

soldering  
desoldering  
& rework  
systems

**METCAL**

# contents and preface

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## Introduction to rework

Rework is a non-value added operation. Therefore, minimizing total economic cost is critical. For any rework process, obtaining high quality, cost-effective results requires optimizing the interaction between operator, equipment, and the given rework task.

Regardless of rework technology, total economic cost includes equipment costs, operator training, total rework time (throughput), and product damage.

## Equipment Costs

Costs differ between rework technologies. This not only includes initial cost but also ongoing costs such as maintenance, calibration and repair.

This is why Metcal offers extensive training, technical notes, and presentations designed to enable you to maximize your equipment performance.

Also, Metcal systems minimize calibration time (some systems require no calibration at all), and are designed with as few parts as possible to minimize maintenance and repair costs.

## Operator Training Costs

Complexity and intuitiveness directly affect operator training costs. This is why Metcal designs their systems to be as easy to use as possible. Metcal makes it easy for anyone to set-up and use their equipment soon after opening the box, allowing for more flexibility and effective use of both permanent and temporary personnel.

## Total Rework Time

This is defined by rework task complexity and volume. Consider total task time, including preparation and start-up, actual operating throughput, and clean-up. Total task time is affected by training, especially when a variety of operators use the equipment. Once again, this is why Metcal systems are designed to be easy to set-up and use.

## Product Damage

Component-related damage includes thermal stress, mechanical shock, lead deformation, unintentional reflow of adjacent leads and induced solder bridging. PCB-related damage includes lifted pads and traces, delamination, blistering, measing, and unintentional reflow of adjacent component leads.

When choosing between convection and conduction rework systems, choose the system that most closely fits your product damage parameters. This is why Metcal offers you equipment for either conduction or convection rework.

## The Metcal Idea: Safer, Faster and Easier

Metcal products are designed with the above in mind. Metcal has led the way in bringing process control improvements to the workbench by combining ergonomic design with powerful technology. The result is safer, faster and easier products addressing a variety of applications which provide real savings and real value.

For over ten years, SmartHeat® conduction systems have delivered the power needed to complete the job, while minimizing damage-causing temperatures. Now, QX Systems bring this same variable-power, fixed temperature idea to convection rework. The result: you know that reworked components will be kept safely within their process limits, maximizing throughput while minimizing thermal damage.

In addition, Metcal considers attention to human factors and industrial design to be of paramount importance to profitable manufacturing. Footprint-reducing packaging saves valuable benchtop real estate. Ergonomic handpieces reduce fatigue, while simple controls minimize error. And, by automating as many functions as possible, we have lowered the amount of training required for proficiency. You can concentrate on doing a good job, rather than setting dials, guessing correction factors, or trying to find a standard setting in a notebook. All of these elements assist in improving throughput and process control. In today's electronic production lines, these savings in time and error add up to real value.

# introducing the QX2

## Staying ahead of developments in SMT

Metcal changed rework with the introduction of SmartHeat systems, which minimize process variability and set new standards for design and ease-of-use. For years, Metcal users have been realizing significant increases in throughput and reduced scrap rates.

## Convection rework

But with today's large, high pin-count, fine-pitch components and multilayer boards, convection systems have become increasingly necessary. Convection systems heat all leads simultaneously, ensuring even reflow. Gentle temperature rise rates protect boards and components. There is no direct mechanical contact on the leads, so the risk of pad damage is minimal and components can be easily salvaged for reuse. Because a wide variety of components can be accommodated by a simple nozzle change, convection systems are potentially very flexible.

However, in practice, convection systems have been much more difficult to optimize. Operators had to develop skill in balancing temperature and air flow, aiming the air stream, and shielding components. And thus the benefits of convection rework have only been realized through a considerable amount of operator training, limiting their use.

## A new approach to convection

Now Metcal changes rework again by introducing the QX2. We combined OK International's experience in convection processes with the Metcal legacy of safer, faster, and easier operation.



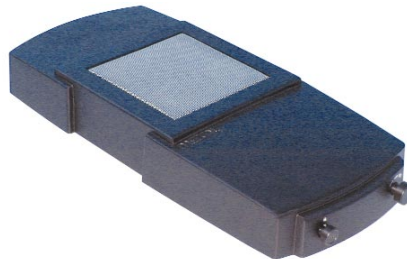
From the moment you take it out of the box, you know the QX2 is like no other convection system. Set-up is fast and easy, requiring no special tools, fixturing, or testing.

Unlike conventional convection systems, the Metcal QX2 provides simplified controls and automation, reducing operator training requirements. The system controller is moveable to suit your preferences and simplifies operation with its push-button configuration.

The need for shielding is minimized through the use of focused convection nozzles, which direct heat exactly where it is needed. Nozzles can be changed in seconds with a simple quick-release system.



An easy-to-use underboard preheater is available to evenly heat boards and prevent warping during the rework of large components and multilayered boards.



To maintain greater process control, the heater exhaust temperature is held constant. The temperature setpoint is low to minimize thermal stress. Should it be necessary to change the setpoint to accommodate process changes, such as new soldering alloys, the QX2 incorporates a lockout code allowing authorized personnel to reprogram it.

To vary heating all that is required is that the airflow level be adjusted. This makes optimizing heat delivery very simple.

During the removal cycle, the vacuum pick-up automatically lifts the component from the board when the solder reflows, and then shuts off the heat. The time used in the removal cycle is stored and displayed as a guide for establishing the minimum time to reattach a similar component.

Never before has convection rework been so safe, fast, and easy.

# QX2 system elements and functions

## Power supply

The power supply unit provides airflow, vacuum, and heat, and forms the main base unit of the system.

## Heater head assembly

Integrated with the frame, the heater head assembly allows controlled vertical movement, and includes the heater and the vacuum pickup.

## Z-axis knob

The Z-axis knob provides fine vertical adjustment of the heater head over the PCB.



## Theta rotation and nozzle release lever

The theta rotation and nozzle release lever allows you to adjust the angle of the nozzle around the Z-axis, to enable the nozzle to be exactly aligned with the component and leads. Pushing the lever past its stop actuates the nozzle release mechanism, allowing nozzles to be changed easily.

## Nozzles

A selection of nozzles is available for the QX2 that permit a large range of components to be reworked. Focused convection nozzles, rather than box nozzles, direct hot air only at the leads, where it is required.

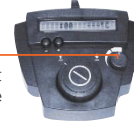


## Remote controller

The controller provides the main interface between you and the QX2. It can be moved to suit your needs

## Airflow selector

The airflow selector determines the rate at which thermal energy is transferred to the component.



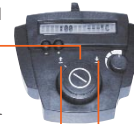
## Temperature display

Displays the temperature of the heater exhaust or the temperature measured by an auxiliary thermocouple in either °C or °F. The heater exhaust temperature is preset at 350°C and may be reset by the process engineer to anywhere between 250°C and 450°C by entering an unlock code.



## Mode selector

By turning the mode selector ring, the user selects **attach mode** or **remove mode**.



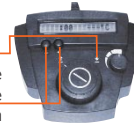
## Remove mode

This mode activates the vacuum pickup, which applies about 3 oz. of upward force to the component. When component liftoff is sensed, the heater is automatically turned off.



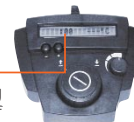
## Attach mode

This mode reflows a new component to the PCB. By adjusting the **time stored in Remove mode** with the **± Keys**, you can ensure an appropriate reflow time, which may be adjusted on the fly if desired.



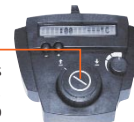
## Timer

By counting up during removal and down during attachment, the timer removes a source of subjective guesswork from the rework process.



## Start/Stop button

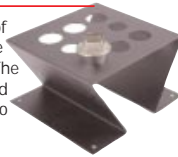
Pressing the Start/Stop button initiates or ends the remove or attach cycle. In remove mode, stopping the cycle also shuts off the vacuum, to release components after liftoff.



# QX2 system elements and functions

## Work tray

This unit provides a working surface of the correct height for the PCB when the optional board holder is not in use. The underboard preheater cannot be used with the worktray. The worktray can also be used to store nozzles.



## Board holder

The board holder can accommodate PCBs in a size range from 2" x 2" to 14" x 18". It is self-centering, and the spring clips can be moved along their rails to hold the board securely, with minimal force. It also allows use of the preheater.

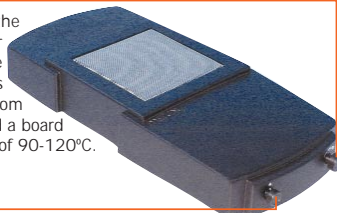


## Preheater

This forced convection heater has a 6" x 6" heating surface, providing a 2°C/cm temperature gradient. The temperature is preset at 180°C, and is not adjustable, to protect the board and components from possible overheating.

## Airflow control

This controls the amount of power applied to the work. Four settings give a range from 150-950W, to yield a board temperature range of 90-120°C.



## Start/Stop button

The preheater connects to the QX2 via a control cable to enable automatic operation during removal and reattachment. For use without the QX2, or if underboard heating is not needed, the manual Start/Stop button can switch the preheater on or off.

## Removal tool

The removal tool has a spring clip which assists in safe removal of hot nozzles. The other side is a tray for catching hot components after removal.



