



HAKKO 941

SOLDERING STATION

High-output, temperature controlled
compact soldering station

Instruction Manual



Thank you for purchasing the Hakko 941 soldering station. This high-output, temperature controlled compact soldering station uses a composite tip, incorporating heater and sensor functions into one element. Several process control features, unique to the Hakko 941, make it applicable to a broad range of soldering applications.

Please read this manual before operating the Hakko 941. Keep this manual readily accessible for reference.

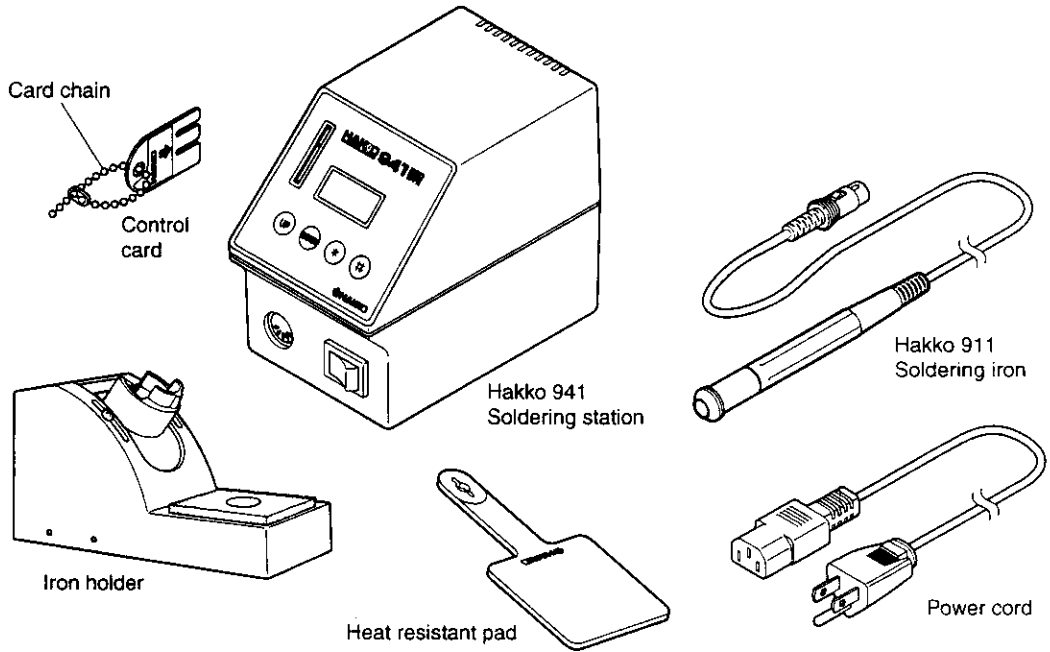


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1. PACKING LIST

Hakko 941 soldering station	1	Iron holder	1
Hakko 911 soldering iron	1	Cleaning sponge	1
Power cord	1	Instruction manual	1
Control card	1	Card chain	1
Heat resistant pad	1	Tips (not included)	



2. SPECIFICATIONS

● Hakko 941 soldering station

Power consumption	50 W. total
Temperature range	200°– 450°C. (400°– 840°F.)
Temperature accuracy	±10°C. (±18°F.) of set temperature. See Figure 1.
Temperature stability	±5°C. (±9°F.) at idle temperature

● Station

Output	15 V., 3 A.
Dimensions (l × w × h)	145 × 85 × 108 mm. (5.7 × 3.3 × 4.3 in.)
Weight	1,300 g. (2.9 lb.)

● Hakko 911 soldering iron

Power consumption	45 W. (15 V.)
Tip to ground resistance	< 2 Ω
Tip to ground potential	< 2 mV.
Length, less cord	172 mm. (6.8 in.) with 2.4D tip
Weight, less cord	30 g. (0.067 lb./1.07 oz.) with 2.4D tip
Length of cord	1.2 m. (4 ft.)

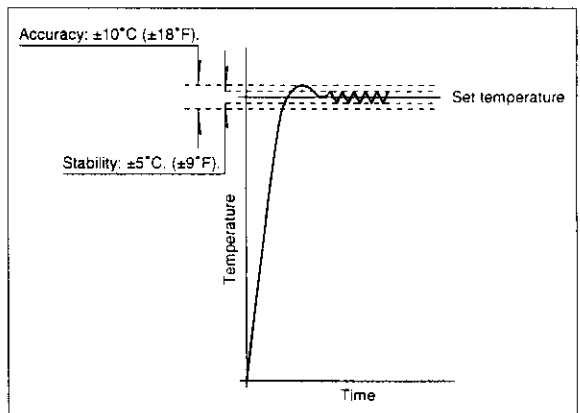


Figure 1. Temperature accuracy and stability.


NOTE:


The temperatures were measured using the Hakko 191 thermometer.

This product is protected against electrostatic discharge. Specifications and design are subject to change without notice.

3. WARNINGS, CAUTIONS, NOTES AND EXAMPLES

Warnings, cautions and notes are placed at critical points in this manual to direct the operator's attention to significant items. They are defined as follows:

 **WARNING:** Failure to comply with a WARNING may result in serious injury or death.

 **CAUTION:** Failure to comply with a CAUTION may result in injury to the operator, or damage to the items involved. Two examples are given below.

NOTE: A NOTE indicates a procedure or point that is important to the process being described.

EXAMPLE: An EXAMPLE is given to demonstrate a particular procedure, point or process.

CAUTION

When power is ON, tip temperatures will be between 200° and 450°C. (392° to 840°F.) To avoid injury or damage to personnel and items in the work area, observe the following:

