

FR-301

Nozzle quick change type

Portable Desoldering Tool

Nozzle included



- Power switch and adjustable temperature control built in the handle
- Use of high thermal efficiency N61 series nozzles
- Reduction of solder clogging by improved heating core (in comparison with the previous model)

Packing List

FR-301	Unit, Pre-filter, Ceramic paper filter (L, qty 2), Nozzle wrench, Iron holder (simple type), Cleaning pin for heating core, Cleaning pin for ø1 mm nozzle, Instruction manual
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Specifications

Model No.	FR-301
Power consumption	110 W (50/60 Hz)
Temperature range	350 to 500 °C
Nozzle to ground resistance	<2 Ω
Nozzle to ground potential	<2 mV
Vacuum generator	Diaphragm pump
Vacuum pressure	81 kPa (610 mmHg)
Suction flow	11 L/min.
Heating element	Ceramic heater
Standard nozzle	ø1 mm (No.N61-08)
Dimensions	215 (W) × 226 (H) mm (with ø1 mm (No.N61-08) nozzle)
Weight*	0.52 kg (with ø1 mm (No.N61-08) nozzle)

* Without cord



Provided in a carrying case

Features

Easy temperature control

LED indicators let you easily see when the heater is active and idling at your temperature setting.

Temperature range

- Setting 1 350°C
- Setting 2 400°C
- Setting 3 450°C
- Setting 4 500°C



Quick change nozzle replacement with special tools

- Provided nozzle wrench



- Optional accessory Nozzle quick changer

Quick and safe nozzle replacement with nozzle quick changer

* It can't be used for the previous model (FR-300).

Nozzle quick changer for FR-301: part No. C5046



* The positioning jig (No. B5231) is separately required for oval type nozzle.

A wide selection of nozzles (N61 series)

SS type nozzles
for micro land patterns



Oval shape nozzles
for flat terminals



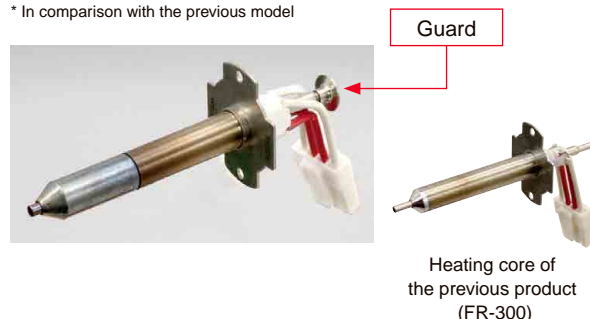
Long type nozzles
for narrow space



Reduction of solder clogging by improved heating core

This additional guard prevents a temperature drop of the heating core by making contact with the front holder and it enables to reduce solder clogging.

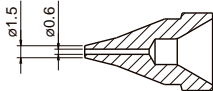
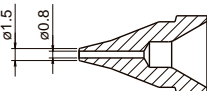
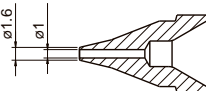
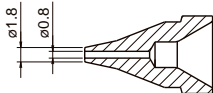
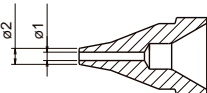
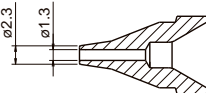
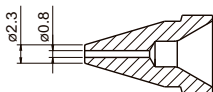
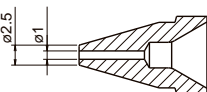
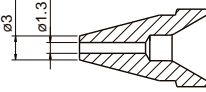
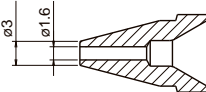
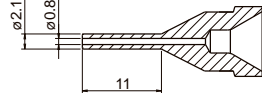
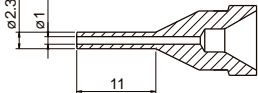
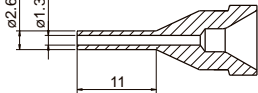
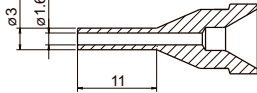
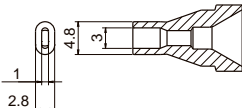
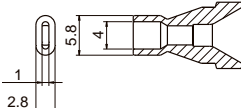
* In comparison with the previous model



Heating core of
the previous product
(FR-300)

Replacement Nozzles

Unit : mm

SS type	N61-01	N61-02	N61-03	
				
S type	N61-04	N61-05	N61-06	
				
Standard type	N61-07	N61-08	N61-09	N61-10
				
Long type	N61-11	N61-12	N61-13	N61-14
				
Oval type	N61-15	N61-16		
				
* N61 series nozzles can also be used for FR-410 desoldering station.				

