



# **HAKKO 939**

**SOLDERING STATION**

## **Instruction Manual**

**No. 939-1**

*Thank you for purchasing the Hakko 939 Soldering Station. Please read this manual carefully before operating the Hakko 939. Store the manual in a safe, easily accessible place for future reference.*

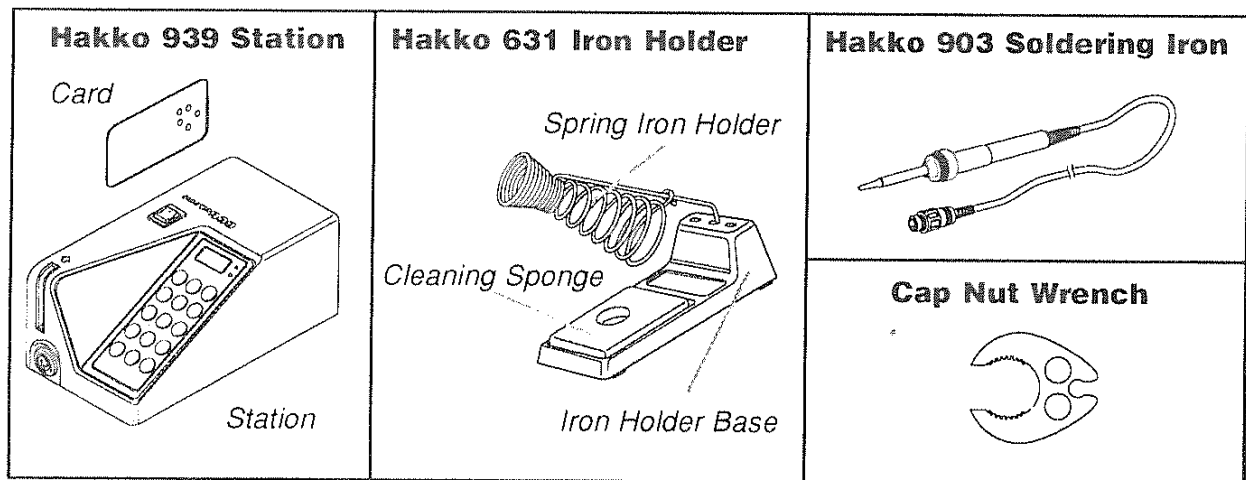
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# Packing List

Please check the contents of the Hakko 939 package and confirm that all the items listed below are included.

Item Name	Count
Hakko 939 Station	1
Soldering Iron (Hakko 903)	1
Card	1
Hakko 631 Iron Holder, consisting of...	
Iron Holder Base	1
Spring Iron Holder	1
Cleaning Sponge	1
Cap Nut Wrench	1
Instruction Manual	1



## Specifications

Station	Name	Hakko 939
	Power Consumption	120V AC, 60W
	Output Voltage	24V AC
	Temperature Range <sup>1</sup>	400-899°F/200-480°C
	Temperature Stability <sup>4</sup>	±18°F/±10°C of set temp.; ±1.8°F/±1°C of tolerance at idling time
	Dimensions	4.3 in. (W) x 3.3 in. (H) x 7.5 in. (D) (110 x 84 x 190mm)
Iron	Weight	3.5 lbs. (1.6 kg)
	Name	Hakko 903
	Power Consumption	24V AC, 50W
	Tip to Ground Resistance <sup>2</sup>	Under 2Ω
	Tip to Ground Potential <sup>3</sup>	Under 2mV (typical: 0.6mV)
	Heating Element	Ceramic Heater (integrated Heater/Tip)
	Cord Assembly <sup>2</sup>	Approx. 4 ft. (1.2m)
	Length	7.5 in. (190mm) (w/o cord)
	Weight	Approx: 0.1 lbs. (45g); (1.5 ozs. w/o cord)

- Notes**
- Although the Hakko 939 can be preset to any temperature between 200°F and 899°F (100°C and 480°C), it is most accurate at temperatures between 400°F and 899°F (200°C and 480°C).
  - Method of measurement is in accordance with MIL-STD-2000, 5-4-14.
  - Method of measurement is in accordance with MIL-STD-2000, 5-4-14.
  - Tolerance at idling time under the following conditions: Preset temperature: 700°F; Room temperature: 73.4°F; Tip: A1244 (Shape 1.6D); Still air.
- \* Specifications and design subject to change without notice.

# Precautions

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## **WARNING!**

In this instruction manual, "warning" and "caution" are defined as follows. For your own safety, be sure to comply with these precautions.

**WARNING!** Misuse may potentially cause death of, or serious injury to, the user.

**CAUTION!** Misuse may potentially cause injury to the user or physical damage to the objects involved.



## **CAUTION!**

When the power is on, the tip temperature is between 400°F and 899°F. Since mishandling may lead to burns or fire, be sure to comply with the following precautions.

