



AMERICAN HAKKO PRODUCTS, INC. - EST. 1984



NEXT GENERATION SOLDERING

Hakko is a trusted brand for over 70 years with American Hakko Products, Inc. selling and distributing in the United States for over 35 of those years. What has made us so successful throughout the years has always been our commitment to produce high quality tools for your needs. This has made us a leading supplier of quality soldering, desoldering, rework, and fume extraction tools in the market. All of this and more, backed by the Quality, Reliability, and Power you've come to expect from Hakko.

QUALITY.
RELIABILITY.
POWER.



ROBOTIC SOLDERING

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HU-200

ROBOTIC SOLDERING SYSTEM

With its built-in programming feature, touchscreen control, and 4-axis system with feeder, operating the **HAKKO HU-200 Robotic Soldering System** is an efficient soldering production solution. Every command is at the operator's fingertips, from precision of movement to controlling the speed at which the HU-200 solders, along with an integrated solder feeder which can control how much solder is dispensed.



FEATURES & BENEFITS

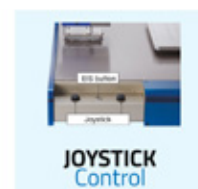
- Touchscreen tablet
- Pre-installed easy-to-program software
- Joystick controls for faster and more accurate positioning experience
- 4-axis soldering system
- Integrated solder feeder
- Built-in tip cleaner
- FU-601 Robotic Integration Soldering included



A touch screen tablet provided as standard equipment allows you to set programming and soldering conditions without having to connect an external PC.



Pre-installed programming software makes creating soldering programs easy to learn. The software enables you to control solder feed, the number of accumulated solder points, soldering speed and much more.



The joysticks give the user better control by allowing you to adjust the inch and jog speed. This allows you to perform more delicate and difficult position adjustments with greater precision.



SPECIFICATIONS For Part No. HU200-03Z

HU-200 ROBOTIC SOLDERING SYSTEM		
Input Voltage		100-240 VAC, 50 / 60 Hz
Soldering Iron Power Consumption		300 W
Movement	X-axis	400 mm
	Y-axis	300 mm
	Z-axis	200 mm
	θ-axis	± 200°
Drive System		Servo motor (all axes)
Position Detection		Absolute encoder
Max Speed	X-axis	800 mm/s
	Y-axis	800 mm/s
	Z-axis	800 mm/s
	θ-axis	800 °/s
Repeatability	X-axis*	± 0.01 mm
	Y-axis*	* Only when the unit temperature is constant
	Z-axis*	
	θ-axis	± 0.01°
Noise Level		56 dB
Ambient Temperature Range		0 °F - 104 °F / 0 °C - 40 °C
Max Workpiece Payload		44.1 lb / 20 kg
External I/O Ports		20 Inputs / 12 Outputs (2 for cleaner)
External Interface		4 USB Ports (1 for PC)
Dimensions (W x H x D)		23.6 x 35.8 x 25.6 in. / 600 x 910 x 650 mm
Weight		110.23 lb / 50 kg

HU-200 Specifications & Contents, [see page 5](#)



For more information [Scan QR Code](#).



SPECIFICATIONS

FU-601 STATION For Part No. FU601-40X (L-shaped Iron)	
Input Voltage	120 VAC, 50 / 60 Hz
Power Consumption	300 W
Temperature Range	120 °F - 940 °F / 50 °C - 500 °C
ESD Safe	Yes
Output Voltage	29 V
Outer Dimension (W x H x D)	5.7 x 4.2 x 8.3 in. / 145 x 107 x 211 mm
Weight (w/o Cord)	8.8 lb / 4 kg

FU-6002 For Part No. FU6002-01X	
Tip Series	TX1 and TX2 Series see page 8 (Tips Sold Separately)
Power Consumption	260 W / 29 V
Tip-to-Ground Resistance	< 2 Ω
Tip-to-Ground Potential	< 2 mV
Heater	Composite Ceramic Cartridge
Outer Dimension (W x H x D)	5.7 x 4.2 x 8.3 in. / 145 x 107 x 211 mm
Weight (w/o Cord)	0.38 lb / 173 g



CONTENTS For Part No. HU200-03Z

Part No.	Description
--	HAKKO HU-200 (robot)
--	Power cord
BX1062	USB cable
CX1003	Cleaner
--	HAKKO FU-601
CX5004	Soldering unit mount
CX5002 ^{*1}	Soldering unit fixture base
CX5003 ^{*1}	Cleaner base
CX5005	Feeder unit
--	Solder reel support shaft
BX1045 ^{*1}	Feeder cable: 4 m
BX1055	Tube unit Φ 0.3 - 1.0
BX1042	Tube unit Φ 1.2 - 1.6
BX1054	Tube unit B Φ 0.3
BX1052	Tube unit B Φ 0.5 - 1.0
BX1053	Tube unit B Φ 1.2 - 1.6
--	PC
-- ^{*1}	Attachment holder (for tablet PC)
-- ^{*1}	Display arm (for tablet PC)
--	Instruction manual (CD-ROM)
--	Quick manual (Installation & Connection)
--	Quick user guide (PC software)
--	I/O cable (for cleaner)
--	Relay cord (1.5 mm)

^{*1} This system is shipped with it attached to the robot main body.



TIP ALIGNMENT JIG

The jig is to allow for repeatable placement of the soldering iron tip.

FU-601 Robotic Integration Soldering Module

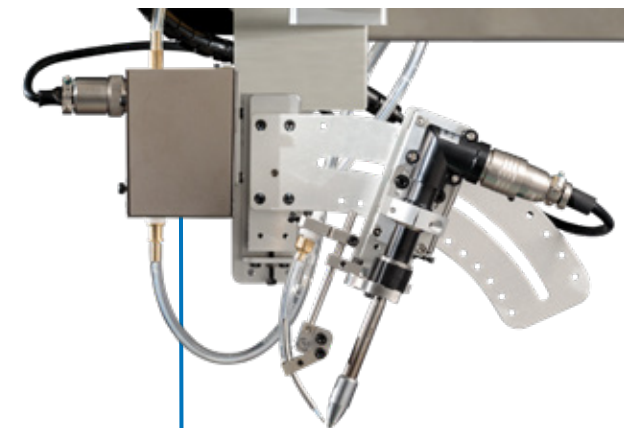
INCLUDED WITH HU-200 ROBOTIC SYSTEM



The **HAKKO FU-601 Robotic Integration Soldering Module** is designed to communicate with the HAKKO FU-500 Intelligent Solder Feeder and the HU-200 Robotic Soldering System to achieve efficient performance soldering automation. [See page 6](#)

EASY TO OPERATE

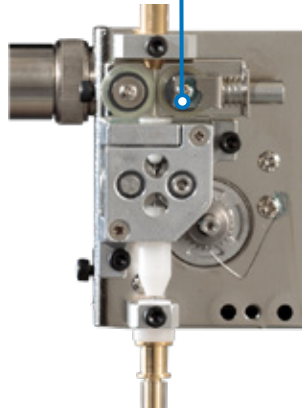
Utilizing the power of the FU-601 Soldering Module, the HU-200 is able to reach temperatures of up to 940 °F / 500 °C by using the powerful TX1 (140W) or TX2 (260W) series tips, which are available in over 40 different shapes and sizes.



BUILT-IN SOLDER FEEDER

Feeder perforates the wire solder surface to prevent solder balls and flux spattering.

Solder wire range:
0.3 mm - 1.6 mm



TIP CLEANER

Brush-type cleaner with solder spatter prevention shield.



For more information [Scan QR Code.](#)



FU-601

ROBOTIC INTEGRATION SOLDERING MODULE



The **HAKKO FU-601 Robotic Integration Soldering Module** is designed to communicate with the HAKKO FU-500 Intelligent Solder Feeder and with the HU-200 can be integrated with various robotic systems to achieve low-cost soldering automation.



FEATURES & BENEFITS

- Uses TX1 and TX2 series tips
- Up to 260W composite ceramic heating element
- Top controlled temperature of 940°F / 500°C and high mass shapes



PART LIST (Optional)

Part No.	Description
BX1023	N2 adapter for TX1 tips
BX1024	N2 nozzle assembly A for TX1-XD24/XD3
BX1025	N2 nozzle assembly B for TX1-XD/XD08/XD16
BX1026	N2 nozzle assembly C for TX1-XBCR4/XRK
BX1029	N2 adapter for TX2 tips
BX1030	N2 nozzle assembly D for TX2-XD4/XD6/XDR4/XDR6/XBCR4/XBCR6
BX1031	N2 assembly E for TX2-XD3/XDR3/XBCR3
CX1000	Point solder slide unit for FU-6001/6002
CX1001	Drag solder slide unit for FU-6001/6002
CX1002	Temperature probe
CX1003	Robotic tip cleaner
FU6001-01X	Straight type soldering unit
FU6002-01X	L-shaped type soldering unit

NITROGEN ADAPTER ASSEMBLY (Optional)

For nitrogen soldering, attach the optional N₂ adapter to the iron and install a nozzle assembly that matches the tip.



INTERCHANGEABLE SOLDERING IRONS

Select Straight or L-shaped to meet your process requirements. The tip can be easily replaced and the position of the tip end can be easily adjusted using the tip alignment jig.



SPECIFICATIONS

STATION	For Part No. FU601-60X (Straight Iron)	For Part No. FU601-40X (L-shape Iron)
Input Voltage	120 VAC, 50 / 60 Hz	
Output Voltage	29 V	
Power Consumption	300 W	
Temperature Range	120 °F - 940 °F / 50 °C - 500 °C	
Outer Dimensions (W x H x D)	5.7 x 4.2 x 8.3 in. / 145 x 107 x 211 mm	
Weight (Station)	8.8 lb / 4.0 kg	
SOLDERING IRON	For Part No. FU6001-01X (Straight Iron)	For Part No. FU6002-01X (L-shape Iron)
Tip Series	TX1 & TX2 Series see page 8 (Tips Sold Separately)	
Power Consumption	260 W MAX / 29 V	
Tip-to-Ground Resistance	< 2 Ω	
Tip-to-Ground Potential	< 2 mV	
Heater	HAKKO Composite Ceramic™	
Weight (w/o cord)	0.376 lb / 171 g	0.381 lb / 173 g



CONTENTS

FU601-60X Soldering Module		FU601-40X Soldering Module	
Part No.	Description	Part No.	Description
FU6001-01X	Soldering iron (Straight)	FU6002-01X	Soldering iron (L-shape)
FU601-01X	FU-601 station	FU601-01X	FU-601 station
CX5019	Soldering iron mount	CX5019	Soldering iron mount
CX5017	Tip alignment jig (TX1)	CX5017	Tip alignment jig (TX1)
CX5018	Tip alignment jig (TX2)	CX5018	Tip alignment jig (TX2)
BX1033	Soldering iron cable	BX1033	Soldering iron cable
BX1056	Connecting cable	BX1056	Connecting cable
BX1027	Flux cover	BX1027	Flux cover
--	Feeder unit attachment screw	--	Feeder unit attachment screw
B2300	Heat resistant pad	B2300	Heat resistant pad
B2419	Power cord	B2419	Power cord
--	Instruction manual	--	Instruction manual



For more information [Scan QR Code](#).



FU-500 & FU-600

ROBOTIC INTEGRATION SYSTEM

The **HAKKO FU-601 Robotic Integration Soldering Module** is designed to communicate with the **HAKKO FU-500 Robotic Integration Solder Feeder** and integrate with various robotic systems to achieve solder usage efficiency.



For more information
Scan or Click
the QR Code.

FU-500

INTELLIGENT SOLDER FEEDER

The **HAKKO FU-500 Robotic Integration Solder Feeder** works in conjunction with the **HAKKO FU-601 Robotic Integration Soldering Module** and can be integrated with various robotic systems to achieve low-cost soldering automation.

The FU-500 Robotic Integration Solder Feeder assists in the robotic soldering process by controlling the feed of solder to the application.



FEATURES & BENEFITS

- Features a compact driver unit that allows the feed to be brought closer to the iron, increasing the accuracy of the amount of solder fed
- With an optical sensor, the FU-500 can detect solder clogging, slipping, and the end of the solder roll
- The Intelligent Solder Feeder is also equipped with a mechanism that perforates the solder wire as a counter measure against flux and solder spatter



CX5006 used with
the **FU-6001**
STRAIGHT IRON



CX1010 used with
the **FU-6002**
L-SHAPE IRON



SPECIFICATIONS

STATION	For Part No. FU500-71X (Straight Type)	For Part No. FU500-21X (L-shape Type)
Input Voltage	120 VAC, 50 / 60 Hz	
Power Consumption	35 W	
Outer Dimensions (W x H x D)	5.7 x 3.9 x 9.1 in. / 145 x 100 x 230 mm	
Weight (Station)	5.1 lb / 2.3 kg	
ESD Safe	Yes	
FEEDER UNIT	For Part No. CX5006 (Straight Type)	For Part No. CX1010 (L-shape Type)
Compatible Solder	Ø0.3 - 1.6 mm	Ø0.3 - 1.6 mm
Diameter Weight	1.8 lb / 800 g	1.8 lb / 800 g



CONTENTS

FU500-71X (Straight Type)		FU500-21X (L Type)	
Part No.	Description	Part No.	Description
CX5006	Feeder unit (straight type)	CX1010	Feeder unit (L type)
BX1041	Tube unit (0.3-1.0 mm)	BX1041	Tube unit (0.3-1.0 mm)
BX1042	Tube unit (1.2-1.6 mm)	BX1042	Tube unit (1.2-1.6 mm)
BX1036	Feeder cable	BX1036	Feeder cable
B3508	Power cord	B3508	Power cord
BX1057	Solder reel stand	BX1057	Solder reel stand
--	Instruction manual	--	Instruction manual



PARTS LIST FOR SOLDER DIAMETERS

	0.3 mm	0.5 mm	0.6 mm	0.8 mm	1.0 mm	1.2 mm	1.6 mm
Solder Feeder Drive Unit	BX1000	BX1001	BX1002	BX1003	BX1004	BX1005	BX1006
Solder Feeder Guide Set	BX1007	BX1008				BX1009	
PTFE Tube Inserts	BX1010	BX1011		BX1012	BX1013	BX1014	BX1015

To configure the FU-500 for use with your soldering application, select the Solder Feeder Drive Unit, Solder Feeder Guide Set, and PTFE Tube Insert based on the diameter of the solder you will be using. These parts are sold separately, but are required for the station to be operational.




TX1 SERIES TIPS



TX1 SERIES TIPS FOR USE WITH HU-200 & FU-601 STATIONS

UNIT: mm(inch)

TX1-XD (Chisel)	TX1-XD08 (Chisel)	TX1-XD16 (Chisel)	TX1-XD24 (Chisel)
TX1-XD3 (Chisel)	TX1-XBCR2 (Bevel)	TX1-XBCR3 (Bevel)	TX1-XBCR4 (Bevel)
TX1-XDR (Chisel)	TX1-XDR16 (Chisel)	TX1-XDR24 (Chisel)	TX1-XDR3 (Chisel)
TX1-XRK (Slot)			
<div><div>For more TX1 Series information Scan QR Code.</div></div>			

TX2 SERIES TIPS



TX2 SERIES TIPS FOR USE WITH HU-200 & FU-601 STATIONS

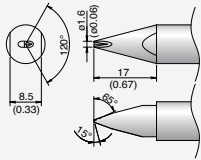
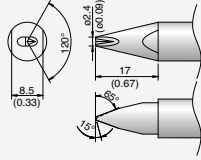
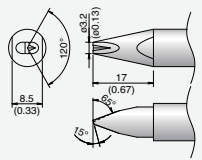
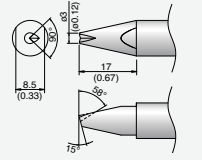
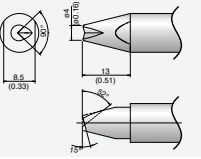
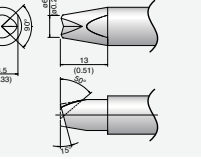
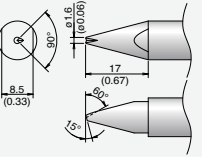
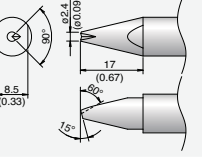
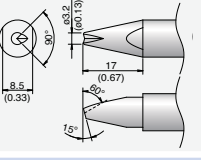
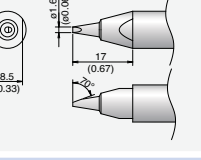
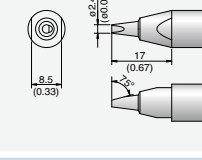
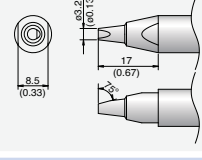
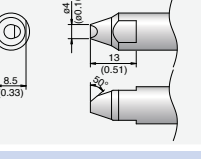
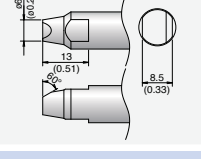
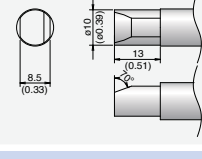
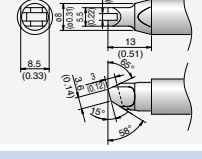
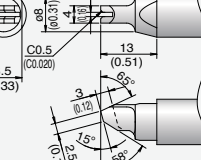
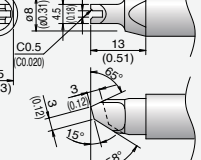
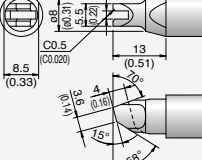
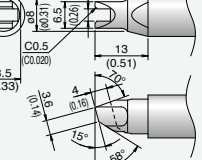
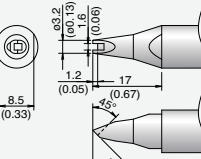

UNIT: mm(inch)

TX2-XD3 (Chisel)	TX2-XD4 & TX2-XDF4* (Chisel)	TX2-XD6 & TX2-XDF6* (Chisel)	TX2-XD08 & TX2-XDF08* (Chisel)
TX2-XD16 & TX2-XDF16* (Chisel)	TX2-XD24 & TX2-XDF24* (Chisel)	TX2-XD32 & TX2-XDF32* (Chisel)	TX2-XDR3 (Chisel)
TX2-XDR4 & TX2-XDRF4* (Chisel)	TX2-XDR6 & TX2-XDRF6* (Chisel)	TX2-XDR12* (Chisel)	<p>For more TX2 Series information Scan QR Code.</p> <p>* Pre-tinning on one side only.</p>



TX2 SERIES TIPS FOR USE WITH HU-200 & FU-601 STATIONS

UNIT: mm(inch)

TX2-XDRF16* (Chisel) 	TX2-XDRF24* (Chisel) 	TX2-XDRF32* (Chisel) 	TX2-XBCR3 (Bevel) 
TX2-XBCR4 (Bevel) 	TX2-XBCR6 (Bevel) 	TX2-XBCR16 (Bevel) 	TX2-XBCR24 (Bevel) 
TX2-XBCR32 (Bevel) 	TX2-XNC16 (Bevel) 	TX2-XNC24 (Bevel) 	TX2-XNC32 (Bevel) 
TX2-XNC40 (Bevel) 	TX2-XNC60 (Bevel) 	TX2-XNC100 (Bevel) 	TX2-XRK (Slot) 
TX2-XRK1040 (Slot) 	TX2-XRK1545 (Slot) 	TX2-XRK2055 (Slot) 	TX2-XRK3065 (Slot) 
TX2-XDR1632 (Groove) 	<div>  <p>For more TX2 Series information Scan QR Code.</p> <p>* Pre-tinning on one side only.</p> </div>		

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FX-100

INDUCTION HEATING SOLDERING STATION



No calibration required. Simply turn ON the station, and feel its power! Within seconds, you'll notice the power of the **HAKKO FX-100 Induction Heating Soldering Station**, rapidly transferring heat to the tips using HAKKO's induction heating technology.



FEATURES & BENEFITS

- Password Lockout prevents unauthorized system setup changes
- Sleep Function reduces tip temperature to preserve tip life and reduce oxidation when the iron is not in use
- Large backlit display provides a clear and simple interface for the operator
- Auto shut-off safety feature
- Compact design minimizes the workbench footprint



SPECIFICATIONS For Part No. FX100-04

STATION	
Voltage	120 VAC
Power Consumption	85 W
Temperature Stability	Meets or exceeds IPC J-STD-001
Output Frequency	13.56 MHz
Outer Dimensions (W x H x D)	5.0 x 5.9 x 6.6 in. / 127 x 150 x 167 mm
Included Handpiece	FX-1001 (Part No. FX1001-51) see page 13

FX-100 STACKING STAND

P/N: 777-208

Expand your workbench space with the **Stacking Stand** designed perfectly for the FX-100 Soldering Station



CONTENTS For Part No. FX100-04 (Complete Kit w/ Station, Handpiece & Iron Holder)

Part No.	Description
FX100-53 FX1001-51 FH800-51BY B5006 B5007 B5008 B2300 ...	Station + B2419 (power cord) Handpiece Iron holder + brass wire & sponge Heat resistant sleeve - yellow color (installed) Heat resistant sleeve - green color Heat resistant sleeve - gray color Heat resistant pad Instruction manual

FX100-04 SOLDERING STATION

Includes everything shown in picture.

IRON HOLDER
w/ Brass Wire & Sponge
P/N: FH800-51BY

**HEAT
RESISTANT
PAD**
P/N: B2300



**HEAT RESISTANT
ANTIBACTERIAL SLEEVES**
P/N: B5007 & B5008

**HANDPIECE
FX-1001**
P/N: FX1001-51



Note: Stacking Stand & Tips Sold Separately

For more information [Scan QR Code.](#)

FX-1001

STANDARD SOLDERING IRON

The **HAKKO FX-1001 Standard Soldering Iron** is a lightweight, slender, and ergonomically designed handpiece with a burn resistant cord that allows the operator dexterity. The FX-1001 handpiece works with the FX-100 soldering station, and uses T31 series tips, available in 4 different temperature series.



FEATURES & BENEFITS

- Powered by RF (induction) heating
- T31 series tips deliver great performance while providing up to 2 times longer tip life (on average) compared to other non-HAKKO tips
- No calibration required
- Slender, lightweight, and ergonomically designed handpiece with burn resistant cord allowing for excellent operator dexterity
- Conversion Kit available (FX1001-52)
- Sleep function that engages when the handpiece is placed in the holder



SPECIFICATIONS For Handpiece Only Part No. FX1001-51

Tip Series	T31-00: 895 °F / 480 °C, T31-01: 840 °F / 450 °C, T31-02: 750 °F / 400 °C, T31-03: 660 °F / 350 °C see page 14 (Tips Sold Separately)
Type of Station	HAKKO Induction Heating Soldering Station
Tip to Ground Resistance	< 2 Ω
Tip to Ground Potential	< 2 mV



CONTENTS For Part No. FX1001-52 (Complete Kit w/ Handpiece & Iron Holder)

Part No.	Description
FX1001-51	Handpiece
FH800-51BY	Iron holder + brass wire & sponge
B5006	Heat resistant sleeve - yellow color (installed)
B5007	Heat resistant sleeve - green color
B5008	Heat resistant sleeve - gray color
B2300	Heat resistant pad
...	Instruction manual

FX1001-52 STANDARD HANDPIECE KIT

Includes everything shown in picture.



The FX1001-51 Standard Handpiece is included with the **HAKKO FX100-04 set**, [see page 12](#).



FT-720* TIP CLEANER

P/N: FT720-03
[see page 101](#).

**Sold Separately*





For more information [Scan QR Code](#).


The **T31 Tips** can be easily identified by a distinctive colored connector end which represents the temperature series of each tip.


Note: Not all tips available in every temperature series.



 **xx = 00** = 895 °F / 480 °C

 **xx = 01** = 840 °F / 450 °C

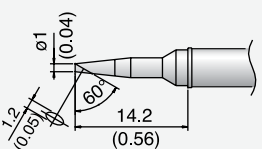
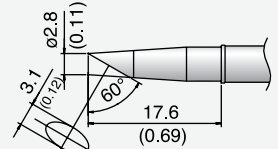
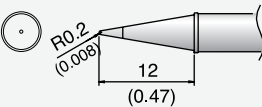
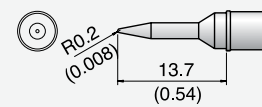
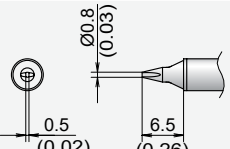
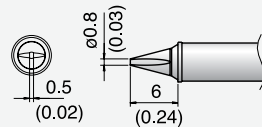
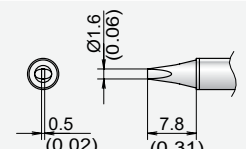
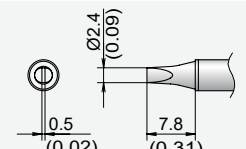
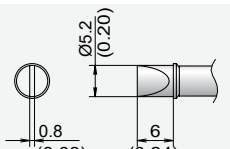
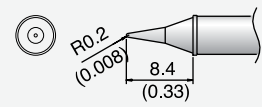
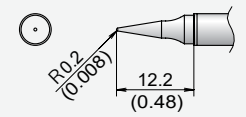
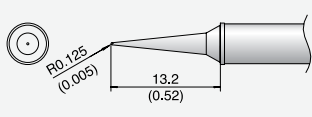
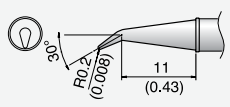
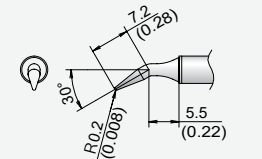
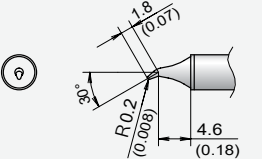
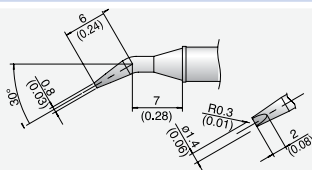

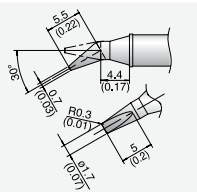
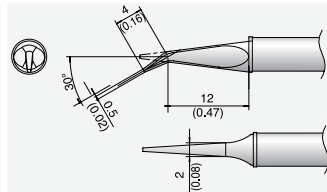
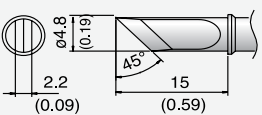
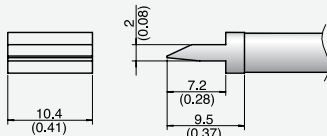
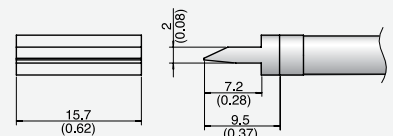
 **xx = 02** = 750 °F / 400 °C

 **xx = 03** = 660 °F / 350 °C



T31 SERIES TIPS FOR USE WITH FX-1001

UNIT: mm(inch)

T31-xxBC1 (Bevel)	T31-xxBC28 (Bevel)	T31-xxBL (Conical)	T31-xxSBL (Conical)
			
T31B-xxD08 (Conical)	T31-xxWD08 (Chisel)	T31B-xxD16 (Chisel)	T31B-xxD24 (Chisel)
			
T31B-xxD52 (Chisel)	T31-xxI (Conical)	T31B-xxIL (Conical)	T31-xxLI (Conical)
			
T31-xxJ02 (Bent)	T31B-xxJL02 (Bent)	T31B-xxJS02 (Bent)	T31-xxJD14 (Bent)
			
T31-xxJD17 (Bent)	T31-xx1601 (Bent)	<div>For more T31 Series information Scan QR Code.</div> 	
			
T31-xxKU (Knife)	T31-xx1401 (Spatula 10.4)	T31-xx1402 (Spatula 15.7)	
			

FX-1002


MICRO SOLDERING IRON



The **HAKKO FX-1002 Micro Soldering Iron** works with the FX-100 Soldering System. The power and performance of induction heating can now be felt with the FX-1002 micro handpiece and T35 series tips. By reducing the size of the tip and handpiece, the FX-1002 allows operators to work under a microscope for micro soldering applications.

For more information
Scan QR Code.



 FEATURES & BENEFITS	 SPECIFICATIONS For Handpiece Only Part No. FX1002-83								
<ul style="list-style-type: none"> The FX-100 Micro Solution! Same great power and performance felt with induction heating Quick-change T35 Series tips Conversion Kit Available (FX1002-84) Great for working under microscopes Sleep function that engages when the handpiece is placed in the holder 	<table> <tr> <td>Tip Series</td><td>T35-02: 750 °F / 400 °C, T35-03: 660 °F / 350 °C see below (Tips Sold Separately)</td></tr> <tr> <td>Type of Station</td><td>HAKKO Induction Heating Soldering Station</td></tr> <tr> <td>Tip to Ground Resistance</td><td>< 2 Ω</td></tr> <tr> <td>Tip to Ground Potential</td><td>< 2 mV</td></tr> </table>	Tip Series	T35-02: 750 °F / 400 °C, T35-03: 660 °F / 350 °C see below (Tips Sold Separately)	Type of Station	HAKKO Induction Heating Soldering Station	Tip to Ground Resistance	< 2 Ω	Tip to Ground Potential	< 2 mV
Tip Series	T35-02: 750 °F / 400 °C, T35-03: 660 °F / 350 °C see below (Tips Sold Separately)								
Type of Station	HAKKO Induction Heating Soldering Station								
Tip to Ground Resistance	< 2 Ω								
Tip to Ground Potential	< 2 mV								

FX1002-84 MICRO SOLDERING HANDPIECE KIT

Includes everything shown in picture.

