

TENMA[®] 21-19800

Temperature Controlled Soldering Station

Instruction Manual

Thank you for purchasing the TENMA 21-19800
TENMA 21-19800 temperature controlled soldering station.
Please read the manual before using the unit.
Keep manual in accessible place for future reference.

Tenma Test Equipment
405 S Pioneer Blvd
Springboro, OH 45066
www.tenma.com

TABLE OF CONTENTS

Package contents.....	3
Parts Guide	3
Care and Safety Precautions	4
Specifications	5
Assembly and Usage	6
Soldering Tip care and Maintenance	7-8
Tip temperature	
Cleaning	
When not in use	
Tip calibration	
Disassembling the hand piece	9
Testing the heating element	10
Replacing the heating element	11
Troubleshooting connections	12-14
Replacing soldering iron cord	15
Reassembling the hand piece	16
Changing of fuse	17
Basic troubleshooting Guidelines	18

BASIC TROUBLESHOOTING GUIDE

PROBLEM 3: SOLDERING IRON TEMPERATURE IS INTERMITTENT

Description: *Main power LED lights up and so does the heater LED but soldering iron temperature rises and falls uncontrollably.*

SOLUTION:

- ◆ Soldering iron plug may be loose from the receptacle; unplug the soldering iron and reattach.
- ◆ Soldering iron cord may be damaged or loose and needs to be replaced or repaired. See trouble shooting soldering iron cords section of this manual.

PROBLEM 4: SOLDER WOULD NOT STICK TO THE SOLDERING TIP

Description: *Soldering iron is able to melt solder, but the soldering does not stick or wet properly the tip.*

SOLUTION:

- ◆ Soldering iron tip may be too dirty or oxidized . Clean and tin the tip, and see our tip maintenance guide for further care.
- ◆ Temperature could be set too high causing solder to quickly burn away. Please adjust to a more suitable lower temperature range.

PROBLEM 5: SOLDERING IRON DOES NOT PRODUCE ENOUGH HEAT

Description: *Soldering iron cannot melt solder fast enough, or actual temperature does not reach the desired set temperature.*

SOLUTION:

- ◆ The system may need to be recalibrated please see [steps in calibrating the tip temperature](#) on page 8 of this manual.
- ◆ Soldering iron tip may be too dirty or oxidized . Clean and tin the tip, and see our tip maintenance guide for further care.

BASIC TROUBLESHOOTING GUIDE



WARNING: To avoid personal injury or equipment damage, disconnect power cords before making any servicing to the equipment, or unless instructed otherwise in the troubleshooting procedures.

PROBLEM 1: THE UNIT HAS NO POWER /MAIN POWER LED DOES NOT LIGHT UP

1. Check if the unit is switched ON.
2. Check the fuse. Replace with the same type of fuse if blown.
3. Check the power cord and make sure there are no disconnections.
4. Verify that the unit is properly connected to the power source.

Additional precautions :

- ◆ Check internal circuitry for shorts that may have caused the blown fuse. See "*Troubleshooting Connections*" on page 12-14.
- ◆ Check for tangles of wires in the heating element causing it to short. See "*Troubleshooting Connections*" on page 12-14.

PROBLEM 2: SOLDERING IRON DOES NOT RISE IN TEMPERATURE

Description: Main power LED lights up and so does the heater LED but soldering iron temperature is relative low and is not heating up.

SOLUTION:

Soldering iron cord may be damaged and needs to be replaced or repaired. See "*Troubleshooting Connections*" on page 12-14 of this manual.

Heating element may be damaged and needs to be replaced see "*Testing the Heating Element*" on page 10 and "*Replacing the Heating Element*" on page 11 on this manual.