- Do not touch metallic parts near the tip.
- Do not use the product near flammable items
- Advise other people in the work area that the unit can reach a very high temperature and should be considered potentially dangerous.
- Turn the power off while taking breaks and when you are finished using it.
- Before replacing parts or storing the unit, turn the power off and allow the unit to cool to room temperature.



## **CAUTION!**

To prevent damage to the unit and to ensure a safe working environment, be sure to comply with the following precautions.

- Do not use the unit for applications other than soldering.
- Do not rap the soldering iron against the work bench to shake off residual solder, or otherwise subject the iron to severe shocks.
- Do not modify the unit.
- Make sure to use only genuine Hakko replacement parts.
- Do not wet the unit or use the unit when your hands are wet.
- Do not bend or damage the cord. Should the cord become bent, do not force the cord into the station.
- The soldering process will produce smoke, so make sure the area is well ventilated.
- While using the unit, do not do anything which may cause bodily harm or physical damage.



## **CAUTION!**

To ensure accurate temperatures, be sure to adjust the temperature whenever the tip or soldering iron are replaced.

Instructions for temperature adjustment are on page 10. Please read this section carefully before using the Hakko 939.

# Names of Parts

## Soldering Iron (HAKKO 903)

### Handle

### Cap Nut

Secures the Tip to the Handle.

### Tip

Transmits heat to the solder or item to be soldered. Integrated with the Heating Element. Replaceable part.

## Station

### Power Switch

When turned to **ON**, starts the process of heating up the Heating Element.

### Card

Used to set and adjust the temperature.

### °C/°F Selector Button

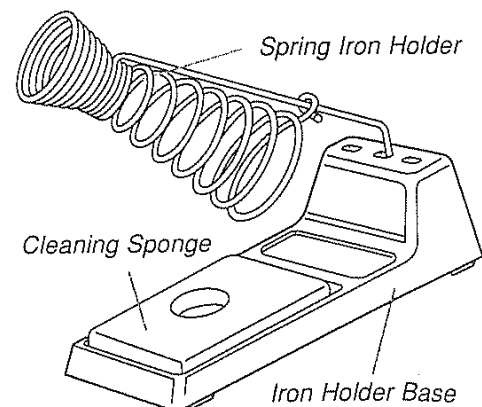
### Cord Assembly

### Receptacle

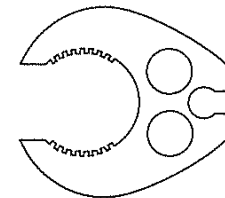
### Fuse Holder (Bottom Panel)

## Accessories

### Hakko 631 Iron Holder



### Cap Nut Wrench



### Power Cord (Back Panel)

### Grounding Terminal (Back Panel)

## Control Panel

### Temperature Display

Range: 400°F - 899°F (200—480°C).

### Heater Lamp

Steady: Tip is being heated.

Blinking: Tip is stabilized at preset temperature.

Off: Tip temperature is higher than the preset temperature. (Or when **S** button is not pressed.)

### Power Lamp

Lights up when Power Switch is turned to **ON**.

### \* Button

- Push to display the preset temperature.

- Push to change the sign (+ or -) after the **T** button is pressed.

### T Button

For adjusting the temperature after the soldering iron or tip has been replaced.

### Number Buttons

Used to input the desired preset temperature.

### R Button

Push when a mistake is made while inputting the preset temperature.

### S Button

- Push to set the preset temperature.

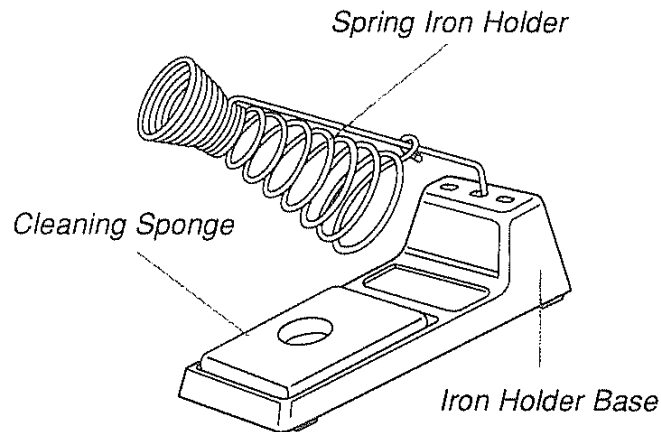
- Push to accept the temperature adjustment.

# Operating the Hakko 939

## Setting Up the Hakko 939

### 1. Assemble the Iron Holder

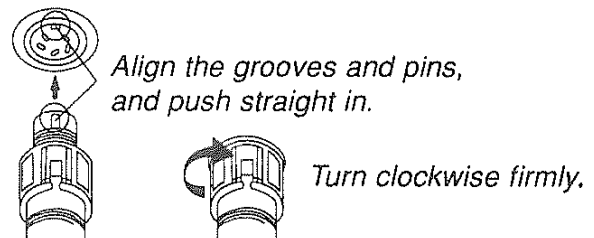
1. Fully insert the Spring Iron Holder into the hole in the base of the Iron Holder.
2. Dampen the Cleaning Sponge with clean water and place it in the base of the Iron Holder.



