

FLUKE®

525A

Temperature/Pressure Calibrator

Getting Started Guide

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Introduction

Your Fluke 525A Temperature/Pressure Calibrator (referred to as “the Calibrator”) is an instrument designed to meet the demands of your process tools calibration workload.

In addition to the functions in Table 1, the Calibrator has the following features and functions.

- Two line backlit LCD display
- 5-way binding posts
- IEEE 488.2 serial interface (optional)

Contacting Fluke

To order accessories or get the location of the nearest Fluke distributor or Service Center, call:

- USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31-402-678-200
- Japan: +81-3-3434-0181
- Singapore: +65-738-5655
- Anywhere in the world: +1-425-446-5500

Or, visit Fluke’s Web site at www.fluke.com.

To register your product, visit register.fluke.com.

Table 1. Summary of Input and Output Functions

| Function | Input | Output |
|--------------|--------------------|--------------------|
| dc V | None | 0 V to 100 V |
| dc mA | None | 0 to 100 mA |
| Resistance | 0 to 4000 Ω | 5 to 4000 Ω |
| Thermocouple | Yes | Yes |
| RTD | Yes | Yes |
| Pressure | Yes | No |

Standard Equipment

The items listed below are included with your Calibrator. If the Calibrator is damaged or something is missing, contact the place of purchase immediately. For information on replacement parts or spares, see the replacement parts list in Chapter 6 of the *525A Users Manual*.

- *525A Getting Started Guide* (this document), Part No. 1601541
- 525A CD-ROM (contains the *525A Users Manual* and *525A Getting Started Guide*), Part No. 1601552
- Power Cord (120 V cord, Part No. 1618621 or 240 V cord, Part No. 769422)
- Thermocouple Shorting Jumper, Part No. 610747

Options and Accessories

For more information about these accessories and their prices, contact your Fluke representative.

- 5520A – 525A Leads kit
- Y525 Rack Mount kit
- Fluke 700 and 6100 series pressure modules
- MET/CAL with 525A Function Select Code (FSC)
- MET/CAL 525A calibration procedure

Safety Information

This Calibrator complies with EN 61010, ANSI/ISA-S82.01-1994, CAN/CSA-C22.2 No. 1010.1-92. Use the Calibrator only as specified in this manual, otherwise the protection provided by the Calibrator may be impaired.

CAT II equipment is designed to protect against transients from energy-consuming equipment supplied from the fixed installation, such as TVs, PCs, portable tools, and other household appliances.

A “**⚠ Warning**” statement identifies hazardous conditions and actions that could cause bodily harm or death.

A “**⚠ Caution**” statement identifies conditions and actions that could damage the Calibrator or the equipment under test.












International symbols used on the Calibrator and in this manual are explained in Table 2.

⚠ Warning

To avoid possible electric shock or personal injury, follow these guidelines:

- Use the Calibrator only as specified in this manual, or the protection provided by the Calibrator might be impaired.
- Inspect the Calibrator before using it. Do not use the Calibrator if it appears damaged. Look for cracks or missing plastic. Pay particular attention to the insulation around the connectors.
- Have the Calibrator serviced only by qualified service personnel.
- Do not apply more than the rated voltage, as marked on the Calibrator, between the terminals or between any terminal and earth ground.
- Always use the power cord and connector appropriate for the voltage and outlet of the country or location in which you are working.
- Never operate the Calibrator with the cover removed or the case open.
- Never remove the cover or open the case of the Calibrator without first removing the power source.
- Use caution when working with voltages above 30 V ac rms, 42 V ac peak, or 60 V dc. These voltages pose a shock hazard.
- Use only the replacement fuse(s) specified in this manual.
- Use the proper terminals, function, and range for your measurements.
- Do not operate the Calibrator around explosive gas, vapor, or dust.
- When servicing the Calibrator, use only specified replacement parts.