IRON HOLDER
w/ Brass Wire & Sponge
P/N: FH800-52BY

HEAT RESISTANT PAD
P/N: B2300

HANDPIECE ONLY
P/N: FX1002-83

**HEAT RESISTANT
ANTIBACTERIAL SLEEVES**
P/N: B5179 (Installed) & B5180

CONTENTS For Part No. FX1002-84 (Complete Kit w/ Handpiece & Iron Holder)

Part No.	Description
FX1002-83 FH800-52BY B5179 B5180 B2300 --	Handpiece only Iron holder + brass wire & sponge Heat resistant sleeve - yellow color (installed) Heat resistant sleeve - green color Heat resistant pad Instructional manual

The FX1002-83 Micro Handpiece is used with the **HAKKO FX-100 set**, see [page 12](#).

**Sold Separately*

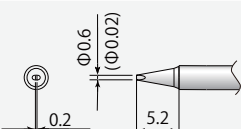
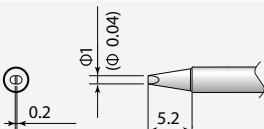
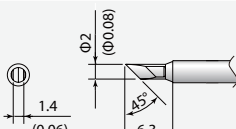
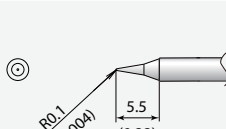
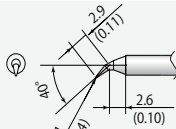


T35 SERIES TIPS



● xx = 02 = 750 °F / 400 °C

○ xx = 03 = 660 °F / 350 °C

T35 MICRO TIPS FOR USE WITH FX-1002					UNIT: mm(inch)				
T35-xxD06	(Conical)	T35-xxD1	(Conical)	T35-xxKU	(Knife)	T35-xxI	(Conical)	T35-xxJ	(Bent)
									





FX-1003

IH MICRO REWORK TWEEZERS

The **HAKKO FX-1003 IH Micro Rework Tweezers** work with the HAKKO FX-100 Induction Heating Soldering Station, delivering the same great power and performance felt with induction heating. With the ultra fine T38 tip shapes available in TWO different temperature series (750 °F & 660 °F), the FX-1003 Micro Hot Tweezers will transform the way you rework.



FEATURES & BENEFITS

- 4 types of tip alignment are possible:
-Vertical: ± 1 mm, Horizontal: 10mm, Forward: ± 1.5 mm, Angle: ± 200 deg.
- The handpiece is designed with an ergonomic shape for comfort and is ESD safe
- The holder includes built-in tip removal feature, stores up to 4 spare tips and makes changing out hot tips easy and convenient
- Sleep function that engages when the handpiece is placed in the holder



SPECIFICATIONS For Handpiece Only Part No. FX1003-83

Tip Series	T38-02: 750 °F / 400 °C, T38-03: 660 °F / 350 °C see page 17 (Tips Sold Separately)
Type of Station	HAKKO Induction Heating Soldering Station
Tip to Ground Resistance	<2 Ω
Tip to Ground Potential	<2 mV



CONTENTS For Part No. FX1003-84 (Complete Kit w/ IH Micro Rework Tweezers & Holder)

Part No.	Description
FX1003-83 FH800-84BY	FX-1003 handpiece only Holder + brass wire & sponge

FX1003-84 IH MICRO REWORK TWEezer KIT

Includes everything shown in picture.



**MICRO TWEEZERS
HOLDER**
w/ Brass Wire & Sponge
P/N: FH800-84BY

MICRO TWEEZERS
P/N: FX1003-83



The FX-1003 Micro Tweezers are used with the
HAKKO FX-100* set, see [page 12](#).

**Sold Separately*



For more information [Scan QR Code](#).

**RECEPTACLE
FOR EASY TIP
REMOVAL**

**CONVENIENT
TIP STORAGE**

**SLEEP MODE
FEATURE**

**FH-800
CLEANING BRUSH**
**Sold Separately - As an Accessory*
P/N: A5065

**FH-800
IRON HOLDER**
P/N: FH800-84BY

**HAKKO
T38 TIPS***
**Sold Separately*



Micro and Precise Tip Lineup for a Variety of Rework

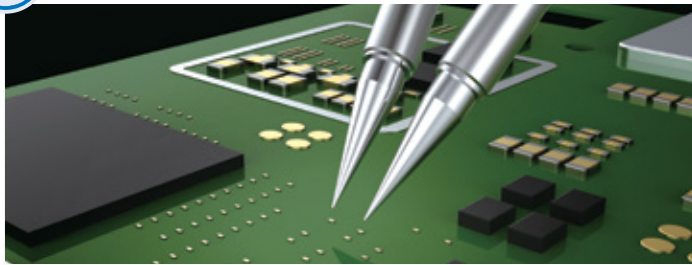
The wide selection of T38 tip shapes support rework of components as small as 01005.



T38 TIPS (SET OF 2) FOR USE WITH FX-1003 T38-02 Series 750 °F / 400°C

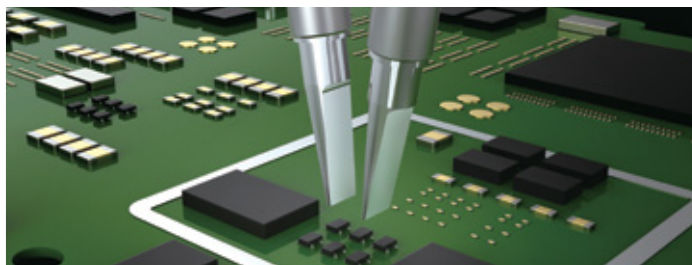
T38-03 Series 660 °F / 349°C

UNIT: mm



Shape I	T38-02I T38-03I	(Conical)	T38-02IS T38-03IS	(Conical)
For 01005 component				

Shape J	T38-02J T38-03J	(Bent)	T38-02JS T38-03JS	(Bent)
For 01005 component				



Shape L	T38-02L1 T38-03L1	(Chip)	T38-02L2 T38-03L2	(Chip)

Shape K	T38-02K T38-03K	(Knife)

For more T38 Series information
Scan QR Code.



4 ADJUSTABLE TIP ALIGNMENTS



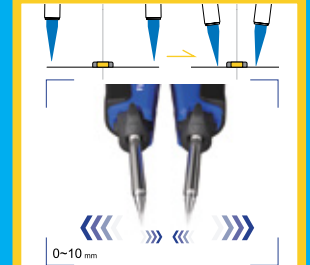
VERTICAL

Perfectly adjusts the tips for precision accuracy



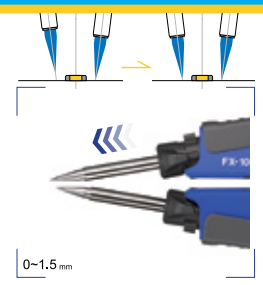
HORIZONTAL

This allows for larger and much smaller components to be removed with a width range of 10 mm down to 0



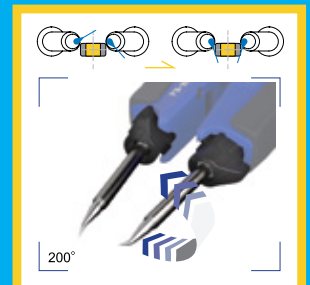
FORWARD

Both left and right tips are adjustable to correct alignment



ANGLE

Rotating the tips give the operator better control of how they would like to remove the components, catering to preference



The FX-1003 Micro Hot Tweezers sports an impressive **line up of tip alignment adjustments** to secure the right contact for micro components.

NEW

HAKKO CONTROL SOFTWARE

The New Hakko Control Software allows the operator to store and load multiple parameter settings for process management control, setting profiles and tip temperature. With the new Hakko Control Software, the operator can also record tip temperature data, record tip offset measurements, and read a real-time temperature graph from a PC.



FX-971



FX-972

TEMPERATURE

5 PRESETS

**SAVE & LOAD
PARAMETERS**

**RECORD AUTO CAL
RESULTS**



FX-805



FX-305

GRAPH & RECORD TEMPERATURE

**Depending on station in use*





NEW

FX-971 SOLDERING STATION

The new **HAKKO FX-971 Soldering Station** is the future of soldering, bringing together precision and innovation with the quality, reliability and power Hakko is known for. A 100W stackable station with a minimal footprint to maximize your workbench space, both a standard and micro handpiece, and an all-new holder for removing and storing tips. This newly designed stackable soldering station provides operators with a 15-degree face tilt, large LCD screen, multi-button functionality, and works with the new Hakko Control Software.



SOLDERING



FEATURES & BENEFITS

- Lightweight and compact 100W soldering station
- Efficient soldering performance with new user interface
- New Hakko Control Software allows for easy parameter set up, as well as data logging
- Large, easy-to-read LCD with a 15-degree face plate tilt
- Password lockout feature for process control
- Iron holder with built-in tip holder and tip exchange features
- Works seamlessly with the FG-100B/101B Tip Thermometer for measuring and wirelessly offsetting the tip temperature to the station



SPECIFICATIONS For Part No. FX971-010

STATION	
Voltage	AC 24 V
Power Consumption	100 W
Temperature Range	120 °F – 850 °F / 50 °C – 450 °C
Temperature Stability	±5 °F / ±3 °C at idle
Outer Dimensions (W x H x D)	3.7 x 5 x 4.8 in. / 93 x 126 x 133 mm
Weight (w/o Cord)	2.6 lb / 1.2 kg
Included Handpiece	FX-9701 (P/N: FX9701-81) see page 22

FX971-010 SOLDERING STATION SET

Includes everything shown in picture.



CONTENTS For Part No. FX971-010 (Complete Kit w/ Station, Handpiece & Iron Holder)

Part No.	Description
--	FX-971 soldering station
FX9701-81	FX-9701 soldering handpiece
FH215-010	FH-215 iron holder w/ cleaning sponge & wire
B5129	USB cable
B2419	Power cord
--	Instruction manual
--	CD-ROM for PC software

4 COMPATIBLE HANDPIECES

* All handpieces sold separately.
Available also in N2.



HAKKO CONTROL SOFTWARE



New HAKKO Control Software allows the operator to set parameters, profiles and record offset & temperature data (from a PC). To download the Hakko Control Software visit us at: <https://hakkousa.com> or [Scan the QR Code.](#)



COMING SOON



FX-972

DUAL-PORT SOLDERING STATION

The new **Hakko FX-972 Dual-Port Soldering Station** is a 200W soldering station that has the power to utilize multiple handpieces for various operator needs. The FX-972 supports 8 different types of handpieces including regular and micro soldering irons, rework tweezers, micro rework tweezers, heavy-duty soldering irons, and nitrogen handpieces as well. In addition, the FX-972 uses a large LCD display, intuitive user interface, wireless IR temperature offsetting, and works with the new Hakko Control Software for data logging capabilities.



SOLDERING



FEATURES & BENEFITS

- A 200W dual port soldering station
- Compatible with 8 different handpieces (see below)
- Large, easy-to-read LCD with a 15-degree face plate tilt
- Password lockout feature for process control
- Iron holder with built-in tip holder and tip exchange features
- Works seamlessly with the FG-100B/101B Tip Thermometer for measuring and wirelessly offsetting the tip temperature on the station



SPECIFICATIONS For Part No. FX972-011

STATION

Voltage	AC 24 V
Power Consumption	200 W
Max Temperature Range	120 °F – 940 °F / 50 °C – 500 °C *Varies w/ handpiece
Temperature Stability	±5 °F / ±3 °C at idle
Outer Dimensions (W x H x D)	5 × 5.9 × 5.4 in. / 126 × 151 × 136 mm
Weight (w/o Cord)	6.2 lb / 2.8 kg

FX972-011 SOLDERING STATION ONLY

Includes everything shown in picture.

CD-ROM for PC SOFTWARE



USB CABLE P/N: B5129



STATION

COLOR BAND P/N: B5348



CONTENTS For Part No. FX972-011 (Station Only)

Part No.	Description
--	FX-972 soldering station
B5348	Color band
B5129	USB cable
B2419	Power cord
--	Instruction manual
--	CD-ROM for PC software

8 COMPATIBLE HANDPIECES

* All handpieces sold separately. *Available also in N2.*



HAKKO CONTROL SOFTWARE



New HAKKO Control Software allows the operator to set parameters, profiles and record offset & temperature data (from a PC). To download the Hakko Control Software visit us at: <https://hakkousa.com> or **Scan the QR Code.**



For more information **Scan QR Code.**



For more information
Scan QR Code.

FX-9701

STANDARD SOLDERING HANDPIECE

The new **HAKKO FX-9701 Standard Handpiece** works with the FX-971 & FX-972 Soldering Stations. An ergonomic, lightweight, 95W handpiece with over 60 tip varieties. The FX-9701 perfectly accompanies the new FX-971 aesthetic and no longer requires the interchanging of grips. **Tips Sold Separately.*



FEATURES & BENEFITS

- 95W Soldering Handpiece
- Single piece handpiece with built-in sleep mode sensor
- Offering a wide variety of T39 tips for various soldering applications



SPECIFICATIONS For Part No. FX9701-81

HANDPIECE

Tip Series	T39 Series see page 22-24
Station Compatibility	FX-971 see page 20 & FX-972 see page 21
Power Consumption	95 W / 24 VAC
Tip-to-Ground Resistance	< 2 Ω
Leak Voltage	< 2 mV
Heating Element	Composite heater

FX9701-011

STANDARD SOLDERING HANDPIECE KIT

Includes everything shown in picture.

IRON HOLDER
w/ Brass Wire & Sponge
P/N: FH215-010



**SOLDERING
HANDPIECE**
P/N: FX9701-81



CONTENTS For Part No. FX9701-011 (Complete Kit w/ Handpiece & Holder)

Part No.	Description
FX9701-81 FH215-010	FX-9701 standard handpiece only Holder + brass wire & cleaning sponge

Also Available: **FX-9702** Part No. FX9702-81
N₂ COMPATIBLE STANDARD SOLDERING IRON
[see page 37](#)

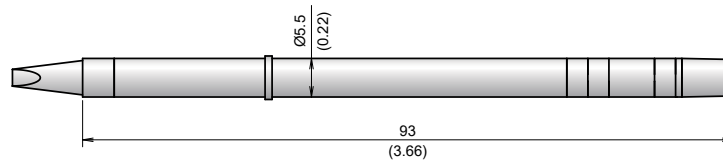
T39 SERIES TIPS



T39 SERIES TIPS FOR USE WITH THE FX-9701 & FX-9702 HANDPIECES

UNIT: mm(inch)

T39-B02	(Conical)	T39-B05	(Conical)	T39-B07	(Conical)	T39-BC1020	(Bevel)
 R0.2 (0.008) 7.5 (0.3) Nozzle Assy F N2 B5295		 R0.5 (0.02) 10 (0.39) Nozzle Assy G N2 B5296		 R0.7 (0.03) 5 (0.2) Nozzle Assy C N2 B5292		 1 (0.04) 45° 11.5 (0.45) 2 (0.08) Nozzle Assy I N2 B5298	
T39-BC1530	(Bevel)	T39-BC2040	(Bevel)	T39-BC2535	(Bevel)	T39-BC3065	(Bevel)
 1.5 (0.06) 60° 15 (0.59) 3 (0.12)		 2 (0.08) 60° 15 (0.59) 4 (0.16)		 2.5 (0.1) 45° 11.5 (0.45) 3.5 (0.14) Nozzle Assy H N2 B5297		 3 (0.12) 60° 15 (0.59) 6.5 (0.26)	



T39 SERIES TIPS FOR USE WITH THE FX-9701 & FX-9702 HANDPIECES

UNIT: mm(inch)

T39-BC3545 (Bevel) Nozzle Assy E N2 B5294	T39-BCF1020 (Bevel) Nozzle Assy I N2 B5298	T39-BCF2535 (Bevel) Nozzle Assy H N2 B5297	T39-BCF3545 (Bevel) Nozzle Assy E N2 B5294
T39-BCM2535 (Bevel) Nozzle Assy H N2 B5297	T39-BCM3545 (Bevel) Nozzle Assy E N2 B5294	T39-BL02 (Conical) Nozzle Assy K N2 B5333	T39-BLL02 (Conical) Nozzle Assy I N2 B5298
T39-B502 (Conical) 	T39-B503 (Conical) 	T39-C1020 (Bevel) Nozzle Assy J N2 B5332	T39-C1025 (Bevel) Nozzle Assy J N2 B5332
T39-C4055 (Bevel) Nozzle Assy E N2 B5294	T39-CF4055 (Bevel) Nozzle Assy E N2 B5294	T39-D08 (Chisel) Nozzle Assy G N2 B5296	T39-D12 (Chisel) Nozzle Assy G N2 B5296
T39-D16 (Chisel) Nozzle Assy G N2 B5296	T39-D24 (Chisel) Nozzle Assy D N2 B5293	T39-D32 (Chisel) Nozzle Assy D N2 B5293	T39-D4 (Chisel) Nozzle Assy B N2 B5291
T39-D52 (Chisel) Nozzle Assy B N2 B5291	T39-DL32 (Long Chisel) 	T39-DL4 (Long Chisel) 	T39-DL52 (Long Chisel)
T39-DLS15 (Chisel) 	T39-I02 (Conical) Nozzle Assy J N2 B5332	T39-IL02 (Conical) Nozzle Assy K N2 B5333	T39-ILS015 (Conical) Nozzle Assy K N2 B5333
T39-J02 (Bent) Nozzle Assy I N2 B5298	T39-JL02 (Bent) 	T39-JS02 (Bent) 	T39-JD08 (Bent)



T39 SERIES TIPS FOR USE WITH THE FX-9701 & FX-9702 HANDPIECES

UNIT: mm(inch)

T39-JD14 (Bent) Nozzle Assy A N2 B5290	T39-JD16 (Bent) Nozzle Assy A N2 B5290	T39-K (Knife) Nozzle Assy A N2 B5290	T39-KF (Knife) Nozzle Assy A N2 B5290
T39-KL (Knife) Nozzle Assy B N2 B5291	T39-KR (Knife) Nozzle Assy B N2 B5291	T39-KU (Knife) Nozzle Assy F N2 B5295	T39-SP104 (Spatula) Nozzle Assy I N2 B5298
T39-SP157 (Spatula) Nozzle Assy I N2 B5298	T39-SP212 (Spatula) Nozzle Assy H N2 B5297	T39-BCR1235 (Grooved) Nozzle Assy D N2 B5293	T39-BCR12 (Grooved Bevel) Nozzle Assy I N2 B5298
T39-BCR16 (Grooved Bevel) Nozzle Assy I N2 B5298	T39-BCR24 (Grooved Bevel) Nozzle Assy H N2 B5297	T39-BCR32 (Grooved Bevel) Nozzle Assy E N2 B5294	T39-BCR4 (Grooved Bevel) Nozzle Assy B N2 B5291
T39-BCR52 (Grooved Bevel) Nozzle Assy B N2 B5291	T39-DR12 (Grooved Chisel) Nozzle Assy G N2 B5296	T39-DR16 (Grooved Chisel) Nozzle Assy G N2 B5296	T39-DR24 (Grooved Chisel) Nozzle Assy D N2 B5293
T39-DR32 (Grooved Chisel) Nozzle Assy D N2 B5293	T39-DR4 (Grooved Chisel) Nozzle Assy D N2 B5293	T39-DR52 (Grooved Chisel) Nozzle Assy B N2 B5291	T39-DS24 (Short Chisel) Nozzle Assy C N2 B5292
T39-DS32 (Short Chisel) Nozzle Assy C N2 B5292	T39-DS4 (Short Chisel) Nozzle Assy C N2 B5292	T39-DS52 (Short Chisel) Nozzle Assy C N2 B5292	 For more information Scan QR Code.



For more information
Scan QR Code.

FX-9703

MICRO SOLDERING HANDPIECE

The new **HAKKO FX-9703 Micro Soldering Handpiece** works with the FX-971 & FX-972 Soldering Stations. A precision micro soldering iron with quick recovery time and 70W of power. This micro handpiece is ideal for soldering micro components especially when soldering under a microscope. 8 different tip variations for soldering components. The FX-9703 Micro Handpiece is the latest innovation in micro soldering.

**Tips Sold Separately.*

SOLDERING



FEATURES & BENEFITS

- 70W Micro Soldering Handpiece
- The slim and shorter handpiece is an ideal option for operators working under the microscope
- Offering 8 T50 tip types for all your micro soldering needs



SPECIFICATIONS For Part No. FX9703-81

HANDPIECE

Tip Series	T50 Series see below
Station Compatibility	FX-971 see page 20 & FX-972 see page 21
Power Consumption	70 W / 24 VAC
Tip-to-Ground Resistance	< 2 Ω
Leak Voltage	< 2 mV
Heating Element	Composite heater

FX9703-011 MICRO SOLDERING HANDPIECE KIT

Includes everything shown in picture.



The **HAKKO FT-720 Tip Cleaner** provides quick and effective cleaning of soldering iron tips with sensor activated counter-rotating brushes, which remove tip oxides, debris, and excess solder without damaging the tip plating.
**Sold Separately*



**IRON HOLDER
w/ Brass Wire & Sponge**
P/N: FH215-011



CONTENTS For Part No. FX9703-011 (Complete Kit w/ Micro Handpiece & Holder)

Part No.	Description
FX9703-81 FH215-011	FX-9703 Micro handpiece Holder + brass wire & sponge

Also Available: **FX-9704** Part No. FX9704-81

N₂ COMPATIBLE MICRO SOLDERING IRON [see page 37](#)

T50 SERIES TIPS

**MICRO SOLDERING
HANDPIECE**
P/N: FX9703-81



T50 SERIES TIPS FOR USE WITH THE FX-9703 & FX-9704 HANDPIECES

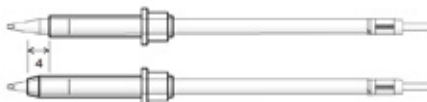
UNIT: mm(inch)

T50-D02 (Chisel)	T50-D04 (Chisel)	T50-D06 (Chisel)	T50-D1 (Chisel)
 Nozzle Assy A: N2 B5337 Nozzle Assy B: N2 B5338	 Nozzle Assy A: N2 B5337 Nozzle Assy B: N2 B5338	 Nozzle Assy A: N2 B5337 Nozzle Assy B: N2 B5338	 Nozzle Assy A: N2 B5337 Nozzle Assy B: N2 B5338
T50-I01 (Conical)	T50-J01 (Bent)	T50-KU (Knife)	T50-KN (Knife)
 Nozzle Assy A: N2 B5337 Nozzle Assy B: N2 B5338	 Nozzle Assy A: N2 B5337	 Nozzle Assy A: N2 B5337	 Nozzle Assy A: N2 B5337

Note: Nozzle Assy A & B may be used with the T50 tips (D02, D04, D06, D1 & I01). Use Nozzle Assy A when using the tip parallel to the board or when Nozzle Assy B interferes with surrounding components.

Nozzle Assy A

Nozzle Assy B



For more information Scan QR Code.



COMING SOON

FX-9705

REWORK TWEEZERS



The new **HAKKO FX-9705 Rework Tweezers** is the latest handpiece to work for use with the FX-972 dual port soldering station. Designed for the removal of small surface mount components, this lightweight, ergonomic handpiece delivers 190W of power to ensure the job gets done efficiently. The FX-9705 has two levels of adjustment capabilities built-in. **Tips Sold Separately.*

SOLDERING



FEATURES & BENEFITS

- 190W Rework Tweezers
- Superior thermal performance
- Quick thermal recovery and light weight ergonomic design
- Two levels of adjustments: Vertical and Forward



SPECIFICATIONS For Part No. FX9705-81

HANDPIECE

Tip Series	T51 Series see below
Station Compatibility	FX-972 see page 21
Power Consumption	190 W / 24 VAC
Tip-to-Ground Resistance	< 2 Ω
Leak Voltage	< 2 mV
Heating Element	Composite heater

FX9705-011 REWORK TWEEZERS KIT

Includes everything shown in picture.

REWORK TWEEZERS

P/N: FX9705-81

IRON HOLDER w/ Brass Wire & Sponge

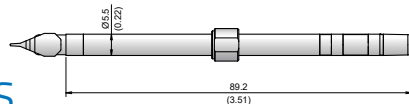
P/N: FH220-013



CONTENTS For Part No. FX9705-011 (Complete Kit w/ Rework Tweezers & Holder)

Part No.	Description
FX9705-81 FH220-013	FX-9705 rework tweezers only Holder + brass wire & sponge

T51 SERIES TIPS



2 LEVELS OF TIP ALIGNMENT:



VERTICAL



FORWARD

For more information
[Scan QR Code.](#)



T51 SERIES TIPS FOR USE WITH THE FX-9705 REWORK TWEEZERS (T51 series tips all sold as pairs)

UNIT: mm(inch)

T51-C05 (Chip)	T51-I05 (Chip)	T51-L1 (Chip)	T51-L2 (Chip)
T51-L3 (Chip)	T51-L6 (SOP)	T51-L8 (SOP)	T51-L10 (SOP)
T51-L13 (SOP)	T51-L16 (SOP)	T51-LA3 (Chip/Angled)	T51-LA6 (SOP/Angled)
T51-LA8 (SOP/Angled)	T51-LA10 (SOP/Angled)		



For more information
[Scan QR Code.](#)

COMING SOON

FX-9706

MICRO TWEEZERS



The latest **HAKKO FX-9706 Micro Tweezers** is designed to work specifically with the FX-972 Dual Soldering Station. The FX-9706 has quick thermal recovery performance and is excellent for micro SMD components. **Tips Sold Separately.*



FEATURES & BENEFITS

- 140W Micro Tweezers
- Four levels of tip alignment:
 - 1) **Vertical:** ± 1 mm (Perfectly adjusts the tips for precision accuracy)
 - 2) **Horizontal:** 10mm (This allows for larger and much smaller components to be removed with a width range of 10 mm down to 0)
 - 3) **Forward:** ± 1.5 mm (Both left and right tips are adjustable to correct alignment)
 - 4) **Angle:** ± 200 deg (Rotating the tips give the operator better control of how they would like to remove the components, catering to preference)
- The handpiece is ESD safe with an ergonomic shape for comfort
- The holder includes built-in tip removal feature, stores up to 4 spare tips and makes changing out hot tips easy and convenient
- Sleep function that engages when the handpiece is placed in the holder



SPECIFICATIONS For Part No. FX9706-81

HANDPIECE

Tip Series	T52 Series see below
Station Compatibility	FX-972 see page 21
Power Consumption	140 W / 24 VAC
Tip-to-Ground Resistance	< 2 Ω
Leak Voltage	< 2 mV
Heating Element	Composite heater



CONTENTS For Part No. FX9706-011 (Complete Kit w/ Micro Tweezers & Holder)

Part No.	Description
FX9706-81	FX-9706 Micro tweezers only
FH215-014	Holder + brass wire & sponge

FX9706-011 MICRO TWEEZER KIT

Includes everything shown in picture.



IRON HOLDER
w/ Brass Wire & Sponge
P/N: FH215-014



MICRO TWEEZERS
P/N: FX9706-81

4 LEVELS OF TIP ALIGNMENT:



VERTICAL



HORIZONTAL



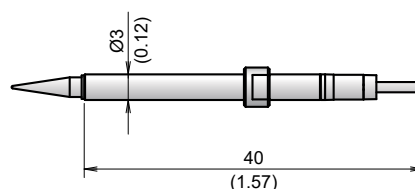
FORWARD



ANGLE



For more information
Scan QR Code.



T52 SERIES TIPS



T52 SERIES TIPS FOR USE WITH FX-9706 MICRO TWEEZERS (T52 series tips all sold as pairs)

UNIT: mm(inch)

T52-I005 (Conical)	T52-I015 (Conical)	T52-J005 (Bent)	T52-J015 (Bent)
T52-K (Knife)	T52-L1 (Chip)	T52-L2 (Chip)	



For more
information
Scan QR Code.



COMING SOON

FX-9707

HEAVY-DUTY HANDPIECE

The **HAKKO FX-9707 Heavy-Duty Handpiece** is for the FX-972 Dual Soldering Station. The FX-9707 is a 200W iron meant for use on larger mass components and large heat sinks. **Tips Sold Separately.*

For more information
Scan QR Code.



FEATURES & BENEFITS

- 200W Heavy-Duty Soldering Handpiece
- Single piece handpiece with built-in sleep mode sensor
- Offering 14 different T53 tips for all your heavy-duty soldering needs



SPECIFICATIONS For Part No. FX9707-81

HANDPIECE

Tip Series	T53 Series see below
Station Compatibility	FX-972 see page 21
Power Consumption	200 W / 24 VAC
Tip-to-Ground Resistance	< 2 Ω
Leak Voltage	< 2 mV
Heating Element	Composite heater

FX9707-011

HEAVY-DUTY SOLDERING HANDPIECE KIT

Includes everything shown in picture.

