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**HAKKO** MODEL  
 MINI PARALLEL REMOVER **FM-2023**

MINI PARALLEL REMOVER

**Instruction Manual**



Thank you for purchasing the FM-2023 mini parallel remover.  
 Please read this manual before operating the FM-2023.  
 Keep this manual readily accessible for reference.



 **CAUTION**

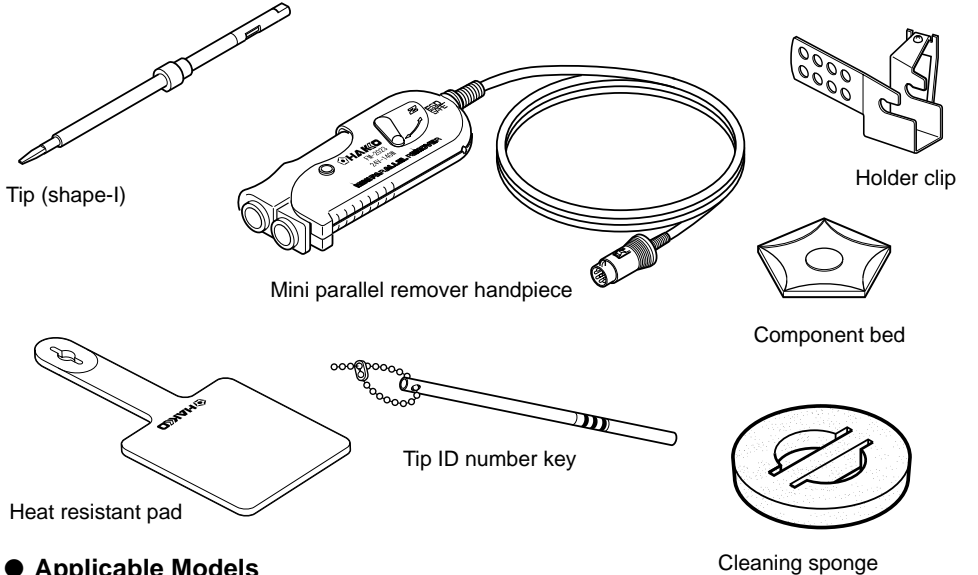
- **The FM-2023 cannot function by itself. It must be connected to an FM-202 soldering station.**
- **Specific information can be found in the instruction manual for your FM-202 soldering station.**

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# 1. PACKING LIST

Mini parallel remover handpiece .....	1	Tip ID number key .....	1
Tips (T9-I) 2pcs/set .....	1	Holder clip (w/screw) .....	1
Heat resistant pad .....	1	Component bed .....	1
Cleaning sponge .....	1		



- **Applicable Models**  
In order to function, the FM-2023 must be connected to the FM-202 soldering station.

# 2. SPECIFICATIONS

- **FM-2023 Mini parallel remover**

Power consumption	140W (24 V)
Temperature range	200 — 400 <sub>i</sub> C (400 — 750 <sub>i</sub> F)
Tip to ground resistance	< 2Ω
Tip to ground potential	< 2mV
Cord assembly	1.2m (4 ft.)
Length, less cord	75mm (w/o tip)
Weight, less cord	32g (Handpiece only), 5g (I tip only)
Standard tip	T9-I (Shape-I)

\* Specifications and design are subject to change without notice.

# 3. WARNINGS, CAUTIONS AND NOTES

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 injury or death.



**CAUTION:** Failure to comply with a CAUTION may result in injury to the operator, or damage to the items involved. (One example is given below.)

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



## CAUTION

When the power is on, the tip temperature is between 200°C/400°F and 400°C/750°F.

Since mishandling may lead to burns or fire, be sure to comply with the following precautions:

- Do not touch the 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 off the power while taking breaks and when finished using the unit.
- Before replacing parts or storing the unit, turn off the power and allow the unit to cool to room temperature.