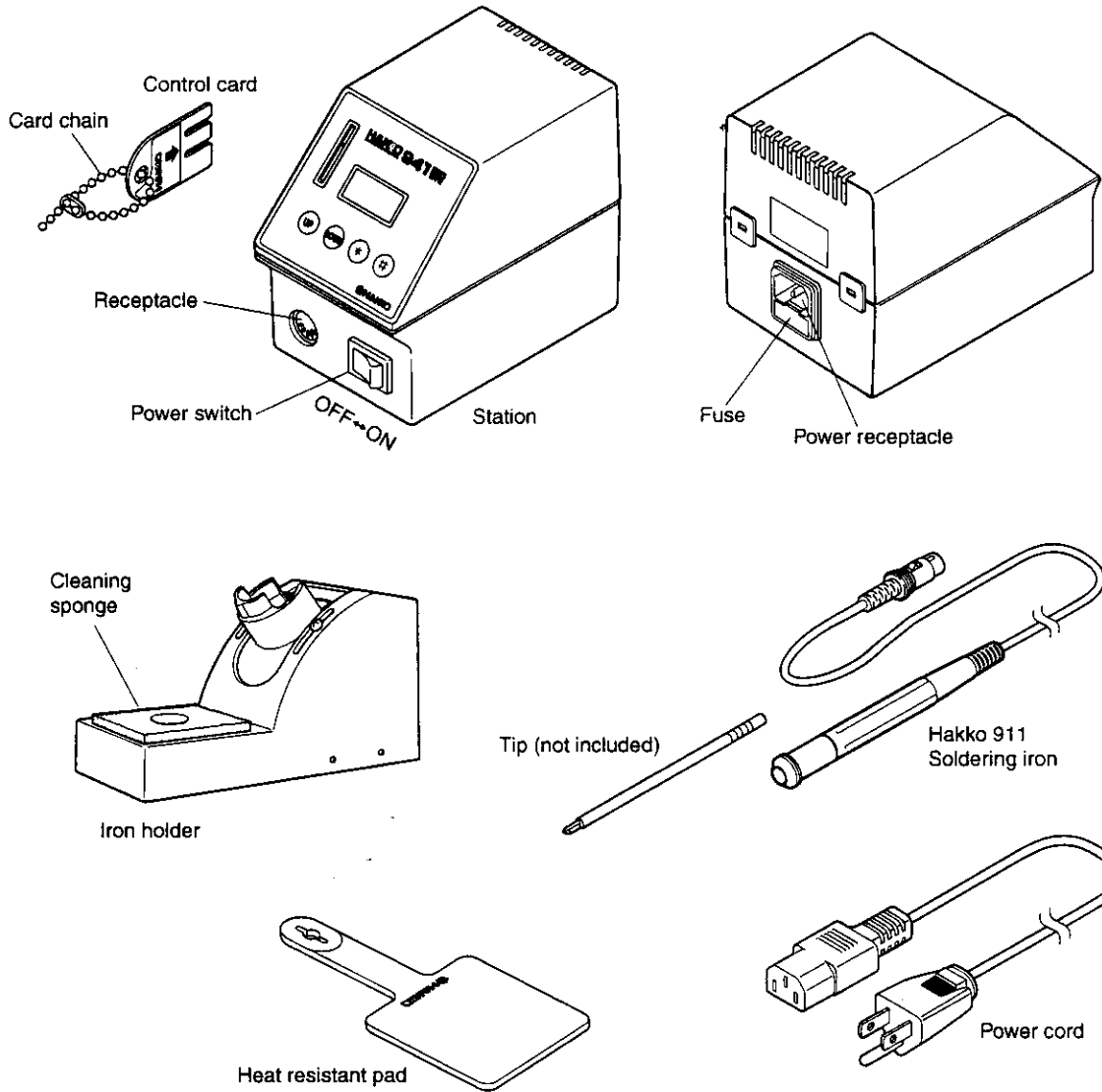
- Do not touch the tip or the metal parts near the tip.
- Do not allow the tip to come close to, or touch, flammable materials.
- Inform others in the area that the unit is hot and should not be touched.
- Turn the power off when not in use, or left unattended.
- Turn the power off when changing parts or storing the Hakko 941.

CAUTION

To prevent accidents or damage to the Hakko 941, be sure to observe the following:

- Do not use the Hakko 941 for applications other than soldering.
- Do not allow the Hakko 941 to become wet, or use it when hands are wet.
- Do not modify the Hakko 941.
- Use only genuine Hakko replacement parts.
- Do not bend or damage the control card. If the card does become damaged, do not force the card into the station slot.
- Do not strike the iron against hard objects to remove excess solder. This will damage the iron.
- Remove power and iron cords by holding the plug – not the wires.
- Be sure the work area is well ventilated. Soldering produces smoke.
- The Hakko 941 is not intended for use by children or infirm persons without supervision.
- Children should be supervised to ensure that they do not play with the Hakko 941.

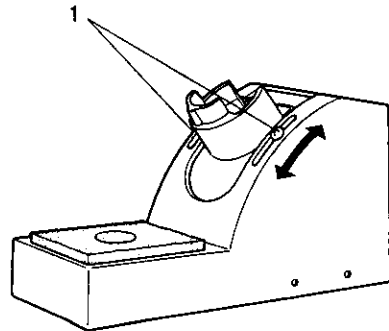
4. PART NAMES



5. INITIAL SETUP

A. Iron holder

1. Adjust the height of the iron holder to suit, as follows:
 - i. Loosen the adjusting screws.
 - ii. Set the iron holder to the desired height.
 - iii. Tighten the screws.



2. Put the small cleaning sponge in one of the four holes in the iron holder base.
3. Add water to the level shown in the accompanying illustration. The small sponge will keep the large sponge moist through capillary action.
4. Wet the large cleaning sponge, squeeze it dry, and put it on the iron holder base.
 - OR -
 Wet the large cleaning sponge, squeeze it dry, and put it on the iron holder base.

B. Handpiece

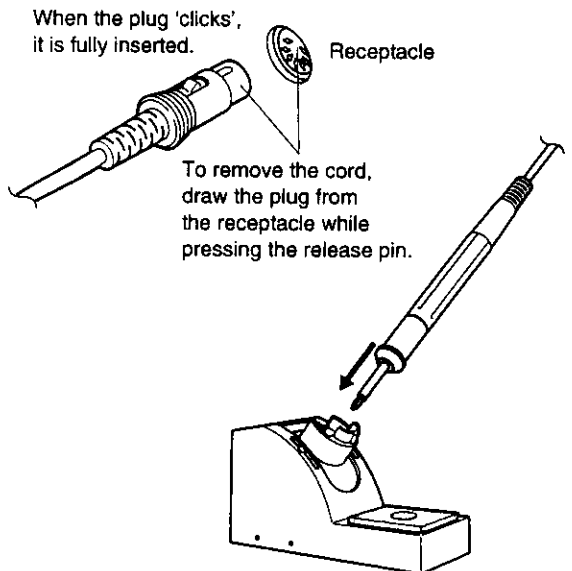
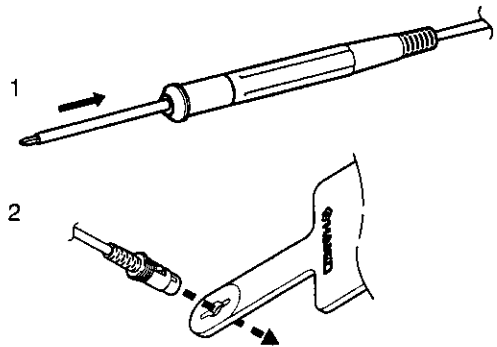
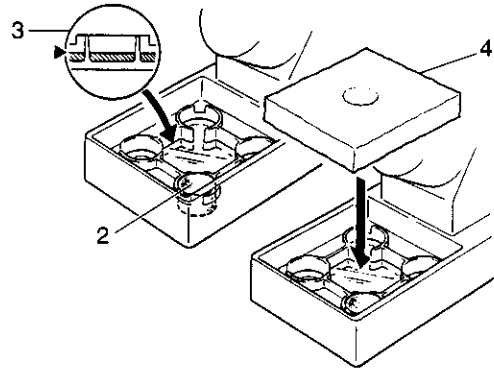
1. Insert the tip fully into the handpiece (Hakko 911).
 There are no orientation requirements.
2. Pass the iron cord through the hole in the heat resistant pad.