* N61 series nozzles can also be used for FR-410 desoldering station.

FR-400 ESD SAFE

Nozzle quick change type



Heavy Duty Desoldering Tool

Digital

Nozzle included

Power Consumption
300 W



- 300 W heavy duty desoldering tool with built-in vacuum pump
- Secure desoldering with valve function
- Reduction of solder clogging
- Improvement in maintainability

FR-410 ESD SAFE

Nozzle quick change type

High-Power Desoldering Tool

Digital

Nozzle included

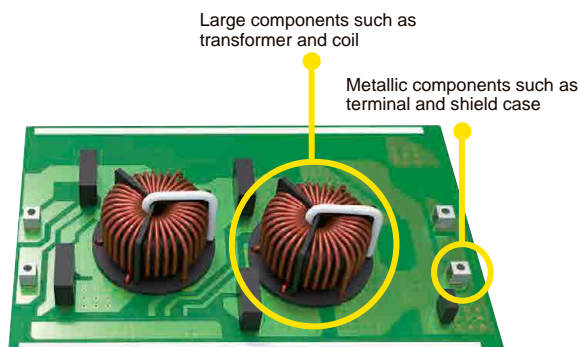
Power Consumption
140 W



- 140 W high power enables perfect desoldering for the components on multi-layer P.W.B.
- A wide selection of nozzles is available for a variety of desoldering works.

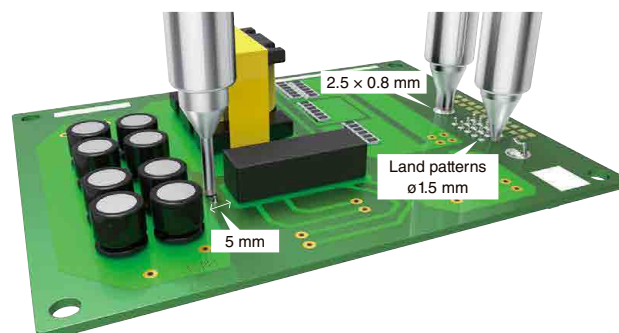
Feature of FR-400

300 W tremendous power makes incredible heating.

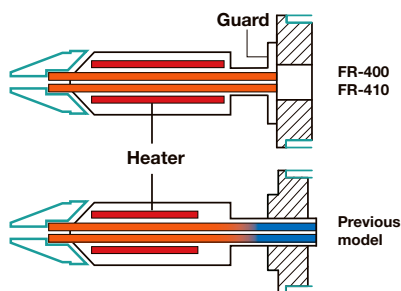


Feature of FR-410

A wide selection of nozzles is available for a variety of desoldering works.



Common Features of FR-400 and FR-410



Secure desoldering, valve function that suctions with high pressure

Suction starts 0.2 seconds after pulling the trigger for instance and high pressure suction to achieve complete desoldering.

Improvement in heating core

Heating ability for backside of heating core is increased to ensure suctioned solder be carried to filter pipe and avoid solder clogging.

Featuring ACF (Anti Clogging Function)

ACF ensures suctioned solder be carried to filter pipe by keeping pump running for a second after releasing trigger.

Reduction of solder clogging by improved heating core

The additional guard prevents a temperature drop of the heating core by making contact with the front holder and it enables to reduce solder clogging.

* In comparison with the previous model

Improvement in maintainability

■ Easy heater replacement



■ Tool box for maintenance kit



■ Quick change nozzle replacement with optional accessory

Quick and safe nozzle replacement with nozzle quick changer
* It can't be used for previous desoldering tools (FR-4001 or FR-4101).

Nozzle quick changer for FR-4003: Part No. C5045

Nozzle quick changer for FR-4103: Part No. C5046



* The positioning jig below is separately required for oval type nozzle.

