### Temperature, Thermocouples

( source and measure, 0.1°C & 0.1°F Resolution, Internal Cold Junction Compensation, thermocouple accuracy not included )

| | °C | | °F | |
|---|---|---|---|---|
| | Range | Accuracy | Range | Accuracy |
| K | -200 to -150 | 2.0 | -382 to -238 | 3.6 |
| | -150 to 0 | 1.2 | -238 to 32 | 2.1 |
| | 0 to 1000 | 0.8 | 32 to 1832 | 1.4 |
| | 1000 to 1370 | 1.2 | 1832 to 2498 | 2.1 |
| J | -200 to -150 | 2.0 | -382 to -238 | 3.6 |
| | -150 to 0 | 1.0 | -238 to 32 | 1.8 |
| | 0 to 1050 | 0.7 | 32 to 1922 | 1.2 |
| E | -200 to -150 | 1.5 | -382 to -238 | 2.7 |
| | -150 to 0 | 0.9 | -238 to 32 | 1.6 |
| | 0 to 850 | 0.7 | 32 to 1562 | 1.2 |
| T | -200 to -150 | 1.5 | -382 to -238 | 2.7 |
| | -150 to 0 | 1.2 | -238 to 32 | 2.1 |
| | 0 to 400 | 0.8 | 32 to 752 | 1.4 |
| R | 0 to 500 | 1.8 | 32 to 932 | 3.2 |
| | 500 to 1760 | 1.5 | 932 to 3200 | 2.7 |
| S | 0 to 500 | 1.8 | 32 to 932 | 3.2 |
| | 500 to 1760 | 1.5 | 932 to 3200 | 2.7 |
| N | -200 to 0 | 1.5 | -328 to 32 | 2.7 |
| | 0 to 1300 | 0.9 | 32 to 2372 | 1.6 |
| L | -200 to 0 | 0.9 | -328 to 32 | 1.6 |
| | 0 to 900 | 0.7 | 32 to 1652 | 1.2 |
| U | -200 to 0 | 1.1 | -328 to 32 | 1.9 |
| | 0 to 600 | 0.7 | 32 to 1112 | 1.2 |
| B | 600 to 800 | 2.2 | 1112 to 1472 | 3.9 |
| | 800 to 1000 | 1.8 | 1472 to 1832 | 3.2 |
| | 1000 to 1820 | 1.4 | 1832 to 3308 | 2.5 |
| C | 0 to 1800 | 1.0 | 32 to 3272 | 1.8 |
| | 1800 to 2310 | 1.5 | 3272 to 4190 | 2.7 |
| mV | -10mV to 70mV | 0.05mV | -10mV to 70mV | 0.05mV |

### DTMF (Hz)

| Range (Hz) | Resolution | Accuracy of Reading |
|---|---|---|
| 0.3 to 99.999 | 0.1Hz | 0.002Hz |
| 10.00 to 999.99 | 0.1Hz | 0.02Hz |
| 1000.0 to 9999.9 | 0.1Hz | 0.2Hz |
| 10000 to 20000 | 1Hz | 2Hz |

### DTMF (%)

| Range (%) | Resolution | Accuracy of Reading |
|---|---|---|
| 0% ~ 100% | 1% | 5% |

### DTMF (Phase Angle)

| Range (°) | Resolution | Accuracy of Reading |
|---|---|---|
| 0 ~ 360 | 1° | 100μS+1° |

