

Operating and Maintaining the Mark V Soldering Station

GENERAL DESCRIPTION

The Mark V Soldering Station is designed to provide precision and ease of operation for delicate soldering applications, particularly strain gage installations. The Mark V consists of a control unit, soldering pencil, and a general-purpose screwdriver-style tip. The standard 115Vac, 50-60 Hz, control unit can be converted to 230 Vac operation by simple adaptation (see wiring diagram on the inside cover of the unit). It is rated at 25W, with overload protection afforded by a fused power supply. A 17-position selector switch regulates power to the heating element, and a 6-ft [1.8 m] 3-wire grounded line cord eliminates potential shock hazards.

Although the 1.1-oz [31-g] pencil is rated at 25W, the 12V fast-recovery element outperforms conventional 40W and 50W irons. It is isolated from the main power supply to prevent electrical damage to the gage. A Teflon heat shield and flexible burn-resistant cord enhance operation.

Four styles of easily replaceable tips are available. Each tip is of one-piece construction. Three of the tips are pre-tinned, iron-clad, solid copper, with the tip shank overlapped with nickel/chromium to retard oxidation during continuous use. The fourth tip is a special nickel-plated copper designed to minimize loss of tip tinning at highest temperature settings. The design of each tip provides the high thermal capacity needed to take full advantage of the fast heating-element recovery rate. Refer to Micro-Measurements Strain Gage Accessories Databook for a description of each tip.

Read through the following instructions thoroughly before operating the Mark V Soldering Station.

OPERATING PROCEDURE

Setup

1. Check the heater selector switch for ease of rotation through all 17 heat positions. As a precaution, reset the selector switch to 7 or 8 to eliminate the possibility of an inappropriately high temperature setting.
2. Adjust the soldering tip to a snug, but not binding, fit; carefully insert the pencil element to the full depth of the tip cavity. To tighten, remove tip from element and gently squeeze the slotted shank with fingers or small pliers. To loosen, remove tip from element and gently spread slotted shank with a wedged instrument, such as a small screwdriver blade. To prevent rotation and possible

damage to the heating element within its tubular handle, always use a straight pulling motion to remove tip.

3. A prerequisite to proper soldering is adequate tinning of the soldering tip. To ensure that the tip is properly tinned, prepare the clad surface, prior to initial use, by wrapping 2 to 3 in [50 to 75 mm] of solder wire around the soldering portion of the tip. If rosin core solder is used, no external flux is required; however, if uncored solder is used, dip the wrapped tip into M-Flux AR so that sufficient flux is available for initial tinning.

PRECAUTIONS

1. Cross-alloying of solders can change the electrical, chemical, thermal and mechanical integrity of the solder being used. To prevent cross-alloying of solders, it is recommended that only one type of solder be used with each tip.
2. Never power the heating element without a soldering tip in place.
3. Do not use the soldering pencil with any power source other than the Mark V control unit.
4. Warranty is void if:
 - (a) An anti-seize compound is used to lubricate the tip.
 - (b) The heating element is twisted.
 - (c) Pliers are used to grip heating element.
 - (d) The unit is operated without a tip in place.

Operation

1. Connect the soldering pencil to the control unit. The connector on the front panel of the unit is keyed to maintain the proper power supply polarity to the pencil element.
2. Set the selector switch to the melting range of the solder being used.
3. Turn the control unit on and allow to heat until the solder wrapped around the tip melts completely. Remove excess melted solder from the tip with a gauze sponge. Never knock or rap a heated iron on any surface to remove excess solder.

To retard oxidation of the tinned, clad surface, reapply an excess of solder to tip between use. It is normal for the tip

to loosen slightly after initial use; if this occurs, turn the control unit off and readjust per previous instructions.

Troubleshooting

If the solder does not begin to melt within several minutes, check the indicator light on the control unit. If the lamp is not lit, turn the unit off; check the power line for proper voltage, and check the fuse on the back panel for continuity.

If the iron takes longer than five minutes to reach full heat, check the internal transformer connections to be certain they are set for the correct line voltage. If the transformer connection appears normal, disconnect the polarized plug from the control unit and recheck the fit of the soldering tip. A loosely fitting tip may retard heat transfer from the heating element to the soldering tip.

The element may be checked for continuity with an ohmmeter. If an open circuit is detected or the resistance is less than 5 ohms, return the pencil to Micro-Measurements for repair or replacement.

MAINTENANCE

The Mark V Soldering Station requires little maintenance when operated under normal circumstances and according to directions. The soldering tip should be cleaned prior to each use by removing the tip and tapping the open end lightly on a hard surface to dislodge any oxidized material on the inside. Proper tip maintenance will prevent the tip from seizing on the heating element through continued use. Periodically tighten all screws and inspect cables and strain-relief clamps.

WARRANTY INFORMATION

Micro-Measurements warrants the Mark V control unit for a period of two years, and the soldering pencil for six months, under normal operating conditions, against defects in workmanship and material. Warranty does not cover normal tip wear or damage due to improper use. Adjustment will be limited to repair or replacement of any parts which Micro-Measurements warranty inspection determines to be defective.

HELPFUL SOLDERING HINTS

High Temperature Soldering

When using +570°F [+300°C] high-lead solder, the M5S-D soldering iron tip is recommended. If either the A, B, or C tip is used, it may be difficult to keep the tip properly tinned, particularly if long idling periods are involved. If one of these tips will be used with +570°F [+300°C]

solder, performance can be improved considerably by carefully filing of the iron cladding, and tinning the exposed pure copper tip. This practice should not be followed with high-tin solder alloys, because the molten solder will quickly erode pure copper tips.

When the soldering iron is idling at an elevated temperature, keep the working surface covered with molten solder. For extended idle periods, reset the selector switch to 7 or 8 to retard oxidation and erosion of the copper.

Inconvenient Gage Locations

To allow soldering in inconvenient gage locations, it may be practical to bend the iron-clad tip to a more appropriate shape. After removing the tip from the element, a mandrel of 1/2-in [13 mm] diameter or more may be employed without damaging the clad surface; a smaller diameter, however will cause cracking and shorten the life of the tip considerably.

If special applications require modifications to the tip configuration, remove the cladding and file to the shape desired, always producing a flat working surface. A conical point may damage the strain gage foil, produce high local heating, or tend to lift the solder from the gage tabs.

Cleaning and Re-tinning Oxidized Tips

Negligent maintenance practices, or wiping with materials that char on the soldering tip, will produce a buildup of oxidation that impairs soldering. Following is the recommended procedure for cleaning and re-tinning tips:

1. Set the selector switch to the appropriate temperature for the solder being used.
2. Place several drops of M-Flux SS on a glass plate.
3. Re-tin the tip by holding it in the SS Flux while feeding solid core solder. Avoid inhaling the fumes. A generous amount of solder is essential.
4. Wipe with gauze sponge.

If tinning is not uniform, gently abrade the tip surface with 220- or 320-grit silicon-carbide paper and repeat Steps 1 through 4.

Application Notes

Application Notes TT-609, "*Strain Gage Soldering Techniques*," TT-603, "*The Proper Use of Bondable Terminals in Strain Gage Applications*," and TT-606, "*Soldering Techniques for Lead Attachment to Strain Gages with Solder Dots*," are available on request. The methods outlined in these Application Notes apply to numerous strain gage applications.

The various installation accessories referred to throughout this Instruction Bulletin are Micro-Measurements Accessories, listed in Strain Gage Accessories Databook and available directly from Micro-Measurements.