## QX2 Features

<b>Vacuum</b>	Self contained
<b>Operator control interface</b>	Movable Controller with: Start/Stop button Airflow control Time control LCD display Remove/attach control
<b>Component removal</b>	Automatic lift off and heater shutoff
<b>Component attachment</b>	Manual, Timer controlled
<b>Nozzle attachment/removal</b>	Push on, quick release
<b>Other</b>	Auxiliary thermocouple port for component/board temperature monitoring

# part numbers for the QX2

## Part numbers for systems

Key	Part#	Item
	OX2-SBP-11:	115V Convection Rework System with Board Holder & Preheater
	OX2-SBP-21:	220V Convection Rework System with Board Holder & Preheater
	OX2-SBH-11:	115V Convection Rework System with Board Holder
	OX2-SBH-21:	220V Convection Rework System with Board Holder
	OX2-S-11:	115V Convection Rework System
	OX2-S-21:	220V Convection Rework System
A	AC-BH:	Board Holder
B	AC-PH-11:	115V Preheater
	AC-PH-21:	220V Preheater
	AC-BP-11:	Board Holder/115V Preheater Kit
	AC-BP-21:	Board Holder/220V Preheater Kit

## 115V Convection Rework System includes the following:

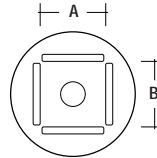
C	OX2-P-11	Power Supply, 115V
D	OX2-2CT	QX2 Controller
E	AC-WT	Work Tray
F	AC-NT	Nozzle Removal Tool
	AC-PC1	Power Cord, 115V
G	AC-CC1	QX2 Controller Cable
	AC-CC2	Preheater Controller Cable
	AC-VC	Vacuum Cup Kit

## 220V Convection Rework System includes the following:

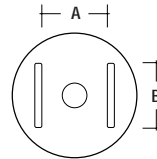
	OX2-P-11	Power Supply, 220V
	OX2-2CT	QX2 Controller
	AC-WT	Work Tray
	AC-NT	Nozzle Removal Tool
	AC-CC1	QX2 Controller Cable
	AC-CC2	Preheater Controller Cable
	AC-VC	Vacuum Cup Kit



## Focused convection nozzles



Component Type	Dimensions in millimeters		Part Number
	A:	B:	
PLCC 20	11	11	NZ-Q11
PLCC 28	13	13	NZ-Q13
QFP 44	17	17	NZ-Q17
QFP 80	18	18	NZ-Q18
PLCC 44	19	19	NZ-Q19
PLCC 52	22	22	NZ-Q22
BOFP 100	23	23	NZ-Q23
PLCC 68	27	27	NZ-Q27
BOFP 132	28	28	NZ-Q28
PLCC 84, QFP 208	32	32	NZ-Q32
QFP 120/128/144/160	33	33	NZ-Q33
QFP 100	19	25	NZ-Q1925



Component Type	Dimensions in millimeters		Part Number
	A:	B:	
SOL 20	11	13	NZ-D1113
SOL 28	11	16	NZ-D1116
TSOP 24-28/40-44	14	20	NZ-D1420
TSOP 28-32	21	9	NZ-D2109
TSOP 48	21	13	NZ-D2113

## Note:

The above nozzles are available as of printing. Additional nozzles are forthcoming; please call for availability.



# the power of SmartHeat

## High throughput at low temperatures

Everyone claims their soldering iron offers the latest technology to help you do your job better. But only Metcal Systems have demonstrated superior performance and ease-of-use. In test after test, Metcal provides unparalleled performance in a wide range of applications. **Joints soldered per hour at 625°F**

METCAL	233
CONVENTIONAL A	176
CONVENTIONAL B	135
CONVENTIONAL C	114

One of the key requirements in forming a strong solder joint is raising the connection temperature to the proper level for the proper amount of time. So, conventional soldering iron manufacturers have spent a lot of time and energy on the accurate and precise control of tip temperature.

However, this focus on controlling tip temperature to yield strong solder joints assumes that perfect tip temperature control equals perfect connection temperature. This is not necessarily the case!

Why? Because different solder joint loads require different amounts of heat to reach the right connection temperature. Even if you know exactly how much heat you have at the tip, you don't know how much each joint needs. Manufacturers should focus on controlling how much heat is delivered to the solder joint, but conventional technology limits their ability.

Controlling tip temperature to control connection temperature is like controlling the speed of a car by the amount of pressure you put on the gas pedal.

Of course, a very skilled operator can adjust the amount of heat being delivered by varying the time on the pedal (dwell time) or quickly changing pressure (tip temperature). In addition, if all the solder joints were alike (like driving on a flat road with no wind factors), controlling only tip temperature could effectively result in a consistent joint.

To compensate for real-world demands, Metcal SmartHeat® Systems use a completely different technology. Instead of just using the tip to store heat, Metcal tip cartridges sense the load and instantly adjust power to quickly deliver the right amount of heat precisely where it is needed.

SmartHeat is like cruise control for your car. Not only does it vary the amount of gas (power) going to the engine (solder tip) based on the speed (connection temperature) desired, but it has an automatic, instantaneous braking system to ensure that you never, ever go too fast (no overshoot). And, because SmartHeat Systems can deliver high power you won't run out of gas along the way, even on the steepest hills.

What does this mean to you? You can solder faster at lower temperatures with a Metcal than with any other iron. This can mean substantial savings in production costs.

## Production cost savings at US\$40.00 per hour

### Number of solder joints per board: 50

Boards/Month	Annual Hours Saved	Annual Savings (US\$)
250	83	\$3,320
500	166	\$6,640
1000	334	\$13,360

### Number of solder joints per board: 100

Boards/Month	Annual Hours Saved	Annual Savings (US\$)
250	166	\$6,640
500	334	\$13,360
1000	666	\$26,640

### Number of solder joints per board: 150

Boards/Month	Annual Hours Saved	Annual Savings (US\$)
250	249	\$9,960
500	498	\$19,920
1000	1002	\$40,080

Want us to run an analysis of your operations? Simply call your local Metcal distributor or representative and ask for a "Value Analysis" demonstration.

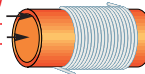
## How SmartHeat technology works

SmartHeat heaters consist of two basic elements: a constant current power supply and a heating element. The radical difference between it and standard heaters is that the heating element itself is capable of seeking and maintaining a predetermined temperature.

The basic design of SmartHeat devices can be conceptually simplified as a solid cylinder made of two materials: a copper core with an outer layer of a special magnetic alloy. This cylinder is surrounded by a coil of fine wire.

When a high-frequency alternating current passes through the coil, a useful physical phenomenon occurs – the current flow becomes confined to the magnetic alloy skin of the device. Known as the "skin effect", this phenomenon serves the purpose of driving the current primarily through the high resistance magnetic layer, causing rapid heating.

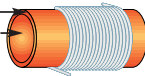
**When the coil is energized, current flows only in the outer layer, which heats up rapidly. The copper core conducts heat to the joint.**



As the outer layer reaches a certain temperature (predetermined by its constituent elements), another physical phenomenon occurs: the layer loses its magnetic characteristics. This temperature, called the Curie Point of the magnetic material, causes the skin effect to decrease, permitting the migration of current into the highly conductive core. Since the overall resistance to current flow is considerably decreased by both the low-resistance path of the inner core and the greater cross-sectional area through which the current travels, and the power supply provides a constant current, overall power consumption decreases proportionally to the reduction in resistance.

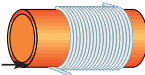
# the power of SmartHeat

At the Curie Point, the skin loses its magnetic properties, and the skin effect vanishes. The copper core conducts current with little resistance, so heating effectively ceases.



With little resistance to generate heat, the temperature begins to drop—but only until it drops below the Curie Point. Then the skin effect resumes and heating recommences. This can occur with remarkable speed.

As soon as the temperature drops below the Curie Point, the skin effect makes the device heat up again. This cycle can repeat rapidly.



The selection of a material with a given Curie Point results in a device that will produce and maintain a specific self-regulated temperature. The result? A system that requires no calibration and responds dynamically to loads.

## SmartHeat technology simplified

We all know what happens when the sun shines on a black surface like asphalt: The surface absorbs the sun's energy and heats up. Conversely, white concrete reflects the sun's energy and does not heat up as much. The asphalt heats more because a black surface is better at absorbing energy than a white one.

Now, imagine what would happen if asphalt could absorb energy until it reached a pre-set temperature, and then turn white to reflect the energy away. When the temperature dropped a few degrees, it would turn black again. You would have a road that could regulate its own temperature and never overheat or become icy.



This analogy is close to the way SmartHeat technology works. The "asphalt" is made from a metal alloy which has the ability to absorb energy from an electrical field and turn it into heat. When the alloy reaches a certain temperature, it stops absorbing energy – in our analogy, it turns white – and its temperature stops rising. When a solder joint draws heat from the heater, the alloy reacts immediately by becoming "black" again to take on more energy and reheat.

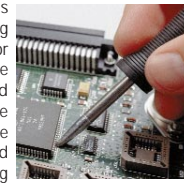
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## To sum it all up:

Because Metcal Systems use SmartHeat technology, They are incapable of overshoot. There is no need for calibration – ever. They deliver high throughput at lower temperatures And you get an easy to use, versatile conduction tool for all your rework needs.

## Metcal can make anyone a rework expert in less time than you'd think

Even a novice can rework difficult boards with just a morning of basic training from one of our expert distributors or representatives. That's because Metcal's patented technology and precision-engineered design assure consistent results. Tip cartridges like the SMTc-x147 (hoof) multi-lead speed soldering cartridge make attaching QFP-208's easier than you've ever imagined. Removal is just as quick and easy.



## No Calibration makes ISO 9000 compliance easy

Because the interchangeable SmartHeat® cartridges contain the heater and temperature self-regulating alloy, SmartHeat® Systems require no calibration.

By specifying the tip cartridge, you've specified most of your process. Just choose the correct tip cartridge, insert it into the handpiece, and flip one switch. Compare that to the myriad of dials, readouts, buttons, and calibration tools and procedures of other systems. This makes compliance with ISO 9000 simple. A "no-calibration" letter is available on request.

## The easiest tip cartridge swap in the industry

Tip cartridges slip in and out with no tools, so you can go quickly from removing a 100-pin QFP to cleaning up pads with one of Metcal's blade tip cartridges and desolder braid, to rapidly soldering a fine pitch component with our "hoof" tip cartridge. It's like having a complete rework station at every bench.



## Reduces your maintenance costs

SmartHeat® Systems reduce maintenance costs because they use no separate control circuits and minimal parts. When you change a tip cartridge, it's like getting a whole new system.



# MX rework systems

## The power to deliver high throughput at low temperatures

Unlike conventional systems, which rely on stored energy, SmartHeat® Systems deliver direct power on demand. This allows you to work at lower temperatures while maintaining the fastest temperature recovery joint-to-joint in the industry.

## Attention to detail provides unmatched comfort and simplicity

The Metcal Talon's easy-squeeze design makes removing SMT components a snap. Unlike other "tweezer-style" tools, the Talon was designed with ergonomics, style, and superior performance in mind. To put it simply, when you try any other tweezer tool, and then try the Talon, you'll agree that there is really no comparison.