C. Soldering station

CAUTION:
 Be sure the power switch is OFF before connecting or disconnecting the soldering iron cord. Failure to do so may result in damage to the circuit board.

1. Insert the power cord into the receptacle at the back of the station.
 Insert the soldering iron cord into the receptacle at the front of the station.
2. Set the iron in the iron holder.
3. Plug the power cord into a grounded wall socket. The Hakko 941 is protected against electrostatic discharge and must be grounded for full efficiency.

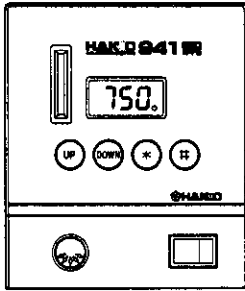
NOTE:
 Be sure the cleaning sponge is kept CLEAN and DAMP. A dirty sponge will transfer contaminants to the soldering tip, reducing thermal efficiency and possibly causing defective solder joints. A dry sponge will abrade the soldering tip, reducing its life.



6. OPERATION

Controls and displays

Controls



The front panel of the Hakko 941 soldering station has the following controls:

- A power on/off switch.
- Four control buttons:
 - **#** – Initiates a data entry mode.
 - ***** – End of sequence signal (terminates a phase of a data entry mode); when pressed for less than one second, displays settings already stored.
 - **UP** – increases the value in the appropriate display window.
 - **DOWN** – decreases the value in the appropriate display window.

Displays

The Hakko 941 has a three-digit display element. Depending upon the selected mode, it will display:

- Normal mode:
Sensor temperature (tip temperature)
- Data entry:
Selected quantity (see 'data entry procedures' for exact characteristics)
- Temperature scale:
°C or °F, depending upon selection
- Error detection:
Refer to 'ERROR MESSAGES' section

In addition, a single heater lamp will flash when the station has reached the desired temperature, indicating that it is ready for use.

An audible alarm is provided to alert the operator when:

- The station has reached the set temperature. The buzzer will sound once.
- The low temperature threshold has been crossed. This alarm will shutoff when the sensed temperature returns to the acceptable range.

1. Turn the power switch ON.
2. Once the temperature is reached, the buzzer sounds. The heater lamp at the lower right of the temperature display **750** starts blinking.
3. Refer to the tip identification number (TIN) on the tip. The TIN should be programmed into the Hakko 941. See TIP IDENTIFICATION NUMBER on page 9.

CAUTION:
Place the iron in the iron holder when not in use.

● Factory settings

The Hakko 941 comes from the factory with the following values preset:

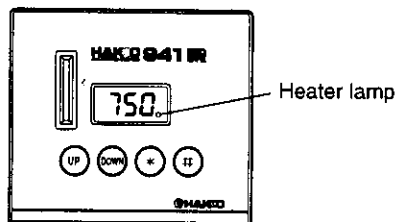
Temperature scale	Fahrenheit
Set temperature	750°F.
Low temperature alarm setting	300°F.
Auto power shutoff	disabled

● Control card

Each Hakko 941 comes with a small card, which inserts in the control slot in the front of the unit. This card is used when entering data for the process control functions. Any Hakko 941 card can be used with any Hakko 941 soldering station.

Using the control card

The control card is used when a value is to be changed or data are to be entered. The Hakko 941 will operate normally with the card inserted. If power is turned on with the card inserted, the station will heat to the temperature set before the card was inserted.



CAUTION:
The Hakko 941 is preset at 750°F. at the factory. Check the temperature setting by pressing the * button. The set temperature will be displayed for two seconds.

● Changing the temperature setting

Example: 700° to 840°

1. Insert the control card into the slot in the front of the unit.

- The *hundreds* digit will begin to flash, indicating that the unit is in the TEMPERATURE SET mode and data may be entered.

2. Entering the *hundreds* digit

- Press the **UP** or **DOWN** button to set the desired figure. **Only 4, 5, 6, 7, or 8 can be selected.** (In °C mode, 2, 3, or 4 can be selected).

When the desired figure is displayed, press the **ENTER** button to enter. The *tens* digit will begin to flash.

3. Entering the *tens* digit

- Press the **UP** or **DOWN** button to set the desired figure. **Any value from 0 to 9 can be selected.** When the desired figure is displayed, press the **ENTER** button to enter. The *units* digit will begin to flash.

4. Entering the *units* digit

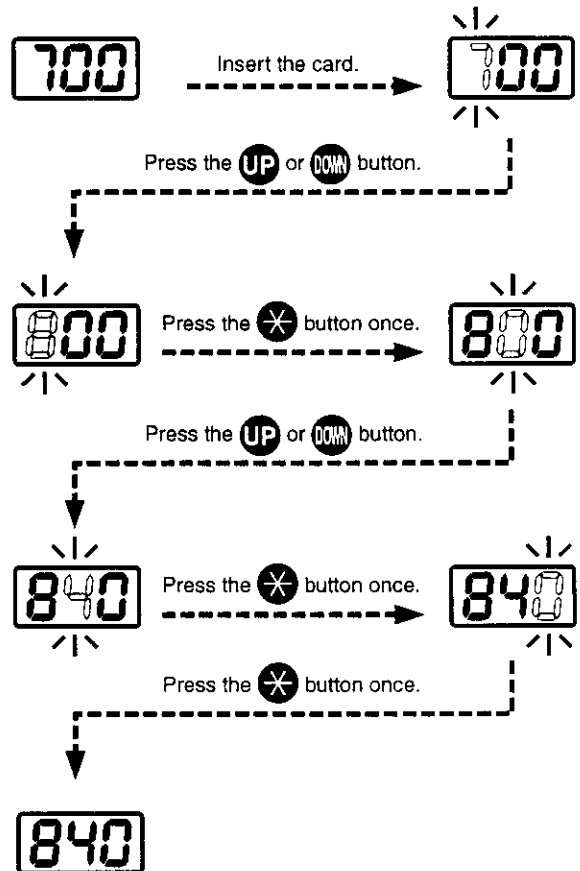
- Press the **UP** or **DOWN** button to set the desired figure. When the desired figure is displayed, press the **ENTER** button to enter. The desired temperature is now entered into the system memory and heater control will begin.