Oval nozzle positioning jig: part No.B5229 for FR-4003
part No.B5230 for FR-4103

Packing List

FR-400	Station, Desoldering tool (FR-4003), Power cord, Iron holder (with cleaning wire), Tool box (Cleaning pin for ø1 mm, Cleaning pin for heating element, Cleaning drill for ø1 mm, Nozzle wrench, Filter [qty 2], Ceramic paper filter [qty 4]), Instruction manual
FR-410	Station, Desoldering tool (FR-4103), Power cord, Iron holder (with cleaning wire), Tool box (Cleaning pin for ø1 mm, Cleaning pin for heating element, Cleaning drill for ø1 mm, Nozzle wrench, Filter [qty 2], Ceramic paper filter L [qty 4]), Instruction manual

Specifications

Model No.	FR-400	FR-410
Power consumption	320 W	190 W
Temperature range	350 to 500 °C	330 to 450 °C
Temperature stability	±5 °C at idle temperature	±5 °C at idle temperature

Station

Output voltage	AC 29 V	AC 24 V
Vacuum generator	Vacuum pump, double cylinder type	Vacuum pump, double cylinder type
Vacuum pressure	80 kPa (600 mmHg, max.)	80 kPa (600 mmHg, max.)
Suction flow*	15 L / min.	15 L / min.
Dimensions	166 (W) × 137 (H) × 264 (D) mm	165 (W) × 137 (H) × 244 (D) mm
Weight	5.7 kg	4.8 kg

Desoldering Tool

Power consumption	300 W (29 V)	140 W (24 V)
Nozzle to ground resistance	<2 Ω	<2 Ω
Nozzle to ground potential	<2 mV	<2 mV
Heating element	Composite heater	Composite heater
Standard nozzle	ø1 mm (No. N60-02)	ø1 mm S type (No. N61-05)
Cord length	1.2 m	1.2 m
Total length**	183 mm (with ø1 mm nozzle)	168 mm (with ø1 mm S type nozzle)
Weight**	270 g (with ø1 mm nozzle)	190 g (with ø1 mm S type nozzle)

* The suction flow is measured at the filter case suction port of station.

** Without cord and hose

Replacement Nozzles for FR-400

Unit : mm

N60-01 Nozzle $\phi 0.8$ 	N60-02 Nozzle $\phi 1$ 	N60-03 Nozzle $\phi 1.3$ 	N60-04 Nozzle $\phi 1.6$ 	N60-05 Nozzle $\phi 2$
N60-06 Nozzle $\phi 2.6$ 	N60-07 Nozzle $\phi 3$ 	N60-08 Nozzle 4.2 x 1.5 	N60-09 Nozzle 6.2 x 1.5 	

Replacement Nozzles for FR-410

Unit : mm

SS type N61-01 	N61-02 	N61-03 	
S type N61-04 	N61-05 	N61-06 	
Standard type N61-07 	N61-08 	N61-09 	N61-10
Long type N61-11 	N61-12 	N61-13 	N61-14
Oval type N61-15 	N61-16 	<p>* N61 series nozzles can also be used for FR-301 desoldering tool.</p>	

FM-204 ESD SAFE

Composite-type Desoldering Tool Digital

Nozzle not included



- Vacuum pump built-in type desoldering tool
- Digital display ensures easy and reliable temperature control.
- Sleep function that works with iron holder prevents nozzle oxidation.

Packing List

FM-204	Station, Iron holder, Ceramic paper filter (10 pcs), Cleaning drill for heating element, Filter pipe assembly (1 pc), Control card, Power cord, Connecting cable, Nozzle remover, Desoldering tool (FM-2024), Handle for gun configuration, Instruction manual
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Features

Replacing the handpiece enables soldering.

■ Soldering

■ N₂ System (P.38 & P.39)



Specifications

Model No.	FM-204
Power consumption	120 W
Temperature range	FM-2024: 350 to 450°C FM-2026/2027: 200 to 450°C
Temperature stability	±5°C at idle temperature

Station

Output voltage	AC 24 V
Vacuum generator	Vacuum pump, double cylinder type
Vacuum pressure	80 kPa (600 mmHg, max.)
Suction flow*	15 L/min.
Dimensions	160 (W) × 120 (H) × 225 (D) mm
Weight	3.7 kg

Desoldering Tool

Power consumption	70 W (24 V)
Nozzle to ground resistance	<2 Ω
Nozzle to ground potential	<2 mV
Heating element	Composite heater
Cord length	1.2 m
Total length**	180 mm (with ø1 mm nozzle)
Weight**	65 g (with ø1 mm nozzle)

* Measured at the filter case suction port of the station.