### 2. Connect the Soldering Iron to the Station

Be sure that the Power Switch is turned to **OFF** before connecting or disconnecting the Power Plug.

1. Insert the 5-pin Connecting Plug into the Receptacle on the Station. Lock the Plug by turning the Plug's outer ring clockwise.
2. Place the Soldering Iron into the Iron Holder.



### 3. Plug the Station into a Power Source

1. Plug the Power Cord into a grounded AC outlet.
2. Turn the Power Switch to **ON**.

#### **Note: when used at 700°F....**

- The temperature is preset at 700°F at the factory. The card is not needed if you intend to use this temperature.
- If the card is not used, the Heater Lamp (in the lower right corner of the Temperature Display) flickers when the temperature has stabilized at 700°F.

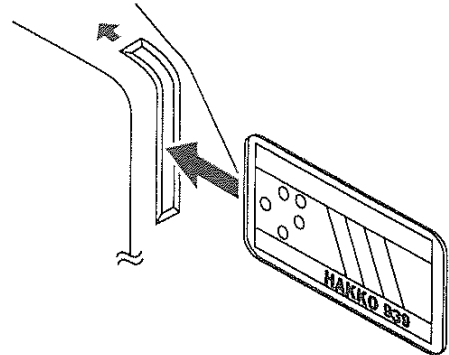
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## Setting or Changing the Temperature

### 4. Insert the Card

Insert the Card into the Card Slot in the Station. Be sure to insert the correct end into the Card Slot. After the **R** button is pressed, the Heating Element and the Digital Display will immediately turn off.

- If the Card is already inserted, press the **R** Button.



### 5. Input the desired temperature

Using the number buttons, input the desired tip temperature. For example, to set the tip temperature to 650°F, press the **6**, **5** and **0** buttons consecutively.

- Be sure to check the Temperature Display to confirm that you have entered the desired numbers. If you make a mistake while entering the temperature, press the **R** button and reenter the temperature.

#### **Using the Push Buttons...**

With the exception of the **°C/°F** and **\*** buttons, the Card must be inserted for the buttons to function.

- \*** Used to confirm the set temperature and to change the sign (+ or -) of the temperature adjustment.
- R** Used when an error is made in entering a temperature value.
- S** Used to set (change) the temperature and during temperature adjustment.
- 0-9** Used to set (change) the temperature and during temperature adjustment.
- T** Used to adjust the tip temperature.
- °C/°F** Used to select Centigrade or Fahrenheit for temperature display.

### 6. Set the temperature

Push the **S** button to set the temperature. The tip temperature will now be maintained at the preset temperature.

- The Heating Element will not begin warming up until the **S** button is pressed.
- The preset temperature value is displayed for 3 seconds after the **S** button is pressed. After that, the actual tip temperature is displayed. When it reaches 700°F (when the Heater Lamp begins to blink), the tip is at the preset temperature.
- To recall the preset temperature, press and hold down the **\*** button.

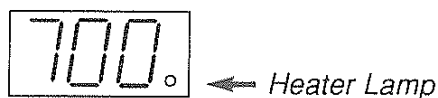
### 7. Begin Soldering

When the Tip reaches the preset temperature, begin soldering.

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### **Heater Lamp...**

1. The Heater Lamp has 3 possible indications.



- |          |  |
|----------|--|
| ON       | Tip is warming up.   |
| BLINKING | Tip temperature has stabilized at the preset temperature.  |
| OFF      | a) <b>S</b> button has not been pressed.   |
|          | b) Tip temperature is higher than the set temperature. Heater Lamp starts flickering only after the tip temperature reaches the set temperature. |
2. If the tip does not heat up even though the heater lamp is lit, the Heating Element is faulty and must be replaced. (See **Replacing the Tip** on page 9.)
  3. If the Temperature Display indicates "**EEE**"...
    1. The sensor (including the sensor circuit) is faulty.
    2. The tip has overheated because the temperature control function has failed.
    3. The tip temperature is higher than 932°F/500°C because of an error in temperature adjustment.

**Note:** As soon as "**EEE**" is displayed, the heating element turns off. The unit will continue to display "**EEE**" until the tip temperature drops to 899°F/480°C.

### **Card...**

1. After setting the temperature, remove the card. The preset temperature cannot be changed until the card is reinserted, even if the power switch is turned off. This prevents anyone else from changing the temperature and ensures safe temperature control.
2. Even if the card is left in the Station, the Hakko 939 will operate normally. If the power is turned off while the card is inserted, when the power is turned on the next time, the soldering iron will heat to the previously set temperature. To change the temperature setting, press the **R** button, set the temperature, and press the **S** button. (See **Setting the Temperature** on page 7 for complete instructions.)
3. Any Hakko 939 Card can be used with any Hakko 939 station.