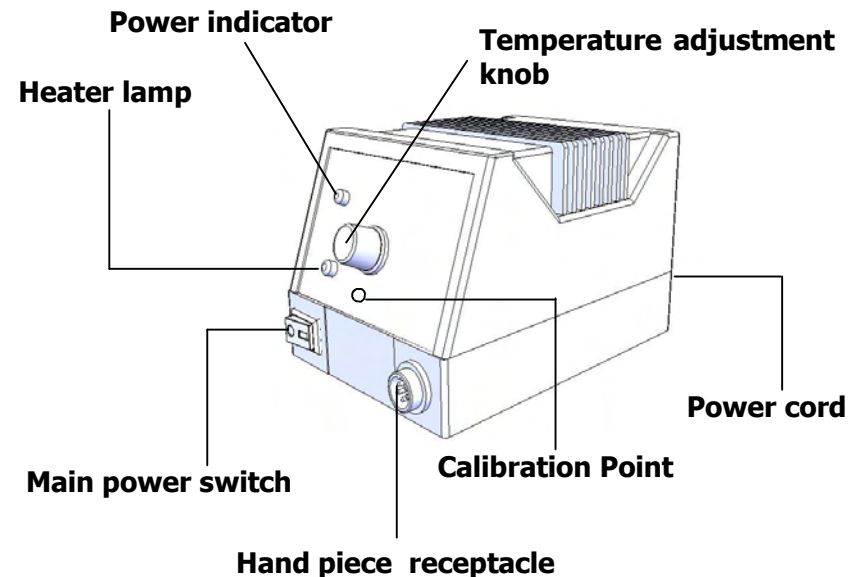
PACKAGE CONTENT

Please check if the listed parts below are included in the package:

TENMA 21-19800

Main Station	.....	1 unit
Soldering Iron	.....	1 pc.
Soldering Iron Stand (includes Sponge)	.....	1 pc.
Instruction Manual	.....	1 pc.
Power Cord	.....	1 pc.

PARTS GUIDE



CARE and SAFETY PRECAUTIONS



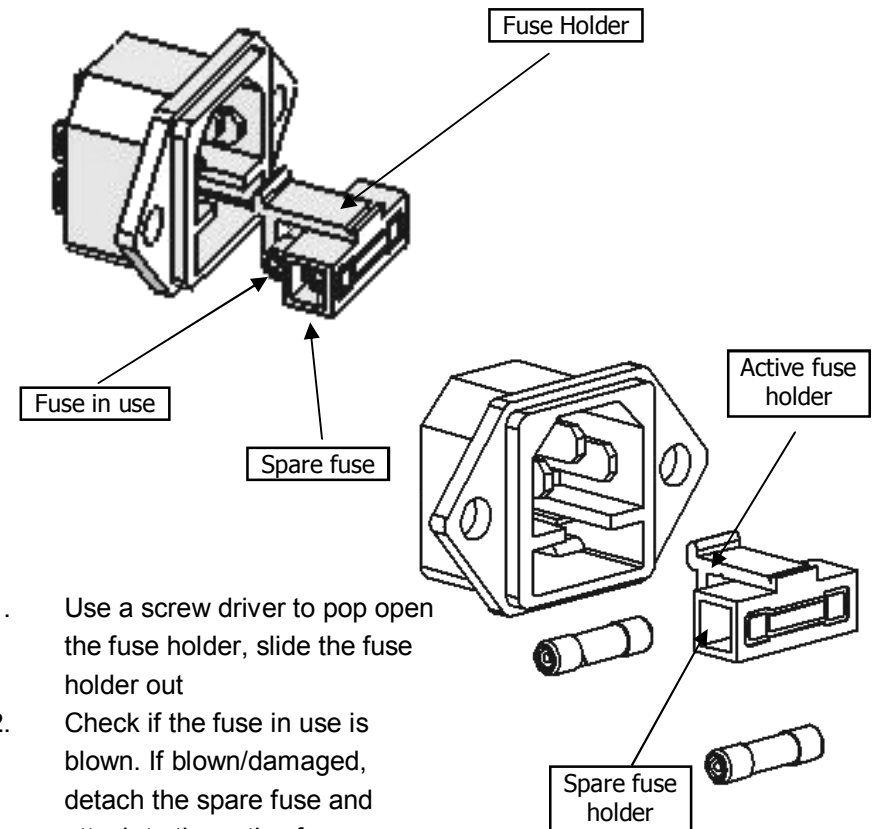
CAUTION: Misuse may cause injury and physical damage. For your own safety, be sure to comply with the following precaution.