NOTE:


If power is switched off or lost during the execution of this procedure, no data will be entered. The entire procedure must be repeated from step 1.

⚠ CAUTION!


The card must be inserted into the card slot in the correct direction. The heater is off while you are setting the temperature.




When the station is ON and the card is in the station, the data entry procedure follows:

- a. Hold the  button down for at least one second.
- b. The current temperature setting will be displayed, then the *hundreds* digit will begin to flash. This indicates that the station has entered the temperature setting mode.
- c. Continue with the procedure of 1-4, above.

NOTE:

When the  button is pressed for less than one second, the current temperature setting is displayed.

● Replacing the tip

- a. Always turn the power OFF when removing or inserting a tip.
- b. Hold the tip with the heat resistant pad and pull it out.
- c. Insert the new tip fully into the Hakko 911. If the tip is not fully inserted, the display will show a sensor error  when power is turned on.

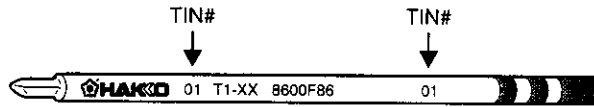
CAUTION:

The tip will be HOT! Use the heat resistant pad to remove it. Do not hold the tip with the heat resistant pad for an extended time.

7. TIP IDENTIFICATION NUMBER

● Entering the TIN (tip identification number)

Soldering tips have different thermal characteristics, depending upon their mass, shape, and surface area. Hakko 941 tips of the same type are controlled to within $\pm 10^{\circ}\text{C}$. ($\pm 18^{\circ}\text{F}$.), but it should be obvious that the tip temperature at idle will not be the same for a fine tip as it will be for a heavy chisel tip, although the set temperature may be the same for each tip. Each Hakko 941 tip style has a specified tip identification number, which may be entered into the station producing the desired tip temperature.



The Hakko 941 has the ability to electronically compensate for geometry variations using tip identification numbers. When a soldering tip is changed, the tip identification number should be programmed into the 941.

How to enter the tip identification number into the Hakko 941:

1. Press the **#** button and hold for more than one second.
 - The station will go into TIN input mode. The *tens* place digit begins to flash. Refer to the tip identification number marked on the tip.

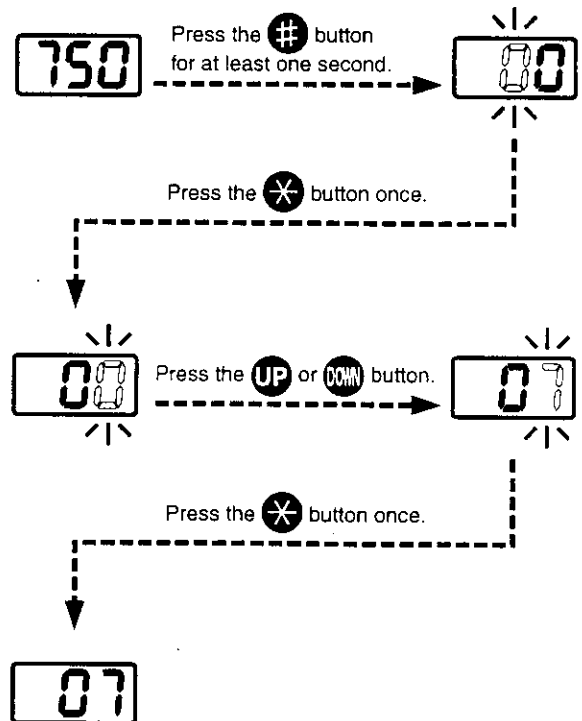
NOTE:

When the **#** button is pressed for less than one second, the stored TIN settings are displayed.

2. Entering a value in the *tens* place digit
 - Using the **UP** or **DOWN** button, enter a value in the *tens* place digit. When the entered value is displayed, press the ***** button. The *units* digit begins to flash.
3. Entering a number in the *units* digit
 - Perform the same steps used to enter the value in the *tens* place digit. After entering a number in the *units* digit, press the ***** button. Now the tip identification number has been stored. The temperature will be controlled using this tip identification number.

Example:

When the tip identification number is 07.



8. PARAMETER SETTINGS

● Entering the parameters

(1) °C or °F temperature display

(2) Auto power shutoff

This is an optional setting. When it is activated and the soldering iron is not used for 30 minutes, the power to the heating element is shutoff automatically and the buzzer will sound three times. When the temperature decreases to 100°C./200°F. the display will show **---**. To begin soldering, cycle the power switch OFF, then ON. The power will be turned on if you hit any button before the temperature decreases to 100°C./200°F.

To bypass this procedure and continue to resetting the low temperature alarm tolerance setting press the **✱** button once.

The Hakko 941 has the following three parameters:

- 1) °C or °F temperature display selection
- 2) Auto power shutoff
- 3) Low-temperature alarm tolerance setting

Once the station enters parameter mode, set the parameters in the order shown below. After all the parameters have been set, normal operation will be resumed.

1. Turn power OFF.
2. Insert the control card into the card slot in the front of the unit.
3. Press and hold down the **UP** and **DOWN** buttons simultaneously, and then turn power ON.
4. The display will show the tip identification number for one second. Hold **UP** and **DOWN** buttons down until the display shows **1C** (Celsius) or **1F** (Fahrenheit).
When either the display shows either **1C** or **1F**, the station is in parameter input mode.
 - Pressing either the **UP** and **DOWN** button will cause the display to alternate between **1C** or **1F**.
 - When the desired scale is displayed, select by pressing the **✱** button. The system will automatically sequence to auto power shutoff mode.

To change the auto power shutoff setting, the procedure is as follows.