# Tip Care and Use

*The Hakko 939's integrated tip/heater provides faster thermal recovery, while the embedded sensor ensures quick detection of changes in the tip temperature.*

## Tip Temperature

High soldering temperatures can degrade the tip. Use the lowest possible soldering temperature for each particular job—the Hakko 939's excellent thermal recovery characteristics ensure efficient and effective soldering even at low temperatures. This also helps protect the soldered items from thermal damage.

## Cleaning

Be sure to clean the tip regularly with a cleaning sponge as oxides and carbides from the solder and flux can form impurities on the tip. During soldering, these impurities can transfer to the soldering joint where they can result in defective joints or reduce the tip's heat conductivity. This will impair the conductivity of heat, causing the tip temperature to increase and damaging both the tip and the board.

## When Not in Use

Never leave the soldering iron sitting at high tip temperatures for long periods of time as the tip's solder plating will become covered with oxide, which can greatly reduce the tip's heat conductivity.

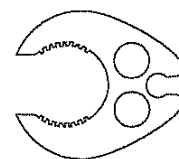
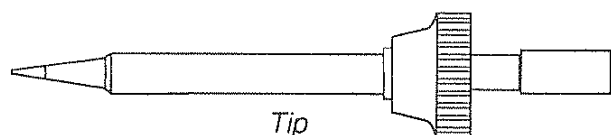
## After Use

After use, wipe the tip clean and coat the tip with fresh solder. This helps prevent tip oxidation.

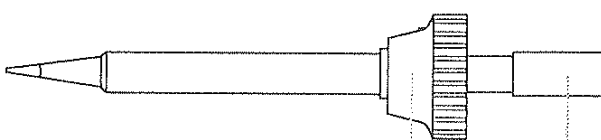
## Replacing the Tip

*Tips for a wide range of soldering needs are available for your Hakko 939 Soldering Station. A list of these tips can be found on page 16 of this Instruction Manual.*

1. Turn off the power switch and disconnect the Soldering Iron from the Station.
2. Using the supplied Cap Nut Wrench, loosen the Cap Nut securing the Tip to the Handle.
3. Remove the Tip.
4. Connect the Tip Connector to the Connector inside the Handle. The Connector Pins have no specific orientation.
5. Tighten the Cap Nut with the Cap Nut Wrench.
6. Adjust the temperature. (See **Adjusting the Tip Temperature.**)

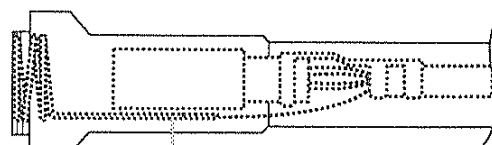


Cap Nut Wrench



Cap Nut

Tip Connector



D-sleeve



# Adjusting the Tip Temperature

*The HAKKO 939 has been tested and calibrated at the factory. Temperature adjustment will be necessary, however, whenever the Tip or the HAKKO 903 Soldering Iron is replaced.*

## Adjusting the tip temperature with a tip thermometer

1. Insert the card into the card slot in the station. Using the station's number and function buttons, input the desired temperature. For example to set the station to 700°F, press **R**, **7**, **0**, **0**, and **S**.
2. When the Heater Lamp begins to blink, measure the temperature at the Tip with a tip thermometer.
3. If the tip temperature is within  $\pm 18^\circ\text{F}/\pm 10^\circ\text{C}$  of the set temperature, adjustment is not necessary.
4. When the measured tip temperature is higher or lower than the station's displayed temperature, adjustment is necessary. For example, when the station's displayed temperature is 700°F and...

**...the measured tip temperature is 740°F; higher than the station's displayed temperature...**

- a. Press the **T** button.
- b. Press the **\*** button until the digital display shows a '-' (minus) sign.
- c. Use the number buttons to input the temperature difference between the tip temperature and the displayed temperature. For example, if the temperature difference is 40°F, press the **4** and **0** buttons. The digital display will read **-40**.
- d. Press the **S** button. After 3 seconds, the actual tip temperature is displayed. When it reaches 700°F, the Heater Lamp will begin blinking. The tip temperature will now be maintained at 700°F.

**...the measured tip temperature is 660°F; lower than the station's displayed temperature...**

- a. Press the **T** button.
  - b. Press the **\*** button until the digital display is blank. This indicates a '+' (plus) condition. (A '+' (plus) sign is not displayed.)
  - c. Use the number buttons to input the temperature difference between the tip temperature and the displayed temperature. For example, if the temperature difference is 40°F, press the **4** and **0** buttons. The digital display will read **40**.
  - d. Press the **S** button. After 3 seconds, the actual tip temperature is displayed. When it reaches 700°F, the Heater Lamp will begin blinking. The tip temperature will now be maintained at 700°F.
5.
    - If an error is made during input, press the **T** button and begin the procedure again.
    - To cancel the adjustment procedure, press the **T** button and then the **S** button.