- Temperature may reach a high of 480°C when turned on.
 - Do not use near flammable gases, paper and other materials.
 - Do not touch heated parts, can cause severe burns.
 - Do not touch metallic parts near the tip.
- Thermal Protector
 - This unit is equipped with an auto shut-off feature when temperature gets too high. The unit will automatically turn back when temperature drops to a safe level.
- Handle with Care
 - Never drop or sharply jolt the unit.
 - Contains delicate parts that may break if unit is dropped.
- Disconnect plug when not to be used for a long period of time.
 - Do not leave the unit powered on while unattended.
- Use only original replacement tips and parts.
 - Turn-off power and let unit cool before replacing parts.
- Soldering process produces smoke, make sure work area is well ventilated.
- Do not alter or the modify unit in any way.
- Never touch the element or tip of the soldering iron. They are very hot (about 750°F) and will give you a nasty burn.
- Take great care to avoid touching the electrical cord with the tip of the iron. The iron should have a heatproof cord for extra protection. An ordinary plastic cord will melt immediately if touched by a hot iron and there is a serious risk of burns and electric shock.
- Always return the soldering iron to its stand when not in use.
- Work in a well-ventilated area. The smoke formed as you melt solder is mostly from the flux and is quite irritating. Avoid breathing it by keeping your head on the side and not directly above of your work.
- Wash your hands after using solder. Solder may contain lead which is a poisonous metal.

CHANGING THE FUSE

Checking the fuse:

The Fuse can be found at the back of the unit, it is incorporated into the AC power receptacle. If fuse is blown replace with same type fuse only.

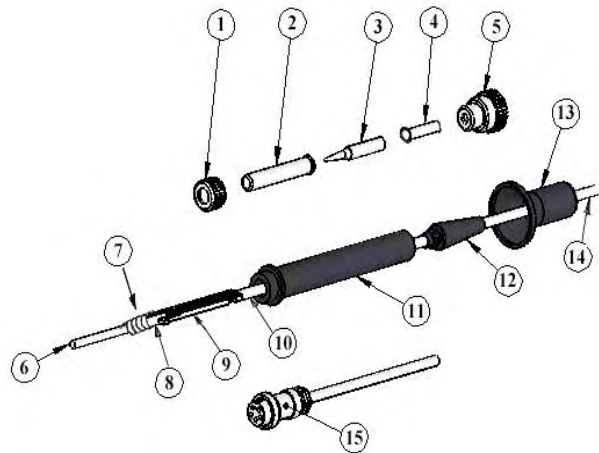


1. Use a screw driver to pop open the fuse holder, slide the fuse holder out
2. Check if the fuse in use is blown. If blown/damaged, detach the spare fuse and attach to the active fuse holder.)
3. Reattach the fuse holder.

REASSEMBLY OF HAND PIECE

After test or replacement of heating elements are done follow the following steps to reassemble the hand piece:

1. Slide in hand piece PCB into the main handle. Be sure to secure the PCB in the notch at the mouth of the main handle.
2. Attach the front module "5" to the main handle.
3. Slide in the Tip holder "4". Make sure the smaller end is inserted first as seen in the illustration below.
4. Insert the soldering iron tip "3" as seen below.
5. Secure the tip by inserting the tip enclosure "2" and nut "1" securely.
6. Reattach the hand piece plug "15" to the receptacle at the main station.
7. Recalibrate the soldering iron, see guide on tip care and maintenance section of this manual.