### DTMF
(Vpp, F1=F2, <1 KHz, %1=%2, Phase1=Phase2)

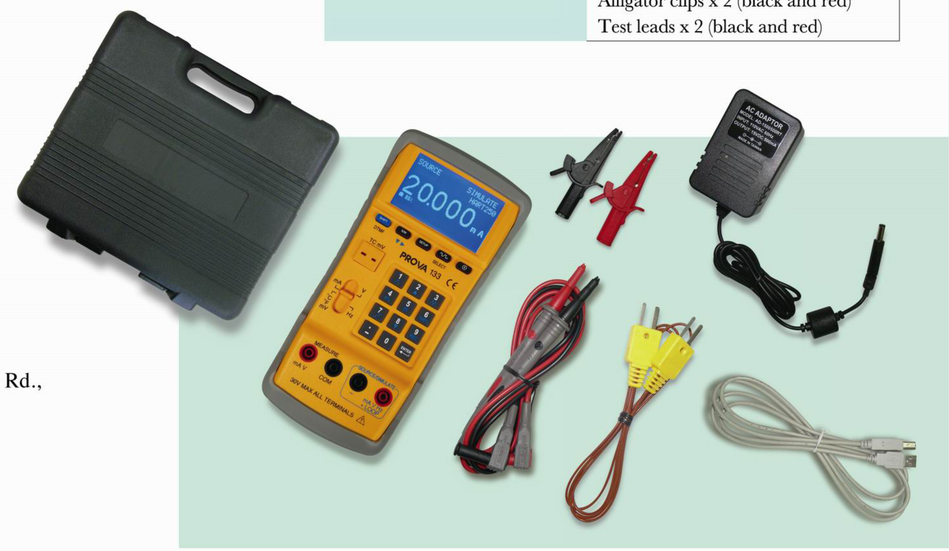
| Range | Resolution | Accuracy of Reading |
|---|---|---|
| 5V ~ 20V | 0.001V | 10% +/-0.6V |

### DTMF
(Offset, F1=F2, <1 KHz, %1=%2, Phase1=Phase2)

| Range | Resolution | Accuracy of Reading |
|---|---|---|
| -5V ~ 5V | 0.001V | 10% +/-0.6V +/-5%xVpp |

### General Specifications

| | |
|---|---|
| AC Power Adaptor | AC 110V or 220V, 50/60Hz input<br>DC 15V / 0.5A output |
| Dimension | 214.0(L) x 98.7(W) x 56.0(H) mm<br>8.4" (L) x 3.9" (W) x 2.2" (H) |
| Weight | 650g / 22.9oz (Batteries included) |
| Operation Environment | 0°C ~ 50°C, 85% RH |
| Storage Environment | -20°C ~ 60°C, 75% RH |
| Accessories | Carrying case x 1<br>User manual x 1<br>AC power adaptor x 1<br>Rechargeable lithium battery (11.1V/ 1600mAh) x 1<br>USB cable x 1<br>Software CD x 1<br>Software manual x 1<br>K-type thermocouple (dual plugs) x 1<br>Alligator clips x 2 (black and red)<br>Test leads x 2 (black and red) |

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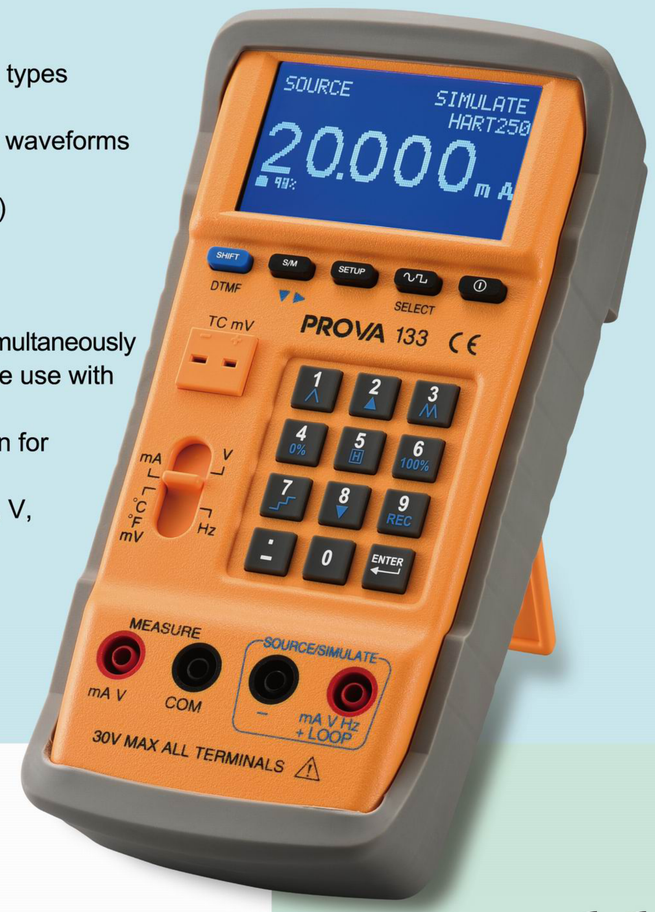
Sep. 20, 2016

