

TECHNICAL DATA

Fluke Calibration 4180/4181 Precision IR Calibrators





Key features

- Accredited radiometric calibration included
- Accurate, reliable performance from $-15\text{ }^{\circ}\text{C}$ to $500\text{ }^{\circ}\text{C}$
- Large target size of 152 mm (6 in) is required for calibrating most thermometers.
- Light instrument weight of 8.6 kg (19 lbs) makes it easy to lift and carry.

Product overview: Fluke Calibration 4180/4181 Precision IR Calibrators

The 4180 Series of Precision Infrared Calibrators for infrared thermometers and thermal imagers is fast, accurate, and easy to use. It comes with an accredited calibration from one of the world's most trusted temperature calibration laboratories, sample calibration procedures for Fluke thermometers built right in and everything you need to get started making high-quality infrared thermometer calibrations. This is the perfect solution for any infrared thermometer or thermal imager within its temperature range.

The 4180 Infrared Temperature Calibrator reaches temperatures from $-15\text{ }^{\circ}\text{C}$ to $120\text{ }^{\circ}\text{C}$ and the 4181 Infrared Temperature Calibrator has a temperature range from $35\text{ }^{\circ}\text{C}$ to $500\text{ }^{\circ}\text{C}$. Uniformity is important in infrared temperature calibration work because an infrared thermometer will “see” as much as the entire target when placed at the appropriate calibration distance.

In addition, with accuracies as good as $\pm 0.35\text{ }^{\circ}\text{C}$ the 4180 Series can meet its specifications without additional emissivity-related corrections, leading to legitimate test uncertainty ratios (TUR) as good as 4:1.

Emissivity, blackbodies and graybodies

Most people associate a blackbody calibration source with calibrating infrared thermometers. Although the word blackbody specifically refers to an ideal surface that emits and absorbs electromagnetic radiation with the maximum amount of power possible at a given temperature, many calibrators with non-ideal surfaces are also referred to as "blackbody calibrators." While an ideal surface would have an emissivity equal to 1.00, many of these "blackbody calibrators" have an emissivity of approximately 0.95 (better described as a "graybody"). A true blackbody calibration source would usually be a long cavity with a narrow opening. Unfortunately the opening is usually too narrow to be useful for calibrating common infrared thermometers which require a large target size for an accurate calibration. The advantage of a true blackbody calibration source is that the emissivity is precisely known. Whereas traditional flat plate calibrators have emissivities with uncertainties too large for meaningful calibrations of most thermometers. That is why the 418X Precision Infrared Thermometers are radiometrically calibrated to correct for uncertainties caused by emissivity and heat loss at the surface of the "blackbody" calibration source.

Specifications: Fluke Calibration 4180/4181 Precision IR Calibrators

| Specifications | 4180 | 4181 |
|--|---|---|
| Temperature range (@ 23°C ambient, 0.95 emissivity) | -15°C to 120°C | 35°C to 500°C |
| Display accuracy ¹ | ±0.40°C at -15°C ±0.40°C at 0°C ±0.50°C at 50°C ±0.50°C at 100°C ±0.55°C at 120°C | ±0.35°C at 35°C ±0.50°C at 100°C ±0.70°C at 200°C ±1.20°C at 350°C ±1.60°C at 500°C |
| Stability | ±0.10°C at -15°C ±0.05°C at 0°C ±0.10°C at 120°C | ±0.05°C at 35°C ±0.20°C at 200°C ±0.40°C at 500°C |
| Uniformity (5.0 in dia of center of target) ² | ±0.15°C at -15°C ±0.10°C at 0°C ±0.25°C at 120°C | ±0.10°C at 35°C ±0.50°C at 250°C ±1.00°C at 500°C |
| Uniformity (2.0 in dia of center of target) ² | ±0.10°C at -15°C ±0.10°C at 0°C ±0.20°C at 120°C | ±0.10°C at 35°C ±0.25°C at 250°C ±0.50°C at 500°C |
| Heating time | 15 min: -15°C to 120°C 14 min: 23°C to 120°C | 45 min: 35°C to 500°C |
| Cooling time | 15 min: 120°C to 23°C 20 min: 23°C to -15°C | 100 min: 500°C to 35°C 40 min: 500°C to 100°C |
| Stabilization time | 10 minutes | 10 minutes |
| Nominal emissivity ³ | 0.95 | 0.95 |
| Thermometer emissivity compensation | 0.9 to 1.0 | 0.9 to 1.0 |
| Target diameter | 152.4 mm (6 in) | 152.4 mm (6 in) |
| Computer interface | RS-232 | RS-232 |

| | | |
|---|---|---|
| Power | 115 V AC ($\pm 10\%$), 6.3 A, 50/60 Hz, 630 W 230 V AC ($\pm 10\%$), 3.15 A, 50/60 Hz, 630 W | 115 V AC ($\pm 10\%$), 10 A, 50/60 Hz, 1000 W 230 V AC ($\pm 10\%$), 5 A, 50/60 Hz, 1000 W |
| Fuse(s) | 115 V AC 6.3 A, 250 V, slow blow 230 V AC 3.15 A, 250 V, T | 115 V AC 10 A, 250 V, fast blow 230 V AC 5 A, 250 V, F |
| Size (H x W x D) | 356 x 241 x 216 mm (14 x 9.5 x 8.5 in) | 356 x 241 x 216 mm (14 x 9.5 x 8.5 in) |
| Weight | 9.1 kg (20 lb) | 9.5 kg (21 lb) |
| <p>1. For 8 μm to 14 μm spectral band thermometers with emissivity set between 0.9 and 1.0</p> <p>2. The uniformity specification refers to how IR thermometers with different spot sizes both focused at the center of the target will measure the same temperature.</p> <p>3. The target has a nominal emissivity of 0.95, however it is radiometrically calibrated to minimize emissivity related uncertainties.</p> | | |

Ordering information



Fluke 4180

Fluke Calibration 4180 Precision IR Calibrators
IR Calibrator, 152 mm (6 in), -15°C to 120°C

Includes:

- 4180 IR calibrator
- Report of calibration (NVLAP accredited)
- Power cord
- User's guide
- Documentation CD
- Target cover
- Serial cable

Fluke 4181

Fluke Calibration 4181 Precision IR Calibrators
IR Calibrator, 152 mm (6 in), 35°C to 500°C

Includes:

- 4181 IR calibrator
- Report of calibration (NVLAP accredited)
- Power cord
- User's guide
- Documentation CD
- Target cover
- Serial cable

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