measurements per second, easy programming, BCD data outputs, and solid-state circuitry with extensive use of integrated circuits. The Type 230 Digital Unit can make a wide variety of repetitive pulse measurements on the signals displayed on the Type 568. The digital presentations can designate voltage measurements, time-difference measurements between similar pulses, and time-difference measurements between percentages or voltages of pulse amplitudes. The Type 230 can be externally programmed for use in high-speed automatic measurement systems and data output connectors provide measurement results in convenient BCD code.

MEASUREMENT MODES

The Type 230 Digital Unit's four basic measurement functions (Channel A volts, Channel B volts, Time, and External Program) are selected by the Measurement Mode switch.

VOLTAGE measurements are made on either Channel A or Channel B between the 0% and the 100% reference zones. The signal polarity is determined and read out automatically on the digital readout.

TIME measurements are made on either Channel A, Channel B or between the two channels. The time measurements are made from a pre-determined start point to a pre-determined stop point that can be referenced to the 0% and 100% reference zones or to the start of the sweep.

EXTERNAL PROGRAM: All of the front-panel functions required to make voltage and time measurements can be easily programmed externally. The variety and flexibility of measurements possible with external programming are even greater than those possible through use of the Type 230 front-panel controls, and measurements and limits can be changed more rapidly.

DIGITAL READOUT

The measurements made by the Type 230 are read out directly on four Nixie* tubes. Decimal point and unit of measure (ns, μ s, ms, s, mV, V) are automatically presented. The polarity of the measurement (+ or -) is also read out automatically.

DISPLAY TIME

The digital readout display time may be varied from ≈ 10 ms to 10 s. **EXTERNAL HOLD** light indicates when the measured data is being held until the recording device has had sufficient time to record the measurement. External hold does not prevent the next measurement from being made. In **TRIGGERED MEASUREMENT** operation, a measurement is started after a receipt of a trigger (+ or -) and after **DISPLAY TIME** has been completed. The **READY** light indicates a ready condition for a trigger.

REFERENCE ZONES

To make any digital voltage or time measurement of the waveforms displayed on the Type 568 Oscilloscope, the Reference Zones must be properly set. The 0% and the 100% zones establish the reference points from which all measurements are made. The reference zones can be brightened on the oscilloscope by means of the CRT Intensification Reference Zone switch. The switch brightens both zones, 100% zone only, 0% zone only or disables the zone intensification.

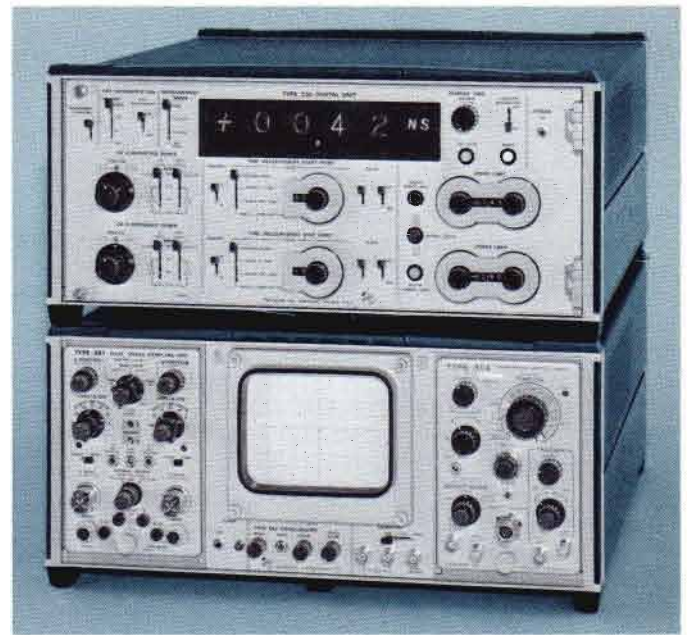
CHANNEL A REFERENCE ZONE

The 0% **POSITION** and 100% **POSITION** controls determine the start position of the 0% and 100% zones to any $\frac{1}{2}$ -cm point from the start of the sweep by means of a 20-position switch. Five external program lines are required for each position control.

LEVEL WIDTH controls select the width of the reference zone and select the type of voltage reading, average or peak.

The **AVERAGE 0.3-cm WIDTH** position of the control is normally used for average voltage and most time measurements.

*Trade-Mark Burroughs Corporation



The three **PEAK** positions (2-cm, 4-cm, 10-cm **WIDTH**) are used for average to peak, or peak to peak voltage measurements. Two program lines are required for each 0% **LEVEL** or 100% **LEVEL** width controls.

CH B REFERENCE ZONES are identical in function and operation as Ch A Reference Zones except they are set on Ch B display.

TIME MEASUREMENT START POINT

The start of the time measurement is selected to start on either Channel A or Channel B and on the first or second positive-going or negative-going slope. The time measurement starts when the signal reaches one of the 99 pre-determined levels. Four different modes of start point level selection are available: (1) % between 0% and 100% zones, (2) mm above 0% zone, (3) mm below 100% zone, and (4) Horizontal mm from sweep start. Eleven BCD program lines are required for externally programming the time measurement start point. There are 159 pre-determined levels available in the external programming mode.