## Adjusting the tip temperature with a room thermometer

*Adjustment based on the room temperature is less accurate than adjustment with a tip thermometer. For greater accuracy, HAKKO recommends adjustment the tip temperature with a tip thermometer.*

1. Allow the HAKKO 939 to cool to room temperature for one hour.
2. Press and hold down buttons 4 and 5 simultaneously and turn the power switch on. The temperature display should indicate "888". Should you make a mistake, the station will start up normally and the heating element will begin warming up. Should this happen, turn the station off and wait until it has again cooled to room temperature.
3. Press 1. Confirm that the display reads "00". If it doesn't, it will be necessary to manually adjust it. For example, if the display reads "20", ...
  - a. Press **T**.
  - b. Press the **\*** button until the display shows a "-" (minus) sign.
  - c. Press **20** and **S**. This will reset the display to "00".
  - d. Press **1** to confirm the new display value.

4. Press **0**. Confirm that the display shows the room temperature. If it doesn't, it will be necessary to manually adjust it. For example, if the display shows 80°F (27°C) and the actual room temperature is 70°F (21°C)...
  - a. Press **T**.
  - b. Press the **\*** button until the display shows a minus sign ("−").
  - c. Press **10** and **S**. (For centigrade, press 6 and **S**.) This will adjust the display downward by 10°F (6°C).
  - d. Press **0** to confirm that the display shows 70°F (21°C)—the actual room temperature.
5. Turn off the power switch when adjustment is completed.
6. Turn on the power switch to start soldering.

### Maximum Adjustment Value

*If the unit does not accept the input value, the station may have exceeded the allowable difference. The maximum allowable difference for any single adjustment is  $\pm 199^{\circ}\text{F}/\pm 99^{\circ}\text{C}$ , while the total allowable difference is  $\pm 199^{\circ}\text{F}/\pm 110^{\circ}\text{C}$ . (See example below.) It is rare, however, that either of these limits is exceeded under normal usage.*

### Example

For the purposes of this example, we shall assume that the Hakko 939 was adjusted at the factory to a setting of -40°F. This value will be seen the first time the tip temperature is adjusted. The following values will be displayed the first time the tip temperature is adjusted.

**Measured difference between tip temperature and displayed temperature: +20°F**

Button	.....	T	.....	*	(+)	.....	2	.....	0	.....	S
Display	.....	-40	.....	40	.....	2	.....	20	.....	20	

The next time the tip temperature is adjusted, the station will display the sum of the factory-set value and the value input the first time the tip temperature is adjusted.

**Measured difference between tip temperature and displayed temperature: +100°F**

Button	.....	T	.....	*	(+)	.....	1	.....	0	.....	0	.....	S
Display	.....	-20	.....	20	.....	1	.....	10	.....	100	.....	100	
Sum	.....	(-40+20=-20)											

And the next time...

**Measured difference between tip temperature and displayed temperature: ...°F**

Button	.....	T
Display	.....	80
Sum	.....	(-20+100=80)

The maximum value of the sum (of the value displayed when the **T** button is pressed and the input value) is  $\pm 199^{\circ}\text{F}$  ( $\pm 110^{\circ}\text{C}$ ). In addition, the maximum value that can be input at any one time is  $\pm 199^{\circ}\text{F}$  ( $\pm 99^{\circ}\text{C}$ ).

### CAUTION!



1. While performing the temperature adjustment procedure, the unit will maintain control of the temperature until the **S** button is pressed.
2. The temperature adjustment values are stored in the station and will be maintained even if the power is turned off.

# Maintenance

*Properly maintained, the Hakko 939 Soldering Iron will provide years of good service.*



## WARNING!

Disconnect the power plug before servicing. Failure to do so may result in electric shock.

## Inspect and Clean the Tip

1. Set the temperature to between 500°F and 600°F and allow the Tip to warm up.
2. When the temperature stabilizes, clean the Tip with the Cleaning Sponge and check the condition of the Tip.
3. If there is black oxide on the solder-plated portion of the Tip, apply new, flux-containing solder and wipe the Tip on the Cleaning Sponge. Repeat until the oxide is completely removed. Coat with new solder.

**Note:** Never use a file to remove oxide from the Tip as the Tip may become damaged.

4. If the Tip is deformed or heavily eroded, replace it with a new one.

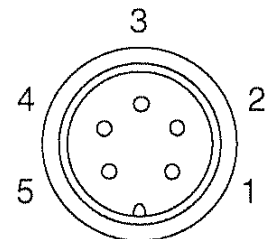
## Check the resistance between the Tip and the Grounding Pin

1. Follow the cleaning procedure above (**Inspect and Clean the Tip**) to clean the Tip.

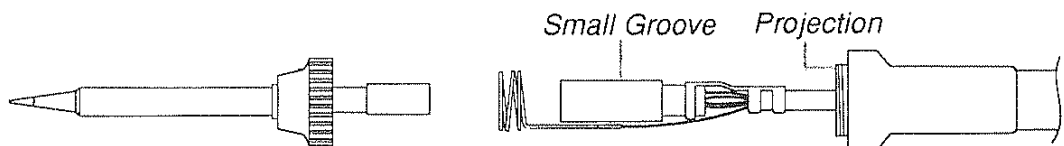
**Note:** If the Tip is coated with flux or oxide the resistance measurement will not be accurate.