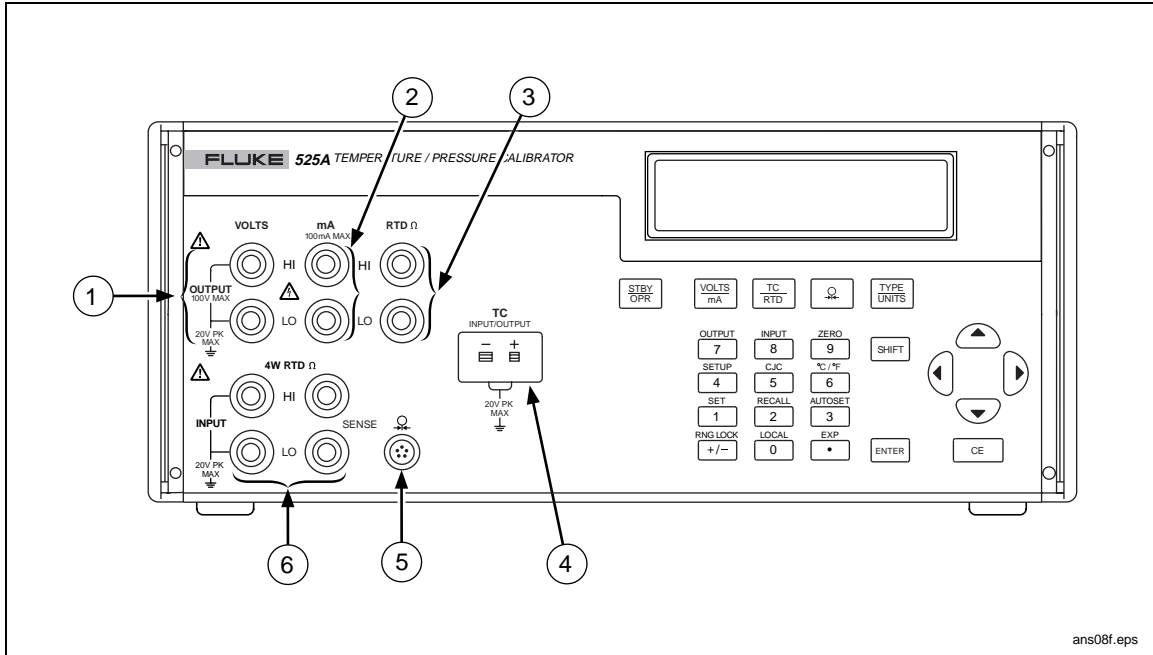
Table 2. Symbols Used on the Calibrator

| | | | |
|---|---|---|---------------------------------------|
|  | AC (Alternating Current) |  | Earth ground |
|  | DC (Direct Current) |  | Resistance |
|  | Pressure |  | Conforms to European Union directives |
|  | Chassis protective ground |  | Canadian Standards Association, NRTL |
|  | Important Information. Refer to the manual. |  | International ON/OFF symbol. |
|  | Caution, risk of electric shock | | |

Getting Acquainted with the Calibrator

Input and Output Terminals

Figure 1 shows the Calibrator input and output terminals and explains their use.



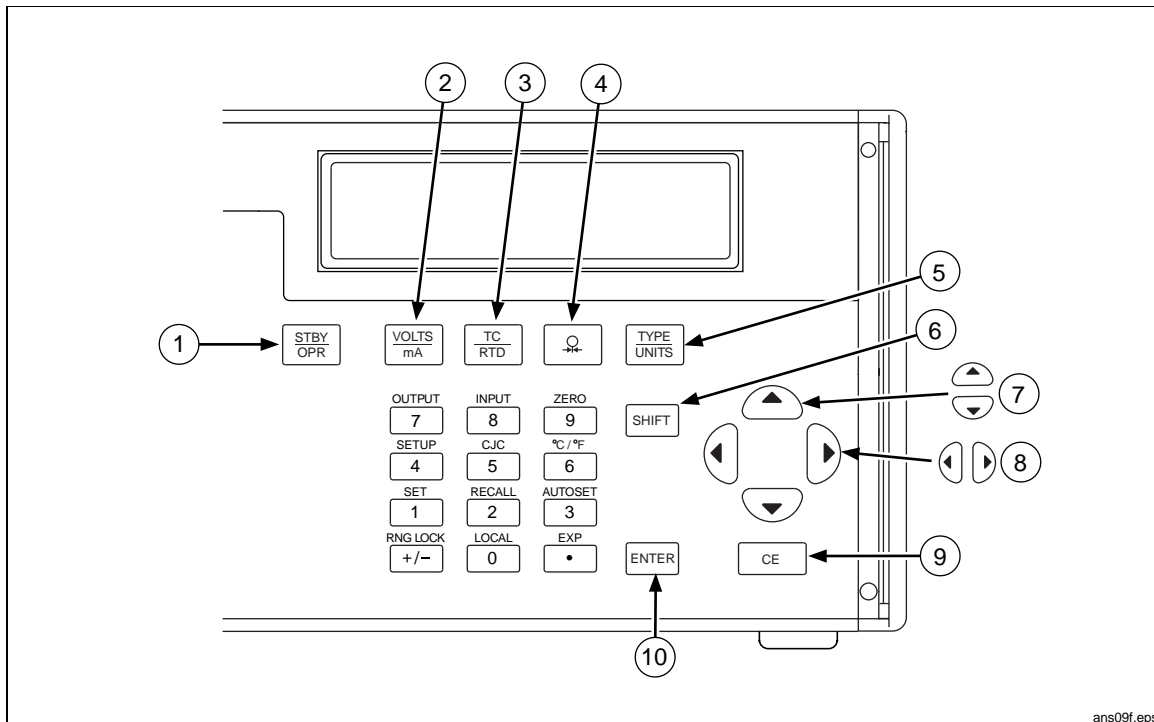
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| No | Description |
|----|---|
| ① | Terminals used to output DC Volts. |
| ② | Terminals used to output DC current. |
| ③ | Terminals used to simulate RTDs and resistance. |
| ④ | Terminal for thermocouple input and simulation. The terminal accepts a miniature polarized thermocouple plug with flat, in-line blades spaced 7.9 mm (0.312 in) center to center. |
| ⑤ | Pressure module input. |
| ⑥ | Input terminals used to measure 4-wire RTD and resistance. |

Figure 1. Input and Output Terminals and Connectors

Using the Keys

Figure 2 shows the Calibrator pushbuttons and explains their use. Other function keys are shown in Figure 3 and described in Table 3.



