

Tip Temperature Measurement

Metcal systems are fully compliant with the IPC J-STD, $\pm 10^{\circ}\text{C}$ ($\pm 18^{\circ}\text{F}$) for temperature stability and repeatability of any given tip geometry.

Metcal specifies the display temperature of the Connection Validation (CV) Series of power supplies to be within the tolerance as specified in the following table when measured independently. The values are based on the worst-case theoretical measurement tolerance of commonly available equipment developed for tip temperature measurement and the CV power supply display tolerance of $\pm 2\%$.

CVC-SMC-HCV CARTRIDGE SERIES – ALL GEOMETRIES		
TEMPERATURE SERIES	IDLE TEMPERATURE RANGE ($^{\circ}\text{C}$)	MAXIMUM DISPLAY VARIANCE ($^{\circ}\text{C}$) versus 3rd party measurement
500 SERIES	246° - 302°	$\pm 11^{\circ}$
600 SERIES	304° - 357°	$\pm 12^{\circ}$
700 SERIES	371° - 413°	$\pm 13^{\circ}$
800 SERIES	427° - 468°	$\pm 14^{\circ}$
900 SERIES	460° - 510°	$\pm 15^{\circ}$
PTC-UFC-UFT CARTRIDGE SERIES – ALL GEOMETRIES		
TEMPERATURE SERIES	IDLE TEMPERATURE RANGE ($^{\circ}\text{C}$)	MAXIMUM DISPLAY VARIANCE ($^{\circ}\text{C}$) versus 3rd party measurement
600 SERIES	299° - 357°	$\pm 12^{\circ}$
700 SERIES	366° - 413°	$\pm 13^{\circ}$
800 SERIES	421° - 468°	$\pm 14^{\circ}$
900 SERIES	454° - 510°	$\pm 15^{\circ}$
DSC CARTRIDGE SERIES – ALL GEOMETRIES		
TEMPERATURE SERIES	IDLE TEMPERATURE RANGE ($^{\circ}\text{C}$)	MAXIMUM DISPLAY VARIANCE ($^{\circ}\text{C}$) versus 3rd party measurement
600 SERIES	293° - 357°	$\pm 12^{\circ}$
700 SERIES	360° - 413°	$\pm 13^{\circ}$
800 SERIES	410° - 468°	$\pm 14^{\circ}$
900 SERIES	443° - 510°	$\pm 15^{\circ}$

Equipment, material tolerances, and technique need to be taken into consideration during testing. Solder tip testers commonly used to measure tip temperature may have tolerances of up to $\pm 5^{\circ}\text{C}$ and must be periodically calibrated. Additionally, the sensor must be replaced in accordance with manufacturer's guidelines to ensure consistent operation. The values used above are based on the solder tip tester's tolerance of $\pm 5^{\circ}\text{C}$ and new sensor.

There are many valid ways to measure the tip temperature and the following significant variables should be carefully considered when measuring tip temperatures.

- Temperature probe technology
- Temperature probe size/mass
- Location on the soldering tip
- Orientation of the soldering handle in relation to the sensor
- Thermal resistance between the sensor and soldering tip

Metcal uses and recommends the following techniques:

- Hold the hand piece/cartridge horizontally, turn on the power supply, and allow enough time for the cartridge to heat.
- Reflow a small amount of solder on to top wettable portion of the tip nearest the cartridge shaft
- Place the solder tip into contact with the small bead of solder on the sensor
- Allow enough time for the temperature to fully stabilize, note the measurement

Understanding the equipment, material tolerances and techniques used to conduct solder tip temperature measurement will provide consistent results and ensure the cartridge meets your soldering requirements.