- The display will show **21** or **20** when this mode is entered.
- Using **UP** or **DOWN** button will change **21** and **20**.
Only when **21** is selected the auto power shutoff will be operated.
- Press the **✱** button to enter the parameter. This will store the auto power shut off setting in system memory. The system will automatically sequence to the low temperature alarm tolerance setting.

(3) Resetting the low temperature alarm tolerance setting


This unique function alerts the operator when the sensed temperature falls below a set limit. If the sensed temperature drops below the alarm level, an error message **H-E** will be displayed, and the buzzer will sound. When the temperature returns within the allowable range, the buzzer will stop. The value is stored in the Hakko 941 as described in the example below:

EXAMPLE:

If the set temperature is 650°F. and the low temperature alarm is 100°F., the alarm will trip when the sensed temperature drops below 550°F.

NOTE:

The threshold limits are: 30°– 150°C.; 50°– 300°F.
If a value exceeding these limits should be entered, the system will revert to the beginning of the mode (the hundreds digit will flash) and the procedure must be begun anew.

To bypass this procedure, press the  button three times.

Range of allowable low-temperature alarm tolerance

For °C: 30° – 150°C

For °F: 50° – 300°F

- When the station enters low-temperature alarm tolerance setting mode, the hundreds digit begun flashing. Enter and store the value in the same manner as described in “Changing the temperature setting.”
- If you enter a value exceeding the allowable range shown to the left, you will be brought back to entering a value in the hundreds digit. If this occurs, re-enter a correct value.
- Once the value is stored, the station will exit the parameter setting mode, display the temperature setting for two seconds, and begin heater control. It is now ready for normal operation.

9. MAINTENANCE

● Tip maintenance

1. Tip temperature

High temperatures shorten tip life and may cause thermal shock to components. Always use the lowest possible temperature when soldering. The excellent thermal recovery characteristics of the Hakko 941 ensure effective soldering at low temperatures.

2. Cleaning

Always clean the soldering tip before use, to remove any residual solder or flux adhering to it. Use a *clean and moist* cleaning sponge (provided with the Hakko 941) or the Hakko 599 tip cleaner. Contaminants on the tip have many deleterious effects, including reduced heat conductivity, which contribute to poor soldering performance.

3. After use

Always clean the tip and coat it with fresh solder after use. This guards against oxidation.

4. When the unit is not being used and the auto power shutoff is not active.

Never allow the unit to idle at a high temperature for extended periods. This will allow the tip to become oxidized. Turn the power switch OFF. If it is to be out of service for several hours, it is advisable to pull the power plug as well.

5. Inspecting and cleaning the tip

This procedure, if followed daily, will materially add to tip life.

- a. Set the temperature to 250°C. (482°F.)
- b. When the temperature stabilizes, clean the tip (see 2, above) and check the condition of the tip. If the tip is badly worn or deformed, replace it.
- c. If the solder plated part of the tip is covered with black oxide, apply fresh solder, containing flux, and clean the tip again. Repeat until all the oxide is removed, then coat the tip with fresh solder.

⚠ CAUTION:
NEVER file the tip to remove oxides!

- d. Turn the power OFF and remove the tip, using the heat resistant pad. Set the tip aside to cool.
- e. Remaining oxides, such as the yellow discoloration on the tip shaft, can be removed with isopropyl alcohol.

● Checking Procedure

⚠ WARNING:

Unless otherwise directed, carry out these procedures with the power switch OFF and the power UNPLUGGED.

■ Check for a broken heater or sensor

1. Check for a broken heater or sensor

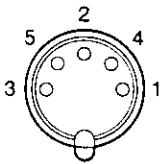
Measure the resistance across this position.



Verify the electrical integrity of the heater and sensor.

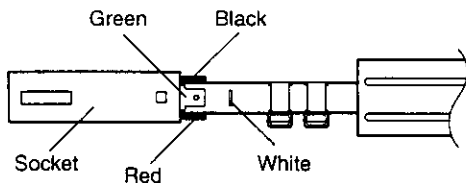
Measure the resistance of the heater and sensor while at room temperature (15 to 25°C.; 59 to 77°F.). It should be $5\Omega \pm 10\%$. If the resistance exceeds these limits, replace the tip.

■ Check the grounding line



1. Unplug the connection cord from the station.
2. Measure the resistance value between Pin 2 and the tip.
3. If the value exceeds 2Ω (at room temperature), perform the tip maintenance described on p.12. If the value still does not decrease, check the connection cord for breakage.

■ Checking the connection cord for breakage



1. Remove the soldering tip and the nipple.
2. Push the socket out from inside the handle assembly.
3. Measure the resistance values between the connector and the lead wires at the socket as follows:

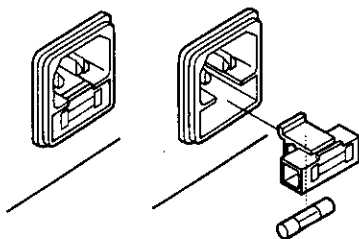
Pin 1 – Red Pin 2 – Green
Pin 3 – Black Pin 5 – White

If any value exceeds 0Ω or is ∞ , replace the handle assembly.

⚠ CAUTION:

Do not lose the O-ring located inside the nipple. When reassembling, match the convex part of the handle assembly with the concave parts of the O-ring spacer and socket.

■ Replacing the fuse



1. Unplug the power cord from the power receptacle.
2. Remove the fuse holder.
3. Replace the fuse.
4. Put the fuse holder back in place.

10. ERROR MESSAGES

● Sensor Error

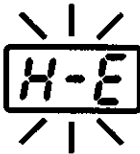
A rectangular digital display showing the error code "S-E".

When there is the possibility that a failure has occurred in the sensor or heater (including the sensor circuit), **S-E** is displayed and the power is shut down with the buzzer sounding continuously.

⚠ CAUTION:

The sensor error also occurs if the tip is not inserted properly. Once the tip is inserted properly, the tip identification number is displayed and the HAKKO 941 is restarted.

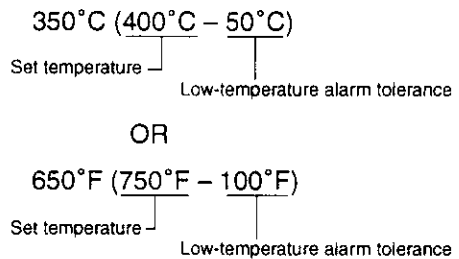
● Low-temperature alarm tolerance error

A rectangular digital display showing the error code "H-E". The display is surrounded by eight short lines radiating outwards, indicating a warning or alarm state.