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| No | Name | Description |
|----|------|---|
| ① | | Cycles the Calibrator through Standby and Operate modes. |
| ② | | Toggles between DC voltage and DC current modes. |
| ③ | | Toggles between the current thermocouple and current RTD. |
| ④ | | Selects the pressure measurement mode. |
| ⑤ | | Selects a thermocouple or RTD type. For pressure measurement, this is used to select the pressure conversion units. |
| ⑥ | | Selects the alternate function on the numeric keys. |
| ⑦ | | <ul style="list-style-type: none"> Increases or decreases the output level. Adjusts LCD contrast and brightness and selects options on the Interface and Address menus. |
| ⑧ | | Selects a different digit to change. |
| ⑨ | | CE (Clear Entry) clears a partially completed keypad entry from the display. The display reverts to the last known good entry. |
| ⑩ | | Loads a newly entered output value into the Calibrator. The new value is an entry from the numeric keypad. Also used when entering custom RTD coefficients and when you adjust the display or contrast. |

Figure 2. Pushbuttons

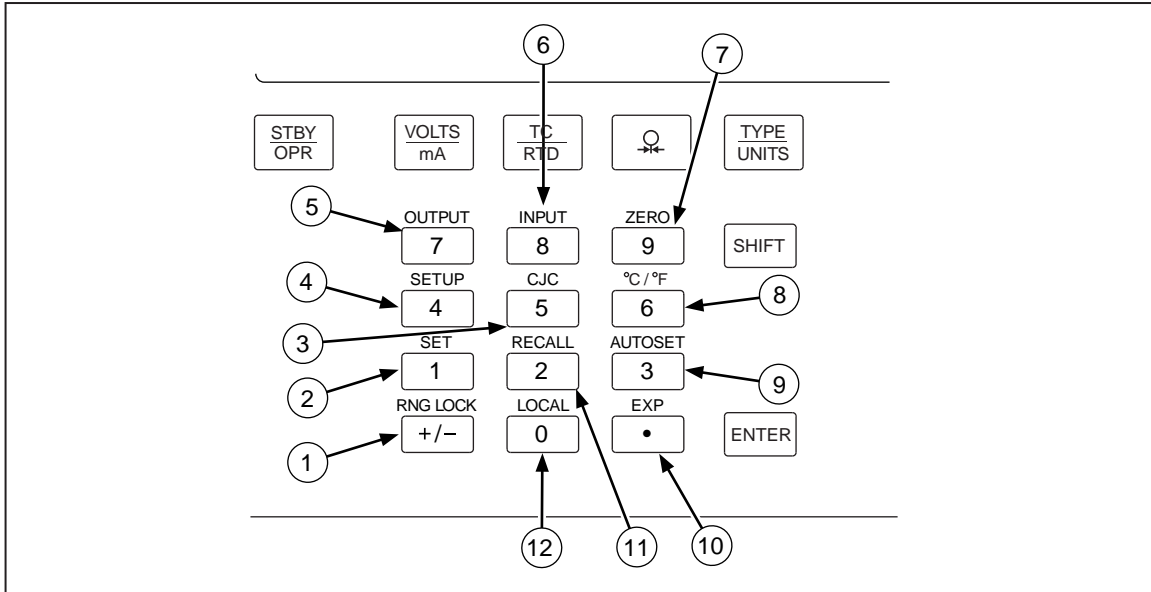


Figure 3. Calibrator Function Keys

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Table 3. Function Keys

| No | Name | Description |
|----|-----------------|---|
| ① | RNG LOCK +/- | Activates/deactivates the autorange feature of the Calibrator in Voltage source modes. |
| ② | SET 1 | Used to program a setpoint step for any output mode. Key in the desired output and press SHIFT 1 . SETPOINT # appears on the display. Select a setpoint number from 1 to 9. The output you entered can now be recalled or used in the AUTOSET key described later in this manual. Each TC type, each RTD/OHMS type, mA, and Volts each have 9 programmable setpoints. |
| ③ | CJC 5 | Toggles between the internal and external cold junction reference locations. |
| ④ | SETUP 4 | Press ENTER to scroll through the LCD Backlight, Interface, and Address menus. <ul style="list-style-type: none"> Use ▲ and ▼ to adjust LCD backlight when the LCD menu is displayed. Use ▲ and ▼ to toggle between Serial and GPIB interface when the Interface menu is displayed. Use ▲ and ▼ to scroll from Address:1 to Address 30 when the address menu is displayed. |
| ⑤ | OUTPUT 7 | Selects Output mode. |

Table 3. Function Keys (cont)

| No | Name | Description |
|----|---|--|
| ⑥ | INPUT <input type="button" value="8"/> | Selects Input mode. |
| ⑦ | ZERO <input type="button" value="9"/> | Zeros the pressure module reading when in Pressure Measurement mode. Zeros the thermocouple TC mV/°C offset when in TC Measurement mode. |
| ⑧ | °C/°F <input type="button" value="6"/> | Toggles between Centigrade and Fahrenheit when you are using the TC or RTD functions. |
| ⑨ | AUTOSET <input type="button" value="3"/> | <p>AUTOSET runs through the setpoints you entered using the SET function. Press <input type="button" value="SHIFT"/> <input type="button" value="3"/>. AUTO SET POINT? appears on the display.</p> <p>Enter a number between 1 and 9 that corresponds to the number of setpoints being used. DWELL TIME 5-500? appears on the display. Dwell time is the number of seconds between each setpoint. The output cycles through each setpoint and then reverses the order. For example, if 5 is entered for the number of setpoints, the Calibrator cycles through setpoints 1, 2, 3, 4, 5 and then reverses to setpoints 4, 3, 2, and 1.</p> <p style="text-align: center;">⚠ Caution</p> <p>Setpoints of 30 V or greater will not go to standby when you use this feature.</p> |
| ⑩ | EXP <input type="button" value="."/> | Used to enter an exponent when you define a custom RTD. |
| ⑪ | RECALL <input type="button" value="2"/> | <p>Used to recall a programmed set point.</p> <p>Press <input type="button" value="SHIFT"/> <input type="button" value="2"/>. RECALL SPT # appears on the display. Enter the number of the output setpoint that you want to use. The output will then be programmed to the setpoint you entered.</p> |
| ⑫ | LOCAL <input type="button" value="0"/> | <p>Used to regain local control of the Calibrator. If you set the Calibrator to a remote state using the remote commands, all the front panel keys are locked out except the Local key. When you press the Local key, the front panel is unlocked.</p> <p style="text-align: center;"><i>Note</i></p> <p><i>This function does not work when you set the Calibrator using the Remote with Lockout command. In Remote with Lockout mode, ALL keys are locked out and the Local key will not unlock the front panel.</i></p> |

Display Error Messages

The following informative messages may appear on the front panel display. An explanation of each message is also provided.