** Without cord and hose

Optional Nozzles for FM-204

Unit : mm

N3-06 Nozzle ø0.6 	N3-08 Nozzle ø0.8 	N3-10 Nozzle ø1 	N3-13 Nozzle ø1.3 	N3-16 Nozzle ø1.6
N3-20 Nozzle ø2 	N3-23 Nozzle ø2.3 	N3-L10 Nozzle ø1 long 		

SPPON

Desoldering Tool

Nozzle included



- Light-weight and simplified desoldering tool with high suction power
- Use a cleaning shaft that enables the nozzle to be cleaned after each use
- Nozzles can be easily replaced.

Replacement Nozzles

Unit : mm

Part No.	Figure	Adaptation products
18-N		No.18, 18G
20-N		No.20, 20G
DS01-N		No.DS01P

Specifications

Part No.	Absorption capacity
18	12 cm ³ (12 cc)
18G	12 cm ³ (12 cc) with guard
20	20 cm ³ (20 cc)
20G	20 cm ³ (20 cc) with guard
DS01P	28 cm ³ (28 cc)

WICK

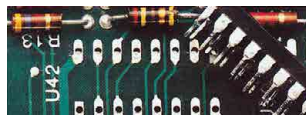
Desoldering Wire



- Economical and easy-to-use desoldering wire
- ESD SAFE package

Features

Through-hole solder removal



Bridging solder removal



Specifications for FR-150

Flux type	ROL0 (IPC J-STD-004)
Halide content	0.00% (JIS Z 3197)
Copper plate corrosion	pass (JIS Z 3197)

Size

No clean type (halogen free)

Part No.	Description
FR150-81	0.7 mm × 1.5 m
FR150-82	1 mm × 1.5 m
FR150-83	1.5 mm × 1.5 m
FR150-84	2 mm × 1.5 m
FR150-85	2.5 mm × 1.5 m
FR150-86	3 mm × 1.5 m

Unflux type (unflux)

Part No.	Description
FR140-81	0.7 mm × 1.5 m
FR140-82	1 mm × 1.5 m
FR140-83	1.5 mm × 1.5 m
FR140-84	2 mm × 1.5 m
FR140-85	2.5 mm × 1.5 m
FR140-86	3 mm × 1.5 m

FR-830 ESD SAFE

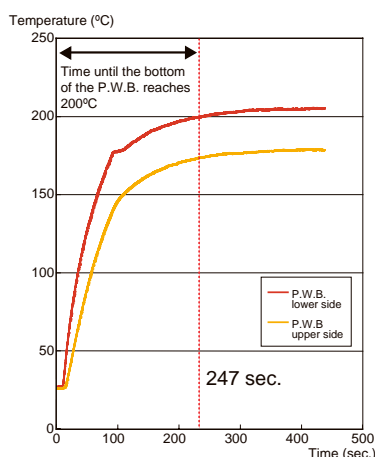
Preheater **Analog**



- Compact pre-heater best suited for heat processing on localized areas
- Featuring quick heatup and less variations in temperature

Features

Preheating in a short time



Test criteria

Measurement method	Temperature measured using sensors mounted on both the top and bottom surfaces of the P.W.B.
Distance between air outlet and P.W.B.	10 mm
Temperature setting	300°C

Set up example with omnivise

- The height can be adjusted to 72.5 mm, 78 mm, 84.5 mm, 91 mm and 97.5 mm.
- The jaws are padded to preclude damage to delicate objects.
- Full rotations of 360° are available without interference.



Packing List

FR-830	Unit, Power cord, Instruction manual
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Specifications

Model No.	FR-830
Power consumption	250 W
Air flow	0.15 m³/min. (fan capability)
Temperature range	150 to 300°C (above the hot air outlet)
Dimensions*	140 (W) × 75 (H) × 185 (D) mm
Weight	0.75 kg

* The height (H) is the distance from the bottom of the feet to the top of the exhaust outlet.

Option

Part No.	Name	Specifications
B3263	Extension pipe	with lid
B2763	Hand switch	—
B1649	Foot switch	—
C1390C	Omnivise	qty 1

FR-810B ESD SAFE

Hot-Air SMD Rework Station **Digital**

Nozzle included



- High volume airflow and high output for a various kinds of rework
- Full digital control of temperature, airflow, and time
- Simple nozzle removal and easy maintenance
- The vacuum pick-up function with an indicator ensures safety for the components and P.W.B.