# PROVA 133

## Documenting Multifunction Calibrator
## and an Arbitrary Function Generator

### Features

- Source 4–20 mA loop Current
- Simulate 4–20 mA transmitter
- Simulate electronic load (Max. 30V, 20mA)
- Test LED brightness (0–24mA)
- Source 0–70 mV and 0–15V
- Calibrate temperature with selection of 11 types of thermocouples
- Source frequency (0.3 to 20KHz) of many waveforms
- Generate arbitrary waveform
- Generate single pulse (3μS to 999.99 mS)
- Map 4–20 mA into engineering units
- Measure Current (mA), Voltage (mV, V), and temperature (°C, °F)
- Measure 4–20 mA with 24 V loop supply simultaneously
- Selectable HART 250Ω resistor to facilitate use with HART communication device
- Programmable cold junction compensation for temperature measurement
- Auto step and auto ramp for sourcing mA, V, and temperature
- Dot matrix LCD with backlight
- Rechargeable lithium battery
- Data logging function for source and measurement
- Program calibrator through PC USB port

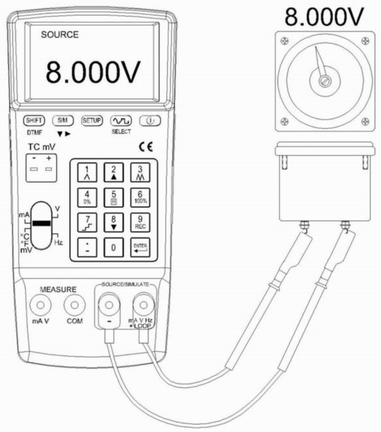



# PROVA 133

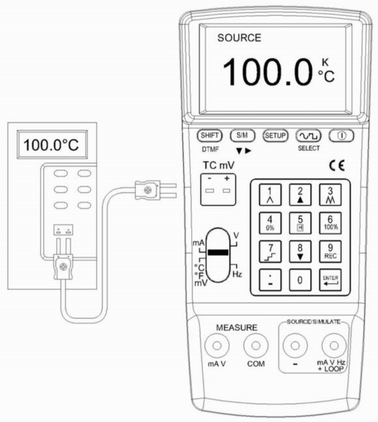
## Documenting Multifunction Calibrator

and an Arbitrary Function Generator

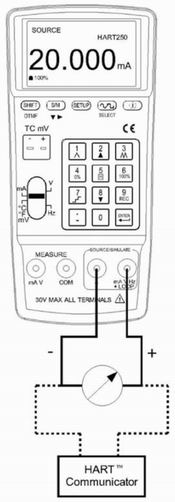
### Source/Measure: mA, V



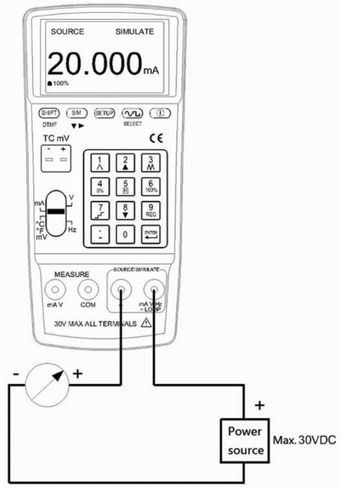

### Source/Measure: °C or °F




### Output (4~20mA) and Facilitate use with HART™ Communicator




### Simulate a Transmitter



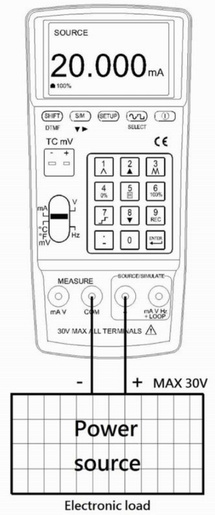

### Map 4~20mA to Engineering Units

| | |
|---|---|
| mA 0%: | 4.000mA |
| mA 100%: | 20.000mA |
| 4mA → | 0.0000KW |
| 20mA → | 100.00KW |
| MAPPING | YES |
| | press DIGITS |

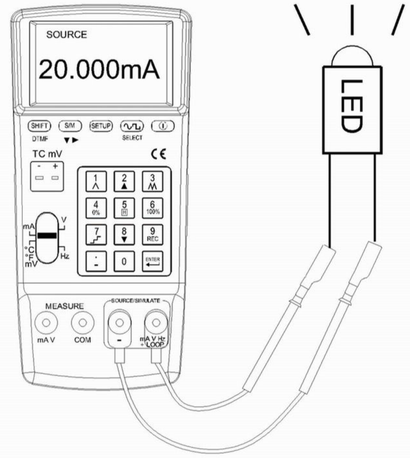
### Programmable Cold Junction Compensation

| | |
|---|---|
| TC 0%: | 100.0 °C |
| TC 100%: | 1000.0°C |
| C.J.COMP.: | 0.0 °C |
| TC TYPE: | K |
| UNIT: | °C |
| | press DIGITS |

