

## C50 Portable Multifunction Calibrator

**Superior Accuracy as compared  
to Competitors!**

Simultaneous Measurement and Generation  
Rugged IP54 Construction for On Site Use  
Quick Connect Terminals



### C50 PORTABLE MULTIFUNCTION CALIBRATOR

The Wahl C50 Portable Multifunction Calibrator integrates all the necessary functions for calibration and maintenance of processes, making it the ideal instrument for maintenance, quality control, and calibration.

Its ergonomic design and embedded software make the C50 an easy to use high performance calibrator.

IP54 rated and fully protected by an anti-shock boot, with integrated quick connect terminals and a high-contrast backlit display, it is comfortable to use in all conditions.

Its polycarbonate keypad protects it from dirt and grease, and the raised keys allow the C50 to be used with protective gloves. It has 10 user programmable configurations for use with repetitive jobs.

### C50 FEATURES

The Wahl C50 is able to simultaneously measure and generate on 2 isolated channels. It has a wide high-contrast backlit display for use in low ambient light conditions.

The C50 is able to measure and generate voltage, current, frequency, resistance signals and also resistive probes and thermocouples.

C50 Calibrator is supplied with protective boot, 6 testing leads with crocodile clips, quick charging battery system, neck/shoulder strap, stand for desktop use, and User Manual.

**Buy it, you'll like it;  
GUARANTEED! \***

\* USA Customers only



Calibration Services Available

(800) 421-2853 • FAX (828) 658-0728 • [www.palmerwahl.com](http://www.palmerwahl.com)

### C50 FUNCTIONS

**QUICK CONNECT SYSTEM:** This unique system is easy to use by pressing down on the top of the terminal, and inserting bare wires with a diameter up to 3 mm (or 10AWG), or compensated thermocouple connectors, and then releasing.

Wires are held tight between 2 brass plates which provide thermal stability to create excellent cold junction compensation for thermocouples.

This system also allows 4mm banana plugs or safety plugs to be connected on the front panel.

**DISPLAY RESOLUTION:** C50 has user selectable resolution to allow measurements to meet specific testing requirements.

**FUNCTIONS:** The C50 allows the following physical values to be measured and simulated:

- Voltage
- Current
- Resistance
- Temperature by resistive probes and thermocouples
- Frequency for frequency signals and dry contacts

Allows scaling of process signals and corrections to temperature probes.

Compatible with HART transmitters by inserting a 250 ohms resistance, which allows uninterrupted digital data transfer.

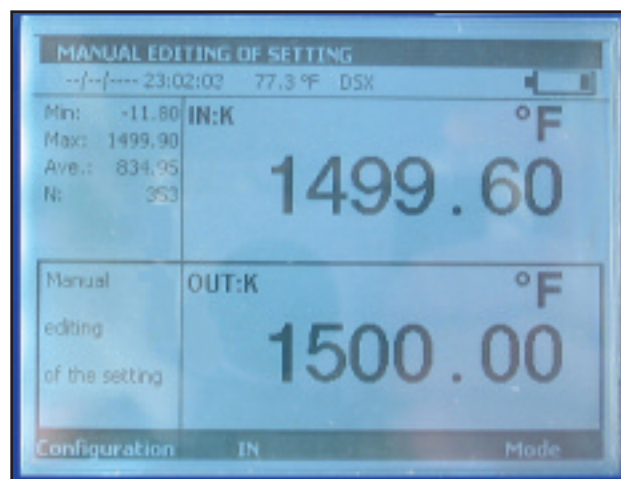
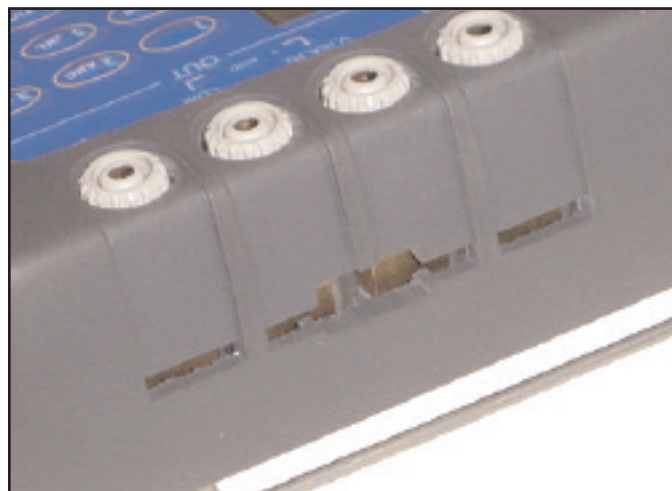
Stores data and can send them to PC for analysis.