2. Measure the resistance between the Tip and the Grounding Pin of the Power Cord Connecting Plug. The correct resistance value is less than 2Ω. If the measured value is outside this range, check the following.

- a. Is the Connecting Plug correctly plugged in?
- b. Is there oxide on the surfaces of the Tip Flange or Grounding Spring which would prevent them from contacting cleanly? If so, remove the oxide.



Connecting Plug Pins



- c. Is the Grounding Line of the Cord Assembly damaged? Measure the resistance between pin 3 and the Grounding Spring. If the resistance is above 2Ω, the cord is damaged and the Cord Assembly must be replaced. (See **Replacement Parts** on page 15)
- d. Is the Grounding Line of the Power Cord damaged? Measure the resistance between the Grounding Terminal on the rear of the Station Case and the Grounding Pin of the Power Cord. If the resistance is above 2Ω, the Grounding Line may be faulty and the Cord Assembly must be replaced.

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## Assembly

1. Insert the Grounding Spring into the D-sleeve and pull it into place.
  2. Place the Grounding Spring in the large groove in the Housing.
  3. Align the projection on the inside of the Handle with the small groove in the Housing and gently insert the Housing into the Handle.
  4. Pull the Cord Assembly so that the entire assembly slides back into the Handle.
  5. Connect the Tip Connector to the connector inside the Handle. The connector pins have no specific orientation.
  6. Replace the Cap Nut and tighten it with the Cap Nut Wrench.
- 

## Troubleshooting Guide

### **The Power Lamp (°F) (°C) does not light up when the Power Switch is turned on**

1. Is the Fuse blown?
  - Determine why the fuse blew and eliminate the cause, then replace the Fuse.
2. Is the Power Cord disconnected?
  - Connect it. If the Power Lamp still does not light up, check the Power Cord.

### **The Tip does not heat up**

1. Are the Power Cord and Cord Assembly correctly connected?
  - Make sure that they are correctly connected.
2. Is the Tip Connector correctly connected?
  - Make sure that it is correctly connected.
3. Has the Heating Element or Sensor failed?
  - **Check the Heating Element**  
Measure the resistance between pins 4 and 5 of the Connecting Plug. It should be between 2.5Ω and 3.5Ω at a room temperature of 73.4°F (23°C). If it is not, replace the tip.
  - **Check the Sensor**  
Measure the resistance between pins 1 and 2 of the Connecting Plug. It should be between 43Ω and 58Ω at a room temperature of 73.4°F (23°C).

### **The Tip temperature is too low**

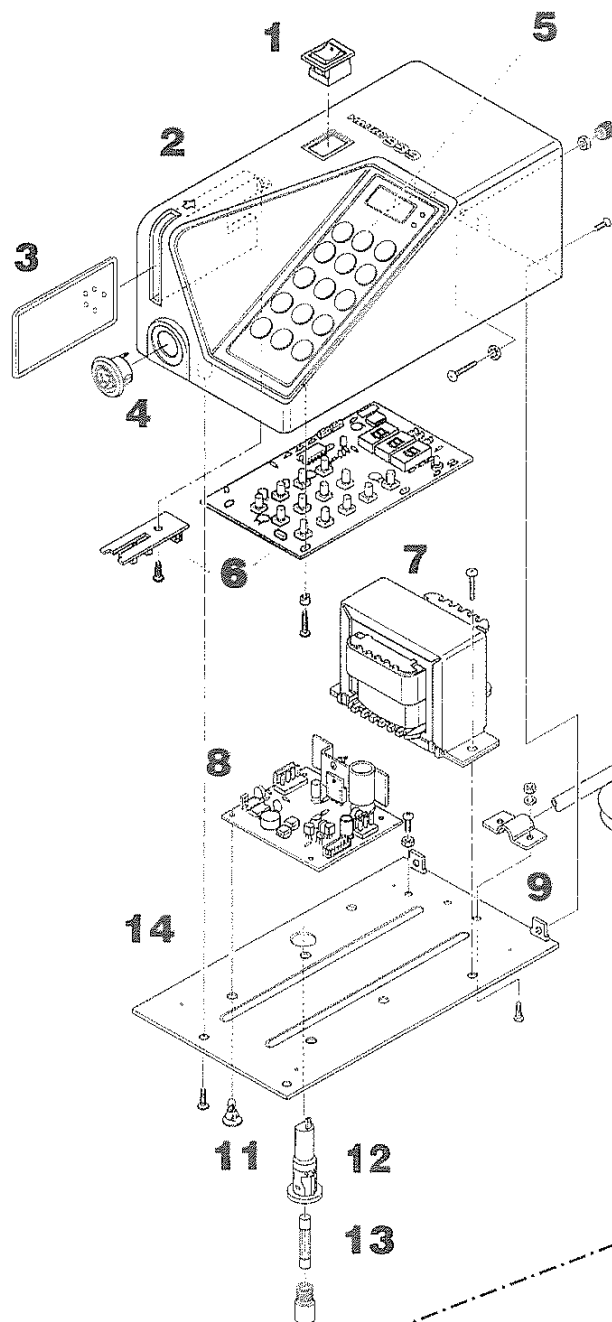
1. Is the Tip coated with oxide?
  - Remove the oxide. (See **Maintenance: Inspect and Clean the Tip.**)
2. Is the Tip worn out?
  - Replace the Tip.