Our sleek design gives you unmatched control and comfort. But we didn't just stop at the handpiece. A cleverly designed beveled edge on tips allows you to rework several components without changing tip cartridges. And, even when you have to change a tip cartridge, there are no annoying screws or difficult tip alignment—it's simple and fast.

## Award winning pistol-grip SMT rework/desoldering system

The MX-500DS allows you to do both SMT and through-hole rework with one power supply at the bench. The MX-500DS converts shop air into a powerful Venturi vacuum to clean through-holes completely and quickly. And the MX-500DS uses paper solder collection liners instead of glass tubes for the easiest maintenance in the industry.



## Superior process control reduces board damage

The predictability of SmartHeat increases quality at every bench. Metcal's direct power delivery responds to the needs of the solder connection, providing both safer rework and a repetitive thermal profile for superior process control.

## Optimized bench space

Since workbenches are getting more and more crowded, the MX power supply has been designed to have a smaller footprint than almost any other system.

## Automatic time-out increases tip cartridge life

The MX-500P power supply senses whether the tip cartridge has been used during the past 30 minutes, and automatically shuts off to maximize the life of your tip cartridges.



**MX-500S-11: Rework System with Expansion Port, 100/120 VAC**  
**MX-500S-21: Rework System with Expansion Port, 220/240 VAC**

### Includes:

MX-500P	Two Port Switchable Power Supply with Power Cord*
MX-RM3E	Rework Handpiece with cord
MX-WS4	Workstand
AC-YS3	Sponge
AC-CP2	Cartridge Removal Pad



**MX-500DS-11: Rework/Desoldering System, 100/120 VAC**  
**MX-500DS-21: Rework/Desoldering System, 220/240 VAC**

### Includes:

MX-500P	Two Port Switchable Power Supply with Power Cord*
MX-DS1	Desoldering Handpiece
MX-RM8E	Desoldering Cord
MX-DAH4	ESD Air Hose with Fitting
MX-WS5	Workstand
MX-RM3E	Rework Handpiece with cord
MX-WS4	Workstand
MX-YS3	Sponge (2 ea)
MX-CP2	Cartridge Removal Pad (2 ea)
AC-CB1	Cleaning Brush
AC-CB2	Tube Cleaning Brush
MX-DCF1	Chamber Liner and Filter Pack
AC-TC	Desoldering Tip Cleaner

The MX-500DS requires shop air for desoldering. If you do not have shop air available, try the SP440 System.

\*220/240 V systems do not include power cords.

# MX rework systems and STTC tip cartridges



**MX-500TS-11: Talon Rework System, 100/120 VAC**

**MX-500TS-21: Talon Rework System, 220/240 VAC**

**Includes:**

MX-500P	Two Port Switchable Power Supply with Power Cord*
MX-TALON	Talon Handpiece with cord
MX-WS5	Workstand
MX-RM3E	Rework Handpiece with cord
MX-WS4	Workstand
AC-YS3	Sponge (2 ea)
AC-CP2	Cartridge Removal Pad (2 ea)

**Upgrade Kits**

**MX-TALON-01: Talon Upgrade Kit**

**Includes:**

MX-TALON	Talon Handpiece with cord
MX-WS5	Talon Workstand
AC-YS3	Sponge
AC-CP2	Cartridge Removal Pad

**MX-D001: Desolder Upgrade Kit**

**Includes:**

MX-DS1	Desoldering Handpiece
MX-RM8E	Desoldering Cord
MX-DAH4	ESD Air Hose with Fitting
MX-WS5	Workstand
MX-YS3	Sponge
MX-CP2	Cartridge Removal Pad
AC-CB1	Cleaning Brush
AC-CB2	Tube Cleaning Brush
MX-DCF1	Chamber Liner and Filter Pack
AC-TC	Desoldering Tip Cleaner

**SM-TALON-02: Talon Upgrade with Switchbox for older STSS Systems**

**Includes:**

MX-TALON	Talon Handpiece with cord
MX-WS5	Talon Workstand
AC-YS3	Sponge
AC-CP2	Cartridge Removal Pad
STSS-SW1E	Switchbox

Tip Cartridges sold separately from all systems.

\*220/240 VAC Systems do not include power cords.

**STTC Soldering Tip Cartridges for MX Systems**

**Choosing the correct geometry**

Pick a tip geometry that will maximize contact with the connection. A flat, blunt tip will transfer more heat than a fine, pointed one. Choosing the largest tip possible will both improve performance and enhance tip life.



**Choosing the proper series**

Using a lower temperature helps prevent thermal damage and significantly enhances your tip life, especially with no-clean solders. Each Metcal cartridge is designed for high power delivery, so you can often solder with a Metcal cartridge at a temperature 100°F or more lower than with a conventional iron. Since Metcal tip cartridges sense thermal loads and respond to them, you need only approximate the size of the loads you will be working with. For most applications, a 600 Series will provide enough power and flexibility. Switch to a 700 Series only where absolutely necessary; for example, when working with heavy ground planes. When working with no-clean solders or thermally sensitive applications, Metcal's 500 Series cartridges are excellent choices.

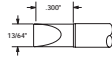
# STTC soldering tip cartridges for MX systems

## Most popular standard recommended tip cartridges

These cartridges are Metcal's most popular. Owning these tips will help you to complete almost every soldering task

## Recommended Purpose

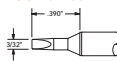
### 13/64 Extra Large Chisel



500 Series: STTC-517  
600 Series: STTC-017  
700 Series: STTC-117

High power for heavy load through-hole and mechanical soldering. The STTC-117 is a good tip for soldering to heavy ground planes.

### 3/32 30° Chisel



500 Series: STTC-536  
600 Series: STTC-036  
700 Series: STTC-136

For medium to heavy load joints requiring extra length.

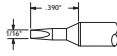
### 1/8 90° Chisel



500 Series: STTC-513  
600 Series: STTC-013  
700 Series: STTC-113

For medium to heavy load joints where access is not a problem.

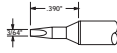
### 1/16 30° Chisel



500 Series: STTC-537  
600 Series: STTC-037  
700 Series: STTC-137

For a wide variety of tasks. If you are looking for a first tip for your Metcal System, the STTC-037 is recommended.

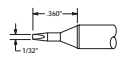
### 3/64 30° Chisel



500 Series: STTC-538  
600 Series: STTC-038  
700 Series: STTC-138

A finer version of the STTC-x37. Good for medium to light through-hole and general surface mount touch-up.

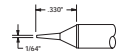
### 1/32 30° Chisel



500 Series: STTC-525  
600 Series: STTC-025  
700 Series: STTC-125

Good for a variety of light solder tasks. Looking for a surface mount touch-up tip? The STTC-025 should be your first choice.

### 1/64 Conical Sharp



500 Series: STTC-522  
600 Series: STTC-022  
700 Series: STTC-122

A versatile fine point for surface mount or fine wire applications. *Not for general through-hole.*

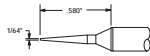
### 1/64 Sharp (Bent 30°)



500 Series: STTC-526  
600 Series: STTC-026  
700 Series: STTC-126

A bent version of the STTC-x22. Good for surface mount touch-up, replacement, and PLCC point-to-point soldering. *Not for general through-hole.*

### 1/64 60° Bevel



500 Series: STTC-545  
600 Series: STTC-045  
700 Series: STTC-145

An extended length fine point for surface mount or fine wire. *Not for general through-hole.*

## Note:

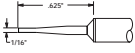
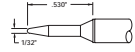
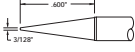







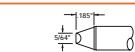
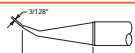
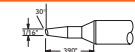
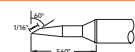
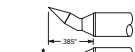

800 Series tip cartridges are available in some configurations should a higher operating temperature be necessary. These are not recommended for general use as tip oxidation increases at high temperatures.

## Please note:

STTC Soldering cartridges are for use with the MX-RM3E soldering/rework handpieces for STSS/MX Systems only. They cannot be used with SP Systems, Talon handpieces, or desolder handpieces.

# STTC soldering tip cartridges for MX systems

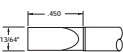
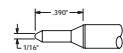
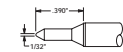
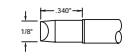
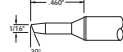
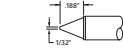
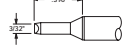
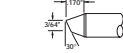
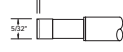
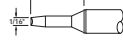
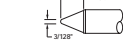
## Other Standard Cartridges

	<b>1/16 60° Chisel</b> STTC-x42
	<b>1/32 Conical Sharp</b> STTC-x01
	<b>3/128 Conical Sharp</b> STTC-x43
	<b>3/64 Chisel (Bent 30°)</b> STTC-x99
	<b>1/16 Conical</b> STTC-x12
	<b>1/32 Conical Sharp</b> STTC-x07
	<b>1/64 Conical Sharp</b> STTC-x06
	<b>3/64 Chisel (Bent 30°)</b> STTC-x41
	<b>1/16 Conical Sharp</b> STTC-x02
	<b>1/32 30° Bevel</b> STTC-x24
	<b>5/64 60° Bevel</b> STTC-x14
	<b>3/128 Sharp (Bent 30°)</b> STTC-x44
	<b>1/16 30° Bevel</b> STTC-x35
	<b>1/32 60° Bevel</b> STTC-x47
	<b>1/16 Chisel (Bent 30°)</b> STTC-x98
	<b>1/64 Sharp (Bent 30°)</b> STTC-x40

x=5 for 500 Series; x=0 for 600 Series; x=1 for 700 Series  
x=8 for 800 Series (see note)

## Specialty cartridges

Specialty cartridges are more expensive than Metcal's standard cartridges. If you think that you need a specialty cartridge, you may want to try a standard cartridge first.