FR-811 ESD SAFE

Hot-Air SMD Rework Station **Digital**

Nozzle not included



- Possible to make full-scale thermal profiles with 6-zone hot air and a bottom heater
- Possible to measure and record temperature of components and P.W.B. with type K thermocouple
- The dedicated software to link a station and a computer for easy and quick settings
- Easy data transfer through an USB cable

Common Features of FR-810B and FR-811

New user friendly functions for SMD rework

Pickup indicator

The indication comes up and the moment of picking up will be visible.



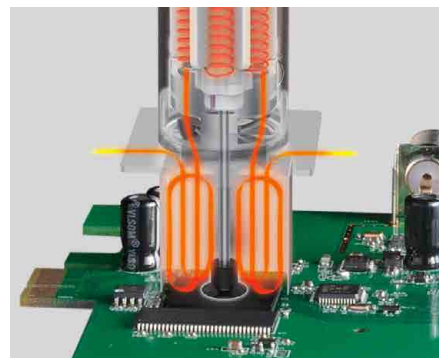
Vacuum pickup function

This can avoid an error to peel off the land by removing components with excessive force.



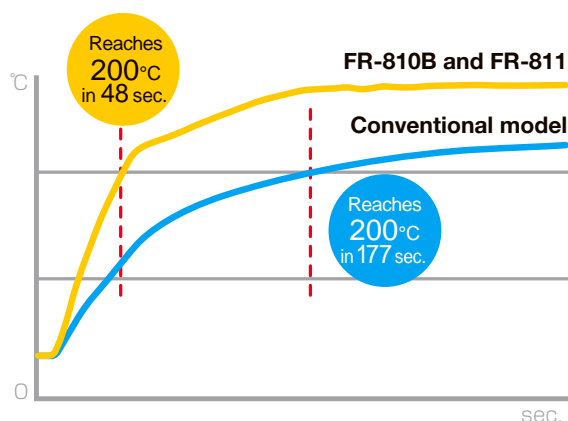
New type of nozzles

The new nozzles improve work efficiency with uniform heating (only with BGA nozzles).



Efficiency improvement

The high volume airflow and high output of FR-810B and FR-811 make it possible to perform the same work in only one-third of the time required when using a conventional model. This reduces the thermal impact on boards and components.



Test criteria

Model	FR-810B	Conventional model
Measurement method	Examination of time taken for connector sections soldered onto a ceramic board to be heated 200°C	
Board	Ceramic board	
Component used	Connector	
Nozzle shape	N51-02	A1130
Temperature setting	600°C	500°C
Air flow setting	9 (115 L/min.)	20 L/min.

Quick-change N51 nozzles



Simple heater replacement



Specifications

Port No.	FR-810B	FR-811
Power consumption	1200 W	
Temperature range	50 to 600°C	

Station

Power consumption	30 W	
Air flow*	1 to 9 (5 to 115 L/min.)	001 to 100% (5 to 115 L/min.)
Dimensions	160 (W) × 145 (H) × 220 (D) mm	
Weight	1.5 kg	

Handpiece

Power consumption	1170 W	
Standard nozzle	ø4 mm (No. N51-02)	—
Total length**	250 mm	
Weight**	180 g	

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

** Without cord

Packing List

FR-810B	Station with handpiece, Nozzle (ø4 mm), Handpiece holder, Vacuum pipe control knob L (with screw), Pads (qty 2 each of ø3 mm, ø5 mm, ø7.6 mm), Heat resistant pad, Power Cord, Temperature distribution chart, Instruction manual
FR-811	Station with handpiece, Grip stand assembly, Vacuum pipe control knob L (with screw), Pads (qty 2 each of ø3 mm, ø5 mm, ø7.6 mm), USB cable, Software (CD-ROM), Thermocouple, Heat resistant pad, Power Cord, Temperature distribution chart, Instruction manual

Option

Part No.	Name	Specifications
C5027	Board holder	—
C5028	Grip fixture M	With hexagon wrench, o-ring and tray
C5029	Grip fixture L	With hexagon wrench and o-ring
B5098	Board clip	—
B5136	Board support unit	—
C5013*	Bottom heater	For FR-811

* Please ask about correct part number to the nearest HAKKO dealer or distributor in your area.

Hot-Air SMD Rework Station

Common Features of FR-810B and FR-811

Auto sleep and auto shutoff features

To ensure safety and conserve power, when the handpiece is placed in the handpiece holder, the auto sleep function is activated and it starts cooling automatically.
If the handpiece has not been removed from the handpiece holder (example: using it in a rework fixture) and after it has been idle for 30 minutes, auto shutoff function is activated. It is automatically powered off.
Access to settings can be restricted via the password function for easy management.