If the sensor temperature falls below the difference between the current temperature setting and the low-temperature alarm tolerance, **H-E** is displayed and the warning buzzer sounds. When the tip temperature rises to a value within the set tolerance, the buzzer will stop sounding.

EXAMPLE:

Assume that the temperature setting is 400°C./750°F. and the tolerance 50°C./100°F. If the temperature continues to decrease and finally falls below the value indicated below while the heating element is on, the displayed value starts blinking to indicate that the tip temperature has dropped.



11. TROUBLE SHOOTING GUIDE

WARNING:

- Before checking the inside of the Hakko 941 or replacing parts, be sure to disconnect the power plug. Failure to do so may result in electric shock.

● The unit does not operate when the power switch is turned on.

CHECK: Is the power cord and/or the connection plug disconnected?

ACTION: Connect it.

CHECK: Is the fuse blown?

ACTION: Investigate why the fuse blew and then replace the fuse. If the cause can not be determined, replace the fuse. If the fuse blows again, send the unit in for repair.

● The tip does not heat up.

- The sensor error **S-E** is displayed.

CHECK: Is the power cord and/or the connection plug disconnected?

ACTION: Connect it.

CHECK: Is the tip inserted properly?

ACTION: Insert the tip completely.

CHECK: Is the connection cord and/or the heater/sensor broken?

ACTION: See the appropriate section of this manual regarding how to check the connection cord and/or the heater/sensor for breakage.

● Solder does not wet the tip.

CHECK: Is the tip temperature too high?

ACTION: Set the appropriate temperature.

CHECK: Is the tip contaminated with oxide?

ACTION: Remove the oxide (see "Tip maintenance" on P. 12).

● The tip temperature is too high.

CHECK: Is the connection cord broken?

ACTION: See "Checking the connection cord for breakage" on P. 13.

CHECK: Is the entered tip identification number correct?

ACTION: Enter the correct value.

● The tip temperature is too low.

CHECK: Is the tip contaminated with oxide?

ACTION: Remove the oxide (see "Tip maintenance" on P. 12).

CHECK: Is the entered tip identification number correct?

ACTION: Enter the correct value.

● The low-temperature alarm tolerance error occurs frequently.

CHECK: Is the tip too small for the items to be soldered?

ACTION: Use a tip with a larger thermal capacity.

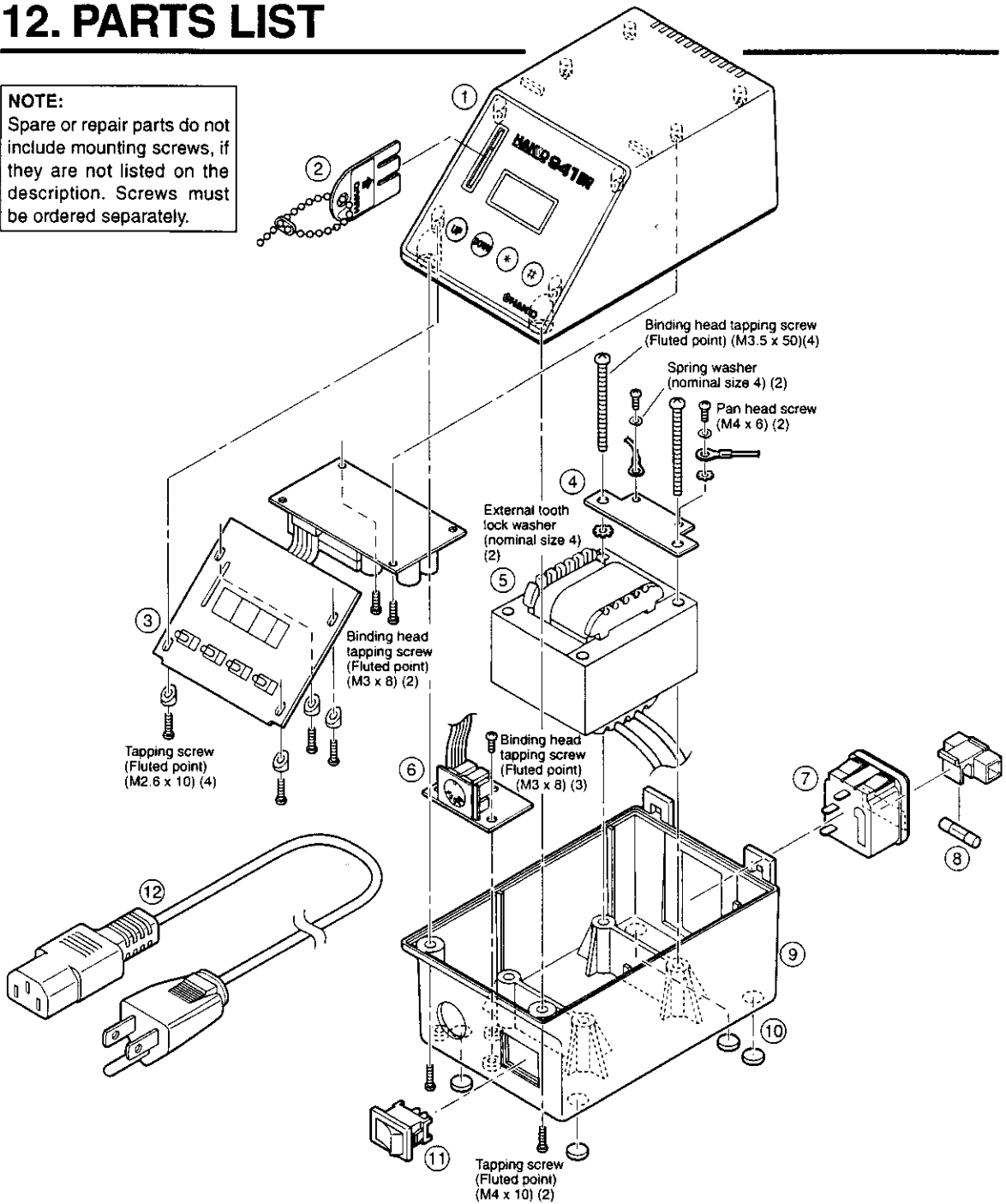
CHECK: Is the setting value for the low-temperature alarm tolerance too low?

ACTION: Increase the setting value.