Table 4. Display Error Messages

| Message | Explanation |
|------------------------|---|
| OVER RANGE | May be displayed in all output modes if you enter a value from the front panel keypad that exceeds the output range of the function. |
| OVER LOAD | May be displayed in V and mA output modes when the current is exceeded for volts and the resistance is exceeded for mA. |
| OL | <p>Displayed in Input modes when the measured value exceeds the upper limit of the range.</p> <p>This error may also display in Output mode when the range is locked and an automatically recalled set point exceeds the locked range. For example, set point 1 (SP1) is set to 1V, SP2 is set to 2V, and SP3 is set to 100V, the range is locked to 10V range and the Calibrator is set up to automatically output the first 3 setpoints. When the Calibrator reaches SP3, the display reads OL, and the output is set to 0 for the duration of that setpoint.</p> |
| -OL | Displayed in Input modes when the measured value exceeds the lower limit of the range. |
| INITIALIZATION FAILURE | Displayed when the Calibrator fails to power up properly. |

Rear Panel View

Figure 4 shows the rear panel and explains the use of the rear panel features of the Calibrator.

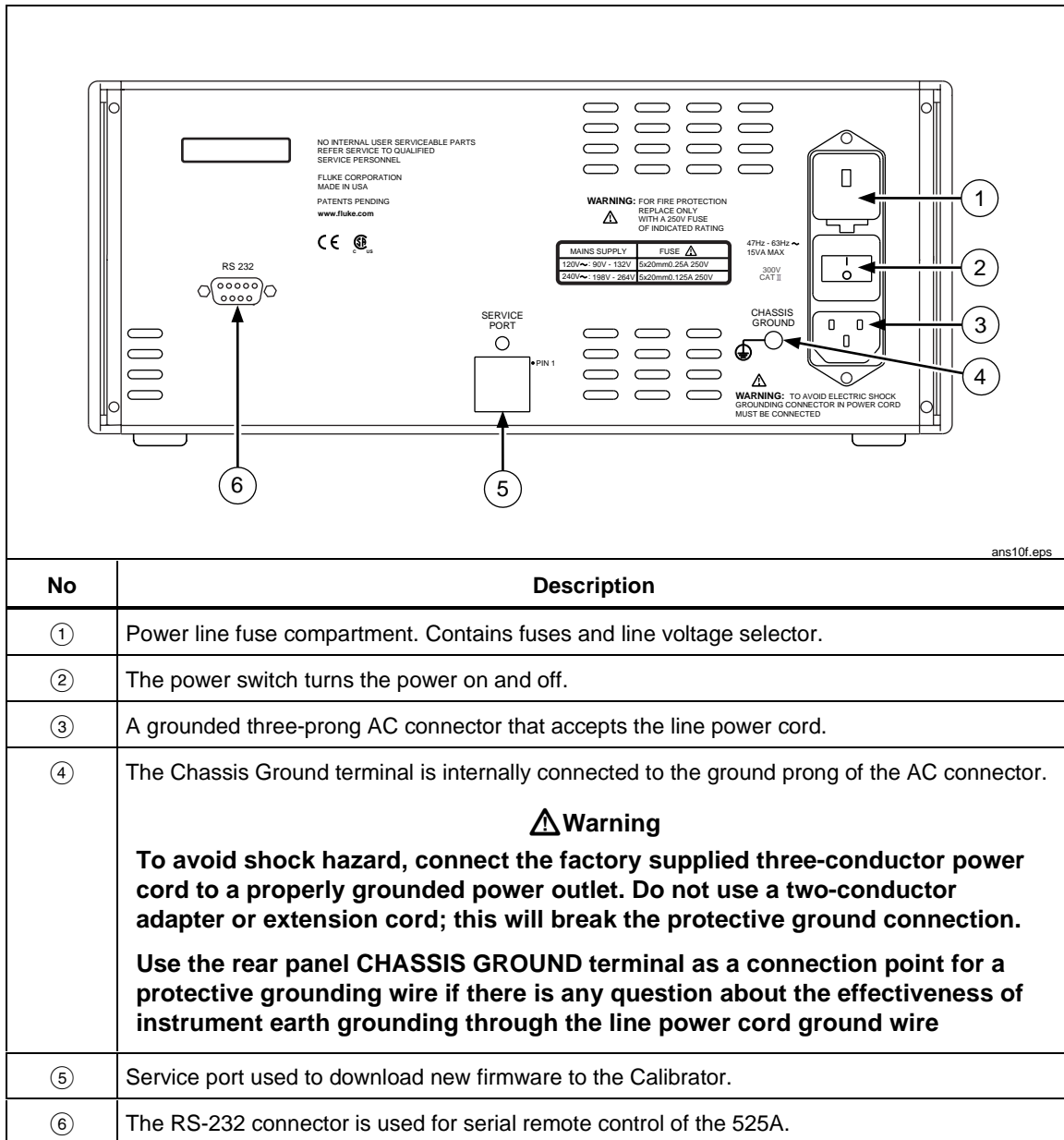


Figure 4. Rear Panel View

General Specifications

| | |
|-------------------------------|--|
| Warm up time | Twice the time since last warmed up, to a maximum of 30 minutes. |
| Settling time | Less than 5 seconds for all functions and ranges except as noted. |
| Standard interface | RS-232 |
| Optional interface | IEEE-488 (GPIB) |
| Temperature performance | Operating 0 °C to 50 °C Calibration (tcal) 18 °C to 28 °C Storage -20 °C to 70 °C |
| Electromagnetic compatibility | CE: Conforms to EN61326 |
| Temperature coefficient | Temperature coefficient for temperatures outside tcal ± 5 °C is 10 % of the 90 day specification (or 1 year if applicable) per °C |
| Relative humidity | Operating <80 % to 30 °C, <70% to 40 °C, <40 % to 50 °C Storage <95 % noncondensing |
| Altitude | Operating 3,050 m (10,000 ft) maximum Nonoperating 12,200 m (40,000 ft) maximum |
| Safety | EN 61010, ANSI/ISA-S82.01-1994, CAN/CSA-C22.2 No. 1010.1-92, NRTL |
| Analog low isolation | 20 V |
| Line power | Line Voltage (selectable) 100 V/120 V or 220 V/240 V Line Frequency 47 to 63 Hz Line Voltage Variation ± 10 % about line voltage setting |
| Power consumption | 15 VA maximum |
| Dimensions | Height 13.3 cm (5.25 in) plus 1.5 cm (0.6 in) four feet on bottom Width $\frac{3}{4}$ standard rack width Depth 47.3 cm (18.6 in) overall |