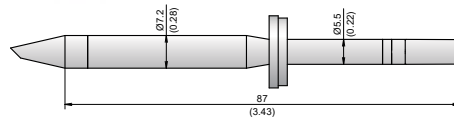


CONTENTS For Part No. FX9707-011 (Complete Kit w/ Heavy-duty handpiece & Holder)

Part No.	Description
FX9707-81 FH220-82	FX-9707 Heavy-duty handpiece only Holder + brass wire & sponge

T53

SERIES TIPS



Also Available: **FX-9708** Part No. FX9708-81
N₂ COMPATIBLE HEAVY-DUTY SOLDERING IRON [see page 37](#)



T53 SERIES TIPS FOR USE WITH THE FX-9707 & FX-9708 HEAVY-DUTY HANDPIECES

UNIT: mm(inch)

T53-B05 (Conical)	T53-BC2030 (Bevel)	T53-BC4060 (Bevel)	T53-BC6090 (Bevel)
 Nozzle Assy A N2 B5345	 Nozzle Assy A N2 B5345	 Nozzle Assy C N2 B5347	 Nozzle Assy C N2 B5347
T53-D16 (Chisel)	T53-D24 (Chisel)	T53-D32 (Chisel)	T53-D45 (Chisel)
 Nozzle Assy A N2 B5345	 Nozzle Assy C N2 B5347	 Nozzle Assy C N2 B5347	 Nozzle Assy C N2 B5347
T53-D52 (Chisel)	T53-DR32 (Grooved Chisel)	T53-DR45 (Grooved Chisel)	T53-DR52 (Grooved Chisel)
 Nozzle Assy C N2 B5347	 Nozzle Assy B N2 B5346	 Nozzle Assy B N2 B5346	 Nozzle Assy B N2 B5346
T53-K (Knife)	T53-BCR1645 (Slotted)	 For more information Scan QR Code.	
 Nozzle Assy B N2 B5346	 Nozzle Assy B N2 B5346		

FX-951

SOLDERING STATION

The **HAKKO FX-951 Soldering Station** features a compact design with advanced heat transfer and thermal recovery. The FX-951 provides its operator with a low temperature alarm, lock out key, interchangeable grips, and a wide temperature range. It's compact design helps keep the bench clutter to a minimum, allowing the operator to breeze through tasks.



FEATURES & BENEFITS

- Superior heat transfer and thermal recovery
- Composite tips — heating element and sensor are integrated with ceramic
- No calibration required & low temperature alarm
- Lockout key card to prevent unauthorized or accidental temp settings
- 30 minute automated shut-off



SPECIFICATIONS For Part No. FX951-98

STATION

Voltage	24 V
Power Consumption	75 W 120 V
Temperature Range	400 °F – 840 °F / 200 °C – 450 °C
Temperature Stability	±9 °F / ±5 °C at idle
Outer Dimensions (W x H x D)	3.1 x 5.1 x 5.1 in. / 80 x 130 x 131 mm
Weight (w/o Cord)	2.6 lb / 1.2 kg
Included Handpiece	FM-207 (P/N: FM207-02) see page 68

FX951-66

SOLDERING STATION SET

Includes everything shown in picture.



CONTENTS For Part No. FX951-66 (Complete Kit w/ Station, Handpiece & Iron Holder)

Part No.	Description
--	FX-951 soldering station
FM207-02	FM-207 soldering handpiece
FH200-01	FH-200 iron holder w/ 599B tip cleaner
B2419	Power cord
B2972	Control Card
B3219	Sleeve assembly (grip), anti-bacterial, green
B2300	Heat resistant pad
B3253	Connecting cable
B2756	Tip tray
--	Instruction manual



FM-207* Part No. FM207-02

SOLDERING IRON INCLUDED WITH THE FX-951

[see page 68](#)

**Tips Sold Separately.*





FX-805

ULTRA HEAVY-DUTY SOLDERING STATION



The **HAKKO FX-805 Ultra Heavy-Duty Soldering Station** is your solution to soldering large mass components, high current induction coils, heat sinks, large transformers, heavy-duty cables and other difficult to solder applications across a wide range of industries including, medical, automotive, communications and energy.



FEATURES & BENEFITS

- Lightweight, 460W soldering station with composite ceramic heating element
- 5 user programmable preset temperatures
- New Hakko Control Software allows for easy parameter set up, as well as data logging
- Large, easy-to-read LCD screen
- Auto sleep function that senses when the soldering iron is not in use
- Password lockout feature for process control
- Re-designed iron holder with built-in tip holder and tip exchange features
- Soldering iron (P/N: FX8004-81) uses heavy-duty T37 Series tips (and compatible with T33 Series tips)



SPECIFICATIONS For Part No. FX805-03

STATION

Voltage	120 VAC, 50 / 60 Hz
Power Consumption	460 W
Temperature Range	120 °F – 940 °F / 50 °C – 500 °C
Temperature Stability	±9 °F / ±5 °C at idle
Outer Dimensions (W x H x D)	5.6 × 4.2 × 8.6 in. / 143 × 107 × 218 mm
Weight (w/o Cord)	8.6 lb / 3.9 kg
Included Handpiece	FX-8004 (P/N: FX8004-81) see page 31



CONTENTS For Part No. FX805-03 (Complete Kit w/ Station, Handpiece & Iron Holder)

Part No.	Description
--	FX-805 soldering station
FX8004-81	FX-8004 soldering handpiece
FH220-82	FH-220 iron holder w/ cleaning sponge & wire (A1561 & A5038)
AF5000	Filter (x1)
B5129	USB cable /1m
B2419	Power cord
--	Instruction manual
--	CD-ROM for PC software

FX805-03

ULTRA HEAVY-DUTY SOLDERING STATION SET

Includes everything shown in picture.

STATION

POWER CORD P/N: B2419

IRON HOLDER P/N: FH220-82

CD-ROM for PC SOFTWARE

FILTER P/N: AF5000

SOLDERING HANDPIECE P/N: FX8004-81

USB CABLE P/N: B5129

HAKKO CONTROL SOFTWARE





FH-220

HEAVY-DUTY IRON HOLDER

The **HAKKO FH-220 Heavy-Duty Iron Holder** is a sturdy holder with a brass cleaning wire and cleaning sponge, tilt adjustable receptacle, and an easy to use tip removal tool and tip holder for storage for standard and nitrogen tips.

P/N: FH220-82



FX-8004

ULTRA HEAVY-DUTY SOLDERING IRON

The **HAKKO FX-805 Ultra Heavy-Duty Soldering Handpiece** is lightweight (54 grams) and uses the new HAKKO T37 Series Tips which feature a 390W composite ceramic heater with an improved sensor to measure accurate tip temperature at the soldering point.



For more information
Scan QR Code.



FEATURES & BENEFITS

- Slender and lightweight (54 g) ergonomic handpiece
- Built-in "sleep" inclinometer sensor that detects non-motion
- Uses T37 Series tips
- Compatible with T33 Series tips



SPECIFICATIONS

Tip Series	T37 see page 32, T33 see page 33 (Tips Sold Separately)
Power Consumption	390 W
Tip-to-Ground Resistance	< 2 Ω
Tip-to-Ground Potential	< 2 mV
Heater	HAKKO Composite Ceramic™
Weight (w/o Cord)	0.12 lb. / 54 g



FG-100B THERMOMETER
P/N: FG100B-03

Using the FG-100B Thermometer you can automatically change the offset value with the wireless IR sending function. see page 94

The FG-101B Soldering Iron Tester is also available (P/N: FG101B-03) see page 94



Also Available: FX-8005* Part No. FX8005-81
N₂ COMPATIBLE HEAVY-DUTY SOLDERING IRON

Requires the use of nozzles that are specific to the tip shape being used. Compatible with the FX-780 & FX-781 Nitrogen Generator see page 34

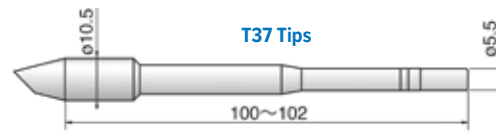
**Tips & Nozzles Sold Separately.*



For more information Scan QR Code.



T37 SERIES TIPS



The **T37 Tips** are designed to work with the FX-8004 Ultra Heavy-Duty Handpiece with a new 390W internal heater. These tips have a sensor system placed closer to the end of the tip to improve response. **Note:** Tips are not backwards compatible with FX-801



T37 SERIES TIPS FOR USE WITH FX-8004

UNIT: mm(inch)

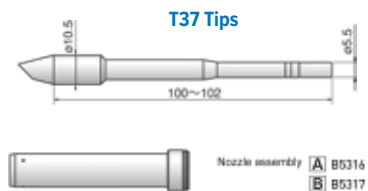
T37-BC3045 (Bevel) 	T37-BC4060 (Bevel) 	T37-BC5075 (Bevel) 	T37-BC6090 (Bevel)
T37-BC70105 (Bevel) 	T37-D24 (Chisel) 	T37-D32 (Chisel) 	T37-D5 (Chisel)
T37-D6 (Chisel) 	T37-D10 (Chisel) 	T37-DR1632 (Slotted) 	
T37-BCR4 (Grooved) 	T37-DR3 (Grooved) 	<p>For more information on the T37 Series Scan QR Code.</p>	



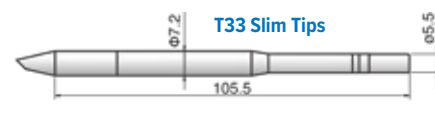
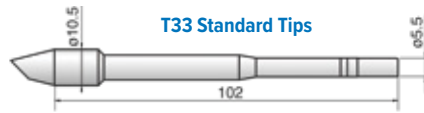
NITROGEN CROSS REFERENCE For T37 TIPS AND N₂ NOZZLES

T37 = 390 W

Compatible Tips	N ₂ Nozzle Assy Part No.	Description
T37-BC4060	B5316	Nozzle Assembly A
T37-BC5075		
T37-BC6090		
T37-BC70105		
T37-BCR4		
T37-D10		
T37-D32		
T37-D5	B5317	Nozzle Assembly B
T37-D6		
T37-BC3045		
T37-D24		
T37-DR1632		
T37-DR3		



T33 SERIES TIPS



The **T33 Standard Tips** are cross compatible to use with the FX-8004 handpiece. These tips feature 260W composite ceramic heating elements. These heating elements have a top controlled temperature of 940 °F / 500 °C and high mass shapes, enabling you to solder some of the most challenging solder joints at only 750 °F / 400 °C and without preheating!

The **T33 Slim Tips** are thinner tips that can be used for narrow spaces but maintains the same amount of heat as the standard tip.



T33 SERIES TIPS FOR USE WITH FX-8004

UNIT: mm(inch)

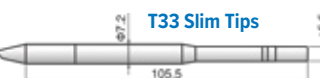
T33-BC2 (Bevel) Nozzle Assy B N2 B5317	T33-SSBC2 (Bevel) Nozzle Assy C N2 B5318	T33-BC3 (Bevel) Nozzle Assy B N2 B5317	T33-SSBC3 (Bevel) Nozzle Assy C N2 B5318
T33-BC4 (Bevel) Nozzle Assy A N2 B5316	T33-SSBC4 (Bevel) Nozzle Assy D N2 B5319	T33-BC5 (Bevel) Nozzle Assy A N2 B5316	T33-SSBC5 (Bevel) Nozzle Assy D N2 B5319
T33-BC6 (Bevel) Nozzle Assy A N2 B5316	T33-D5 (Chisel) Nozzle Assy A N2 B5316	T33-D6 (Chisel) Nozzle Assy A N2 B5316	T33-SSD6 (Chisel) Nozzle Assy E N2 B5320
T33-SSD16 (Chisel) Nozzle Assy C N2 B5318	T33-D24 (Chisel) Nozzle Assy B N2 B5317	T33-SSD24 (Chisel) Nozzle Assy D N2 B5319	T33-D32 (Chisel) Nozzle Assy A N2 B5316
T33-SSD32 (Chisel) Nozzle Assy E N2 B5320	T33-1610 (V-Groove) Nozzle Assy B N2 B5317	T33-SS1610 (V-Groove) Nozzle Assy C N2 B5318	T33-1611 (Groove) Nozzle Assy B N2 B5317

T33-SS1611 (Groove) Nozzle Assy C N2 B5318
--

NITROGEN CROSS REFERENCE For T33 TIPS AND N₂ NOZZLES

T33 = 260 W

Compatible Tips	N ₂ Nozzle Assy Part No.	Description	Compatible Tips	N ₂ Nozzle Assy Part No.	Description
T33-BC4	B5316	Nozzle Assembly A	T33-SSBC2	B5318	Nozzle Assembly C
T33-BC5			T33-SSBC3		
T33-BC6			T33-SSD16		
T33-D32			T33-SS1610		
T33-D5			T33-SS1611		
T33-D6	B5317	Nozzle Assembly B	T33-SSBC4	B5319	Nozzle Assembly D
T33-BC2			T33-SSBC5		
T33-BC3			T33-SSD24		
T33-D24			T33-SSD32	B5320	Nozzle Assembly E
T33-1610			T33-SSD6		
T33-1611					





FX-780 & FX-781 NITROGEN GENERATOR

The **HAKKO Nitrogen (N₂) Soldering System** is the ideal solution for all your lead-free hand-soldering applications. The bench-top FX-780 Nitrogen Generator creates nitrogen gas from filtered, dry compressed air and the FX-791 Nitrogen Controller delivers it efficiently and uniformly to the nitrogen compatible soldering iron and soldering area. It can be used with any HAKKO soldering station that has a nitrogen compatible handpiece.



FEATURES & BENEFITS

FX-780 & FX-781 NITROGEN GENERATOR

- High-volume, high-performance Nitrogen Generator
- Concentration of generated N₂ gas up to 99.9%
- Generator can be placed vertically or horizontally
- Nozzle assembly envelops the soldering iron tip and delivers uniform nitrogen gas to the soldering area
- The nitrogen flow can reduce or prevent oxidation from forming during the soldering process

FX-791 CONTROLLER

- Compact Nitrogen Controller
- Controls the flow of nitrogen to the FM-2026 nitrogen iron with the FX-951, FM-206 and FM-203 soldering stations
- Controls the flow level from 0.25 L/min to 2.5 L/min (recommended level 0.5-1.5 L/min.) and should be adjusted to the tip shape



SPECIFICATIONS

NITROGEN GENERATOR	FX780-01	FX781-81
Air Supply Pressure	0.3 - 0.7 MPa (44 - 102 psi)	
Concentration of Generated N ₂	99.9% (max)	
Generated N ₂ Gas Flow	1.5 L/min.	2.4 L/min.
Outer Dimensions (W x H x D) (w/o sockets and valve)	2.9 x 11.1 x 2.8 in. / 73 x 282 x 71 mm	2.9 x 16.02 x 2.8 in. / 73 x 407 x 71 mm
Weight	3.3 lb / 1.5 kg	4.4 lb / 2 kg
NITROGEN CONTROLLER	FX791-01	
Input Gas Pressure	0.2 - 0.9 MPa (28 - 129 psi)	
Output Gas Flow	0.25 - 2.5 L/min	
Input Hose	0.24 in. / 6.0 mm OD (not included)	
Outer Dimensions (W x H x D)	2.76 x 4.76 x 5.28 in. / 70 x 121 x 134 mm	
Weight	1.3 lb / 600 g	
Contents	FX-791 (1 pc)	

NITROGEN GENERATOR

FX-780*
SMALLER CAPACITY
NITROGEN GENERATOR
P/N: FX780-01

**Sold Separately*



FX-781
LARGER CAPACITY
NITROGEN GENERATOR
P/N: FX781-81



NITROGEN CONTROLLER

FX-791
NITROGEN CONTROLLER
P/N: FX791-01



Also Available:
FM2026-KIT
NITROGEN SOLDERING
SYSTEM KIT

Conversion Kit P/N: FM2026-KIT

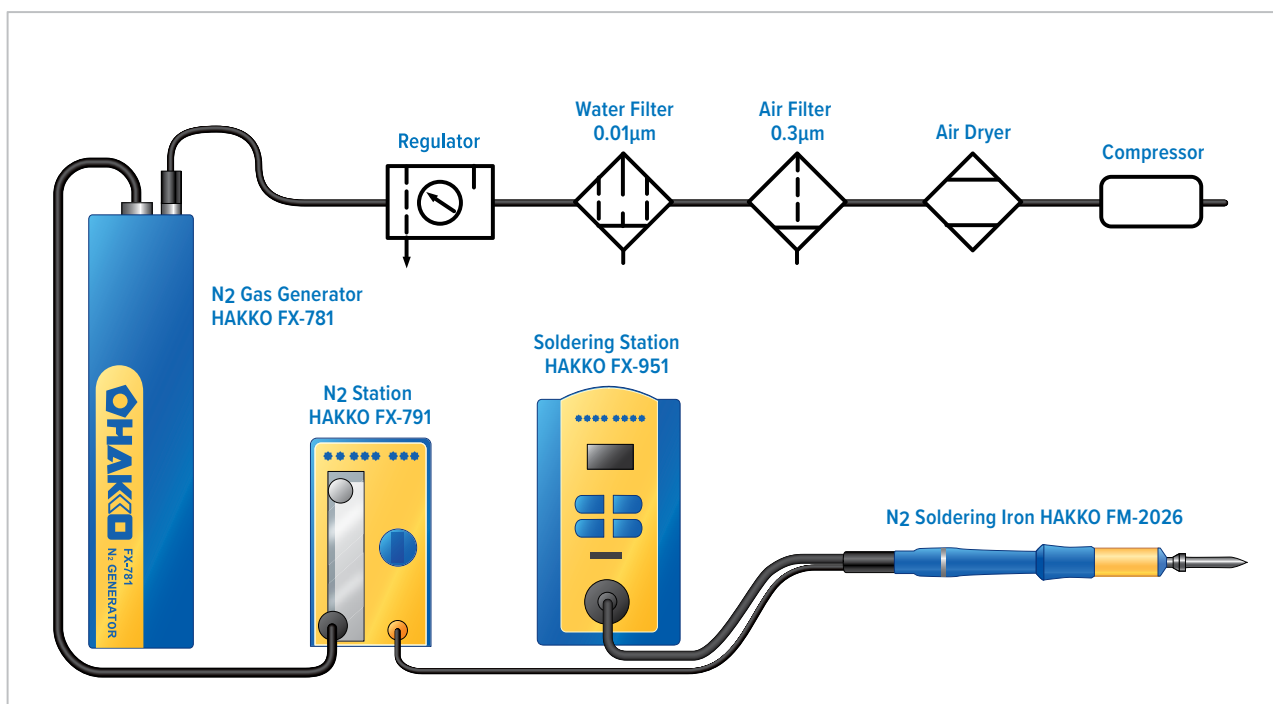
This Conversion Kit is compatible with only the N₂ handpieces listed in the page 36



For more information Scan QR Code.

FOR ONE SOLDERING IRON

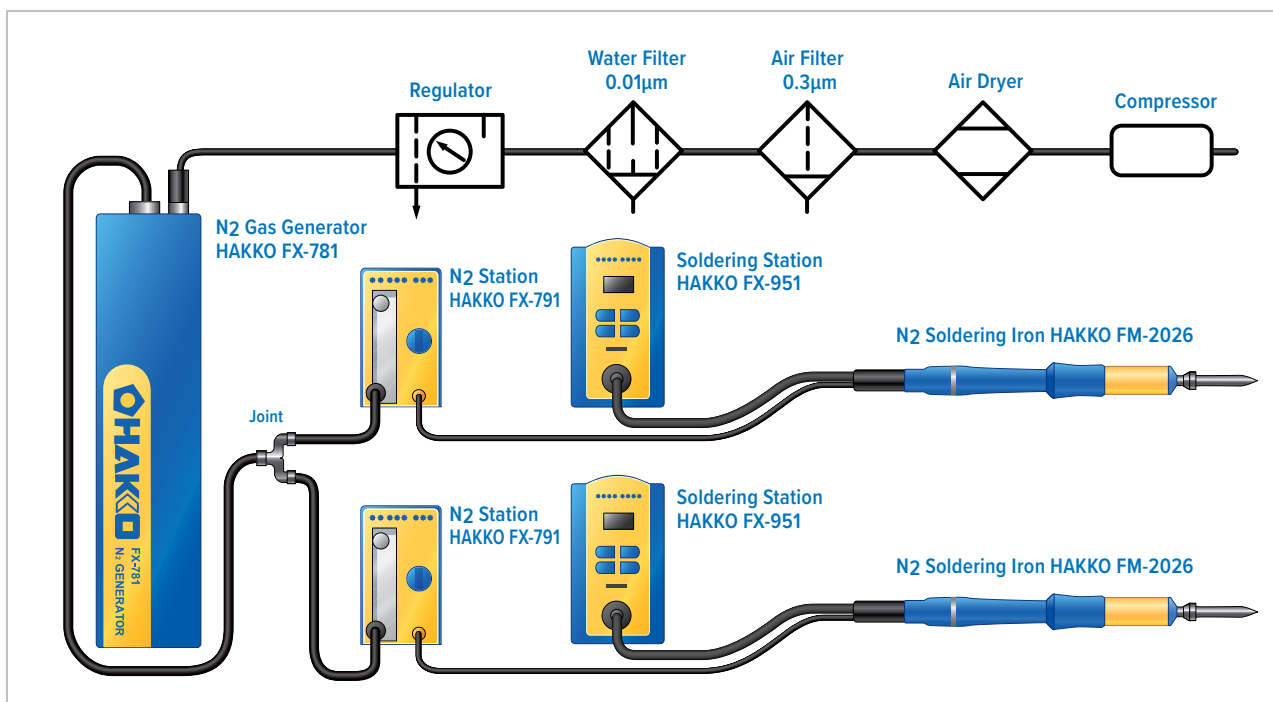
Small-capacity type : HAKKO FX-780
Large-capacity type : HAKKO FX-781



* It is capable to supply high concentration Nitrogen of 99.9% at the output rate approx. 1L/min.
(at air supply pressure of 0.7MPa)









FOR TWO SOLDERING IRONS

Large-capacity type : HAKKO FX-781



* It is capable to supply high concentration Nitrogen of 97% at the output rate approx. 1L/min.
(at air supply pressure of 0.5MPa)

NITROGEN HANDPIECE VARIATIONS

	Handpiece Only	Category	Station Compatibility	Power Consumption	Tips/Nozzles
	FX-9702 See page 37	Standard N ₂ Soldering Handpiece	Only for FX-971 & FX-972 stations	90 W / 24 VAC	T39 Series Not Included See page 24
	FM-2026 See page 38	Standard N ₂ Soldering Handpiece	Compatible w/ FX-971, FX-972, FX-951, FM-202, FM-203, FM-204, FM-205, FM-206 & FP-102, stations	70 W / 24 V	T17 Series Not Included See page 38
	FX-8802 See page 46	Standard Soldering w/ N ₂ capability	Compatible w/ FX-889, FX-888D, FX-888	65 W / 26 V	T18 Series Not Included See page 49
	FX-9704 See page 37	Micro N ₂ Soldering Handpiece	Only for FX-971 & FX-972 stations	70 W / 24 VAC	T50 Series Not Included See page 25
	FM-2032 See page 70	Micro Soldering w/ N ₂ capability	Compatible w/ FX-971, FX-972, FX-951, FM-203, & FM-206	48 W / 24 V	T30 Series , See page 70 N ₂ Nozzles (used with adaptor C5038 - C5040) assemblies See page 70
	FX-9708 See page 37	Heavy-Duty N ₂ Soldering Handpiece	Only for FX-972 station	200 W / 24 VAC	T53 Series , Not Included See page 28
	FM-2031 See page 39	Heavy-Duty N ₂ Soldering Handpiece	Compatible w/ FX-972 & FM-206 stations	140 W / 24 V	T22 Series , See page 39 N ₂ Nozzles (B3121, B3123, B3124 & B3561) assemblies
	FX-8005 See page 37	Ultra Heavy-Duty N ₂ Soldering Handpiece	Only for FX-805 station	390 W / 30 V	T33 Series , Not Included See page 33 N ₂ Nozzles (B5318, B5319 & B5320) assemblies See page 32 . T37 Series , Not Included See page 32 N ₂ Nozzles (B5316 & B5317) assemblies See page 32 .

These are the new nitrogen capable handpiece equivalents for the FX-9701, FX-9703, FX-9707 and for FX-8004 when equipped with the the FX-791 controller and FX-780 or FX-781 Nitrogen Generators



FX-9702

N₂ STANDARD SOLDERING HANDPIECE

P/N: FX9702-81

For more information
Scan QR Code.



FX-9704

N₂ MICRO SOLDERING HANDPIECE

P/N: FX9704-81

For more information
Scan QR Code.



FX-9708

N₂ HEAVY-DUTY HANDPIECE

P/N: FX9708-81

For more information
Scan QR Code.



FX-8005

N₂ ULTRA HEAVY-DUTY SOLDERING HANDPIECE

P/N: FX8005-81

For more information
Scan QR Code.





For more information
Scan QR Code.

FM-2026

NITROGEN SOLDERING IRON

The **HAKKO FM-2026 Soldering Iron** can be used with the HAKKO FM-203, FM-206 and FX-951 stations. Soldering efficiency is improved as the preheated nitrogen envelops the soldering iron tip.

T17 SERIES TIPS

T17 SERIES TIPS FOR USE WITH FM-2026 NITROGEN SOLDERING IRON

UNIT: mm(inch)

T17-D08 (Chisel)	T17-D16 (Chisel)	T17-D24 (Chisel)	T17-B2 (Conical)						
 Nozzle Assy D N2 B2709	 Nozzle Assy C N2 B2708	 Nozzle Assy C N2 B2708	 Nozzle Assy C N2 B2708						
T17-J02 (Bent)	T17-BC1 (Bevel)	T17-BCF1 (Bevel)	T17-BC2 (Bevel)						
 Nozzle Assy B N2 B2707	 Nozzle Assy F N2 B2899	 Nozzle Assy F N2 B2899	 Nozzle Assy A N2 B2706						
T17-BCF2 (Bevel)	T17-BC3 (Bevel)	T17-BCF3 (Bevel)	T17-KF (Knife)						
 Nozzle Assy A N2 B2706	 Nozzle Assy G N2 B2900	 Nozzle Assy G N2 B2900	 Nozzle Assy J N2 B2923						
T17-KU (Knife)	T17-KR (Knife)	<div>NITROGEN CROSS REFERENCE FOR T17 TIPS AND N₂ NOZZLES</div> <table><tr><th>Compatible Tips</th><th>N₂ Nozzle Assy Part No.</th><th>Description</th></tr><tr><td>T17-BC2, T17-BCF2</td><td>B2706</td><td>Nozzle Assembly A</td></tr></table>		Compatible Tips	N ₂ Nozzle Assy Part No.	Description	T17-BC2, T17-BCF2	B2706	Nozzle Assembly A
Compatible Tips	N ₂ Nozzle Assy Part No.	Description							
T17-BC2, T17-BCF2	B2706	Nozzle Assembly A							
 Nozzle Assy H N2 B2901	 Nozzle Assy I N2 B2902								

NEW N2 Handpiece
NITROGEN CONTROLLER
P/N: FM2026-06



For more T17 Series
information
Scan QR Code.



FM-2031

NITROGEN HEAVY DUTY SOLDERING IRON

The **HAKKO FM-2031 Nitrogen Heavy Duty Soldering Iron** is a compatible handpiece that can be attached to the FM-203 “D” port and the HAKKO FM-206 CH2 or CH3 ports.

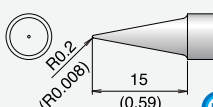
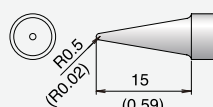
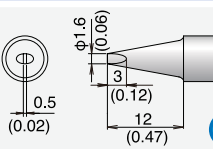
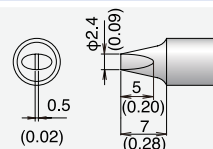
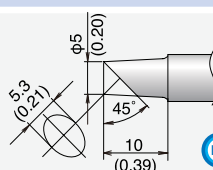
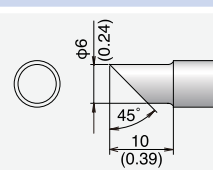
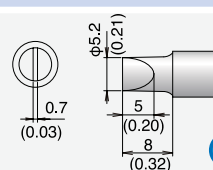
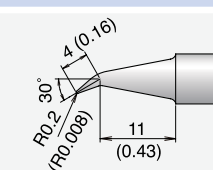
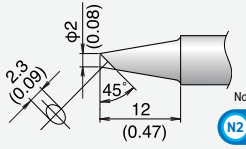
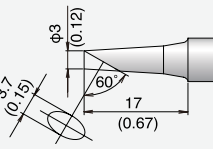
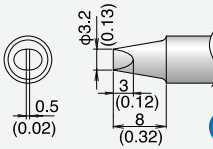
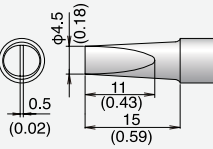
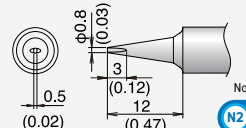
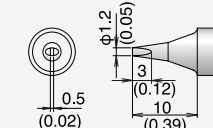
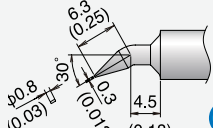
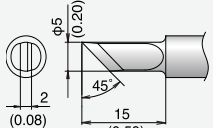
T22 SERIES TIPS

For more information
Scan QR Code.