12. PARTS LIST

NOTE:

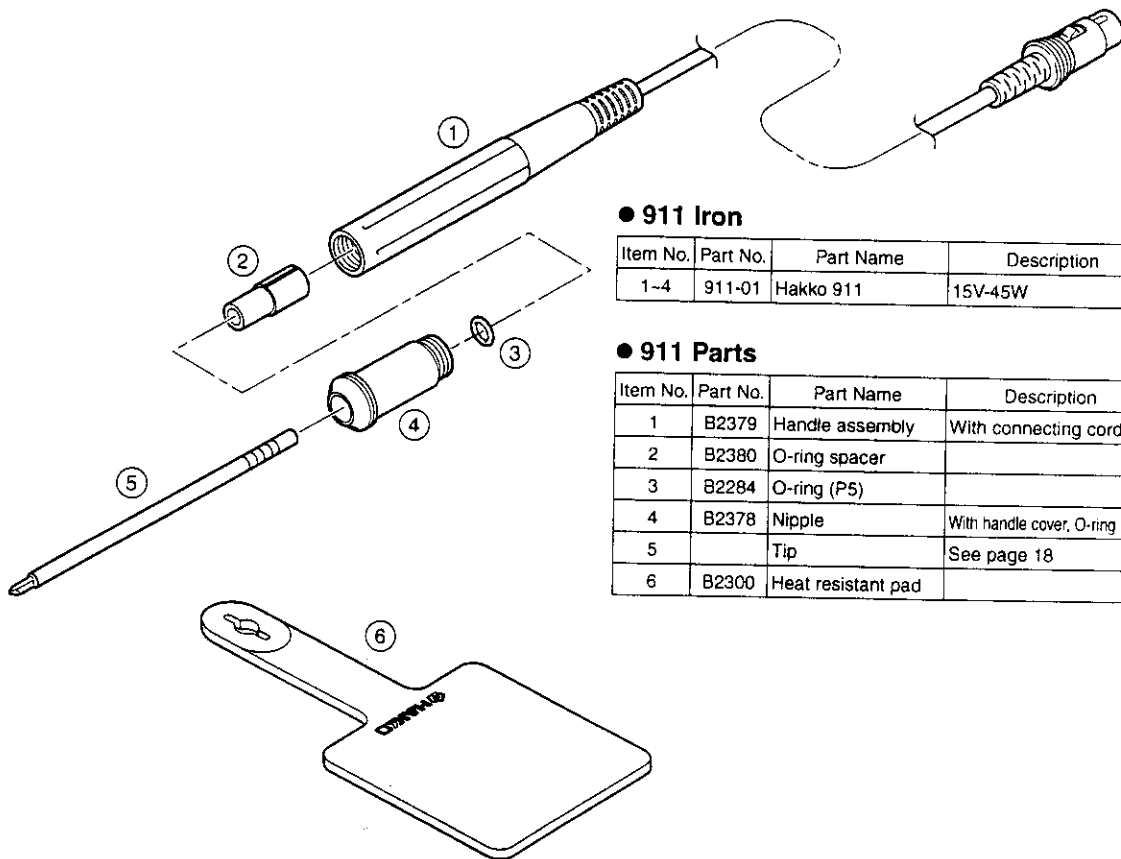
Spare or repair parts do not include mounting screws, if they are not listed on the description. Screws must be ordered separately.



● 941 Station

Item No.	Part No.	Part Name	Description
1	B2568	Upper case	With membrane sheet
2	B2388	Control card	
3	B2569	P.W.B. (temperature control & power supply) - 2 pcs.	
4	B2227	Grounding plate	
5	B2570	Transformer	100-15V
	B2590	Transformer	110, 120-15V
	B2591	Transformer	220, 230-15V
6	B2383	Connector board	

Item No.	Part No.	Part Name	Description
7	B2384	Power receptacle	
8	B2403	Fuse, 250V-2A	100-120V
9	B2571	Bottom case	With power receptacle, rubber feet
10	B2405	Rubber foot	4 ea.
11	B1084	Power switch	
12	B2419	Power cord, 3 core & American plug	

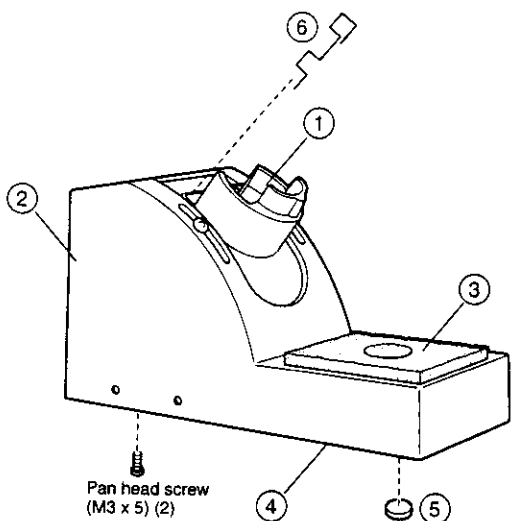


● 911 Iron

Item No.	Part No.	Part Name	Description
1-4	911-01	Hakko 911	15V-45W

● 911 Parts

Item No.	Part No.	Part Name	Description
1	B2379	Handle assembly	With connecting cord
2	B2380	O-ring spacer	
3	B2284	O-ring (P5)	
4	B2378	Nipple	With handle cover, O-ring (P5)
5		Tip	See page 18
6	B2300	Heat resistant pad	



Pan head screw
(M3 x 5) (2)

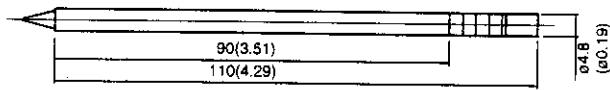
● Iron Holder

Item No.	Part No.	Part Name	Description
1-5	C1413	Iron holder	For HAKKO 911, 912

● Iron Holder Parts

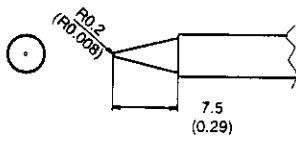
Item No.	Part No.	Part Name	Description
1	B2390	Iron receptacle	With two screws
2	B2389	Iron holder base	(With bottom plate)
3	A1427	Cleaning sponge	
4	B2391	Bottom plate	
5	B2405	Rubber foot	4 ea.
6	B2572	Retaining clip	

13. TIP STYLES

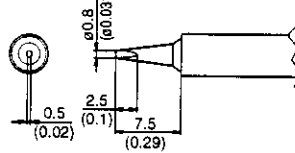


Unit: mm (in.)