### **The Tip quickly wears out**

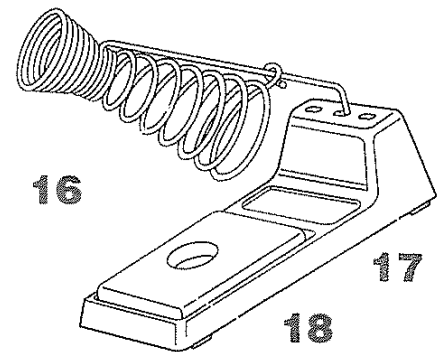
1. Is the preset temperature too high?
  - Set an appropriate temperature.
2. Is the Iron often left sitting for a long time at a high temperature?
  - Turn the power off when not in use.

# Replacement Parts

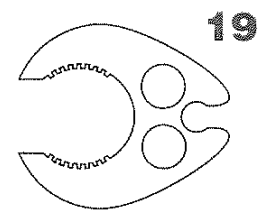
## Station



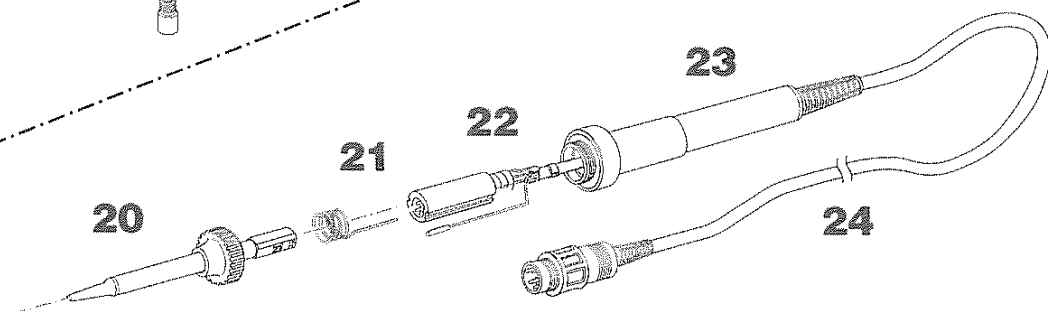
## Iron Holder



## Wrench



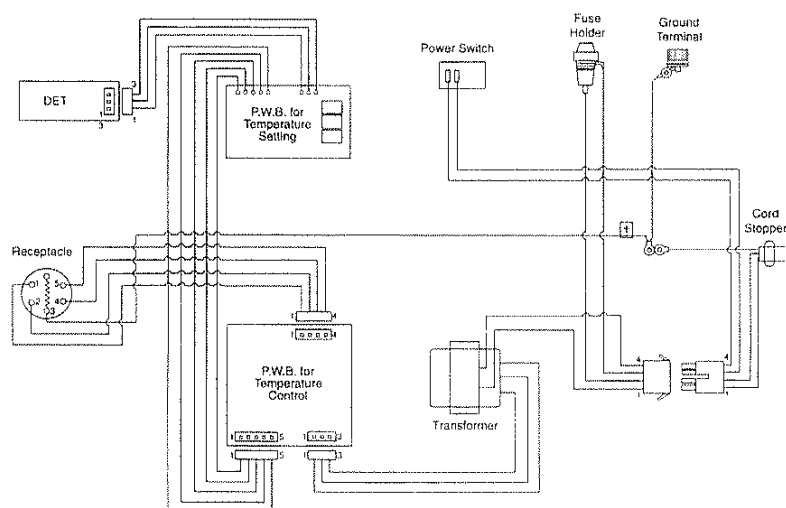
## Soldering Iron



# Replacement Part Number Chart

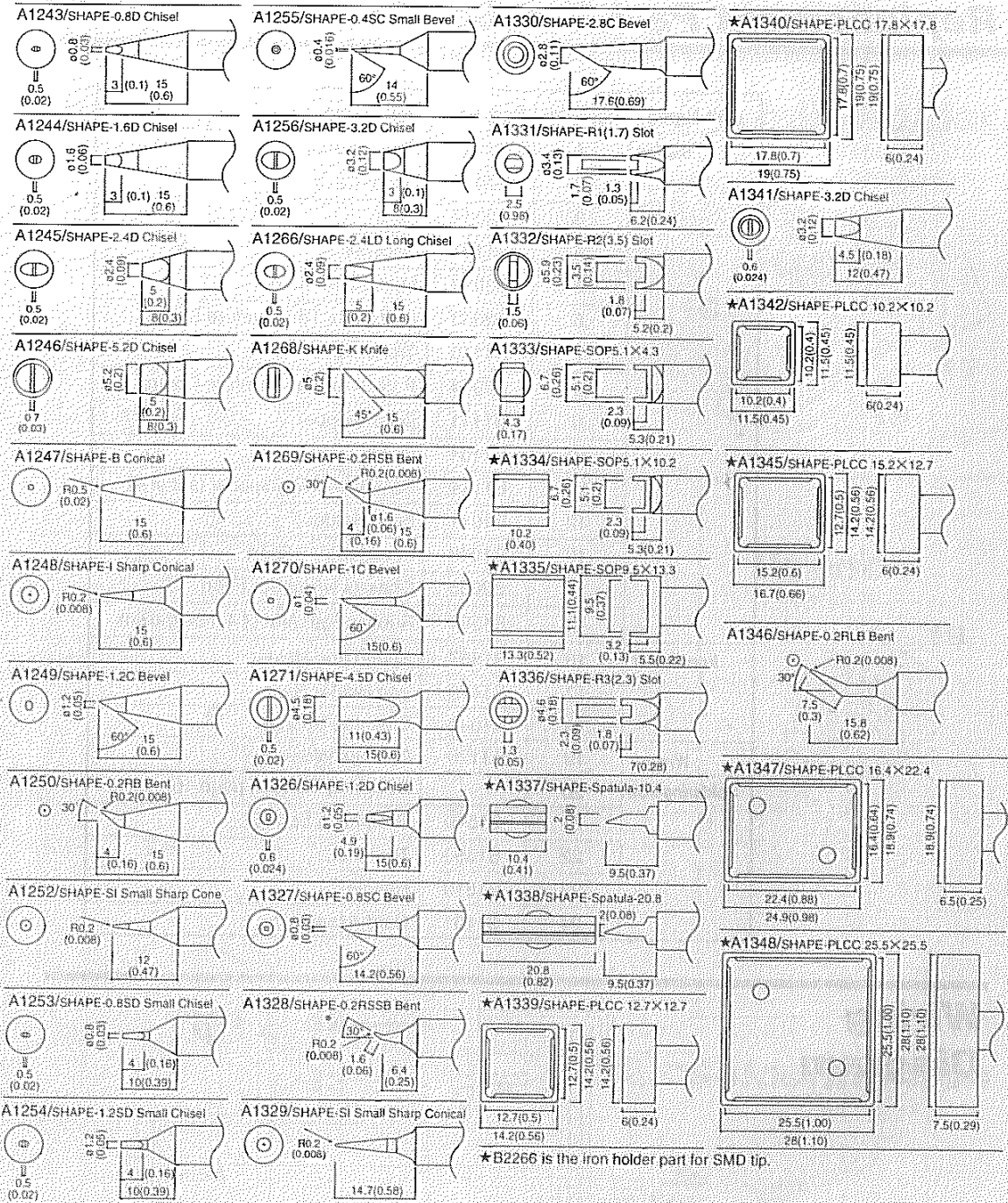
Unit Name	Item No.	Part No.	Part Name
<b>Station</b>	1	B1109	Power Switch
	2	B2051	Upper Case
	3	B2052	Card
	4	B1107	Receptacle
	5	B2056	Membrane Sheet
	6	B2053	P.W.B. for Temperature Setting
	7	B1110	Transformer
	8	B2054	P.W.B. for Temperature Control
	9	B1111	Cord Stopper
	10	B1104	Power Cord
	11	B1114	P.W.B. Locking Spacer (set of 4)
	12	B1041	Fuse Holder
