



W2470 Series

## Line-Powered 4½-Digit Panel Meters

The Weston 2470 Series are a family of 4½-digit, high-accuracy, line-powered, single-range panel meters. The series offers a high-brightness LED displays with five DC ranges from 20mV full scale with 1μV resolution, to 200V full scale with 10mV resolution.

All models provide automatic zero calibration, accuracy of  $\pm 0.005\%$  rdg  $\pm 2$  digits, and an auxiliary power supply output of  $\pm 12\text{VDC}$  or  $+ 5\text{VDC}$ . Options include a parallel-BCD output with 200V RMS isolation (Models 2472) as well as direct readout in engineering units such as psi, pH, °C, or °F (all models). Any model may be adapted to 4-20mA current-loop and 1-5V voltage loop data transmitters.



### INPUT CIRCUIT AND ACCURACY (Single-ended Input)

Ranges	Accuracy @23°C $\pm 1^\circ\text{C}$	Accuracy @18°C-28°C	Temperature Coefficient
20mV	$\pm 0.005\%$ rdg $\pm 3\text{d}$	$\pm 0.01\%$ $\pm 3\text{d}$	$\pm 0.001\%$ rdg $\pm 0.15\mu\text{V}/^\circ\text{C}$
200mV	$\pm 0.005\%$ rdg $\pm 2\text{d}$	$\pm 0.015\%$ rdg $\pm 2\text{d}$	$\pm 0.002\%$ rdg $\pm 0.3\mu\text{V}/^\circ\text{C}$
2V*	$\pm 0.005\%$ rdg $\pm 2\text{d}$	$\pm 0.01\%$ rdg $\pm 2\text{d}$	$\pm 0.001\%$ rdg/ $^\circ\text{C}$
20V*	$\pm 0.005\%$ rdg $\pm 2\text{d}$	$\pm 0.025\%$ rdg $\pm 2\text{d}$	$\pm 0.0035\%$ rdg/ $^\circ\text{C}$

\*Accuracy at Zero:  $\pm 1$  count  $0^\circ\text{C}$  to  $50^\circ\text{C}$ . Typically Zero up to  $40^\circ\text{C}$ .

- **Accuracy:**  $\pm 0.005\%$  rdg  $\pm 2$  digits
- **$\pm 1$  Count Stability** at zero over the full operating temperature range.
- **LED** — Models 2471 and 2472 provide high-brightness, 0.56" high LED display.
- **Fast Warm Up Time** — temperature controlled zener voltage reference eliminates temperature shifts.
- **Direct Readout in Engineering Units** — psi, pH, °C, °F, or other options.
- **Isolated, Parallel BCD Output** — available in Models 2472.
- **Four Current Ranges:** — 200μA to 200mA
- **Three Auxiliary Power Supply Outputs** —  $\pm 12\text{VDC}$  or  $+5\text{VDC}$  for driving external circuits.
- **Automatic Zero and Polarity** — eliminates calibration adjustments and allow direct readings of + and - signal inputs.
- **Low Power Consumption** — Special circuit design provides cool running operation in industrial environments.
- **Low Noise** — Patented Westcon Dual Slope Integration provides excellent noise rejection.
- **Ratiometric Operation** optional.

## 2470 Series Specifications

**ANALOG INPUT**

Configuration	Bipolar, single ended
Input Resistance	1000 megohms
Bias Current	7nA max., 20mV @ 23°C 2nA, 200mV @ 23°C 200pA, 2V @ 23°C 20pA, 200V @ 23°C

Input Protection	
19.999mV	±20V
199.99mV	±60V
1.9999V	±150V
19.999V	±500V
NMRR	Filter Single-pole, optimized 65 dB typical, 50 dB min @
Rejection Ratio	50 or 60 Hz
Ratiometric Operation	Ratio input over 2:1 Ref voltage range

**COMMON MODE**

(CMRR AC)	120 dB typical; 100 dB min. at 60 Hz if unbalanced
Max. Common Mode Voltage	500V RMS (247) 200V RMS (2472)