**DISPLAY:** C50's dual display simultaneously displays the measurement value, the emitted value, the gauge and the used functions. On the top line, date, time and external temperature are indicated.

During measuring, Average, Maximum, Minimum, and the number of measurements are displayed on the left.

During emission, this part of screen displays all details of ramps, steps and constant value emission functions.

Drop-down menus are used with the navigator.



## C50 Calibration

### Functions and performances: @23°C +5°C

Accuracy is given in % of reading (C50 display) + fixed value

#### DC Current: Measurement

Range	Resolution	Accuracy (1 year)	Remarks
±50mA	1µA	0.018% R + 2µA	Rin < 25Ω

C50 can measure up to 50mA with/without loop supply (24V).  
For measurements of transmitter outputs, special ranges give a dual display using mA and % of full scale.  
C50 also provides linear or quadratic signals. In current measurement HART compatibility can be selected to measure currents coming from HART protocol transmitters.

#### DC Current: Emission

Range	Resolution	Accuracy (1 year)
24mA	1µA	0.018% R + 2µA

Emission output with or without 24V loop supply

#### Pre-programmed steps

	0%	25%	50%	75%	100%
4-20mA linear	4	8	12	16	20
0-20mA linear	0	5	10	15	20
4-20mA quad	4	5	8	13	20
0-20mA quad	0	1.25	5	11, 25	20
4-20mA valves	3.8 - 4 - 4.2		12	19, 20, 21	

#### DC Voltage: Measurement

Range	Resolution	Accuracy (1 year)	Remarks
±100mV	1µV	0.013% R + 3µV	Rin > 10MΩ
±1V	10µV	0.013% R + 20µV	Rin > 10MΩ
±10V	100µV	0.015% R + 200µV	Rin = 1MΩ
±50V	1mV	0.015% R + 2mV	Rin = 1MΩ

Rin = Input resistance

#### DC Voltage: Emission

Range	Resolution	Accuracy (1 year)	Min Load
100mV	1µV	0.013% R + 3µV	Load 1KΩ
2V	10µV	0.013% R + 30µV	Load 2KΩ
20V	100µV	0.015% R + 300µV	Load 4KΩ

#### Frequency and Counting: Measurement

Range	Resolution	Accuracy (1 year)
20 kHz	< 0.01 Hz	0.005% R

Threshold triggering: 1V  
Unit scale: Pulse/min or Hz  
Measurement on frequency signals and on dry contacts  
Measurement for counting will be performed on defined time or infinite time.

#### Frequency and Pulses: Emission

Range	Resolution	Accuracy (1 year)
1000 Hz	< 0.01 Hz	0.005% R
10 kHz	10 Hz	0.005% R

Unit scale: Pulse/min or Hz  
Pulse emission  
Dry contacts simulation  
Max amplitude: 20V (Selectable by user)

#### Resistance: Measurement

Range	Resolution	Accuracy (1 year)	Remarks
400Ω	1mΩ	0.012% R + 10mΩ	Measurement current = 0.25mA
4000Ω	10mΩ	0.012% R + 100mΩ	Measurement current = 0.25mA

Resistance measurement with 2, 3 or 4 wires resistance measurement: automatic recognition of number of connected wires displayed on the screen.

#### Resistance: Emission

Range	Resolution	Accuracy (1 year)	Remarks
400Ω	10mΩ	0.014% R + 30mΩ	I ext from 0.1 to 10mA
4000Ω	100mΩ	0.014% R + 300mΩ	I ext from 0.1 to 10mA

Emission resistance: establishing time < 1ms: for compatibility with smart transmitters