### Simulate Electronic Load (Max. 30V, 24mA)




### Test LED Brightness (0~24mA)




## Specification (23 +/- 5ºC)

**mA** (source) (Vopen > 24V)

| Range | Resolution | Accuracy of Reading |
|---|---|---|
| 0.005mA to 4mA | 1uA | +/-0.03% +/- 5dgts |
| 4mA to 20mA | 1uA | +/-0.03% +/-3dgts |
| 20mA to 24mA | 1uA | +/-0.03% +/-5dgts |

**V** (source) (maximum load 1mA, short circuit protection < 100mA)

| Range | Resolution | Accuracy of Reading |
|---|---|---|
| 0.005V to 10V | 0.001V | +/-0.03% +/-5dgts |
| 10V to 15V | 0.001V | +/-0.03% +/-5dgts |

**mA** (measure)

| Range | Resolution | Accuracy of Reading |
|---|---|---|
| -4mA to -0.005mA | 1uA | +/-0.03% +/- 10dgts |
| 0.005mA to 4mA | 1uA | +/-0.03% +/- 5dgts |
| 4mA to 20mA | 1uA | +/-0.03% +/-3dgts |
| 20mA to 24mA | 1uA | +/-0.03% +/-5dgts |

**V** (measure)

| Range | Resolution | Accuracy of Reading |
|---|---|---|
| -3V to -0.005V | 0.001V | +/-0.03% +/-10dgts |
| 0.005V to 10V | 0.001V | +/-0.03% +/-5dgts |
| 10V to 24V | 0.001V | +/-0.03% +/-5dgts |

If reading of mA (measure) or V (measure) is less than 5 digits, it is displayed as 0.

**Duty Cycle** (%, square wave, 10 Vpp, 0.3~20KHz)

| Range | Resolution | Rise Time of Vpp | Fall Time of Vpp |
|---|---|---|---|
| 0 to 100% | 1% | 10µS max, 5µS typical | 15µS max, 7.5µS typical |

**Pulse** (square wave, 10 Vpp, Offset -5V~+5V)

| Range | Resolution | Rise Time | Fall Time |
|---|---|---|---|
| 3.0µS to 9999.9µS | 0.1µS | 10µS max, 5µS typical | 15µS max, 7.5µS typical |
| 10.000mS to 99.999mS | 0.001mS | | |
| 100.00mS to 999.99mS | 0.01mS | | |

**Frequency** (source, 10 Vpp, 0V offset, square wave, duty cycle = 50%)

| Range (Hz) | Input Resolution | Accuracy |
|---|---|---|
| 0.3 to 99.999 | 0.1Hz | 0.002Hz |
| 10.00 to 999.99 | 0.1Hz | 0.02Hz |
| 1000.0 to 9999.9 | 0.1Hz | 0.2Hz |
| 10000 to 20000 | 1Hz | 2Hz |

**Voltage Peak to Peak for Sine Wave**

(Vpp, 0.3~20KHz, 50% duty cycle, sine wave, 0V offset)

| Range (V) | Resolution | Accuracy of Reading |
|---|---|---|
| 0.1 to 20V | 0.001V | 5% +/- 0.3V |

**Voltage Peak to Peak for Non-Sine Wave**

(Vpp, 0.3~20KHz, 0V offset)

| Range (V) | Resolution | Accuracy of Reading |
|---|---|---|
| 0.1 to 20V | 0.001V | 6% +/- 0.4V |

**Voltage Peak to Peak** (Vpp, 0.3~20KHz, 50% duty cycle, square wave, 0V offset)

| Range (V) | Resolution | Accuracy of Reading |
|---|---|---|
| 1 to 20V | 0.001V | 6% +/- 0.4V |

**Voltage of Offset** (Maximum Vpp < 20V)

| Range (V) | Resolution | Accuracy of Reading |
|---|---|---|
| -5V to 5V | 0.001V | 5% +/-0.5V +/-5%xVpp |