	<b>13/64 Large Chisel</b> STTC-x65
	<b>1/16 Conical Sharp</b> STTC-x32
	<b>1/32 Conical Sharp</b> STTC-x31
	<b>1/8 90° Chisel</b> STTC-x03
	<b>1/16 30° Bevel</b> STTC-x05
	<b>1/32 Conical</b> STTC-x16
	<b>3/32 90° Chisel</b> STTC-x33
	<b>3/64 30° Bevel</b> STTC-x15
	<b>Heat Staking</b> STTC-070 Only available in 600 Series
	<b>1/16 90° Chisel</b> STTC-x04
	<b>3/128 Conical</b> STTC-x11

### Note:

800 Series tip cartridges are available in some configurations should a higher operating temperature be necessary. These are not recommended for general use as tip oxidation increases at high temperatures.

### Please note:

STTC Soldering cartridges are for use with the MX-RM3E soldering/rework handpieces for STSS/MX Systems only. They cannot be used with SP Systems, Talon handpieces, or desolder handpieces.

# SMTC SMT rework tip cartridges for MX systems

## Choosing the correct tip cartridge for surface mount removal

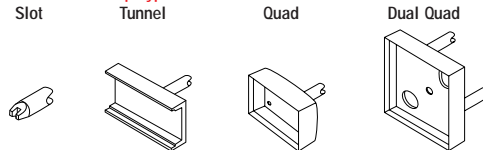


### Choosing the correct tip geometry

First, measure the dimensions of your component. Then, using the charts which follow, look up your component description, and match it to the dimensions listed (sometimes components with the same description can have different dimensions). If this doesn't work, try looking up the dimensions of other types of components; one of them may work.

The tip you choose must match your component. A "near fit" is not good enough for most applications. The leads must be contacted on all sides to ensure even performance.

### SMT Removal Tip Types



Please note that dual cartridges require 2 power supplies and 2 handpieces. A dual handle support (DHS) is also recommended.

### Free Tip Picker Program

Metcal makes available, free of charge, a "Tip Picker" program, to be used with the Microsoft® Excel® spreadsheet program. This is the easiest way yet to get the right tip. Contact Metcal or your local Metcal representative for a copy. You can also download a copy from [www.metcal.com](http://www.metcal.com).

### Tip Template Guide

Many customers have said that trying to measure their components and match them up to a chart can be difficult. That's why Metcal developed the SMTC Tip Template Guide. The SMTC Tip Template is a series of ESD-safe, clear plastic templates in an easy-to-use book. Look up what type of component you have, and turn to one of our templates. Lay the template over the component, and, if it fits and has the correct lead count, you've found your tip. There's also an outline of each tip at the edge of the template, so you can turn the template and "try out" the tip on the component. Contact your local Metcal Distributor or Representative to order.

### Choose the proper Series

Each Metcal cartridge is specially designed to deliver high power in response to loads. For this reason, you can often rework with a Metcal cartridge at a temperature 100°F or more below that of a conventional iron. In the tip listing which follows, the recommended Series is included in its own column. If you think you need a different series than recommended, call your Metcal Distributor or Representative.

### Soldering QFP's, PLCC's, or other multi-leaded packages?

Let one of Metcal's Multi-lead Soldering tip cartridges or one of Metcal's blade tips do the work for you! It's faster than laboriously soldering point to point. And safer than drag soldering with a bent hook tip, which can abrade leads and shorten tip life.

In addition, you can use Metcal's blade tips to clean up pads or solder components using either wire solder or solder paste. Call Metcal or your local Metcal Representative or Distributor for a copy of our Technical Note or for a demonstration.

### Need a custom tip cartridge?

If you have a component that needs a tip cartridge not listed in this brochure, call your local Metcal Representative or Distributor. We may have introduced a new tip cartridge between printings. In addition, Metcal has a custom tip program. Call for details.

### Please note:

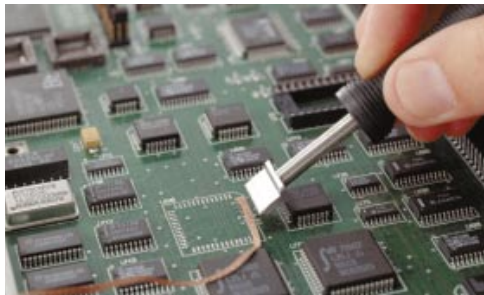
SMTC surface mount rework cartridges are for use with MX-RM3E soldering/rework handpieces for STSS/MX Systems only. They cannot be used with SP Systems, Talon handpieces, or desolder handpieces.

# SMTC specialty tip cartridges for MX systems

## Pad clean-up

Metcal's blade tip cartridges may be used with desolder braid to clean up the pads for both two and four-sided components regardless of the lead configuration or pitch.

For proper wicking, always use the tip by working with the grain of the pad. Never use a blade to wick by dragging it down the row of pads. The heat combined with the abrasive action may cause the epoxy holding the land to the board to lift the pad.



Choose the size of blade tip that best fits the row of pads. For optimum heat delivery, use the recommended part number below to order.

Dimension in inches	Recommended Part Number
0.410 Long	SMTC-060
0.620 Long	SMTC-061
0.830 Long	SMTC-062
1.550 Long Dual	SMTC-1110

Please note that dual cartridges require 2 power supplies and 2 handpieces. A dual handle support (DHS) is also recommended.

## Other special tip cartridges

Hot Plate (.425in. sq.)	SMTC-x136
28-Pin SMT Connector	SMTC-x98



## Multi-lead speed soldering

Metcal makes special tip cartridges for replacing most component configurations, gull-wing and J-lead, regardless of the number of leads or the lead pitch. We call these multi-lead speed soldering tip cartridges.

For components on boards where access is not a problem, we recommend our SMTC-x147 "hoof" tip cartridge. (This tip cartridge is shaped like a horse's hoof) This tip is designed specifically for "drag soldering" techniques. The face holds just the right amount of solder, and the SMTC-x147 has extra plating where necessary to prevent the failures so commonly seen when using a bent hook to drag solder. Once you have practiced a bit, you will find it is the easiest and fastest way to solder surface mount components.

The "knife" tip (SMTC-x161) is designed for multi-lead soldering of PLCC's in tight spaces. The "mini-hoof" (SMTC-x167) is designed for soldering of either PLCC's or QFP's in tight spaces.

See your local Metcal distributor or representative for a demonstration of these easy techniques.

Style  
Hoof  
Mini-Hoof

Recommended Part Number  
SMTC-x147  
SMTC-x167



Knife



SMTC-x161



## Please note:

x = 5 for 500 Series; x = 0 for 600 Series; x = 1 for 700 Series.

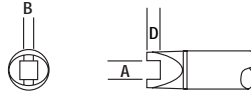
## Note

SMTC rework cartridges are for use with MX-RM3E soldering/rework handpieces for STSS/MX systems only. They cannot be used with SP systems, Talon handpieces, or desolder handpieces.



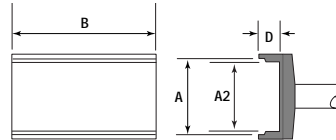
# SMTC SMT rework tip cartridges for MX systems

## Slot Tip Cartridges



SMD Component	Dimensions in inches			Part Number	Recommended Series	Recommended Part Number
	A: Width	B: Length	D: Depth			
Chip 0402, 0603	.070	.040	.035	SMTC-x96	500	SMTC-596
Chip 0402, 0603,0805(angle)	.080	.050	.060	SMTC-x88	500	SMTC-588
Chip 0805	.090	.050	.070	SMTC-x01	500	SMTC-501
Chip 1206, 1210	.140	.060	.070	SMTC-x02	500	SMTC-502
Chip 1808, 1812	.190	.080	.075	SMTC-x03	500	SMTC-503
Chip, Case A (EIA SOPM-3224)	.135	.080	.120	SMTC-x35	500	SMTC-535
Chip, Case B (EIA SOPM-3528)	.150	.095	.100	SMTC-x32	500	SMTC-532
Inductor, Case B (EIA SOPM-4532)	.190	.110	.160	SMTC-x36	500	SMTC-536
Chip, Case C (EIA SOPM-6032)	.250	.095	.130	SMTC-x33	600	SMTC-033
Chip, Case D (EIA SOPM-7243)	.300	.100	.140	SMTC-x34	600	SMTC-034
Chip, Case E	.330	.180	.225	SMTC-x41	600	SMTC-041
SOT-23	.068	.100	.050	SMTC-x05	500	SMTC-505
SOT-89	.110	.250	.080	SMTC-x08	500	SMTC-508

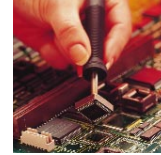
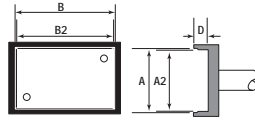
## Tunnel Tip Cartridges



SMD Component	Dimensions in inches				Part Number	Recommended Series	Recommended Part Number
	A2: Width	A: Width	B: Length	D: Depth			
Chip MNR32	.095	.130	.110	.062	SMTC-x149	600	SMTC-0149
DPAK	.335	.335	.250	.200	SMTC-x47	600	SMTC-047
SO-8	.320	.380	.750	.240	SMTC-x107	600	SMTC-0107
SO-16	.330	.330	.475	.230	SMTC-x46	600	SMTC-046
SO-8	.335	.335	.665	.250	SMTC-x68	600	SMTC-068
SOIC-8	.200	.200	.170	.090	SMTC-x04	600	SMTC-004
SOIC-14,-16	.200	.200	.400	.090	SMTC-x06	600	SMTC-006
SOIC-14	.204	.204	.350	.100	SMTC-x142	600	SMTC-0142
SOIC-24(mini flat pack)	.280	.280	.620	.125	SMTC-x77	600	SMTC-077
SOIC-16 (large)	.320	.320	.470	.270	SMTC-x124	600	SMTC-0124
SOIC-20	.375	.375	.520	.125	SMTC-x10	600	SMTC-010
SOIC-24	.375	.375	.620	.125	SMTC-x09	600	SMTC-009
SOIC-28, SOL-34	.375	.375	.720	.125	SMTC-x07	600	SMTC-007
SOIC-32	.520	.520	.805	.170	SMTC-x42	600	SMTC-042
SOJ-28, SOM-36	.315	.340	.740	.074	SMTC-x26	600	SMTC-026
SOJ-32, 34	.315	.340	.840	.125	SMTC-x140	600	SMTC-0140
SOJ-40, SOM-32	.410	.450	1.020	.075	SMTC-x40	600	SMTC-040
SOJ-42	.410	.450	1.070	.125	SMTC-x148	600	SMTC-0148
SOMC-14,-16, DB-20	.270	.270	.440	.090	SMTC-x20	600	SMTC-020
SOP-20	.270	.270	.285	.100	SMTC-x138	600	SMTC-0138
SOP-28	.420	.420	.720	.125	SMTC-x39	700	SMTC-139
SOP-40	.460	.510	1.000	.125	SMTC-x134	700	SMTC-1134
SOP-44	.510	.565	1.070	.105	SMTC-x83	700	SMTC-183
TSOP-28	.470	.505	.320	.065	SMTC-x95	600	SMTC-095
TSOP-40	.730	.760	.400	.120	SMTC-x154	600	SMTC-0154
TSOP-56	.730	.760	.556	.120	SMTC-x162	600	SMTC-0162