Calibration Services Available



C50 RTD: MEASURE AND EMISSION					
Sensor	Range	Resolution	Accuracy/1year Measure	Resolution	Accuracy/1year Emission
Pt 50 ( $\alpha = 3850$ )	-220°C +1200°C	0.01°C	0.012% R + 0.06°C	0.03°C	0.014% R + 0.18°C
Pt 100 ( $\alpha = 3850$ )	-220°C +1200°C	0.01°C	0.012% R + 0.05°C	0.02°C	0.014% R + 0.12°C
JPt 100 ( $\alpha = 3916$ )	-200°C +510°C	0.01°C	0.012% R + 0.05°C	0.02°C	0.014% R + 0.12°C
Pt 100 ( $\alpha = 3926$ )	-210°C +850°C	0.01°C	0.012% R + 0.05°C	0.02°C	0.014% R + 0.12°C
Pt 200 ( $\alpha = 3851$ )	-220°C +600°C	0.01°C	0.012% R + 0.12°C	0.10°C	0.014% R + 0.33°C
Pt 500 ( $\alpha = 3850$ )	-220°C +1200°C	0.01°C	0.012% R + 0.07°C	0.03°C	0.014% R + 0.18°C
Pt 1000 ( $\alpha = 3851$ )	-220°C +1200°C	0.01°C	0.012% R + 0.05°C	0.02°C	0.014% R + 0.08°C
Ni 100 ( $\alpha = 618$ )	-60°C +180°C	0.01°C	0.012% R + 0.03°C	0.01°C	0.014% R + 0.08°C
Ni 120 ( $\alpha = 672$ )	-40°C +205°C	0.01°C	0.012% R + 0.03°C	0.01°C	0.014% R + 0.08°C
Ni 1000 ( $\alpha = 618$ )	-60°C +180°C	0.01°C	0.012% R + 0.03°C	0.01°C	0.014% R + 0.08°C
Cu 10 ( $\alpha = 427$ )	-70°C +150°C	0.1°C	0.012% R + 0.18°C	0.01°C	0.014% R + 0.10°C
Cu 50 ( $\alpha = 428$ )	-50°C +150°C	0.01°C	0.012% R + 0.06°C	0.03°C	0.014% R + 0.15°C

Resistive probes measurements in 2, 3 or 4 wires: automatic recognition of number of connected wires displayed on screen

- Temperature coefficient: < 10% of accuracy / °C
- Accuracies are given for 4 wires connected probes
- Above specifications are for the C50 meter only, and do not include specific sensor or implementation conditions
- Measurement current: 0.01mA to 1mA
- Establishing time: < 1ms for simulation (simulation on quick transmitters)



# C50 Calibration

# Wahl C50 Calibrator

## C50 THERMOCOUPLES: MEASURE AND EMISSION

Type	MEASUREMENT			EMISSION		
	Input Range	Resolution	Accuracy/1year Measure	Output range	Resolution	Accuracy/1year Emission
K	-250°C to -200°C	0.2°C	0.80°C	-240°C to -50°C -50°C to -0°C +0°C to +1372°C	0.2°C	0.60°C
	-200°C to -120°C	0.1°C	0.25°C		0.1°C	0.10°C
	-120°C to -0°C	0.05°C	0.1°C		0.05°C	0.013% R +0.08°C
	+0°C to +1372°C	0.05°C	0.013% R +0.08°C			
T	-250°C to -200°C	0.2°C	0.70°C	-250°C to -100°C -100°C to -0°C +0°C to +400°C	0.2°C	0.40°C
	-200°C to -120°C	0.05°C	0.25°C		0.05°C	0.10°C
	-120°C to -50°C	0.05°C	0.10°C		0.05°C	0.013% R +0.08°C
	-50°C to +400°C	0.05°C	0.013% R +0.08°C			
J	-210°C to -120°C	0.05°C	0.25°C	-210°C to +0°C +0°C to +1200°C	0.05°C	0.20°C
	-120°C to -0°C	0.05°C	0.09°C		0.05°C	0.013% R +0.07°C
	+0°C to +1200°C	0.05°C	0.013% R +0.07°C			
E	-250°C to -200°C	0.1°C	0.45°C	-240°C to -100°C -100°C to +40°C +40°C to +1000°C	0.10°C	0.25°C
	-200°C to -100°C	0.05°C	0.15°C		0.10°C	0.10°C
	-100°C to -0°C	0.05°C	0.07°C		0.05°C	0.013% R +0.05°C
	+0°C to +1000°C	0.05°C	0.013% R +0.05°C			
R	-50°C to +150°C	0.5°C	0.80°C	-50°C to + 350°C +350°C to + 900°C +900°C to +1768°C	0.5°C	0.5°C
	+150°C to +550°C	0.2°C	0.013% R +		0.2°C	0.13% R +0.35°C
	+550°C to +1768°C	0.1°C	0.35°C		0.1°C	0.13% R +0.20°C
			0.013% R +0.2°C			
S	-50°C to +150°C	0.5°C	0.80°C	-50°C to +120°C +120°C to +450°C +450°C to +1768°C	0.5°C	0.8°C
	+150°C to +550°C	0.2°C	0.013% R +0.35°C		0.2°C	0.013% R +0.35°C
	+550°C to +1768°C	0.1°C	0.013% R +0.25°C		0.1°C	0.013% R +0.25°C
B	+400°C to +900°C	0.2°C	0.013% R +0.4°C	+400°C to +850°C +850°C to +1820°C	0.2°C	0.013% R +0.4°C
	+900°C to +1820°C	0.1°C	0.013% R +0.2°C		0.1°C	0.013% R +0.2°C
U	-200°C to +660°C	0.05°C	0.15°C	-200°C to +600°C	0.05°C	0.15°C
L	-200°C to +900°C	0.05°C	0.2°C	-200°C to +900°C	0.05°C	0.2°C
C	-20°C to +900°C	0.1°C	0.25°C	-20°C to +900°C +900°C to +2310°C	0.1°C	0.25°C
	+900°C to +2310°C	0.1°C	0.013% R +0.15°C		0.1°C	0.013% R +0.15°C
N	-240°C to -190°C	0.2°C	0.5% R	-240°C to -190°C -190°C to -110°C -110°C to -0°C +0°C to +1300°C	0.2°C	0.3°C
	-190°C to -110°C	0.1°C	0.15% R		0.1°C	0.15°C
	-110°C to -0°C	0.05°C	0.08°C		0.05°C	0.08°C
	+0°C to +1300°C	0.05°C	0.013% R +0.06°C		0.05°C	0.013% R +0.06°C
PR	-100°C to +1400°C	0.05°C	0.3°C	-100°C to +1400°C	0.05°C	0.3°C
Mo	+0°C to +1375°C	0.05°C	0.013% R +0.06°C	+0°C to +1375°C	0.05°C	0.13% R +0.06°C
NiMo / NiCo	-50°C to +1410°C	0.05°C	0.013% R +0.30°C	-50°C to +1410°C	0.05°C	0.013% R +0.30°C