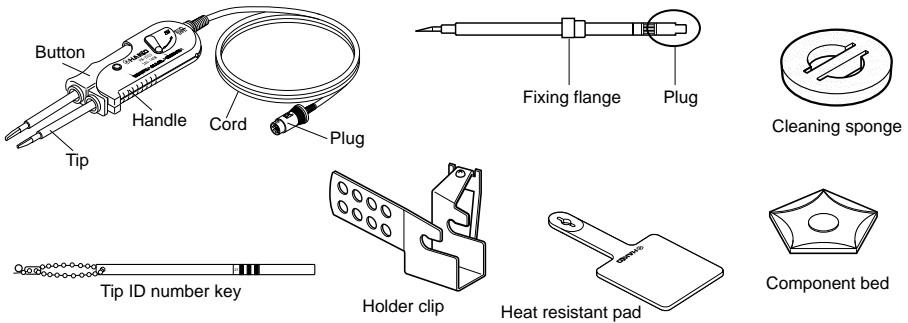


## CAUTION

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

- Do not use the unit for applications other than those specifically described in the instruction manual.
- Do not set the tip temperature higher than 400°C/750°F.
- Do not rap the FM-2023 against the work bench to shake off residual solder, or otherwise subject the iron to severe shocks.
- Do not modify the unit.
- Use only genuine HAKKO replacement parts.
- Do not wet the unit or use the unit when your hands are wet.
- The operating process will produce smoke. Make sure the area is well ventilated.
- Pull on the plug to disconnect the FM-2023 from the station outlet. Do not pull the cord.

# 4. PART NAMES



# 5. SETTING UP THE FM-2023

## 1. Connector cord

Pass the connector cord through the hole in the heat resistant pad.

## 2. Iron holder

Attach the holder clip to iron holder no.634-01, 634-02 or 634-03.

Hang the lower hook of holder clip on the lower wire of the iron holder and attach it with the screw.

(Setup follows)

1. Do not let the tips extend beyond the back of the iron holder base.

(See drawing No.1)

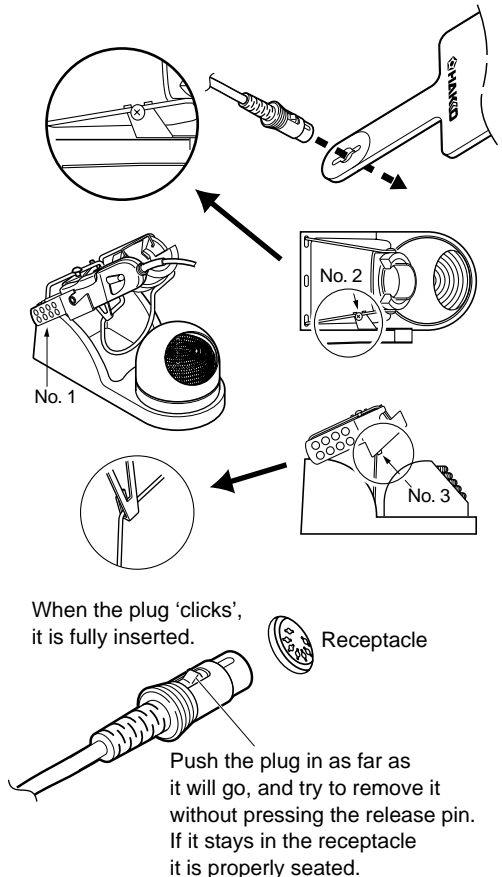
2. Before tightening the screw, make sure that the 2 projections of holder clip are touching the upper wire of the iron holder. (See drawing No.2 and No.3)

## 3. Connections

1. Connect the plug to the FM-202.
2. Place the FM-2023 in the iron holder.
3. Plug the power cord into the power supply. Be sure to ground the unit.

### NOTE:

This product is protected against electrostatic discharge and must be grounded for full efficiency.



# 6. OPERATION

## ● Controls and displays

Please refer to the FM-202 instruction manual.

### ⚠ CAUTION:

FM-2023 tips do not have a tip ID. Use the Tip ID number key.

### NOTE:

If the buzzer sounds three times when the Tip ID number key is inserted into the process gate, there has been a reading error. Reinsert the Tip ID number key. If the code bar is torn or damaged the process gate will not be able to read it.

### NOTE:

This procedure must be followed EVERY TIME THE TIPS ARE CHANGED.

## ● Displays

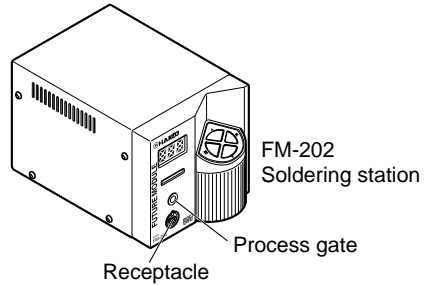
1. If tips are in the handpiece, remove them.
2. Turn the power switch ON.
3. The display will show **E-E** and the LED on the connector will flash.
4. Insert the Tip ID number key into the process gate until the buzzer sounds once. ID data are displayed for one second. The display shows **5-E**.

### NOTE:

The tips are a packaged matched set and must be used together.