**PERFORMANCE**

Accuracy	±0.005% of reading ±2 counts
Resolution	±0.005% for 19999 counts
Range Tempco	±2 ppm of reading/°C typical ±10 ppm of reading/°C max.
Zero Stability	±1 count of offset at zero from 0° to 50°C
Step Response	within 1 count final value within 1 conversion for ±F.S. step input

**DISPLAY**

Scale Length	±19999
Type of Display	0.56" high brightness LED (2471-2472)
Polarity	Negative inputs: minus sign at far left Positive inputs: blank at far left
Overrange	Alternating between Indication 0000 and a 1 in the MSD location, with the polarity sign preserved
Decimal Points	Available at any of the following four positions by connecting a selected terminal to Pin N: 1.XXXX 1X.XXX 1XX.XX 1XXX.X

**WARM UP REQUIREMENTS**

Zero	10 seconds
F.S. Calibration	10 minutes max (within .01% final value)
Long Term Stability	90 days within rated accuracy
Long Term Stability	±1 count over full operating at Zero temperature range

**ENVIRONMENT**

Operating Temperature	0°C - 50°C
Storage Temperature	-55°C to + 85°C
Humidity	55°C at 85% RH non-condensing

**CONVERSION TECHNIQUE**

Dual slope (U.S. Patent 3,051,939) A/D conversion with Auto-zero and single reference. Conversion is "true bipolar" for accurate tracking through zero.

Conversion Rate	2.5/sec
Signal Integration Time	100 ms

**OUTPUTS AVAILABLE**

(Auxiliary power for customer circuitry)

1. ±12 volts	Voltage tolerance: ±5%
2. +5 volts	Voltage tolerance: ±5%

**POWER REQUIREMENTS****2471/2472**

Power	117/220/240 VAC (±10%)
Frequency	47 Hz - 440 Hz
Power Consumption	3.5W (Full Lit Display)

**CONTROL FUNCTIONS**

(TTL Compatible; Open/Close Contact Compatible)

- External Hold Connect "Start/Hold" to "Digital Common" to retain most significant reading 2471, to Pin N; 2472, Pin K to Pin 2 on BCD Board
- Command Start Momentary release of previously connected "Start/Hold" (Duration 1µsec min)
- External Decimal Point Control Connect selected decimal point terminal to Pin N
- External Blanking Connect "Blanking" to Pin N to blank all but polarity sign (available only on 2471, 2472)
- Print Command When Pin F on BCD output goes low BCD data is valid and can be read by printer or computer

**DIMENSIONS AND WEIGHT**

**Bezel:** 4"w. x 1.75"h. x .56"d.  
(101.6mm x 44.45mm x 14.22mm)

**Body:** 3.875"w. x 1.67"h. x 4.0"d.  
(98.42mm x 42.42mm x 101.6mm)

**Panel Cutout:** 3.924"w. x 1.682"h.  
(99.67mm x 42.72mm)

**Weight:** approximate 13 oz. (364g)

Socketed analog & digital chip providing greater serviceability



High efficiency display LED

Single calibration adjustment

Crystal oscillator clock for long term stability and optimum integration period for 50 or 60 Hz operation

Temperature controlled voltage reference providing extended accuracy

**ORDERING INFORMATION**

RANGE	CATALOG # 115 VAC*	CATALOG # 230 VAC*
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**MODEL 2471—LED DISPLAY**

0-19.999 mV	2471-0280593	2471-0280592
0-199.99 mV	2471-0280561	2471-0280556
0-1.9999 V	2471-0280562	2471-0280557
0-19.999 V	2471-0280563	2471-0280558

**MODEL 2472— LED DISPLAY WITH ISOLATED BCD**

0-19.999 mV	2472-0280597	2472-0280596
0-199.99 mV	2472-0280581	2472-0280576
0-1.9999 V	2472-0280582	2472-0280577
0-19.999 V	2472-0280583	2472-0280578

Input connectors: Analog and power — #9790-0267253, BCD  
 —#9790-0271102,

\* All voltages  $\pm 15\%$