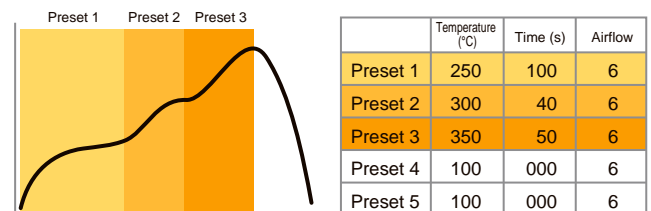
Handpiece holder No.B5048 in the picture can be attached to FR-811 as well (option).

Preset mode

	Preset 1	Preset 2	Preset 3	Preset 4	Preset 5
Temperature (°C)	250	300	350	400	450
Time (sec.)	100	80	50	120	150
Airflow (level)	6	7	8	4	5

Chain presets function for making a simple thermal profile

The chain presets function is to make a simple thermal profile by combining several preset conditions (up to 5 steps).



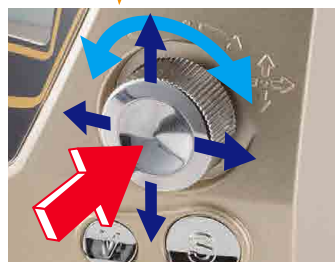
* Presets 4 and 5 have been set to "000", so they are skipped.

Features of FR-811

Interface designed for intuitive operation. Possible to link to a PC.



Easy-to-read LCD



Easy-to-operate multi-direction control knob



A USB device terminal for easy data transfer

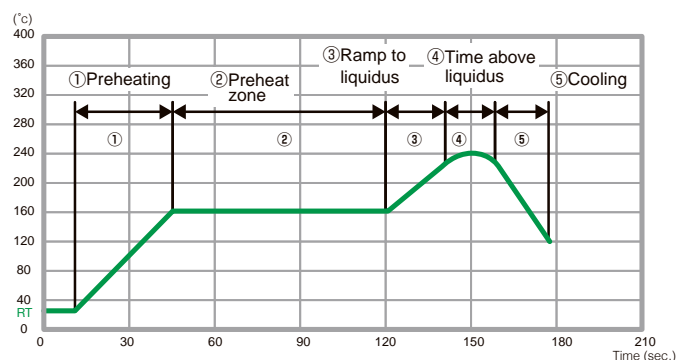


Link to a PC (A USB I/F terminal available)

The functions needed for SMD rework are in a compact body.

Possible to make full-scale thermal profiles with 6-zone hot air and a bottom heater

A basic thermal profile is composed of the 5 parts shown below. FR-811 can provide 6 zones in which temperature, time, and airflow are controlled. Therefore FR-811 can make a full-scale thermal profile which is close to reflow profiles made by a reflow oven.



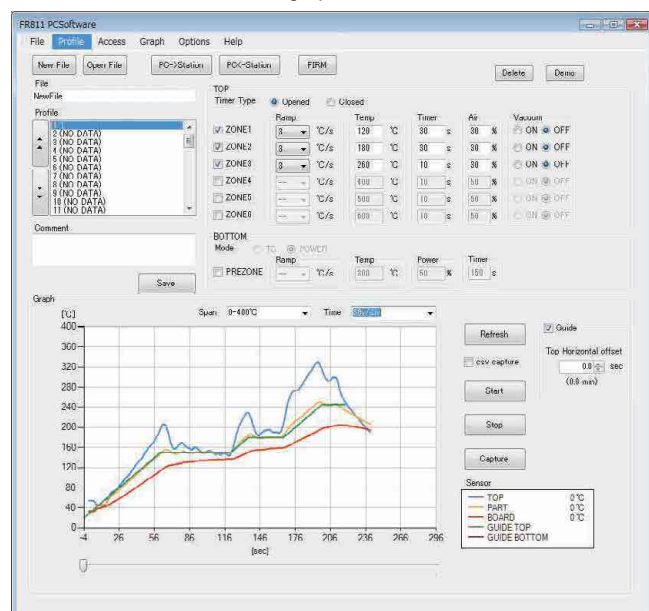
Record thermal data

By connecting a thermocouple included with FR-811, the temperature of the component or circuit board can be measured and recorded. In addition, if "TC LINK" is set, the heater output can be automatically controlled so that the temperature of the thermocouple attached to the component or circuit board follows the set profile.