| Weight (without options) | 4 kg (9 lb) |

DC Voltage Specifications, Output

| Ranges ¹ | Absolute Uncertainty, tcal $\pm 5^{\circ}\text{C}$ \pm (ppm of output + μV) | | | | Stability | | Resolution | Maximum Burden ² |
|--|---|-----------------|--------|-----------------|---|--|-------------------|--------------------------------|
| | 90 days | | 1 year | | 24 hours, $\pm 1^{\circ}\text{C}$ \pm (ppm of output + μV) | | | |
| 0 to 100.000 mV | 25 | 3 | 30 | 3 | 5 +2 | | 1 μV | 10 mA |
| 0 to 1.00000 V | 25 | 20 | 30 | 20 | 4 +20 | | 10 μV | 10 mA |
| 0 to 10.0000 V | 25 | 200 | 30 | 200 | 4 +200 | | 100 μV | 10 mA |
| 0 to 100.000 V | 25 | 2 mV | 30 | 2 mV | 5 +1 mV | | 1 mV | 1 mA |
| TC Output | | | | | | | | |
| -10 to 75.000 mV | 25 | 3 μV | 30 | 3 μV | 5 +2 μV | | 1 μV | 10 Ω |
| 1. All outputs are positive only. 2. Remote sensing is not provided. Output resistance is $< 1\Omega$. | | | | | | | | |

| Ranges | Noise | |
|-----------------|---|---|
| | Bandwidth 0.1 to 10 Hz (ppm of output + μV p-p) | Bandwidth 10 Hz to 10 kHz (μV rms) |
| 0 to 100.000 mV | 1 μV | 6 μV |
| 0 to 1.00000 V | 10 μV | 60 μV |
| 0 to 10.0000 V | 100 μV | 600 μV |
| 0 to 100.000 V | 10 ppm+1 mV | 20 mV |

DC Current Specifications, Output

| Ranges ¹ | Absolute Uncertainty, tcal $\pm 5^{\circ}\text{C}$ \pm (ppm of output +mA) | | | | Resolution | Maximum Compliance Voltage | Maximum Inductive Load |
|-----------------------------------|---|---|--------|---|-----------------|----------------------------------|------------------------------|
| | 90 days | | 1 year | | | | |
| 0 to 100.000 mA | 85 | 2 | 100 | 2 | 1 μA | 10 V | 100 μH |
| 1. All outputs are positive only. | | | | | | | |

| Ranges | Noise | |
|-----------------|-------------------------------|----------------------------------|
| | Bandwidth 0.1 to 10 Hz p-p | Bandwidth 10 Hz to 10 kHz rms |
| 0 to 100.000 mA | 2000 nA | 20 μA |

Resistance Specifications, Output

| Ranges ¹ | Absolute Uncertainty, tcal $\pm 5^{\circ}\text{C}$, $\pm\Omega$ | | Resolution | Allowable Current ² |
|------------------------|---|--------|---------------|--------------------------------|
| | 90 days | 1 year | | |
| 5 to 400.00 Ω | 0.025 | 0.03 | 0.01 Ω | 1 to 10 mA |
| 5 to 4.0000 k Ω | 0.25 | 0.3 | 0.1 Ω | 250 μA to 1 mA |

1. Continuously variable from 0 to 4 k Ω .

2. For currents lower than shown, the floor adder increases by $\text{Floor}_{(\text{new})} = \text{Floor}_{(\text{old})} \times I_{\text{min}}/I_{\text{actual}}$.
For example, a 500 μA stimulus measuring 100 Ω has a floor uncertainty of $0.025\Omega \times 1 \text{ mA}/500 \mu\text{A} = 0.05 \Omega$.