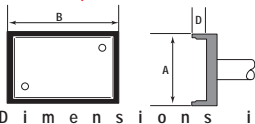
# SMTC SMT rework tip cartridges for MX systems

## Quad/Dual Quad Tip Cartridges



SMD Component	Dimensions in inches					Part Number	Recommended Part Number
	A2: Width	A: Width	B2: Length	B: Length	D: Depth		
PLCC-18	.300	.330	.500	.530	.100	SMTC-x11	SMTC-111
PLCC-20	.360	.400	.360	.400	.100	SMTC-x12	SMTC-112
PLCC-28	.370	.410	.570	.610	.100	SMTC-x103	SMTC-1103
PLCC-32	.450	.500	.550	.600	.100	SMTC-x16	SMTC-116
PLCC-28	.455	.500	.455	.500	.100	SMTC-x13	SMTC-113
PLCC-44	.660	.700	.660	.700	.100	SMTC-x14	SMTC-114
PLCC-52	.760	.800	.760	.800	.100	SMTC-117**	SMTC-117**
PLCC-68	.960	.995	.960	.995	.140	SMTC-118**	SMTC-118**
PLCC-68 Dual*	.960	.995	.960	.995	.140	SMTC-x28	SMTC-128
PLCC-84	1.160	1.195	1.160	1.195	.140	SMTC-119**	SMTC-119**
PLCC-84 Dual*	1.165	1.195	1.165	1.195	.140	SMTC-x29	SMTC-129
SOFP-48 (EIAJ)	.330	.330	.330	.330	.100	SMTC-x121	SMTC-1121
SOFP-64 (EIAJ)	.440	.440	.440	.440	.110	SMTC-x120	SMTC-1120
TOFP-44	.440	.480	.480	.520	.110	SMTC-x159	SMTC-1159
TOFP-80	.485	.525	.485	.525	.105	SMTC-x132	SMTC-1132
QFP-48	.550	.550	.550	.550	.130	SMTC-x115	SMTC-1115
VOFP-100 (EIAJ)	.570	.610	.570	.610	.080	SMTC-x118	SMTC-1118
QFP-128 (3.2 mm fp)	.620	.620	.860	.860	.130	SMTC-x133	SMTC-1133
QFP-44	.635	.635	.635	.635	.130	SMTC-x21	SMTC-121
QFP-100	.650	.650	.885	.885	.130	SMTC-x43	SMTC-143
QFP-64,-80	.675	.675	.910	.910	.130	SMTC-x15	SMTC-115
QFP-100	.805	.805	.805	.805	.190	SMTC-x45	SMTC-145
QFP-144	.805	.840	.805	.840	.075	SMTC-x122	SMTC-1122
QFP-132	.985	1.020	.985	1.020	.125	SMTC-x86	SMTC-186
QFP-100	1.040	1.040	1.040	1.040	.130	SMTC-x44	SMTC-144
QFP-208 Dual*	1.125	1.170	1.125	1.170	.114	SMTC-x81	SMTC-181
QFP-120,-160 Dual*	1.165	1.200	1.165	1.200	.120	SMTC-x48	SMTC-148
POFP-240 Dual*	1.290	1.330	1.290	1.330	.110	SMTC-x125	SMTC-1125
POFP-304 Dual*	1.600	1.650	1.600	1.650	.200	SMTC-x158	SMTC-1158

## Socket Tip Cartridges (tip inside socket)



SMD Component	Dimensions in inches			Part Number	Recommended Part Number
	A: Width	B: Length	D: Depth		
PLCC-20 Socket	.360	.360	.115	SMTC-x144	SMTC-1144
PLCC-28 Socket	.445	.445	.150	SMTC-x12	SMTC-112
PLCC-32 Socket	.456	.556	.120	SMTC-x109	SMTC-1109
PLCC-44 Socket	.660	.660	.100	SMTC-x118	SMTC-1118
PLCC-52 Socket	.750	.750	.150	SMTC-x14	SMTC-114
PLCC-68 Socket	.955	.955	.120	SMTC-x108	SMTC-1108
PLCC-84 Socket Dual*	1.160	1.160	.115	SMTC-x145	SMTC-1145

x=0 for 600 Series, x=1 for 700 Series. A 700 Series tip cartridge is recommended for all quad SMT removal tips.

\*Dual tip cartridges require 2 power supplies and 2 handpieces. A dual handle support (MX-DHS) is also recommended.

\*\* Available in 700 Series only.

# TATC tip cartridges for MX Talon® systems

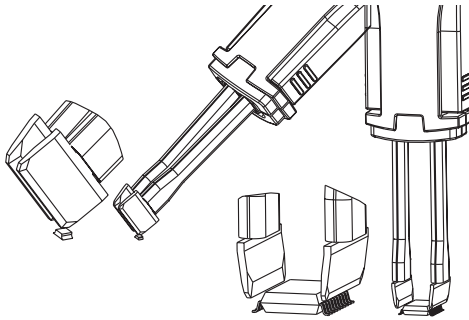
## The ultimate in versatility



## Choose the correct geometry

Metcal TATC tip cartridges are available in the following tip geometries and in two standard temperature ranges (500 Series and 600 Series).

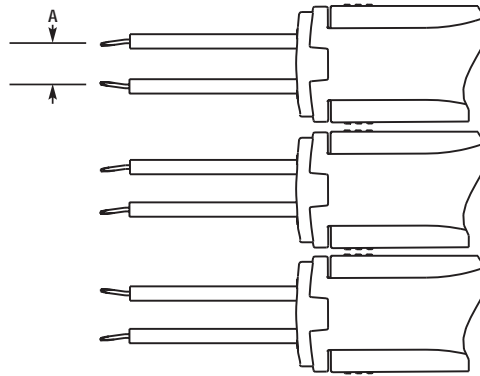
Metcal's unique design means that a wide range of components can be removed by a small range of tips. You can remove 28-pin SOIC's, tantalums, and 0603 chip caps without changing tips. Where it is possible, a beveled edge is provided to improve versatility. When you use this feature, make sure that all leads are contacted during removal. See illustration below.



## Choose the proper Series

Each Metcal cartridge is designed to deliver high power in response to loads. For this reason, you can often work with a Metcal cartridge at a temperature lower than with a conventional iron. 500 Series cartridges will work well for most applications.

## Tip cartridges can be inserted three ways



Measurement "A" (Span) refers to the minimum and maximum distance between two cartridges when used together in the Talon® in the three possible configurations.

Part Number	Dimensions in inches	
	Description	Span (A)
TATC-x01	Fine Point Tips	0.03–0.37
TATC-x02	Blades, 0.25*	0.00–0.36
TATC-x03	Blades, 0.62*	0.06–0.42
TATC-x04	Blades, 0.81*	0.10–0.47
TATC-x05	TSOP 32*	0.00–0.78
TATC-x06	Blades, 1.10*	0.00–0.66

x=5 for 500 Series, 6 for 600 Series

\*Denotes a corner bevel for small components.

## Please note

TATC tip cartridges are for use with the Talon only

# STDC tip cartridges for MX desoldering systems

## Choosing the correct desolder tip cartridge

Proper tip cartridge selection is important for getting the best results. Since changing tip cartridges is so quick and easy, there is no need to compromise.

## Choosing the correct Series

STDC cartridges are highly durable and designed for high heat transfer, making desoldering on multi-layer boards much easier. Desolder cartridges are available in three temperature ranges (600, 700, and 800 Series). A typical board usually requires a 700 Series tip cartridge. Try a 600 Series tip cartridge first for thermally sensitive components or small single-sided boards. 800 Series tip cartridges can help you do the most stubborn jobs.

## Choosing the correct geometry



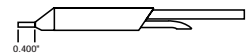
Select a tip cartridge with an inside diameter (A) larger than the lead diameter, and an outside diameter (B) that is approximately the same size as the pad.

Long reach cartridges are available in three popular geometries for reaching hard-to-access leads.

## Standard STDC tip cartridge



## Long reach STDC tip cartridge

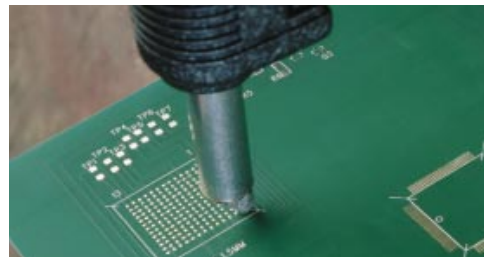


Dimensions in inches		600 Series	700 Series	800 Series	Long Reach*	Long Reach 800 Series
Inside Diameter (A)	Outside Diameter (B)					
0.025	0.055	STDC-002	STDC-102	STDC-802	N/A	N/A
0.030	0.066	STDC-003	STDC-103	STDC-803	STDC-703L	STDC-803L
0.040	0.070	STDC-004	STDC-104	STDC-804	STDC-704L	STDC-804L
0.050	0.080	STDC-005	STDC-105	STDC-805	STDC-705L	STDC-805L
0.060	0.090	STDC-006	STDC-106	STDC-806	N/A	N/A
0.095	0.125	STDC-007	STDC-107	STDC-807	N/A	N/A

\*When using long reach cartridges, 600 Series heat delivery is insufficient for fast, safe device removal. Therefore, long reach desolder tip cartridges are only available in 700 and 800 Series.