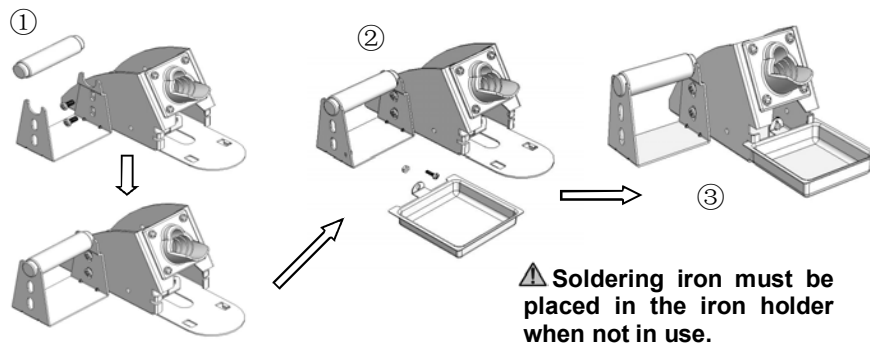
SPECIFICATION

Model#	21-19800
Power Consumption	35W
Fuse	0.5A
MAIN STATION	
Output Voltage	24V
Temperature Range	200—480 °C 392—896°F
Dimension	4.3"x3.7"x6.6" (W x L x H)
SOLDERING IRON	
Power Consumption	24V—60W
Tip to Ground Resistance	Less than 2 Ohm
Tip to Ground Potential	Less than 2 Ohm
Heating Element	Ceramic Heating Element
Power Cord	1.1 meters
Length	1.2 meters
Weight	100 grams
Design and specification might change without prior notice.	

ASSEMBLY and USAGE

I. SOLDERING IRON STAND

1. Assemble soldering iron stand.



2. Dampen the cleaning sponge with water, squeeze it dry and place it in its base.

II. SOLDERING IRON

1. Attach the soldering iron to the receptacle connector at the bottom right area of the main unit.
2. Place soldering iron to the soldering iron stand as shown in Fig. 1
3. Plug the power cord into a receptacle with ground.

III. MAIN UNIT

1. Turn on unit.
2. When the heater lamp blinks on and off then it means that the tip temperature has reached the set temperature and is ready for use.

REPLACING SOLDERING IRON CORD

When cord is proven to be faulty follow the steps to replace the cord:

1. Follow these steps to disassemble the hand piece (only to be done by a service professional or experienced technician).
2. Write down or make a brief illustration of wire configuration in the PCB.

Note : Different models have different configurations it is critical to have proper wire configurations clearly noted before proceeding to the next step. (See proper connections table for reference)

3. Unsolder the wires connecting the hand piece PCB and cord together.
4. Unattached the black wire connecting the cord and grounding spring together.
5. Detach the PCB from the cord by releasing the metal grips located at the bottom of the PCB .
6. Slide out the main handle , soft grip pad and tail end of the hand piece.
7. Insert the tail end and soft grip pad into the new cord.
8. Insert the new cord thought the main handle.
9. Solder the wires back into the PCB, using the proper configurations.
10. Re-attach the wires from the new cord to the grounding spring.
11. Bend the metal on the bottom end of the PCB to grip the cord firmly.
12. Follow “Reassembly of hand piece” procedure to complete the process.

TROUBLESHOOTING CONNECTIONS

Additional notes:

Proper connections table:

PIN	CORD COLOR	CORD COLOR	Heating element
1	RED	RED	RED
2	BLUE	BLUE	RED
3	BLACK	BLACK	SPRING
4	GREEN	GREEN	BLUE
5	WHITE	WHITE	WHITE

SOLDER TIP CARE and MAINTENANCE

- Tip Temperature

If the tip temperature is too high, it decreases the life of the tip. We suggest that you use the lowest possible temperature for the type of solder you are using. This not only prolong life of the tip, it also quickens heat recovery and decreases harm to sensitive components.