Resistance Specifications, Input

| Ranges | Absolute Uncertainty, tcal $\pm 5^{\circ}\text{C}$, $\pm(\text{ppm of output } +\Omega)$ | | | | Resolution | Stimulus Current |
|-------------------------|--|-------|--------|-------|----------------|------------------|
| | 90 days | | 1 year | | | |
| 0 to 400.00 Ω | 35 | 0.003 | 40 | 0.003 | 0.001 Ω | 1 mA |
| 401 to 4001.00 Ω | 35 | 0.03 | 40 | 0.03 | 0.01 Ω | 0.1 mA |

Thermocouple Specification, Output and Input

| TC Type | Range ($^{\circ}\text{C}$) | | Absolute Uncertainty, tcal $\pm 5^{\circ}\text{C}$, $\pm(^{\circ}\text{C})^1$ | |
|---------|------------------------------|-------------------------|---|-------------------------|
| | | | Output/Input | |
| | Minimum | Maximum | 90 days | 1 year |
| B | 600 $^{\circ}\text{C}$ | 800 $^{\circ}\text{C}$ | 0.42 $^{\circ}\text{C}$ | 0.46 $^{\circ}\text{C}$ |
| | 800 $^{\circ}\text{C}$ | 1000 $^{\circ}\text{C}$ | 0.39 $^{\circ}\text{C}$ | 0.39 $^{\circ}\text{C}$ |
| | 1000 $^{\circ}\text{C}$ | 1550 $^{\circ}\text{C}$ | 0.40 $^{\circ}\text{C}$ | 0.40 $^{\circ}\text{C}$ |
| | 1550 $^{\circ}\text{C}$ | 1820 $^{\circ}\text{C}$ | 0.44 $^{\circ}\text{C}$ | 0.45 $^{\circ}\text{C}$ |
| C | 0 $^{\circ}\text{C}$ | 150 $^{\circ}\text{C}$ | 0.25 $^{\circ}\text{C}$ | 0.30 $^{\circ}\text{C}$ |
| | 150 $^{\circ}\text{C}$ | 650 $^{\circ}\text{C}$ | 0.21 $^{\circ}\text{C}$ | 0.26 $^{\circ}\text{C}$ |
| | 650 $^{\circ}\text{C}$ | 1000 $^{\circ}\text{C}$ | 0.23 $^{\circ}\text{C}$ | 0.31 $^{\circ}\text{C}$ |
| | 1000 $^{\circ}\text{C}$ | 1800 $^{\circ}\text{C}$ | 0.38 $^{\circ}\text{C}$ | 0.50 $^{\circ}\text{C}$ |
| | 1800 $^{\circ}\text{C}$ | 2316 $^{\circ}\text{C}$ | 0.63 $^{\circ}\text{C}$ | 0.84 $^{\circ}\text{C}$ |
| E | -250 $^{\circ}\text{C}$ | -100 $^{\circ}\text{C}$ | 0.38 $^{\circ}\text{C}$ | 0.50 $^{\circ}\text{C}$ |
| | -100 $^{\circ}\text{C}$ | -25 $^{\circ}\text{C}$ | 0.16 $^{\circ}\text{C}$ | 0.18 $^{\circ}\text{C}$ |
| | -25 $^{\circ}\text{C}$ | 350 $^{\circ}\text{C}$ | 0.14 $^{\circ}\text{C}$ | 0.15 $^{\circ}\text{C}$ |
| | 350 $^{\circ}\text{C}$ | 650 $^{\circ}\text{C}$ | 0.14 $^{\circ}\text{C}$ | 0.16 $^{\circ}\text{C}$ |
| | 650 $^{\circ}\text{C}$ | 1000 $^{\circ}\text{C}$ | 0.16 $^{\circ}\text{C}$ | 0.21 $^{\circ}\text{C}$ |

1. Does not include thermocouple wire error.

Thermocouple Specification, Output and Input (continued)

| TC Type | Range (° C) | | Absolute Uncertainty, tcal ±5 °C, ±(°C) ¹ | |
|--|------------------|---------|---|---------|
| | | | Output/Input | |
| | Minimum | Maximum | 90 days | 1 year |
| J | -210 °C | -100 °C | 0.20 °C | 0.27 °C |
| | -100 °C | -30 °C | 0.18 °C | 0.20 °C |
| | -30 °C | 150 °C | 0.14 °C | 0.16 °C |
| | 150 °C | 760 °C | 0.14 °C | 0.17 °C |
| | 760 °C | 1200 °C | 0.18 °C | 0.23 °C |
| K | -200 °C | -100 °C | 0.25 °C | 0.33 °C |
| | -100 °C | -25 °C | 0.19 °C | 0.22 °C |
| | -25 °C | 120 °C | 0.14 °C | 0.16 °C |
| | 120 °C | 1000 °C | 0.19 °C | 0.26 °C |
| | 1000 °C | 1372 °C | 0.30 °C | 0.40 °C |
| L | -200 °C | -100 °C | 0.37 °C | 0.37 °C |
| | -100 °C | 800 °C | 0.26 °C | 0.26 °C |
| | 800 °C | 900 °C | 0.17 °C | 0.17 °C |
| N | -200 °C | -100 °C | 0.33 °C | 0.40 °C |
| | -100 °C | -25 °C | 0.20 °C | 0.24 °C |
| | -25 °C | 120 °C | 0.16 °C | 0.19 °C |
| | 120 °C | 410 °C | 0.14 °C | 0.18 °C |
| | 410 °C | 1300 °C | 0.21 °C | 0.27 °C |
| R | 0 °C | 250 °C | 0.58 °C | 0.58 °C |
| | 250 °C | 400 °C | 0.34 °C | 0.35 °C |
| | 400 °C | 1000 °C | 0.31 °C | 0.33 °C |
| | 1000 °C | 1750 °C | 0.30 °C | 0.40 °C |
| S | 0 °C | 250 °C | 0.56 °C | 0.56 °C |
| | 250 °C | 1000 °C | 0.36 °C | 0.36 °C |
| | 1000 °C | 1400 °C | 0.30 °C | 0.37 °C |
| | 1400 °C | 1750 °C | 0.35 °C | 0.46 °C |
| T | -250 °C | -150 °C | 0.51 °C | 0.63 °C |
| | -150 °C | 0 °C | 0.18 °C | 0.24 °C |
| | 0 °C | 120 °C | 0.13 °C | 0.16 °C |
| | 120 °C | 400 °C | 0.12 °C | 0.14 °C |
| U | -200 °C | 0 °C | 0.56 °C | 0.56 °C |
| | 0 °C | 600 °C | 0.27 °C | 0.27 °C |
| mV | -10 to 75.000 mV | | | |
| 1. Does not include thermocouple wire error. | | | | |