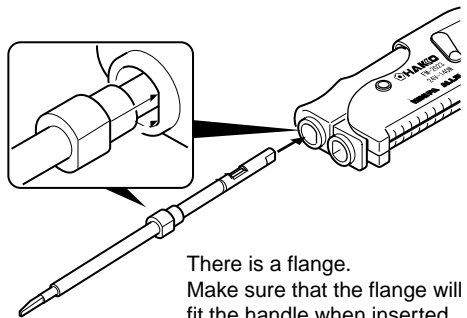
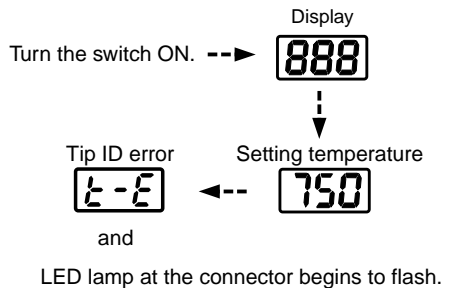
5. Inserting the tip:

Hold the head part of the tip with the heat resistant pad and insert the tip into the handpiece. Push until the tip stops. Repeat for second tip.



### ⚠ CAUTION:

Refrain from inserting foreign objects, the wrong end of the tip, or incompatible tips into the process gate. Damage may result.



6. When the set temperature is reached, the buzzer sounds and the heater lamp at the lower right of the temperature display starts blinking.

## ● Operating instructions

### 1. Set the Temperature

**⚠ CAUTION:**

Never set the temperature to any value over 400°C (750°F). Doing so may damage the station. Set the temperature according to the type of work to be done.

### 2. Switch lever on the handle

The FM-2023 is double acting.

- When the tips are touching - i.e. the handpiece is closed- an 'R' is visible on the handle. Operate by squeezing the movable part of the handle at the back.
- When the handpiece is open, an 'N' is visible on the handle. Operate by squeezing the movable part of the handle at the front.

### 3. Apply solder or flux

If there is insufficient solder on the PWB, or the soldered area is too small, apply solder or flux to the PWB. Solder may also be applied to the tips.

### 4. Melt the solder

Place the tips on the soldered part and melt the solder. Confirm that the solder is fully melted. See sketch 'A'.

### 5. Remove the component

After confirming that the solder is fully melted, lightly squeeze the handpiece to grasp the component and lift to remove the component. See sketch 'B'.

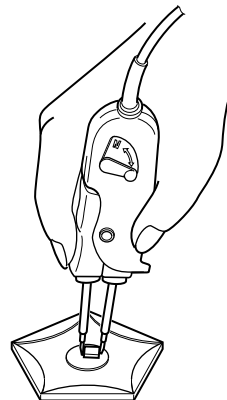
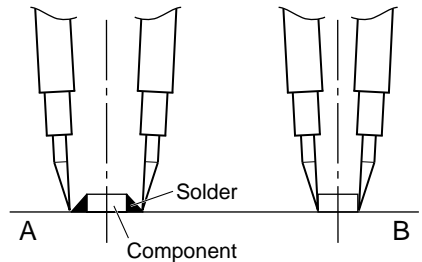
Place the desoldered chip onto the tray keeping the tips in parallel, and open them to release.

**NOTE:**

Once the two tips are inserted into the hand-piece, heat control begins.  
Both tips of the set must be inserted or the handpiece will not heat.

**⚠ CAUTION:**

Very high tip temperatures may damage the printed circuit board, possibly causing the printed pattern to become detached. HAKKO recommends setting the tip temperature below 300°C (572°F) for all normal work. Using the lowest possible effective temperature not only helps protect parts that are sensitive to heat, it also helps protect the tip from deterioration caused by heat.



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## ● Control card and changing the temperature setting

Please refer to the FM-202 Instruction manual.

## ● Replacing the tip

### Removing and inserting the tip:

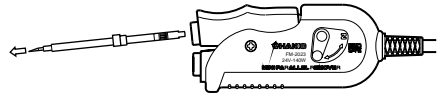
Removing the tip:

Hold the handle and pull the tip out of the handpiece with the heat resistant pad.

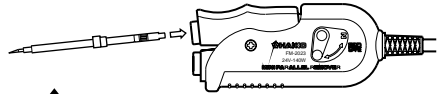
Inserting the tip:

Before inserting the tip; Insert the Tip ID number key into the process gate until the buzzer sounds once.

Hold head part and insert the tip into the handpiece. Push until the tip stops.



Hold the handpiece at the front to remove tip.



Hold this part to insert into the handpiece.

### **⚠ CAUTION:**

The tip can be very HOT. Use the heat resistant pad for handling hot tips, but do not hold the hot portion of the tip, even with the pad, for longer than necessary.