## Note:

STDC cartridges are for use in the MX-DS1 pistol grip desolder handpiece only. They cannot be used with the SP440. 800 Series tip cartridges are available at a higher operating temperature be necessary. These are not recommended for general use as tip oxidation increases at high temperatures.

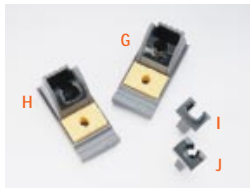


# MX accessories and spare parts



## Handpieces and Cords

A	MX-RM3E	Soldering/rework handpiece and cord*
B	MX-RM6E	Long reach soldering/rework handpiece and cord*
C	MX-TALON	Talon handpiece and cord
D	MX-DS1	Desolder handpiece
E	MX-RM8E	Desolder cord
	MX-DAH2	Airhose, ESD, no fitting (not shown)
F	MX-DAH4	Airhose, ESD, standard with fitting



## Workstand Items

G	MX-WS4	Soldering/rework workstand (includes YS3 sponge)
H	MX-WS5	Desoldering/Talon workstand (includes YS3 sponge)
I	MX-WSC5	Phenolic insert for MX-WS5 workstand
J	MX-WSC4	Phenolic insert for MX-WS4 workstand
	AC-YS1	Sponge (1.7" x 2.7" x 1.0") for WS1 workstand (not shown)
	AC-YS3	Sponge for WS3, WS4, and WS5 workstands (not shown)



## Miscellaneous Accessories

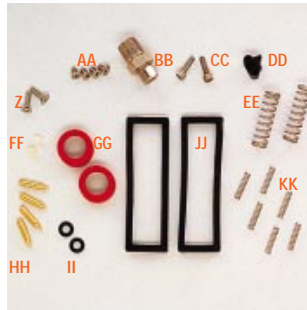
K	AC-TSTAND	Tip stand*
L	AC-CP2	Cartridge removal pad
M	AC-BRUSH	Cartridge cleaning brush
N	MX-DHS	Dual handle support for dual heater cartridges
O	MX-TEMPLATE	SMTC tip template guide
P	AC-TCASE	Tip case*

\* Tips not included



## Desoldering Accessories

Q	MX-DCF1	15 chamber liners and 6 filters kit
	MX-DCF1L	Chamber liners (40) (not shown)
	MX-DCF1F	Fume filters (20) (not shown)
R	MX-DAR1	Air regulator and filter with fitting
S	AC-TC	Desoldering tip cleaner
T	AC-CB1	Chamber cleaning brush
U	AC-CB2	Tube cleaning brush
V	MX-DVC1	Venturi cartridge
W	MX-DSL1	Seal, chamber
X	MX-DSL2	Seal, cartridge
Y	MX-DSB	Swivel bushing



## Maintenance Kit (MX-DMK1) for MX desolder system

Z		Large Phillips screws (2) (Not sold separately)
AA		Small Phillips screws (4) (Not sold separately)
BB	MX-DSB	Swivel bushing
CC		Hex screws (2) (Not sold separately)
DD	MX-DLA	Latch adjustment
EE		Large springs (2) (Not sold separately)
FF		Nylon screws (2) (Not sold separately)
GG	MX-DSL2	Seal, cartridge (2)
HH		Hinge pins (4) (Not sold separately)
II		O-Rings (2) (Not sold separately)
JJ	MX-DSL1	Seal, chamber (2)
KK		Small springs (6) (Not sold separately)

# MX accessories



### MX-NPM Net Power Meter

Because of Metcal's unique Direct Power SmartHeat Technology, a Metcal® Net Power Meter can help in a variety of applications.

### Advanced Tip Selection Techniques

By using the Net Power Meter to measure delivered power, you can determine which tip cartridges to use and how to position them for maximum effectiveness, even for uncommon geometries or loads. Whichever tip cartridge draws maximum power for a given temperature is the proper choice.

### Training Aid

By monitoring the power applied to a task, not the temperature or pressure, you can check to see if you are using your Metcal System correctly.

### Reflow Indicator

The Net Power Meter can be used as a reflow indicator when removing SMT components.

### Quantitative Verification

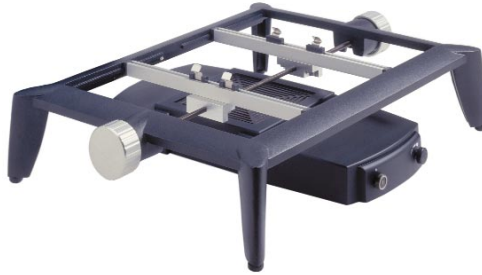
The Net Power Meter provides immediate quantitative lab or bench-top verification of the Metcal System's performance, from time on the joint to correct tip selection.

### Troubleshooting

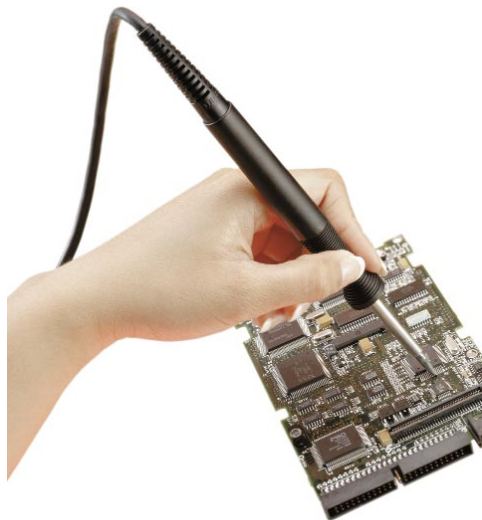
The Net Power Meter can also be used to troubleshoot power supplies, handle cords, and tip cartridges.

### Board Holder and Preheater

This boardholder and preheater can help you to rework even the thickest boards, or components with heavy ground planes. See page 3 for more details.



AC-BH:	Board Holder
AC-PH-11:	115V Preheater
AC-PH-21:	220V Preheater
AC-BP-11:	115V Board Holder/Preheater Kit
AC-BP-21:	220V Board Holder/Preheater Kit





# SP200 soldering system



## Metcal Direct Power for soldering applications

With increased competition, companies of all sizes are being driven to cut costs – without cutting corners. Now you don't have to settle for second best. The SP200 delivers 100% Metcal performance for soldering applications. Just as in all Metcal SmartHeat systems, there is no calibration required.

The SP200 is an ideal choice for both large and small companies. You can put an SP200 on through-hole soldering and surface mount touch-up benches, and a Metcal MX500 Surface Mount Rework System on the benches of your SMT rework operators.

**SP200-11** Soldering system, 115 VAC  
**SP200-21** Soldering system, 220/240 VAC

### Includes:

SP-PW1	Power Supply with power cord*
SP-HC1	Handpiece with cord
SP-WSK1	Workstand with Sponge
AC-CP2	Cartridge Removal Pad

Tip cartridges sold separately.



## SP200 soldering Accessories

A	SP-HC1	Solder handle/cord for SP200
B	SP-WSC	Replacement cradle for SP-WSK1
C	SP-WSK1	Solder workstand with YS3 Sponge
	AC-YS3	Sponge for WSK1/WSK2 (not shown)



## Miscellaneous Accessories

D	AC-TSTAND	Tip stand
E	AC-TCASE	Tip case*
F	AC-CP2	Cartridge removal pad
G	AC-BRUSH	Cartridge cleaning brush

The following are shown on page 18

AC-BH:	Board Holder
AC-PH-11:	Preheater
AC-BP-11:	Board Holder/Preheater Kit

\* 220/240 VAC Systems do not include power cords.

\* Tips not included

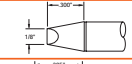

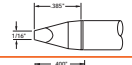
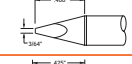
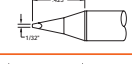
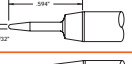
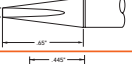
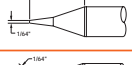
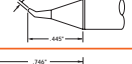
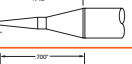



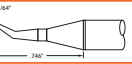
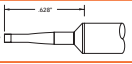
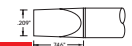
# SSC soldering tip cartridges for the SP200

## Selecting a SSC tip cartridge

Each Metcal tip cartridge is designed for high power delivery, so you can often solder 100°F or more lower than with a conventional iron. For most applications, a 600 Series tip cartridge will provide enough power and flexibility to do the job. Switch to a 700 Series only where absolutely necessary; for example, when working with heavy ground planes. When working with no-cleans or thermally sensitive applications, Metcal's 500 Series tip cartridges are an excellent choice. *x= 5 for 500 Series, 6 for 600 Series, and 7 for 700 Series.*

## Tip Geometry

For maximum performance, pick a tip geometry which will maximize contact with the connection. A flat, blunt tip will transfer more heat than a fine, pointed one. Choosing the largest tip possible will improve performance (enabling you to conduct more heat at lower temperatures), and enhance tip life.

	<b>1/8 90° chisel</b> SSC-x13A	High power for medium to heavy loads where access is not a problem.
	<b>3/32 30° chisel</b> SSC-x36A	General purpose for medium to heavy loads requiring extra length.
	<b>1/16 30° chisel</b> SSC-x37A	If you are looking for a first tip cartridge for your Metcal system, the SSC-637A is recommended.
	<b>3/64 30° chisel</b> SSC-x38A	A finer SSC-x37A. Good for medium to light through-hole and general surface mount touch up.
	<b>1/32 30° chisel</b> SSC-x25A	Good for a variety of light solder tasks. The SSC-625A should be your first choice for SMT touch-up.
	<b>1/32 conical sharp</b> SSC-x01A	For light duty applications requiring extra length.
	<b>3/32 Long chisel</b> SSC-x46A	Long reach chisel. A multi-purpose tip for heavy through-hole loads in hard to access areas.
	<b>1/64 conical sharp</b> SSC-x22A	Versatile fine point tip cartridge for SMT touch-up or fine wire applications. Not for general throughhole.
	<b>1/64 sharp (bent 30°)</b> SSC-x26A	A bent SSC-x22A. Good for SMT touch-up. Not for general throughhole.
	<b>1/64 conical sharp</b> SSC-x45A	An extended length fine point tip cartridge for SMT touch-up or fine wire. Not for general throughhole.
	<b>Multi-lead speed solder</b> SSC-x39A	Designed for drag soldering of fine pitch parts, both gull-wing and J-lead.
	<b>Mini hoof</b> SSC-x67A	For speed soldering gullwing leads.
	<b>Knife</b> SSC-x61A	For speed soldering J-leads.
	<b>Long sharp (bent 30°)</b> SSC-x54A	A bent version of the SSC-x45A. Good for working under a microscope.
	<b>1/16 60° chisel</b> SSC-x42A	An extended-reach chisel tip for medium-load joints where access is a problem.
	<b>30° chisel</b> SSC-x17A	High power for heavy-load soldering.

