

Metcal

Increase process control and lower cost of ownership

With consumer demand for lower-cost technology and a manufacturing focus on high margins and productivity, the need for process control is more vital than ever. Even in this struggle, the hand soldering function can be easily overlooked. Older soldering systems are still utilized in many factories far beyond their intended lifetime – which can result in higher operating costs and decreased productivity.

Frequently outdated stations are used, often improperly, by untrained operators. The impending result is a station set to maximum temperature as an operator attempts to increase thru-put without realizing the damage caused to delicate components and boards – which illustrates the need for simple yet high performance soldering systems in the modern production facility.

What makes a high performance system simple? Heat delivery is a major component, and a direct power soldering system based on technology like SmartHeat® by Metcal is optimal to ensure maximum performance. SmartHeat systems react directly to the varying power demands across the circuit board to provide the correct soldering temperature without overheating components, all with the fastest recovery time possible.

Once the power supply is on, the frequency output prompts the heater to warm up for soldering. Because the proprietary coating acts as the heater's controller, there are no heater controls to go out of specification. As the heater warms and the coating reaches its curie point, a precise amount of power is then directed to the solder joint while maintaining a set temperature of $\pm 2^{\circ}\text{C}$. Due to this variable power, operators can perform continuous soldering tasks without wait time, eliminating cold solder joints or the need to increase temperatures for lead-free applications.

To ensure process control, variables surrounding the hand soldering function must be as fixed as possible. Because operator influence affects production more here than in any other part of the factory, the soldering system should incorporate a minimal number of variable operator controls. Case in point, an operator will often increase temperature to the maximum level in an effort to meet thru-put demands, causing inevitable damage to components. By standardizing on a fixed temperature system this risk factor is eliminated completely.

Designed for optimal process control, the MFR Series from Metcal features tip-controlled temperature. Simply select a tip to restrict temperature ranges throughout the building, eliminating temperature variables along with burned boards and damaged traces.

Calibration requirements must also be considered with any new system investment. While most soldering systems now claim “no calibration required”, each still includes a calibration port with procedure outlined in the manual. The average factory spends (4) hours per year on calibration for each system, leading to an astounding loss in productivity:

For example: 100 Stations x 4 Hours x \$35 Labor Rate = \$14,000 in Calibration Costs

A soldering station that is truly calibration free and repeatable to $\pm 2^{\circ}\text{C}$ eliminates this loss, paying for itself over time. All MFR Series systems from Metcal feature SmartHeat technology, and are known throughout the industry as high-performance, truly calibration free systems. In evaluation Metal tips feature extended use more than five times longer than comparable products, earning their return on investment many times over during the life cycle.

For precision applications, Metcal offers a range of affordable, high-performance soldering cartridges for use with tight board locations or beneath the microscope. Combined with an MFR power supply, SxV replaceable tips keep operating costs low while maximizing power transfer to the PCB. The MFR accommodates both a tip and cartridge, and allows for a precision tweezer tool for reworking smaller components. The result is an unprecedented system at this price point.

The entire range of Metcal systems now incorporates a standard sleeper stand, so the power supply automatically reduces power to the tip once the handpiece is replaced in the stand. Power is restored immediately once the handpiece is removed with no operator intervention required. Tip life is extended and operating costs are reduced.

Unlike conventional systems, the MFR Series features grounded tips with active tip monitoring. If the tip ground goes out of specification, the handpiece is automatically shut down and the operator is alerted with a red LED. Also an industry first, the MFR monitors the AC power (mains) ground. If there is damage to the ground pin on the supply cord or if the ground goes out of specification, the operator is alerted with a red LED and the system shuts down.

Existing Metcal SP200 users have come to rely on the SmartHeat technology that helps reduce operating costs while meeting thru-put demands. However, for lead-free applications the new MFR Series offers a 60W power output, providing an added boost. To further aid in the transition to the MFR Series, Metcal has introduced a new handpiece that uses SCC cartridges from the SP200, but fits the MFR series – allowing operators to use existing inventory during the transition, while taking advantage of all the new features of the MFR Series.

Formerly only a cost-effective solution for high-reliability and military manufacturers, all the best features of a direct soldering system are now within reach. With a wide assortment of power supplies, handpieces and tip options, The MFR series is now available to meet the requirements of any production facility.

This white paper is based on an original publication by Ed Zamborsky of OK International.