T22 SERIES TIPS FOR USE WITH FM-2030 & FM-2031 HEAVY SOLDERING IRON

UNIT: mm(inch)

T22-BL (Conical)  Nozzle Assy A N2 B3121	T22-BL2 (Conical)  Nozzle Assy A N2 B3121	T22-D16 (Chisel)  Nozzle Assy C N2 B3123	T22-D24 (Chisel)  Nozzle Assy E N2 B3561
T22-C5 (Bevel)  Nozzle Assy D N2 B3124	T22-C6 (Bevel)  Nozzle Assy D N2 B3124	T22-D52 (Chisel)  Nozzle Assy D N2 B3124	T22-J02 (Bent Angle)  Nozzle Assy A N2 B3121
T22-BC2 (Bevel)  Nozzle Assy A N2 B3121	T22-C3 (Bevel)  Nozzle Assy A N2 B3121	T22-D32 (Chisel)  Nozzle Assy D N2 B3124	T22-D45 (Chisel)  Nozzle Assy D N2 B3124
T22-D08 (Chisel)  Nozzle Assy C N2 B3123	T22-D12 (Chisel)  Nozzle Assy A N2 B3121	T22-JD08 (Chisel)  Nozzle Assy E N2 B3561	T22-K (Knife)  Nozzle Assy C N2 B3123



For more T22 Series information
Scan QR Code.



NITROGEN CROSS REFERENCE For T22 TIPS AND N₂ NOZZLES

Compatible Tips	N ₂ Nozzle Assy Part No.	Description
T22-BL, T22-BL2, T22-BC2, T22-C3, T22-D12 & T22-J02	B3121	Nozzle Assembly A
T22-D08, T22-D16 & T22-K	B3123	Nozzle Assembly C
T22-C5, T22-C6, T22-D32, T22-D45, T22-D52	B3124	Nozzle Assembly D
T22-D24, T22-JD08	B3561	Nozzle Assembly E



FX-305

DIGITAL SOLDER POT

The **HAKKO FX-305 Digital Solder Pot** includes a standard 75 x 75 mm crucible and is perfect for tinning leads and soldering components. The FX-305 features a maximum temperature setting of 990 °F / 530 °C, a new 100 x 100 mm crucible size, an LCD interface, and HAKKO Control Software that makes setting parameters and temperature fast and easy.



FEATURES & BENEFITS

- 3 crucible sizes, 50 x 50 mm, 75 x 75 mm, & 100 x 100 mm
- Easy pot replacement and new safety cover above solder pot
- LCD digital display; max temp of 990 °F
- Hakko Control Software to easily set parameters and temperature settings
- Wireless IR Auto-Cal feature (with use of FG-100B/101B)
- Solder leak detection sensor added in for safety
- 5 different heating programs for optimum temperature settings: Sn-Pb, Sn-Ag-Cu, Sn-Cu, Sn, and Sn-Bi



SPECIFICATIONS For Part No. FX305-03

Power Consumption	575 W		
Temperature Stability	±9 °F / ±5 °C at idle		
Weight	5.5 lb / 2.5 kg		
Crucible Size	50 x 50 mm	75 x 75 mm	100 x 100 mm
Temperature Range	120 °F - 990 °F / 50 °C - 530 °C	120 °F - 940 °F / 50 °C - 500 °C	120 °F - 840 °F / 50 °C - 450 °C
Crucible Dimensions (W x H x D)	2.0 x 2.0 x 1.7 in. / 50 x 50 x 72.5 mm	3.0 x 3.0 x 1.7 in. / 75 x 75 x 42.5 mm	3.9 x 3.9 x 2.1 in. / 100 x 100 x 53 mm
Outer Dimension (W x H x D)	6.4 x 3.9 x 9.4 in. / 162 x 100 x 239 mm		
Outer Dimension (W x H x D) w/Safety Cover	6.4 x 4.8 x 9.4 in. / 162 x 123 x 239 mm		

FX305-03 DIGITAL SOLDER POT

Includes everything
shown in picture.

**SOLDER POT
SAFETY COVER**
P/N: B5322

**75 x 75 mm
CRUCIBLE**
P/N: A5068

**J-SHAPED
WASTE
COLLECTOR**
P/N: B2919

SPATULA
P/N: B2932

USB CABLE
P/N: B5129

**CD-ROM for
HAKKO Control
Software**

POWER CORD
P/N: B2419



CONTENTS For Part No. FX305-03

Part No.	Description
--	Soldering pot unit
A5068	Standard 75 x 75 mm long life crucible
B2932	Spatula
B5129	USB cable
B1416	Hexagon wrench
B2919	J-Shape waste collector
B2419	Power cord
B5322	Solder pot safety cover
---	Instructional manual
---	CD-ROM for HAKKO control software



ACCESSORIES For Part No. FX305-03

Part No.	Description
A5067	50 x 50 mm extended life crucible
A5069	100 x 100 mm extended life crucible
B5324	Safety bench mount bracket
B5325	Temperature probe fixture
A1310	Probe

HAKKO CONTROL SOFTWARE

New HAKKO Control Software allows the operator to set parameters, profiles, temperature and other settings from a PC. To download the Hakko Control Software visit us at: <https://hakkousa.com> or Scan QR Code.





**SAFETY BENCH
MOUNT BRACKET**

**Sold Separately*
P/N: B5324



PROBE + FIXTURE*

**Sold Separately - As an Accessory*
P/N: A1310 & B5325

FX-305

CRUCIBLES



50 x 50 mm CRUCIBLE*

P/N: A5067

**Sold Separately*



75 x 75 mm CRUCIBLE

P/N: A5068 (Included)



100 x 100 mm CRUCIBLE*

P/N: A5069

**Sold Separately*



**FG-100B
THERMOMETER**

P/N: FG100B-03
see page 94

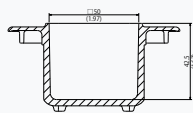
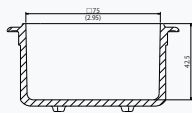
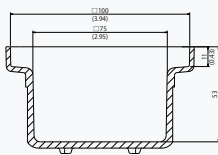


**FG-101B
THERMOMETER**

P/N: FG101B-03
see page 95



CRUCIBLES

A5067	A5068	A5069
		

Using the FG-100B Thermometer and FG-101B Soldering Iron Tester you can automatically change the offset value with an IR sending function.



FX-300

ANALOG SOLDERING POT

The **HAKKO FX-300 Analog Soldering Pot** features analog functionality and a rugged ceramic heating element. This soldering pot is lead-free compatible and can accommodate two crucible sizes.



FEATURES & BENEFITS

- Analog functionality with variable temperature control
- Ceramic heating element
- Easy crucible replacement
- Accommodates two crucible sizes: 50 mm (included w/unit) and 75 mm square (optional)
- Use the two crucibles for different solder compositions and use the different crucible sizes with the same unit
- Optional extended life crucible (with special coating treatment) available



SPECIFICATIONS For Part No. FX300-03

Power Consumption	220 W	
Temperature Stability	±9 °F / ±5 °C	
Weight (w/o solder and cord)	3.74 lb 1.7 kg	
Outer dimensions (W x H x D)	5.6 x 4.0 x 8.7 in. / 143 x 100 x 220 mm	
Crucible Size	50 x 50 mm Square	75 x 75 mm Square
Temperature Range	400 °F - 840 °F / 200 °C - 450 °C	400 °F - 720 °F / 200 °C - 380 °C
Solder Pot Dimensions (W x H x D)	2.0 x 2.0 x 1.7 in. / 50 x 50 x 42 mm	3.0 x 3.0 x 2.1 in. / 75 x 75 x 55 mm
Molten Solder Capacity	1.87 lb / 0.85 kg	2.64 lb / 1.2 kg

***NOTE:** The extended life crucibles are available in two sizes 50x50 mm square and 75x75 mm square (with a special treated coating) that extends the life of the pot. Sold Separately.

FX300-03 ANALOG SOLDERING POT

Includes everything shown in picture.

J-SHAPED SOLDER WASTE COLLECTOR

P/N: B2919



CONTENTS For Part No. FX300-03

Part No.	Description
FX300-03 B2932 B2919 B1417 A1517 --	Solder pot unit Spatula J-shaped solder waste collector Hexagon wrench 50 x 50 mm crucible Instruction manual



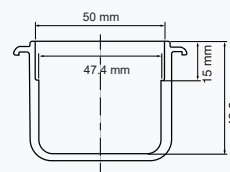
ACCESSORIES For Part No. FX300-03

Part No.	Description
A1310 A1518 A1539 A1540	Thermocouple probe 75 x 75 mm regular crucible 50 x 50 mm extended life crucible 75 x 75 mm extended life crucible

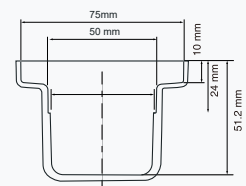


CRUCIBLES

A1517 Normal / A1539 Extended Life



A1518 Normal / A1540 Extended Life



For more information Scan QR Code.

373

SOLDER FEEDER



For more information
Scan QR Code.

The **HAKKO 373 Solder Feeder** allows the operator to solder with one hand by feeding the solder directly to the solder joint. This process controls solder feed consistency, eliminates the need for 'transfer soldering', while also freeing up your other hand. The 373 Solder Feeder requires the proper **adjustment ring** for the solder diameter size you are working with, along with the corresponding **tube unit** that will run the solder up to the handpiece, and the **guide pipe** that takes the solder from the tube unit and feeds it to the solder joint. For those working with a bottom feed type unit, a special receptacle for your handpiece has been designed with the guide pipe in mind.

**Soldering handpieces and tips sold separately*



FEATURES & BENEFITS

- Operator can adjust the speed and amount of solder to be fed to the soldered area
- Can be used with a wide variety of HAKKO soldering irons
- Adjustable solder backfeed 0 to 5 mm
- ESD-safe by design



SPECIFICATIONS For Part No. 373-11

SOLDERING SELF FEEDER

Power Consumption	6 W
Motor Rating	24 VDC, 3.2 W
Solder Feed Time	0 - 7 sec. (Auto mode)
Solder Feed Speed	0.18 - 1.0 in. / sec / 4.5 - 26 mm / sec
Solder Backfeed	0 - 0.2 in. / 0 - 5 mm Fixed speed
Mode Switch	Auto / Manual
Compatible Solder Diameters	0.024, 0.026, 0.031, 0.039, 0.04, 0.063 in / 0.6, 0.65, 0.8, 1.0, 1.2, 1.6 [†] mm
Coiled Solder	Maximum 2.2 lb / 1 kg bobbin
Optional Part	B1649 - Foot switch
Outer Dimensions (W x H x D)	4.2 x 4.3 x 8.5 in. / 107 x 110 x 215 mm
Weight	Approx. 3.3 lb / 1.5 kg



COMPATIBLE HANDPIECES

Handpiece Part No.	Compatible Station
FM-2027	FM-206, FM-205, FM-204, FM-203 & FX-951
FM-2030	FM-206 & FM-203
FX-1001	FX-100
FX-8001	FX-888D & FX-889
FX-8805	FX-888D & FX-889
FX-8002	FX-801
FX-9701	FX-971 & FX-972

EX. If you have the FX-100 station with the FX-1001 handpiece and you're working with solder that has a diameter of 0.6mm then your configuration is "B1626 (Adjustment Ring) + *C5056 (Tube Unit) + B5268 (Guide Pipe) + B5266 (Handpiece Receptacle)"

*Note: This configuration is using a bottom feed type tube unit
† 1.6mm is only supported for tin/lead solder and not lead-free



For more Soldering Feeder Configurations Scan QR Code.



485

SOLDER FOUNTAIN



The **HAKKO 485 Solder Fountain** is a compact, high-performance soldering system developed exclusively for soldering and desoldering components and connectors mounted on PC boards. This soldering unit can be purchased with or without air blower control unit.

Part No: 485-V12



FEATURES & BENEFITS

- Compatible with LEAD-FREE solder
- Solder flow is time-controlled and temperature-controlled
- Soldering and desoldering cycles are automatic and precise
- A built-in locator light pinpoints the exact position for placing components
- Solder remaining in through-holes is completely removed by using the Hakko 486 Air Blower accessory (included with 485-V12)
- A large selection of custom nozzles are available



SPECIFICATIONS For Part No. 485-1-V12 & 485-V12

SOLDERING SYSTEM

Power Consumption 120 VAC, 850 W

Temperature Control Ambient to 570 °F / 299 °C

Solder Capacity 22 lb / 10 kg

Heating Element 800 W (400 W x 2)

Air Pressure Only for (485-V12) 4.4 - 22 lb / 2 kg/cm² -10 kg/cm²

Dimensions (W x H x D)	485 Body	19.7 x 9.6 x 21.7 in. / 500 x 245 x 550 mm
	486 Air unit Only for (485-V12)	5.9 x 3.9 x 11.8 in. / 150 x 100 x 300 mm

Weight	485 Body	77 lb / 35 kg without solder
	486 Air unit Only for (485-V12)	7.7 lb / 3.5 kg



REPLACEMENT PARTS & NOZZLES

Part No.	Description
486	Air unit
485-N-01	14/16 Pin nozzle
485-N-02	18/20 Pin nozzle
485-N-03	28 Pin nozzle
485-N-04	42 Pin nozzle
485-28	14/16 Pin air hood
485-29	18/20 Pin air hood
485-30	28 Pin air hood
485-31	42 Pin air hood
485-026B	Anti-oxidizer
B2932	Spatula
485-10	Lamp (6 V / 10 W)
485-H-V12	Heating element 120 V / 400 W
485-06	Sensor / CA
485-07	IC tweezers



CONTENTS For Part No. 485-1-V12 & 485-V12

Part No.	Description	Part No.
485-1-V12 (485 System WITHOUT 486 air blower)	14/16 Pin nozzle	485-N-01
	18/20 Pin nozzle	485-N-02
	28 Pin nozzle	485-N-03
	42 Pin nozzle	485-N-04
	IC tweezers	485-07
	Anti-oxidizer	485-026B
	Spatula	B2932
	Lamp (6 V / 10 W)	485-10
	Positioning board	485-20
	Bubble level	485-22
	Waste collector	485-23
	Locator light	485-26
Foot switch (connected to body)	485-60	
485-V12 (485 System WITH 486 air blower)	Includes 485-1-V12 plus:	486
	Air unit - body	485-24
	Air hood holder with hose cable	485-28
	14/16 Pin air hood	485-30
	28 Pin air hood	485-31
	42 Pin air hood	485-31
	18/20 Pin air hood	485-29

NOTE: The 485 is shipped without solder



FX-888D

SOLDERING STATION



The **HAKKO FX-888D Soldering Station** is perfect for a variety of soldering applications. From working with metal jewelry, RC Cars, and DIY projects to phone and tablet repair, the FX-888D is affordable, reliable, and convenient to use. Voted multiple times best in its class, it's no wonder it's the # 1 soldering station on the market.



FEATURES & BENEFITS

- Adjustable temperature control, range: 120 - 899 °F
- Digital display reads °F or °C
- Ceramic heating element and sensor ensure rapid heat-up and fast recovery
- Password protected temperature settings
- Preset mode allows up to 5 user-programmable preset temperatures
- Slender, lightweight ergonomic design
- Wide selection of tips available



SPECIFICATIONS For Part No. FX888D-23BY

STATION

Power Consumption	70 W
Station Output	26 VAC
Temperature Range	120 °F - 899 °F / 50 °C - 480 °C
Temperature Stability	±1.8 °F / ±1.0 °C
Temperature Control	Microprocessor control using closed-loop sensor
Temperature Presets	2 - 5 (Default = 5)
Dimensions (W x H x D)	3.9 x 4.7 x 4.7 in. / 100 x 120 x 120 mm
ESD-Safe	Yes

HANDPIECE

Tip Series	T18 Series Tips (Only T18-D16 Included) see page 49
Power Consumption	65 W / 26 VAC
Tip to Ground Resistance	< 2 Ω
Tip to Ground Potential	< 2 mV
Heater	HAKKO True Ceramic™



CONTENTS For Part No. FX801-02 (Complete Kit w/ Station, Handpiece & Iron Holder)

Part No.	Description
--	FX-888D soldering station
FX8801-02	FX-8801 soldering handpiece
T18-D16	Soldering iron tip (installed on the iron)
FH800-03BY	Iron holder
A1559	Cleaning sponge
A1561	Tip cleaning wire
--	Instruction manual

FX888D-23BY SOLDERING STATION

Includes everything shown in picture.





Consumer
Top Pick

FX-889

DUAL-PORT SOLDERING STATION



The **HAKKO FX-889 Dual-Port Soldering Station** is a versatile station backed by the power of the FX-888D with two soldering ports instead of one. No more hassle of having to unplug one handpiece to use another in the middle of a project. Two independent ports, offering users two soldering stations with full power output that can be used simultaneously. **Soldering Handpiece Sold Separately.*



FEATURES & BENEFITS

- Two independent ports
- Adjustable temperature control, range: 120 °F - 899 °F
- Digital display reads °F or °C
- Ceramic heating element and sensor ensure rapid heat-up and fast recovery
- Password protected temperature settings
- Preset mode allows up to 5 user-programmable preset temperatures
- Slender, lightweight ergonomic design
- Wide selection of tips available

Note: The FX-889 station does not include any soldering iron handpiece. The following soldering iron handpieces can be used with the FX-889 soldering station (sold separately):

AVAILABLE HANDPIECES FOR FX-888D & FX-889



FX-8801 Standard Soldering Handpiece



FX-8802 Standard Soldering Handpiece
w/ N₂ capability



FX-8805* Large Soldering Handpiece
Uses T18 (see page 49) & T19 (see page 48) Series Tips



FX-8803 Soldering Gun with Manual Solder Feed
Separate holder required



FX-8804 SMD Hot Tweezers
Separate holder required (see page 88)



COLOR BAND

P/N: B5125

Used to identify which soldering iron is connected to receptacle "Iron A" or "Iron B"



CONTENTS For Part No. FX889-04/P (Handpiece not included)

Part No.	Description
--	Dual Port Soldering Station
FH801-81	Dual Iron Holder
B2419	Power Cord
B5125	Color Band (set of 2)
--	Instruction manual

FX889-04/P DUAL-PORT SOLDERING STATION SET

**DUAL-PORT
STATION**
P/N: FX889-04/P

**DUAL
IRON HOLDER**
P/N: FH801-81

RUBBER PLATE
(Included with the Iron Holder)





FX-600

SOLDERING IRON

The **HAKKO FX-600 Soldering Iron** is a lightweight, portable temperature adjustable soldering iron that doesn't require a station. A perfect 74W iron for the DIY hobbyist and electronics enthusiasts alike.



FEATURES & BENEFITS

- Adjustable temperature control
- Fast recovery
- Portable & lightweight
- Ceramic heating element.



SPECIFICATIONS For Part No. FX600-05/P

HANDPIECE

Input Voltage	120 VAC, 50/60 Hz
Tip Series	T18 Series (T18-B Included) see page 49
Power Consumption	74 W
Tip-to-Ground Resistance	< 2 Ω
Leak Voltage	< 2 mV
Temperature Range	392 °F - 932 °F / 200 °C - 500 °C
Temperature Stability	±1.8 °F / ±1.0 °C
Heater Type	HAKKO True Ceramic™
Cord Length	6.0 ft / 1.8 m

B5286 CAP KIT



FH-300 IRON HOLDER

P/N: FH300-01/P
[See page 99](#)



For more information
[Scan QR Code.](#)



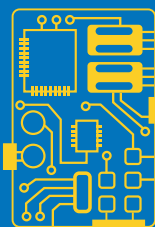
CONSUMER FRIENDLY APPLICATIONS



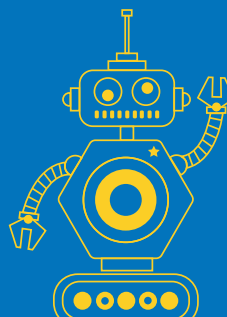
SMALL
APPLIANCES
FIX



DIY KITS



CIRCUIT
BOARDS



MINI ROBOTS

PROFESSIONAL
& AFFORDABLE
SOLDERING
PROJECTS

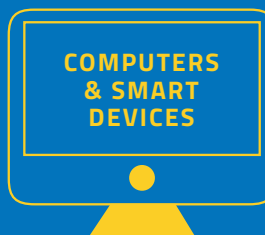


JEWELRY

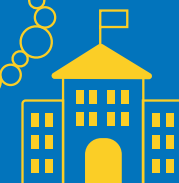
ELECTRONIC &
HOBBY PROJECTS



GAMING



COMPUTERS
& SMART
DEVICES



EDUCATION
& TRAININGS



FX-601

SOLDERING IRON

The **HAKKO FX-601 Soldering Iron** is ideal for soldering applications that require mobility or a long reach. The slender, ergonomic handpiece allows you to solder for long periods of time without hand fatigue.



FEATURES & BENEFITS

- Adjustable temperature control
- Fast recovery
- Portable & lightweight
- Ceramic heating element.

A protective safety cap for the HAKKO FX-600/601 soldering irons. see [page 47](#)



SPECIFICATIONS For Part No. FX601-02/P

HANDPIECE	
Tip Series	T19 Series see page 48
Input Voltage	120 VAC, 50 / 60Hz
Power Consumption	67 W
Temperature Range	Approx. 464 °F - 1004 °F / 240 °C - 540 °C
Temperature Stability	±1.8 °F / ±1 °C at idle temperature
Heater Type	HAKKO True Ceramic™
Cord Length	6.0 ft / 1.8 m

T19

SERIES TIPS

For more information
[Scan QR Code.](#)



T19 SERIES TIPS FOR USE WITH FX-8805 & FX-601 HANDPIECES

UNIT: mm(inch)

T19-B (Conical) 	T19-B2 (Conical) 	T19-C3 (Bevel) 	T19-C4 (Bevel)
T19-C65 (Bevel) 	T19-D5 (Chisel) 	T19-D24 (Chisel) 	T19-D32 (Chisel)
T19-D65 (Chisel) 	T19-I (Needle) 	<p>For more T19 Series information Scan QR Code.</p>	

T18

SERIES TIPS



T18 SERIES TIPS FOR USE WITH 907-ESD, 913, FX-600, FX-8801, FX-8802 & FX-8803 HANDPIECES

UNIT: mm(inch)

T18-B (Conical) 	T18-SB (Conical) 	T18-BL (Conical) 	T18-BR02 (Bent Conical)
T18-C05 (Bevel) 	T18-C08 (Bevel) 	T18-C1 & T18-CF1 (Bevel) 	T18-CF15 (Bevel)
T18-C2 & T18-CF2 (Bevel) 	T18-CFS25 (Bevel) 	T18-C3 & T18-CF3 (Bevel) 	T18-C4 & T18-CF4 (Bevel)
T18-C5 (Bevel) 	T18-K (Knife) 	T18-D08 (Chisel) 	T18-D12 (Chisel)
T18-D16 (Chisel) 	T18-D24 (Chisel) 	T18-D32 (Chisel) 	T18-DL12 (Chisel)
T18-DL2 (Chisel) 	T18-DL32 (Chisel) 	T18-S3 (Chisel) 	T18-S4 (Chisel)
T18-S6 (Chisel) 	T18-S7 (Chisel) 	T18-S9 (Chisel) 	T18-I (Conical Sharp)
T18-IS (Conical Sharp) 	<div> <p>For more T18 Series information Scan QR Code.</p> </div>		



Consumer
Top Pick

FX-650

SOLDERING IRON



For more information
Scan QR Code.

The **HAKKO FX-650 Soldering Iron** is a lightweight, economical soldering iron for light to medium soldering of electrical wires and electronic components. It is an excellent tool for hobbyist and beginners.



FEATURES & BENEFITS

- Uses a highly efficient ceramic heater
- Comes with a basic iron stand and a small sample of lead-free solder
- T34 Series tips that integrate tip and enclosure, simplifying the tip changing process



SPECIFICATIONS For Part No. FX650-02/P

HANDPIECE

Tip Series	T34 Series (T34-B Included) see page 50
Input Voltage	120 VAC, 50 / 60 Hz
Power Consumption	15 W
Max Temperature	896 °F / 480 °C
Temp Stability	±5 °F / ±9 °C
Heater Type	HAKKO True Ceramic™
Cord Length	6.0 ft / 1.8 m



605 IRON COVER
P/N: 605M

The **HAKKO 605M Iron Cover** offers superior heat resistance and thermal insulation. With the HAKKO 605M, the soldering iron can be placed in the toolbox immediately after finishing soldering work.

T34

SERIES TIPS



T34 SERIES TIPS FOR USE WITH FX-650 HANDPIECE

UNIT: mm(inch)

T34-B (Conical)	T34-C08 (Bevel)	T34-C2 (Bevel)	T34-C3 (Bevel)
T34-C4 (Bevel)	T34-D32 (Chisel)	T34-I (Conical Sharp)	

For more
T34 Series
information
Scan QR Code.

Consumer
Top Pick



For more information
Scan QR Code.

FX-901

CORDLESS SOLDERING IRON

The **HAKKO FX-901** is the cordless soldering iron ideal for field service technicians and for all your soldering projects and hobbies. This portable, lightweight, battery-operated soldering iron can operate above 600 °F for up to 120 minutes.



FEATURES & BENEFITS

- ON / OFF switch
- Quick-change composite tip
- Maintains soldering temperature of 600 °F
- Separate battery magazine for easy replacement of batteries
- Long-life battery power:
-Alkaline batteries ~70 minutes -Ni-MH batteries ~120 minutes



SPECIFICATIONS For Part No. FX-901/P

HANDPIECE

Tip Series	T11 Series (T11-B Included) see below
Power Consumption	Alkaline batteries (AA) 6 V (6 W) Ni-MH (AA) 4.8 V (5 W)
Battery	Type AA x 4 (not included)
Outer Dimensions (w/o cap) (L x W x D)	8.3 x 1.6 x 0.9 in. / 212 x 40 x 23 mm

PROTECTIVE SAFETY CAP

Turns unit off and covers tip.



Consumer
Top Pick



For more information
Scan QR Code.

PRESTO 980

PENCIL-STYLE SOLDERING IRON

The **HAKKO PRESTO 980 Pencil-Style Soldering Iron** is a 20W light-duty iron with a boost feature allowing you to momentarily increase power to 130W for occasional heavy-duty applications.



FEATURES & BENEFITS

- Delivers 20W power, but when quick heat-up is needed or a large amount of energy is required (such as soldering relays or connectors) press the yellow button for 130W of extra power. Button should not be pressed for more than 30 seconds at a time.
- Two styles available: Pencil (PRESTO-980) and Pistol (PRESTO-981)



SPECIFICATIONS For Part No. 980-V12/P

HANDPIECE

Tip Series	980-T Series (Tips Sold Separately) see below
Input Voltage	120 VAC, 50/60 Hz
Power Consumption	Approx. 20 W
Boost Temperature	Approx. 1166 °F / 630 °C
Maximum Repetitive Boost Temperature	Approx. 1292 °F / 700 °C

980-T SERIES TIPS FOR USE WITH PRESTO 980

UNIT: mm(inch)

980-T-B (Conical)	980-T-BC (Bevel)	980-T-D (Chisel)

Also Available

PRESTO 981
PISTOL-STYLE
SOLDERING IRON



For more information
Scan QR Code.





DESOLDERING

• FR-400 Ultra Heavy-Duty Desoldering Station	54
• FR-4003 Ultra Heavy-Duty Desoldering Gun	55
• N60 Series Nozzles	55
• FR-410 High-Power Desoldering Station	56
• FR-4103 Desoldering Gun	57
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• N61 Series Nozzles	59
• FM-204 Desoldering & Soldering Station	60
• FM-205 "Shop Air" Desoldering & Soldering Station	61
• FM-2024 Desoldering Tool Handpiece	62



FR-400

ULTRA HEAVY-DUTY DESOLDERING STATION

The **HAKKO FR-400 Ultra Heavy-Duty Desoldering Station** is specifically designed for the difficult rework of extremely large mass components where a significant amount of thermal inertia must be overcome. An excellent tool for desoldering the most challenging solder joints. Now with a more efficient quick-change nozzle capability!



FEATURES & BENEFITS

- 300 W Heating Element with a top controlled temperature of 940 °F (500 °C)
- Anti-Clogging features helps ensure peak vacuum pressure to the solder joint and prevents premature release of the vacuum system before the solder has cleared the heater and is captured in the solder collector chamber
- The display includes a vacuum indicator that lets you know if there are any restrictions building that will need to be cleaned out using the tools that are in the maintenance kit (included with the station.)