# SP440 self-contained desoldering system



## Power on demand for through-hole desoldering

The Metcal® SP440 Self-Contained Desoldering System is designed for production through-hole rework. With 50 Watts of power and tips designed to maximize heat transfer, the SP440 is ideal for heavy load desoldering of components on heavy ground plane and multilayer PCBs. The SP440 delivers superior Metcal performance at a price competitive with lesser tools.

Using SmartHeat technology, the SP440 delivers higher watt density power at lower temperatures than conventional desoldering tools. This minimizes the risk of thermal damage.

The whisper quiet, self-contained vacuum pump delivers a powerful vacuum capable of clearing through-holes quickly and completely. As the vacuum system is built into the unit, the SP440 is portable and ideal for areas lacking shop air.

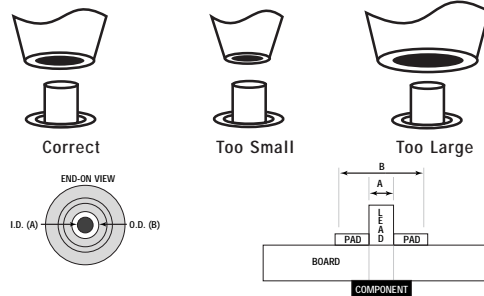
The lightweight, ergonomic pencil grip desolder tool is designed to maximize control and comfort while reducing fatigue. The cable and vacuum tubing are burn-resistant and the paper solder collection chamber liner has been designed for easy disposal – no glass tubes! Also, the SP440 has an automatic Time-Out feature to extend tip life. Desolder tips are sold separately.

## Choosing the correct desolder tip cartridge

Proper tip cartridge selection is important for getting the best results. Choosing the right tip cartridge will maximize your performance at the lowest possible temperature. Since changing tip cartridges is so quick and easy, there is no need to compromise.

## Choosing the correct geometry

Select a tip with an inside diameter larger than the lead diameter and an outside diameter approximately the same size as the pad.



## Choosing the correct Series

The SP440 features high durability SDC desolder cartridges, designed for high heat transfer, making desoldering on multi-layer boards much easier. Desolder cartridges are available in two temperature ranges (600 and 700 Series). A typical board usually requires a 700 Series tip. Try a 600 Series tip first for thermally sensitive components or small single-sided boards. 800 Series tip cartridges are available should a higher operating temperature be necessary. These are not recommended for general use as tip oxidation increases at high temperatures.

## Dimensions in inches

Inside Diameter A	Outside Diameter B	Part Number		
		600 Series	700 Series	800 Series
0.025"	0.055"	SDC-602	SDC-702	SDC-802
0.030"	0.060"	SDC-603	SDC-703	SDC-803
0.040"	0.070"	SDC-604	SDC-704	SDC-804
0.050"	0.080"	SDC-605	SDC-705	SDC-805
0.060"	0.090"	SDC-606	SDC-706	SDC-806
0.095"	0.125"	SDC-607	SDC-707	SDC-807

## Systems

SP-440-11 Self-Contained Desoldering System, 120 VAC

SP-440-21 Self-Contained Desoldering System, 220/240 VAC

## Includes:

SP-PW3	Power Supply with power cord*
DP-DSG2	Desolder Tool assembly, pencil grip
DP-FIL	Filter Pack
DP-SL3	Front seal for DP-DSG2
DP-WSK2	Desolder workstand with AC-YS3 Sponge
AC-CP2	Cartridge removal pad
AC-TC	Tip Cleaners

\*220/240VAC Systems do not include power cords.

## Replacement parts

DP-VP1	Vacuum pump for SP440-11
DP-VP2	Vacuum pump for SP440-21
DP-CA2	Coil assembly
DP-CC	Solder collection chamber
DP-SL3	Front seal for DP-DSG2
DP-VB1	Valve body assembly
DP-VL1	Vacuum line, ESD
DP-WSC2	Replacement desolder cradle for DP-WSK2
AC-YS3	Sponge

# training, applications support, warranties

## Training

Metcal offers a full line of training classes through a network of industry trainers. There are courses specially designed for beginning operators, as well as advanced technique courses suitable for trainers or experienced SMT technicians. Hands-on training ensures practical experience that can be brought back to the plant. In addition, Metcal offers custom training. We can train your people to your specific industrial, military, or vocational needs. Courses can be held on-site or off-site. Call your local Metcal Representative or contact [customercare@metcal.com](mailto:customercare@metcal.com) for more information.

## Applications support

Metcal's Answer Team, comprised of a unique network of engineers, industry leaders, product managers, operators, and experienced representatives and distributors can work with you to solve your most pressing problems. Whether you need advice on removing a new package, want to know if the new solder you are thinking of using requires any special techniques, or need a custom tip or product modification, Metcal can help. Also, Metcal regularly sponsors seminars and user groups, and publishes papers on important topics in the industry. If you need help, visit our website, contact Metcal at 800-776-1778, your local Metcal Distributor or Representative, or contact [customercare@metcal.com](mailto:customercare@metcal.com).

## The rework and repair exchange at [www.metcal.com](http://www.metcal.com)

As an industry service, Metcal sponsors the Rework and Repair Exchange on the World Wide Web at <http://www.metcal.com>. The Exchange is a comprehensive forum for discussion on a variety of industry topics. In addition, it contains the most comprehensive links to other web sites in the industry, including a link to Metcal's own product information and technical papers site, as well as to organizations such as SMTA, magazines such as Circuits Assembly, and sites for contract manufacturers, suppliers, trainers, and more.

## SmartHeat Systems Warranty

Metcal, Inc. warrants Power Supplies against any defects in materials or workmanship for four (4) years from the date of purchase by the original owner. All Handle/Cord Assemblies and the DS1 Desolder Tool are warranted against any defects in materials or workmanship for one (1) year from the date of purchase by the original owner. The coil assembly for the SP440 (DP-CA2) is warranted for 1000 hours or six (6) months.

Metcal warrants that the heater in its STTC, STDC, TATC, SDC, and SSC tip cartridges will operate according to specifications for the lifetime of the tip plating. Because tip plating is mainly dependent upon the user's application and practices, tip cartridges are not warranted for plating wear. Tip cartridges are warranted against any defects in materials or workmanship. Misused, abused, altered or damaged tip cartridges are not warranted.

All tip cartridges that fail to heat will be repaired or replaced at Metcal's option.

Metcal will repair or replace (at Metcal's sole option) a Power Supply that fails in normal use within three (3) years after the expiration of the four-year warranty at the then current repair or exchange rate. This offer does not apply to any previously opened, modified, repaired, altered, misused or damaged Power Supply.

Metcal warrants all other products except consumables against any defects in materials or workmanship for ninety (90) days from the date of purchase by the original owner.

This warranty excludes normal maintenance and shall not apply to any opened, misused, abused, altered or damaged items. If the product should become defective within the warranty period, Metcal, Inc., will repair or replace it free of charge at its sole option. The replacement item(s) will be shipped, freight prepaid, to the original purchaser.

The warranty period will start from the date of purchase. If the date of purchase cannot be substantiated, the date of manufacture will be used as the start of the warranty period.

## QX2 System Warranty

Metcal, Inc., warrants the QX2 system and all other products except consumables (e.g. vacuum cups) against any defects in materials or workmanship for one year from the date of purchase by the original owner.

This warranty excludes normal maintenance and shall not apply to any opened, misused, abused, altered or damaged items.

If the product should become defective within the warranty period, Metcal, Inc. will repair or replace it free of charge at its sole option. The replacement item(s) will be shipped, freight prepaid, to the original purchaser. The warranty period will start from the date of purchase. If the date of purchase cannot be substantiated the date of manufacture will be used as the start of the warranty period.

# product specifications

## SP440 Power Supply

Tip-to-ground potential < 2 mV, true RMS, 50-500 Hz  
 Tip-to-ground resistance < 2 ohms, DC, unit on  
 Idle temperature stability  $\pm 2^\circ\text{F}$  ( $\pm 1.1^\circ\text{C}$ ), still air  
 Ambient operating temp 50-104°F (10-40°C)  
 Maximum enclosure temp 150°F (65°C)  
 Input line voltage 108-132 VAC  
**SP440-11** 85-110 VAC  
**SP440-12** 216-264 VAC  
**SP440-21** 45-70 Hz  
 Input line frequency 50 W @ 72°F (22°C) ambient  
 Nominal output 470 KHz  
 Output frequency After 25-30 mins idle time  
 Time out feature 72 inches (1830 mm)-18/3 SJT  
 Power cord (3-wire)

## SP440 Desolder Tool

Vacuum rise time 25 ms to 12 inches (305 mm) Hg  
 Handpiece assembly 5 ft (1520 mm)  
 carbon loaded silicone, shielded

## Dimensions

length x width x height 8.0 in. x 6.0 in. x 7.0 in.  
 (203 mm x 152 mm x 178 mm)  
 weight (total unit) 9.0 lbs (4.1 kg)  
 weight (desolder tool) 8.0 oz (227 g)

## Standards Compliance

MIL-STD-2000, -1686, -45743E, WS-6536D and E  
 ESD  $10^9$ - $10^{11}$  ohm/square per ASTM D257  
 (ESD  $10^9$ - $10^9$  ohm/square where possible)

## MX Power Supply

Tip-to-ground potential < 2 mV, true RMS, 50-500 Hz  
 Tip-to-ground resistance < 2 ohms, DC, unit on  
 Idle temperature stability  $\pm 2^\circ\text{F}$  ( $\pm 1.1^\circ\text{C}$ ), still air  
 Ambient operating temp 50-104°F (10-40°C)  
 Maximum enclosure temp 150°F (65°C)  
 Thermal switch Setpoint at 150  $\pm$  3°F (66  $\pm$  1.2°C)  
 Auto-reset once cooled to 110°F (43°C)