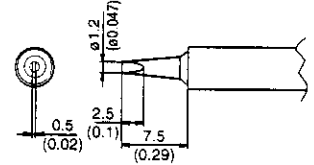
T1-B Shape-B



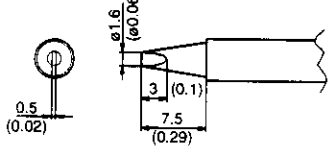
T1-08D Shape-0.8D



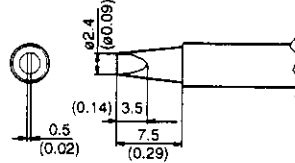
T1-12D Shape-1.2D



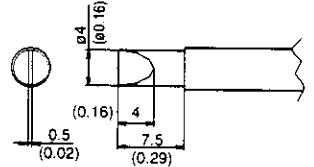
T1-16D Shape-1.6D



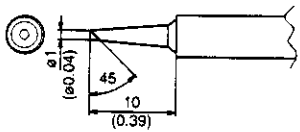
T1-24D Shape-2.4D



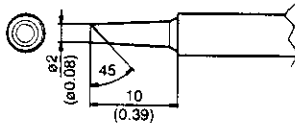
T1-4D Shape-4D



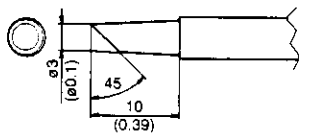
T1-1BC Shape-1BC



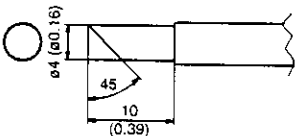
T1-2BC Shape-2BC



T1-3BC Shape-3BC

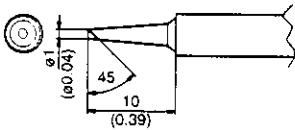


T1-4C Shape-4C



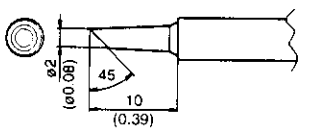
T1-1BCF Shape-1BC

Cut Surface Pre-tinned



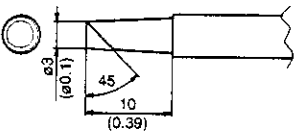
T1-2BCF Shape-2BC

Cut Surface Pre-tinned



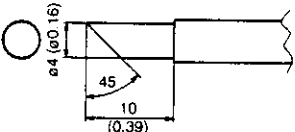
T1-3BCF Shape-3BC

Cut Surface Pre-tinned

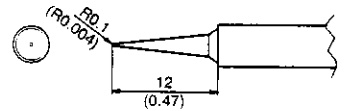


T1-4CF Shape-4C

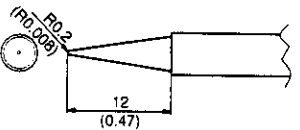
Cut Surface Pre-tinned



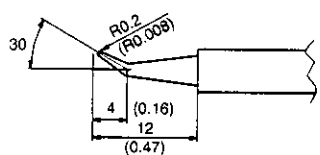
T1-LI Shape-LI



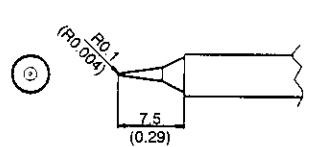
T1-LB Shape-LB



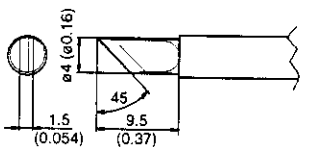
T1-02J Shape-0.2RB



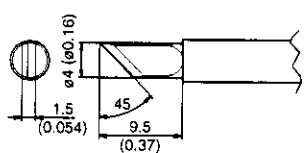
T1-I Shape-I



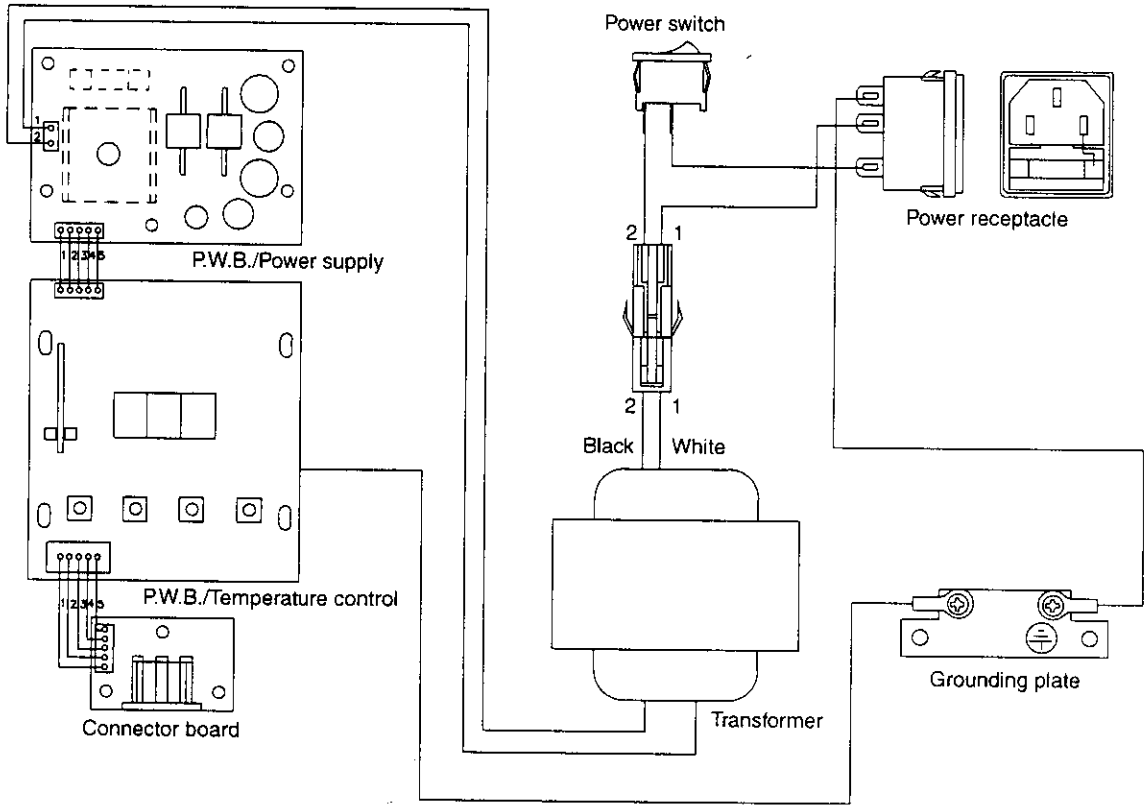
T1-K Shape-K



T1-KL Shape-KL



14. WIRING DIAGRAM



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