Operation on a PC for various settings

By connecting FR-811 and a computer with a USB cable and using the dedicated software which comes as standard, a set thermal profile and actual temperature change can be shown in a graph in real time. The set values and graph can be saved in csv format.



Linked operation with the bottom heater

FR-811 can control on/off timing and output of the bottom heater which is available optionally.



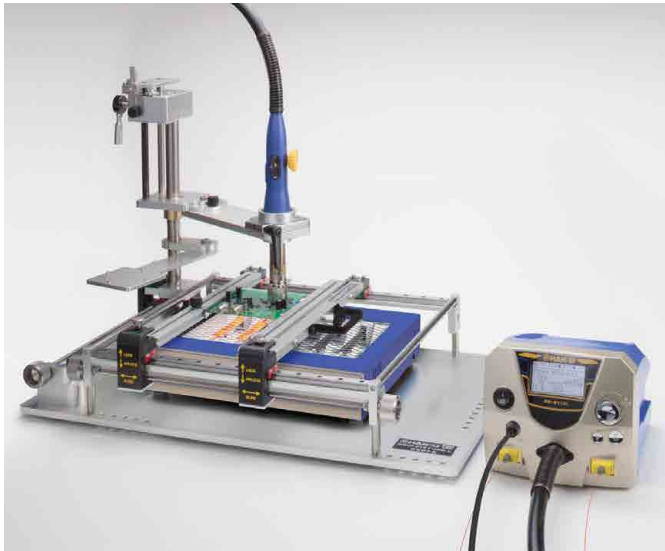
Hot-Air SMD Rework Station

Common Features of FR-810B and FR-811

Assembly of a low-cost SMD rework system

A low cost rework system can be assembled with a bottom heater, a grip fixture, and a board holder.

* The following pictures are set-up examples.



Option

Grip Fixture L

No.C5029



A board holder can be easily attached to the large baseplate.

Grip Fixture M

No.C5028



Recommended if a bottom heater is not required or in case of use of a bottom heater other than the dedicated model for FR-811.

The dedicated bottom heater for FR-811



Equipped with carbon heaters. Heating area is divided into 2 sections.

Board Holder

No.C5027



Makes it easy to set and remove a P.W.B. and to make fine adjustments after setting.

Board Clip

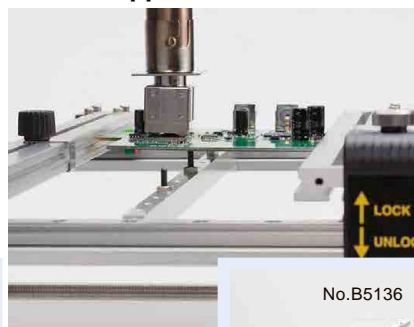
No.B5098



Accepts even irregular-shaped P.W.B.

Board Support Unit

No.B5136



Supports P.W.B. from underneath to minimize its warping.

Option

Temperature probe for hot air station

Possible to measure the temperature of hot air with using thermometer and temperature probe.

It is also possible to measure the temperature of workpieces with using thermometer and Sensor B (No. A1557) which comes with No. C1541.



Optional Nozzles (Quick-change type) for FR-810B, FR-811 and FR-702

Unit: mm

Single	N51-01* Single 2.5	N51-02 Single 4	N51-03 Single 5.5	N51-04 Single 7	N51-05* Bent Single 1.5 × 3

BGA	N51-10 BGA 4 × 4	N51-11 BGA 6 × 6	N51-12 BGA 8 × 8	N51-13 BGA 10 × 10	N51-14 BGA 12 × 12
N51-15 BGA 14 × 14	N51-16 BGA 15 × 15	N51-17 BGA 17 × 17	N51-18 BGA 18 × 18	N51-19 BGA 20 × 20	
N51-20 BGA 22 × 22	N51-21 BGA 24 × 24	N51-22 BGA 27 × 27	N51-23 BGA 29 × 29	N51-24 BGA 35 × 35	
N51-25 BGA 38 × 38	N51-26 BGA 40 × 40				

* The vacuum function does not operate with these nozzles.

Single nozzle set (N51-01, N51-03, N51-04, and N51-05) is also available.