- Cleaning

The soldering iron tip should be cleaned after use by wiping it on the damp sponge found in the soldering iron stand, this is to get rid of burnt solder or fluxes that causes oxidation on the tip. Regular cleaning is also needed when tips are used for prolonged period of time (remove tip from soldering iron and clean it once a week). The solder tips are chrome electroplated on the surface and should be bright silver with no flux residue or solder on it.

 **Remember to tin the tip after cleaning in preparation for the next use.**

- When Not in Use

If a soldering iron does not have a thin consistent layer of clean solder over the entire surface, the tip has not been properly tinned. When you are not using your iron, make sure you leave a large lump of solder on the tip. This maintains the tinning on the tip, and the tip will last much longer. Many technicians mistakenly clean the tip before they put the iron into the holder. Leave the solder on the tip to protect it.

SOLDER TIP CARE and MAINTENANCE

- STEPS in Checking, Cleaning and Tinning the Tip

⚠ **Never use file or sharp rough objects in removing oxidation of the tip**

1. Set temperature to 250° C (482° F)
2. After real temperature reaches the set temperature, use a damp sponge to clean the tip and check for damages.
3. If the tip has oxidation, apply solder and wipe using the damp sponge, repeat these steps until oxidation is removed.
4. After cleaning, coat tip with a thin layer of clean solder and set it aside ready for the next usage.
5. If the tip shows disfiguration or has rust on it. Change the tip.

⚠ **Temperature calibration must be done every time you change the solder tip or change the heating element.**

- STEPS in Calibrating the Tip Temperature

1. Plug in station and turn it on.
2. Set temperature to 400° C (750° F)
3. Wait for Heater LED to light up.
4. Use an external sensor and place it on the solder tip.
5. Take off the rubber stop in the CAL point. Use a screwdriver, one that fits the CAL hole, to adjust the CAL point.

Turn clockwise - To increase temperature
Counterclockwise - To decrease temperature

6. Adjust until the external sensor reads 400° C (750° F).

TROUBLESHOOTING CONNECTIONS

Follow the following direction to test for hand piece cord faults:

Test 1: Rendering physical strain to the cord

1. Turn on the unit.
2. Set temperature to 900 °F.
3. Bend and straiten the entire length of the cord bit by bit. The heater lamp should always be lit while doing so. If the heater lamp becomes intermittent the cord is faulty and should be replaced.

Note: the Heater lamp will blink if the temperature of the soldering iron tip has reached the set temperature i.e. 480°C. this is not an indication of a faulty cord.

Test 2: Resistance test

1. Follow the steps in disassembling the hand piece .
2. Test for continuity between the following pins and colored wires at the hand piece PCB, all tests should register 0 to 2 Ω.
3. If any of the above mentioned combination does not register 0 Ω the cord is faulty and should be replaced.
4. See our “replacing the soldering iron cord”guide.

Pin 1 & Red wire	Pin 2 & BLUE wire
Pins 3 & BLACK wire	Pin 4 & GREENwire
Pin 5 & WHITE wire	

TROUBLESHOOTING CONNECTIONS

The 5 pin socket can be tested to detect faults in the handpiece:

Pins 4 & 2	∞
Pins 4 & 1	∞
Pins 5 & 1	∞
Pins 5 & 2	∞

Before plugging in the hand piece conduct the following test:

If any of the above mentioned combination registers a short review the steps in “replacing the heating element” to ensure proper connections.

⚠ Warning: Ensure none of the above mentioned conditions are present before plugging in the hand piece. Failure to do so can damage the internal circuitry of the unit.