	13	B1042	Fuse (125V—2A)
	14	B2055	Chassis w/Rubber Feet
	15	B1204	Rubber Feet (set of 4, not shown)
<b>Iron Holder</b>	16	B1857	Spring Iron Holder
	17	B1470	Iron Holder Base
	18	A1042	Cleaning Sponge
<b>Wrench</b>	19	B1126	Cap Nut Wrench
<b>Soldering Iron</b>	20		Soldering Tip (see page 16)
	21	B1549	Grounding Spring
	22	B1550	Terminal
	23	B1810	Handle
	24	B1101	Cord Assembly

## Wiring Diagram



# Tips

Measurements shown are in millimeters and (inches).



**HAKKO**  
HAKKO CORPORATION  
http://www.hakko.com  
HEAD OFFICE  
4-5, SHIOKUSA 2-CHOME, NANIWA-KU, OSAKA, 556-0024 JAPAN  
TEL: (06) 6561-3225 FAX: (06) 6561-8466  
TLX: HAKKOOSA J65274

**OVERSEAS AFFILIATES**  
U.S.A.: AMERICAN HAKKO PRODUCTS, INC.  
28920 N. AVENUE WILLIAMS VALENCIA, CA 91355, U.S.A.  
TEL: (661) 294-0090 FAX: (661) 294-0096  
Toll Free (800) 88-HAKKO  
http://www.hakkousa.com

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