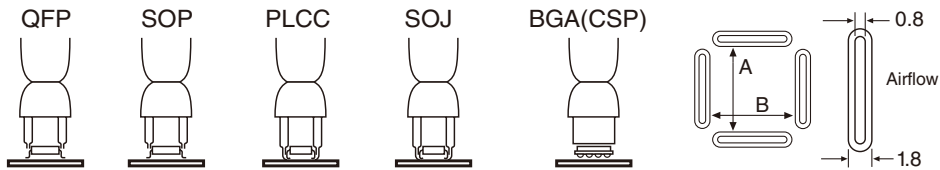
* N51-02 included with FR-810B



Hot-Air SMD Rework Station

Optional Nozzles (Conventional type) for FR-810B, FR-811 and FR-702

Unit: mm



The size in each description indicates the size of the package.

QFP and BQFP

A1125B QFP 10 × 10 A: 10.2 B: 10.2	A1262B QFP 12 × 12 A: 12.2 B: 12.2	A1126B QFP 14 × 14 A: 15.2 B: 15.2	A1128B QFP 14 × 20 A: 15.2 B: 21.2	A1127B QFP 17.5 × 17.5 A: 19.2 B: 19.2
A1261B QFP 20 × 20 A: 20.2 B: 20.2	A1129B QFP 28 × 28 A: 29.7 B: 29.7	A1263B QFP 28 × 40 A: 27.7 B: 39.7	A1265B QFP 32 × 32 A: 32.2 B: 32.2	A1203B QFP 35 × 35 A: 35.2 B: 35.2
A1264B QFP 40 × 40 A: 40.2 B: 40.2	A1215B QFP 42.5 × 42.5 A: 42.5 B: 42.5	A1180B BQFP 17 × 17 A: 18.2 B: 18.2	A1181B BQFP 19 × 19 A: 19.2 B: 19.2	A1182B BQFP 24 × 24 A: 24.2 B: 24.2




SOP and TSOL

A1131* SOP 4.4 × 10 4.8	A1132* SOP 5.6 × 13 5.7	A1133* SOP 7.5 × 15 7.2	A1134* SOP 7.5 × 18 7.2	A1258B SOP 7.6 × 12.7 8.2
A1260B SOP 8.6 × 18 8.7	A1257B SOP 11 × 21 11.7	A1259B SOP 13 × 28 13.5	A1185B TSOL 13 × 10 11.9	A1186B TSOL 18 × 10 18.2
A1187B TSOL 18.5 × 8 18.5				






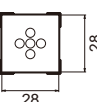
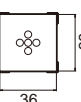
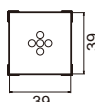

PLCC

A1188B PLCC 9 × 9 (20 pins) A: 11 B: 11	A1140B PLCC 11.5 × 11.5 (28 pins) A: 13 B: 13	A1141B PLCC 11.5 × 14 (32 pins) A: 15 B: 13	A1139B PLCC 12.5 × 7.3 (18 pins) A: 9 B: 14	A1135B PLCC 17.5 × 17.5 (44 pins) A: 18.5 B: 18.5
A1136B PLCC 20 × 20 (52 pins) A: 21 B: 21	A1137B PLCC 25 × 25 (68 pins) A: 26 B: 26	A1138B PLCC 30 × 30 (84 pins) A: 31 B: 31	A1189B PLCC 34 × 34 (100 pins) A: 36.5 B: 36.5	



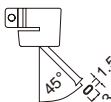

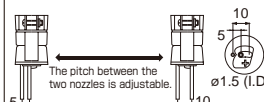
SOJ

A1214B SOJ 10 × 26	A1183* SOJ 15 × 8	A1184B SOJ 18 × 8
		

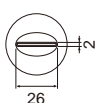
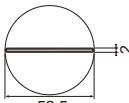
BGA

A1470 BGA 8 × 8	A1471 BGA 12 × 12	A1472 BGA 13 × 13	A1473 BGA 15 × 15	A1474 BGA 18 × 18
				
A1475 BGA 27 × 27	A1476 BGA 35 × 35	A1477 BGA 38 × 38	A1478 BGA 40 × 40	
				

Single

A1124B* Single 2.5	A1130* Single 4.4	A1142B* Bent single 1.5 × 3	A1190* Dual single 2.5 × 9.5	A1325* Dual single ø1.5 × 5 to 10 Adjustable pitch
				

SIP

A1191* SIP 25L	A1192* SIP 50L
	

* The vacuum function does not operate with these nozzles.