Test the resistances of the following configurations:

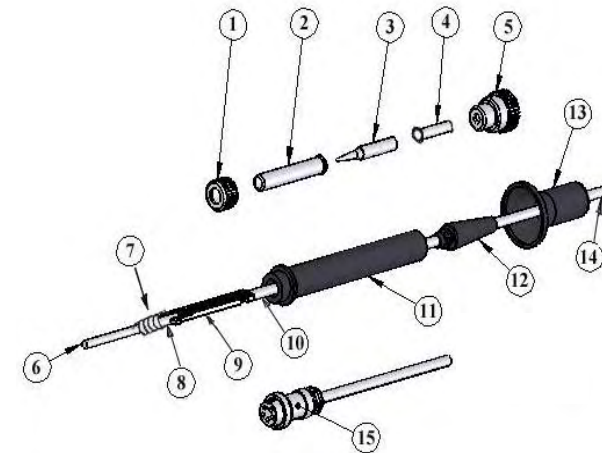
Pins 1 & 2	19 to 23 Ω
Pins 4 & 5	1.2 to 1.5 Ω
Pin 3 & solder tip	Below 2 Ω



DISASSEMBLING THE HAND PIECE

The hand piece may be disassembled for trouble shooting and repair:

1. Turn off main station and unplug from power source.
2. Detach the Soldering Iron Receptacle (“15” as shown in the figure below) from the main unit.
3. Turn the Copper Nut, (“1” as shown in the figure below) counter clockwise to loosen it.
4. Pull out the Tip Enclosure (“2” as shown in the figure below), the Solder Tip (“3” as shown in the figure below), and the Tip Lock (“4” as shown in the figure below).
5. Turn the Plastic Nut (“5” as shown in the figure below) counter clockwise to release it from the main body.
6. Push out the Heating Element (“6” as shown in the figure below) via the Wire Cord (“14” as shown in the figure below).



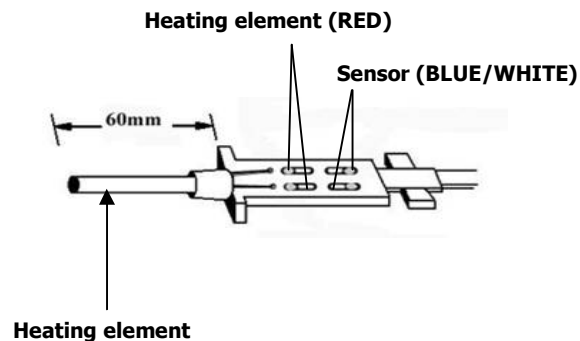
TESTING THE HEATING ELEMENT

To test if the heating element is in working condition:

Cool down assembly to room temperature before continuing the tests below:

1. Follow "*disassembling the hand piece*" guide.
2. Do the following tests on the hand piece PCB board:
 - ♦ Resistance value of heating element (RED) 2.5 — 3.5 Ω
 - ♦ After testing check results with the following:
 - ♦ If the resistance value is not as stated above replace the heating element.
 - ♦ If a 0 Ω or infinite resistances are measured check for shorts or open circuits.
 - ♦ Intermittent readings can also be caused by cold solder double check solder points if the heating element has recently been replaced.

To replace the heating element follow "*Replacing the heating element*" guide on the next page



REPLACING THE HEATING ELEMENT

The heating element can be replaced as follows:

1. Follow the steps in "disassembling the soldering iron".
 2. Unsolder the heating element wires (RED) and the sensor wires (blue and/ or white).
 3. The old heating element can now be detached from the hand piece board.
 4. Detach the metal protector located at the bottom part of the heating element.
 5. Reattach the metal protector to the bottom part of the new heating element.
 6. Pass the New heating elements wires (RED) thru the holes located on top of the board.
 7. Solder the heating element's wires and the sensor wires to the board match with the same colored wires (red wire to red wire on board, blue wire with blue wire on board etc.)
- ♦ Solder one RED wire of heating element with RED wire on PCB.
 - ♦ Solder the other RED wire of heating element with BLUE wire on PCB.
 - ♦ Solder BLUE wire of heating element with GREEN wire on PCB.
 - ♦ Solder WHITE wire of heating element to with WHITE wire on PCB.