SPECIFICATIONS For Part No. FR400-53

STATION

Nozzle Series	N60 see page 55 (N60-02 standard nozzle included)
Input Voltage	120 VAC 50/60 Hz
Power Consumption	320 W
Temperature Range	660 °F - 940 °F / 350 °C - 500 °C
Temperature Stability	±5 °C / ±9 °F at idle
Vacuum Generator	Pump - double cylinder
Vacuum Pressure (max.)	80 kPa (24in. Hg / 600 mm Hg)
Output Voltage	29 V
Suction Flow	15 L/min
Outer Dimensions (W x H x D)	6.5 x 5.4 x 10.4 in. / 166 x 137 x 264 mm
ESD Safe	Yes
Included Handpiece	FR-4003 (Part No. FR4003-81) see page 55

FR-400 DESOLDERING SET

Includes everything shown
in picture. P/N: FR400-53

MAINTENANCE KIT P/N: C5011

FR-400 HANDPIECE HOLDER P/N: FH400-82

FR-4003 DESOLDERING TOOL P/N: FR4003-81

FR-400 ACCESSORY

NOZZLE QUICK CHANGER P/N: C5045

Easily change your FR-400
nozzles with just a twist on
the Nozzle Quick Changer.
[See page 103](#)



CONTENTS For Part No. FR400-53 (Complete set w/ Station, Desoldering Tool & Iron Holder)

Part No.	Description
--	Desoldering station
FR4003-81	Gun-style handpiece
FH400-82	Holder for FR-4003 handpiece
N60-02	Standard nozzle
B2419	Power cord
C5011 (Includes the below 6 pcs)	Maintenance kit:
• B1087	• 1.0 mm cleaning pin
• B1215	• Heater cleaning pin
• B1303	• 1.0 mm cleaning drill
• B5082	• Nozzle wrench
• A5020	• Station filter (x2)
• A5045	• Handpiece filter (x4)
--	Instruction manual



For more information [Scan QR Code.](#)

U.S. Patent Registered

FR-4003

ULTRA HEAVY-DUTY DESOLDERING GUN



The **HAKKO FR-4003 Ultra Heavy-Duty Desoldering Gun** handpiece is designed to work with the FR-400 Desoldering Station. The handpiece operates between a temperature range of 660 °F - 940 °F through a composite ceramic heating core and also features a solder collection chamber for efficient solder removal.



FEATURES & BENEFITS

- Designed for the FR-400 Desoldering station
- Improved handpiece with quick change nozzle mechanism
- Large solder collection chamber is 3X larger in capacity than other Hakko desoldering stations and can be cleaned and re-used thus reducing environmental waste



SPECIFICATIONS For Part No. FR4003-81

Nozzle Series	N60 see below
Station Compatibility	FR-400 see page 54
Power Consumption	300 W
Nozzle-to-Ground Resistance	< 2 Ω
Nozzle-to-Ground Potential	< 2 mV
Heater	HAKKO Composite Ceramic™
Standard Nozzle (included)	N60-02 (0.04 in. / 1.0 mm)



FILTERS

Part No.	Description
A5045	Ceramic filters (10 pack)



CLEANING PINS & DRILLS

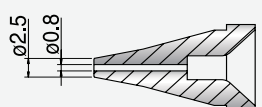
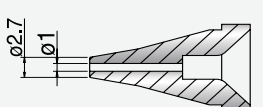
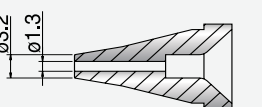
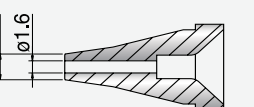
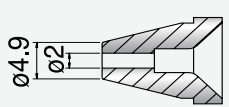
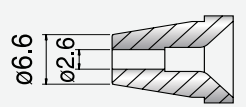
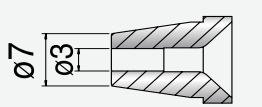
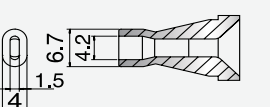
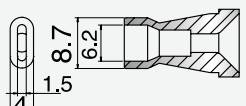
[see page 57](#)

N60 SERIES NOZZLES



N60 SERIES NOZZLES FOR USE WITH FR-4003 DESOLDERING GUN

UNIT: mm

N60-01	N60-02	N60-03	N60-04
			
N60-05	N60-06	N60-07	N60-08
			
N60-09			
			





FR-410

HIGH-POWER DESOLDERING STATION



The **HAKKO FR-410 Desoldering Station** is a high-power, 190W desoldering station for desoldering components on multi-layer printed circuit boards, with small land patterns, and in difficult to reach areas and narrow spaces.



FEATURES & BENEFITS

- Wide selection of nozzle configurations
- Large, easy-to-read display that includes a vacuum level indicator
- Three (3) user-programmable presets
- Password lockout to prevent any unauthorized changes to the systems operation or setup
- Vacuum system with 0.2 second delay timer to ensure application of maximum vacuum
- Easy-access solder collection chamber that is simple to clean
- Easy-to-change heater cartridge with HAKKO Composite Ceramic™
- Quick change mechanism for nozzle replacement



SPECIFICATIONS For Part No. FR410-52 & FR410-53

STATION

Nozzle Series	N61 see page 59 (N61-05 standard nozzle included)
Input Voltage	120 VAC 50/60 Hz
Power Consumption	190 W
Temperature Range	620 °F - 850 °F / 330 °C - 450 °C
Temperature Stability	±9 °F / ±5 °C at idle
Temperature Control	Microprocessor control using closed-loop sensor
Temperature Presets	3 — User programmable
Vacuum Generator	Vacuum Type, Double Cylinder Type
Vacuum Pressure (max.)	80 kPa (24in. Hg / 600 mm Hg)
Output Voltage	24 V
Suction Flow	15 L/min.
Dimensions (W x H x D)	6.5 x 5.4 x 9.6 in. / 165 x 137 x 244 mm
ESD Safe	Yes

**FR-4103
DESOLDERING GUN**
P/N: FR4103-81



CONTENTS For Part No. FR410-52 & FR410-53

	Part No.	Description
FR410-52	FR4103-81 FH410-81	FR-410 w/ Gun-Style Handpiece Holder for FR-4103 Handpiece
FR410-53	FR4104-81 FH410-02	FR-410 w/ Pencil-Style Handpiece Holder for FR-4104 Handpiece
FR410-52 FR410-53	C5030 B1087 B1215 B1303 B5106 A5020 A5044 B2419 N61-05 --	Maintenance kit (includes the below 6 pcs) <ul style="list-style-type: none">• 1.0mm cleaning pin• Heater cleaning pin• 1.0mm cleaning drill• Nozzle wrench• Station filter (x2)• Handpiece filter (x4) Power cord Standard nozzle Instruction manual

**FR-4104
DESOLDERING PENCIL**
P/N: FR4104-81



**FR410-52 & FR410-53
MAINTENANCE KIT**
P/N: C5030

Basic Maintenance Kit with an assortment of basic tools included.



For more information [Scan QR Code.](#)

FR-4103

DESOLDERING GUN

The **HAKKO FR-4103 Desoldering Gun** handpiece is designed to work with the FR-410 Desoldering Station. The handpiece operates between a temperature range of 330° - 450°C (620° - 850°F) through a composite ceramic heating core and also features a solder collection chamber for efficient solder removal.



For more information
Scan QR Code.



FR-4104

DESOLDERING PENCIL

The **HAKKO FR-4104 Desoldering Pencil** is the pencil-style version of the desoldering handpiece. The FR-4104 features the same performance specifications as the FR-4103.



For more information
Scan QR Code.



SPECIFICATIONS For Part No. FR4103-81 & FR4104-81

Nozzle Series	N61 see page 59 (Nozzles Sold Separately)
Station Compatibility	FR-410 see page 56
Power Consumption	140 W
Nozzle-to-Ground Resistance	< 2 Ω
Nozzle-to-Ground Potential	< 2 mV
Heater	HAKKO Composite Ceramic™
Standard Nozzle (Included)	N61-05 (0.04 in. / 1.0 mm)



FILTERS For Part No. FR4103-81 & FR4104-81

Part No.	Description
A1030 (Only for FR-4104) B5185 (Only for FR-4103) A5044	Spring filters (10 pack) Filter assembly pipe Ceramic filters (10 pack)



CLEANING PINS & DRILLS For Part No. FR4103-81 & FR4104-81

Part No.	Description
B2874 B1086 B1087 B1088 B1089 B2875 B1215	0.6 mm cleaning pin 0.8 mm cleaning pin 1.0 mm cleaning pin 1.3 mm cleaning pin 1.6 mm cleaning pin 2.0 - 2.3 mm cleaning pin Heater cleaning pin
B5141 B1302 B1303 B1304 B1305	0.6 mm cleaning drill 0.8 mm cleaning drill 1.0 mm cleaning drill 1.3 mm cleaning drill 1.6 mm cleaning drill



FEATURES & BENEFITS For Part No. FR4103-81 & FR4104-81

- Designed for the FR-410 Desoldering Station
- Improved handpiece with quick change nozzle mechanism
- Solder Collection Chamber



FR-410 ACCESSORY

NOZZLE QUICK CHANGER P/N: C5046

Easily change your FR-410 nozzles with just a twist on the Nozzle Quick Changer. [See page 103](#)



FR-301

PORTABLE DESOLDERING TOOL

The **HAKKO FR-301 Portable Desoldering Tool** puts the performance of an industrial desoldering station into a compact and lightweight hand tool that can be used on the workbench or in the field.



N61 NOZZLE



FEATURES & BENEFITS

- Easy-to-clean solder collection chamber minimizes maintenance and reduces waste
- Fast release tool for the quick-change nozzle system
- Closed-loop sensor integrated heating system for improved thermal performance
- Compatible with Lead-Free solders
- Unique pump design that lowers vibration and noise, but improves vacuum pressure and flow



SPECIFICATIONS For Part No. FR301-03/P

Nozzle Series	N61 see page 59 (N61-08 (0.04 in. / Ø1.0 mm) included)
Voltage	120 VAC 50/60 Hz
Power Consumption	140W
Temperature Range	660 °F - 930 °F / 350 °C - 500 °C
Nozzle-to-Ground Resistance	< 2 Ω
Nozzle-to-Ground Potential	< 2 mV
Temperature Stability & Accuracy	Meets or exceeds IPC J-STD-001
Heating Element	Ceramic
Vacuum Source	Single-Cylinder diaphragm pump
Vacuum Pressure	81 kPa (24 in. Hg / 610 mm Hg)
Suction Flow	11 L/min

FR301-03/P DESOLDERING TOOL W/CASE

Includes everything shown in picture.

**CLEANING PIN
FOR 1.0MM NOZZLE**
P/N: B1087

**CLEANING PIN
FOR HEATING ELEMENT**
P/N: B1085

**IRON
HOLDER**
P/N: C5003

**1.0mm NOZZLE
(1 INSTALLED)**
P/N: N61-08

PRE-FILTER
P/N: B5104

**DESOLDERING
TOOL**

**NOZZLE
WRENCH**
P/N: B5106

**CERAMIC
PAPER FILTER**
P/N: A5044



CONTENTS For Part No. FR301-03/P

Part No.	Description
--	Desoldering tool
B5106	Nozzle wrench
B5104	Pre-filter
A5044	Ceramic paper filter (Large) (1 installed, 2 replacement)
B1087	Cleaning pin for 1.0 mm nozzle
B1085	Cleaning pin for heating element
N61-08	1.0 mm nozzle (1 installed)
C5003	Iron Holder
--	Instruction manual



N61

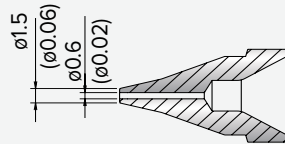
SERIES NOZZLES



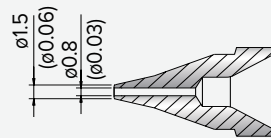
N61 SERIES NOZZLES FOR USE WITH FR-4103, FR-4104 and FR-301 DESOLDERING TOOLS

UNIT: mm (in)

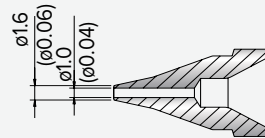
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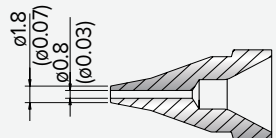
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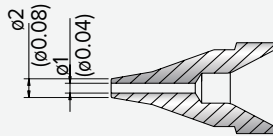
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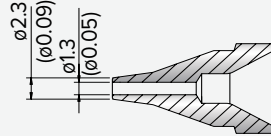
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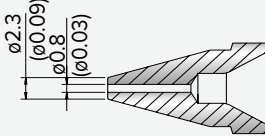
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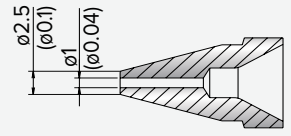
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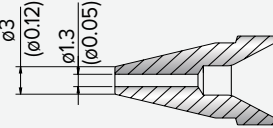
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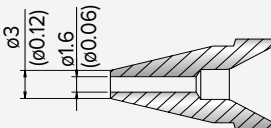
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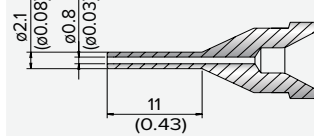
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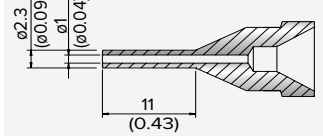
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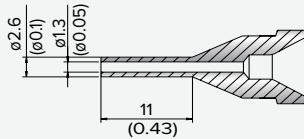
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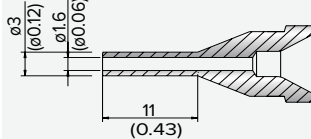
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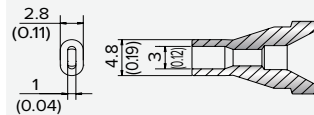
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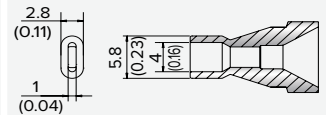
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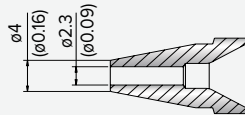
N61-15



N61-16



N61-17



For more information on the
N61 Nozzle Series [Scan QR Code.](#)

DESOLDERING



FM-204

DESOLDERING & SOLDERING STATION

The **HAKKO FM-204 Desoldering and Soldering Station** is a self-contained station with a built-in vacuum pump. This single port station has both the functionality for soldering and desoldering with a gun or pencil style desoldering handpiece. Utilizing N3 nozzles for a quick change process makes interchanging nozzles fast and convenient.



FEATURES & BENEFITS

- Built in vacuum pump
- Meets or exceeds J-STD-001 requirements
- Placing the iron into the iron holder activates the sleep mode
- Can be used for soldering with the FM-2027 soldering iron (not included)
- Handpiece converts to either gun or pencil style



SPECIFICATIONS For Part No. FM204-01 / FM204-CP

STATION	
Nozzle &/or Tips Series	N3 Nozzles see page 62 &/or T15 Tips see page 80 (Nozzles & Tips Sold Separately)
Power Consumption	120W
Temperature Range	400 °F - 840 °F / 200 °C - 450 °C *
Temperature Stability	±9 °F / ±5 °C at idle temperature
Station Output	24V
Vacuum Generator	Vacuum pump, double cylinder
Vacuum Pressure (Max.)	80 kPa (24 in. Hg / 600 mm Hg)
Suction Flow	15 L/min
Dimensions (W x H x D)	6.3 x 4.7 x 8.9 in. / 160 x 120 x 225 mm
Included Handpiece	FM-2024 (Part No. FM2024-02) see page 62



CONTENTS For Part No. FM204-01 / FM204-CP

	Part No.	Description
FM204-01	--	FM-204 desoldering station
	FM2024-02	Desoldering handpiece
	FH200-05	Iron holder with 599B tip cleaner
	B2873	Cleaning drill
	A1612	Filter pipe assembly (1 piece)
	A1613	Ceramic paper filter (10 pcs)
	B2972	Control card
	B2756	Tip tray
	B2872	Handle (for gun configuration)
	B3253	Connecting cable
	B2419	Power cord
	B2300	Heat resistant pad
	B2876	Nozzle remover
	--	Instruction manual
FM204-CP With Added Soldering Iron	FM2027-03	FM-2027 Soldering iron

FM-204 DESOLDERING SET

P/N: FM204-01



**DESOLDERING
HANDPIECE**
P/N: FM2024-02

**FM-204
DESOLDERING
STATION**

**IRON HOLDER
w/ Brass Wire**
P/N: FH200-05

FM-204 DESOLDERING SET w/ SOLDERING IRON

P/N: FM204-CP



**IRON HOLDER
w/ Brass Wire**
P/N: FH200-05

**DESOLDERING
HANDPIECE**
P/N: FM2024-02

**FM-204
DESOLDERING
STATION**

**FM-2027
CONVERSION
KIT**
P/N: FM2027-03



For more information [Scan QR Code.](#)

*Temperature range varies depending on handpiece model connected.

P/N: FM204-01 ships with one (1) FM-2024 desoldering handpiece.

P/N: FM204-CP ships with one (1) FM-2024 desoldering handpiece and one (1) FM-2027 soldering handpiece.

[U.S. Patent Registered](#)

FM-205

"SHOP AIR" DESOLDERING & SOLDERING STATION

The **HAKKO FM-205** is a "Shop-Air" Desoldering and Soldering Station. The shop-air feature provides for higher vacuum pressure and increased suction flow compared to the FM-204. The station also functions as a soldering station with a separately purchased FM-2027 Conversion Kit.



FEATURES & BENEFITS

- Requires shop air
- Digital temperature control
- Uses composite nozzles for improved thermal performance
- Uses low cost disposable filter cartridges
- Desoldering Handpiece converts to either gun or pencil style
- Functions as a soldering station with the FM-2027 soldering iron conversion kit (not included)
- Includes low temperature alarm, sleep mode functionality and auto power off



SPECIFICATIONS For Part No. FM205-01

STATION	
Nozzle & Tips Series	N3 Nozzles see page 62 & T15 Tips see page 80 (Nozzles & Tips Sold Separately)
Power Consumption	80 W
Temperature Range	400 °F - 840 °F / 200 °C - 450 °C*
Temperature Stability	±9 °F / ±5 °C at idle temperature
Vacuum Generator	Ejector type
Vacuum Pressure (max.)	93 kPa 28 in. Hg / 700 mm Hg
Suction Flow	20 L/min
Input Air Pressure (in use)	490 kPa (71 psi) when in use (trigger or button is pressed)
Comp. Air Consumption	46 L/min
Dimensions (W x H x D)	6.3 x 4.7 x 8.9 in. / 160 x 120 x 225 mm

FM-205 DESOLDERING SET

FM-205 DESOLDERING STATION



CONTENTS For Part No. FM205-01 (Complete Set w/ Desoldering Station, Handpiece & Iron Holder)

Part No.	Description
--	FM-205 desoldering station
FM2024-02	Desoldering handpiece
FH200-05	Iron holder with 599B tip cleaner
B2873	Cleaning drill
B2876	Nozzle remover
A1612	Filter pipe assembly (1 piece)
A1613	Ceramic paper filters (10 pcs)
B2972	Control card
B3253	Connecting cable
B2756	Tip tray
B2419	Power cord
B2300	Heat resistant pad
--	Instruction manual

*Temperature range varies depending on handpiece model connected.

P/N: FM205-01 ships with one (1) FM2024-02 desoldering tool.

U.S. Patent Registered

NOTE: This station requires shop air

REQUIRED AIR CONNECTION KIT* P/N: 999-216-01

Air pressure regulator package with filter

* Sold Separately.



For more information [Scan QR Code.](#)



FM-2024

DESOLDERING TOOL HANDPIECE

The **HAKKO FM-2024 Desoldering Tool Handpiece** uses the N3 Series nozzles.
Desoldering handpiece for use with FM-203 / FM-204 / FM-205 / FM-206 stations.



For more information
Scan QR Code.



FEATURES & BENEFITS

- Convertible Gun or Pencil Style Handpiece
- Disposable Solder Collection Filter
- Anti-Clogging Design



FILTERS AND REPLACEMENT PARTS

Part No.	Description
A1612	FM-2024 Filter pipe (set of 10)
A1613	Ceramic paper filter (set of 10) (For use with FM-203 / FM-204 / FM-205 / FM-206 stations / C1492 Desoldering Control Box)
999-216	Air hose kit (for use with FM-205 station see page 61 or with C1492 Desoldering Control Box)
999-216-01	Air hose kit with regulator



SPECIFICATIONS For Part No. FM2024-02

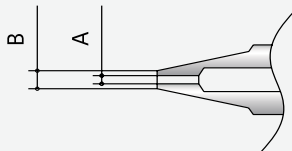
Nozzle Series	N3 (Nozzles Sold Separately) see below
Station Compatibility	FM-203, FM-204 see page 60 , FM-205 see page 61 & FM-206 see page 64
Power Consumption	70W
Temperature Range	660 °F - 840 °F / 350 °C - 450 °C
Tip-to-Ground Resistance	< 2 Ω
Tip-to-Ground Potential	< 2 mV

N3 SERIES NOZZLES

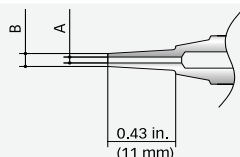


N3 SERIES NOZZLES FOR USE WITH FM-2024

Type 1



Type 2



For more information on the
N3 Nozzle Series [Scan QR Code.](#)



REPLACEMENT NOZZLES

Nozzle Type 1

Part No.	Description	A	B
N3-06	Nozzle, 0.6 mm / 0.02 in.	0.6 mm / 0.02 in.	1.9 mm / 0.07 in.
N3-08	Nozzle, 0.8 mm / 0.03 in.	0.8 mm / 0.03 in.	2.0 mm / 0.08 in.
N3-10	Nozzle, 1.0 mm / 0.04 in.	1.0 mm / 0.04 in.	2.3 mm / 0.09 in.
N3-13	Nozzle, 1.3 mm / 0.05 in.	1.3 mm / 0.05 in.	2.6 mm / 0.10 in.
N3-16	Nozzle, 1.6 mm / 0.06 in.	1.6 mm / 0.06 in.	3.0 mm / 0.12 in.
N3-20	Nozzle, 2.0 mm / 0.08 in.	2.0 mm / 0.08 in.	3.4 mm / 0.13 in.
N3-23	Nozzle, 2.3 mm / 0.09 in.	2.3 mm / 0.09 in.	3.8 mm / 0.15 in.

Nozzle Type 2

Part No.	Description	A	B
N3-L10	Long Nozzle 1.0 mm / 0.04 in.	1.0 mm / 0.04 in.	2.3 mm / 0.09 in.

REWORK

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FM-206

3-PORT REWORK STATION



The **HAKKO FM-206 Rework Station** raises performance standards for rework systems to a new level. With the capability to power any FM Series HAKKO handpiece, the HAKKO FM-206 can be tailored to fit your specific rework needs.

The sleek compact design maximizes bench space, and the full graphic user interface simplifies setup and operation. Three powerful ports allow for a variety of combinations of HAKKO handpieces including, soldering, micro soldering, desoldering, SMD hot tweezers, mini tweezers, HD irons and a hot air pencil, making this the ultimate rework station.



FEATURES & BENEFITS

- Graphic User Interface for easy setup and operation
- 3 simultaneously powered ports
- Self contained pump for vacuum and air flow
- Meets or exceeds J-STD-001 requirements
- Password Lockout for process control
- Digital airflow indicator
- Can be configured in many ways using all FM Series handpieces
- Sleek compact design minimizes loss of bench space
- Integrates with Hakko FR-830, FR-870B, and FR-872 Preheaters
- Manual or automatic profile for hot air
- Low cost composite hot air nozzles
- Optional foot switch for pump operation
- Security attachment point
- Quiet pump operation
- Desoldering delay timer
- Configurable display in °F or °C
- Capable of hot air rework of 0201 and 01005
- No calibration required
- ESD Safe by design



SPECIFICATIONS For Part No. FM206-55 (Base unit)

Power Consumption	410 W (max)
Temperature Stability	±9 °F / ±5 °C
Air Flow	6 L/min. Max (hot air)
Vacuum Generator	Diaphragm Pump System
Vacuum Pressure (Max.)	80 kPa (600 mmHg)
Suction Flow	14 L/min.
Weight	13.7 lb / 6.2 kg
Outer Dimensions (W x H x D)	6.38 x 5.35 x 7.48 in. / 162 x 136 x 245 mm



HANDPIECE CONFIGURATION (See below)

Part No.	Port 1	Port 2	Port 3
FM206-DSS	FM-2024 (Desoldering Gun)	FM-2027 (Soldering)	FM-2027 (Soldering)
FM206-DTS	FM-2024 (Desoldering Gun)	FM-2022 (Rework Parallel Remover)	FM-2027 (Soldering)
FM206-STA	FM-2027 (Soldering)	FM-2022 (Rework Parallel Remover)	FM-2029 (Rework Hot Air)
FM206-DSA	FM-2024 (Desoldering Gun)	FM-2027 (Soldering)	FM-2029 (Rework Hot Air)



3-PORT REWORK STATION CONFIGURATIONS

FM206-DSS

Desolder
Solder
Solder

FM206-DTS

Desolder
Tweezer
Solder

FM206-STA

Solder
Tweezer
Air

FM206-DSA

Desolder
Solder
Air



For more information [Scan QR Code.](#)

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Handpiece Options



	Handpiece Model	Category	Temperature Range	Power Consumption	Tips/Nozzles
	FM-2027 See page 68	Soldering	400 °F - 840 °F 200 °C - 450 °C	70 W / 24 V	T15 Series Not Included See page 74
	FM-2026 See page 38	N ₂ Soldering	400 °F - 840 °F 200 °C - 450 °C	70 W / 24 V	T17 Series Not Included See page 38
	FM-2022 See page 66	Desoldering Parallel Remover	400 °F - 750 °F 200 °C - 400 °C	140 W / 24 V	T16 Series Not Included See page 67
	FM-2023 See page 67	Desoldering Mini Hot Tweezer	400 °F - 750 °F 200 °C - 400 °C	140 W / 24 V	T9 Series Includes T9-I See page 67
	FM-2024 See page 62	Desoldering Handpiece (Gun/Pencil)	660 °F - 840 °F 350 °C - 450 °C	70 W / 24 V	N3 Nozzles Not Included See page 62
	FM-2029 See page 68	Rework Hot Air	200 °F - 1030 °F 93 °C - 554 °C	140 W / 24 V	N4 Nozzles Not Included See page 68
	FM-2030 See page 69	Heavy Duty Soldering	400 °F - 930 °F 200 °C - 500 °C	140 W / 24 V	T22 Series Not Included See page 39
	FM-2031 See page 69	Heavy Duty N ₂ Soldering	400 °F - 930 °F 200 °C - 500 °C	140 W / 24 V	T22 Series Not Included See page 39
	FM-2032 See page 70	Micro Soldering	400 °F - 840 °F 200 °C - 450 °C	48 W / 24 V	T30 Series Not Included See page 70



FM-2022

SMD PARALLEL REMOVER



The **HAKKO FM-2022 SMD Parallel Remover** uses revolutionary parallel action between the tip ends (one tip remains stationary) allowing greater surface contact between the tip and the component and providing more efficient and even heat transfer.

Whether removing small chips or larger SOP components, the parallel action of the FM-2022 also allows for a more secure hold on the component.



FEATURES & BENEFITS

- The Parallel Remover uses the same quick-change composite tip technology as the FM-206 soldering station
- A fixing collar properly aligns the tips opposite each other
- Holder with sleep function



SPECIFICATIONS For Part No. FM2022-02 (Handpiece Only)

Tip Series	T16 see below (Tips Sold Separately)
Station Compatibility	FM-203 & FM-206 see page 64
Power Consumption	140 W / 24 V
Temperature Range	400 °F - 750 °F / 200 °C - 400 °C
Temperature Stability	±9 °F / ±5 °C
Tip-to-Ground Resistance	< 2 Ω
Tip-to-Ground Potential	<2 mV (typical 0.6 mV)

FM2022-05 CONVERSION KIT

Includes everything shown in picture.

HANDPIECE HOLDER
w/ Sponge
P/N: FH200-03

CONNECTOR CORD
P/N: B3253

HEAT RESISTANT PAD
P/N: B2300

**FM-2022
SMD PARALLEL
REMOVER***
P/N: FM2022-02
* Tips Sold Separately

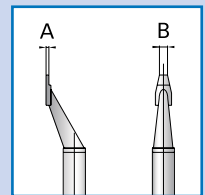


T16 SERIES TIPS FOR USE WITH FM-203 & FM-206

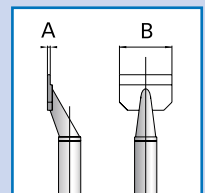
Part No.	A	B
T16-1001	0.008 in. / 0.2 mm	N/A
T16-1002	0.03 in. / 0.7 mm	0.02 in. / 0.5 mm
T16-1003	0.03 in. / 0.7 mm	0.04 in. / 1.0 mm
T16-1004	0.03 in. / 0.7 mm	0.08 in. / 2.0 mm
T16-1013	0.03 in. / 0.7 mm	0.12 in. / 3.0 mm

Part No.	A	B
T16-1005	0.03 in. / 0.7 mm	0.24 in. / 6.0 mm
T16-1006	0.03 in. / 0.7 mm	0.31 in. / 8.0 mm
T16-1007	0.03 in. / 0.7 mm	0.39 in. / 10.0 mm
T16-1008	0.03 in. / 0.7 mm	0.51 in. / 13.0 mm
T16-1009	0.03 in. / 0.7 mm	0.63 in. / 16.0 mm
T16-1010	0.03 in. / 0.7 mm	0.79 in. / 20.0 mm
T16-1011	0.03 in. / 0.7 mm	0.98 in. / 25.0 mm
T16-1012	0.03 in. / 0.7 mm	0.71 in. / 18.0 mm

TIPS for
CHIP Components



TIPS for
SOP Components



CONTENTS For Part No. FM2022-05 (Conversion Kit w/ Handpiece & Holder)

Part No.	Description
FM2022-02 FH200-03 B2300 B3253	FM-2022 SMD parallel remover Handpiece holder with sponge Heat resistant pad Connector cord



For more information [Scan QR Code](#).