Accuracy is given for reference junction @ 0°C

With use of internal RJ (except couple B) add an additional uncertainty of 0.3°C

CJC localization can be selected by keypad programming, except for thermocouple type B:

- External at 0°C, internal (temperature compensation of instrument's terminals) or by temperature programming
- Temperature coefficient: < 10% of accuracy /°C. Display unit: °C, and °F



Calibration Services Available

### C50 ADDITIONAL FUNCTIONS

**FILE MENU:** User can save up to 10 full configurations of the instruments and recall them as desired.

Configurations can be saved and recalled in function of user and of use. Configurations include all programming done on instrument, as the range.

**CONTRAST ADJUSTMENT:** Screen's contrast can be adjusted as desired to fit with measurement environment.

**SCREEN BACKLIGHTING:** Time of backlighting can be programmed to save battery.



**BATTERY LIFE:** C50 Battery Life is 5-10 hours depending on functions used.

**SCALING:** In measurement and simulation, scaling allows process signals to be displayed in % of FS or in all other units. This function also allows sensors to be corrected after a calibration.

**RELATIVE MEASUREMENT:**

- Programming of a reference value different from the one of the instrument (NUL function).
- Subtracting of constant value by measuring or by programming it from a measured value (TARE function).

**SQUARE ROOT:** In current measurement and simulation, this function takes into account a quadratic signal coming from a  $\Delta P$  transmitter.

**STATISTICAL FUNCTIONS:** Average, Minimum, Maximum, and number of measurements done are always displayed. Reset key allows values to be updated.

**SIMULATION MENU:** Simulation value is set by entering value on keypad or using the cursor to change the appropriate digit.

**RAMPS GENERATION:** Starting, ending and length time values of simple or cyclic ramps can be simulated. Number of ramps can also be adjusted in case of cyclic ramps for any signals.

**STEPS SIMULATION:** 2 modes are provided.

- Program mode: Starting value, number of steps and the duration of step.
- Manual mode: User has approximately one hundred preset values.

In current simulation, user will have some additional preset values in function of range and according to 0%, 25%, 50%, 75% and 100% from selected gauge.

Choice is done between gauges:

- 0-20mA: linear or quadratic
- 4-20mA: linear or quadratic

**SYNTHESIZER:** With 100 programmable values, the C50 allows complex curves to be generated.

**TRANSMITTER FUNCTION:** C50 is able to be used as a transmitter. Measurement input is copied on the output with scaling.

C Series Calibrators Specifications	
Memory	10 User Specified Configurations
Language	5 user Selected Languages: English, French, Spanish, German and Italian
Display	Backlight LCD with Adjustable Contrast
Recommended Ambient Conditions	0° to 50°C, 10 to 80% Relative Humidity
Maximum Ambient Conditions	-10° to 55°C, 10 to 80% Relative Humidity
Battery Life Power Supply	5 - 10 hours depending on Functions Selected, Rechargeable NiMH Batteries
Weight Dimensions	1.9 lbs (900g) 8.3 x 4.3 x 2.0 in. ( 210 x 110 x 50mm)



**Included:** C50 Calibrator is supplied with protective boot, 6 testing leads with crocodile clips, quick charging battery system, neck/shoulder strap, stand for desktop use, and User Manual.

*Specifications are subject to change without notice.*