# 7. MAINTENANCE

## ● Tip maintenance

Please refer to the FM-202 Instruction manual.

## ● Checking Procedure

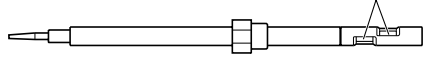
### ⚠ WARNING:

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

### ■ Verify the electrical integrity of the heater and sensor

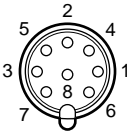
1. Check for a broken heater or sensor

Measure the resistance across the tip as shown.



Measure the resistance while at room temperature (15 to 25°C; 59 to 77°F). It should be  $8\Omega \pm 10\%$ . If the resistance exceeds these limits, replace the tip.

### ■ Check the grounding line



### ■ Checking the connection cord for breakage

1. Unplug the connection cord from the station.
2. Measure the resistance value between pin 2 and the tip (both tips).
3. If the value exceeds  $2\Omega$  (at room temperature), perform the tip maintenance described on P.12 of the FM-202 instruction manual. If the value still does not decrease, check the connection cord for breakage.

1. Insert a set of verified tips in both sides of the handle.
2. Measure the resistance value between two pins.

Pin 1 - Pin 3	7~9 $\Omega$
Pin 5 - Pin 3	8~10K $\Omega$
Pin 7 - Pin 4	7~9 $\Omega$
Pin 8 - Pin 4	8~10K $\Omega$

If the measured value exceeds above values, replace the FM-2023.



# 8. TROUBLESHOOTING GUIDE

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**⚠ WARNING:**

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

● **The tip does not heat up.**

- The sensor error **[5-E]** is displayed.

● **Solder does not wet the tip.**

● **The tip temperature is too high.**

● **The tip temperature is too low.**

● **The soldering iron error **[E-E]** is displayed.**

- The LED heater lamp does not light.

**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.

**CHECK** : Is the tip temperature too high?

**ACTION** : Set the appropriate temperature.

**CHECK** : Is the tip contaminated with oxide?

**ACTION** : Remove the oxide by cleaning the tip on a damp sponge or Hakko 599B tip cleaner.

**CHECK** : Is the connection cord broken?

**ACTION** : See “Checking the connection cord for breakage”.

**CHECK** : Is the Tip ID number key entered correctly?

**ACTION** : Enter the correct value.

**CHECK** : Is the tip contaminated with oxide?

**ACTION** : Remove the oxide by cleaning the tip on a damp sponge or Hakko 599B tip cleaner.

**CHECK** : Is the Tip ID number key entered correctly?

**ACTION** : Enter the correct value.

**CHECK** : Is the connection cord broken?

**ACTION** : See “Checking the connection cord for breakage”.

**CHECK** : Is the FM-2023 plug disconnected?

**ACTION** : Connect the FM-2023.

- 
- The low-temperature alarm tolerance error **H-E** occurs frequently.

- Tip ID error **E-E** is displayed.

- Heater terminal short circuit error **HSE** is displayed.

- The tips cannot be closed.

- The tips will not return to the original position.

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

**ACTION** : Use a tip with a large thermal capacity.

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

**ACTION** : Increase the setting value.

**CHECK** : Does the tip come off during use?

**ACTION** : Enter correctly. See section 6, Operation for instructions.

**NOTE:**

If the buzzer sounds three times when Tip ID number key is inserted into the process gate, there has been a reading error. Reinsert the Tip ID number key. If the code bar is torn or damaged the process gate will not be able to read it. See the FM-202 manual for instructions of manually entering the Tip ID.