RTD and Thermistor Specification, Output

| RTD Type | Range (° C) | | Absolute Uncertainty tcal ± 5 °C, \pm (°C) ¹ | |
|-----------------------|-------------|---------|--|---------|
| | Minimum | Maximum | 90 days | 1 year |
| Pt 385, 100 Ω | -200 °C | -80 °C | 0.06 °C | 0.07 °C |
| | -80 °C | 0 °C | 0.08 °C | 0.10 °C |
| | 0 °C | 100 °C | 0.08 °C | 0.10 °C |
| | 100 °C | 300 °C | 0.07 °C | 0.09 °C |
| | 300 °C | 400 °C | 0.07 °C | 0.09 °C |
| | 400 °C | 630 °C | 0.08 °C | 0.09 °C |
| | 630 °C | 800 °C | 0.08 °C | 0.10 °C |
| Pt 3926, 100 Ω | -200 °C | -80 °C | 0.06 °C | 0.07 °C |
| | -80 °C | 0 °C | 0.06 °C | 0.07 °C |
| | 0 °C | 100 °C | 0.06 °C | 0.08 °C |
| | 100 °C | 300 °C | 0.07 °C | 0.08 °C |
| | 300 °C | 400 °C | 0.07 °C | 0.09 °C |
| Pt 3916, 100 Ω | -200 °C | -190 °C | 0.06 °C | 0.07 °C |
| | -190 °C | -80 °C | 0.06 °C | 0.08 °C |
| | -80 °C | 0 °C | 0.06 °C | 0.08 °C |
| | 0 °C | 100 °C | 0.06 °C | 0.08 °C |
| | 100 °C | 260 °C | 0.07 °C | 0.08 °C |
| | 260 °C | 300 °C | 0.07 °C | 0.08 °C |
| | 300 °C | 400 °C | 0.07 °C | 0.09 °C |
| Pt 385, 200 Ω | -200 °C | -80 °C | 0.31 °C | 0.38 °C |
| | -80 °C | 0 °C | 0.32 °C | 0.38 °C |
| | 0 °C | 100 °C | 0.33 °C | 0.39 °C |
| | 100 °C | 260 °C | 0.33 °C | 0.39 °C |
| | 260 °C | 300 °C | 0.36 °C | 0.43 °C |
| | 300 °C | 400 °C | 0.36 °C | 0.43 °C |
| | 400 °C | 600 °C | 0.42 °C | 0.50 °C |
| Pt 385, 500 Ω | -200 °C | -80 °C | 0.13 °C | 0.15 °C |
| | -80 °C | 0 °C | 0.13 °C | 0.15 °C |
| | 0 °C | 100 °C | 0.13 °C | 0.16 °C |
| | 100 °C | 260 °C | 0.14 °C | 0.17 °C |
| | 260 °C | 300 °C | 0.14 °C | 0.17 °C |
| | 300 °C | 400 °C | 0.15 °C | 0.18 °C |
| | 400 °C | 600 °C | 0.16 °C | 0.19 °C |
| 600 °C | 630 °C | 0.16 °C | 0.19 °C | |

1. 2-wire output

RTD and Thermistor Specification, Output (continued)

| RTD Type | Range (° C) | | Absolute Uncertainty tcal ±5 °C, ±(°C) ¹ | |
|-----------------------------|-------------|---------|--|----------|
| | Minimum | Maximum | 90 days | 1 year |
| Pt 385, 1000 Ω | -200 °C | -80 °C | 0.06 °C | 0.07 °C |
| | -80 °C | 0 °C | 0.06 °C | 0.08 °C |
| | 0 °C | 100 °C | 0.07 °C | 0.08 °C |
| | 100 °C | 260 °C | 0.07 °C | 0.08 °C |
| | 260 °C | 300 °C | 0.07 °C | 0.09 °C |
| | 300 °C | 400 °C | 0.07 °C | 0.09 °C |
| | 400 °C | 600 °C | 0.08 °C | 0.09 °C |
| | 600 °C | 630 °C | 0.08 °C | 0.09 °C |
| PtNi 385, 120 Ω (Ni 120) | -80 °C | 0 °C | 0.04 °C | 0.05 °C |
| | 0 °C | 100 °C | 0.04 °C | 0.04 °C |
| | 100 °C | 260 °C | 0.03 °C | 0.03 °C |
| Cu 427, 10 Ω ² | -100 °C | 260 °C | 0.63 °C | 0.75 °C |
| YSI 400 | 15 °C | 50 °C | 0.005 °C | 0.007 °C |

1. 2-wire output
2. Based on MINCO Application Aid No. 18.