FM-2023

SMD MINI HOT TWEEZER

The **HAKKO FM-2023 Mini Hot Tweezer** is designed for use with small chip components as small as 0201. The FM-2023 has the unique feature of allowing it to work as a standard or reverse action. A simple flip of a switch sets the action of the tool.



FEATURES & BENEFITS

- Can be used with components as small as 0201
- Able to work as standard and reverse
- Can be used with the FM-206 & FM-203



SPECIFICATIONS For Part No. FM2023-02 (Handpiece Only)

Tip Series	T9 see below (T9-I tip included)
Station Compatibility	FM-203 & FM-206 see page 64
Power Consumption	140 W / 24 V
Temperature Range	400 °F - 752 °F / 200 °C - 400 °C
Temperature Stability	±9 °F / ±5 °C
Tip-to-Ground Resistance	< 2 Ω
Tip-to-Ground Potential	<2 mV (typical 0.6 mV)




CONTENTS For Part No. FM2023-05 (Conversion Kit w/ Handpiece & Holder)

Part No.	Description
FM2023-02	FM-2023 mini hot tweezer
FH200-04	Iron holder with sponge
B2849	Component bed
T9-I	Standard tip
B2300	Heat resistant pad
B3253	Connector cord

NOTE: The FM-2023 must be used in conjunction with an FM-203 soldering station or an FM-206 3-port rework station.



TWEEZERS SERIES TIPS FOR USE WITH FM-2023 HANDPIECE

Part No.	Size A [a]	Shape
T9-I	0.008 in. / R0.2	
T9-L1	0.04 in. / 1.0 mm	
T9-L2	0.08 in. / 2.0 mm	

U.S. Patent Registered

FM2023-05 CONVERSION KIT

Includes everything shown in picture.

HANDPIECE HOLDER
w/ Sponge
P/N: FH200-04

CONNECTOR CABLE
P/N: B3253

TIP, (I Shape)
P/N: T9-I (Included)

COMPONENT BED
P/N: B2849

**FM-2023
MINI HOT TWEEZERS**
P/N: FM2023-02

**HEAT
RESISTANT
PAD**
P/N: B2300



For more information [Scan QR Code.](#)



FM-2027

SOLDERING IRON



For more information
Scan QR Code.



FEATURES & BENEFITS

- Tip locks into sleeve assembly with an audible click
- Sleeve assembly connects to handpiece via locking connector
- Press connector tabs to unlock sleeve assembly
- Multi-color sleeves available (yellow, orange, blue, green, pink)
- Sleeves are anti-bacterial and anti-microbial



SPECIFICATIONS For Part No. FM2027-02 (Handpiece Only)

Tip Series	T15 Series see page 71 (Tips Sold Separately)
Station Compatibility	FM-203, FM-204 see page 60 , FM-205 see page 61 , FM-206 see page 64 & FX-951
Tip-to-Ground Resistance	< 2 Ω
Tip-to-Ground Potential	< 2 mV

FM2027-03 CONVERSION KIT

Includes everything shown below.



CONTENTS For Part No. FM2027-03 (Conversion Kit w/ Handpiece & Iron Holder)

Part No.	Description
FM2027-02 FH200-01 B3216 B2300 B3253	FM-2027 soldering handpiece Handpiece holder Yellow sleeve / grip Heat resistant pad Connecting cable

U.S. Patent Registered

FM-2029

SINGLE HOT AIR HANDPIECE



For more information
Scan QR Code.



FEATURES & BENEFITS

- Slender handpiece
- Composite nozzle (built-in heater)
- Easy to change nozzles
- Holder with sleep function



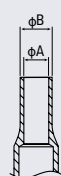
SPECIFICATIONS For Part No. FM2029-02

Nozzles	N4 Series see below (Nozzles Sold Separately)
Station Compatibility	FM-206 3-Port Rework station
Power Consumption	140 W / 24 V
Temperature Range	200 °F -1030 °F / 100 °C -550 °C
Nozzle to Ground Resistance	< 2 Ω
Nozzle to Ground Potential	< 2 mV



N4 REPLACEMENT NOZZLES

Part No.		ϕ A	ϕ B
N4-01		2.0 mm	2.5 mm
N4-02		4.0 mm	5.0 mm
N4-03		6.0 mm	7.0 mm
N4-04		8.0 mm	9.0 mm
N4-05		2.0 mm	2.5 mm



CONTENTS For Part No. FM2029-01 (Conversion Kit w/ Handpiece & Iron Holder)

Part No.	Description
FM2029-02 C5034 B3253 B2300	FM-2029 hot air handpiece Handpiece holder Connecting cable Heat resistant pad

U.S. Patent Registered



FM-2030

HEAVY-DUTY SOLDERING IRON

For more information
Scan QR Code.



The HAKKO **FM-2030 Heavy-Duty Soldering Iron** is best for soldering difficult-to-solder heavy ground planes and/or high heat sink applications. For heavy duty soldering, the FM-2030 is the ideal companion to the HAKKO FM-203 Dual Port Soldering Station or the HAKKO FM-206 3-Port Rework System.



FEATURES & BENEFITS

- The FM-2030 heavy duty soldering iron provides a higher mass tip with double the power of conventional T15 tips
- Conversion Kit available including holder, see Part No: FM2030-02
- Includes holder (with sleep functionality), tip cleaner and other affiliated parts
- The FM-2030 can only be attached to the Hakko FM203-HD "D" channel and the HAKKO FM-206 CH2 or CH3 ports.



SPECIFICATIONS For Part No. FM2030-01 (Handpiece Only)

Tip Series	T22 Series see page 39 (Tips Sold Separately)
Station Compatibility	FM-203 & FM-206 see page 64
Power Consumption	140 W / 24 VAC
Tip-to-Ground Resistance	< 2 Ω
Leak Voltage	< 2 mV



CONTENTS For Part No. FM2030-02 (Conversion Kit w/ Handpiece & Iron Holder)

Part No.	Description
FM2030-01 FH200-01 B3253 B2300	FM-2030 handpiece Handpiece holder Connecting cable Heat resistant pad

U.S. Patent Registered

FM2030-02 CONVERSION KIT

Includes everything shown in picture.

HANDPIECE HOLDER

w/ Brass Wire
P/N: FH200-01

CONNECTING CABLE

P/N: B3253

HEAT RESISTANT PAD

P/N: B2300

HANDPIECE FM-2030*

P/N: FM2030-01

* Tips Sold Separately



NITROGEN CROSS REFERENCE For T22 TIPS AND N₂ NOZZLES

Compatible Tips	N ₂ Nozzle Assy Part No.	Description
T22-BL, T22-BL2, T22-BC2, T22-C3, T22-D12 & T22-J02	B3121	Nozzle Assembly A
T22-D08, T22-D16 & T22-K	B3123	Nozzle Assembly C
T22-C5, T22-C6, T22-D32, T22-D45, T22-D52	B3124	Nozzle Assembly D
T22-D24, T22-JD08	B3561	Nozzle Assembly E



CONTENTS For Part No. FM2031-02 (Conversion Kit w/ Handpiece & Iron Holder)

Part No.	Description
-- FH200-01 B3253 B2300	FM-2031 handpiece Handpiece holder Connecting cable Heat resistant pad

Also Available:

FM2031-01 NITROGEN COMPATIBLE HEAVY-DUTY SOLDERING IRON

Compatible with the FM-206* Rework System [see page 64](#) , FX-780/FX-781 Nitrogen Generators [see page 34](#) & FX-791 Nitrogen Controller [see page 34](#) . *Tips Sold Separately.

Conversion Kit P/N: FM2031-02



For more information Scan QR Code.





FM-2032

MICRO SOLDERING IRON

For more information
Scan QR Code.



FEATURES & BENEFITS

- Thin, burn resistant iron cord
- Quick-change T30 Series tips
- Cool running grip even when operating at 840°F for extended periods
- ESD-Safe design

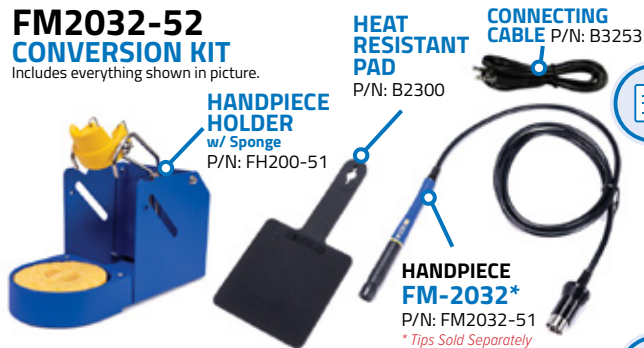


SPECIFICATIONS For Part No. FM2032-51 (Handpiece Only)

Tip Series	T30 Series see below (Tips Sold Separately)
Power Consumption	48 W
Temperature Range	400 °F - 840 °F / 200 °C - 450 °C
Tip to Ground Resistance	< 2 Ω
Tip to Ground Potential	< 2 mV
Length of Cord	4.3 ft / 1.3 m

FM2032-52 CONVERSION KIT

Includes everything shown in picture.



CONTENTS For Part No. FM2032-52 (Kit w/ Handpiece & Iron Holder)

Part No.	Description
FM2032-51	Handpiece only
B3253	Connecting cable
FH200-51	Iron holder & sponge
B2300	Heat resistant pad
--	Instruction manual



NITROGEN CROSS REFERENCE FOR T30 TIPS AND N₂ NOZZLES

Compatible Tips	N ₂ Nozzle Assy Part No.	Description
T30-D1, T30-D06, T30-I, T30-KU	C5038	Nozzle Assembly A
T30-KN	C5039	Nozzle Assembly B
T30-J	C5040	Nozzle Assembly C
All T30 tips	C5041	Nozzle Assembly D
--	B5178	Hose Assembly

NITROGEN NOZZLE ASSEMBLY : The N₂ nozzle assembly fits over the T30 tips like a sleeve. The C5038, C5039, and C5040 assemblies offer accurate delivery of N₂ to the end of the tip, while the C5041 assembly is shorter to allow maximum compatibility with all T30 tips. To be used with FX-780 and FX-781 Nitrogen Generator [see page 87](#)



NOTE: Nozzle assembly requires B5178 Hose Assembly (sold separately).

T30 SERIES TIPS

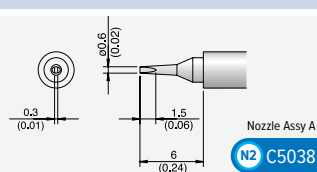
U.S. Patent Registered



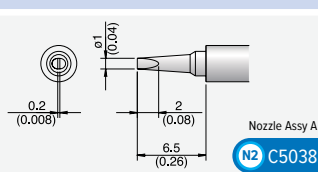
T30 SERIES TIPS FOR USE WITH FM-2032 HANDPIECE

UNIT: mm(inch)

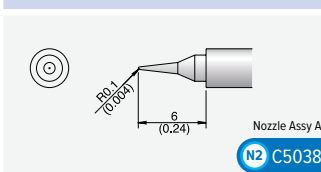
T30-D06



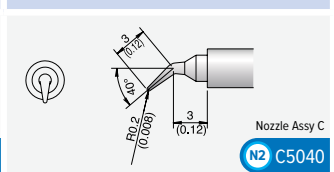
T30-D1



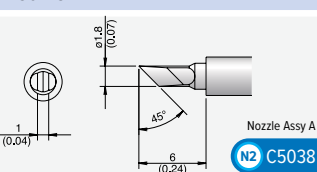
T30-I



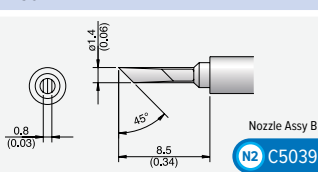
T30-J



T30-KU



T30-KN



For more information on the
T30 Series [Scan QR Code.](#)



T15 SERIES TIPS FOR USE WITH FM-2027 HANDPIECE

UNIT: mm(inch)

T15-B (Conical) 	T15-B2 (Conical) 	T15-B3 (Conical) 	T15-B4 (Conical)
T15-I (Conical) 	T15-IL (Conical) 	T15-ILS (Conical) 	T15-BLL (Conical)
T15-SB02 (Conical) 	T15-SB03 (Conical) 	T15-SB05 (Conical) 	T15-SB08 (Conical)
T15-SBS04 (Conical) 	T15-SBS07 (Conical) 	T15-D08 (Chisel) 	T15-D12 (Chisel)
T15-D16* (Chisel) 	T15-D2 (Chisel) 	T15-D24 (Chisel) 	T15-D32 (Chisel)
T15-DL32 (Chisel) 	T15-D4 (Chisel) 	T15-DL4 (Chisel) 	T15-D52 (Chisel)
T15-DL52 (Chisel) 	T15-1603 (Chisel) 	T15-XD15 (Chisel) 	<p>For more information on the T15 Series Scan QR Code.</p>

N2 T17 tips and nozzles can be used with the Nitrogen Soldering System see page 87
 *T15-D16 available in pure nickel construction as T15-1608 for soldering with specialized alloys



T15 SERIES TIPS FOR USE WITH FM-2027 HANDPIECE

UNIT: mm(inch)

T15-BC1 (Bevel)	T15-BCF1 (Bevel)	T15-BC2 (Bevel)	T15-BCF2 (Bevel)
T15-BC3 (Bevel)	T15-BCF3 (Bevel)	T15-C4 (Bevel)	T15-CF4 (Bevel)
T15-C1 (Bevel)	T15-SBC04 (Bevel)	T15-BC12 (Bevel)	T15-BC15 (Bevel)
T15-BC28 (Bevel)	T15-BCM2 (Bevel)	T15-BCM3 (Bevel)	T15-CF2 (Bevel)
T15-CF3 (Bevel)	T15-KF (Knife)	T15-KL (Knife)	T15-KU (Knife)
T15-K (Knife)	T15-J02 (Bent)	T15-JL02 (Bent)	T15-JS02 (Bent)
T15-1605 (Bent Chisel)	T15-JD08 (Bent Chisel)	T15-JD14 (Bent Chisel)	T15-JD16 (Bent Chisel)



For more information on the T15 Series Scan QR Code.

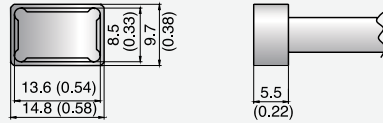
N2 T17 tips and nozzles can be used with the Nitrogen Soldering System see page 34



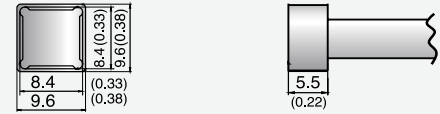
T15 SERIES TIPS FOR USE WITH FM-2027 HANDPIECE

UNIT: mm(inch)

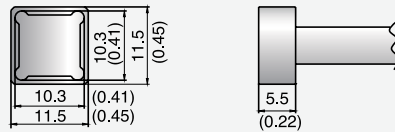
T15-1201 (Quad, 13.6 x 8.5)



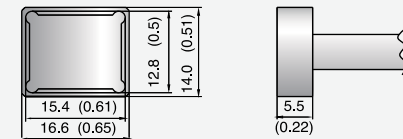
T15-1209 (Quad, 8.4 x 8.4)



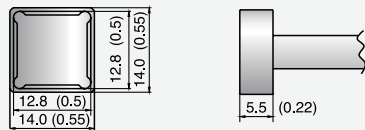
T15-1202 (Quad, 10.3 x 10.3)



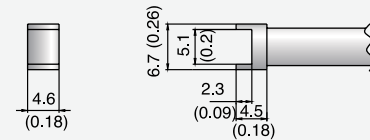
T15-1210 (Quad, 15.4 x 12.8)



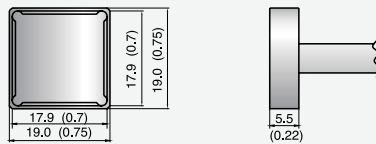
T15-1203 (Quad, 12.8 x 12.8)



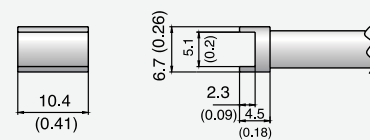
T15-1001 (Tunnel, 5.1 x 4.6)



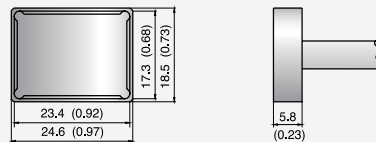
T15-1204 (Quad, 17.9 x 17.9)



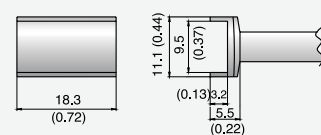
T15-1002 (Tunnel, 5.1 x 10.4)



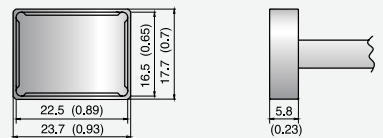
T15-1205 (Quad, 23.4 x 17.3)



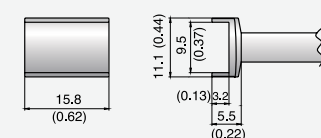
T15-1003 (Tunnel, 9.5 x 18.3)



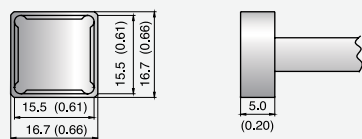
T15-1206 (Quad, 22.5 x 16.5)



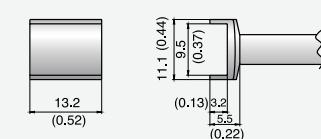
T15-1004 (Tunnel, 9.5 x 15.8)



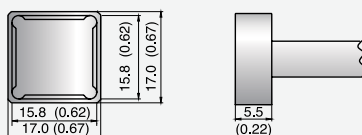
T15-1207 (Quad, 15.5 x 15.5)



T15-1005 (Tunnel, 9.5 x 13.2)



T15-1208 (Quad, 15.8 x 15.8)



For more information on the
T15 Series Scan QR Code.



T15 SERIES TIPS

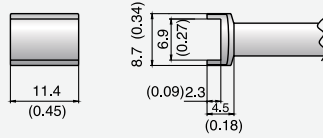


T15 SERIES TIPS FOR USE WITH FM-2027 HANDPIECE

UNIT: mm(inch)

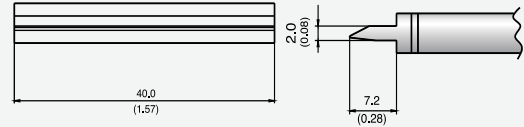
T15-1006

(Tunnel, 6.9 x 11.4)



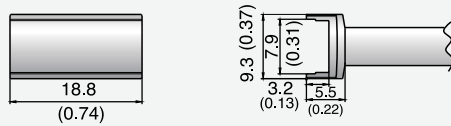
T15-1406

(Spatula, 21.2)



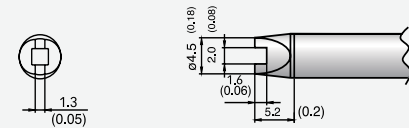
T15-1007

(Tunnel, 7.9 x 18.8)



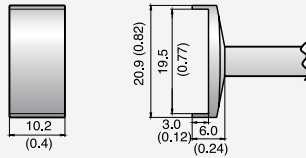
T15-R20

(Slot, 2.0R)



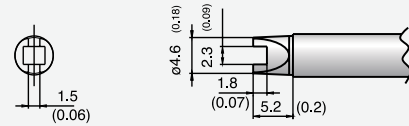
T15-1008

(Tunnel, 19.5 x 10.2)



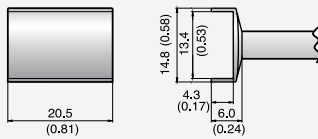
T15-R23

(Slot, 2.3R)



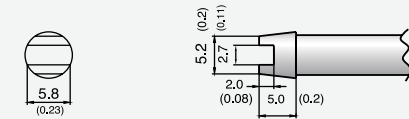
T15-1009

(Tunnel, 13.4 x 20.5)



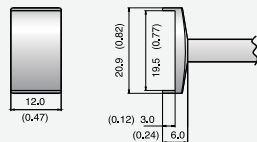
T15-R27

(Slot, 2.7R)



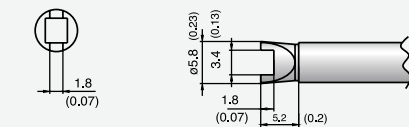
T15-1010

(Tunnel, 19.5 x 12.0)



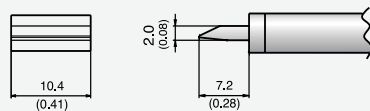
T15-R34

(Slot, 3.4R)



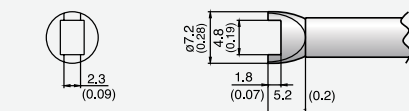
T15-1401

(Spatula, 10.4)



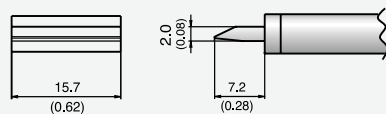
T15-R48

(Slot, 4.8R)



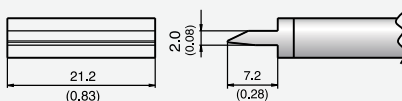
T15-1402

(Spatula, 15.7)



T15-1403

(Spatula, 21.2)



For more information on the
T15 Series [Scan QR Code.](#)

FR-810B

SMD HOT AIR REWORK SYSTEM

The **HAKKO FR-810B SMD Hot Air Rework System** has a compact and lightweight design (only 3.3 lbs.) and features a quiet, self-contained turbine air supply and built-in SMD vacuum pickup. The new heating element design improves durability, provides a top end temperature of 600 °C (1120 °F). New N51 Series quick-change nozzles allow for tool-free installation and removal, and the integrated holder provides automatic safety cool down when the handpiece is not in use.



FEATURES & BENEFITS

- Easy to read digital display for both temperature and air level
- Slender handpiece with integrated vacuum pick-up indicator that indicates when the component has been lifted from the PC Board
- The ability to store up to 5 user programmable presets for temperature, airflow and time
- New Chain Presets feature that allows the operator to link up to 5 presets to run in sequence, simulating a 5-heating zone reflow profile for SMD components
- Auto Sleep & Shut-off features
- Maximum airflow of 115 L/min
- Can be used with existing HAKKO Hot Air Nozzles
- Password Lockout to prevent unauthorized setup changes
- Optional stand-alone holder with safety shield



SPECIFICATIONS For Part No. FR810B-05

Nozzle Series	N51 Series see page 78 & existing HAKKO Hot Air Nozzles see page 79 (Nozzles Sold Separately)
Power Consumption	820 W
Airflow Source	Turbine
Airflow Capacity ¹	5 - 115 L/min
Airflow Setting Range ⁺	1 to 9 (5 - 115 L/min)
Temperature Range ²	120 °F - 1120 °F / 50 °C - 600 °C
Dimensions (W x H x D)	6.3 x 5.7 x 8.7 in. / 160 x 145 x 220 mm
Heater Power Consumption	790 W
ESD Safe	Yes



CONTENTS For Part No. FR810B-05

Part No.	Description	Part No.
FR810B-05	FR-810B hot air rework station	--
	Heat resistant pad	B2300
	Large vacuum pipe knob (with screw)	B3023
	Handpiece holder	B5048
	Power cord	B5054
	Pad 3.0 mm (2 pcs)	A1520
	Pad 5.0 mm (2 pcs)	A1439
	Pad 7.6 mm (2 pcs)	A1438
	Instruction manual	--

⁺ Values for airflow are approximate. Actual volume of airflow may be affected by the size and shape of the nozzle used.

¹ Airflow capacity is rated as free flowing. Restrictions created by various nozzles may reduce the maximum airflow capacity.

² Under certain airflow and temperature conditions, the station may not attain the maximum allowable temperature selection.



FR-810B with C5027, optional board holder and C5028, fixture system



Vacuum Pick-up Indicator





FR-811

ADVANCED SMD HOT AIR REWORK SYSTEM

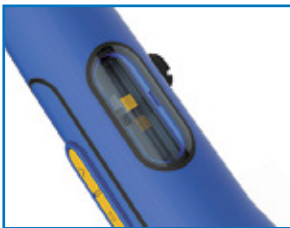


The **HAKKO FR-811 SMD Hot Air Rework System** is an advanced SMD rework station with vacuum pickup and a multitude of features for every need. When integrated with a bottom heater, board fixture and vision system, the FR-811 is a complete SMD rework system and the ideal choice for bottom terminated components. For complete set please see FR811-SET.



FEATURES & BENEFITS

- Stand-alone holder with safety shield
- Graphic Display
- Dual Thermocouple Inputs
- 6 Stage Program Profiles
- 50 Profile Flash Memory Storage
- Hot Air Handpiece with Vacuum
- Auto Cool Down Handpiece Holder
- USB Port for PC Software Integration



Integrated vacuum pickup with visual reflow indicator that safely lifts the component off the PCB at the right time.



Two thermocouple inputs for integrated closed-loop process control.

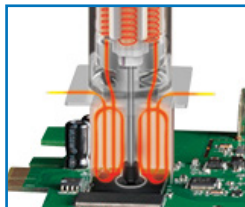


USB to PC interface to allow for PC communication with the system.



USB port for flash drive storage of rework profiles.

N51 Nozzle design to optimize heating and mitigate adjacent reflow, even on densely populated PCBs.



SPECIFICATIONS For Part No. FR811-04

Nozzle Series	N51 Series see page 78 & existing HAKKO Hot Air Nozzles see page 79 (Nozzles Sold Separately)
Power Consumption	820 W
Heater Power Consumption	790 W
Airflow Capacity ¹	Setting 1-100% (115 L/min Max)
Vacuum Function	Yes
Temperature Range ²	120 °F - 1120 °F / 50 °C - 600 °C
Thermocouple Inputs	2 - Type K
External Connections	1 - USB-A and 1 - USB mini B
Operating Modes	Manual or automatic
Memory	50 Profiles (6 stage + preheater profiles)
Process Control	Password lockout
Auto Power Off Safety	Yes
Auto Cooling Safety	Yes
Dimensions (W x H x D)	6.3 x 5.7 x 8.7 in. / 160 x 145 x 220 mm
ESD-Safe	Yes

¹ Airflow capacity is rated as free flowing. Restrictions created by various nozzles may reduce the maximum airflow capacity.

² Under certain airflow and temperature setting conditions, the station may not attain the maximum allowable temperature selection.



For more information [Scan QR Code](#).

FR-811 Set

COMPLETE SMD HOT AIR REWORK SYSTEM

The **HAKKO FR-811 SMD Hot Air Rework System** is an affordable and easy to use system that simplifies the hot air rework of SMD components, including BTCs such as QFN/DFN and BGA using up to six stages for a rework profile, and includes a board only preheating stage to allow for proper reflow at lower top heater temperatures. One thermocouple input provides closed-loop top heat control based on part temperature while the other input provides closed-loop bottom heat control based on PCB temperature.

Included with the HAKKO FR-811 is communication software that allows for PC programming of the system, enabling the user to create and modify rework profiles, and the ability to upload them to, or download them from the system.