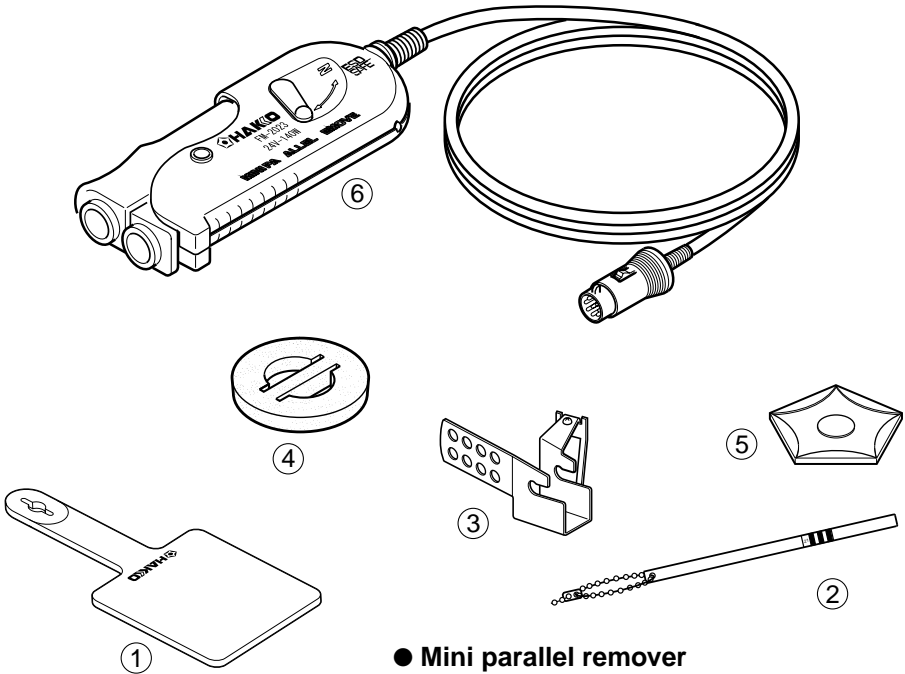
**CHECK** : Is the tip for FM-2023?

**ACTION** : Turn the power switch OFF and insert the correct FM-2023 tip. Turn the power switch ON.

**CHECK** : Is there a foreign object between the tips?

**ACTION** : Remove it.

# 9. PARTS LIST



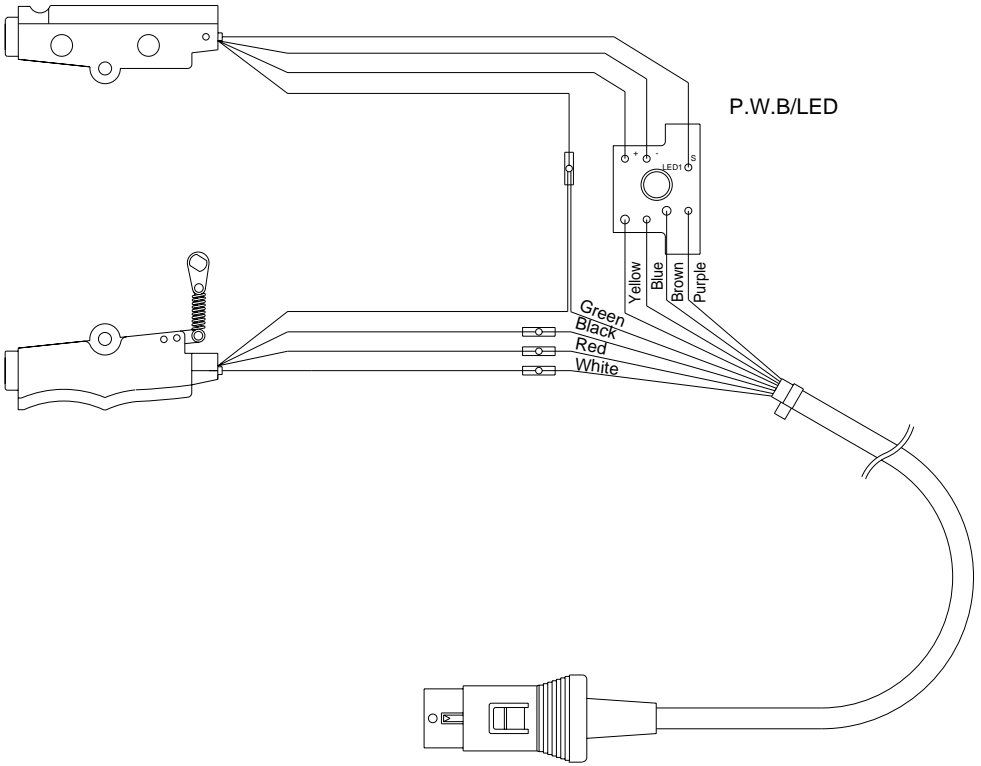
## ● Mini parallel remover

Item No.	Part No.	Part Name	Specifications
①	B2300	Heat resistant pad	
②	B2847	Tip ID number key	
③	B2848	Holder clip	with screw
④	A1495	Cleaning sponge	
⑤	B2849	Component bed	
⑥	FM2023-02	Handpiece only	w/o tip

## ● Tips

Part No.	Part Name	Size A	Shape
T9-I	Tip/CHIP I	----	----
T9-1L	Tip/CHIP 1L	1 mm (0.04 in.)	
T9-2L	Tip/CHIP 2L	2 mm (0.08 in.)	

# 10. WIRING DIAGRAM



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