## Input line voltage

**MX-500P-11** 90-130 VAC  
**MX-500P-21** 190-260 VAC

## Preheater

**MX-500P-11** 45-70 Hz  
**MX-500P-21** 50-60 Hz  
 Nominal output 40 Watts maximum @ 72°F (22°C) ambient  
 Output frequency 13.56 MHz  
 Auto-off feature 10 millisecond lag time  
 Time out feature After 25-30 minutes idle time  
 U.S. power cord (3-wire) 72 inches (1830 mm) - 18/3 SJT

## Dimensions

length x width x height 5.3 in. x 9.5 in. x 4.7 in. (135 mm x 241 mm x 119 mm)  
 weight (total unit) 7.5 lbs (3.4 kg)  
 Standards Compliance MIL-STD-2000, -1686, -45743E,  
 WS-6536D and E

## Agency Approvals

ETL, CE Approved  
 ESD materials  $10^9$ - $10^9$  ohm/square per ASTM D257  
 ( $10^9$ - $10^9$  ohm/square where possible)

## MX RM3E Soldering/Rework Handpiece

Weight 56.7 g  
 Handle cord assembly 72 inches (1830 mm) carbon loaded silicone, shielded  
 ESD materials 105-1012 ohm/square as per ASTM D257  
 (105-109 ohm/square where possible)

## MX TALON handpiece

Weight 2.0 oz (56.7 g)  
 Handle cord assembly 72 inches (1830 mm) carbon loaded silicone, shielded  
 ESD materials  $10^9$ - $10^9$  ohm/square as per ASTM D257  
 ( $10^9$ - $10^9$  ohm/square where possible)

## MX desoldering handpiece

Input air pressure 60-100 psig required  
 Vacuum 18 inches (457 mm) Hg minimum  
 Weight 10.5 oz (298 g)  
 Handle cord assembly 72 inches (1830 mm) carbon loaded silicone, shielded  
 ESD materials  $10^9$ - $10^9$  ohm/square as per ASTM D257  
 ( $10^9$ - $10^9$  ohm/square where possible)

## MX Tip Cartridges

STTC Startup power 500 Series > 25 Watts  
 600 Series > 25 Watts  
 700 Series > 30 Watts  
 Maximum Temperature 500 Series  $\leq$  575°F (302°C)  
 600 Series  $\leq$  675°F (357°C)  
 700 Series  $\leq$  775°F (412°C)

## SP200 Power Supply

Tip-to-ground potential < 2 mV, true RMS, 50-500 Hz  
 Tip-to-ground resistance < 2 ohms, DC, unit on  
 Idle temperature stability  $\pm 2^\circ\text{F}$  ( $\pm 1.1^\circ\text{C}$ ), still air  
 Ambient operating temp 50 - 104 °F (10 - 40 °C)  
 Maximum enclosure temp 150 °F (65 °F)

## Input line voltage

**SP200-11** 108-132 VAC  
**SP200-21** 216-264 VAC

## Input line frequency

45 - 70 Hz  
 Nominal output 35 Watts @ 72°F (22°C) ambient

## Output frequency

470 KHz  
 Power cord (3-wire) 6 ft (183 cm) - 18/3 SJT

## Handle/cord assembly

4 ft (122 cm) carbon loaded silicone, shielded

## Dimensions

length x width x height 4.25 in. x 3.5 in. x 6.7 in. (108 mm x 89 mm x 170 mm)

## weight (total unit)

5.0 lbs (2.3 kg)

## weight (handpiece)

2.0 oz (57 g)

## Standards compliance

MIL-STD-2000, -1686, -45743E, WS-6536D and E

## Agency Approvals

ETL Listed, FCC Approved  
 ESD materials  $10^9$ - $10^9$  ohm/square per ASTM D257  
 ( $10^9$ - $10^9$  ohm/square where possible)

## OX2 Specifications

**OX2-S-11** 90-132 VAC, 50/60 Hz  
**OX2-S-21** 220-260 VAC, 50-60Hz

## Input voltage

Heater 550 W  
 Rated current 5 amps  
 Air flow 20 to 50 l/min  
 Source temperature (default setpoint) 662°F  
 Source temperature range 482°F-842°F

## Convection system

Heater 950 W  
 Rated current 8.5 amps  
 Heating surface 6 in. x 6 in.  
 Board temperature range 194°F-248°F

## Preheater

Minimum board size 2 in. x 2 in.  
 Maximum board size 14 in. x 18 in.

## Board Holder

Convection Rework System (Operating) 11.5 in. x 20.5 in. x 14.2 in.  
 292 mm x 521 mm x 361 mm  
 (Stored) 11.5 in. x 16.8 in. x 21.0 in.  
 292 mm x 427 mm x 533 mm

## Weights

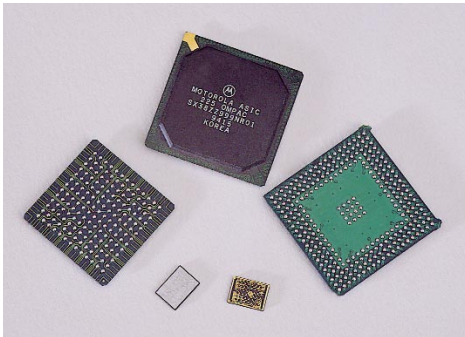
Convection Rework System 20.5 in. x 15.0 in. x 5.0 in.  
 Board Holder 521 mm x 381 mm x 127 mm  
 Preheater 8.2 in. x 15.5 in. x 2.5 in.  
 208 mm x 394 mm x 64 mm

## Outer Dimensions (W x D x H)

Agency approvals UL 499, CSA E335-1, CSA E335-2-45, FCC Part 15, CE

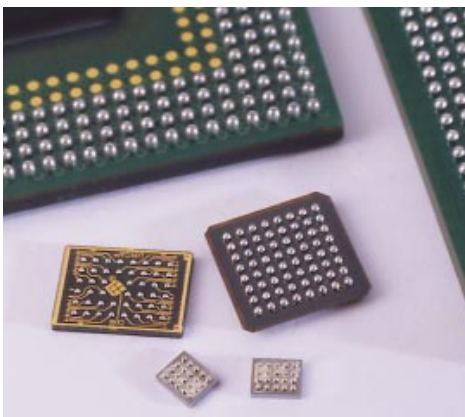
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What if you need the ultimate in process control and flexibility for advanced packages like BGA,  $\mu$ BGA, and FlipChip? There are new chips being developed every day. And some of those chips are going to land on your assembly line tomorrow. How can you be sure that the system you buy today will do the job three years from now?



During the early 1990's, we recognized the shift towards array packaging and the implications this had on rework, specifically the need for accurate profiling and greater levels of process control. Rather than simply modify a QFP rework system, the first BGA Micro Oven products were designed specifically to meet the requirements of array package technology. At OK we also understand that to most customers, rework is a non-value-added operation. With this in mind, the products were developed to be cost-effective and easy to use, offering the user great flexibility to deal with the ever expanding range of components available.

In addition, we have long-established relationships with technology leaders in the computer, telecommunications and components industries. Our global network works alongside the development teams creating new component types. This allows us to be ready with systems to deal with new component types as they reach the market.



As the recognized leader in BGA, CSP, and leading-edge technology rework, we've been invited to speak at over one hundred conferences worldwide. We conduct non-commercial seminars and workshops worldwide on these fast-changing topics. These multi-media presentations include a non-commercial overview of technology, applications, and methodology, followed by a hands-on workshop to reinforce principles and techniques from the seminar.



### What does all this mean for you?

It means we know what chips are coming out before you've seen them. So we can better prepare you with a system that will not only meet today's needs today, but tomorrow's needs as well.

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**3500**  
**micro oven**



## control your environment

# AIRIDUS

### Consider this

Your Metcal® System is designed to provide you with the ultimate in process control. But what about your operators and environment?

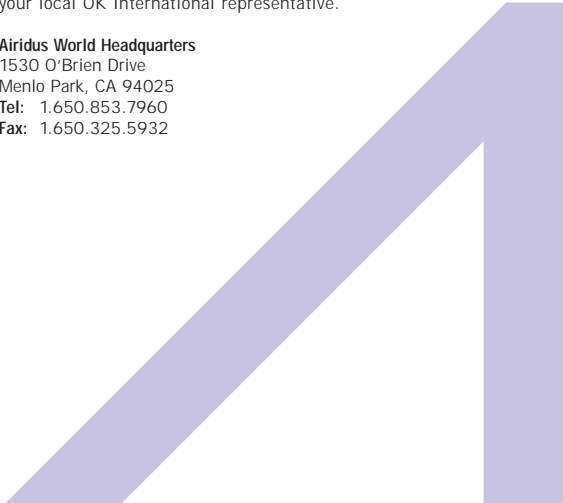
Manual soldering generates irritating smoke and airborne particulates, along with substances and gases such as acetone, carbon monoxide, and formaldehyde. These substances have been shown to cause occupational asthma, sore throats, eye irritation, and many other problems. Airidus systems purify the air – making it healthier. Healthy work environments have been shown to reduce absenteeism and turnover, while raising employee productivity.

In addition, chip manufacturers have known for years about the benefits of clean rooms, and some leading precision manufacturers are already assembling in clean room environments with fume extraction. Why take chances with airborne particulates and other substances contaminating your boards?

This is where Airidus Fume Extraction Systems can help. Airidus' new TX and VX Systems are available with two different monitoring options and three different filtration options, depending on your application. TX Systems are used for tip or micro-arm extraction, while VX Systems are used for arm and plenum extraction. Filters are easy to change, units are quiet, and maintenance is simple.

Airidus also manufactures self-contained cabinets, shop-air powered tip extraction units, fume absorbing fans, and more. For more information, visit [www.airidus.com](http://www.airidus.com), or contact your local OK International representative.

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METCAL Conduction & Convection Rework Systems.  
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20690 Rev 9/99 USA

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