C5029 Handpiece Fixture
(Included) for use with other preheaters

999-267 Basic Vision Kit
(Included) to align BTCs using the overlay and transparency features

C5033 Stand-alone Holder
(Sold Separately) with safety shield and integrated auto top and cool down

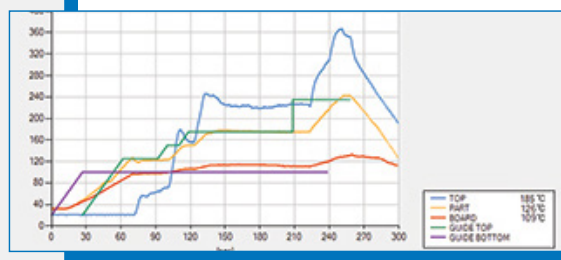
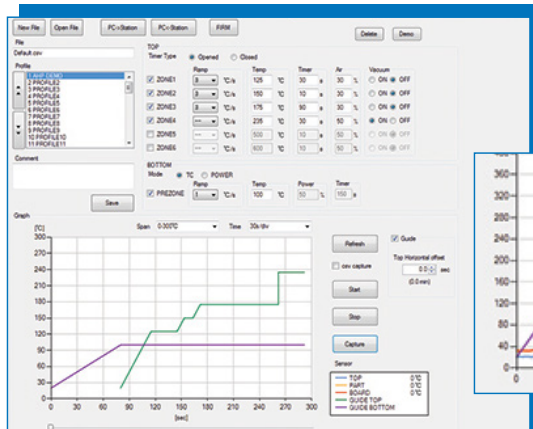
Integrated **Component Nest**
assembly compatible with standard CPF stencils or flux trays

C5027 PCB Holder
(Included) is versatile and simple to use

C5016 Bottom Heater (Included) that seamlessly integrates with the FR-811 System for complete reflow control

FR811-04 Advanced Hot Air Rework System
(Included)

Easy to use software for profile creation and monitoring






N51 SERIES NOZZLES



N51 SERIES NOZZLES FOR USE WITH FR-810, FR-810B & FR-811

UNIT: mm(inch)

N51-01 (Single) (Inside diameter) Note: Vacuum pick-up not functional for this nozzle	N51-02 (Single) (Inside diameter)	N51-03 (Single) (Inside diameter)	
N51-04 (Single) (Inside diameter)	N51-05 (Bent) (Inside diameter) Note: Vacuum pick-up not functional for this nozzle	N51-06 (Bent) Note: Vacuum pick-up not functional for this nozzle	
N51-10 (BGA, 4 x 4)	N51-11 (BGA, 6 x 6)	N51-12 (BGA, 8 x 8)	N51-13 (BGA, 10 x 10)
N51-14 (BGA, 12 x 12)	N51-15 (BGA, 14 x 14)	N51-16 (BGA, 15 x 15)	N51-17 (BGA, 17 x 17)
N51-18 (BGA, 18 x 18)	N51-19 (BGA, 20 x 20)	N51-20 (BGA, 22 x 22)	N51-21 (BGA, 24 x 24)
N51-22 (BGA, 27 x 27)	N51-23 (BGA, 29 x 29)	N51-24 (BGA, 35 x 35)	N51-25 (BGA, 38 x 38)
N51-26 (BGA, 40 x 40)	<div><p>For more information on the N51 Series Scan QR Code.</p></div>		



HOT AIR SERIES NOZZLES FOR USE WITH FR-811, FR-810B, FR-803B, FR-802 & FR-801

UNIT: mm(inch)

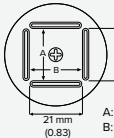
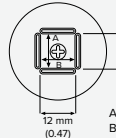
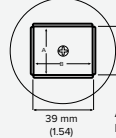
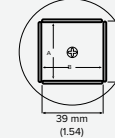
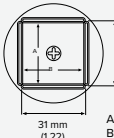
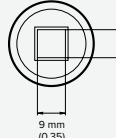
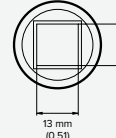
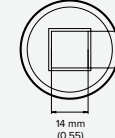
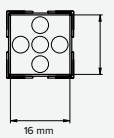
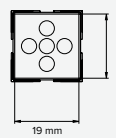
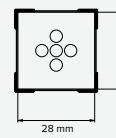
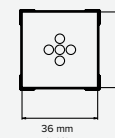
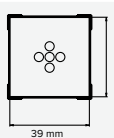
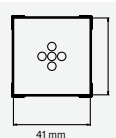

A1125B (QFP, 10.2 x 10.2) A: 10.2 mm (0.40) B: 10.2 mm (0.40)	A1126B (QFP, 15.2 x 15.2) A: 15.2 mm (0.60) B: 15.2 mm (0.60)	A1127B (QFP, 19.2 x 19.2) A: 19.2 mm (0.76) B: 19.2 mm (0.76)	A1128B (QFP, 15.2 x 21.2) A: 15.2 mm (0.6) B: 21.2 mm (0.83)
A1129B (QFP, 28.2 x 28.2) A: 28.2 mm (1.17) B: 28.2 mm (1.17)	A1135B (PLCC-44, 18.5 x 18.5) A: 18.5 mm (0.73) B: 18.5 mm (0.73)	A1136B (PLCC-52, 21 x 21) A: 21 mm (0.83) B: 21 mm (0.83)	A1137B (PLCC-68, 26 x 26) A: 26 mm (1.02) B: 26 mm (1.02)
A1138B (PLCC-84, 31 x 31) A: 31 mm (1.22) B: 31 mm (1.22)	A1139B (PLCC-18, 9 x 14) A: 9 mm (0.35) B: 14 mm (0.55)	A1140B (PLCC-28, 13 x 13) A: 13 mm (0.51) B: 13 mm (0.51)	A1141B (PLCC-32, 15 x 13) A: 15 mm (0.59) B: 13 mm (0.51)
A1180B (BQFP-84, 18.2 x 18.2) A: 18.2 mm (0.72) B: 18.2 mm (0.72)	A1181B BQFP (BQFP-100, 19.2 x 19.2) A: 19.2 mm (0.76) B: 19.2 mm (0.76)	A1182B BQFP (PLCC-28, 24.2 x 24.2) A: 24.2 mm (0.95) B: 24.2 mm (0.95)	A1184B SOJ (SOJ, 19 x 10) A: 19 mm (0.75) B: 10 mm (0.39)
A1185B (TSOL, 10 x 13) A: 10 mm (0.39) B: 13 mm (0.51)	A1186B (TSOL, 19.2 x 19.2) A: 19.2 mm (0.76) B: 19.2 mm (0.76)	A1187B (TSOL, 8 x 18.5) A: 8 mm (0.31) B: 18.5 mm (0.73)	A1188B (PLCC-20, 10 x 10) A: 10 mm (0.39) B: 10 mm (0.39)
A1189B (PLCC-100, 36.5 x 36.5) A: 36.5 mm (1.44) B: 36.5 mm (1.44)	A1203B (BQFP-196, 35 x 35) A: 35 mm (1.38) B: 35 mm (1.38)	A1214B (SOJ, 27 x 12) A: 27 mm (1.06) B: 12 mm (0.47)	A1215B (QFP, 42.5 x 42.5) A: 42.5 mm (1.67) B: 42.5 mm (1.67)
A1257B (SOP, 21 x 11.7) A: 21 mm (0.83) B: 11.7 mm (0.46)	A1258B (SOP, 11.7 x 8.2) A: 11.7 mm (0.46) B: 8.2 mm (0.32)	A1259B (SOP, 29 x 13.5) A: 29 mm (1.14) B: 13.5 mm (0.53)	A1260B (SOP, 19 x 8.7) A: 19 mm (0.75) B: 8.7 mm (0.34)







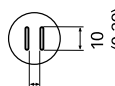
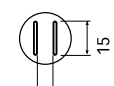
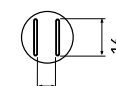
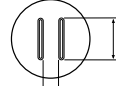
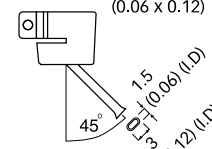
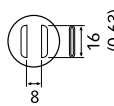
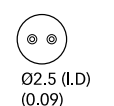
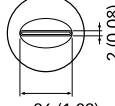
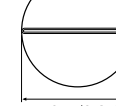
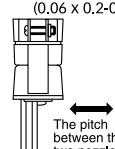
HOT AIR SERIES NOZZLES FOR USE WITH FR-811, FR-810B, FR-803B, FR-802 & FR-801

UNIT: mm(inch)

A1261B (QFP, 20.2 x 20.2)  A: 20.2 mm (0.80) B: 20.2 mm (0.80)	A1262B (QFP, 12.2 x 12.2)  A: 12.2 mm (0.48) B: 12.2 mm (0.48)	A1263B (QFP, 27.7 x 39.7)  A: 27.7 mm (1.09) B: 39.7 mm (1.56)	A1264B QFP (QFP, 40.4 x 40.4)  A: 40.2 mm (1.58) B: 40.2 mm (1.58)
A1265B (QFP, 32.2 x 32.2)  A: 32.2 mm (1.27) B: 32.2 mm (1.27)	A1470 (BGA, 9 x 9)  9 mm (0.35)	A1471 (BGA, 13 x 13)  13 mm (0.51)	A1472 (BGA, 14 x 14)  14 mm (0.55)
A1473 (BGA, 16 x 16)  16 mm (0.63)	A1474 (BGA, 19 x 19)  19 mm (0.75)	A1475 (BGA, 28 x 28)  28 mm (1.10)	A1476 (BGA, 36 x 36)  36 mm (1.42)
A1477 (BGA, 39 x 39)  39 mm (1.54)	A1478 (BGA, 41 x 41)  41 mm (1.61)	 <p>For more information on the Hot Air Series Nozzles Scan QR Code.</p>	

VACUUM FUNCTION INOPERATIVE NOZZLES

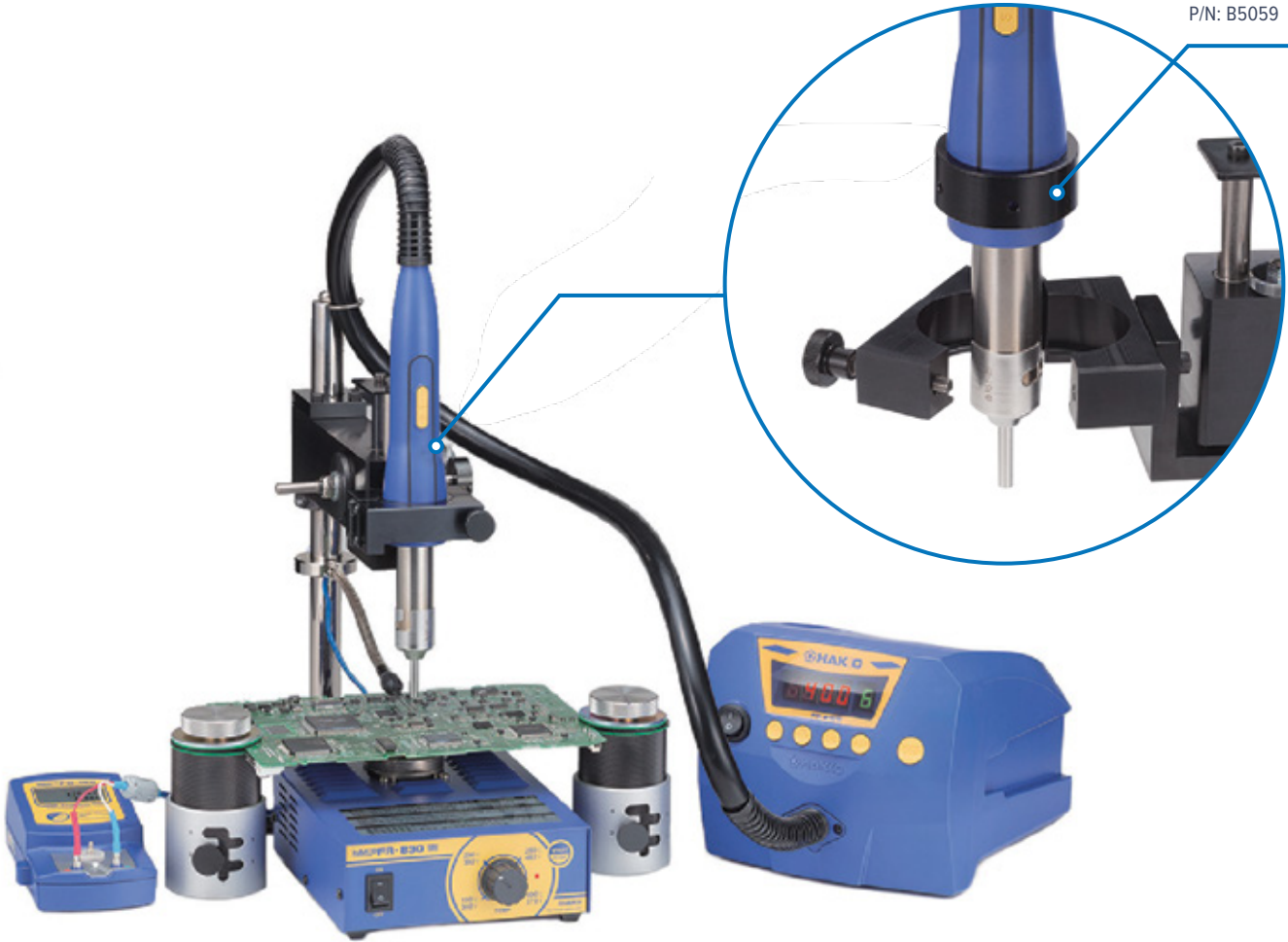
When attaching the nozzle to the Hakko FR-803B, FR-810B or FR-811

A1124B Single Ø2.5 (0.09)  Ø2.5 (I.D.) (0.09)	A1130 Single Ø4.4 (0.17)  Ø4.4 (I.D.) (0.17)	A1131 SOP 4.8 x 10 (0.19 x 0.39)  4.8 (0.19)	A1132 SOP 5.7 x 15 (0.22 x 0.59)  5.7 (0.22)	A1133 SOP 7.2 x 16 (0.28 x 0.62)  7.2 (0.28)	A1134 SOP 7.2 x 19 (0.28 x 0.75)  7.2 (0.28)
A1142B Bent Single 1.5 x 3 (0.06 x 0.12)  1.5 (0.06) (I.D.) 3 (0.12) (I.D.)	A1183 SOJ 16 x 8 (0.63 x 0.31)  16 (0.63) 8 (0.31)	A1190 Dual Single 2.5 x 9.5 Pitch (0.09 x 0.37)  Ø2.5 (I.D.) (0.09)	A1191 SIP 26 x 2 (1.02 x 0.08)  26 (1.02)	A1192 SIP 52.5 x 2 (2.07 x 0.08)  52.5 (2.07)	A1325 Dual Single ø1.5 x 5-10 (0.06 x 0.2-0.39) Adjustable Pitch  The pitch between the two nozzles is adjustable. 5 (0.2) 10 (0.39)

REWORK ACCESSORIES

FOR FR SERIES REWORK STATIONS

Handpiece Fixture
Adapter Required for
FR-810B & FR-811
P/N: B5059



FG-100B Tip Thermometer
uses a fine gauge wire sensor to measure tip temperatures up to 930 °F. Easy to read digital temperature display reads the temperature settings immediately.
See [page 94](#)



C1390C Omnivise™
Holds boards easily, safely and securely. Unique design allows 680 °F use. Five adjustable heights. Can accommodate any board size.



FR-830 Preheater
Precondition boards for soldering and rework with hot air. Temperature range is 302 °F - 572 °F / 150 °C - 300 °C.
See [page 87](#)



C1392B Rework Fixture
Rack and pinion action for smooth vertical motion. Makes repetitive component removal and installation simple.



851

SMD REWORK STATION

The **HAKKO 851 Hot Air Rework Station** is ideal for soldering and desoldering small surface mount chip components, heating heat-shrink tubing, and other local heating operations.



FEATURES & BENEFITS

- Adjustable temperature control from 212 °F - 1004 °F / 100 °C - 540 °C
- The air volume sensor has an 'ultra-light' setting
- ESD-Safe by design

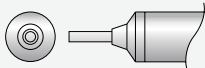
Uses

- Soldering and desoldering of small surface-mounted chip components
- Shrink tubing, heat tests and other local heating operations

NOZZLES

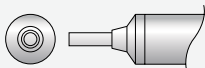
A1065

Inside dia 0.06 in. / 1.5 mm



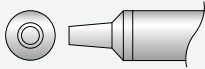
A1066

Inside dia 0.08 in. / 2.0 mm



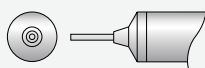
A1067

Inside dia 0.12 in. / 3.0 mm



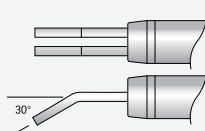
A1147

Inside dia 0.04 in. / 1.0 mm



A1344

Inside dia 0.04 in. / 1.0 mm



SPECIFICATIONS For Part No. 851-2

Station

Power Consumption

85 W

Pump

Diaphragm type

Capacity

6 L/min. (max.)

Outer Dimensions (W x H x D)

6.6 x 4.0 x 7.1 in. / 167 x 101 x 182 mm

Nozzle Series

851 Series (See Left)

Handpiece Power Consumption

85 W

Hot Air Temperature Range

212 °F - 1004 °F / 100 °C - 540 °C

CONTENTS

Part No.	Description	Part No.
851-2	851 hot air station	-
	Hot air rework iron (connected to station)	*
	Handpiece holder	B1190
	Nozzle holder	B1212
	Nozzle Ø 0.06 in. / 1.5 mm	A1065
	Nozzle Ø 0.08 in. / 2.0 mm (Attached to Iron)	A1066
	Nozzle Ø 0.12 in. / 3.0 mm	A1067
	Instruction manual	--

* Hot air rework iron cannot be purchased separately.



394

BATTERY OPERATED SMD VACUUM PICK-UP TOOL



The suction power on the **HAKKO 394 Vacuum Pick-up Tool** provides smooth, even suction to hold a part in place while you line it up for exact placement. The perfect pick-up tool for surface mount components.



FEATURES & BENEFITS

- Easy-to-use, battery operated pick-up tool for surface mount components.
- Uses 2 AAA batteries
- Ideal for handling surface mount components



SPECIFICATIONS For Part No.394-01

Power Supply	AAA alkaline battery x2
Suction Capacity	4.2 ozf / 120 gf with pad A1311
Dimensions (L x H x W)	5.1 x 1.1 x 0.9 in. / 130 x 29 x 22 mm
Pickup Power	
Pad Size (Part No.)	Maximum Item Weight
3 mm (A1166)	0.2 ozf / 6 gf
5 mm (A1312)	1.4 ozf / 40 gf
7 mm (A1167)	2.8 ozf / 80 gf
10 mm (A1311)	4.2 ozf / 120 gf
Service Life of Battery*	
Pickup Repetition Limit	Continuous Pickup Time**
Approx. 15 Hours	Approx. 30,000 times



REPLACEMENT PARTS

Part No.	Description
A1164	Bent nozzle 0.02 in. / 0.4 mm
A1165	Bent nozzle 0.04 in. / 1.1 mm w/stopper
A1166	Pad 0.12 in. / 3 mm
A1312	Pad 0.2 in. / 5 mm
A1167	Pad 0.28 in. / 7 mm
A1311	Pad 0.39 in. / 10 mm
A1486	Straight nozzle 0.04 in. / 1.1 mm with stopper
A1198	Bent nozzle Ø 0.01 in. / 0.26 mm



CONTENTS

Part No.	Description
394-01	Vacuum pick-up tool
A1165	Bent nozzle 0.04 in. / 1.1 mm
A1312	Pad 0.20 in. / 5 mm
A1311	Pad 0.39 in. / 10 mm
	AAA alkaline battery x2

U.S. Patent Numbers: D467,048.

*Service Life of Battery

Pick-up Repetition Limit: ~30,000 pick-ups (with alkaline batteries)
A 26 mm x 26 mm QFP is picked up for 2 seconds using a 10 mm diameter pad and then released for 1 second. This cycle is repeated continuously until the QFP is no longer picked up.

*Continuous Pick-up Time: ~15 hours

This is the time period from the moment a 26 mm x 26 mm QFP is picked up using a 10 mm diameter pad to the moment the QFP drops.



A1164



A1165



A1198



A1486



A1166



A1167



A1312





FR-860

PREHEAT PLATE



The **HAKKO FR-860 Preheat Plate** is designed specifically for the automotive and telecommunications industries. The low profile and large, even heat surface across the plate provides fast, efficient heat.



FEATURES & BENEFITS

- Ideal for PCB's bonded to solid metal substrates
- Temperature control feedback from either plate or remote thermocouple
- Split plate/controller design allows for minimal bench space use
- Low profile allows for use under microscopes
- Preheat plate does not warp over time
- ESD Safe



SPECIFICATIONS For Part No. FR860-02

Power Consumption	600 W
Temperature Range	RT - 500 °F / RT-260 °C
Temperature Stability	± 9 °F / ± 5 °C
Temperature Control	Industrial Microprocessor
Temperature Control Modes	Plate or External Thermocouple
Thermocouple Inputs	1 - Type K
Heating Surface Dimensions (W x D)	7.0 x 7.0 in. / 178 x 178 mm
Overall Dimensions (Plate) (W x H x D)	9.8 x 3.1 x 8.0 in. / 250 x 79 x 204 mm
Overall Dimensions (Controller)	3.9 x 2.6 x 6.7 in. / 100 x 66 x 169 mm

FR-860 PREHEAT PLATE

P/N: FR860-02

PREHEAT PLATE
P/N: FR860-02

POWER CORD
P/N: B2419

THERMOCOUPLE
P/N: B3516

CONTROLLER
P/N: 999-722



CONTENTS

Part No.	Description
999-722	Controller
FR860-02	Preheat plate (large)
B2419	Power cord
B3516	Thermocouple (type k)
--	Instruction manual



FR-872

4-BANK IR PREHEATER



The **HAKKO FR-872 4-BANK IR Preheater** includes a feature to control ramp rate for heating sensitive assemblies. Designed to elevate the temperature of printed circuit board assemblies so the components can be soldered and desoldered more easily, with improved results, particularly on high-mass boards, which can “heat-sink” a significant amount of energy from a soldering iron tip or hot air tool. The FR-872 incorporates a new heating method and a closed-loop thermocouple control. The preheater array has four separate switchable zones for smaller PCBs used in devices such as cell phones.



FEATURES & BENEFITS

- High efficiency carbon filament IR heating lamps
- 4 independent switchable heat zones
- 8.8 x 10.5 in (224 x 266 mm) effective heating area
- Manual or Auto operation modes
- Preheat controlled by power percentage or thermocouple for closed-loop feedback of the PCB heating
- Ramp Control that controls the ramp rate of the PCB when using either of the thermocouple modes of temperature control
- Soft EPO to protect assemblies
- Automatic operation following a 3-heating zone profile that can be programmed into the system (with up to 20 possible profiles)
- Faster than ceramic IR heating
- Integration capability with the Hakko FR-803B hot air and FM-206 rework systems with connecting cable (B3657 and B3686 (Not included)).



SPECIFICATIONS For Part No. FR872-03

Power Consumption	1440 W
Heater Array	Carbon filament lamp X 12
Thermocouple Input	K-type (1)
Power Range	0 - 100% (1% increments)
Temperature Range	120 F° - 392 °F / 50 °C - 200 °C
Ramp Rate Select	34, 36, or 37 °F/sec
Timer Range	0 - 999 seconds
Operating Modes	Manual - Power Manual - Thermocouple Automatic - Power Automatic - Thermocouple
Heating Control	Power: Percentage-based Thermocouple: PID control
Maximum Board Depth	16.9 in. / 430 mm
Dimensions (W x H x D)	14.2 x 3.8 x 21.1 in. / 360 x 97 x 535 mm
Heating Area (W x D)	11.2 x 13.8 in. / 286 x 350 mm
Effective Heating Area (W x D)	8.8 x 10.5 in. / 224 x 266 mm
Zones	4
External Connections	1 — integrate with the FM-206

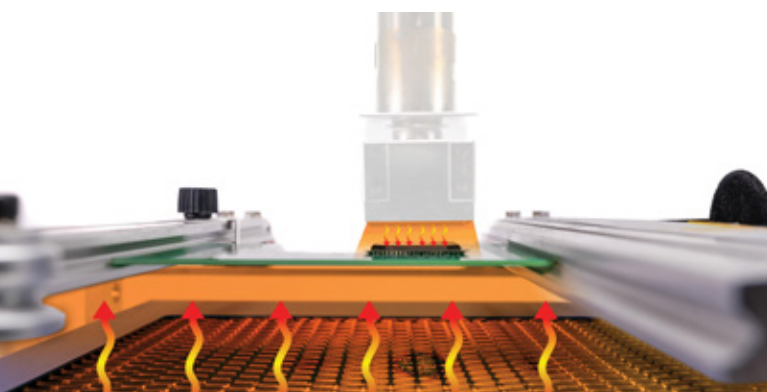


CONTENTS For Part No. FR872-03

Part No.	Description
---	FR-872 4-bank ir preheater
A5003	High efficiency carbon filament ir heater (spare)
B3516	Thermocouple
---	(2) nuts
---	(2) washers
B5042	Power cord
---	Instruction manual



FR-872
LARGE IR
PREHEATER
P/N: FR872-03





FR-870B

2-BANK IR PREHEATER



The **HAKKO FR-870B 2-Bank IR Preheater** bench-top board heater is designed to elevate the temperature of the printed circuit board assemblies so that components on them can be easily soldered and desoldered. This tool is particularly useful when soldering Pb-free assemblies.



FEATURES & BENEFITS

- 9.8 x 5.5 in. PCB capacity
- Soft EPO to protect assemblies
- Integrates with HAKKO FM-206
- Manual or automatic modes of operation
- Preheat control by power or thermocouple
- 2 independent switchable zones
- Small footprint and low profile
- Ramp rate control settings of 34, 36, or 37 °F / sec.
- Faster than ceramic IR preheating



SPECIFICATIONS For Part No. FR870B-04

Voltage	120 VAC
Power Consumption	730 W
Heater Array	Carbon filament lamp X 6
Thermocouple Input	K-type
Power Range	0 - 100% (1% increments)
Temperature Range	120 °F - 392 °F / 50 °C - 200 °C
Ramp Rate Select	34, 36, or 37 °F/sec
Timer Range	0 - 999 seconds
Operating Modes	Manual - Power Manual - Thermocouple Automatic - Power Automatic - Thermocouple
Heating Control	Thermocouple: PID control
Dimensions (W x H x D)	11.7 x 3.9 x 12.2 in / 296 x 100 x 311 mm
Board Capacity (W x D)	9.8 x 5.5 in. / 248 x 140 mm
Effective Heating Area (W x D)	7.5 x 3.2 in. / 190 x 80 mm
Zones	2
External Connections	1 — integrate with the FM-206

FR-870B 2-BANK IR PREHEATER

P/N: FR870B-04

POWER CORD
P/N: B2419

THERMOCOUPLE
P/N: B3516

SPARE HEATING
LAMP
P/N: A5003



CONTENTS

Part No.	Description
--	FR-870b 2-bank preheater
A5003	Spare heating lamp
B3516	Thermocouple
B2419	Power cord
--	Instructional manual

Optional Part:
Connecting Cable for FM-206, P/N: B3686



FR-830

PREHEATER



The **HAKKO FR-830 Preheater** is a compact and low cost solution for hot air preheating of printed circuit boards. The design of the FR-830 delivers consistent heat through the closed-loop temperature control allowing you to select a preheating temperature between 302°- 572 °F (150 °C - 300 °C). The new heater and fan design makes the HAKKO FR-830 the most durable hot air preheater HAKKO has ever made.



FEATURES & BENEFITS

- Compact design
- Measures only 5.5 x 3 x 7.3 in. / 140 x 75 x 185 mm
- Fast heating and excellent thermal stability
- Closed-loop adjustable temperature control — 302 °F to 572 °F / 150 °C to 300 °C
- ESD-Safe by design
- Integrated cool down mode
- Optional hand or foot switch available to activate preheater



SPECIFICATIONS For Part No. FR830-02

Power Consumption	470 W / 120 VAC
Hot Air Temperature	302 °F - 572 °F / 150 °C - 300 °C
Air Flow	6.35 cu.ft/min / 0.15 cu.m/min
Dimensions (W x H x D)	5.5 x 3.0 x 7.3 in. / 140 x 75 x 185 mm



CONTENTS

Part No.	Description
FR830-02	Preheater
B2419	Power cord
--	Instruction manual



ACCESSORIES

Part No.	Description
B1649	Foot Switch
B2763	Hand Switch
B3263	Extension Pipe w/LID
B3685	Connecting Cable, FM-206



OMNIVISE
P/N: C1390C
Sold Separately

FR-830
PREHEATER
P/N: FR830-02

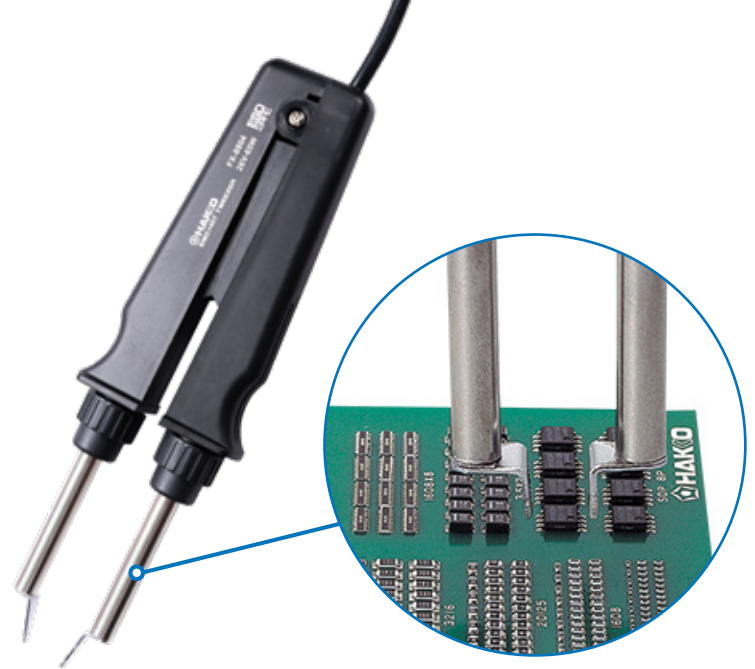




FX-8804

SMD HOT TWEEZERS

The **HAKKO FX-8804 SMD Hot Tweezer** delivers direct heat to the component, preventing damage to surrounding components on dense boards. Easily removes SMD chips and flat packs up to 25mm. Compatible only with the HAKKO FX-888/FX-888D and FX-889 soldering stations.



FEATURES & BENEFITS

- Direct heating - less effect upon surrounding components on crowded boards
- Easily removes SMD chips and flat packs up to 25 mm
- The collet allows easy replacement of the tips
- Specially designed tool allows easy and precise tip alignment



CONTENTS For Part No. FX8804-CK (Hot Tweezers & Holder included)

Part No.	Description
FX8804-02	SMD hot tweezer
FH800-04BY	Holder with cleaning sponge A1559
B2300	Heat resistant pad
A1378 (2mm)	One set of tips

FX8804-CK IRON HOLDER CONVERSION KIT

Includes everything shown in picture.