RTD and Thermistor Specification, Input

| RTD Type | Range (° C) | | Absolute Uncertainty, tcal ±5 °C, ±(°C) ¹ | |
|---------------|----------------|---------|---|----------|
| | Minimum | Maximum | 90 days | 1 year |
| Pt 385, 100 Ω | -200 °C | -80 °C | 0.031 °C | 0.032 °C |
| | -80 °C | 0 °C | 0.018 °C | 0.020 °C |
| | 0 °C | 100 °C | 0.018 °C | 0.020 °C |
| | 100 °C | 300 °C | 0.027 °C | 0.030 °C |
| | 300 °C | 400 °C | 0.031 °C | 0.035 °C |
| | 400 °C | 630 °C | 0.042 °C | 0.047 °C |
| | 630 °C | 800 °C | 0.050 °C | 0.057 °C |
| | Pt 3926, 100 Ω | -200 °C | -80 °C | 0.031 °C |
| -80 °C | | 0 °C | 0.014 °C | 0.015 °C |
| 0 °C | | 100 °C | 0.018 °C | 0.019 °C |
| 100 °C | | 300 °C | 0.026 °C | 0.029 °C |
| 300 °C | | 400 °C | 0.031 °C | 0.034 °C |
| 400 °C | | 630 °C | 0.041 °C | 0.046 °C |

1. 4-wire mode. Uncertainties listed do not include probe uncertainties.

RTD and Thermistor Specification, Input (continued)

| RTD Type | Range (° C) | | Absolute Uncertainty, tcal ±5 °C, ±(°C) ¹ | |
|----------------------------|--------------|--------------|---|----------|
| | Minimum | Maximum | 90 days | 1 year |
| Pt 3916, 100 Ω | -200 °C | -190 °C | 0.026 °C | 0.028 °C |
| | -190 °C | -80 °C | 0.011 °C | 0.012 °C |
| | -80 °C | 0 °C | 0.014 °C | 0.015 °C |
| | 0 °C | 100 °C | 0.018 °C | 0.019 °C |
| | 100 °C | 260 °C | 0.025 °C | 0.028 °C |
| | 260 °C | 300 °C | 0.026 °C | 0.029 °C |
| | 300 °C | 400 °C | 0.031 °C | 0.034 °C |
| | 400 °C | 600 °C | 0.040 °C | 0.045 °C |
| Pt 385, 200 Ω | 600 °C | 630 °C | 0.042 °C | 0.047 °C |
| | -200 °C | -80 °C | 0.071 °C | 0.072 °C |
| | -80 °C | 0 °C | 0.075 °C | 0.076 °C |
| | 0 °C | 100 °C | 0.079 °C | 0.081 °C |
| | 100 °C | 260 °C | 0.082 °C | 0.085 °C |
| | 260 °C | 300 °C | 0.090 °C | 0.093 °C |
| | 300 °C | 400 °C | 0.093 °C | 0.097 °C |
| | 400 °C | 600 °C | 0.100 °C | 0.105 °C |
| Pt 385, 500 Ω | 600 °C | 630 °C | 0.101 °C | 0.106 °C |
| | -200 °C | -80 °C | 0.046 °C | 0.047 °C |
| | -80 °C | 0 °C | 0.049 °C | 0.050 °C |
| | 0 °C | 100 °C | 0.043 °C | 0.045 °C |
| | 100 °C | 260 °C | 0.030 °C | 0.033 °C |
| | 260 °C | 300 °C | 0.032 °C | 0.035 °C |
| | 300 °C | 400 °C | 0.037 °C | 0.041 °C |
| | 400 °C | 600 °C | 0.047 °C | 0.052 °C |
| Pt 385, 1000 Ω | 600 °C | 630 °C | 0.048 °C | 0.076 °C |
| | -200 °C | -80 °C | 0.031 °C | 0.032 °C |
| | -80 °C | 0 °C | 0.034 °C | 0.035 °C |
| | 0 °C | 100 °C | 0.039 °C | 0.040 °C |
| | 100 °C | 260 °C | 0.025 °C | 0.028 °C |
| | 260 °C | 300 °C | 0.027 °C | 0.030 °C |
| | 300 °C | 400 °C | 0.030 °C | 0.034 °C |
| | 400 °C | 600 °C | 0.041 °C | 0.045 °C |
| PtNi 385, 120 Ω (Ni120) | 600 °C | 630 °C | 0.042 °C | 0.047 °C |
| | -80 °C | 0 °C | 0.209 °C | 0.210 °C |
| | 0 °C | 100 °C | 0.210 °C | 0.211 °C |
| Cu 427, 10 Ω ² | 100 °C | 260 °C | 0.211 °C | 0.212 °C |
| | -100 °C | 230 °C | 0.300 °C | 0.304 °C |
| YSI 400 | 15 °C | 50 °C | 0.005 °C | 0.007 °C |
| SPRT, 25 Ω | User Defined | User Defined | 0.05 °C | 0.06 °C |

1. 4-wire mode. Uncertainties listed do not include probe uncertainties.

2. Based on MINCO Application Aid No. 18.

Pressure Measurement

The Calibrator can accept either the Fluke 700 or 6100 series pressure modules. Pressure modules plug directly into the front panel Lemo connector with the Calibrator firmware autodetecting the type and value of the module you are attaching.

| Range | Accuracy/Resolution | Units |
|-------------------------------|-------------------------------|--|
| Determined by pressure module | Determined by pressure module | PSI (pounds per square inch) inH ₂ O4°C (inches of water at 4 degrees Celsius) inH ₂ O20°C (inches of water at 20 degrees Celsius) cmH ₂ O4°C (centimeters of water at 4 degrees Celsius) cmH ₂ O20°C (centimeters of water at 20 degrees Celsius) BAR (bars) mBAR (millibars) KPAL (kilopascals) inHg 0°C (inches of mercury at 0 degrees Celsius) mmHg 0°C (millimeters of mercury at 0 degrees Celsius) Kg/cm ² (kilograms per square centimeter) |