CRT intensification during the time measurement portion of the sweep is selected by means of the **CRT Intensification Time Measurement On-Off** switch.

TIME MEASUREMENT STOP POINT

All functions of the Time Measurement Stop Point are identical to the previously explained Time Measurement Start Point. It stops the count on the selected point on Ch A or Ch B. If the Stop Point occurs before the Start Point, a negative reading is indicated.

LIMIT CONTROLS

The Limit Controls select the **UPPER** and **LOWER** measurement Limits. Measurement limit results can be quickly determined on the front-panel by means of three lights (**ABOVE UPPER LIMIT**, **WITHIN LIMITS**, **BELOW LOWER LIMIT**) and the information is available on the rear panel for stopping automatic measurement sequences or for automatic sorting. Fifteen BCD lines are required for programming each limit control.

RESOLUTION

DOTS/MEASUREMENT Time measurements are performed by gating and counting clock-pulses during the measurement interval. If a measurement interval occupied 2.5 div and the sweep speed was 10 ns/div with 100 samples/div, then 250 samples would be registered in the digital readout counter and reading would be 25.0-ns. For sweep speeds with multipliers of 2, the count is doubled and the decimal is shifted to maintain maximum resolution. For multiples of 5 the count is divided by 2 providing 50 samples/div.

The **TIME MEASUREMENT START** and **STOP** comparators have ± 0.1 mm pick-off resolution capabilities. This gives the Type 230 the ability to scale a 1-cm display in 1% steps.

MEASUREMENT AVERAGING permits selection of measurements to be a statistical average of eight sweeps or to be a measurement of only one sweep. One program line is required for Measurement Averaging selection.

EXTERNAL READOUT

Data outputs are available on the rear-panel of the Type 230 that permit the recording of measurement polarity, displayed digits, units of measure, decimal point, and measurement limit results. The information is in BCD code (1 2 4 8; true . . . ground, false . . . +12 Volts) and the Type 230 can be synchronized to the data recorder.

Regulated power is available for use in systems applications.

EXTERNAL PROGRAMMING

The Type 230 Digital Unit is designed to be externally programmed for use in high-speed measurement systems, up to 100 measurements per second with proper programming techniques. All of its measurement functions can be programmed by means of ground closures or logic levels. The programming is achieved with 104 program lines using negative logic with true being ground or $< 2V$ and false being open or $> 6V$. Suitable programming devices include card readers, block readers, computers, etc.

HIGH SPEED PROGRAMMED MEASUREMENTS

When using the Type 3T4 Programmable Sampling Sweep for the oscilloscope time base, the Type 230 Digital Unit can program the Type 3T4 to provide increased measurement speeds. The time-base can be made to run fast (10 dots/div) during the non-measurement part of the sweep and then run

at normal speeds (100 dots/div) for maximum resolution during the measurement. The Type 3T4 is also set for Single-Sweep operation and the sweep is started by the Type 230 so that no time is lost waiting for an unwanted sweep to finish. This function is obtained by externally programming the high speed program line.

Measurement speed can be increased by externally programming the position of the 0% and/or 100% Reference Zones start point to 12 cm. This puts the reference zones into a memory hold position of up to 10 seconds and permits several different measurements to be made without a zone charging sweep. This gives an additional feature of permitting measurements referenced to reference zones that are not on the CRT display.

OTHER CHARACTERISTICS

POWER REQUIREMENTS

90 to 136 VAC or 180 to 272 VAC, 48 to 66 Hz, 130 watts maximum at 115 V and 60 Hz. Rear panel selector provides rapid accommodations for six line-voltage ranges.

TYPE 230 DIMENSIONS AND WEIGHTS

Height	8 in	20.3 cm
Width	16 ³ / ₁₆ in	42.7 cm
Depth	21 ⁷ / ₈ in	55.5 cm
Net weight	38 lb	17.3 kg
Domestic shipping weight	≈ 50 lb	≈ 22.7 kg
Export-packed weight	≈ 73 lb	≈ 33.2 kg

TYPE R230 DIMENSIONS AND WEIGHTS

Height	7 in	17.8 cm
Width	19 in	48.3 cm
Depth	22 ³ / ₄ in	57.8 cm
Net weight	40 lb	18.2 kg
Domestic shipping weight	≈ 52 lb	≈ 23.6 kg
Export-packed weight	≈ 75 lb	≈ 34.1 kg

INCLUDED STANDARD ACCESSORIES

Type 230 to Type 568 48-inch interconnecting cable (012-0119-00); 3 to 2-wire adapter (103-0013-00); two instruction manuals (070-0635-00). Type R230 also includes mounting tracks (351-0085-00) and mounting hardware.

Please refer to Terms and Shipment, General Information page.

TYPICAL AUTOMATIC MEASUREMENT SYSTEM

(For further information, consult your Field Engineer)