HEAT
RESISTANT
PAD
P/N: B2300

SMD HOT
TWEEZERS
P/N: FX8804-02

A1378* TIPS
P/N: A1378
*Included

IRON HOLDER
W/CLEANING
SPONGE
P/N: FH800-04BY

















SPECIFICATIONS For Part No. FX8804-02 (Handpiece Only)

Station Compatibility	FX-888/FX-888D see page 45 & FX-889 see page 46
Tip Series	950 Series Tips see below
Power Consumption	65 W
Temperature Range	392 °F - 750 °F / 200 °C - 400 °C
Tip to Ground Resistance	< 2 Ω
Leak Voltage	2 mV
Heating Element	Ceramic heater



TIPS For Part No. FX8804-02

	Size A [B] x W	Part No.	Description
CHIP	 0.10 x 0.04 in. / 2.6 x 1.0 mm	A1576	Tip/Chip 2.6C
	 1.5 [0.5] x 1.0 mm / 0.06 [0.02] x 0.04 in.	A1388	Tip/Chip 0.5C
	 0.02 x 0.04 in. / 0.5 x 1.0 mm	A1577	Tip/Chip 0.5L
	 0.04 x 0.04 in. / 1.0 x 1.0 mm	A1379	Tip/Chip 1L
	 0.08 x 0.04 in. / 2.0 x 1.0 mm	A1378	Tip/Chip 2L
	 R0.01 in. / R0.25 mm	A1389	Tip/Chip 0.5I
SOP	 0.16 x 0.04 in. / 4 x 1.0 mm	A1390	Tip/SOP 4L
	 0.24 x 0.04 in. / 6 x 1.0 mm	A1391	Tip/SOP 6L
	 0.31 x 0.04 in. / 8.0 x 1.0 mm	A1380	Tip/SOP 8L
	 0.39 x 0.04 in. / 10.0 x 1.0 mm	A1381	Tip/SOP 10L
	 0.51 x 0.04 in. / 13.0 x 1.0 mm	A1382	Tip/SOP 13L
	 0.59 x 0.04 in. / 15.0 x 1.0 mm	A132	Tip/SOP 15L
	 0.71 x 0.04 in. / 18.0 x 1.0 mm	A1383	TIP/SOP 18L
	 0.79 x 0.04 in. / 20.0 x 1.0 mm	A1384	Tip/SOP 20L
	0.98 x 0.04 in. / 25.0 x 1.0 mm	A1385	Tip/SOP 25L



FUME EXTRACTION

- **FA-400** Smoke Absorber 90
- **FA-430** Fume Extraction System..... 91
- **LOC-LINE KIT®** Segmented Hoses & Accessories..... 92
- **DUCT** Accessories 92



FA-400

SMOKE ABSORBER

The **HAKKO FA-400 Smoke Absorber** is a quick, safe, and efficient way to absorb soldering smoke and fumes. Optional high-efficiency filter is available and all filters are easily replaceable.



FEATURES & BENEFITS

- Can be used in a vertical (standing up) position or low-profile position (laying down)
- Interchangeable filter. Optional HEPA filter
- Light weight and compact smoke absorber
- ESD Safe



SPECIFICATIONS For Part No. FA400-04

Power Consumption	19 W
Absorption Capacity (w/o filter)	Vertical Position (1.1m ³ /min) 38.8 CFM Horizontal Position (0.5m ³ /min) 17.7 CFM
Dimensions (W x H x D)	5.5 x 3.0 x 7.3 in. / 169 x 213 x 113 mm
Air Capacity (w/ filter)	1.07 m ³ /min



CONTENTS For Part No. FA400-04

Part No.	Description
--	
A1001	Smoke absorber
--	Filter (1pc)
--	Instruction manual



ACTIVATED-CARBON FILTER

Filter Dimensions	5.1 x 5.1 x 0.4 in. / 130 x 130 x 10 mm
Amount of Activated-Carbon Filter	0.03 lb / 7 g
Max. Absorbing Weight of Noxious Components per Filter	0.01 lb / 2 g



REPLACEMENT PARTS

Part No.	Description
A1001	Activated carbon filter (set of 5)
B1166	Knob (set of 2) for C1568. ESD



ACCESSORIES

Part No.	Description
999-198	High-efficiency pleated filter
C1568	Optional arm stand w/ knobs



**FA-400 ACCESSORY
ARM STAND HOLDER***
P/N: C1568

**Sold Separately.*



**FA-400 ACCESSORY
High-Efficiency
Filter***

P/N: 999-198

**Sold Separately.*

NOTE: When using the 999-198 High-efficiency filter the smoke absorber must be used in the vertical standing position, or the unit may be elevated using the C1568 arm stand.



**FA-400
Horizontal Position**

Air capacity: (0.5m³/min) 17.7 CFM



For more information [Scan QR Code.](#)

FA-430

FUME EXTRACTION SYSTEM

The **HAKKO FA-430 Fume Extraction System** is specially designed for use in the electronics soldering process by extracting the contaminated air directly at the source. The three-stage filtering system returns purified air to the area.



FEATURES & BENEFITS

- 3-Stage filter system for superior air purification
- Airflow adjustments: Low, Med, High
- Powerful suction for maximizing aerosol capture
- Dual duct ports for multiple operators
- Adjustable ducts for mobility and control
- HEPA Filters available to increase efficiency
- Filter indicator lights alerting it is time to change the filter
- Keeps the air cleaner for a healthier workspace



SPECIFICATIONS For Part No. FA430-16

Motor Type	Brushless
High Airflow (w/ single duct)	4.1 m³/min (145 cfm)
Medium Airflow (w/ single duct)	3.1 m³/min (109 cfm)
Low Airflow (w/ single duct)	2.6 m³/min (92 cfm)
Vacuum Pressure	1500 Pa / 0.44 in. Hg
Filtering Efficiency	>98% 0.3µm (capable of 99.97% @ 0.3µm) with use of HEPA rated filters
Noise Level	44 - 55 dB @ 1m
Weight	16.5 lb. / 7.5 kgs
ESD Safe	Yes

FA-430 with duct & RECTANGULAR NOZZLE
P/N: FA430-KIT1



FA-430 with duct & ROUND NOZZLE
P/N: FA430-KIT2



CONTENTS For Part No. FA430-16

Part No.	Description
--	Fume extraction unit
A1585	Pre-filter
A1586	Main filter
B3641	Power cable
B3619	Port cap
--	Instruction manual



CONTENTS For FA-430 DUCT KIT 1 & KIT 2

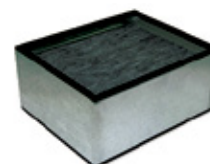
KIT 1 w/ DUCT RECTANGULAR NOZZLE (P/N: FA430-KIT1)		KIT 2 w/ DUCT ROUND NOZZLE (P/N: FA430-KIT2)	
Part No.	Description	Part No.	Description
C1571	Rectangular nozzle w/ duct kit	C1572	Round nozzle w/ duct kit
Both (P/N: FA430-KIT1 and FA430-KIT2 includes the contents below)			
Part No.	Description	Part No.	Description
--	Fume extraction unit	--	Fume extraction unit
A1585	Pre-filter	A1585	Pre-filter
A1586	Main filter	A1586	Main filter
B3641	Power cable	B3641	Power cable
B3619	Port cap	B3619	Port cap
B3625	Net	B3625	Net
--	Instruction manual	--	Instruction manual

FA-430 ACCESSORIES



HEPA FILTER*

P/N: A1573



CARBON ODOR FILTER*

P/N: 999-245



REMOTE POWER SWITCH*

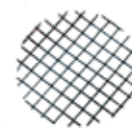
P/N: 999-252



PRE-FILTER*

P/N: A1572

Note: For use with Hepa Filter A1573



DEBRIS SCREEN*

P/N: 999-700

For more information **Scan QR Code.**

Optional Parts
*Sold Separately.





LOC-LINE KIT®

SEGMENTED DUCT & ACCESSORIES

Flexible segmented duct capped with either a round or rectangular nozzle allow the nozzle to be placed close to the work and moved out of the way when needed. ESD Safe.



CONTENTS For Part No.'s 999-205-01 & 999-205-02

Part No.	Description	Specifications
999-195	(A) Round nozzle or	4.5 in / 114.3 mm diameter for 999-194
999-196	(A) Rectangular nozzle	6 x 3.5 in. / 152.4 x 88.9 mm for 999-194
999-194	(B) Articulated duct	2.5 in. / 63.5 mm articulated duct per foot
999-197	(C) 999-194 adapter	3 x 2.5 in. / 76.2 to 63.5 mm for 999-194
999-188-02	(D) Bench clamp	Bench clamp with 3.0 in. / 76.2 mm coupler
999-169	(E) Duct clamp	3.5 in. / 88.9 mm duct clamp, 2 pack
999-189	(F) Neoprene duct	3.0 in. / 76.2 mm neoprene ESD duct, 6 ft / 1.83 m

ACCESSORIES For Part No.'s 999-205-01B & 999-205-02B

Part No.	Description	Specifications
B3621	(G): Adapter	Adapter to fit the Hakko Neoprene duct (999-189) to the FA-430 fume extraction unit

NOZZLE KIT OPTIONS

ROUND NOZZLE KIT (P/N: 999-205-01)		RECTANGULAR NOZZLE KIT (P/N: 999-205-02)	
Part No.	Description	Part No.	Description
999-195	Round nozzle 4.5 in. / 114.3 mm	999-196	Rectangular nozzle 6 x 3.5 in. / 152.4 x 88.9 mm
ROUND NOZZLE KIT w/ ADAPTER (P/N: 999-205-01B)		RECTANGULAR NOZZLE KIT w/ ADAPTER (P/N: 999-205-02B)	
Part No.	Description	Part No.	Description
999-195	Round 4.5 in. / 114.3 mm	999-196	Rectangular nozzle 6 x 3.5 in. / 152.4 x 88.9 mm
B3621	Adapter for FA-430 only	B3621	Adapter for FA-430 only

DUCT ACCESSORIES



A) ROUND NOZZLE
P/N: 999-195



A) RECTANGULAR NOZZLE
P/N: 999-196



B) ARTICULATED DUCT
P/N: 999-194



C) ADAPTER FOR 999-194 DUCT
P/N: 999-197



D) BENCH CLAMP (3.0 in)
P/N: 999-188-02



E) DUCT CLAMP
P/N: 999-169



F) NEOPRENE DUCT
P/N: 999-189



G) ADAPTER
for neoprene duct
P/N: B3621



RELATED PRODUCTS

• FG-100B Tip Thermometer.....	94
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• FT-802 Thermal Wire Stripper	96
• FT-8004 Wire Stripper Handpiece	97
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• 611-1/611-2 Solder Spool Stand	99
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• FT-720 Tip Cleaner	101
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• FS-100 Tip Cleaning Paste	102
• C5045 Nozzle Quick Changer for FR-400	103
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FG-100B

TIP THERMOMETER

The **HAKKO FG-100B Thermometer** measures soldering iron tip temperatures as well as solder pot temperatures and hot air station temperatures (with optional temperature probes). Lightweight, easy to replace sensors provide accurate measurement of tips and nozzles for verification or calibration processes.

The AUTO HOLD feature minimizes individual differences in temperature measurements by automatically ending a measurement once the measurement is stabilized. To preserve battery life, the auto shutoff feature turns the thermometer off when not used for three minutes. The thermometer design allows for easy measurements for right or left handed operators. Another feature of the thermometer allows the user to transmit measurement data through the SEND function, which uses an IR signal to transfer the information to a compatible station that will then automatically offset the set temperature.



FEATURES & BENEFITS

- Auto hold feature minimizes individual measurement differences
- Low battery indicator
- Sensor Failure Indicator
- Quick and easy sensor replacement
- Design allows easy access to sensor from front, right or left sides
- Auto shutoff after 3 minutes
- Able to display either °F or °C
- Measurement counter
- Temperature Send Function (on certain soldering stations only)
- Also sold with a Certificate of Calibration (FG100B-US03)



SPECIFICATIONS For Part No. FG100B-03

Display Units	1°F (Default)	1°C
Range of Measurement*	32 °F - 1300 °F	0 °C - 700 °C
Measurement Tolerance †	±6 °F (in 572 °F - 1112 °F range)	±3 °C (in 300 °C - 600 °C range)
Sensor Type	K (CA) type thermocouple	
Power Supply	006P 9V battery (alkaline cell recommended)	
Dimensions ‡ (W x H x D)	75 x 44 x 140 mm (2.95 x 1.73 x 5.51 in.)	

*FG-100B 191-212 Sensor can only be used to measure temperatures below 500°C / 932°F

† (±10°F/±5°C outside range)

‡ Dimensions exclude protrusions



OPTIONAL PARTS FOR FG-100B

Part No.	Description
A1310	Temperature probe * For measuring the temperature of solder in pots and other applications as required.
A1556	Thermocouple sensor A
A1557	Thermocouple sensor B
C1541	Hot Air Probe
CX1002	Robotic Temperature Probe



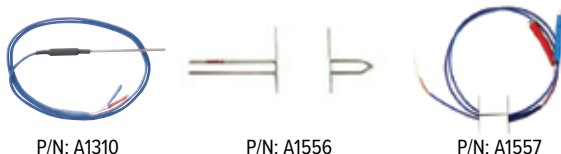
CONTENTS For Part No. FG100B-03

Part No.	Description
-- 191-212 --	Tip thermometer Sensor (10 pack) 9V battery (for sample use only) Instruction manual



REPLACEMENT PARTS

Part No.	Description
191-212	Sensor (10 pack)



P/N: A1310

P/N: A1556

P/N: A1557

AS5000*
EXTENDED LIFE SENSOR
P/N: AS5000
*Optional Part



For more information [Scan QR Code](#).

FG-101B

SOLDERING IRON TESTER

The **HAKKO FG-101B Soldering Iron Tester** measures tip temperature, leak voltage, and tip-to-ground resistance. This tester will provide you with quick, and accurate measurements.

The soldering iron tester also features the ability to send measurement information using IR to a compatible station that will automatically calibrate the tip temperature.



FEATURES & BENEFITS

- Resistant to drift and ambient temperature variations
- Highly reliable and accurate measurements
- MAX HOLD function displays maximum value when MAX HOLD button is pressed
- Suitable for Lead-Free solder applications
- AUTO HOLD feature that ends measurements automatically once the tip temperature is stabilized
- Able to switch between °Fahrenheit and °Celsius
- Temperature Sending Function
- Includes a Certificate of Calibration



SPECIFICATIONS For Part No. FG101B-03

Power Consumption	2W / 120V	
Temperature	Measurement Range ¹	32 F° - 1300 °F (0 °C - 700 °C)
	Measurement Tolerance ²	±6 °F (in 572 °F - 1112 °F range) ±3 °C (in 300 °C - 600 °C range)
	Sensor Type	K (CA) type thermocouple
Voltage	Resolution	0.1 mV
	Measurement range	0 - 40 mV (AC)
	Precision	± (5% + 1 digit)
Resistance	Resolution	0.1 Ω
	Measurement range	0 - 40 Ω
	Precision	± (5% + 1 digit)
Display	Liquid crystal display (LCD)	3.5 digit
Dimensions (W x H x D)	211 x 53 x 126 mm (8.31 x 2.09 x 4.96 in.)	

¹Temperature sensor (PN: 191-212) can only be used to measure temperatures below 932 °F (500 °C). To measure higher temperatures, use an applicable temperature probe.

²Measurement tolerance is ±10 °F / ±5 °C for measurements outside the range given for measurement tolerance above.



ACCESSORIES/REPLACEMENT PARTS FOR FG-101B

Part No.	Description
A1310	Temperature probe. For measuring the temperature of solder in pots and other applications as required.
A1556	Thermocouple sensor A
A1557	Thermocouple sensor B
191-212	Sensor (10 Pack)
AS5000	Extended Life Sensor
B2468	Fuse / 125V-5A
B1752	Conduction plate
B1754	Ground Clip
B1950	Conduction Wire



CONTENTS For Part No. FG101B-03

Part No.	Description
-- 191-212 B2468 B1950 B2419 B1754 --	Soldering iron tester Sensor (10 pack) Fuse Conductive wire Power cord Ground clip Instruction manual





FT-802

THERMAL WIRE STRIPPER

The **HAKKO FT-802 Thermal Wire Stripper** is a superior performing thermal wire stripper with a redesigned ergonomic handpiece and designed for use with a wide variety of insulation materials. Achieve clean insulation removal compared to other wire strippers, with no ragged edges, nicks or cuts to the conductor.



FEATURES & BENEFITS

- Compact station maximizes bench space
- Digital power control from 5% to 100%
- 3-digit password security eliminates the need for a key card
- Flexible cord for a long reach (1.6 m x 5.25 ft)
- Redesigned ergonomic handpiece
- Auto power-off and sleep mode functionality
- Easy blade alignment



SPECIFICATIONS For Part No. FT802-03

STATION	
Blade Series	G4-1601, G4-1602 and G4-1603 see page 97 (Blades Sold Separately)
Voltage	120 VAC 50/60 Hz
Power Consumption	76 W
Dimensions (W x H x D)	76 x 159 x 161 mm (3.0 x 6.3 x 6.3 in.)
ESD Safe	Yes
Included Handpiece	FT-8004 (Part No. FT8004-81) see page 97



CONTENTS For Part No. FT802-03 (Complete Kit w/ Station and Handpiece)

Part No.	Description
--	FT-802 station
FT8004-81	Handpiece
B2419	Power cord
--	Instruction manual
--	Wire material guideline sticker
--	Hexagon wrench (1.27 mm)

U.S. Patent Registered



FT-802 STATION

POWER CORD
P/N: B2419

HEXAGON
WRENCH

WIRE MATERIAL
GUIDELINE
STICKER

HANDPIECE
P/N: FT8004-81

3 HANDPIECE HOLDER & AUTO SLEEP MODE

The built-in handpiece holder has a magnetic sensor that will activate its Sleep Mode when the handpiece is placed on the handle holder. Sleep Mode is a 50% reduction to the power setting.



1 BLADES & TOOLS STORAGE COMPARTMENT

The back of the station has convenient slots to store additional blades and tools.



2 BLADE REMOVAL PLATE

A convenient blade removal plate built directly into the station's holder for removing blades with ease



For more information [Scan QR Code.](#)



The **HAKKO FT-8004 Wire Stripper Handpiece** is a fully redesigned thermal wire stripper handpiece, with an ergonomic handle, easy blade alignment, and superior thermal performance. Designed with comfort, power, and flexibility in mind.



For more information
Scan QR Code.

FT-8003

HOT KNIFE

The **HAKKO FT-8003 Hot Knife** is designed for stripping ultra-thick wires, expando or other wire harness braid.
Note: G3-1601 blade included with the FT8003-81 Conversion Kit.



FEATURES & BENEFITS

- Ultra-slim ergonomic handpiece
- 2 different blade types
- Easy insertion and removal of blade
- ESD Safe
- Superior performance



SPECIFICATIONS For Handpiece Only Part No. FT8003-81

HANDPIECE

Hot Knife Blades Series	G3-1601 & G3-1602 see below (Hot Knife Blades Sold Separately)
Compatible Stations	HAKKO Wire Stripping Station (FT-800, FT-801 and FT-802) see page 96
Power Consumption	46 W / 24 V
Tip to Ground Resistance	<2 Ω
Tip to Ground Potential	<2 mV

FT8003-81 HOT KNIFE CONVERSION KIT

Includes everything shown in picture.



CONTENTS For Part No. FT8003-81 (Complete Kit w/ Handpiece & Sleep Holder)

Part No.	Description
FT8003-02 B3253 B3648 G3-1601 C5034	Hot knife handpiece Connecting cord Removal tool Knife blade Handpiece holder w/ guard



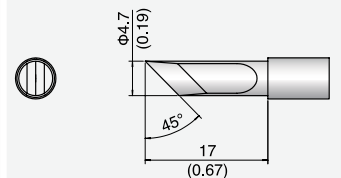
G3 SERIES HOT KNIFE BLADES FOR USE

UNIT: mm(inch)

G3-1601



G3-1602



CONNECTING CORD P/N: B3253

HANDPIECE HOLDER W/ GUARD P/N: C5034

HANDPIECE P/N: FT8003-02

KNIFE BLADE P/N: G3-1601 Included w/ conversion kit

REMOVAL TOOL P/N: B3648

CLEAN INSULATION CUT



IRON HOLDERS

For more information
Scan QR Code.



602



607



633-01



633-02



FH-300



SPECIFICATIONS

	Dimensions mm(inch)	Cleaning	Use With
602	3.6 X 4.3 in. / 92 x 108 mm	Sponge P/N: 602-029	N452/N453/N454 (DASH), 918/920/921/922 (MACH-I), 455, 456, 503/508, 905/910/915 (PORTABLE)
607	3.9 X 6.5 in. / 98 x 166 mm	Sponge P/N: 602-029	583/585/587/589/ MG soldering guns
633-01	3.3 X 7.3 in. / 84 x 186 mm	Wire P/N: 599-029	FX-600 see page 47 , FX-601 see page 48 , FX-650 see page 50 , FR-300, FR-301 see page 58 ,
633-02	3.3 X 7.3 in. / 84 x 186 mm	Sponge P/N: A1519	N452, N453, N454 (DASH), 918, 920, 921, 922 (MACH-I), 455, 456, 808
FH300-01/P	Φ85 x 5.5 in. / Φ85 x 140 mm	Sponge P/N: A1519	FX-600 see page 47 , FX-601 see page 48 , FX-650 see page 50 , PRESTO see page 51 , N454 (DASH), 918, 922 (MACH) 933, 944, MACH, DASH

611-1/611-2

SOLDER SPOOL STAND



SPECIFICATIONS

	611-1	611-2
Outer Dimensions (W x H x D)	87 x 78 x 141 mm (3.4 x 3.1 x 5.6 in.)	87 x 200 x 141 mm (3.4 x 7.9 x 5.6 in.)
Shaft Diameter	15 mm / Ø0.6 in.	15 mm / Ø0.6 in.
Weight	450 g / 1.0 lb	750 g / 1.7 lb



P/N: 611-2



P/N: 611-1

Note: Solder Wire Not Included

For more information Scan QR Code.





FG-470

ESD WRIST STRAP TESTER

This wrist strap tester can be used anywhere to quickly and easily check wrist strap performance. The **HAKKO FG-470 ESD Wrist Strap Tester**, which uses the 9 V battery, ensures employee safety and eliminates product defects caused by static electricity.



For more information
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FEATURES & BENEFITS

- Mounting holder to plug and unplug with ease
- Banana plug and grounding wire are included
- ESD safe with a 9V battery
- Low, Pass, and High indicator for accurate testing



SPECIFICATIONS For Part No. FG470-02

Power Supply	9 V battery	
Grounding Wire	3.28 ft / 1 m	
Dimensions † (W x H x D)	3.35 x 1.73 x 3.54 in. / 85 x 44 x 90 mm	
Indication	Nominal Resistance	
	Low Good High	R < 800 Ω 800 K - 9 M Ω R > 9 M Ω

† Without mounting holder

U.S. Patent Registered



DIP LINER



FEATURES & BENEFITS

- Low-cost, high-performance tool for reforming IC and LSI leads
- Speeds IC and LSI insertion
- No more broken leads during IC and LSI insertion or transportation
- Simply insert the IC case into the DIP Liner chute, and the leads are protected right through circuit board insertion
- Adjustable lead former fits all types, sizes and makes of ICs and LSIs



SPECIFICATIONS

Part No.	Width of IC	Number of IC Leads
FT100	0.3 in. / 7.5 mm	8, 14, 16, 18, 20
FT150	0.4 in. / 10 mm	22
FT200	0.6 in. / 15 mm	24, 28, 40, 42
FT300	0.7 in. / 19 mm	64



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599B

TIP CLEANER



For more information
Scan QR Code.



The **HAKKO 599B Tip Cleaner** cleans your soldering iron tips without water! The 599B is made from coils of brass, which is softer than the tip plating yet harder than the oxidation that forms on the tip. To clean the tip, simply plunge (stab) the iron tip into the coils.



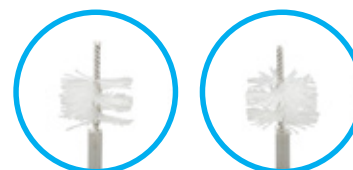
FEATURES & BENEFITS

- Cleans better than conventional sponges
- No water required
- Will not reduce the tip temperature



SPECIFICATIONS For Part No. 599B-02

Size (mm/in.)	2.8 in. / 71.1 mm
Replacement Wire	Part No. 599-029
U.S. Patent Number D480, 522.	



Equipped with
FLUROPLASTIC BRUSHES



FT-720

TIP CLEANER

The **HAKKO FT-720 Tip Cleaner** provides quick and effective cleaning of soldering iron tips with sensor activated counter-rotating brushes, which remove tip oxides, debris, and excess solder without damaging the tip plating.



FEATURES & BENEFITS

- Compact and lightweight
- Interchangeable counter-rotating brushes
- Adjustable window size to fit most tip shapes
- Convenient internal tray for collecting solder waste
- Capable of being mounted to the FH-200 holder



SPECIFICATIONS For Part No. FT720-03

Rating	5 W / 24 VDC 140 mA
Brush Rotation Speed	1670 rpm
AC Adapter Included	Part No. B3528
Dimensions (W x H x D)	2.6 x 2.5 x 3.7 in. / 67 x 63 x 94 mm



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For more information
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FT-700

TIP POLISHER

When hand soldering with Lead-Free alloys, higher tip temperatures and highly-active fluxes cause oxidation and corrosion, which greatly decreases the life of your soldering iron tip. The **HAKKO FT-700 Tip Polisher** helps maximize the life of your tip by keeping it clean and free from oxidation quickly and easily.



FEATURES & BENEFITS

- FAST and EASY way to keep your soldering iron tips clean and free from oxidation
- Two counter-rotating polishing brushes (brushes will not damage tip plating)
- Lead-Free tip polish for immediate tip tinning
- FS-100 tip polish may be used with or without the FT-700 to remove tip oxides and restore tips



SPECIFICATIONS For Part No. FT700-05

Power Consumption	4.5 W / 120 V
Dimensions (W x H x D)	2.8 x 2.1 x 4.0 in. / 70 x 54 x 101 mm
Accessories	FS100-01 chemical paste see below B3052 polishing brush (2 pieces)

FS-100

TIP CLEANING PASTE



The **HAKKO FS-100 Tip Cleaning Paste** is specially formulated to easily remove oxide from soldering tips. Can be used alone or use with the FT-700 Tip Polisher for increased effectiveness.



FEATURES & BENEFITS

- Re-tins oxidized soldering iron tips and is 100% Lead-Free
- Helps rejuvenate very oxidized and/or corroded soldering iron tips back to useful life
- Does not contain Diammonium Phosphate and will not corrode the PWB or tip (Conforms to JIS-Z-31976.6.1 test method)



SPECIFICATIONS For Part No. FS-100-01

Amount	10g
Content	Flux and Tin



C5045

NOZZLE QUICK CHANGER FOR FR-400

Easily change your HAKKO FR-400, N60 series nozzles with just a twist on the **HAKKO C5045 Nozzle Quick Changer**.



For more information
Scan QR Code.



FEATURES & BENEFITS

- 3 separate receptacles
- Compatible with the FR-4003 desoldering gun handpiece
- Special positioning jigs available for oval-shaped nozzles
- Needs two additional B5221 enclosures to utilize all 3 receptacles



SPECIFICATIONS For Part No. C5045

Number of Receptacles	3
Compatible Handpiece	FR-4003 see page 55
Dimensions (W x H x D)	5.13 x 4.97 x 4.83 in. / 130 x 126 x 111 mm
Receptacle	B5227 (for FR-400)
Oval Nozzle Positioning Jig	B5229



B5221 Enclosure
For FR-4003 Handpiece



B5222 Enclosure
For FR4103/FR4104
Handpiece



B5193 Enclosure
For FR-301 Portable
Desoldering Tool



C5046

NOZZLE QUICK CHANGER FOR FR-410 & FR-301

The **HAKKO C5046 Nozzle Quick Changer** is an accessory item that is ideal for use with the FR-301, FR-4103, and FR-4104 N61 series nozzles for easy and quick removal, and storage of various nozzles.



FEATURES & BENEFITS

- 3 separate receptacles
- Compatible with the FR-4103, FR-4104, & FR-301
- Special positioning jigs available for oval-shaped nozzles
- Needs two additional B5193 enclosures to utilize all 3 receptacles for use with FR-301
- Needs two additional B5222 enclosures to utilize all 3 receptacles for use with FR-4103/4104



SPECIFICATIONS For Part No. C5046

Number of Receptacles	3
Compatible Handpiece	FR-4103 see page 57 , FR-4104 see page 57 , FR-301 see page 58
Dimensions	5.13 x 4.97 x 4.83 in. / 130 x 126 x 111 mm
Receptacle	B5228 (For FR-410/FR-301)
Oval Nozzle Positioning Jig	B5230 (For FR-410), B5231 (For FR-301)



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You've Come to Expect from HAKKO.



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Continually striving to put a smile on our customers' faces has always been our number one priority. You can hear it when you call into our customer service and you can see it on our products. Our process for creating a better product always starts with the customer and we'd like to involve them in on that process as much as possible. The Hakko Tips E-Newsletter is our way to **connect** them to that experience, to **inform** them, and let them **grow** with us.



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American Hakko Products, Inc. with the mission of building a better **future** for younger generations, is dedicated to the community, universities and schools whose main focus is on engineering where people come from all walks of life to build something together. Over the years we've prided ourselves in assisting in this endeavor by inspiring and **empowering** the next generation to **embrace** their skills of soldering using Hakko products.



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